



The Electronic Library

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Scholarly communication of *The Electronic Library* from 2003-2009: a bibliometric study

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Scholarly
communication
of *TEL*

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Abstract

Purpose – The study aims to divulge the patterns of scholarly communication of *The Electronic Library* from 2003 to 2009 and to measure the coverage and quality of contributions of this journal towards LIS literature.

Design/methodology/approach – Seven volumes of *The Electronic Library (TEL)* published during the years 2003-2009 collected from Emerald Management Xtra, that constituted 42 issues and a total number of 417 articles carrying 7,442 citations, have been taken up for the analysis. The study analyzes bibliographical forms, types of articles, authorship pattern, geographical distribution of contributors, chronological distribution of citations, length of articles, and ranking of journals. The study employs Bradford's Law of Scattering.

Findings – The majority of articles published in *TEL* fall under the category of research papers, followed by case studies, and general reviews. Regarding the bibliographical distribution of citations, it is found that the majority of citations are from journals, followed by web resources and books. The study further reveals that the average length of articles is 13.017 pages and the scattering of contributors is limited within a few countries.

Originality/value – The paper is relevant and useful to those who are interested in bibliometrics and it provides a comprehensive study of scholarly communication of *The Electronic Library* from 2003-2009 for comprehending essential publishing traits of this journal during the stated period.

Keywords Bibliometrics, Citation analysis, Citation counts, Bradford's Law, Journals, Library studies

Paper type Research paper

Introduction

Bibliometrics is a promising area of research in the field of library and information science (LIS) and has realistic applications in measuring the coverage and quality of books, journals, and articles. It helps in formulating need-based collection building policy and provides authentic data to inform managers to take judicious decisions in the process of documents' selection. The current study is a bibliometrics analysis of a leading international referred journal "*The Electronic Library*" (*TEL*) which is published bi-monthly with six issues per year/volume and containing the original research contributions of the authors. Established in 1983 initially as a quarterly journal, by the year 2009 *TEL* had successfully brought out 27 volumes with some seven or eight papers in each issue. In this study, the articles published during the period 2003 to 2009 have been analyzed.



Literature review

Some of the pertinent studies on bibliometrics and citation analysis conducted by the scholars of LIS all over the world are worthy of examination. In this respect, Mote and Deshmukh (1996) found that journals are the most cited form of communication amongst the library and information scientists and the source journal is the most cited publication. The study further revealed that library professionals most frequently refer to the journals in which they write. Shokeen and Kaushik (2004) in their study entitled "*Indian Journal of Plant Physiology: a citation analysis*" found that journal articles are predominant with 81 percent of total citations. The ratio of author self-citation to total citations is 1:16.65. The ratio of journal self-citation to total citation is 1:31.91. The results also highlight that 398 citations are below 10 years old, whereas 358 citations are below 20 years but more than 10 years old. Jena (2006) in his study on "A bibliometric analysis of the journal *Indian Journal of Fibre and Textile Research, 1996-2004*" revealed various facets of the trend of publications of this journal. Zao (2007) identified six clusters of journals, including general educational psychology/learning/literacy, school psychology, measurement and counseling, Germany-based educational psychology, creativity, and the other related themes. Moreover, the authors found that a small number of journals accounted for a relatively high percentage of the intra-disciplinary citations; the majority of the selected journals cited more than being cited in the field. Neuhaus and Daniel (2008) highlighted that citation-enhanced databases need to be examined carefully, with regard to both their potentialities and their limitations for citation analysis. Turk (2008) indicated that there is quite a uniform way about methodology of citation counts and substantial research about motivation for URL citations to LIS articles. Willett (2008) found that many of the most cited papers in the *Journal of Chemical Information and Modeling* describe software packages that play a key role in modern chemoinformatics research. Livonen *et al.* (2009) found that the availability of the references of dissertations was good in two Finnish universities. A large number of references, especially journal articles, were already available electronically. The university libraries have a significant role in contributing to doctoral studies because they offer access to adequate information resources. However, this study evaluates the qualitative contributions of *The Electronic Library* to the field of LIS during the aforementioned period which has been unexplored.

Methodology

Seven volumes of *The Electronic Library* published during the years 2003 to 2009 collected from Emerald Management Xtra (EMX) that constituted 42 issues and a total number of 417 articles carrying 7,442 citations have been taken up for the analysis. The study analyzes bibliographical forms, types of articles, authorship patterns, geographical distribution of contributors, chronological distribution of citations, length of articles, and ranking of journals. The study employs Bradford's Law of Scattering. For the stated purpose, citations appended at the end of each articles published during the aforesaid period were extracted from HTML version of the articles that appeared in EMX. The citations were sequentially transferred into a word file and a copy of this file was printed out. The major bibliographical forms of documents that included books, journals, web resources, proceedings, reports and theses were pencil marked with the symbols "B", "J", "W", "P", "R" and "T"

respectively. The minor bibliographical forms like personal communications, lectures, speeches, newsletters, white papers, pamphlets, guidelines, standards, notes, commentary, news items and such other materials which were reported much less by their individual numbers were grouped under other category and pencil marked as "O". Entries under each category was totaled and presented for interpretation. Further, the age of citations of books and journals was manually worked out. The geographical distribution of contributors was decided basing upon the address of the authors' affiliation.

In order to work out the ranking of authors and ranking of journals, the date was entered into MS office Excel Worksheet for yielding the most accurate and authentic result. The study tested out the scattering pattern of *TEL* cited journals through the application of Bradford's law. Moreover, the entries were arranged, re-arranged, checked, cross-checked and carefully examined to produce the most valid out put for readers' understanding and appreciation.

Analysis

Year wise contribution of articles and citations

Table I depicts the year wise contribution of articles. It is found that the highest numbers of articles (71) were published in the year 2009 while; the least number of articles (53) were brought out in the year 2003. The articles published in the year 2009 have yielded the highest number of citations (1,557) whereas the least number of citations (633) were found in the year 2004. The overall citations per article are found to be 17.844. Interestingly, out of the total 417 numbers of articles, 36 articles are absolutely free of citations which indicate that nearly one-tenth of the total contributions reflect innovative thought contents that symbolize the high intensity of originality of expression of some leading authors in the field.

Types of contributions

It is evident from Tables II and III that the articles published in *The Electronic Library* are categorized into seven types namely, research papers, case study, general review, conceptual paper, technical paper, viewpoint, and literature review. Out of these seven types, nearly half of the articles (46.283 percent) fall under the category of research papers, followed by case study (21.583 percent), general review (10.791 percent), conceptual papers (7.434 percent), technical papers (5.516 percent), viewpoint (4.556 percent), and literature review (3.597 percent). Mostly, it is deduced from the study that

Year	No. of articles	Articles without citation	Average no. of articles per issue	Total no. of citations	No. of citations per article
2003	53	10	8.333	758	14.302
2004	54	11	9	633	11.722
2005	63	10	10.5	758	12.032
2006	60	1	10	1,193	19.883
2007	54	1	9	1,191	22.056
2008	62	0	10.333	1,351	21.790
2009	71	3	11.833	1,557	21.930
Total	417	36	9.929	7,441	17.844

Table I.
Year wise contribution of
articles and citations

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Article type	No. of papers	Cumulative no.	Percentage	Cumulative percentage
Research papers	193	193	46.283	46.283
Case study	90	283	21.583	67.866
General review	45	328	10.791	78.657
Conceptual paper	31	359	7.434	86.091
Technical paper	23	382	5.516	91.607
Viewpoint	19	401	4.556	96.163
Literature review	15	416	3.597	99.760
Not mentioned	1	417	0.240	100.000

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Table II.
Types of contributions

Year	Research papers	General review	Case study	Literature review	Technical paper	Conceptual paper	Viewpoint	Not mentioned	Total
2003	27	8	17	0	1	0	0	0	53
2004	17	5	4	4	5	19	0	0	54
2005	21	13	10	1	6	2	9	1	63
2006	26	6	12	3	3	3	7	0	60
2007	29	5	11	3	3	2	1	0	54
2008	30	4	21	1	2	3	1	0	62
2009	43	4	15	3	3	2	1	0	71
Total	193	45	90	15	23	31	19	1	417

Table III.
Types of contributions (year wise)

authors are more interested in contributing research papers than any other category or, the journal has a specific penchant to this category of contributions obviously for their intrinsic value of qualitative research.

Authorship patterns

Table IV reveals that, single authors (47.242 percent) have made major contribution to *TEL* during the stated period, followed by joint authors (34.772 percent) and three authors (11.99 percent). However, the contribution of more than three authors (5.995 percent) is quite minimum and hence negligible. **This analysis shows that solo contribution is more predominant than the cooperative one,** except for the year 2009 which was led by joint authors (Table V).

Length of articles

Table VI reveals that the average length of articles published in *TEL* is 13.017 pages. It further reflects that the publishing year 2008 accommodated the highest average

Authors	No. of articles	Cumulative no. of articles	Percentage	Cumulative percentage
Single	197	197	47.242	47.242
Joint	145	342	34.772	82.014
Three	50	392	11.990	94.005
> Three	25	417	5.995	100

Table IV.
Authorship pattern

length of 14.806 pages per article while, the lowest average length of 9.722 pages per article was noticed in the year 2004. Considering the average length of articles published in *TEL*, it is deduced that the journal provides the contributors an ample scope for exercising their thought contents comprehensively and exhaustively or may be due to the fact that the contributors are supplementing the text with more facts, figures, and illustrations to justify their research findings.

Geographical distribution of contributors

The geographical distribution of contributors is presented in Table VII. It is found that there are in all 751 authors who have contributed for the sample total of 417 articles, and the authors are geographically scattered over 52 different countries of the world. Out of the total 751 contributors China, which includes Taiwan, contributed the highest number of 159 articles constituting 21.172 percent of the total contributions. USA is found to be the second highest country that contributed 94 (12.517 percent) articles. However, none of the other countries is found to have contributed more than one-tenth of contributions. Only four countries namely UK, Nigeria, New Zealand and India have a record of individual contributions ranging from 5-10 percent of the total contributions. Concurrently, contributions from other different countries are found less. Furthermore, it is evident that only four top ranked countries have altogether made more than 50 percent contributions. Moreover, the analysis indicates that 75 percent of contributions are made by top ten countries and the remaining 25 percent of contributions are from 42 countries. The overall analysis indicates that *TEL* has set due consideration for the quality of production of articles with respect to the technological trends of both developed and developing countries of various parts of the globe.

Bibliographical distribution of citations

One of the vital aspects of bibliometrics analysis is the evaluation of bibliographical distribution of citations. In this study, the major bibliographical forms like, journals,

Authors	2003	2004	2005	2006	2007	2008	2009	Total
Single	34	33	41	32	22	21	14	197
Joint	12	14	14	17	23	27	38	145
Three	6	3	8	9	6	7	11	50
> Three	1	4	0	2	3	7	8	25
Total	53	54	63	60	54	62	71	417

Table V.
Authorship pattern (year wise)

Year	No. of articles	No. of pages	Average length of articles
2003	53	601	11.340
2004	54	525	9.722
2005	63	704	11.175
2006	60	859	14.317
2007	54	782	14.481
2008	62	918	14.806
2009	71	1,039	14.634
Total	417	5,428	13.017

Table VI.
Length of articles

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30,1

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Country	No. of contributors	Cumulative contributors	Percentage	Cumulative percentage
China	159	159	21.172	21.172
USA	94	253	12.517	33.689
United Kingdom	70	323	9.321	43.010
Nigeria	53	376	7.057	50.067
New Zealand	44	420	5.859	55.926
India	43	463	5.726	61.651
Australia	35	498	4.660	66.312
Iran	31	529	4.128	70.440
South Africa	23	552	3.063	73.502
South Korea	15	567	1.997	75.500
Spain	14	581	1.864	77.364
Russia	13	594	1.731	79.095
Greece	11	605	1.465	80.559
Serbia	11	616	1.465	82.024
Singapore	10	626	1.332	83.356
Botswana	9	635	1.198	84.554
Italy	9	644	1.198	85.753
Malaysia	9	653	1.198	86.951
Pakistan	9	662	1.198	88.149
Canada	7	669	0.932	89.081
Turkey	7	676	0.932	90.014
Arab Emirates	6	682	0.799	90.812
Bangladesh	6	688	0.799	91.611
Kuwait	6	694	0.799	92.410
Luxemburg	6	700	0.799	93.209
Ireland	5	705	0.666	93.875
Poland	5	710	0.666	94.541
Thailand	5	715	0.666	95.207
Netherlands	4	719	0.533	95.739
Scotland	4	723	0.533	96.272
Saudi Arabia	3	726	0.399	96.671
Iceland	2	728	0.266	96.938
Norway	2	730	0.266	97.204
Philippines	2	732	0.266	97.470
Switzerland	2	734	0.266	97.737
Other countries (1 each)	17	751	2.264	100.000

Table VII.
Geographical distribution of contributors

Rank	Bibliographical forms	No. of citations	Cumulative citations	Percentage	Cumulative percentage
1	Journals	3,649	3,649	49.033	49.033
2	Web	1,414	5,063	19.000	68.033
3	Books	1,189	6,252	15.977	84.010
4	Proceedings	662	6,914	8.895	92.905
5	Report	251	7,165	3.373	96.278
6	Thesis	61	7,226	0.820	97.098
7	Others	216	7,442	2.902	100.000

Table VIII.
Bibliographical forms of documents

books, web, proceedings, reports, theses have been taken into consideration. Tables VIII and IX depict the bibliographical aggregate distribution of citations and the year wise distribution of citations respectively. It is evident from the analysis that a majority of citations are taken from journals (49.033 percent) followed by, web resources (19 percent), books (15.977 percent), proceedings (8.895 percent), reports (3.373 percent) and theses (0.820 percent). Concurrently, other forms which include personal communications, newsletters, white papers, pamphlets, guidelines, standards, etc. contributed 2.902 percent. Therefore, it is crystal clear that journal citations have played a major role in production of scholarly articles in *TEL*.

Chronological distribution of citations

Tables X and XI represent the chronological distribution of citations of journals and books respectively. It is found that the contributors have referred to the most recent documents, i.e. even they have opted to cite the articles of the same year of publication. The authors have cited 6.687 percent of the journals of one year old, 14.552 percent of two years old, 12.634 percent of three years old, 11.866 percent of four years old, and 10.852 percent of five years old. Within five years, the total citations constitute 57.632 percent. Between 6-15 years, the citation is constantly observed to be less than 10 percent for each year, and after 15 years it is even reduced to less than 01 percent for each subsequent year of citation. Moreover, it is found that there is a decreasing trend of journal citations after two years of their publication.

Table XI reveals that the authors are also keen on citing the latest books although the percentage of such citation is comparatively less than journal citations (Figure 1). It further reflects that more than half of the citations of books fall within seven years of their publication, and the estimated total citations within 10 years is 70.143 percent. Again the citation trend starts decreasing after six years of their publication. Since the publication and distribution of books take a little longer time, the fresh citation of books is found comparatively less than that of journals (Figure 2).

Ranking of journals

Table XII provides the ranking list of journals that were cited in *TEL* in their decreasing order of citations. The journals listed in this table may be considered the preferred media for reporting of new knowledge in the field of library and information science with the specific domain of applications and implications of new technology, automation, the internet, user interfaces, and networks in all types of libraries, information centers and museums throughout the world as well as the development of

Year	Journals	Books	Web	Conf/Proc	Report	Thesis	Others	Total
2003	234	119	323	22	24	2	34	758
2004	315	86	113	66	17	11	26	634
2005	375	102	139	72	25	1	44	758
2006	584	229	162	130	44	14	30	1,193
2007	561	206	224	119	41	9	31	1,191
2008	674	266	232	96	46	10	27	1,351
2009	906	181	221	157	54	14	24	1,557
Total	3,649	1,189	1,414	662	251	61	216	7,442

Table IX.
Bibliographical forms of
documents (year wise)

EL 30,1	Year	No. of citations	Cumulative citations	Percentage	Cumulative percentage
	0	38	38	1.041	1.041
	1	244	282	6.687	7.728
	2	531	813	14.552	22.280
	3	461	1,274	12.634	34.914
110	4	433	1,707	11.866	46.780
	5	396	2,103	10.852	57.632
	6	260	2,363	7.125	64.757
	7	248	2,611	6.796	71.554
	8	218	2,829	5.974	77.528
	9	171	3,000	4.686	82.214
	10	93	3,093	2.549	84.763
	11	96	3,189	2.631	87.394
	12	76	3,265	2.083	89.477
	13	48	3,313	1.315	90.792
	14	51	3,364	1.398	92.190
	15	48	3,412	1.315	93.505
	16	26	3,438	0.713	94.218
	17	18	3,456	0.493	94.711
	18	23	3,479	0.630	95.341
	19	19	3,498	0.521	95.862
	20	23	3,521	0.630	96.492
	21	22	3,543	0.603	97.095
	22	13	3,556	0.356	97.451
	23	11	3,567	0.301	97.753
	24	8	3,575	0.219	97.972
	25	8	3,583	0.219	98.191
	26	8	3,591	0.219	98.411
	27	2	3,593	0.055	98.465
	28	9	3,602	0.247	98.712
	29	6	3,608	0.164	98.876
	30	5	3,613	0.137	99.013
	>30 < 92	36	3,649	0.987	100.000

Table X.
Chronological
distribution of citations
(journals)

software and hardware for such applications. This list can be regarded as free of any national or regional bias as it has been prepared on the basis of citations in *TEL* which has a high journal impact factor during many years and is regarded as a reputed international referred journal in the field of library and information science. It is expected that the present ranking list would help the researchers, the librarians, the information manager and the documentalists of research centers, library and educational institutions to formulate their acquisition policy for serial publication suiting to the academic and research needs of LIS scholars, students and teachers.

Out of 3,649 citations, the journal *The Electronic Library* which is taken as source journal for the present study, gets first position scoring the highest citations of 270 having 7.399 percent of total citations. The reason for this journal occupying the first position may be its comprehensive coverage, higher journal impact factor among the journals whose scope and coverage of publication are more or less similar to that of *TEL*. *Journal of the American Society for Information Science and Technology* is second in the rank being cited 151 (4.138 percent) times, and *College & Research Libraries*

Year	No. of citations	Cumulative citations	Percentage	Cumulative percentage
0	13	13	1.093	1.093
1	52	65	4.373	5.467
2	92	157	7.738	13.204
3	110	267	9.251	22.456
4	94	361	7.906	30.362
5	96	457	8.074	38.436
6	106	563	8.915	47.351
7	84	647	7.065	54.415
8	73	720	6.140	60.555
9	62	782	5.214	65.770
10	52	834	4.373	70.143
11	30	864	2.523	72.666
12	27	891	2.271	74.937
13	28	919	2.355	77.292
14	35	954	2.944	80.235
15	22	976	1.850	82.086
16	20	996	1.682	83.768
17	17	1,013	1.430	85.198
18	8	1,021	0.673	85.870
19	10	1,031	0.841	86.712
20	14	1,045	1.177	87.889
21	6	1,051	0.505	88.394
22	9	1,060	0.757	89.151
23	11	1,071	0.925	90.076
24	10	1,081	0.841	90.917
25	6	1,087	0.505	91.421
26	4	1,091	0.336	91.758
27	7	1,098	0.589	92.347
28	6	1,104	0.505	92.851
29	11	1,115	0.925	93.776
30	5	1,120	0.421	94.197
> 30 < 168	69	1,189	5.803	100.000

Table XI.
Chronological
distribution of citations
(books)

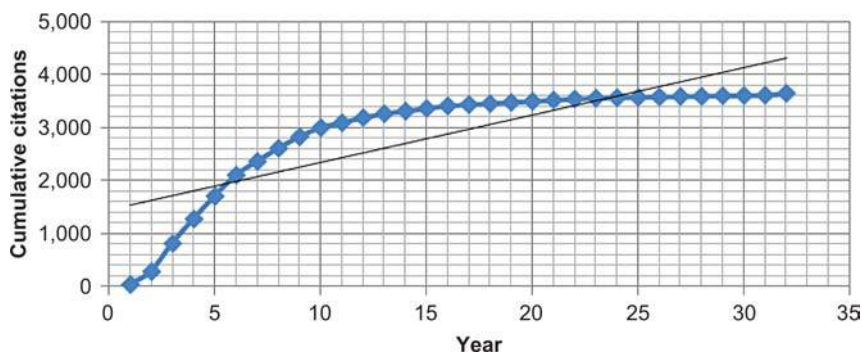
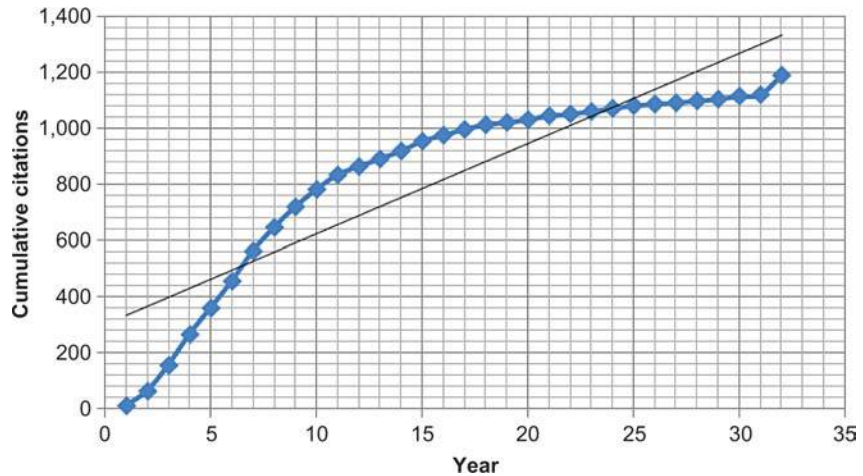


Figure 1.
Chronological distribution
of journal citations

Figure 2.
Chronological distribution
of book citations



occupies third rank with 74 citations (2.028 percent). The fourth rank is shared by three journals namely, *D-Lib Magazine*, *Information Processing and Management* and *Journal of Documentation* with 72 citations (1.973 percent) each. *The Journal of Academic Librarianship* with 68 citations (1.864 percent) ranked fifth. The first ten journals account for 26.309 percent having total citations 1,535. From this table, it is also observed that the 55 journals accounted for nearly 50 percent and the remaining 979 journals accounted for rest 50 percent of total citations.

Scattering of citations

The data for the scatter of citations over journal titles are depicted in Table XIII. Out of 1,034 journals in total, only 55 journals (5.319 percent) have been cited 1,824 (49.986 percent) times of all the citations. This shows that the journal citations are not scattered very much in case of core journals, i.e. a large chunk of citations are given to a small number of journals, but it shows high scattering for other journals, i.e. 1,825 citations (50.014 percent) cover 979 journals:

- TJ = 1034 (total number of journals).
- CC = 3649 (total number of citations received by 1,034 journals).
- Average citations per journal: $CC/TJ = 3.529$.

The more scattered the literature, presumably the fewer are the citations per journal on an average. If the literature is not scattered, the citations per journal will be more. However, in this case, the average number of citations per journal is 3.529 which are relatively less. This suggests a very high scattering.

Scattering index (SI) is the proportion of journal titles that were cited only once to the total number of journals. The greater the proportion, i.e. scattering index, the more the scattering implied. Here the scattering index is $648/1,034 = 0.627$ which indicates high scatter. Moreover, it is found that out of 1,034 journals, 648 are cited only for once. It suggests that the given data set exhibits high scattering, as the SI is more than 0.5.

Sl no.	Rank	Name of journal	No. of citations	Cumulative citations	Percentage	Cumulative percentage
1	1	<i>The Electronic Library</i>	270	270	7.399	7.399
2	2	<i>Journal of the American Society for Information Science and Technology</i>	151	421	4.138	11.537
3	3	<i>College & Research Libraries</i>	74	495	2.028	13.565
4	4	<i>D-Lib Magazine</i>	72	567	1.973	15.539
5	= 4	<i>Information Processing and Management</i>	72	639	1.973	17.512
6	= 4	<i>Journal of Documentation</i>	72	711	1.973	19.485
7	5	<i>The Journal of Academic Librarianship</i>	68	779	1.864	21.348
8	6	<i>Library Hi Tech</i>	66	845	1.809	23.157
9	7	<i>Library Review</i>	59	904	1.617	24.774
10	8	<i>Online Information Review</i>	56	960	1.535	26.309
11	9	<i>Communications of the ACM</i>	49	1,009	1.343	27.651
12	10	<i>Information Technology and Libraries</i>	37	1,046	1.014	28.665
13	11	<i>Library Journal</i>	34	1,080	0.932	29.597
14	12	<i>First Monday</i>	32	1,112	0.877	30.474
15	13	<i>Library and Information Science Research</i>	30	1,142	0.822	31.296
16	14	<i>Information Research</i>	29	1,171	0.795	32.091
17	= 14	<i>Journal of Information Science</i>	29	1,200	0.795	32.886
18	15	<i>Program: Electronic Library and Information Systems</i>	28	1,228	0.767	33.653
19	16	<i>Annual Review of Information Science and Technology (ARIST)</i>	26	1,254	0.713	34.366
20	17	<i>OCLC Systems & Services</i>	25	1,279	0.685	35.051
21	18	<i>Reference Services Review</i>	24	1,303	0.658	35.708
22	19	<i>Government Information Quarterly</i>	23	1,326	0.630	36.339
23	= 19	<i>Journal of Librarianship and Information Science</i>	23	1,349	0.630	36.969
24	= 19	<i>Library Trends</i>	23	1,372	0.630	37.599
25	= 19	<i>Reference & User Services Quarterly</i>	23	1,395	0.630	38.230
26	20	<i>Ariadne</i>	22	1,417	0.603	38.833
27	21	<i>Library Management</i>	21	1,438	0.576	39.408
28	22	<i>African Journal of Libraries, Archives and Information Science</i>	20	1,458	0.548	39.956
29	23	<i>Computers in Libraries</i>	19	1,477	0.521	40.477
30	= 13	<i>MIS Quarterly</i>	19	1,496	0.521	40.998
31	24	<i>Aslib Proceedings</i>	18	1,514	0.493	41.491
32	25	<i>Information and Management</i>	16	1,530	0.438	41.929
33	= 25	<i>Information Development</i>	16	1,546	0.438	42.368
34	= 25	<i>Information Today</i>	16	1,562	0.438	42.806
35	= 25	<i>New Library World</i>	16	1,578	0.438	43.245
36	= 25	<i>Online</i>	16	1,594	0.438	43.683
37	26	<i>Expert Systems with Applications</i>	15	1,609	0.411	44.094
38	= 26	<i>International Journal of Man-Machine Studies</i>	15	1,624	0.411	44.505
39	= 26	<i>Libri</i>	15	1,639	0.411	44.916
40	27	<i>International Journal of Human-Computer Studies</i>	14	1,653	0.384	45.300

(continued)

Table XII.
Ranking of journals

Sl no.	Rank	Name of journal	No. of citations	Cumulative citations	Percentage	Cumulative percentage
41	28	<i>American Libraries</i>	13	1,666	0.356	45.656
42	= 28	<i>Computers and Education</i>	13	1,679	0.356	46.013
43	= 28	<i>Information Systems Research</i>	13	1,692	0.356	46.369
44	= 28	<i>Portal: Libraries and the Academy</i>	13	1,705	0.356	46.725
45	= 28	<i>Scientometrics</i>	13	1,718	0.356	47.081
46	29	<i>Webology</i>	12	1,730	0.329	47.410
47	30	<i>EContact</i>	11	1,741	0.301	47.712
48	= 30	<i>Journal of Digital Information</i>	11	1,752	0.301	48.013
49	= 30	<i>Management Science</i>	11	1,763	0.301	48.315
50	= 30	<i>Searcher</i>	11	1,774	0.301	48.616
51	31	<i>Cataloging & Classification Quarterly</i>	10	1,784	0.274	48.890
52	= 31	<i>Chronicle of Higher Education</i>	10	1,794	0.274	49.164
53	= 31	<i>Internet Research</i>	10	1,804	0.274	49.438
54	= 31	<i>Journal of the Medical Library Association</i>	10	1,814	0.274	49.712
55	= 31	<i>Nature</i>	10	1,824	0.274	49.986
56	32	10 Journals (9 each)	90	1,914	2.466	52.453
57	33	7 Journals (8 each)	56	1,970	1.535	53.987
58	34	15 Journals (7 each)	105	2,075	2.878	56.865
59	35	25 Journals (6 each)	150	2,225	4.111	60.976
60	36	24 Journals (5 each)	120	2,345	3.289	64.264
61	37	42 Journals (4 each)	168	2,513	4.604	68.868
62	38	72 Journals (3 each)	216	2,729	5.919	74.788
63	39	136 Journals (2 each)	272	3,001	7.454	82.242
64	40	648 Journals (1 each)	648	3,649	17.758	100.000

Table XII.

Bradford's law of scattering states that:

If scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several other groups or zones containing the same number of articles as the nucleus when the number of periodicals in the nucleus and succeeding zones will be as 1: n : n^2 : n^3 ... (Vickery, 1993).

Applying the law into the context of the present study, the whole sample of 3,649 citations can be divided into three equal zones having citations of 1,216 in each. It is understood from Table XIII that the first zone contained 18 journals which is the nuclear zone and journals falling in this zone are called "core journals". The second quantum of 1,216 citations forming the second zone are contained in approximately in next 118 journals, which is the first peripheral zone around the nucleus and journals falling in this zone are known as "allied journals". The third or last quantum of 1,216 citations forming the third zone are contained in next 898 journals, which is second peripheral zone around the first peripheral zone and journals falling in this zone are known as "alien journals".

The ratio of number of journals in these three zones is 18: 118: 898 – which is almost equivalent to 18: 18×7 : 18×7^2 – where 18 represents the number of journals in the

Rank	No. of citations	No. of journals	Cumulative journals	Cumulative journals (%)	Total no. of citations of equal rank	Cumulative citations	Cumulative citations (%)
1	270	1	1	0.097	270	270	7.399
2	151	1	2	0.193	151	421	11.537
3	74	1	3	0.290	74	495	13.565
4	72	3	6	0.580	216	711	19.485
5	68	1	7	0.677	68	779	21.348
6	66	1	8	0.774	66	845	23.157
7	59	1	9	0.870	59	904	24.774
8	56	1	10	0.967	56	960	26.309
9	49	1	11	1.064	49	1,009	27.651
10	37	1	12	1.161	37	1,046	28.665
11	34	1	13	1.257	34	1,080	29.597
12	32	1	14	1.354	32	1,112	30.474
13	30	1	15	1.451	30	1,142	31.296
14	29	2	17	1.644	58	1,200	32.886
15	28	1	18	1.741	28	1,228	33.653
16	26	1	19	1.838	26	1,254	34.366
17	25	1	20	1.934	25	1,279	35.051
18	24	1	21	2.031	24	1,303	35.708
19	23	4	25	2.418	92	1,395	38.230
20	22	1	26	2.515	22	1,417	38.833
21	21	1	27	2.611	21	1,438	39.408
22	20	1	28	2.708	20	1,458	39.956
23	19	2	30	2.901	38	1,496	40.998
24	18	1	31	2.998	18	1,514	41.491
25	16	5	36	3.482	80	1,594	43.683
26	15	3	39	3.772	45	1,639	44.916
27	14	1	40	3.868	14	1,653	45.300
28	13	5	45	4.352	65	1,718	47.081
29	12	1	46	4.449	12	1,730	47.410
30	11	4	50	4.836	44	1,774	48.616
31	10	5	55	5.319	50	1,824	49.986
32	90	10	65	6.286	90	1,914	52.453
33	56	7	72	6.963	56	1,970	53.987
34	105	15	87	8.414	105	2,075	56.865
35	150	25	112	10.832	150	2,225	60.976
36	120	24	136	13.153	120	2,345	64.264
37	168	42	178	17.215	168	2,513	68.868
38	216	72	250	24.178	216	2,729	74.788
39	272	136	386	37.331	272	3,001	82.242
40	648	648	1,034	100.000	648	3,649	100.000

Table XIII.
Citation trend of ranked
journals

nucleus and $n = 7$ is a multiplier. This is well known Bradford's pattern, i.e. $m: m^*n: m^*(n)^2$ where m is number of core journals in a discipline and n is known as Bradford multiplier. Therefore, Bradford's law of scattering is confirmed by this data.

It is observed from Figure 3 that the initial portion of the graph, pertaining to the core (nucleus) zone is containing high productivity journal, deviates from straight-line pattern. The remaining portion of the graph pertaining to allied journals shows straight-line pattern and the alien journals (low productivity) scattered thereafter.

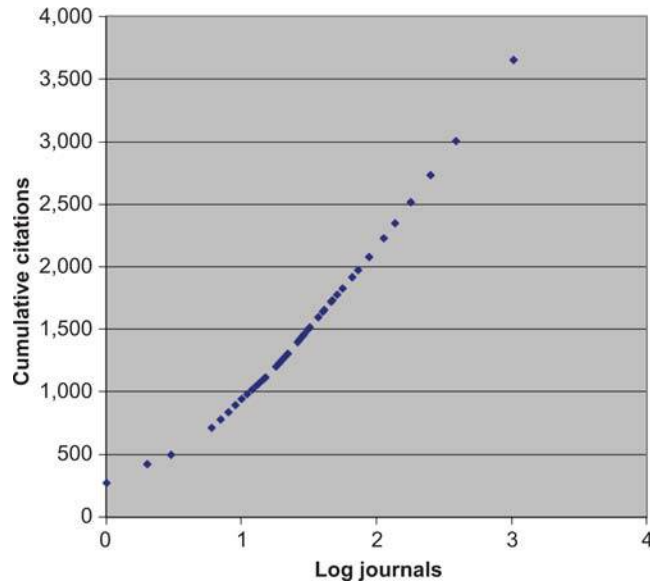


Figure 3.
Bradford's distribution of
journals

From this study it is concluded that application of Bradford's law suitably fits to the present study and it is observed that 18 journals are core (high productivity) journals, in the field of library and information science exclusively devoted to the areas of libraries and the web, the digital library, software and hardware developments, library networking and automation-integrated library systems, OPACs, user interfaces-web usability, internet access and use, e-books and e-journals, e-governance and e-readiness, online and distance learning, which are mainly used or referred by the researchers. Among the core journals *The Electronic Library* stands in the first position which implies that it is the first choice of the researchers due to the rich contents of its high standard and qualitative articles on the aforementioned areas.

Summary of findings

The vivid analysis of the study divulges the following major findings:

- The average number of citations per article published in *TEL* is 18 (17.844) which indicate that the publication policy of *TEL* conforms to the standard norm of citation.
- The study reveals that from among different categories of articles published in *TEL*, nearly half of the articles (46.283 percent) fall under the category of research papers, followed by case study (21.583 percent), general review (10.791 percent), conceptual papers (7.434 percent), technical papers (5.516 percent), view point (4.556 percent), and literature review (3.597 percent) which indicates that authors are more interested in contributing research papers than any other category.
- In regard to authorship patterns, the single authored articles are highest (47.242 percent) followed by joint authored articles (34.772 percent). These two categories constitute 82.014 percent which shows that the contributors are keen

-
- on writing articles individually or, jointly as an alternative choice. It shows that solo research is predominant over the mentioned publication period of *TEL*.
- The study reveals that the average length of articles is 13.017 pages. Perhaps it is due to the fact that the contributors are giving more facts, figures, and illustrations to justify their research findings.
 - The scattering of contributors are limited within a few countries. Some 50 percent of articles are contributed by four countries; and 75 percent of articles are contributed from a subtotal of ten countries which indicates that leading *TEL* authors hail from a selected few countries.
 - Regarding the bibliographical distribution of citations, it is found that the majority of citations are from journals followed by web resources, and books.
 - In regard to the recent citation of journals and books, it is found that in both the cases the contributors have referred the most recent documents. However, 50 percent of journal references are within five years and 50 percent of the book references are within seven years.

As per Bradford's Law of scattering, it is observed that 18 journals are core (high productivity) journals which are mainly used or referred by the researchers. The core journals are *The Electronic Library*, *Journal of the American Society for Information Science and Technology*, *College & Research Libraries*, *D-Lib Magazine*, *Information Processing and Management*, *Journal of Documentation*, *The Journal of Academic Librarianship*, *Library Hi Tech*, *Library Review*, *Online Information Review*, *Communication of the ACM*, *Information Technology and Libraries*, *Library Journal*, *First Monday*, *Library and Information Science Research*, *Information Research*, *Journal of Information Science*, and *Program: Electronic Library and Information Systems*.

Suggestions for future research

Due to paucity of time and certain unavoidable situations, the authors could not make the study a little more exhaustive – which could have provided some more interesting results. Therefore, the authors feel that this research may provide useful scaffolding to the following area of research in future:

- *The Electronic Library* may be re-visited after a couple of years for a different time slot and the scope of the study could be extended to incorporate authors' productivity pattern, degree of authors' collaboration and Journal Impact Factor based on citations of *TEL* articles received by Google Scholar which can further be compared with the corresponding impact factor of Thomson Reuters (ISI) for a given year.
- An informatics appraisal of some other core journals in the field of library and information science may be carried on in the light of the present research.
- A comparative study may be drawn between two single journals of relatively similar standard with reference to the metrics used in this study.

Conclusion

The Electronic Library is a reputed international referred journal in the field of library and information science exclusively devoted to the use, application, design, and

development of various facets of information communication technologies in the electronic age. Analysis of seven volumes of the journal shows that it publishes high quality articles leading with research papers, case studies, and general reviews contributed by the advanced researchers which in turn, help research scholars, senior library managers, collection development officers, acquisition librarians, and reference librarians to refresh their knowledge from findings on ongoing trends on application and use of digital libraries, automation, networking, and assorted topics from around different parts of the world. In this direction, *TEL* is striving hard to constantly improve the quality of its publication over last few years. Recently, *The Electronic Library* was in Emerald News (2010) for fairly improving its ISI journal impact factor over the last year. Moreover, as evident from the study, *TEL* has set due consideration for the quality of production of articles with respect to the technological developments of both developed and developing countries with useful information and descriptions of specific applications around the globe in conformity accordance with its the editorial policy of the journal.

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