Chapter 4

IMPACT OF INTERNET ON LIBRARIES
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CHAPTER 4
IMPACT OF INTERNET ON LIBRARIES

4.1 INTRODUCTION

Internet is perhaps the most important development in the field of information technology that has been described as arguably the most complex structure yet discovered in the world. Internet, an open computer communication infrastructure and a network of networks also known as the Cyberspace, Information Superhighway, the Net, etc., has enabled global level inter-connectivity of computers and computer networks. A traditional avenue for sharing research data and information, Internet has brought in a new era in global communications.

The growth of Internet has been global, continuous and rapid. In 1991, Internet was available in only 73 countries; 100 countries accessed it in 1993; it reached 148 countries in 1995 and over 160 countries around the world in 1996. In 1999, its reach extended to 214 countries and territories. The number of host computers and the users are almost doubling every year. The Internet Architecture Board, one of the three erstwhile managing bodies of the Internet Society, has estimated a monthly growth rate of 10-15 per cent for computer hosts. It is providing connectivity to over 100 million users. And in North America alone, the Internet has over 4.6 million hosts and about 40 million users. At present it has a base of about 6.8 million subscribers which is expected to reach 20 million by the turn of the century. The publicly indexable Web (excluding pages that are not normally considered for indexing by search engines, such as pages with authorisation requirements, pages hidden behind search forms, etc) in February 1999 contained about 800 million pages (320 million in December 1997) amounting to about 6 Terabytes of data on about 3 millions servers. It was also reported that six search engines namely, AltaVista, Excite, HotBot, Infoseek, Lycos, and NorthernLight cover about 60 per cent of the Web (Lawrence and Giles, 1999).
As per the Internet domain survey of the Internet Software Consortium (www.isc.org/dsview.cgi?domainsurvey/) of January 2000, there are 72.4 million host computers directly hooked to it (as against 29.7 million hosts in January 1998) up from less than three-fourth's of a million in 1992 (Table 4.1). Currently 100 million people are connected to Internet. The registered domains (level 2) increased from 11 millions in January 1998 to 18.9 millions in July 1999. United States of America alone accounted for over 36.2 million hosts followed by Japan, the United Kingdom, Germany, Canada, and Australia. The number of host computers as a proportion of population is also rising steadily; from about 1,000 in 1995 to about 5,500 in 1998 per one million population. As of July 1999, with about 5,77,000 host computers (~11 for every thousand population) Finland tops the list of hosts per thousand population. There have been tremendous developments in the area of transmission speeds at which the information/data files are transmitted over the Net. Initially the transmission speed used to be 64 kbps; this reached 1.5 Mbps in 1993, to 622 Mbps by late 1990s (in developed countries) and is leaping towards Gbps rates.

Table 4.1: Growth of Internet hosts during 1991-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Internet hosts</th>
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<tbody>
<tr>
<td>1991</td>
<td>3,76,000</td>
</tr>
<tr>
<td>1992</td>
<td>7,27,000</td>
</tr>
<tr>
<td>1993</td>
<td>13,13,000</td>
</tr>
<tr>
<td>1994</td>
<td>22,17,000</td>
</tr>
<tr>
<td>1995</td>
<td>58,46,000</td>
</tr>
<tr>
<td>1996</td>
<td>1,43,52,000</td>
</tr>
<tr>
<td></td>
<td>1,67,29,000*</td>
</tr>
<tr>
<td>1997</td>
<td>2,18,19,000</td>
</tr>
<tr>
<td></td>
<td>2,60,53,000*</td>
</tr>
<tr>
<td>1998</td>
<td>2,96,70,000</td>
</tr>
<tr>
<td></td>
<td>3,67,39,000*</td>
</tr>
<tr>
<td>1999</td>
<td>4,32,30,000</td>
</tr>
<tr>
<td></td>
<td>5,62,18,000*</td>
</tr>
<tr>
<td>2000</td>
<td>7,23,98,092</td>
</tr>
</tbody>
</table>

Note: Adapted from Internet domain surveys (www.nw.com and www.isc.org); the data marked with asterisk (*) is the status in the month of July in that year.
Using Internet one can explore a museum (www.amnh.org), educate kids (www.exploratorium.edu; kids.earth.nasa.gov; www.hhmi.org/coolscience), find answers to questions (whyfiles.news.wise.edu; www.howstuffworks.com), get answers to science queries from over 500 scientists from all over the world (www.madsci.org), explore the universe (www.marsnews.com; www.spaceflight.nasa.gov; space.jpl.nasa.gov) and the earth (www.glacier.rice.edu; www.nationalgeographic.com), and get to know about health and medicine including visual science (www.cellsalive.com; www.intelihealth.com; www.pregnancycalender.com/first9months).

Internet also holds guides to techno-commercial information sources. Important Web-based information resources in medicine, pharmacy, business management, education and research, environmental science, energy and environment, health science, higher education, management, economics, etc have been dealt by various authors (see various papers in Kumar and Vashishth, 1999). Although it contains only a fraction of one per cent of the world’s publicly available data, it is tripling in size each year and in six or so years it will be growing a thousand fold. According to an observation, in five years from now, 80 per cent of publicly available data will be on the Net (quoted in Cronin and McKim, 1996, p. 164). In fact, Internet users are already buckling under the information overload and are using metadata sites and a host of information search engines to browse through the myriads of information haystack.

Internet offers a variety of technologies to access the information, and these are changing rapidly. Starting with basic tools like e-mail, Telnet, and FTP, Internet has shifted emphasis to navigation aids like Wide Area Information Servers (WAIS), Archie, Mosaic, Usenet, Gopher, and the consumer-oriented home pages of the World Wide Web (WWW or simply the Web). Gopher, Usenet, Archie and WAIS were popular before the advent of WWW, which provides most of these facilities, and hence these are less used now. Many authors discussed in detail about the various Internet tools and their usage (for example, Curtois, 1994 & 1996; Curtois and Baer, 1995; Fazuluddin
Internet provides various search tools to facilitate easy searching and location of required information. A number of search engines are available which include AltaVista (www.altavista.digital.com), Excite (www.excite.com), HotBot (www.hotbot.com), InfoSeek (www.infoseek.com), Lycos (www.lycos.com), WebCrawler (www.webcrawler.com), WWW Worm (www.goto.com) etc. Many of these cover Web and Usenet newsgroups. They index full text of documents, allow Boolean search by term, keyword or phrase. Some cover URLs and some HTML documents. Subject directories (also called as meta sources) catalogue Internet resources, organise these into hierarchical subject groups and provide hypertext links to individual sites. They categorise resources by subject and resource type and are excellent starting points for searching Internet. Yahoo! (www.yahoo.com), Magellan (www.Mckinley.com), Galaxy (galaxy.einet.net) are omnibus directories covering all areas, while resource- and subject-specific directories are maintained by professional societies. Meta search tools like DogPile (www.dogpile.com), MetaCrawler (www.metacrawler.com), MetaFind (www.metafind.com), and ProFusion (profusion.ittc.ukans.edu) save the time of the surfer by sending queries simultaneously to multiple Web search tools and directories, integrating search results, removing duplicates and presenting the final results in a systematic manner (Rajashekar, 1999).

The growing importance of Internet can be observed from the coverage of Internet and related literature in primary scientific journals. It has become so all-pervasive that apart from existing journals (including special issues), a number of periodicals like Internet Librarian, Web Librarian, Electronic Research Librarian, Electronic Commerce World (monthly), International Journal of Electronic Commerce, The EM-Electronic Markets Newsletter (quarterly), etc devoted to Internet and e-commerce have been started.
4.1.1 Internet 2

The astounding monthly growth rate of 10-20 per cent and the ever growing use of Internet resulted in congestion leading to the unreliable transmission of data and packet loss. Further, Internet cannot prioritise traffic thus reducing quality of critical applications. For example, while telephony and videoconferencing need steady transmission, these are treated on par with e-mail, gossip, or games which are non-serious in nature. Security is another inherent problem of Internet. These factors coupled with the growing business applications lead to the conclusion that Internet would collapse and so not suitable for future networks. While the power of CPU doubles every 18 months, the bandwidth is doubling every 6 months and as such is no longer a problem in a high-speed network. Data traffic is growing at a faster rate than voice traffic and by the year 2003, it is expected that 25 per cent of the estimated 93 million fax transmissions will be carried over by Internet (Cameron, 1999, p. 117).

The frustration encountered by research and academic institutions, as a result of overloaded backbone of Internet which is not developing as fast as needed to meet the rapidly evolving advanced common needs of research and education, made it necessary to take up initiatives and projects towards overcoming the bottlenecks. These include the Internet 2 and the Next Generation Internet Initiative of USA, CA*net II and CA*net 3 of Canada, MirNet of Russia, Asia Pacific Advanced Network of South Korea, and initiatives by Singapore, Australia and Japan.

Internet 2 which began in the last quarter of 1996, is a collaborative effort of 34 US academic and research institutions (which has swelled to 135 now) working with industry and government. It is aimed at developing and implementing advanced high speed network technology and applications that are vital to research and education missions of higher education without the bandwidth constraints and traffic congestion of today’s Internet. Internet 2 is being built on the present Internet with a view to be a test bed for advanced research applications. It is not a replacement of the existing
Net, but enhancement of its capabilities and is a project of the University Corporation for Advanced Internet Development (UCAID). Internet 2, when fully in place without any bandwidth problems would facilitate advanced applications such as human-to-human, human-to-computer and computer-to-computer interaction. Applications like high quality full motion video, telelearning, real-time digital libraries, teleinstrumentation, telemedicine, datamining, voice over Internet Protocol (VOIP), and many others are possible besides applications to manufacturing, architecture, military, arts and humanities (see Chapter 5 in Cameron, 1999).

4.2 INTERNET AND LIBRARIES

User applications on Internet cover a whole gamut of subject fields and areas—advertising, business, commerce, culture, education, finance, research, recreation, science and technology and so on. The avenues for exploitation of Internet resources by libraries are unlimited and endless. It provides access to a variety of commercial and non-commercial information sources including bibliographic and full-text databases, table of contents of primary journals, electronic and online journals, books and newsletters, library catalogues and OPACs, graphics databases, multimedia walk through programs, and audio visual clip art databases, e-mail, directories, product catalogues, campus information systems, etc. Internet is also a test bed for electronic document delivery, electronic publishing, publicity and marketing of products and services, training and education, and integrated access to local and external information.

Internet is a resource of many varieties of information. For example, free software developed at various academic institutions and research organisations as well as by individuals is made available through Internet; newspapers, electronic shopping merchandise, product information catalogues of various institutions and organisations, bulletin board discussion forums for exchange of professional views, news and research; shareware/clipware (made available for free trial before actual purchase, albeit with deletion of important routines), research articles and preprints are a few to name. A lot of public domain software is available free of cost on various Internet sites.
which can be downloaded for personal or official usage (but not for marketing purposes).

Internet is holding enormous volumes of information in each and every field of human knowledge. It holds primary, secondary and tertiary sources of information in a wide range of subject fields and in varying formats. The primary sources available include e-journals, monographs, reports, patents, standards, individual articles and preprints, data files, etc. Other primary sources of information on Internet include home pages of various institutions, organisations and agencies. These provide important information on strengths, weaknesses, projects undertaken, subject expertise, infrastructure and resources available. Library catalogues including OPACs, bibliographies, indexes, databases of abstracts and reviews are the secondary sources available on Internet. Many major academic and special libraries, particularly from developed countries are maintaining their library catalogues on Internet. Internet also offers electronic resources including reference sources, electronic magazines (e-zines), e-journals, dictionaries, encyclopaedias, directories, etc, many of them free of charge. Many e-journals are available either freely with print versions or at nominal extra cost. Web pages or home pages of publishers and institutions provide information that may help in evaluating them. Online bookstores like Amazon.com (www.amazon.com), Barnes and Noble (www.barnesandnoble.com), BookStacks (www.books.com/scripts/default.txt) and Internet Bookshop (www.bookshop.co.uk) make acquisition of books convenient as they facilitate easy search, evaluation, sending online supply orders, etc. There are over 250 of them on Internet.

Internet provides a wealth of information for the libraries. There are many Internet sites of interest available in each and every field of knowledge (see, for example, Snavely, 1997; and Wolinsky, 1996). Internet immensely benefits all the important services offered by a library including acquisitions, cataloguing, reference services, serials, interlibrary loans, specialised resources, etc. Barbara Stewart (1996) listed over 350 sites of librarian interest in these areas. Thulasi and Rajashekar (1999) list about 80 sites that deal with acquisition, serials control, technical processing, reference
service and resource sharing. Price verification, ordering clarifications regarding price/ exchange rates, etc can be done using Internet. *Books-in-Print Online* provides all sorts of forms used by acquisitions librarian and a number of bookstores are available for ordering. When libraries have Internet connectivity, they can tune their acquisitions keeping in view what is accessible through international networks. Many OPACs hosted on the Web can help in locate a document for getting it on interlibrary loan when needed. Many cataloguing tools are online with more and more being added day by day. One can access weekly lists of Library of Congress Subject Headings. Many catalogues of OCLC, RLIN, LC. etc can be accessed which greatly simplifies cataloguing process, of course, for a fee. Listservs like AutocatT, Intercat, Serialst, Web4Libs, etc discuss various issues of cataloguing practice. Also, such connectivity, once in place, could be used for developing and offering services, both for domestic and international customers.

Internet makes it possible to keep abreast of current developments through many of its Web sites and services. Some of these services sites and services are briefly dealt here:

**World Wide Preprint Search Service**: This is a single window for searching through the most popular online scientific preprint repositories in the world. Established by the International Centre for Theoretical Physics (ICTP), Italy, the service (www.ictp.trieste.it/indexes/preprints.html) provides single keyword searching with capabilities of limiting the searches/results by year. It also has links to the world’s major preprint repository server at Los Alamos National Laboratory (xxx.lanl.gov).

**CARL UnCover**: Created through cooperative efforts of Colorado Alliance Research Libraries (CARL), UnCover indexes tables of contents of over 13,000 journals within 24 hours of their receipt. Document delivery, introduced in 1991, employs optical scanning and storing in a central computer, which handles fax transmissions to users’ fax machines. It is a very popular service with librarians; credit cards account half the transactions at US$ 10-15 per article (ucweb.carl.org/reveal/).

**Faxon Finder**: The database, created by double keyboarding of current contents and adding editorial structure for quality enhancement, includes some 10,000 most popular journals subscribed through Faxon Company and is linked to Faxon Xpress,
a twenty-four hour document delivery service. It is available on Bath Information Data Service (BIDS) Network of UK.

**Inside Information** : A service brought out by British Library Document Supply Centre (BLDSC), UK, it covers the electronic table of contents of over 10,000 of the most frequently used titles held by the Centre. This service is available on CD-ROM as well as BIDS Network. The document delivery is through BLDSC.

**SwetsScan Table of Contents** : The table of contents (www.swets.nl/sscan96.html) of over 7,000 journals received by Swets as part of their FAST consolidation service are scanned and are made available to individual libraries. The document delivery is cheaper if subscription is made through Swets (Woodward, 1991).

**ContentsFirst/ArticlesFirst** : OCLC ContentsFirst service, linked with ArticlesFirst and FastDoc, provides access to table of contents of 13,000 journals, citations to 5.5 million/articles and access to over 9,00,000 full-text documents for instant online document delivery (www.oclc.org).

**BiblioTech Review** : The primary objective of the site (www.gadgetserver.com/bibliotech) is to inform and keep abreast of current developments in the global library automation industry.

**CurrentCites** : It is a monthly bibliography of selected articles, books and electronic documents on information technology (sunsite.berkely.edu/currentcites).

**Library News Flashes** : This site (www.hwwilson.com/libnews/) of the H.W. Wilson Company, updated once a week, usually on Monday, presents very short library announcements of all kinds, chronologically with most recent listed first.

**Reference Update** : *Current Contents* of the Institute for Scientific Information (ISI) has been available on floppy discs as well as online for quite some time. Now, ISI has started the Research Alert Direct service which consists of Journal Tracker for tracking table of contents; CorporateAlert, designed for helping information centres to electronically disseminate contents and abstracts; PersonalAlert, for providing customised profile-based individualised service; ProfessionalAlert, for informing a group based on profiles; TopicsSelect, for helping retrieval of topic-specific information; and FocusOn, for covering broader areas (www.isinet.co/prodserv/rec/ru.html).

Due to inherent drawbacks of electronic information, the resources on Internet like traditional information sources need to be evaluated by the librarian to judge the
quality of contents. As anyone can publish anything on Internet, there will be a lot of variation in the quality. More over, multiplicity of information resources like e-journals, publicity/advertising material, preprints/reports, product literature, multimedia and vanity publishing led to the information over load making the problem acute. These necessitate sifting through the material to find relevant, quality information. The criteria like accuracy of data, currency of information, the standing of publisher, authority of author to write on the subject, coverage of topic, and objectivity of publication which are applied to print publications, are valid for electronic publications as well. Other aspects of evaluation of electronic resources include the scope, content, site integrity, ease of use, etc. One development that helps in identifying quality resources over Internet is the growing number of Web sites with select reviews and/or award information resources on Internet. Some sites, particularly those managed by librarians such as Argus Clearinghouse, are useful sources of evaluation of Internet resources. One of the evaluation services worth mentioning is the Scout Report, the oldest and most respected service which associates a team of librarians and subject experts for evaluation, and is published weekly on the Web and by e-mail. It contains about 9000 full-text Scout Report summaries in brief format and about 3,700 summaries in long format (as of April 2000) catalogued under 21 subject categories (of LC classification).

The large volumes of information put on the Net on a daily basis necessitates evaluation to be carried out as quickly. Methodologies have been evolved to evaluate and rate an electronic resource site available on the Internet. Many criteria for evaluation have been in practice. Some of the factors are: context, scope, content, currency, uniqueness, user-friendliness, browsability, organisation, access and connectivity, navigation, reliability, etc (see for example, Jeff Ash, Virtual libraries on the information super highway (chaos.mur.csu.edu.au/itc125/virtlibs/#contents); Best of 1996: Social sciences, humanities and Asian-Pacific studies WWW resources, 1997 (coombs.anu.edu.au/SpecialProj?QLTY/BEST/method96.html); T. Matthew Creole, Six quests for the electronic Grail: Current approaches to information quality in WWW resources, 1996 (coombs.anu.edu.au\SpecialProj/QLTY/TMC/Quest6.html); Kevin M.
Oliver, et al., Evaluating the quality of Internet information sources, 1997 (itech1.coe.uga.edu/Faculty/gwilkinson/AACE97/html); OMNI guidelines for resource evaluation. (omni.ac.uk/agec/evalguid.html); Alligator Smith (www.vuw.ac.nz/~agsmth/evalin/index.htm); Hope N. Tillamook, Evaluating quality on the Net, 1997 (www.tiac.net/users/hope/findqual.html); WWW cyberguide ratings for content evaluation (www.cyberbee.com/guide1.html); etc.

The information sources around the world are getting inter-linked through Web pages and Web servers spread around the globe. Several projects have been initiated which focus on developing digital libraries to provide remote access over Internet to very large multimedia document collections, stored on distributed servers. Web also provides information about how to access computerised library systems of universities around the world and of online bibliographic databases and libraries. Lists of online Internet public access library catalogues, databases and library newsletters are available on the Web besides the databases of well known libraries like the Library of Congress. The Telnet and Hytelnet tools facilitate accessing library resources on an easy to use menu interface. Universal resource locators on the Web allow the users to enter a Web page under an appropriate category. These also enable the users of a particular category to see related home pages. Services like CommerceNet (www.commercenet.com) allow adding the home pages to the existing indexes as well as spreading the information including printed directories. The design and development of home pages is dealt extensively in the literature (see for example, Duval and Main 1995; O’Kane 1996; and Spear 1995).

4.3 INTRANET-BASED SERVICES

4.3.1 E-mail

Electronic mail is the most commonly used service of Internet. E-mail facilitates communication with people all over the world. It made the geographical boundaries of nations shrink, as one can send mail to anyone connected to Internet wherever he is
almost instantaneously. It has become the lifeblood of Internet with millions and millions of messages exchanged across the globe daily. Internet provides several e-mail programmes, many of them free of charge, subject to certain terms and conditions of usage. These facilities are, in reality, put on by computer firms like Microsoft Network, Netscape Communications, etc. Hotmail, Lycosmail, Yahoo! and Indiamail are free whereas e-mail facilities offered by networks like CompuServeAmerica OnLine and Delphi, are subscription-based.

E-mail, in most of the cases, reduces postal delays, which otherwise is a usual phenomenon in traditional correspondence. The mail is received within seconds and it is not uncommon to receive reply in a matter of few hours (even minutes). Apart from correspondence and communication of programmes, plans, participation in meetings/conferences, etc, the important use of e-mail in library environment is in document delivery. Text and image files, downloaded from databases can be dovetailed with regular mails as attachments. Even printed pages can be scanned and sent as image files. Further e-mail facilitates online ordering, sending interlibrary-loan requested and exchange of data. Another benefit of e-mail is that it is possible to participate in a mailing list and get them free of charge. These may be used for various purposes like surveys, marketing of information services and products, etc (see Chapter 3 for a detailed discussion).

4.3.2 Bulletin Board Service

Many systems were employed to deliver information services to the home and business sectors. The videotex (like Prestel of UK and Minitel of France) and teletex are two of them. The former met with a limited success and the latter could not progress as expected due to the limitations of delivery technology. Internet has brought in the Bulletin Board Service (BBS) which have matured with the growth PCs as well as the technology. An off shoot of the e-mail facility, BBS is essentially a many-to-many e-mail system (Buckland, 1987). Much before the Internet became popular and widely
acceptable, WELL (Whole Earth Lectronic Link), the first BBS (www.weli.com) originally affiliated to the Whole Earth Review magazine, was set up in mid 1980s by a group of enthusiasts. It is a lively forum for discussion on a diverse range of topics. Today, more than 12,000 BBSs are available in USA alone, and thousands of bulletin boards covering a number of subject fields and sub-fields are available over the Net. There are two types of bulletin boards, moderated and non-moderated.

A bulletin board is a medium for posting and discussing announcements and messages of interest to a community of online users. The Bulletin Board for Librarians (BUBL) is designed to be an interactive system. BUBL and the National Information on Software and Services Bulletin Board (NISSBB) are available on Joint Academic Network of UK. These services disseminate professional information in an open bulletin board that will be read and commented by users in the field. The views and critical comments are 'posted' (appended) to the bulletin board, which in turn will be seen by the moderator of the BBS and other professionals. Further comments, if any, can be posted again. In India, about 22 BBSs (14 of them from Delhi alone) were active in 1995 (Ramaiah, 1995). General applications of BBSs include e-mail, electronic publishing, conducting surveys, exchanging news and research findings, mailing lists, access to network resources, etc.

4.3.3 Discussion Forums

Many discussion forums (also known as discussion lists) are available especially for LIS professionals. The operation of discussion forums is automated and controlled using a computer programme. Subscription is generally free and by sending an e-mail to the list server, the service is automatically directed to the e-mail box of the requester. The discussion forum, PACS-L (Public Access Computer Systems-L) discusses the applications of computers in libraries (Table 4.2). For LIS professionals, PACS-Review and CurrentCites give the latest information on the use of technology in libraries. In addition, listservs are used by professionals for subscribing or unsubscribing from
mailing lists. The Special Libraries Association, The American Library Association, and other associations support electronic conferences (e-conferences). Some discussion lists provide current awareness by including hundreds of abstracts in the subject field on a daily basis. These groups are helpful when one wants to locate, say, an important document which is out of print. These facilitate both for getting information and also supplying to others when needed.

LIS-FORUM, a discussion forum in library and information science was launched in India in November 1994 by the National Centre for Science Information of the Indian Institute of Science, Bangalore. The project was sponsored by NISSAT. The main objectives of LIS-FORUM are to act as an electronic forum (or conference) for LIS professionals, managers, educators and users; to discuss the issues related (but not exclusive) to library and information practices and use of IT for providing library and information services; and to act as an electronic medium for quick exchange of information and experiences related to the LIS field. As of now, current awareness information including news, surveys, enquiries and announcements about forthcoming events are the main types of information distributed (Rajashekar, 1997).

4.3.4 Network Newsgroups

Usenet is one of the most popular and commonly used feature of Internet and second only to e-mail. These are newsgroups or discussion groups where in queries and messages on any topic or subject can be posted. Other people (usually members) can reply to them. The topics range from every branch of human knowledge. But each newsgroup is confined to one subject and an individual may be a member of more than one newsgroup.

The top of the hierarchy denotes subjects (for example, comp: computers; sci: science; soc: social science/society; bionet: biologists; biz: business), and some the general topics (for example; news: news and events; misc: miscellaneous topics; rec
Under each of these, many sub-groups are formed. Local hierarchies include countries or states, for example, jp for Japan, uk for United Kingdom, ca for California, etc. (Crumlish, 1996). The number of hierarchies in a newsgroup differ from two or more (Hoffman, 1996).

In 1994 there were 18 hierarchies (7 mainstream and 11 alternative) under which over 2300 newsgroups were functioning in various subject groups like computers (526), science (87) social sciences (97), recreation (295), etc. This rose to over 11,000 in 1996 and many more are being created all the time. Whereas mainstream hierarchical groups (like comp) were created after deliberations, it is not the case with alternative groups. All these are free and there are no charges for accessing, except the 'clari' hierarchy of ClariNet. This hierarchy, having 239 newsgroups, is accessible through subscription only, as information for this is collected from various sources, edited and repackaged and is made available for members (Hahn and Rick, 1994). One can get the list of all newsgroups or discussion groups at www.liszt.com.

One of the best ways to keep informed in a particular subject is to read Usenet newsgroup in that subject. In general, a person who has something to say on a topic can prepare a message (an article) and post it to the entire newsgroup. Other interested persons can reply/comment on the message. A series of articles and replies is called thread. The articles and replies are deleted from the directory where they are stored at depending upon the site. Most of these are discussion forums and anyone can post anything. The same newsletter/article may be re-posted from one newsgroup to another. Some messages may create anger, disappointment, or even disgust. So many maintain semi-anonymity. Some use killfiles or filters to avoid unwanted posts.

Many a time, fast-breaking events appear on Usenet before they appear in newspapers or television. Some newsgroups are moderated (for example, newsannounces, newsusers), but most of them are non-moderated and free for all. Newsgroups ending with "answers" (for example, comp.answers) are moderated repositories for the
documents of frequently asked questions generated in that hierarchy.

Table 4.2: Some discussion forums/e-conferences in LIS field

<table>
<thead>
<tr>
<th>Forum</th>
<th>Subject field</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACQNET</td>
<td>Acquisition related issues</td>
</tr>
<tr>
<td>Archives</td>
<td>Archival Theory and Practice</td>
</tr>
<tr>
<td>Autocat</td>
<td>Library cataloguing and authority issues</td>
</tr>
<tr>
<td>BI-L</td>
<td>Bibliographic instructions and assistance</td>
</tr>
<tr>
<td>Buslib-L</td>
<td>Business libraries and issues</td>
</tr>
<tr>
<td>Cdromian</td>
<td>Issues of CD-ROM in LAN</td>
</tr>
<tr>
<td>CD-ROM-L</td>
<td>Issues of CD-ROM use in libraries</td>
</tr>
<tr>
<td>Fedsig-L</td>
<td>Issues related to government documents</td>
</tr>
<tr>
<td>Govdoc-L</td>
<td>Issues related to government documents</td>
</tr>
<tr>
<td>Ill-L</td>
<td>Interlibrary loan issues</td>
</tr>
<tr>
<td>Inforef</td>
<td>Information/reference services</td>
</tr>
<tr>
<td>Intercat</td>
<td>Cataloguing issues</td>
</tr>
<tr>
<td>LAW-LIB</td>
<td>Law librarianship issues'</td>
</tr>
<tr>
<td>Libadmin</td>
<td>Library administration issues</td>
</tr>
<tr>
<td>Libpln-L</td>
<td>Library planning issues</td>
</tr>
<tr>
<td>LIBREF-L</td>
<td>Library reference services/activities issues</td>
</tr>
<tr>
<td>Medilib-L</td>
<td>Issues related to medical libraries</td>
</tr>
<tr>
<td>Nettrain</td>
<td>Teaching/training to use Internet</td>
</tr>
<tr>
<td>PACS-L</td>
<td>Computer systems for libraries</td>
</tr>
<tr>
<td>PUBLIB</td>
<td>Issues of public librarianship</td>
</tr>
<tr>
<td>Serialst</td>
<td>Issues of serials cataloguing</td>
</tr>
<tr>
<td>Usmarc-L</td>
<td>Issues related to USMARC format</td>
</tr>
<tr>
<td>Web4lib</td>
<td>Creation/management of library-based www services</td>
</tr>
</tbody>
</table>

4.3.5 Electronic Conferences

In recent times, e-mail-based discussion groups called electronic conferences (e-conferences) have come into vogue. Here, the originator of the idea of an e-conference accepts the responsibility to maintain it and distributes the message through listservs or other special mailing list management software. Thus, these can be viewed as moderated newsgroups (as against Usenet newsgroups, many of which are not moderated). Several surveys have been conducted. It was found that researchers are using e-mail communications to replace others. It was also found that those who are
connected (through e-mail) are better informed as well as more productive and creative 
(quoted in Kovacs, et al, 1995). A majority of professionals felt that e-conferences 
enhance other sources of professional information and are reliable sources of 
professional and research information for personal use. There are two sources to find 
out information about e-conferences: (a) New-List, an e-conference by itself, carries 
information about new e-conferences; and (b) the Directory of Scholarly Electronic 
Conferences (a part of Directory of Electronic Journals, Newsletters and Academic 
Discussion Lists published by the Association of Research Libraries – 
listserv@kentvm.kent.edu). Some library-related e-conferences/discussion forums are 
listed in Table 4.2. Many of these are gatewayed to Usenet facilitating reading through 
news readers rather than receiving them as e-mail. These have subscribers ranging 
from 2000 to more than 10,000; those e-conferences gatewayed to Usenet would 
have larger number of subscribers (Robinson, 1996).

4.4 ELECTRONIC COMMERCE

Internet has brought in a new concept, called electronic commerce (e-commerce), 
in marketing and business fields. It is, perhaps, one of the most impressive benefits 
and positive influences of Internet which made the institutions, industries, individual 
professionals having expertise in various fields and commercial organisations, 
contribute to the electronic information resources and thereby gain increased mar-
ketability of products, services and expertise. Variously known as e-commerce, e-biz, 
cyber commerce, online commerce, Net commerce, etc, it is the latest phenomenon 
of Internet. Individuals/professionals also can play a role in e-commerce by becoming 
consultants offering their expertise or customers for services/products offered over 
Internet. E-commerce is redefining the way business is conducted by individuals, 
institutions and industries. It has provided new avenues for marketing, novel ways for 
advertising, large customer base for vendors and manufacturers, increased visibility 
for products, and a variety of alternatives for customers.
Internet provides information including profiles of companies, institutions, industries, professional consultants, organisations and their activities, products, services, technologies etc. The Web sites maintained by manufacturers, vendors, and financial institutions participating in e-commerce, and also of organisations supporting it like CommerceNet, Netscape, Microsoft, etc will be more useful for those who would like to enter into the world of e-biz. E-mail distribution lists, manufacturer's and product directories, listservs, etc are also available for product marketing. Realising that the competitive edge/advantage of traditional commerce is fast becoming limited, the business companies started looking for newer avenues to enhance profitability. They found that Internet provides seamless access to customers, partners, suppliers, and distributors besides providing enormous opportunities to expand business beyond local and geographical boundaries. Thus, Internet became a medium to achieve corporate competitiveness and profitability.

Internet allows selling of non-material goods directly while material goods can be delivered by conventional means. The former includes software, downloading articles from e-journals and/or digital libraries, newspapers, magazines, etc. Ordering books and other goods by searching online book stores and shopping malls is an example where the items ordered are sent by post to the specified addresses. Internet facilitates e-commerce in three ways (Opplerger, 1998):

(a) It provides a very large customer base and reaches maximum number of countries,

(b) The presence (creation) and maintenance of a site on Internet is cheap, and results in reduced prices, makes more competitive, facilitates instant updation, access and sales (i.e., it results in 'zero time lag' between advertising and sales), and

(c) It caters to the customer's wide and varied interests, thus saving the time taken for travelling between different places (although physically seeing may help choose quality items).

E-commerce is influencing the structure of business dealings and supply chains. It is growing at a rate of more than 30 per cent promoting business-to-business and
business-to-customer/consumer transactions manifold. This is mainly because Web-based transactions offer low service costs. For example, sending a 40 page document from New York to Tokyo costs an average of US$ 26 through courier services; about US$ 30 by fax and a mere 10 cents via Internet (Chasia, 1998, p. 43). A host of electronic payment systems used over Internet facilitate cheaper operational costs; about 5 cents per transaction for digital currency as against 45 cents per transaction for credit card payments, 75 cents for check payments and US$ 1 per transaction for paper currency payments (ter Maat, 1997, p. 69). In a typical Indian scenario, a typical Internet online bank transaction costs 5 paisa per transaction as against Rs 1.50 through a teller (Balasubramanian, 1998, p. 49). Internet is an inexpensive medium, which allows widespread access to individuals, institutions and business industry without any discrimination. Internet provides the same facilities, opportunities and avenues to all irrespective of any preference or favouritism on any product or firm. Thus, right from advertising and automobiles to software and value-added services, all thrive over cyberspace. Besides IT companies, non-info tech firms like those from automobile industry, drugs, groceries, books, etc are all trading over the Net. See, for example, how e-commerce benefited some of the companies:

(a) Yahoo! reported a revenue of US$ 86 million for the first quarter of 1999, nearly three times to the corresponding period in 1998; for 1998, it raked US$ 203 million, a three-fold increase over 1997.

(b) Knight-Ridder New Media, electronic publisher, has developed a Web-based application for making financial operations more efficient, and attracting new subscribers and advertising revenue through innovative online publishing for all the company’s newspapers.

(c) The Internet commerce of Cisco Systems, a major communications firm, in 1996 was US$ 100 million that rose to US$ 3.2 billion in 1997.

(d) The world wide e-business revenues of IBM in 1998 were US$ 27 billion, more than one-third of total revenues for the year.

(e) Intel in its first month of operation on the Net made sales of US$ 1 billion, an e-
business record, and is gearing up for an online trade of US$ 3 trillion by the year 2003.

(f) The Web site of Amazon.com was visited by 15,10,000 during the fourth quarter of 1997 and 22,60,000 in the first quarter of 1998; It achieved a book sales of US$ 610 millions in 1998, a growth of 313 per cent over the sales for 1997.

(g) Dell Computers encourages customers to design their own OCs online with daily sales running around US$ 10 million up from US$ 6 million daily during December 1997 holiday period.

(h) Auto-by-Tel, a Web-based automotive market place, had auto sales worth US$ 1.8 billion (3,45,000 purchase requests) during 1996; by 1997, it rose to about US$ 6 billion (12,00,000 purchase requests).

Although there are differences of opinion as to the revenues generated by global e-commerce, it is steadily growing. As per the NASSCOM (1997) report, the value of global Internet commerce in 1997 was US$ 9.61 billion; the projected values for the years 1998, 1999 and 2000 are US$ 13.06, 17.76 and 24.15 billion respectively. Other reports published in the Economic Times (1998 p.11) estimate that e-commerce would generate US$ 45.8 billion in 1998 and US$ 200 billion by the turn of the century. The IDC of USA estimated that transactions worth US$ 10 billion were executed over Internet in 1997 (equal to a mere 0.05 per cent of the global commerce). It estimated the value of e-commerce for 1998, 2000, 2001, and 2010 to be US$ 45.8, 150, 220 and 1000 billion, respectively (Brand Equity, 1996. p. 4). The US Department of Commerce projected that e-commerce will reach US$ 310 billion in 1999 and by the year 2003 it would reach US$ 1.5 trillion (The Hindu, 5 September 1999). As per the survey of CMP Research in December 1997, it was observed that nearly two-thirds of the US companies would be resorting to e-commerce by the year 1998. About 40 per cent of the US companies conducted business on Internet in 1997 and another 23 per cent will be joining them by the year 1998 (Punja, 1998, p. 10). This demonstrates the growing value and importance of e-commerce for global economy.

With more than 72.4 million computers (in the year 2000) attached to the Net
spread over the goibe, about 2 million domain names, about 2.75 lakh Internet protocol networks, 6.5 lakh Web sites growing at the rate of 10-20 per cent every month and over 100 million users, the Net can make a lot of difference in the business world. By the year 2000, about 36 million house holds from US alone, 20 million from the European Union and 12 million from India will be accessing the Web.

The main characteristic of e-commerce is the anonymity it provides to the customers and vendors as well as to the transactions, which take between them. Other characteristics include privacy, and integrity of messages sent, authenticity and non-repudiation of transactions taking place on the Net. This has given rise to initial hick-ups including insecurity, fraud, money laundering and impersonation (Lakshmana Moorthy and Karisiddappa, 1998). This situation in turn led to the formulation of security protocols. In the case of online ordering and instant purchases, the payments have to be made either through deposit accounts or smart/credit cards or any of the electronic payment systems. A host of electronic payment systems like First Virtual Internet Payment System, E-cash, ICVERIFY, NetCash, Secure Internet Payment System, CyberCoin, MilliCent, Payword, PayNow, NetBill etc have been developed and are available for the customers to choose from (Loshin and Murphy, 1998; and Opplinger, 1998).

In electronic market place, search costs are heavily reduced, as all the information about an item/product is available at one place (when more than one location is involved, hyperlinks are provided). This reduces search time and related costs and also enables in locating suppliers matching the needs of the buyers. However, this is not true in all cases. As per a study, the average prices of second hand cars sold through AUCNET, an electronic market place for used cars in Japan, were found to be much higher than that of traditional non-electronic markets. But the higher prices made many sellers list their cars on AUCNET, which in turn attracted more buyers as it offered better choices. It had also created risks of buying inferior quality vehicles as transactions are made without physical inspection (Lee, 1998, p. 73).
But all is not well with e-commerce. While it is growing steadily, many customers get dissatisfied, sometimes frustrated, with some sites. This is because of the 'out of stock' messages that are encountered by customers; it has been observed that 10 per cent of the orders could not be satisfied because of the non-availability of the advertised stocks. The consumers are annoyed for the failure to get feedback from the Web sites. A majority of the consumers felt that more information is needed on their purchases.

4.4.1 Web Advertising

Internet facilitates advertising, marketing and sales thereby promoting e-commerce. Marketing through advertisements is one of the well established channels in business. Advertising over Internet involves low premiums, assures easy access and has global appealing as against the conventional print media. Whereas the print media generally have a restricted domain, Internet caters to all kinds of vendors and customers in almost all subject areas. Unlike print media, there is no restriction of space; one can put up additional information. This avoids the follow up material sent in the case of print media when a user wants to know more about a particular item advertised. Unlike the print media where it takes longer time to know the popularity or otherwise of the product, it is immediately known to the vendor due to the instant feedback received from the customers. Whereas in the conventional commerce the advertiser goes to the consumer, in the Net commerce the latter goes to the former. Quite often, the interaction between the user and the Web site results in online ordering and receiving the products as well.

Advertising on the Web (or Netvertising), i.e., hosting a home page on the Web, is one of the best ways to make the world know about an institution, an organisation, a library or even an individual (say, a professional consultant). This would enable publicity about the various facilities, services and products offered to the users. It was estimated that there were 25 million home pages available on the Web in 1995 which
was expected to reach 200 million by 1999 (Subbaram, 1996). The foreign Web servers charge anywhere between a few thousands to a few lakhs of rupees (depending upon the size) for designing, developing and hosting a Web page. In India NIC and VSNL from public sector and also many private firms are providing this service at competitive rates. VSNL charges Rs 3 lakhs, 6 lakhs, and 12 lakhs for data transfer of up to 1 GB, 10 GB and 30 GB per month, respectively (with an additional Rs 3 lakhs towards general service charges in each case) for hosting a dedicated Web server. As Internet supports audio, video, animation and graphics, this area is gaining more and more attention. The Web advertising and marketing are generally skewed towards educated, middle and high income groups. Many newspapers, newsletters, and ad agencies are advertising on the Net. The ad revenues for Web sites during April-June 1998 was US$ 422.7 million which is almost double when compared to the revenues for the same period in 1997 (Kaur, 1998, p. 75). As per the Internet Advertising Bureau, the ad revenues have grown from US$ 267 million in 1996 to 906.5 million in 1997 and to 2 billion in 1998 (The Hindu, 5 September 1999). During the first quarter of 1999, the ad revenues reached US$ 693 million, double the figure for the same period in 1998 (www.nua.ie/surveys/). The top three Web advertising categories are computer-related goods, books and credit cards. As per a survey reported in Computers Today (16-30 September 1999, p. 35), Amazon.com tops the list of companies with a “Net Presence” (a measure of Internet visibility) rate of 57.6, closely followed by barnesandnoble.com (56.1) and Microsoft (42).

As a result of the Net advertising, the ISPs in Europe, especially in UK, are moving towards providing free Internet access, without any limit on the hours of usage. Internet telephony and reduced-charge, limitless talk-time long distance telephony (with advertisements at the beginning and at every one minute interval) are becoming order of the day in the US. Some provide the new customers with cash incentives (up to US$ 100) on signing. All this is made possible because of the advertising revenues, which partially make up the revenue loss in these situations. The rapidly falling costs coupled with the availability of bandwidth due to the use of fiber optic systems, further helped such freebies possible.
4.4.2 E-Commerce and Libraries

Publishing industry is already exploiting Internet by offering electronic/online journals, table of contents of journals, and catalogues of books and products over Internet. Well-known bookstores around the world are offering their holdings over Internet. It is possible to order a book from, say, Blackwell (www.blackwell.co.uk/bookshops), which maintains a database of over 150,000 active titles. Bookwire (www.bookwire.com) has links to 150 booksellers and over 200 publishers to select publications and for ordering. Many sites of publishers tell the user about the recently published books, include book reviews, and provide information on electronic books, rare book dealers, mailing lists, best sellers in fiction, etc. Online services like AOL provide many forms of online content for attracting subscribers. These include a glimpse of title page, book reviews, contents and excerpts from books. Many well known (and also obscure) books are available free of charge for downloading from Online Book Initiative, a Gopher site (world.std.com). A number of electronic reference sources and guides, and many e-magazines (e-zines), business publications and scholarly periodicals are available for subscription over the Net. These are increasing rapidly day by day and represent, perhaps, the largest single resource available to anyone at any given time.

Libraries with Internet access can benefit from online book stores; they can acquire books and journals, reports and other information services from Internet. Of particular importance to librarians is the Acqweb, a Web site intended for library acquisitions. A recent search (December 1999) of Yahoo! for online bookshops/bookstores gave a list of 454 Web sites covering various subject fields. Users can use these sites for online ordering of documents. The search also revealed 464 bookshops, 117 online book publishers, 2709 book publishers (having a home page on the Net) in 11 categories. Many of these offer searching and ordering facilities. There were 1123 sites for online ordering dealing with books, drugs and pharmaceuticals, computers, food, automobiles, art, tours and equipment.
Amazon.com is an online book store offering a wide range of books at prices that are lower than those at retail book stores. The selected book can be ordered through the online order form. Payment can be made through credit card or when the books are delivered. One can also view the contents of the book and sometimes read a part or whole of it. It is the most popular and number one destination for online book purchases over the Net. Its Web site was visited by 2,260,000 surfers for purchasing books during the first quarter of 1998, an increase from 1,510,000 customers during the fourth quarter in 1997. It reported US$ 16 millions and 66 millions in the first and fourth quarters of 1997, respectively thus achieving over 400 per cent growth during the year. The sales touched US$ 87.4 millions during the first quarter of 1998 (Balasubramanian, 1998). It achieved a book sales of US$ 610 millions in 1998, a growth of 313 per cent over the sales for 1997. In just three and a half year's time Amazon.com became the third largest bookseller behind Barnes and Noble (US$ 2.7 billions in 1998) and Borders (US$ 2.3 billions). The music division of Amazon.com became the largest music seller in 1998 with US$ 33.1 million sales (The Hindu, 5 September 1999).

4.5 ELECTRONIC PAYMENT SYSTEMS

Electronic/digital payment, in brief, is a transaction process involving the customer, shopping mall (an intermediary representing various vendors/merchants), vendor, credit card bank and the customer's bank. In a simple process, it involves the customer, online vendor, vendor's bank and credit card bank. The mode of payment varies with different systems. One can choose to pay through a payment system sponsor (for instance, DigiCash) wherein the participants have to register with the system in some way. Another approach is payment through digital currency wherein the customer, having an account with a bank offering digital currency, can withdraw money and transact using digital wallets. Digital signatures and cryptographic techniques are used for safe and secure transactions. The procedure of different electronic payment systems has been extensively dealt in the literature (see for

Some of the important players involved in e-commerce include CommerceNet, CyberCash, DigiCash, First Virtual Holdings, IBM, MasterCard International, MicroSoft, Mondex International, NetCash/NetCheque, Netscape Communications, VeriSign, and Visa. There are a number of other firms involved as well. Also, to facilitate payments of very small amounts (of the order of a few cents) and to minimise overhead costs of using the other electronic payment systems, several micropayment systems came into existence. These include, CyberCoin from CyberCash, MilliCent from DEC, PayWord and MicroMint from Ron Rivest and Adi Shamir, and NetBill from Carnegie Mellon University (Opplinger, 1998).

Electronic funds transfer (EFT) through electronic checking has been in usage since 1960s. This involves the customer, the vendor/merchant and the intermediary/financial institution. This resulted in improving speed of transaction, saving time, and reducing costs of paper handling. This has led to the development of digital cash ensuring anonymity of the customer and also made possible the usage of prepaid cards (like telephone cards) and later, electronic cash (e-cash) (Panurach, 1996). In digital payment systems, to transact business, both the customers and vendors have to make some commitment to the payment system; some times they may have to open an account with the digital payment system, install software on their computers to operate and may have to enter into agreements. Some of the electronic payment systems are dealt in the following sections.

4.5.1 First Virtual Internet Payment System

Established in 1994 to facilitate Net commerce, First Virtual (FV) Holdings, is a pioneering and successful Internet service providing company. The first product of the company is the Internet Payment System, built on top of Internet protocols. The system does not use cryptography. In this system, the customer first registers with
FV by giving identification and credit card details. A virtual personal identification number (VPIN) is assigned to the customer by FV. When the customer and the vendor come to an agreement, using Internet protocol to transact business, the transaction is submitted to FV. The customer provides the VPIN to the vendor and informs FV. The vendor in turn checks the authenticity of VPIN with FV clearing house which in turn confirms the payment orders while the payment is debited to the customer. The money is transferred off-line after receipt of confirmation. FV uses email to place and confirm payment orders while the money is handled off-line. First Virtual supports both Visa and Master cards, and charges US$ 10 as annual fee with a registration fee for providing VPIN. A detailed description of FV's experiences, perils, pitfalls and security and administrative issues were discussed in detail by Borenstein, et al (1996) (see also the Web site www.firstvirtual.com for more information).

4.5.2 Electronic Cash

Electronic Cash (e-cash), developed by DigiCash Co. of Netherlands, is being implemented by Mark Twain Bank (USA) and Merita Bank (Finland). This system involves three players; the customer, the vendor and the e-cash issuing bank. The customer obtains e-cash from the issuing bank (by sending payment from his own banker) and stores the same on hard disc of his/her PC or on a smartcard. The customer can transfer corresponding amount to a vendor for purchasing goods or services. The vendor then redeems the e-cash received from the customer by approaching the e-cash issuing bank (which can be credited to the vendor's bank). The most striking feature of the e-cash system is the anonymity it provides to both the vendor and the customer. It is transferable from person to person and can be spent only once. One problem perceived is that anonymity may lead to black money and illegal money laundering. To ensure the e-cash is used only once, hardware devices called digital wallets or digital envelopes are being used.
4.5.3 CyberCash

The Secure Internet Payment System, developed by CyberCash Inc., USA, offers a secure, inexpensive, instantaneous and efficient delivery of payments across Internet. The system provides a digital wallet to the customers. It acts as a conduit for transactions among Internet vendors, customers and banking networks. It involves the customer, vendor and their respective banks, and a clearing centre to process transactions among different banks. Customers can authorise payments out of their digital wallets; the payments are signed, encrypted and then sent through the vendor back to CyberCash which in turn are passed on to the vendor's bank for processing. The required software is provided free of cost for client as well as server applications. The participating banks and credit card processors pay a fee to CyberCash. CyberCoin feature has been developed to facilitate micropayments, for transactions below US$ 10,

PayNow, an electronic check payment system, has also been recently developed based on the CyberCash system. This reduces operational costs as it lowers mailing charges, paper transactions and increases accuracy of billing (Loshin and Murphy, 1997). A similar system is the NetCheque and NetCash, developed by the Information Sciences Institute of the University of Southern California (gost.isi.edu/info/NetCheque).

4.5.4 Smartcards

Smartcard concept was developed over a decade ago. Smartcards are wallet-sized plastic cards with a programmable micro-processor that interfaces to network terminal devices and is nothing but electronic cash on card. The smartcard contains different types of memory, RAM, ROM, EEPROM etc (Myhill, 1998). Two smartcards in use include Mondex of MasterCard (www.mondex.com) and VisaCash of Visa (www.visa.com). The memory and processing capabilities of the chip on smart
cards enhance the bank card and allows the banks offer increased utility, convenience and products tailored to the individual needs. The new smart cards can enhance mobile e-commerce (Hofland, 1998).

4.5.5 Major Concerns of Electronic Payments

There are several concerns in the usage of electronic payment systems. These include:

(a) The anonymity of customer and merchant may result in fraud, impersonation and delivery of goods at wrong addresses;

(b) Credit card information may be used by unscrupulous persons/hackers who may order unwanted material and have them delivered to non-customer addresses or authorise self payments;

(c) Bugs may appear due to the incompatible protocol implementations of Internet sites dealing with software;

(d) It may lead to the usage of cancelled credit cards, overshooting available credit limit and payment to an unknown party; and

(e) Problems may arise due to the security considerations including authentication of transactions and data.

In spite of many such problems, e-commerce will still continue to grow and may one day surpass the traditional commerce in revenues. And the turnover of many companies supports this feeling.

4.5.6 Security Considerations

The customer orders online for purchase of a product or a book and also provides his/her credit card number and authorisation by way of password or by digital signature. However, as the message travels through many systems and
Internet backbone networks before reaching the destination, the system administrators, supervisors or even hackers can intercept the mail and misuse the credit card numbers. More than 20,000 credit card numbers stored in a computer at an Internet service provider (ISP) were compromised by an intruder as early as 1995 (Loshin and Murphy, 1997). Security of e-transactions is a must to ensure the growth of e-commerce as “any unscrupulous individual could order unwanted materials and have them sent to non-library address, or authorise payments of library funds to him or herself” (Barber, 1995) thus causing loss to vendor and/or the customer. Such situations have led to the development of protocols like Secure Hypertext Transfer Protocol (SHTTP), Secure Sockets Layer Protocol (SSLP), Secure Electronic Payment Protocol (SEPP) of MasterCard, iKP Protocols of IBM, Secure Electronic Transaction Protocols (SETP) jointly developed by MasterCard, Visa, Microsoft, Netscape, Terisa and VeriSign; etc., and so on for taking care of security of electronic payments. Further public key and private key encryptions are used for sending payment details securely over networks. Technologies including cryptography, digital watermarks and digital signatures for security of information over networks and are discussed in Chapter 5 (for detailed discussion see Lakshmana Moorthy and Karisiddappa, 1998(a)-(c)).

4.6 CONCERNS

There exists a wide disparity in the society, despite the interconnectivity of educational, financial and banking institutions and libraries achieved through various networks and Internet. The electronic infrastructure has given rise to the digital divide separating the globe into technological haves and technological have-nots—those having the infrastructure and those who neither possess nor have access to these tools. Even in the most stable and advanced economy like the US, the polarisation is visible and widening, surprisingly on income and racial lines. The study, Falling through the Net II of the US Department of Commerce, reveals such disparities and disturbing projections (Howland, 1998). Although the Internet boasts of global reach, there is not much to be happy about its impact on developing countries. The balance is heavily
tilted towards developed countries; very few nodes with inadequate infrastructure and unreliable telecommunication links are available in the developing countries. It is well established that the telephone infrastructure is synonymous with economic strength; poor infrastructure undoubtedly results in obstructing the economic growth.

In a study undertaken in 1994, it was found that the computer nodes were strongly associated with per capita income. Of the 9,10,149 Internet connections in 1992, about 97 per cent were located in developed countries; about 65 per cent in USA alone followed by other wealthy countries of OECD. Even after seven years (in 1999), the scenario is similar. Although the number of Net users in Asia jumped by 63 per cent, it accounted only 12 per cent of the Net users world wide. In contrast, the US and Canada put together accounted for 62 per cent users (Vijay, 1999). At present the connectivity to the Net in India is available in government and financially strong research institutions. It will take a few more years before Internet and global network access technologies become easily available to all libraries in the country.

The cost of transmission over Internet continues to drop resulting in the delivery of more and more types of documents. Colour pictures from Web sites and home pages, audio and phone calls can be transmitted over Internet. Telecommuting will become a common phenomenon when free telephone calls are possible over Internet. As individuals will be able to carry out more types of jobs from home, ultimately any job that involves answering phones and using computers can be moved to any location. Efforts are being made by telecommunication vendors in the direction of designing and development of switching and transmission equipment for providing phone services over Internet. This in turn will introduce quality of service protocols, which would pave the way for broadcast and on-demand TV/HDTV over Internet. General public will be able to rent movies over Internet (Gilheany, 1999). The latest trend is towards providing global Internet roaming via the global clearing houses (such as Global Reach Interconnection of AimQuest and iPass) which allow individuals and corporates world wide access to an Internet accounts by local dialling.

Many constraints like institutional hurdles, government regulations,
technological limitations, insecurity over anonymous payments, reluctance of financial institutions to adopt new technologies, are to be overcome before the cyber commerce is accepted. However, the usage of Internet will have a positive impact on the way the information is generated, processed, stored, retrieved and disseminated. The availability of e-mail and file transfer capabilities are expected to improve the dissemination of the information across the continents. The only hindrance, it seems, comes from the computer display resolution technology and the size of the VDU. These make the electronic book reading or viewing a tedious option to the conventional print-on-paper reading. This calls for development of reader-friendly VDUs for achieving the limitless usage of Internet resources.

4.7 CONCLUSION

Internet is a global phenomenon, so it would have a global impact on the way people live interact with each other influencing and affecting all those involved at all levels, viz., personal, regional, national and global levels. Internet helped libraries in providing shareware, free downloadable software, and above all the information about what is happening around in the field. All Internet applications have become dynamic as new versions get released within a few months (sometimes with in a few weeks) after launching. Due to large visibility and customer base, the players are able to achieve lower development costs and higher profits. Many software firms developed and distributed software free of charge (initially) to non-commercial and personal users; they started earning revenues from commercial and private users.

Bulletin board services and discussion forums in various areas of library management help discuss current issues faced by libraries besides suggesting solutions to problems. These facilitate dissemination of professional information and immensely contribute towards professional development. For the reference librarian, Internet is a gold mine providing information on each and every thing of interest. Specific Web sites cater to the needs of acquisition and serials librarians. Thulasi and Rajashekar 159
(1999) enumerated possible activities where Internet could be used to enhance or support the library acquisitions, technical processing, serials control, reference and information services, and library management. They also provided a list of useful Internet resources useful for these activities. A library home page can be created and hosted on Internet. A number of Web sites that are heavily searched by the library staff for day today operations can be identified and hyperlinks can be provided from the library home page. These hyperlinks provide instant access to the electronic information resources on the Web. The library home page has several applications and utilities including promoting the use of the library; furnishing information and publicising about the library, its activities, rules and regulations, and procedural guidelines; providing information services like CAS and SDI to the users online and collecting feedback; and providing links to relevant sites that are of interest to users. Several guidelines and Web page authoring tools, some of them freely on Internet, are available. Resource sharing is another activity where Internet is being used as an important tool. It provides necessary communication, technology and delivery systems for resource sharing. Internet connectivity puts the libraries in a virtual network and a common user interface through Web browsers enable access to shared resources. E-mail and FTP protocols help in document delivery. Resource sharing applications include union catalogues, cataloguing, cooperative acquisition, interlibrary loan and reference services.

Internet saves time and resources; it reduces communication gap between library and users, vendors and publishers; and improves operational efficiency through increased interaction thus leading to better quality of services. For marketing library products and services, there is no better medium than Internet. Many universities are using Internet to host information on the courses offered, due dates, application modalities, syllabi, schedules, facilities and infrastructure available. They are able to reach clients spread over a large geographical area. A researcher can conduct questionnaire surveys easily using Internet. Organisation specific intranets are being established over Internet utilising all the facilities and tools of Internet.
Internet provides space and medium to share one's ideas and interact with other 'like minded' people. It creates social interaction beyond geographical, political, religious and racial boundaries. Berghel (1995, p. 26) calls such a cyber community as digital village, brought about by the real-time interactive and participatory capabilities of the cyber space. These digital villages have no location, yet they connect individuals with shared interests and objectives. Scholars have been the most active builders who use a number of diverse discussion forums such as listservs, e-mail, e-journals, and home pages for debating and sharing ideas (Cronin and McKim, 1996, p. 168). ISI, INSPEC, CAS as well as other major abstracting and indexing services started including some titles available on Internet for indexing and coverage in their databases. This would surely improve the status of Internet as a publishing medium and may lead to the wide acceptance e-publications as qualitative publications for appointments and promotions.

Apart from these applications, societal impact of Internet include its influence on people by way of providing access to knowledge in any field irrespective of caste, creed, gender, faith or location. The worldwide reach of the Web means that the academics and researchers in less developed countries can interact with remote data sets hosted by the R&D institutions in the developed countries. Web facilitates new kinds of technology transfer for educational purposes. Games, personal finance, banking shopping, communication, education, entertainment, and health are some of the popular applications for the general use.

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