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## Bibliometric analysis of the 'Electronic Library' journal (2000-2010)

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## Abstract

*This study aims to present a bibliometric analysis of the Electronic Library journal, the aim being to offer a summary of research activity in library and information science and characterize its most important aspects. The paper analyzes a bibliometric study of 578 articles were published during the period January 1, 2000 to December 31, 2010 in the Electronic Library journal. The paper covers the bibliometric analyses of year-wise distribution of articles, category-wise classification of papers, subject-wise distribution of articles, authorship patterns, and institutions-wise distribution of contributions. Special issues of the Electronic Library brought out during 2000-2010, and prolific authors during 2000 to 2010 have been analyzed.*

## Keywords

*Electronic Library; Bibliometrics; Content analysis; Scientific journal*

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## Introduction

Bibliometrics is a set of methods used to study or measure texts and information ([Wikipedia](#), 2011). Bibliometric studies have been applied mainly to scientific fields and are based principally on various metadata elements like author, title, subject, citations, etc. related to scholarly publication within a discipline. This type of analysis provides useful indicators of scientific productivity, trends, the emphasis of research in various facets and researchers' preferences for publication ([Jacobs](#), 2001). [Sengupta](#) has defined bibliometric as organization, classification and quantitative evaluation of publication pattern of macro-communication along with their authorships by mathematical and statistical calculations.

The term bibliometrics was first coined by [Pritchard](#) in 1969. An initiating example of a bibliometric study was statistical analysis of the literature of comparative anatomy from 1543 to 1860, done by including book and journal titles, and grouping them by countries of origin and periods. According to [Hulme](#) (1923) entitled "*Statistical Analysis of the History of Science*". His investigation was based on the entries in the English International Catalogue of Scientific Literature. Another third study was the work of [Gross and Gross](#) reported in 1927. They counted and analyze the citations in articles from the *Journal of the American Chemical Society*, and produced a list of journals estimates important to chemical education. [Zipf's](#) law (1949) relates to the frequency of word occurrence. Zipf derived his law from the empirical law of least effort. He said that there is relationship between the rank of the word and its frequency of textual matter, if the words are arranged in their decreasing order of frequency of occurrence in a long text. This law indicates that, "in a long textual matter if the words are arranged in their decreasing order of frequency then the rank of any given word of the text will be inversely comparative to the frequency of occurrence of the words". Another important work was Bradford's 1934

article on the distribution of literature in lubrication research. It is an important part of the theoretical foundation of bibliometrics, "*Bradford's Law of Scattering*".

In 1948, the Father of Indian library scientist, Dr. S.R. Ranganathan, coined the term "*librametry*", which historically appeared first and was intended to modernize the services of librarianship. Bibliometrics is analogous to Ranganathan's librametrics, the Russian concept scientometrics, informetrics, and subdisciplines like econometrics, psychometrics, sociometrics, biometrics, technometrics, chemometrics, and climetrics, where mathematics and statistics are applied to study and solve problems in their respective fields. Scientometrics is now used for the application of quantitative methods to the history of science and overlaps with bibliometrics to a considerable extent ([Thanuskodi, 2010a](#)).

## The *Electronic Library* Journal

The *Electronic Library* journal is devoted to the applications and implications of new technology, automation, digitization, the Internet, user interfaces, and networks in all types of libraries, information centers and museums throughout the world as well as the development of software and hardware for such applications. It provides a vehicle for the latest research and ongoing developments in today's digital library and information environments in different countries, and offers practical advice, useful information and descriptions of specific applications around the globe. It is published bimonthly, when it began to publish a continuous annual volume ([Emeraldinsight, 2011](#)). It is a highly regarded journal in the field of LIS, publishes mainly new research, and is known to receive a high number of citations ([Bauer & Balkalbasi, 2005](#)).

## Related studies

This article reviews a few studies conducted abroad as well as in India on bibliometric study in chronological order.

[Thanuskodi](#) (2010b) discussed the research output performance of social scientists on social science subjects. The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of cited journals etc. [Yeoh and Kaur](#) (2008) analyses the publication output of Research in Higher Education for subject support in collection development in the light of growing interest in diversified domains of research in higher education. Consequently, analysis of 40 issues of publications revealed a diversified usage pattern of bibliographic reference sources by contributing researchers, with a cumulative total of citations being 8,374. A positive trend in research collaboration of contributing authors, and a steady growth in the use of reference sources, periodicals and web documents in the citations signify the trend of scholarly communication of research works in the electronic age. Similar to other disciplines of research findings, journals and books were the most cited source materials for researchers thrash out.

[Verma, Tamrakar and Sharma](#) (2007) revealed that majority of the articles in the journal are two-authored and majority of the contributions are from New Delhi. [Singh, Mittal and Ahmad](#) (2006) conducted a bibliometric study of literature on digital libraries. The important findings are that most articles (61 percent) are single-authored; author productivity is not in agreement with [Lotka's](#) Law, except in one case where the number of articles is three; the maximum number of articles were published in 2003 with English being the most productive language; maximum articles were published in the journal *D-lib Magazine*; distribution of articles nearly follows Bradford's Law; and USA ranked first for maximum number of journals. [Tiew](#) (2000) found that 53% of articles contained journal self-citations, and a tendency is noticed for authors affiliated to the institution publishing the journal to cite the journal. [Patra, Bhattacharya and Verma](#) (2006) analyzed the growth pattern, core journals and authors' distribution in the field of bibliometric using data from *Library and Information Science Abstract* (LISA) and found that the growth of literature does not show any definite pattern. [Dhiman](#) (2000) has done ten year bibliometric study *Ethnobotany Journal* published during 1989-1998. In this paper examines year-wise, institution-wise, country-wise, authorship pattern, range of references cited and length of the articles.

## Objectives and methodology

The objectives of the present study are:

- to study year-wise distribution of papers;
- to study categories-wise classification of papers;
- to study subject-wise distribution of the papers;

- to study the authorship pattern of papers;
- to study institute-wise distribution of papers; and
- to study the most prolific contributions of papers.

The methodology applicable in the current study is bibliometric scrutiny, which is used to analyses in detail the bibliographic attributes of the articles published in the *Electronic Library* journal from 2000-2010. Eleven volumes (Vol. 18 to 28) containing sixty-six issues of the *Electronic Library* have been taken up for the study. The authors have extracted the information from the *Electronic Library* journal website published by Emerald Group of Publishing and then used MS Excel to organize, tabulate and analyze the data for the study.

## Data analysis and interpretation

The *Electronic Library* journal have extracted all the details such as author(s), title, year of publication, institutional affiliation, etc. of all articles published from 2000 to 2010 were recorded for the following analysis.

### Year-wise distribution of articles

During the period January 1, 2000 to December 31, 2010, 578 articles were published. Table 1 show that the numbers differs from year to year and there is also steady increase in the number of articles from the year 2000 to 2010. Out of total 578 articles, the maximum numbers of articles are in the year 2009 contributing 71 articles, which are 12.28% to the total publications. The minimum numbers of articles are in the year 2000 with 31 articles, which are 5.36% to the total publications.

**Table 1. Year-wise Distribution of Articles**

Year	Vol. No.	No. of Articles Issue-wise						No. of Articles	%
		1	2	3	4	5	6		
2000	18	6	5	5	5	5	5	31	5.36
2001	19	5	5	5	6	6	6	33	5.7
2002	20	7	8	7	6	7	6	41	7.1
2003	21	7	8	9	9	9	9	51	8.82
2004	22	9	10	10	7	9	9	54	9.35
2005	23	11	10	11	12	10	9	63	10.89
2006	24	8	12	10	11	10	10	61	10.56
2007	25	8	8	9	9	9	12	55	9.52
2008	26	9	10	10	11	11	10	61	10.56
2009	27	12	13	13	12	11	10	71	12.28
2010	28	12	10	8	9	10	8	57	9.86
Total	11	94	99	97	97	97	94	578	100

### Category-wise classification of papers

Table 2 focuses that the category wise classification of the papers published during period from 2000 to 2010. The study reveals that the maximum number of articles published as under the category of research paper i.e. 236 (40.83%), whereas 133 (23.01%) articles published under the case study category. There were a small numbers of articles published as under the literature review category, i.e., 22 (3.81%). Thus, it clearly shows that 40.83% of the users are regular visitors of the Library, while the remaining 9.17% are not regular visitors of the library.

**Table 2. Category-wise Classification of Papers**

Category	Year											No. of Articles	%
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Research paper	1	6	8	24	16	20	8	30	29	43	41	236	40.83
Technical paper	1	9	9	1	5	6	29	3	2	3	2	70	12.11
Conceptual	0	0	1	0	19	1	2	2	4	2	2	33	5.71

paper													
Viewpoint	0	1	0	0	0	10	5	0	1	1	1	19	3.28
Case study	1	10	14	18	5	12	10	11	19	15	8	133	23.01
Literature review	0	2	1	0	4	1	5	3	2	3	1	22	3.81
General review	8	5	8	8	5	13	2	6	4	4	2	65	11.25
Total	3	33	41	51	54	63	61	55	61	71	57	578	100

## Subject-wise distributions

The particulars of subject-wise analysis of articles are shown in the Table 3. Table shows that a majority of a contributions appeared under library and Internet 141 (24.39%). The next position is taken by digital library 89 (15.40%). This is followed by electronic resources 71 (12.29%) and academic library 65 (11.25%). Further followed by information services and others subject 54 (9.34%) have contributed by various authors in the *Electronic Library* journal. There are small numbers of contributions shows in the subject like library automation, library profession, public library, special library and RFID application in library and information centers.

Table 3. Subject-wise Distribution of Articles

Subjects	Year											No. of Articles	%
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Electronic Resources	5	6	5	5	6	11	9	4	7	6	7	71	12.29
Library Automation	2	2	1	3	4	4	7	3	2	1	4	33	5.70
Library and Internet	3	16	19	13	18	15	10	9	17	10	11	141	24.39
Library Profession	1	0	1	0	2	2	2	4	2	2	4	20	3.46
Digital Libraries	10	2	3	4	8	8	10	12	10	16	6	89	15.40
Academic Libraries	2	2	2	4	4	7	6	7	8	12	11	65	11.25
Public Libraries	0	1	0	2	2	2	3	0	0	2	0	12	2.07
Special Libraries	0	1	0	0	1	0	0	0	1	2	1	6	1.04
OPACs	2	0	2	0	2	4	1	2	4	5	4	26	4.50
RFID Applications	0	0	0	0	1	2	0	2	0	2	0	7	1.22
Information Services	3	3	4	10	2	2	6	8	5	6	5	54	9.34
Others	3	0	4	10	4	6	7	4	5	7	4	54	9.34
Total	31	33	41	51	54	63	61	55	61	71	57	578	100

## Authorship patterns

The authorship pattern was analyzed to determine the percentage of single and multiple authorship. As [Harsanyi](#) (1993) has shown, different disciplines interpret the order of authorship differently. According to [Terry](#) (1996), there are no established norms for citation order in librarianship and information science. As indicated in Table 2, our author sample consists of 2153 authors for 975 articles.

Table 4 reveals that during 2000-2010 the highest proportion of articles were by single authors (46.54%), followed by articles with 2 authors (32.87%), 3 authors (15.40%), and 4 or more authors (5.19%). The data point out that the large number of articles by single authors means that there are no well-established research groups in the area and the subject is a new and emerging one. [Chen and Chen](#) (2005) have also

found that in the area of metadata research in library and information science maximum papers are published by single authors.

**Table 4. Authorship patterns**

Authorship	Year											No. of Articles	% of Articles	Total Author
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010			
Single	16	18	20	34	33	41	29	25	22	13	18	269	46.54	269
2 authors	11	13	11	10	14	14	13	21	27	32	24	190	32.87	380
3 authors	4	2	7	6	3	8	17	7	6	18	11	89	15.4	267
4 authors	0	0	2	1	2	0	1	2	6	4	4	22	3.81	88
5 authors	0	0	1	0	1	0	0	0	0	2	0	4	0.69	20
6 authors	0	0	0	0	1	0	1	0	0	1	0	3	0.52	18
7 authors	0	0	0	0	0	0	0	0	0	1	0	1	0.17	7
Total articles	31	33	41	51	54	63	61	55	61	71	57	578	100	--
Total authors	50	50	76	76	89	93	116	96	118	170	115	--	--	1049
Average authors per article	2	2	2	2	2	2	1.9	2	1.9	2.4	2			
Single %	52	55	49	67	61	65	48	45	36	18	32			
Joint %	48	45	51	33	39	35	52	55	64	82	68			

### Degree of collaboration in the *Electronic Library*

To determine degree of collaboration in quantitative terms, the formula given by K. Subramanyam (1983) was used.

The formula is

Where **C** = Degree of collaboration

$$C = \frac{NM}{NM + NS}$$

**NM** = Number of multi authored papers

**NS** = Number of single authored papers

$$C = \frac{269}{269 + 780}$$

In the present study the value of **C** is **0.256**

As a result, the degree of collaboration in the *Electronic Library* journal is 0.256, which clearly indicates its dominance upon individual contribution.

### Institutions-wise distribution of papers

Table 5 shows institution-wise distribution of papers published in the *Electronic Library* journal during the period under study. Authors from universities and academic institutions contributed 417 (72.15%) papers followed by 76 (13.15%) from research institutions. Authors from others, i.e., private research institutions, information centers etc. and colleges comprised 10.90% and 3.80% respectively.

**Table 5. Institutions-wise distribution of contributions**

Institutions	Years											No. of Articles	%
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Universities	21	21	31	31	36	43	42	40	46	58	48	417	72.15
Colleges	1	4	2	2	1	3	3	0	4	1	1	22	3.80
Research	4	6	4	5	9	12	9	7	7	7	6	76	13.15

Institutions													
Others	5	2	4	13	8	5	7	8	4	5	2	63	10.90
Total	31	33	41	51	54	63	61	55	61	71	57	578	100

## Special issues

Table 6 shows the details of special/thematic issues of the *Electronic Library* journal brought out during 2000-2010 under the Guest Editorship of eminent LIS professionals both from academia as well as research and development organizations/institutions. Out of 66 issues published during 2000-2010, only fifteen special issues were brought out. There were no special issues were brought out during 2000, 2001, 2006 and 2010. But in the later part of decade, i.e., 2002 onwards, the journal has published a number of thematic issues quite regularly except 2006 and 2010.

**Table 6. Special issues of the *Electronic Library* brought out during 2000-2010**

Year	Volume & Issue No.	Theme/Title	Guest Editor(s)
2002	Vol. 20 No.4	Electronic books for teaching and learning	Dr. Monica Landoni and Pro. Ignacio Aedo
2003	Vol. 21 No.3	Libraries in the twenty-first century	Dr. David Raitt
	Vol. 21 No. 5	The impact of IT on indigenous people	Dr. Loriene Roy and Dr. David Raitt
2004	Vol. 22 No. 1	Network and security issues	Dr. David Raitt
	Vol. 22 No. 6	Oceans of opportunity: Whakawhitihiate Moana	Dr. David Raitt
2005	Vol. 23 No. 1	Electronic books	Dr. David Raitt
	Vol. 23 No. 3	ICT developments in Nigerian libraries	Dr. David Raitt
	Vol. 23 No. 5	Issues from multimedia gaming technology	Dr. David Raitt
2007	Vol. 25 No. 2	Metadata and semantics for digital libraries	Dr. David Raitt
	Vol. 25 No. 4	Papers from the ALIA 2006 Conference	Dr. David Raitt
	Vol. 25 No. 5	WWW applications in South Africa	Dr. David Raitt
2008	Vol. 26 No. 3	Artificial intelligence applications in digital content	Dr. David Raitt
	Vol. 26 No. 5	LIANZA 2007	Dr. David Raitt
2009	Vol. 27 No. 2	Ubiquitous digital library and innovative community	Dr. David Raitt
	Vol. 27 No. 5	Special sections on MTSR 2007 and ALIA 2008	Dr. David Raitt

**No special issues were brought out during 2000, 2001, 2006 and 2010.**

## Prolific authors

It was observed that there are a total of 1038 of contributors for 578 articles Stephen M. Mutula and Howard Falk have contributed eight articles and seven articles each; Shien-Chiang Yu has contributed six articles, whereas 4 authors have contribution of five articles each. The data showed that authors contributions of 3 and 4 times contributed 139 articles, while authors have 1 and 2 times contributed 869 articles, which have published in the *Electronic Library* journal during 2000 to 2010.

## Conclusion

The publishing trend totally depends on the output of contributors, patterns of contributions and the quality of research. The year 2009 shows the maximum number of contributions to the *Electronic Library* journal. This study reveals that the categories of article distributions are remarkable in this research journal. The majority of the articles were contributed by single authors; and most authors were librarians, faculty members or researchers affiliated with academic or research institutions. Out of 66 issues published during 2000-2010, only fifteen special issues were brought out from eminent editors and guest editor of LIS professionals. It is registered that Stephen M. Mutula, Howard Falk, and Shien-

Chiang Yu were most proliferate authors who have contributed eight articles, seven articles and six articles each. The *Electronic Library* is notably a scholarly journal that stipulates or induces fruitful research for the library and information profession.

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