DESIDOC Journal of Library & Information Technology, Vol. 37, No. 4, July 2017, pp. 264-269 DOI: 10.14429/djlit.37.4.10712

DESIDOC Journal of Library and Information Technology (*DJLIT*): A Bibliometric Analysis of Cited References

Vishal Dattatray Bapte

Knowledge Resource Centre, Sant Gadge Baba Amravati University, Amravati, Maharashtra-444 602
E-mail: vishal_bapte@rediffmail.com

ABSTRACT

The paper presents a bibliometric analysis of the 4821 cited documents appended to the 295 articles published in *DJLIT* during 2011-15. The citation analysis is based on various strictures such as studying distribution of citations, authorship pattern, degree of collaboration, distribution of reference sources, prominent authors and ranked list of core journals. The study revealed that there is dominance of single authorship with 1912 (39.65%) citations followed by two authors with 1152 (23.89%) citations, three authors with 456 (9.45%) citations and more than three authors with 386 (8%) citations. There has been the availability of a good degree of institutional publications as well. Year-wise authorship pattern is also specified so as to see the dominance of particular authorship pattern for the period considered under the study. The degree of authors' collaboration for the present study is 0.51 and modified collaborative coefficient is 0.3661. Dr B.M. Gupta with 52 citations is the most prolific author. Dr K.C. Garg and Dr B.S. Kademani are at the second and third position respectively. The study further exposed the journal to be the mostly cited information source 2560 (53.10%) followed by websites (22.69%) and books (10.81%). Conference papers, reports, theses, workshop papers and seminar papers equally seem to be preferred domain with regard to using pertinent information source. Ranked list of journals denotes Scientometrics to be the most used journal (6.60%) by the authors contributing in DJLIT. The source journal is at the second position in the ranked list with 5.43%. A glance at the ranked core list of journals suggests that maximum journals are from foreign countries.

Keywords: *DJLIT*, bibliometrics, citation analysis, cited references, bradford's law

1. INTRODUCTION

Citation analysis is the area of bibliometrics which deals with the study of relationship between citing document and citing document[1]. Weinstock[2] observes that scientific tradition requires that when a reputable scientist or technologist publishes an article, he should refer to earlier articles, which relate to his theme. Garfield has enumerated 15 excellent reasons as to why an author should do this[1]. Strictly adhering to this scientific tradition would be helpful in studies research evaluation and science policy which is ultimately the aim of citation analysis[3].

2. LITERATURE REVIEW

Some of the reviews in the light of present study have been studied and enumerated as follows:

Jan[4] did the citation analysis of 593 articles published in *Library Trends* during 1994-2007. Out of 15662 references, 13783 were *p-citations* and 1879 were *e-citations*. Each issue published approximately 11 articles. Although the journals outnumbered the books and other resources in the total citation received, yet aggregated figure showed the difference of books and journals citation was in decimal fraction. Largest number of conference proceeding were cited in the year 1999. The researcher hardly used e-books as a reference source. Very less number 11.86% e-journals were cited against 88.14% of other resource types during the 14 years. The female contributions with 52.34% accounted more than male contribution (47.66%) as they contributed more than 60% during the year 1996, 1998, 2005-2007.

Deshmukh[5] analysed 4141 citations appended to articles published in '*Annals of Library and Information Studies*' during 1997 to 2010. He found that maximum citation, i.e., 2258 (54.34%) were from journals in which source journals leaded with 11.12%. The half life of LIS literature was found to be 9 years for journals and 14 years for books respectively. The ratio of single authorship was more in the case of books (70.52%) as compared to journals (52.7%).

Kumar & Moorthy[6] performed the bibliometric analysis of *DESIDOC Journal of Library and Information Technology* during 2001-2010. The result indicated that maximum number of papers (37.6%) were from single authors followed by two-authored papers (36.9%). The Web/internet was increasingly cited information source which the authors thought was keeping in tune with the era of IT. However, journals got the first place 1382 with (40.31%) citations. Dr B.M. Gupta stood out to be the prominent author. In case of institution-wise distribution of papers, Universities ranked first with 139 contributions followed by Government or Research institutions which had 104 contributions to their credit. The average length of papers was 6-10 pages.

Received 30 September 2016, online published 30 June 2017

While doing the Citation analysis of Collection Building, Har Singh[7] consulted 179 articles from 8volumes (2005-2012) which carried 2388 citations including 85 self-citations. With regard to range and percentage of citation per articles, a total 54 (30.17%) articles topped the list with between 10 to 19 citations. Authorship pattern showed the trend towards single authorship with 118 (65.92%), followed by two authors 50 (27.93%). It is through Subramanian's formula, the author deduced that degree of collaboration in 'Collection Building' was from 0.23 to 0.50. 253 authors contributed 179 articles in which Kanwal, Ameen from Pakistan was found to be the most prolific authors. Most of the contributors were from USA followed by Canada and India. Maximum 119 (66.48%) articles were between six to ten pages followed by 46 (25.7%) articles between one to five pages. The ranking of source materials indicated that journals were the mostly cited information source with maximum 1020 (42.71%) citations. The source journal 'Collection Building' leaded with 92 (9.02%) citations stood at the top in the ranked list of 1020 journals.

Singh & Bedi[8] in their study analysed the citations affixed in the theses of Sociology, accepted by University of Delhi during 1995-2010. The study revealed that researchers in Sociology used books mostly for their research than any other information source. It is surprising that web resources did not get any citations. With regard to country-wise and city-wise scattering of citations, India ranked first with 45.98% citations and New Delhi ranked first having 24.48% citations respectively. Oxford University Press dominated with 440 publications (30.17%) followed by Sage publication with 200 publications (13.71%) in case of publisher-wise scattering of citations. In ranked list of the journals both *Indian Journals of Economic and Political Weekly* with 137 (10.70%) and *Indian Journal of Psychiatry* with 98 (7.66%) got the maximum citations. Single authors received maximum citations (83.94%) than the collaborative authors.

Patra[9] examined the citation pattern of Indian LIS journals through Google Scholar to know the strength and weakness of Indian LIS journals. The average citations of Indian LIS journals varied from maximum 4.21 to minimum 0.29 with *Annals of Library and Information Studies* having the highest citation per paper (4.21%). Single authorship was found to be most common in all journals selected for study. This showed collaborative research is not preferred by LIS scholars. However, two-authored and three authored articles were cited more than single-authored articles. The authors opined that Indian LIS journals were not maintaining their online indexing or archiving properly.

3. OBJECTIVES

The study has been carried out with the following objectives to:

(a) Estimate year-wise and volume-wise quantitative growth of cited-articles

(b) Find out quantitative distribution of citations

(c) Examine the authorship pattern and to identify prominent authors from the cited documents

(d) Know the type of reference sources used by the authors in *DJLIT*

(e) Scrutinise cited journals so as to find out core journals using Bradford's law of scattering

4. METHODOLOGY

The data for the present study has been gathered from 4821 citations appended to the 295 citing articles published in *DJLIT* during 2011-2015. The articles were accessed in print form and which were not available in print were accessed through the archive available (http://publications.drdo.gov.in/ojs/index.php/djlit/issue/archive). The information with regard to the cited documents of each article was noted in MS Excel sheet. The recorded data was analysed and interpreted using the excel sheet. While preparing the ranked list of the journals, website (www.scimagojr.com) was consulted to determine country of origin of journals. It is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus database[10].

5. DATA ANALYSIS

5.1. Distributions of References

Table 1 reflects volume-wise and year-wise citations quoted by the citing authors. 295 articles have been published during the five years which is the span of the study. These published articles received 4821 citations. Most of the citations, i.e., 1011 (20.97%) appeared in the year 2011. Although, there is no great difference in the amount of references cited every year, yet from 2011 onwards the amount of cited documents is decreasing upto 2015.

Table 1. Distribution of citations

S. No.	Year	Volume	No. of articles	Total references	Cumulative references	Percentage	Cumulative %
1.	2011	31	55	1011	-	20.97	-
2.	2012	32	65	996	2007	20.65	41.62
3.	2013	33	62	987	2994	20.48	62.1
4.	2014	34	60	934	3928	19.38	81.48
5.	2015	35	53	893	4821	18.52	100

5.2. Authorship Pattern

Figure 1 shows the authorship pattern of contributors. Maximum contributions were single authored, i.e., 1912 (39.65%), followed by two authors (23.89%), three authors (9.45%), more than three authors (6.55%) and corporate authors (6.55%). The collaborative research is a good degree of visible; still there is dominance of one author, followed by two authors. The percentage-wise graphical display of authorship pattern is given as below.

5.3. Year-wise Authorship Pattern

Table 2 throws light on the year-wise authorship pattern. Maximum single author contributions appears in the year 2012, i.e., 410 followed by 2013 and 2011. Two-authors, three-authors and more then three authors have contributed significantly in the year 2011 with 279, 126 and 107 articles respectively. The contributions from corporate authorship are also significant.

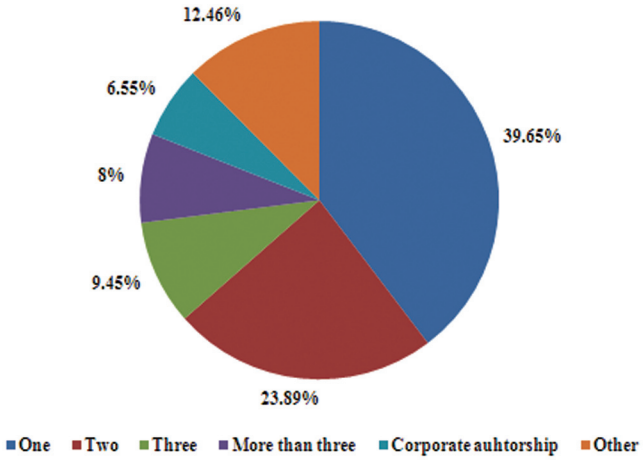

Figure 1. Authorship pattern of contributions.

5.4. Degree of Collaboration

Table 3 shows the degree of authors' collaboration and modified collaborative coefficient in *DJLIT*. It was calculated by using Subramanyam's[11] and Savanur & Srikanth's formula[12] respectively. Hence, the degree of collaboration in the present study is 0.51. There is no greater difference in the degree of collaboration in all the years with the exception of 0.40 in the year 2012. While average modified collaborative coefficient is 0.3661. More than three authors have been given ¼ credits. Corporate authorship and others have not been taken into account.

5.5. Prominent Authors

In all 3904 authors were cited. Table 4 lists 17 authors which were cited 10 or more times. Among all the cited authors in *DJLIT*. Dr B.M Gupta has got first rank with 52 citations, followed by Dr K.C. Garg with 43, Dr B.S. Kademani with 32, R. Rousseau with 22, Dr C.K. Ramaiah with 20 and G. Prathap with 19 citations.

5.6. Distributions of Information Sources

Table 5 shows distribution of different forms of cited literature used by different authors during research writing. The table clearly depicts journals to be highly cited information source with 2560 (53.10%) citations followed by websites 1094 (22.69%) and books with 521 (10.81%). The citations received for reports and theses indicate that they are important source, though they are less in numbers. In fact, conference proceeding has been used more by the citing authors as compared to reports and theses. It shows how conferences have been popular nowadays and it has been regarded as one of the important medium to spread

Table 2. Year-wise authorship pattern of contribution

Authorship pattern	Year (%)					No. of references (%)
	2011	2012	2013	2014	2015	
Single author	402 (8.33)	410 (8.50)	406 (8.42)	354 (7.34)	340 (7.05)	1912 (39.65)
Two authors	279 (5.78)	161 (3.33)	246 (5.10)	228 (4.72)	238 (4.93)	1152 (23.89)
Three authors	126 (2.61)	69 (1.43)	98 (2.03)	85 (1.76)	76 (1.57)	454 (9.45)
More than three authors	107 (2.21)	46 (0.95)	102 (2.11)	80 (1.65)	51 (1.05)	386 (8)
Corporate authorship	41 (0.85)	121 (2.50)	52 (1.07)	26 (0.53)	76 (1.57)	316 (6.55)
Not given/other	56 (1.16)	189 (3.92)	83 (1.72)	161 (3.33)	112 (2.32)	601 (12.46)
Total	**1011 (20.97)**	**996 (20.65)**	**987 (20.47)**	**934 (19.39)**	**893 (18.52)**	**4821 (100)**

Table 3. Degree of authors' collaboration

Year	Single author (No.)	Multiple authors (Nm)			Degree of collaboration (C)	Modified collaborative coefficient (MCC)
		Two authors	Three authors	More than three authors		
2011	402	279	126	107	0.56	0.3326
2012	410	161	69	46	0.40	0.2336
2013	406	246	98	102	0.52	0.6599
2014	354	228	85	80	0.53	0.3092
2015	340	238	76	51	0.52	0.2954
Average					**0.51**	**0.3661**

Table 4. Prominent authors

S. No.	Author	No. of citations	Rank
1.	Gupta, B.M.	52	1
2.	Garg. K.C.	43	2
3.	Kademani, B.S.	32	3
4.	Rousseau, R.	22	4
5.	Ramaiah, C.K.	20	5
6.	Prathap, G.	19	6
7.	Egghe, L.	18	7
8.	Sen, B.K.	18	7
9.	Dhawan, S.M.	15	8
10.	Kalyane, V.L.	13	9
11.	Satija, M.P.	13	9
12.	Padhi, P	13	9
13.	Glanzel, W.	11	10
14.	Schubert, A	11	10
15.	Foo, S.	10	11
16.	Lynch, C.	10	11
17.	Sagar, Anil	10	11

scientific information. The figures under newspapers and others are inclusive of may vital information population such as seminar papers, newspapers workshop papers, dissertations, standards, talks/lectures, meeting papers, project documents, manifesto, private communications, interviews, memoir, patents, records, reviews and atlases, though they are meagre in numbers.

5.7. Scattering of Cited Articles in Journals in *DJLIT*

To find out scattering of articles in journals in *DJLIT*, the number of journals and the number of articles published by them has been given. Their ranking and log has equally been calculated as given in Table 6.

The logarithm graph in Fig. 2 is derived by plotting a curve where coordinates are cumulative number of articles in the y-axis and the log of ranking of journals in x-axis where journals are cumulated from most to least productive. The curve in the graph has an ascending shape as if leading to straight line. It almost resembles to what Bradford has stated. Bradford's distribution for research output in *DJLIT*.

Table 6. Scattering of cited articles in DJLIT

No. of journals (A)	No. of articles (B)	Total articles C=(A*B)	Cumulation of C	Rank	Log
1	169	169	169	1	0.0000
1	139	139	308	2	0.3010
1	136	136	444	3	0.4771
1	57	57	501	4	0.6020
1	45	45	546	5	0.6989
1	43	43	589	6	0.7781
1	42	42	631	7	0.8450
1	36	36	667	8	0.9030
1	35	35	702	9	0.9542
1	32	32	734	10	1.0000
1	31	31	765	11	1.0413
1	30	30	795	12	1.0791
1	28	28	823	13	1.1139
1	27	27	850	14	1.1461
1	24	24	874	15	1.1760
2	22	44	918	17	1.2304
1	21	21	939	18	1.2552
2	19	38	977	20	1.3010
3	18	54	1031	23	1.3617
4	17	68	1099	27	1.4313
3	16	48	1147	30	1.4771
3	13	39	1186	33	1.5185
2	12	24	1210	35	1.5440
5	11	55	1265	40	1.6020
4	10	40	1305	44	1.6434
2	9	18	1323	46	1.6627
7	8	56	1379	53	1.7242
7	7	49	1428	60	1.7781
6	6	36	1464	66	1.8195
14	5	70	1534	80	1.9030
18	4	72	1606	98	1.9912
25	3	75	1681	123	2.0899
219	2	438	2119	342	2.5340
441	1	441	2560	783	2.8937

Table 5. Year-wise distribution of source materials

S. No.	Information source	2011	2012	2013	2014	2015	Total	%
1.	Journals	599	413	530	517	501	2560	53.10
2.	Websites	157	356	120	220	241	1094	22.69
3.	Books	99	94	153	106	69	521	10.81
4.	Conference papers	105	59	113	49	51	377	7.82
5.	Reports	13	14	18	13	4	62	1.29
6.	Theses	4	3	11	10	5	33	0.68
7.	Workshop paper	13	7	3	1	2	26	0.54
8.	Newspapers and others	21	50	39	18	20	148	3.07
	Total	**1011**	**996**	**987**	**934**	**893**	**4821**	**100**

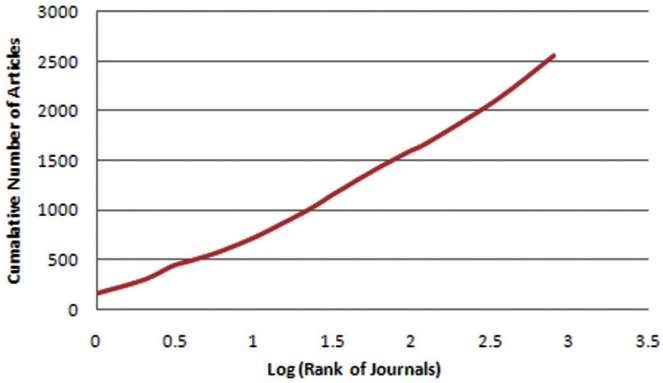

Figure 2. Bibliograph for scattering of literature.

Table 7 reflects Bradford zones and distribution research output in *DJLIT* during the scope of the study. When 2560 citations were divided into three Bradford's zone thus 14 journals contributing 850 articles in the first zone, in the next zone 121 journals published 856 articles and next 648 journals published 854 articles. Bradford stated that the numbers of journals following successfully in the three zones will $1:n:n^2$. Hence observed distribution is 14: 121: 648 = 783 and expected distribution is 14: 14*6.95: 14*$(6.95)^2$. Here 6.95 is the average of the Bradford's multiplier obtained by dividing the number of journals titles of a particular zone by its preceding zone (here 121/14=8.6) and (648/121=5.3).

Table 8. Core journals referred by the scientists

S. No.	Name of the journal	Countries	No. of papers
1.	*Scientometrics*	Netherlands	169
2.	*DESIDOC Journal of Library & Information Technology*	India	139
3.	*Annals of Library & Information Studies*	India	136
4.	*Electronic Library*	UK	57
5.	*Libraries Hi Tech*	UK	45
6.	*Library Philosophy & Practice*	United States	43
7.	*Journal of Documentation*	UK	42
8.	*SRELS Journal of Information Management*	India	36
9.	*Malaysian Journal of Library & Information Science*	Malaysia	35
10.	*Journal of the American Society for Information Science*	United States	32
11.	*D-Lib Magazine*	United States	31
12.	*Library Review*	UK	30
13.	*Bulletin of the Medical Library Association: JMLA*	United States	28
14.	*College & Research Libraries*	UK	27
	Total		**850**

Table 7 - Bradford's distribution for research output in *DJLIT*

Zones	No. of publications	% of publications	No. of journals	% of journals	Bradford multiplier
First	850s	33.20	14	1.79	-
Second	856	33.44	121	15.45	8.6
Third	854	33.36	648	82.76	5.3
Total	**2560**	**100**	**783**	**100**	**Average=6.95**

5.8. Core Journals Referred by the Scientist

Table 8. denotes the core journals referred by the scientist at *DESIDOC Journal of Library and Information Technology*. In all 783 journals have been cited 2560 times by the citing authors in *DJLIT* during the scope under the study. *Scientometrics* from Netherlands is highly quoted 169 (6.60%) journal. The source journal stands at the second position with 139 (5.43%) citations. The source journal is followed by *Annals of Library and Information Studies* with 136(5.31%), *Electronic Library* with 57(2.23%), and *Library Hi Tech* with 47(1.83%) citations. Remaining ranking can be viewed from the table given above. First 8 journals in the rank contribute 26.05% of the total journal citations. The first 42 journals in the rank list contribute 50.19% of the total citations. However, only the first core zone from Bradford as given in Table 8 forms the list of core journals.

6. CONCLUSIONS

The study divulged that 30 issues have 295 citing articles. Each volume published 59 articles with an average. Each issue approximately contained 10 articles. The quantitative growth of citations is lowering down from 2011 to 2015. With regard to authorship pattern, single authorship has dominated the rest of patterns of collaboration. Still the contributions from corporate authors' are noteworthy. There share is 6.55%. Out of all the information sources, journals are the mostly cited information source followed by websites and books. The ranked list gives an idea about principal journals in the discipline.

The present study is important in that it deals with one of the leading Library and Information Science journals in India. The citation study of such a journal was really appropriate though the findings may not exactly be generalised for the whole discipline as they are. This study needs to be strengthened by more comprehensive studies inclusive of prominent Library and Information Science Journals from India. Yet the findings are of vital importance to know the citation behaviour of *DJLIT* which may be useful for further studies on this line.

REFEENCES

1. Smith, Linda. Citation analysis. *Library Trends*, 1981, **30**, 83-106. http://www.ideals.illinois.edu/bitstream/handle/2142/7189/librarytrendsv30i1_opt.pdf?seqence=3#page=88 (accessed on 5 December 2015).
2. Weinstock, Melvin. Citation indexes. *In* Encyclopedia of Library and Information Science, edited by Allen Kent & Harold Lancour, Marcel Dekker, New York, 1971, 16-40.
3. Garfield, Eugene. Citation analysis as a tool in journal evaluation. *Science*, 1972, **178**(1), 527-44. http://garfield.library.upenn.edu/essays/v1p527y1962-73.pdf (accessed on 31 October 2015).
4. Jan, Rosy. Citation Analysis of Library Trends. *Webology*, 2009, **6**(1), 1-10. http://www.webology.org/2009/v6n1/a67.html (accessed on 31 October 2015).
5. Deshmukh, Prashant. Citations in Annals of Library and Information Studies during 1997 to 2010: A study. *Annals Lib. Info. Studies*, 2011, **58**(4), 355-61. http://nopr.niscair.res.in/bitstream/123456789/13485/1/ALIS%2058%284%29%20355-361.pdf (accessed on 27 October 2015).
6. Kumar, Manoj & Moorthy, A.L. Bibliometric analysis of *DESIDOC Journal of Library and Information Technology* during 2001-2010. *DESIDOC J. Lib. Info. Tech.,* 2011, **31**(3), 203-08. http://publications.drdo.gov.in/ojs/index.php/djlit/article/view/989/418 (accessed on 31 October 2015).
7. Singh, Har. Citation analysis of Collection Building during 2005-2012. *Collection Building*, 2013, **32**(3), 89-99. http://www.emeraldinsight.com/0160-4953.htm (accessed on 31 October 2015).
8. Singh, K.P. & Bebi. Citation analysis of PhD theses in sociology submitted to University of Delhi during 1995-2010. *DESIDOC J. Lib. Info. Tech.*, 2013, **33**(6), 489-93. http://publication.drdo.gov.in/ojs/index.php/djlit/article/view/5480/2974 (accessed on 27 October 2015).
9. Patra, Swapan Kumar. Google scholar-based citation analysis of Indian library and information science journals. *Annals Lib. Info. Studies*., 2014, **61**(3), 227-34. http://nopr.niscair.res.in/bitstream/123456789/29483/1/ALIS%206/%283%20227-234.pdf (accessed on 28 October 2015).
10. http://www.scimagojr.com/journalsearch.php?q=21100201051&tip=sid&clean=0 (accessed on 12 March, 2016).
11. Subramanyam, K. Bibliometrics studies of research collaboration: A review. *J. Info. Sci*., 1982, **6**, 33-38. http://jis.sagepub.com (accessed on 12 May 2016).
12. Savanur, K. & Srikanth. Modified collaborative coefficient: A new measure for qualifying degree of research collaboration. *Scientometrics*, 2010, **84**(2), 365-71.DOI-10.1007/s11192-009-0100-4 (accessed on 3 January 2017).

CONTRIBUTOR

Mr Vishal Dattatray Bapte is working as Assistant Librarian in the Knowledge Resource Centre of Sant Gadge Baba Amravati University, Amravati (Maharashtra). He is the Head of acquisition section, Periodical section, Circulation section and Reference section. He also negotiates for the Online resources and its subscription. He did his MLISc in 2007 from Sant Gadge Baba Amravati University. Prior to the joining of the present institution, he worked as Librarian in Shankarlal Khandelwal College, Akola (Maharashtra).