

# ANALYSIS OF SCHOLARLY RESEARCH AND IMPORTANT FACTORS OF ELECTRONIC JOURNALS

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**Abstract:** E-journals are playing important role in all intellectual sectors in upgrading the knowledgebase of various stakeholders of these sectors. With the objectives of helping researchers to initiate new research, and to help librarians and users to understand the status of electronic journals in terms of their development, usage, acceptance, awareness and other important aspects; the study reviewed important research articles on electronic journals. Some important areas are identified for new research. From the analysis of the database, it is found that overall awareness and usage rate of electronic journals is good, these improve overall usage of library, they are also indispensable resources for researchers, faculty and students. The study concluded that research should be continued on important aspects of e-journals to improve their features and service capabilities, libraries should provide access to useful e-journals and improve facilities and infrastructure to up-lift the satisfaction of their users.

Note : i. The phrases ‘e-journals’ and ‘electronic journals’ are used interchangeably with the same meaning.

ii. The phrases ‘topics’ and ‘factors’ are used interchangeably with the same meaning.

**Key Words:** e-journals, electronic journals, research, impact, internet, web technologies, library.

## 1.0 Introduction

Accessing research outputs for carrying out new research and updating knowledge has become essential in the present knowledge and competitive society. Even with the availability of plethora of information, original and high value information coming out of research is under high demand. Print journals by nature have some limitations, difficulty in retrieving information, delay in publication; high subscription costs, destroy and diminish in physical entity, etc. Electronic journals emerged as solution to the problems associated with print journals. With the in-depth penetration of information and communication technologies, internet and web technologies in the society, especially in the education and research sectors, user expectations and information seeking behaviors changed to greater extent. Print media has become insufficient to fulfill the diverse demands of users. Continuing research to improve the service capabilities of electronic journals has become essential. This paper aims to analyze the research trends in the field of electronic journals and to notify the areas in which scope is more for new studies.

## 2.0 Objectives of the Study .

1. To analyze research works done in the field of e-journals and to identify the gaps in research or scope for new research in the field.
2. To analyze important factors of e-journals.
3. To study the evolution and development of e-journals.
4. To Study the impact of e-journals on research and academic libraries.
5. To analyze the awareness and usage rate and use patterns preferred by users

6. To Study the pricing aspects of e-journals with reference to print journals.
7. To study the consortium initiatives and their effect on users and libraries.
8. To study the evaluation strategies for e-journals.
9. To study preservation and archiving standards and practices of e-journals.

### 3.0 Research Methodology

The study is based on the data collected from various research studies on electronic journals. This is not a review paper, but only data is obtained from research literature. Literature originated from research is a great asset which retains authentic facts, analyzing such facts, apprehending the results of various research works and produce new knowledge using those facts is the purpose of this study.

Four potential sources had been identified for obtaining information on the topic:

- (1) Google scholar
- (2) Google
- (3) Proquest database
- (4) Springer e-journals database

Search is carried out using keywords 'e-journals' and 'electronic journals', all full text documents related to the topic were downloaded. About two hundred documents comprising journal articles, reports, reviews, book chapters, power point presentations were downloaded. Since analyzing the research studies carried out on the topic is main objective of this paper, about 128 research articles which are very relevant to the topic are selected for the study. In the first level analysis of abstracts of the articles, 10 important topics of electronic journals are identified and articles are categorized accordingly (details provided in Table I). Many articles covered multiple topics; those articles are added under all the topics it has covered.

In second level analysis, abstract, conclusions and in some cases full-text of the articles are deeply analyzed and all data required as per the objectives of the study are derived. The works carried out and the scope for new research is analyzed and discussed in all major areas studied. Based on the analysis of the derived data, important implications are made on all important factors of electronic journals identified for the study.

### 4.0 Review of Literature

Important literature published on the topic has been reviewed and presented here to show the works done on various areas of the topic. The study found literature on electronic journals starting from 1985. The study found about 128 research articles which are very relevant to the topic. Important studies related to various sub-topics of the study are presented under.

- **Evolution and Development of Electronic journals** : e-journals were in experimental stage during later 1980s (Case, Donald, 1985, D. J. Pullinger, 1986). E-journals started emerging from 1990 (Paul Metz and Paul M. Gherman, 1991, Okerson, An, 1991). Time to time changes in the fields of computer and web technologies affect various aspects of electronic journals – format, styles, user interfacing, interactivity, archiving, pricing, open access system etc. (Borwein, Jonathan; Smith, Richard, 1997). In future e-journals, users will be able to link and manipulate documents or parts of documents into sets of related ideas (Chern Li Liew; Schubert Foo; Chennupati, K R, 2000).
- **Awareness and usage pattern of electronic journals** : the study found literature on the topic in 50 articles starting from late 1990s, usage and awareness rate was very low during the time (Speier, Cheri; Palmer, Jonathan; Wren, Daniel; Hahn, Susan, 1999). Awareness and usage improves along with the improvement in availability and features of e-journals starting from the year 2000 (Carol Tenopir, Donald W King, 2002, Golnessa Galyani Moghaddam & V.G. Talwar, 2008). User's information seeking behavior changes with the availability of e-journals (Martin J. Brennan, Julie M. Hurd, Deborah D. Bleic, and Ann C. Weller, 2002). There are variations in use pattern of e-journals; a small number of journals formed the majority of total use (Philip M. Davis, 2002). Small number of heavy users contribute to larger total downloads (Davis, Philip M; Solla, Leah R, 2003). Electronic journals were mostly used for research needs followed by education. Even though Electronic journals opened up many exciting opportunities and potentials for academic libraries, e-journal may not completely replace the existing print version but both will complement each other to meet the needs of the users (Umeshareddy Kacherki and Mahesh J.Thombare, 2010). There is no doubt, e-journals will play a key role in the acquisition of knowledge by the needy in the future (T.Indrani and Dr. V. Radhakrishnan, 2014).
- **Impact of electronic journals on libraries** : Nisonger, Thomas E (1997) analyzed basic library collection management issues regarding electronic journals specifically: selection, collection evaluation, archiving/preservation, and policy making. Ashcroft, Linda; Langdon, Colin (1999) investigates benefits of and barriers to the purchase of electronic journals in university library collections in the UK and North America. Chan, Liza (1999) delineates the positive and

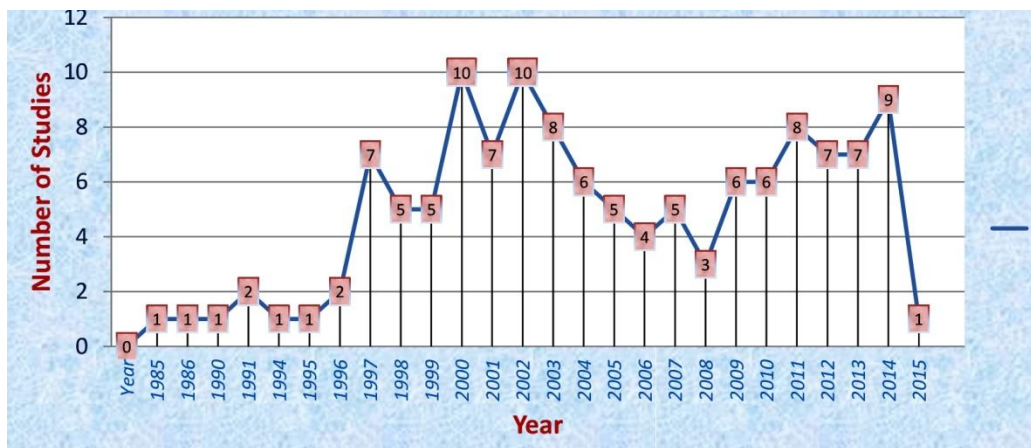
negative aspects of the technology and reviews the crucial issues and trends concerning electronic journals. **Carol Hansen Montgomery (2000)** did a case study on background and development of the migration to an electronic journal collection by the W.W. Hagerty Library of Drexel University, Philadelphia. Calvert, **Hildegund M (2000)**, reports the results of a series of studies conducted at Ball State University Libraries to examine the impact electronic journals and aggregate databases have on interlibrary loan activities. **Carol Hansen Montgomery & Donald W. King (2002)** studied the impact of a library's shift to electronic journals on staff and costs. **Zhang, Xiaoyin (2003)** Describes how electronics resources have affected traditional print journals activities and the periodical section staff in a university library responded to the changes. **Zhang, Xiaoyin;Haslam, Michaelyn (2005)** Evaluated UNLV libraries collection and re-evaluated the organizational structure, staff resources and workflow to find the best ways of providing reliable access to electronic resources for the users. **Adina Gonza lez Bonorino and Valeria E. Molteni (2007)** – studied the impact of Electronic journals exerted on different services and areas making in Argentine private universities. **Amritpal Kaur (2011)** examine the impact of e-journals on university libraries in India, in terms of resources, staffing, space, technical services and equipment. **Faizul Nisha, (2012)** presented whole process of acquisition of e-journals including management issues and the problems associated with them.

- **Impact of electronic journals on research and scholarly communication:** **Harter, Stephen P (1996)** assesses the extent to which scholars and researchers are aware of, are influenced by, and build their own work upon research published in e-journals. **Stephen P. Harter and Hak Joon Kim (1997)** studied the impact of electronic journals on scholarly communication. **Ahmed Taha (2004)** analyzed how e-journals changed the way that the researchers seek and exchange scientific information at UAEU library. **Ian Rowlands (2009)** studied on how researchers have responded to the unprecedented levels and convenience of access to scholarly journals. **R Guruprasad; Khaiser Nikam and Vidyadhar Y Mudkavi (2010)** studied on how scholarly electronic communication and e-journals effect the change in pattern of information seeking and reading by aerospace scientist and engineers working in the Indian aerospace organizations. **Shesh Mishra, Shiv Singh, Reena Mishra,Swati (2014)**. investigate the level of awareness and utilization of electronic journals or E-journals among research scholars (RS) of Banasthali Vidyapith (BV), Rajasthan, India. **Shiv Singh, Sanjay Kataria (2014)** compared between the awareness & use of e-Journals among the research scholars and faculty members.

**5.0 Data Analyses**

**5.1 Research Trends on Electronic Journals**

About 128 research articles are analyzed and various research studies carried out on important aspects of e-journals are discussed. The reviewed articles are published during the period of 31 years from 1985 to 2015.



**FIGURE 1. - YEAR WISE RESEARCH STUDIES ON E-JOURNALS**

**5.2 Distribution of Literature among Topics and Periods**

For better understanding of the trends in research, 31 years is divided into 4 periods, 1985-2000, 2001-2005, 2006-2010 and 2011-2015. 10 important topics related to e-journals are identified and the topic wise and period wise analysis of literature is made.

Table 1. Distribution of Literature among Topics and Periods

Topic	Number of articles discussed the topic during the period				Topic wise total studies
	1985-2000	2001-2005	2006-2010	2011-2015	
Archiving and preservation	2	2	2	0	6
Awareness and usage pattern of electronic journals	2	14	11	23	50
Electronic consortium	3	1	3	1	8
Evaluation	1	1	0	1	3
Evolution and Development of Electronic journals	14	8	9	4	35
Impact of electronic journals on libraries	7	12	2	3	24
Impact Of Electronic Journals On Research And Scholarly Communication	3	2	5	7	17
Open Access Electronic journals	1	0	0	2	3
Pricing Patterns	6	4	1	0	11
e-journal services	2	4	3	1	10
<b>Period wise total studies</b>	<b>41</b>	<b>48</b>	<b>36</b>	<b>42</b>	

### Period Wise Analysis of Research studies

#### During the period 1985-2000

1. Most studied topic during the period is 'Evolution and Development of Electronic journals' since e-journals evolution was in early stage, in late 1990s
2. Second most studied is 'Impact of electronic journals on libraries' due to increase in availability of e-journals.
3. Third most studied topic is 'Pricing Patterns' due to the factor libraries were interested in comparing e-journals prices with print journals.

#### During the period 2001-2005

1. Most studied topic during the period is 'awareness and usage pattern of electronic journals'
2. Second most studied is 'Impact of electronic journals on libraries'
3. Third most studied topic is 'evolution and development of electronic journals'

Influencing factors during the period are: More users started using e journals, more and more libraries started subscribing and more advanced value added features are integrated with e journals.

#### During the period 2006-2010

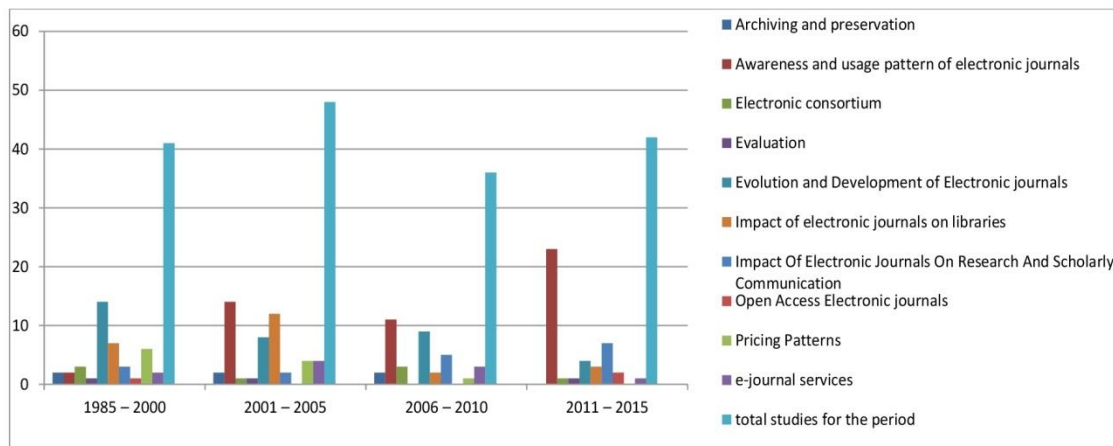
1. Most studied topic during the period is 'awareness and usage pattern of electronic journals'
2. Second most studied is 'Evolution and Development of Electronic journals'
3. Third most studied topic is 'Impact of Electronic Journals on Research and Scholarly Communication'.

This correlates with the factors such as usage, development and impact of electronic journals attracts more research studies since these topics demand for continuous improvements in order to enhance user friendliness and usage rate of electronic journals.

#### During the period 2011-2015

1. Most studied topic during the period is 'awareness and usage pattern of electronic journals'
2. Second most studied is 'Impact of Electronic Journals on Research and Scholarly Communication'.
3. Third most studied topic is 'Evolution and Development of Electronic journals'.

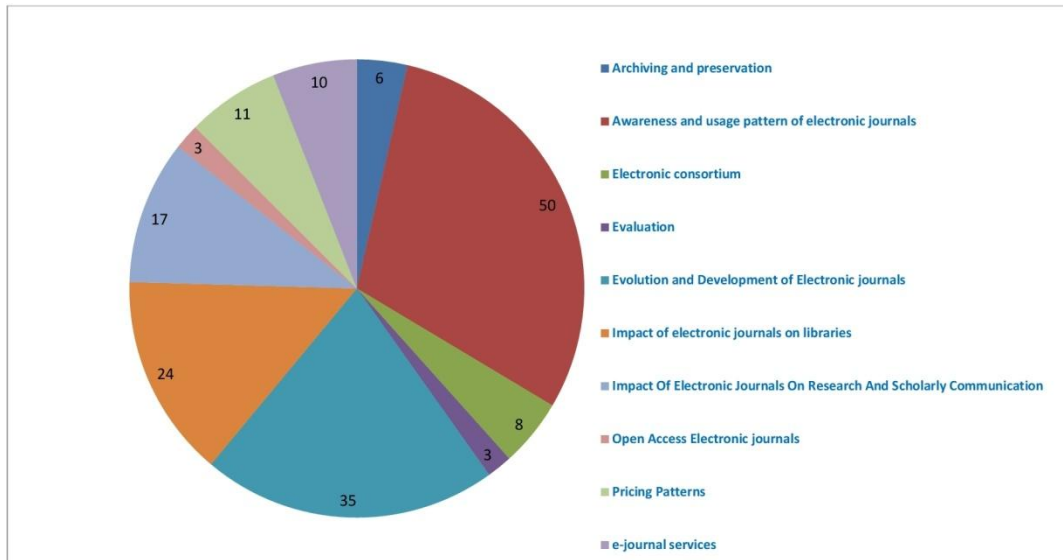
In recent years also more research has been carried out on the topics usage, development and impact of electronic journals in order to inflate the value and usage rate of electronic journals.



**Figure 2. PERIOD WISE ANALYSIS OF RESEARCH STUDIES**

### 5.3 Topic Wise Analysis of Research Works

- 'Awareness and usage pattern of electronic journals' is the most studied topic, over all 50 studies covered the topic (39.06%). Period wise analysis also shows that the topic is studied extensively during 3 periods covering 15 years (2001-2015). The topic is less studied during the period 1985-2000 since e-journals were in initial stage of evolution, awareness and acceptance level among users was less.
- 'Evolution and Development of Electronic journals' is second most studied topic, 35 studies discussed the topic (27.34%). The topic is studied extensively during the 1985 to 2000. This correlates with the factor the period is early stage of evolution and development for electronic journals, considerable number of studies are done on the topic during next two consecutive periods 2001- 2005 (8) and 2006 – 2010 (9) respectively.
- 'Impact of electronic journals on libraries'(24 studies) and 'Impact of Electronic Journals on Research and Scholarly Communication'(17 studies) received third and fourth place respectively.
- Topics which received very less research are 'Archiving and preservation', 'Evaluation' and 'Open Access Electronic journals'. These topics are important areas to enhance the value of electronic journals and help the users and libraries in selecting and using good electronic journals. Hence high scope is there for new research in these areas.



**FIGURE 3. TOPIC WISE RESEARCH STUDIES**

**6.0 Study and analysis of important factors of electronic journals**

Analyzing important topics of e-journals and discovering various facts on each topic helps users, librarians, publishers, and researchers of e-journals in understand the status of various aspects of e-journals; which ultimately contribute for the development of electronic journals.

**6.1 Evolution and Development of Electronic journals**

For the convenience of effective notification of different stages of development, important developments are notified in 3 time periods 1985- 2000, 2001-2005, 2016-2015.

**6.1 .1 Important developments from 1985 to 2000**

From 1985 -1990 e-journals publication process were under experimental stage using computers and network technologies. From 1990 they started appearing and grown in numbers and also improved in their appearance and format by adopting time to time changes in computer, software, hardware and web technology fields. From later 1990s, more number of commercial publishers started publishing electronic version of their print journals. Usage rate also less, more users were not confident on the quality of e-journals. Slowly libraries were increasing e-journal subscription. More value added features like external links, mappings and search facilities appeared in later stages.

**6.1 .2 Important developments from 2001 to 2005**

There is a manifold increase in number of online journals. Well developed world wide web (www), internet, email, hardware and software technologies paved ways for advanced features in e-journals. Publishers started assigning ISSN for electronic only journals. With well acquaintance of computer and internet technologies, Users adapted to use e-journals. Enhanced features like retrospective conversion to electronic format and system integration add considerable value to the e- journals. Additional features like open URL link resolver and imported e-journals MARC records made e-journals access easier. More number of e-consortia are formed in India.

**6.1.3 Important developments from 2006 to 2015**

Majority of universities and higher education institutions started subscribing to e-journals. No major technical developments observed through the literature. More studies carried out related to use and usage patterns of electronic journals from 2008 onwards. More emphasis is on improving access and usage of e-journals.

**6.1.4 Awareness and Usage Pattern of Electronic Journals**

The study clearly perceived that numerous studies are conducted on ‘Awareness and usage pattern of electronic journals’. Out of 128 articles reviewed, 50 (39.06%) articles are related to usage and use pattern of e-journals.

Data drawn from the literature related to ‘Awareness and usage pattern of electronic journals’ are analyzed under 6 categories ‘Awareness about the availability of e-journals, usage rate, access methods, Search Strategies, Information Seeking and Use Pattern, and Obstacles for use.

**Table 2 Awareness and Usage Pattern of Electronic Journals**

1.	<b>Awareness about the availability of e-journals</b>						
	Factors Analyzed	awareness is good	Awareness through internet	Awareness through library staff	Awareness through faculty	Awareness through friends	Other methods
	Number of Articles Agreed	18	6	8	5	5	3
2.	<b>Usage Rate</b>						
	Factors Analyzed	e-journals have positive impact and useful	Usage rate is good	Usage for research	Usage For studies	Usage for upgrading knowledge	Usage For publishing Articles
	Number of Articles Agreed	25	32	14	9	7	6
3.	<b>Access Methods</b>						
	Factors Analyzed	Access through library systems	Access through computer lab	Access through Departmental library	Access at their place of convenience	IP based Access	-
	Number of Articles Agreed	8	6	3	2	3	-
4.	<b>Search Strategies</b>						
	Factors Analyzed	Key Word search	Boolean search	Phrase search	Basic search	Others	-
	Number of Articles Agreed	6	1	2	1	4	-
5.	<b>Information Seeking and Use Pattern</b>						
	Factors Analyzed	Information Seeking pattern Varies	Few journals contribute most for total usage	Few users contribute most for total usage	Change in user behavior due to e-journals	Frequency of use varies	Use pattern varies subject wise and institution wise
	Number of Articles Agreed	6	2	2	2	13	2
6.	<b>Obstacles for use</b>						

Factors Analyzed	Lack of search and use skills	slow Internet	Insufficient IT infrastructure	Non-availability of relevant and full text articles	Difficulty in reading from computer	Power failure
Number of Articles Agreed	19	13	8	9	4	2

- 18 studies agreed that awareness is good among users. Awareness through library staff is the major source of awareness (8 studies), searching through internet is the second source (6 studies), followed by awareness through faculty (5 studies), and friends (6 studies).
- Majority of studies (25 studies) found that e-journals have overall positive impact and useful in serving the purpose the users access them.
- Majority of studies (32 studies) found that Usage rate is good. Purpose of use in decreasing order:
  1. Research (14 studies)
  2. For Studies (9 studies)
  3. Upgrading knowledge (7 studies)
  4. Publishing articles (6 studies).
- Central Library is first preference for accessing e-journals (8 studies), computer laboratory is second preference (6 studies), followed by departmental library (3 studies), and IP based access.
- Keyword search is the most preferred search followed by phrase search.
- High skewness is observed in usage pattern, 6 studies agreed that user’s behavior changed due to e-journals. Frequency and duration of use varies highly (13 studies). Few journals contribute most for total usage, few users contribute most for total usage. Use pattern varies subject wise and institution wise.
- 18 articles mentioned that users prefer both e-journals and print journals
- 8 articles mentioned that users like positive features of e-journals, advanced and easy search and retrieval facilities, integration of multimedia, time saving, more interactive, external links etc;.
- Most preferred format is pdf (4 studies).
- Drawbacks of e-journals: lower quality than print, dependence on publishers for archiving, un-organized.

**7.0 Suggestions for Libraries**

An attempt to cumulate major suggestions given by authors of various studies for libraries to improve the usage of e-journals is also been made.

**Table 3 - Suggestions for Libraries to Improve Usage Rate of E-Journals**

Suggestions	Number of studies
Develop and maintain Balanced collection (print + electronic) with user needs	4
Improve IT infrastructure – Internet speed, computers, networking	6
Create Awareness through training programs, library / institution web-site, advertising and promotion	5
Arrange user training programs on usage and search skills	12
Have skilled library staff	2

**Important suggestions**

- Arrange user training programs on usage and search skills ( 12 studies).
- Improve IT infrastructure – Internet speed, computers, networking (6 studies).
- Create Awareness through training programs, library / institution web-site, advertising and promotion ( 5 studies).
- Develop and maintain Balanced collection (print + electronic) with user needs ( 4 studies).



- Have skilled library staff (2 studies).

### 8.0 Impact of Electronic Journals on Libraries

The review found 26 (20.31%) articles discussed on the topic.

**Table 4 - Impact of E-Journals on Libraries**

Area of impact	Number of studies agreed
Positive impact on libraries	<ul style="list-style-type: none"> <li>• 6 studies agreed on e-journals have positive impact on libraries and usage of library</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>• 4 studies agreed that there is impact on infrastructure of periodical section, increase in systems, implementation of LAN &amp; networking, developing library gateways</li> </ul>
Collection development & Management	<ul style="list-style-type: none"> <li>• 5 studies proved that libraries have to manage collection with the combination of print and e-journals based on the users interests.</li> <li>• 4 studies mentioned that there is decrease in print journals subscription due to increase in e-journals subscription</li> </ul>
Budget	<ul style="list-style-type: none"> <li>• 4 studies agreed that there is increase in overall expenditure due IT infrastructure costs in addition to journal subscription costs. Whereas only one article argued that cost is lower in long run</li> </ul>
Staffing	<ul style="list-style-type: none"> <li>• More studies mentioned about additional training requirement for staff for managing and providing services to users</li> <li>• 2 studies showed that more staff are required for managing and providing services to users</li> <li>• 2 studies showed that there is increase in workload due to e-journals</li> <li>• Position of librarian and library staff enhanced – (1 study)</li> </ul>
services	<ul style="list-style-type: none"> <li>• ILL – Mixed Response- cannot say (1), have impact (1), no impact (1)</li> <li>• Decrease in Document delivery service (2)</li> <li>• Decrease in photocopying demand (1)</li> </ul>
Space	<ul style="list-style-type: none"> <li>• Increase in space (2)</li> <li>• Decrease in space (1)</li> </ul>
Challenges for libraries	<ul style="list-style-type: none"> <li>• 3 studies agreed that libraries have to manage some challenges arises due to e-journals – studying and improving various factors for improving e-journals use (3), marketing and promoting e-journals. Librarians have to manage some of the problems of e-journals – problems in systems &amp; networking, cataloguing, lack of standardization, archiving, ISSN etc</li> </ul>

- E-journals have positive impact on libraries and usage of library
- E-journals impacted infrastructure – especially periodical section and IT infrastructure
- Libraries have to manage collection among different combinations of print and e-journals and also with different access modes based on the users interests
- There is increase in overall expenditure due IT infrastructure costs in addition to journal subscription costs
- Increase in staff workload demands for more staff and also demands training for available staff in managing and delivering e-journal services.
- Supporting literature found to draw implications on effect of e-journals on library services and library space is not sufficient.
- E-journals pose many challenges for librarians - studying and improving various factors that lead to improved e-journals use (3). Librarians have to manage some of the problems of e-journals – problems in systems & networking, cataloguing, lack of standardization, archiving, ISSN etc.

### 8.1 Impact of Electronic Journals on Research and Scholarly Communication

The study reviews 17 articles on the topic ‘impact of electronic journals on research and scholarly communication’.

- 2 studies in 1990s concluded that electronic journals have no impact on research and scholarly communication. When comparing this finding with use and awareness data, both are correlating awareness and use of electronic journals is very low during 1990s, hence due to low level of awareness, use and acceptance there is no impact of e-journals on research and scholarly communication.

- Majority of studies 15 out of 17 (88%) conducted from 2002 to 2015 agreed that electronic journals have positive impact on research and scholarly communication, they added value to the outcome of the research.
- Majority of studies (58.82%) are Indian studies carried out during the period 2009 to 2015.

## 8.2 Pricing Patterns

Based on data observed from, there are no Indian based studies on the topic. Upon observing the outcomes of 8 studies on the topic it is found there are mixed responses, there are no major number of studies which supports one particular aspect related to pricing.

Some of the minor observations found are:

- E-journals help in decreasing journal prices – (Paul Metz and Paul M. Gherman, 1991, Carol Tenopir and Donald W. King, 1998, Carol Hansen Montgomery & Donald W. King, 2002).
- E-journals Price is lesser than print journals but additional expenditure for IT infrastructure and other related costs will lead to overall increase in budget
- Libraries are burdened with subscription to both print and electronic journals (Gyeszly, Suzanne D, 2001, Roberts, Michael; Kidd, Tony; Irvine, Lynn, 2004).
- Electronic journal prices slightly lower but not so appreciable - (Carol Tenopir and Donald W. King, 1998, Golnessa Galyani Moghaddam, 2009).

## 8.3 E-journal services

Even though the study found 10 studies related different services for improving access and usage of e-journals, it is observed that there are mixed responses, there are no major number of studies which supports one particular type of service, hence Any particular implication cannot be derived.

## 8.4 E-journal Consortium

Total number of studies found on e-consortia is 13.

- E-consortia models initiated during late 1990s (Paul Metz J. Menzel, K. Metzner and E. Pope, 1997).
- 6 studies concluded that e-consortia model helps in decrease in cost of journals and increase in user satisfaction (Rosaly Favero Krzyzanowski; Taruhn, Rosane, 2000., Ashcroft, Linda, 2000., and Roberts, Michael; Kidd, Tony; Irvine, Lynn, 2004).
- There are 8 (57.14%) Indian based studies related to e-consortia (Golnessa Galyani Moghaddam & V.G. Talwar, 2008). 5 Indian studies conducted on UGC- Infonet E-journal Consortium all studies agreed that the Consortium has positive impact on users.
- Drawbacks of consortia model- 3 studies argued on drawbacks of consortia model – all publications in the consortium are not useful, only few are major users and low awareness. Patterns indicated a high degree of skew in use of the journal collection.

## 8.5 E-journal Evaluation

Very few studies are found on evaluation of e-journals. Only 3 studies mentioned about evaluation of e-journals. The major observation is there is no standard method or strategy for evaluating e-journals; usage statistics provided by publisher or aggregators are the common source of evaluation of usefulness of e-journals. (Ashcroft, Linda; Langdon, Colin, 1999), more analytical evaluation of the nature of scholarly communication on the web is needed (Harter, Stephen P; Ford, Charlotte E, 2000), usage reports are to be taken as a support to library decision-making activity, since it reflects the true value of e-journals/databases (V.J. Suseela, 2011).

## 8.6 Archiving and preservation

The study reviewed 7 articles covers literature on Archiving and preservation of electronic journals.

- There are no standards or models for archiving, much has to be done to bring out acceptable standards and model (Golnessa Galyani Moghaddam, 2008., Ashcroft, Linda; Langdon, Colin, 1998, Shemberg, Marian; Grossman, Cheryl, 1999., Mabe, Michael A, 2001).
- Publishers are the main source of archiving (Carol Hansen Montgomery & Donald W. King, 2002., Chandana Patra, 2006).

## 9.0 Summary of findings

Important findings of the study on various aspects of e-journals are summarized as under:

- a) **Analysis of Research trends:** some topics received more research while in some areas more research is required in order to elevate the usage of e-journals.

- **Most studied topics :** ‘Awareness and usage pattern of electronic journals’ is the most studied topic, over all 50 studies covered the topic (39.06%). Period wise analysis also shows that the topic is studied extensively during 3 periods covering 15 years (2001-2015). ‘Evolution and Development of Electronic journals’ is second most studied topic, 35 studies discussed the topic (27.34%). ‘Impact of electronic journals on libraries’ (24 studies) and ‘Impact of Electronic Journals on Research and Scholarly Communication’ (17 studies) received third and fourth place respectively.
- **Topics Received Lesser Research:** ‘Archiving and preservation’, ‘Evaluation’ and ‘Open Access Electronic journals’. These topics are important areas to enhance the value of electronic journals and help the users and libraries in selecting and using good electronic journals. Hence high scope is there for new research in these areas.

**b) Evolution and Development of Electronic journals**

The data shows that e-journals evolved and developed in terms of their appearance and format and numbers by adopting time to time changes in computer, software, hardware and web technology fields. From the year 1990 to 2005, developments in technological aspects and user friendly features are more. From the year 2006 no major technological developments observed.

**c) Awareness and Usage Pattern of Electronic Journals:**

- Good number of studies (18 studies) agreed that awareness is good among users. Awareness through library staff is the major source of awareness (8 studies), searching through internet is the second source (6 studies), followed by awareness through faculty (5 studies), and friends (6 studies).
- Majority of studies (25 studies) found that e-journals have overall positive impact and useful in serving the purpose the users access them.
- Majority of studies (32 studies) found that Usage rate is good. Purpose of use in decreasing order:
  1. Research (14 studies)
  2. For Studies (9 studies)
  3. Upgrading knowledge (7 studies)
  4. Publishing articles (6 studies).

**d) Impact of electronic journals on academic & research libraries:**

- e-journals have positive impact on libraries and usage of library
- e-journals impacted infrastructure – especially periodical section and IT infrastructure.
- libraries have to manage collection among different combinations of print and e-journals and also with different access modes based on the users interests
- There is increase in overall expenditure due IT infrastructure costs in addition to journal subscription costs
- Increase in staff workload demands for more staff and also demands training for available staff in managing and delivering e-journal services.
- E-journals pose many challenges for librarians - studying and improving various factors that lead to improved e-journals use (3). Librarians have to manage some of the problems of e-journals – problems in systems & networking, cataloguing, lack of standardization, archiving, ISSN etc.

**e) Impact of Electronic Journals on Research and Scholarly Communication:**

Majority of studies 15 out 17 (88%) conducted from 2002 to 2015 agreed that electronic journals have positive impact on research and scholarly communication, they added value to the outcome of the research.

**f) Pricing Patterns:**

E-journals help in decreasing journal prices but not so appreciable. E-journals Price is lesser than print journals but additional expenditure for IT infrastructure and other related costs will lead to overall increase in budget.

**g) E-journal Consortium:**

E-consortia models initiated during late 1990s. 6 studies concluded that e-consortia model helps in decrease in cost of journals and increase in user satisfaction. 3 studies argued on drawbacks of consortia model – all publications in the consortium are not useful, only few are major users and low awareness.

**h) E-journal Evaluation:**

There is no standard method or strategy for evaluating e-journals; usage statistics provided by publisher or aggregators are the common source of evaluation of usefulness of e-journals. More analytical evaluation of the nature of scholarly communication on the web is needed.

**i) Archiving and preservation:**

There are no standards or models for archiving, much has to be done to bring out acceptable standards and models.

## 10. Conclusion

The study could draw many inferences based on the review of literature and the multidimensional analysis of data drawn from the literature. One major implication is on the research studies conducted on electronic journals. It is certain that extensive and multi-faceted research studies are happened in the field of electronic journals. More research works happened on awareness and usage, Evolution and development, impact of electronic journals on libraries, and impact of electronic journals on research and scholarly communication. But being a vital part of education, research and development sectors; electronics journals have numerous facets having potential for continuous research, such potential areas identified are 'Archiving and preservation, 'Evaluation' and 'Open Access Electronic journals'.

Electronic journals have become indispensable tools in scholarly world and are being used for upgrading knowledge and bringing out new knowledge through research. They have become boon for libraries to serve tech savvy users who seeks fast and convenient services. Electronic journals helped in improving overall usage rate of libraries. But still libraries have to work on collection development strategies, creating awareness, providing training on access and search skill to patrons, improving IT infrastructure in order to improve the usage of e-journals which ultimately leads to more user satisfaction.

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