CHAPTER- 4
ELECTRONIC JOURNALS: AN OVERVIEW

1.0 INTRODUCTION

A well-equipped library is the nerve centre of any research institution as it promotes research work through its resources. In recent times, stress is being laid on research and major contributions to the research and development (R&D) of a nation are mainly from the research activities of the institutions. It is realized that excellence in scientific research can be achieved only by means of adequate and relevant resources in institutions. At the present juncture, it becomes imperative for librarians to measure which type of resources are most useful for users due to the spurt in the research activities, escalation of material costs, and stringent finance for the libraries. Journals constitute useful information resource for researchers, policy makers, teachers and scientists because they provide nascent information expeditiously. Journals have been very important source of scholarly communication among research scholars and scientific communication among scientists and researchers. They serve as an input to ongoing research activities. A scholarly journal has got certain functions in the scientific world no matter in what format it is published or distributed. According to Lambert (17) functions of journals lay in four distinct areas which are as follows:

- To make the results of original research available to the widest possible audience.
- To provide a permanent record or archive of research which has been carried out?
- To enable an individual scientist or technologist to establish the fact that, he was the first person to make a particular discovery, the process being formally known as the assignment of priority.
- To ensure a guaranteed standard of quality in the papers accepted for publication, this being achieved through the refereeing system.

Tenopir and King found ample evidence that scholarly journals are not only widely read, but are extremely useful and important to scientists' work, whether it is teaching, research,
administration, or other activities. Despite its benefits to the academic and research community, the printed journal has been subjected to criticism from many angles such as the peer review process, delays in publication, lack of storage space, escalating costs, lack of selectivity, stoppage of subscriptions by libraries and commercial publishers holding copyrights (Rao 390). Limited access like only one user can use a particular issue at a time and they can only be access within the library during the library hours, loss and mutilation are also some serious problems associated with printed journals. Thus due to these issues, the academic and research community is trying to maintain research communication through newer channels like electronic journals.

With the emergence of the internet, publishing has become very easy, quick and cheap in a medium that can be accessed easily by everyone from anywhere. With the steady growth of e-journals on the internet, it was found that creativity and productivity has also improved due to network technologies. Scholars have understood the power of electronic journals and seem to have accepted the new medium for communicating research ideas and results among fellow professionals. The internet is reshaping the way in which scholars communicate with one another, changing the characteristics of scholarly communication (Rao 393).

E-journals were first suggested some years ago as a possible means of revolutionizing the world of research journals. E-journals could be distributed more economically than paper journals, because the main costs of preparing the text, the review process and other procedures are not as capital intensive as the costs of printing and mailing print copies. Consequently, it was hoped that the financial costs of journals in the electronic environment could slow or reverse the escalating costs of scientific journals (Llewellyn, Pellack and Shonrock).

2.0 CONCEPT OF E-JOURNAL

There is no universally accepted definition of e-journal. Different terms used by authors include ‘paperless journal’, ‘virtual journal’, ‘e-serials’, and ‘online journal’. The experts in the fields give the definitions on the basis of production, distribution etc. Before coming to definition of e-journal, we have to consider first the definition of a journal. According to ALA Glossary of Library and Information Science (125) journal is "a periodical specially one containing scholarly articles and / or disseminating current information on research and development in a particular subject field".
Harrods's Glossary (424) defines a journal as "A newspaper or periodical. Particularly a periodical issued by a society or institution and containing news, proceedings, transactions and report work carried out in a particular field". “Journal is a periodical publication, especially dealing with matters of current interest; often used of official or semi official publications of special groups” (Webster's Third New International Dictionary of English Language 629).

The term electronic journal or “e-journal” referred to journals and newsletters that are prepared and distributed electronically and they may or may not have a print counterpart. Ashcroft and Langdon (105) defines an electronic journal as “a journal, including indexing and abstracting services, provided by any electronic means, e.g. Internet, CD-ROM, although not necessarily exclusively by electronic means”. Whalley has made a distinction between a 'pure' electronic journal, which is a journal that has been set up as a totally electronic, peer-reviewed journal, and a 'hybrid' electronic journal that has versions both in electronic and paper formats.

Edward differentiates between electronic and online journals as: “electronic journals are– one where the text is read on, and/or printed from the end user’s computer rather than as print on paper. Online – the data is downloaded directly from the host computer rather than via an intermediate medium such as CD-ROM”.

Meadows (151) support the view that electronic journals are available both online and on CD-ROM and each medium has its advantages and disadvantages. Online provision allows for greater flexibility, but CD-ROMs are easier for publishers and librarians to handle.

In view of Jones and Cook, an electronic journal may not be all that different from a print journal in the fundamental editorial process. Articles are submitted by individuals in the academic and practice community, are peer reviewed by editorial board members of the journal to be accepted or rejected, and are subsequently published. It is the digital medium that is different. E-journals have produced an advanced method of scholarly interaction in the sense that individuals can
respond instantaneously to the articles and these responses can be published as soon as the editors receive them.

Journals that are published exclusively in electronic format present an innovation in the way that scientific information is communicated to the research community. Significant concerns remain regarding the impermanence of materials in electronic formats and the use of innovative features of electronically formatted material (Llewellyn, Pellack and Shonrock). E-journals have led to much speculation about their likely impact. While some see electronic publishing as simply a new medium of delivery, others believe it constitutes a force for change which could revolutionise scholarly communication. (Nelson 205).

Thus from the above discussion it can be seen that, different terms have been used for e-journals in literature. Electronic journals are often referred to interchangeably as "electronic serials", "online journals" and "electronic periodicals". The electronic journal can be described as journals that are prepared, distributed or accessed via electronically.

3.0 HISTORY AND GROWTH OF E-JOURNALS

The historical evolution of electronic journal has been traced to a 1960 UNESCO report that advocated use of computer technology to help the problems of traditional journal publishing. Mental Workload, dealing with human-machine interactions in complex systems, has been identified as the first full-fledged electronic journal. It was issued in 1980 at the New Jersey Institute of Technology and funded by the National Science Foundation. Mental workload was referred, edited, and copyrighted the same as a print journal. In 1980s under the project, Birmingham Loughborough Electronic Network Development (BLEND) a journal entitled Computer Human Factors was produced, it was designed to accept, referee, edit, and archive articles electronically. The BLEND project resulted in two issues of Computer Human Factors, each containing two referred articles. However, both the mental workload and Computer Human Factors failed and their failure illustrated the importance of “human factors” (i.e., although the electronic medium allowed more rapid editing and refereeing, there were still “human delays in getting down to work”). In 1987, Syracuse University's e-journal New Horizons in Adult Education appeared inconspicuously. The BITNET (A U.S. University network founded in 1981)
that started internet distribution of *New Horizons in Adult Education* and a handful of other e-journals produced at universities in the late 1980s and early 1990s attracted few students and scholars. Several electronic journals which began publication in 1990 included *Public Access Computer Systems Review, Journal of the International academy of Hospitality Research, Postmodern Culture, Current Cities etc.* (Nisonger 26)

Developments during the early 1990s testify to the burgeoning interest in electronic journals. The first meeting of the Association of Electronic Scholarly Journals took Place in October 1990 at North Carolina State University VPIEJ-L, an online discussion group devoted to electronic journals, was founded in the mid-1990s at the Virginia Polytechnic Institute and state University. Also during the early 1990s, some seminars or conferences devoted to electronic journals were organized. Typical examples include a seminar at Bond University in May 1992, sponsored by the Australian Serials Interest Group and the Australian Council of Libraries and Information Services, or the International Conference on Referred Electronic Journals, held at the University of Manitoba in Winnipeg, Manitoba, Canada, during October 1993. By the late 1990s, too many conferences to enumerate had been on the topic of electronic journals (Nisonger 27-28).

The mid-1990s witnessed the major trend in which the commercial and university presses offer simultaneously electronic versions of their established print journals. The commercial interest in e-journals started with the invention of World Wide Web and the release of Mosaic browser in 1993. However, by mid-1990s Elsevier, Wiley, and Springer started piloting e-journal systems. One of Springer's early tests, Red Sage was a partnership with university of California, San Francisco and Bell Laboratories. It featured an online alert system to send articles to users based on their profiled keywords, as a selective dissemination of information (SDI alert). The web was still in its infancy and accessible mostly through university networks. Every academic institution was not wired and graphics could not be displayed with the sharpness comparable with the print publication. As a result of this uncertainty, many publishers provided free access to the online equivalent of journals held by libraries in print. University presses were interested in experimenting with the new medium. John Hopkins created project MUSE in 1995, seeing the promise off web even at that early stage. Users of project MUSE started to access files from their own work stations with multiple simultaneous accesses. The project MUSE innovators also
recognized that the web would soon offer the ability to provide more content than the print medium. Moreover, full searching and enhanced graphics would make the e-versions more useful and popular. Not to be overlooked are the cataloguing advancement of this period. Despite a dramatic growth in e-journals both academic and commercial, without a gateway to them they would remain obscure. The first gateway built by libraries was Online Public Access Catalogue (OPAC). In 1995, the MARC 856 Electronic Location and Access field approved for use which resulted in rapid development of Web-based Catalogues. Thus in a short span of time, a deluge of e-journals was met by the tools to describe, organize and provide access to them in a traditional way. (Medeiros 189-191)

By 2000, e-journals became a normal part of the cataloguing workflow, yet new means of access were also being developed. Web developers were migrating manually coded web lists to databases that served alphabetical and subject arranged lists of e-journals to the web. Although web-based catalogues continued to evolve into more attractive system, their progress couldn't keep pace with the means available to web developers, which shifted preferred means of patron access to e-journals away from the catalogues. Database-driven website maintenance impacted the administration of e-journals that provided libraries a space to record internal notes about e-journal licensing terms. This effectively became the precursor to today's electronic resource management systems. Several publishers offered their journals through home-grown interfaces, and several others opted to outsource the hosting of their e-journals to interface platforms such as, HighWire Press, MetaPress and IngentaConnect. More transient but nevertheless equally appealing access to e-journals for users came from aggregated collections such as EBSCOhost, Gale Expanded Academic ASAP, and ProQuest research Library. These entities provided the facility of federated searching across thousands of e-journals, yielding set of full text results. These services became common in late 1990's and currently are a staple of most academic library offerings (Medeiros 192-194).

4.0 CATEGORIES OF E-JOURNALS
Electronic journals can be grouped under the following broad three categories:
**CD-ROM Journals**

These are journals published on CD-ROM, may be bibliographical or full text. They vary in frequency and are distributed along with search software to access and print. Many publishers have started publishing some of their core journals on CDROMS. All journals and conference proceeding of IEEE and Elsevier's ADONIS, etc. are some of the best examples. CD-ROM journals are far more economical than online journals, because once they are acquired; the library can provide unlimited access to numerous users (Taubes 765).

**4.1 Networked E-Journals**

These are electronic journals, available over networks, such as Internet, BITNET or any other commercial networks. Example of networked e-journals are e-newsletters, e-discussion lists, un-moderated bulletin boards, peer reviewed journals and popular magazines etc. Many of the networked e-journals are based on mailing list software, such as LISTSERV, ListProc etc. (Kumbar and Sangam 27).

**4.2 Online journals**

These are paid journals that are available on “cost-per-access” basis via online database such as Knight-Rider Information (ISI, Philadelphia), EBSCO Information services etc. (Woodward and McKnight 72). Online databases provide access to a large number of bibliographic and full - text journals. Such databases have been found very useful for providing various types of library services. ‘On-line’ refers to the fact that searcher is in direct communication with the database. A search is conducted in a two way interaction between the searcher and with the computer. Online set up usually consists of a PC, modem, and STD line and subscribers password code (Thiruvarasu 58). Online services can be accessed locally from three major telecommunication carriers TYRNE, TELNET and UNINET. There are many other online services available apart from these three.

**5.0 ADVANTAGES OF E-JOURNALS**

Electronic journals have revolutionized the whole concept of traditional librarianship. It seems now that more weighted is being given to accessibility of information rather than to its holding. The emphasis is on economic accessibility and usage of information. E-journals availability on
internet has brought number of advantages like interactive searching, availability throughout 24 hours, 365 days and availability of information prior print form for both the libraries and the user community. There are several advantages of e-journals such as:

5.1 Speed of Production and Distribution
The printing and mailing processes are eliminated while authoring and publishing systems can be integrated easily by computer-readable text. Also electronic transmission, especially in the review process, saves valuable time. This production mode also established networking support to collaborative authorship and electronic communication among authors, editors, referees, and other participants in the publishing process (Lancaster 523-524). For the offline portion of electronic journals, it is evident that the portability increases, as a simple CD-ROM can hold several thousand articles with complete indexing and graphics. This speed advantage of electronic journals facilitates prompt annotation and commentary by the community of scholars worldwide (Chan 11).

5.2 Accessibility
User can access a particular articles or journals within minutes, or even seconds, rather than hours or days because of physical spatial constraints, provided equipment is available large collections of material can be searched and retrieved simultaneously and instantly. There is an active rather than a passive dissemination of information if there are "interest profiles" of readers kept with the publishers. This active dissemination mechanism is that whenever new articles are accepted into the database, the readers would be alerted at their desktop. In other words, electronic journals allow intelligent full text retrieved based on past use and interests (Chan 12).

5.3 Subscription Costs
Some online electronic journals can be accessed without paying any subscription charges or membership fee but printed journals always require a subscription fee. There are various journals which are freely available on web.
5.4 Economical
Electronic journals could be distributed more economically than print journals, because the main cost of repairing the text, the review process and other such procedures are not as capital-intensive as the costs of printing and mailing print copies. E-journals are also delivered rapidly as there is no time lag between its publication and delivery as it is received instantaneously.

5.5 No Fear of Loss and Mutilation
E-journals cannot be mutilated; stolen or misplaced this is the main advantage of electronic journal over print resources.

5.6 Multimedia Capabilities
Besides the traditional plain text, tables, figures and graphics, other innovative ways of presenting research results can be supported by electronic page layout. Interactive three dimensional models, motion video and sound are a few possibilities with e-resources

5.7 Internet and External links
Hypertext and hypermedia formats enable linkages among sections within an article and among articles in journals and other electronic resources. Publishers, research groups, even authors can be contacted conveniently via electronic links. Users have more creative ways to have their information queries answered. Searching and browsing are no longer linear (Chan 12).

5.8 Seamless Access
Providing seamless access to information has always been the professional dreams of librarians. The concept of seamless access defines the rules and benefits of emerging digital library environment. The traditional models of information access and delivery follow a two step process which generally happens as two separate events in time. First the user searches a database and finds articles of probable relevance. Second, he checks his library collection or alternative sources for obtaining copies of the articles. The second part always frustrated the user, often making the first part of the exercise futile. E-Journals and the emerging access and delivery models has completely eliminate this frustration, integrating the two steps in real time. On finding the article of his choice from a database or from a reference list of citations while
browsing an electronic journal, the user can instantly access the complete article through a mouse click (Sathyanarayana 1-2).

6.0 LIMITATIONS OF E-JOURNALS

The following limitations are associated with the services of electronic journals, if subscribed in a library (Khan; Sridevi, Satyanarayana and Murthy 318, Gurdev Singh 244):

- Even though it is becoming cost effective, but initial investment is high. Special equipment (computer or printer) are required.
- Potential authors are reluctant to submit their papers in e-journals as scientist's main consideration in choosing a journal is its standard and reputation which is many times doubtful.
- Unless the system is not easy to use, contributors have no increase to change their normal pattern of publication.
- Uncomfortable for sustained reading on computer screen.
- Required technological support and compatibility of hardware may vary from one publication to another.
- Different formats have different pricing schemes, making their selection, use and organization increasingly difficult.
- They may take some time to display page images conveniently on computer screen.
- Involve legal copyright issues.
- The pricing scheme of some suppliers is very complicated and limiting and this might hinder libraries from utilizing e-journals.
- E-journals and articles are not physically present in the library.
- Often not included in indexing & abstracting services.
- Publishers change their day to day terms & conditions.
- Possibility of data manipulation by unauthorised persons
- Lack of archiving and back files availability.
- Perishable citation: once printed, the details of paper journal remain constant. Thus, finding them again is easy. However websites change their URLs or frequently disappear altogether.
7.0 DEVELOPING COLLECTION IN E-JOURNAL

In recent years, the internet has created a new environment that dramatically changes the ways people seek information and the way libraries deal with it. Academic libraries feel the pressure of adapting themselves to the digital environment. E-journal is one of the significant digital components of the collection of libraries. A recent article in the Nature Magazine (Butler 196) which investigates the transition of print journals to e-journals concludes that a journal without a web version is rare and probably endangered. There are major factors which enforce the publishers to accept the transition to e-journal such as the convenience of web for access and browsing; facility of internet for delivery, digital library revolution which is promising instant delivery of complete information and not just the bibliographic surrogates to users’ desktop, in a seamless manner. But at the same time, e-journals, unlike the traditional print material, pose challenges such as access, interface, technical support, licensing and archiving. In this way, the traditional concept of collection management is undergoing change because the challenges to provide access to electronic journals warrant a separate collection development policy focusing on these materials.

Collection development is one of the components of collection management. It is the selection and acquisition of library materials, considering users’ current needs and future requirements. But collection management is much more than collection building alone. It involves managing the use of the collection, its storage, its organization and making it accessible to users. Special libraries these days, face specific challenges owing to exponential growth in publishing, increasing cost of publications, increasing user demands, budget constraints, space shortages, etc. In view of these factors collection development policy for the selection and acquisition of literature becomes very important besides efficient techniques of storage and retrieval, maintenance (including, care and repair of publications, occasional weeding out programs), inter-library cooperation, and reprographic services. The principal library collection for most scientific and technical libraries are of books including society publications, periodicals, standards, patents, reprints, trade literature, maps, translations, microfilms, etc. With regard to e-journals, the serials librarian coordinates the selection, acquisition, and management of electronic journals, as well as the allocation and management of the budget for e-journals subscriptions where as the electronic resources librarians are responsible for the negotiation and management of licenses.
and contracts (Kwantlen Polytechnic University).

**8.0 ISSUES AND CHALLENGES ASSOCIATED WITH E-JOURNALS**

There are many issues and challenges associated with e-journals. Librarians have been dealing with different formats of reading materials for over many years but the e-journals have thrown up several issues. Some of them are as follows:

**8.1 Refereeing**

Refereeing or peer review is a unique characteristic and process of scholarly journal publishing in which external references or editor or an editorial board imposes stringent criteria on acceptance of contributions (Lancaster 525). There have been challenges for electronic journals in getting contributions because the legitimacy of electronic journals is questioned by tenure committees in academic institutions (Tenopir 577). Nevertheless, vigorous peer review process is implemented in many scholarly electronic journals.

**8.2 Archiving**

Preservation of collection for posterity for all times to come has been one of the basic functions of library to provide the required information or document whenever it is needed. But archiving the e-journals is a big question. Publishers are involving their commercial policy and exercising customized technical features and controls for delivering them to libraries for archiving. Some publisher's offer choice to libraries either to use publisher's remote archive or to develop their own archives. Basically, archiving has become a domain of e-publisher or aggregators, e.g. and EBSCO, TDNET.

**8.3 Hardware and Software Connections**

All libraries cannot afford to have full connectivity to internet with full functions to access, download and preserve e-journals. The cost involved in creating the entire infrastructure for using different e-journals. The national informatics centre (NCI), New Delhi and Videsh Sanchar Nigarn Limited (VSNL) are offering internet connections with limited facilities like e-mail etc., at cheaper rates but accessibility to full text articles through such connections is still under consideration (Hickey 530).
8.4 Network traffic

Due to uncontrolled growth of resources and their accessibility on the internet, there is likelihood of traffic congestion. As a result connectivity will take more time. Data transfer will slow down, hence those who want to search full text articles with graphics and images will have to wait for more time to download information from the server (Malinconico 223).

8.5 Economic Factors

This is one of the key factors for the success of e-journals at present there seems to be an economic advantage to libraries because publishers are allowing e-journals access irrespective of library subscription to print or to electronic version. Electronic version is cheaper by 10% to 20%. These saving will be consumed by overhead costs in maintenance of computer hardware, software etc.

8.6 Storage and Archiving

Librarians are bound to encounter problems associated with storing and retrieving data, providing printouts, upgrading the retrieval software, and whether new software can handle previously converted data. Though the cost of hard disc is going down considerably yet storage of current as well as back runs will be difficult to cope with.

8.7 Standardization

A standard format for e-journals has not yet been developed. There are several file formats viz. PDF, SGML, HTML, TEXT, ASCII, etc the libraries will need to have all the necessary software to access, retrieve, view, download and print the articles. The most popular among above are PDF and HTML file formats.

8.8 Copyright and Licensing

Copyright provides protection of the intellectual property of the author in order to preserve the originality and integrity of the work, warrant for the attachment of the author and the work in public and protect the authors’ ideal an economic interest and benefits, including publication and reproduction of his / her work.
Electronic journals presently emphasized information access instead of ownership. There are several copyright problems due to the inadequacy of current legislation and the case of replication, modification and transmission. While commercial publishers are experienced in this area, they are asserting their entitlement to copyright and intellectual property rights through various licensing policies. So as flat fee subscription, set price by potential users in institution and other charges (Tenopir 589). On the other hand, downloading and redistribution of electronic information is very easy and scholarly communities value sharing of information and the academic model of electronic journal publication reasserts gift culture.

8.9 Acceptability of Electronic Journal
Acceptability of e-journals by authors, librarians and end users is another issue on which diverse opinions have been expressed. It is regarded as a transition phase in which acceptability of electronic journal is still a matter of concern.

8.10 Training and Education
With the emergence of new technology, one should know how to handle it and keep oneself up-to-date about its use. All librarians and users may not have any familiarity in using the technology associated with e-publications. Thus, their training will be required for full exploitation of such material. Since technology is changing very fast, it will require upgradation, which will not be cost effective in any way.

9.0 CURRENT TRENDS
There is an exponential growth in the number of electronic journals. The seventh edition of the Association of Research Libraries Directory of Electronic Journals Newsletter and Academic Discussion lists contains 3,400 serial titles; while 1,465 of them are categorized as electronic journals. There are 1,049 peer reviewed electronic journals compared to 417 in the 1996 edition. The number of electronic journals increases from 700 titles in the fifth edition in 1995, 440 in the fourth edition in 1994 and 110 in the first edition in 1991. Since electronic journals are proliferating extensively, they appear in most academic disciplines. The major broad categories are: Science, Technology and Medicine (STM); arts and humanities; and social sciences. There are also various special categories of e-journals that are devoted to the specific topics (Chan 11).
But there are many predictions on how far reaching electronic journals can be. Some authors are more optimistic than others. Crawford and Gorman (157) assert "that electronic journals will fail eventually if they are just a means of distribution the production cost". With the proliferation of information and journal titles, the roles of publishers, readers, researchers and libraries are increasingly blended and give rise to consortium transaction and the consortium model will require libraries to shift from owning model to an access model.

9.1 Access Vs. Ownership

There is a major shift in information management from owning a serial to accessing it. Earlier, housing a large collection and investing a large amount used to be a matter of seat pride for a library for being capable of meeting most of its users' requirements with its own resources. But today, in an electronically accessible environment, physical location of information is becoming less and less important. The very concept of ownership has been left behind. The emphasis has now shifted from building strong local collection (traditional) to accessing electronic materials available anywhere in the world Harloe and Budd (83). Most of the publishers like the American Institute of Physics; American Mathematical Society etc. have announced their subscription policy for e-journals. Its cost is marginally less than corresponding printed version and subscription is valid for one year like print serials. In this way we conclude that electronic journals open up many exciting opportunities and potentials for academic libraries.

9.2 Consortium Transaction

Indian Higher Education System is one of the largest system in the world, facing challenges due to globalization, increased academic population, knowledge explosion in different forms and a lot of research and development projects on one side and on other side reduced budgets, diversity of user's needs, reduction in staff, inflation, escalation in cost of scholarly publications and so on Mounissamy, Kalliammal, and Thirunavukkarasu (26). The rapid progress of information technology through R&D activities all over the world now tries satisfy the information needs of the human being in multidimensional form and voluminous development has urged the libraries to adopt new philosophies and technologies for collection development and reduce the cost of information. The library consortia is a better solution because the reduction of cost is achieved.
by the consortium acting as an agent on behalf of all member libraries to negotiate a purchase price that is lower than that available to an individual institution Labo and Bhandi (63).

It provides an opportunity to maximize cooperative collection building and for resource sharing over the long term. There exist many consortia venture at national and international level. In India, the major consortia includes: CSIR Consortia, FORSA, HELINET, IIM Library Consortia, INDEST Consortia etc, serving a wide cross section of research and development institutions.

Few examples of consortia at the international level includes following.

- NOVANET: NOVANET established in 1988 is a consortium of academic libraries.
- Center for Research Libraries (CRL) - a consortium of North American universities, colleges, and independent research libraries.
- Arizona University Libraries Consortium (AULC)
- The International Coalition of Library Consortia (ICOLC) - It was established in 1997 and serves higher education institutions.
- Me Gill affiliated Health Sciences Library Consortium: The consortium was established in 1990.
- Consortium of Academic Libraries in Manchester (CALM): was established in 1992.
- Co-operative Action by Victorian Academic Libraries (CAVAL)(Australia): was established in 1978
- South Asia Library Consortia: Members of the committee on Cooperation Institutional Corporation (CIC) with major South Asia Collections joined together in 1993 for a program of cooperative activity and also ensured the development of Digital South Asia Library.
- The Washington Research Library Consortium (WRLC) is a regional resource sharing organization established by several universities in the Washington D.C. and so on. It was founded in 1987.
- China Academic Library and Information System (CALIS): was formed in 1998 and it is a nationwide academic Library Consortium.
- Ohiolink: Established in 1987, No. of libraries covered 84.
- Heal-link: No. of libraries covered 32 institutions covered 18 Higher educational and 14 technical institutions
• Virtual Library of Virginia: USA (VIVA) – 1994 participating libraries 68, types of institutions covered state colleges and universities.

• Consortium of Academic Library of Catalonia (CBUC) is formed in 1990 by eight public universities of Catalonia, whose mission is to improve library services through cooperation (Labo and Bhandi 63).

10.0 E-journals in Science and Technology

J H Poincare, the French genius, once wrote: ‘science is built of facts, the way a house is built of bricks; but an accumulation of facts is no more a science than a pile of bricks is a house’. These facts, deriving from observation and experiment, have first to be communicated to the scientific community and then consciously integrated into the structure of knowledge. As John Gray and Brian Perry had said, ‘science would not be science without scientific communication’ and a Royal Society has proclaimed, ‘science rests on its published record’ (Grogan 13-14). In the field of science and technology, primary literature published in the form of periodicals, journals, research reports, patents, standards, reports of scientific expeditions etc is very significant.

Among various primary sources, journals are regarded as vital source of information for the scientific research and development. Most new discoveries and novel presentations of ideas first appear as journal articles. With the emergence of IT applications, particularly Internet, there has been a major shift from traditional print journals to electronic journals (e-journals) in view of many advantages of the latter, i.e. fast, easy, ‘anywhere-anytime’ accessibility, sharability, hyperlink facility to related texts, cost-effectiveness and obviation of the storage problem encountered in the case of print journals. As a result, the number of e-journals is fast growing and at present 15,000+ e-journals are available in S&T areas alone.

The continuous escalation in price of e-journals has adversely affected the information resource base of R&D/academic organizations. Further, no single library can subscribe to all e-journals in all subject disciplines thus as a result of which libraries involved in resource sharing activities. Conventional type of resource sharing activities like Inter Library lending was predominant in these institutions. The technology driven environment has made the various libraries to think of consortia to cope with the ever increasing needs, but never increasing budget. CSIR Consortia,
FORSA, HELINET, IIM Library Consortia, INDEST Consortia in India serving a wide cross section of institutions. One can access e-journals of various subjects from these consortiums.

10.1 Prominent Online Databases in Science and Technology

The major publishers offering electronic resources especially online databases, electronic journals, e-books etc in the field of science and technology includes following:

- **ScienceDirect**
  It is a leading full-text scientific database offering journal articles and book chapters from more than 2,500 peer-reviewed journals and more than 11,000 books. There are currently more than 11 million articles/chapters, a content base that is growing at a rate of almost 0.5 million additions per year. ScienceDirect is a part of Elsevier, which is the world's largest scientific, technical and medical information provider. ScienceDirect covers authoritative titles from the core scientific literature, including high-impact factor titles such as THE LANCET, Cell and Tetrahedron. The articles in ScienceDirect are broadly grouped in in four main sections: Physical Sciences and Engineering, Life Sciences, Health Sciences, and Social Sciences and Humanities (SciVerse).

- **SpringerLink**
  SpringerLink is a leading global scientific, technical and medical publisher, providing researchers in academia, scientific institutions and corporate R & D departments with quality content via innovative information products and services. It is providing researchers with access to millions of scientific documents from journals, books, series, protocols and reference works. A total of around 7.5 million content items can be accessed from SpringerLink. Springer believes it has the largest open access portfolio worldwide, with over 350 open access journals (Springer).

- **Wiley-Blackwell**
  Wiley's Scientific, Technical, Medical, and Scholarly (STMS) business, also known as Wiley-Blackwell, serves the world's research and scholarly communities, and is the largest publisher for professional and scholarly societies. Wiley-Blackwell's programs encompass journals, books, major reference works, databases, and laboratory manuals,
offered in print and electronically. Wiley Online Library provide online access to a broad range of STMS content: over 4 million articles from 1,500 journals, 9,000+ books, and many reference works and databases (Wiley).

- **Nature Publishing Group**
  Nature Publishing Group (NPG) is a publisher of high impact scientific and medical information in print and online. NPG publishes journals, online databases, and services across the life, physical, chemical and applied sciences and clinical medicine.

- **American Institute of Physics (AIP) Publishing**
  The American Institute of Physics (AIP) is a not-for-profit membership corporation created for the purpose of promoting the advancement and diffusion of the knowledge of physics and its application to human welfare. AIP Publishing LLC provides the global physical science community with a comprehensive collection of highly cited peer reviewed scientific information. Accessed by researchers at nearly 4,000 institutions worldwide, AIP Publishing’s portfolio of 17 journals includes prestigious titles such as Applied Physics Letters, Journal of Applied Physics and The Journal of Chemical Physics, and the AIP Conference Proceedings series (American Institute of Physics).

- **American Chemical Society (ACS) Publications**
  ACS is a congressionally chartered independent membership organization which represents professionals at all degree levels and in all fields of chemistry and sciences that involve chemistry. ACS Publications is the division of ACS provides the worldwide scientific community with a comprehensive collection of the most-cited, peer-reviewed journals in the chemical and related sciences. ACS Publications publishes more than 40 journals, Chemical & Engineering News, C& EN Archives, ACS Legacy Archives, and the ACS Symposium Series via its award-winning web-based platform. ACS journals are #1 in citations or Impact Factor in the seven chemistry categories as well as nine additional categories (American Chemical Society).
• **World Scientific Community**
  World Scientific Publishing Company was established in 1981, it is one of the leading scientific publishers in the world, and the largest international scientific publisher in the Asia-Pacific region. World Scientific publishes about 500 new titles a year and 120 journals in various fields. Many of its books are recommended texts adopted by renowned institutions such as Harvard University, California Institute of Technology, Stanford University and Princeton University (World Scientific).

• **Cambridge Journals Online**
  Cambridge Journals Online (CJO) is the online journals publishing service of Cambridge University Press. CJO hosts leading journals across multiple disciplinary collections of over 320 leading journals covering subjects including science and technology, medicine, and the humanities and social sciences. (Cambridge University Press)

• **Royal Society of Chemistry (RSC) Publishing**
  The RSC is the largest organization in Europe for advancing the chemical sciences. Supported by a worldwide network of members and an international publishing business, its’ activities span education, conferences, science policy and the promotion of chemistry to the public. RSC publishing provides access to journals, books and databases linking over 1,121,413 chemical science articles and chapters. One can access the latest research of interest using the custom eAlerts, RSS feeds and blogs or one can explore content using the quick and advanced searches. RSC provide access to the highest quality of integrated scientific research.(RSC.Publishing)

• **MIT Press**
  The MIT Press is the only university press in the United States whose list is based in science and technology. It publish about 200 new books a year and over 30 journals (The MIT Press).

The Prominent Citation Analysis Resources in the field of Science and Technology includes:
• **Scopus**

Scopus is the largest abstract and citation database of peer-reviewed research literature with more than 20,500 titles from more than 5,000 international publishers. It includes 49 million records, 78% with abstracts and over 5.3 million conference papers. It offers researchers a quick, easy and comprehensive resource to support their research needs in the scientific, technical, medical and social sciences fields and arts and humanities. (SciVerse)

• **Web of Science**

It is the world’s most trusted citation index covering the leading scholarly literature. It covers over 12,000 of the highest impact journals worldwide, including Open Access journals and over 150,000 conference proceedings. One can find current and retrospective coverage in the field of sciences, social sciences, arts, and humanities, with coverage to 1900 (Thomson Reuters).

11.0 CONCLUSION

Electronic journal open up many exciting opportunities and potentials for science and technological libraries in research and development institutions. This new service has a vast potential of providing a quality service. They possess many advantages and disadvantages. Librarians need to be able to identify and balance the factors that would make electronic journals a success or failure in their libraries. However in the context of shrinking budgets it is very essential to evaluate each e-journal so that the expenditure is justified economic prosperity has direct linkage with the growth of facilities for access to information. More and more libraries are redirecting their funds to offer free, direct on demand articles services to patrons. The technology has led to inevitable change in day-to-day working of libraries. To promote the use of e-journals in research and development in science and technological institutions, it is pertinent that libraries should improve their ICT infrastructure.
REFERENCES


