BIBLIOMETRIC ANALYSIS OF D-LIB MAGAZINE

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Abstract :

The paper brings out the results of a bibliometric analysis of the journal titled "D-Lib Magazine" for the period between 2003 to 2012. The data were downloaded from the journal's website. This study aims at analysing the research output performance of library and Information Science professionals on Library and Information 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. All the studies point towards the merits and weakness of the journal which will be helpful for its further development. The result showed showed that out of 361 articles joint authors contributed 241 (66.75%) articles while the rest 120 (33.25%) articles were contributed by single author. Study reveals that the highest contributions were from universities with 147 (40.73%). This is followed by research institutions with 82 (22.71%) and Colleges 65 (18.00%). The remaining 67 articles (18.56%) were contributed by other agencies like public organisations etc. The study also reveals that majority of the contributors preferred journals as the source of information which occupied the top position with the highest number of citations 3656 (49.36%) of the total 7407 citations followed by Seminar / Conference Proceedings with 1315 (28.68%) citations.

KEYWORDS :

Bibliometrics, Bibliography, Authorship pattern, Library and Information Science, Citation.

INTRODUCTION

The terms bibliometrics and scientometrics were almost simultaneously introduced by Pritchard and by Nalimov and Mulchenko in 1969. While Pritchard explained the term bibliometrics as "the application of mathematical and statistical methods to books and other media of communication", Nalimov and Mulchenko defined scientometrics as "the application of those quantitative methods which are dealing with the analysis of science viewed as an information process". According to these interpretations the speciality scientometrics is restricted to the measurement of science communication, whereas bibliometrics is designed to deal with more general information processes. The anyhow fuzzy borderlines between the two specialities almost vanished during the last three decades, and nowadays both terms are used almost as synonyms. Instead, the field informetrics took the place of the originally broader speciality bibliometrics. The term informetrics was adopted by VINITI (Gorkova, 1988) and stands for a more general subfield of information science dealing with mathematical statistical analysis of communication processes in science. In contrast to the original definition of bibliometrics, informetrics also deals with electronic media and thus includes topics such as the statistical analysis of the (scientific) text and hypertext systems, library circulations, information measures in electronic libraries, models for Information Production Processes and quantitative aspects of information retrieval as well.

D-Lib Magazine is an electronic publication with a focus on digital library research and development, including new technologies, applications, and contextual social and economic issues. D-Lib Magazine appeals to a broad technical and professional audience. The primary goal of the magazine is timely and efficient information exchange for the digital library community to help digital libraries be a broad interdisciplinary field, and not a set of specialties that know little of each other.

The Corporation for National Research Initiatives (CNRI) is making D-Lib Magazine available for the advancement of knowledge and practice on digital library research and related matters. Funding was previously provided by the US Defense Advanced Research Projects Agency (DARPA) under Grant No. N66001-98-1-8908 and by the National Science Foundation (NSF) under Grant No. IIS-0243042. The magazine is currently supported by the D-Lib Alliance and other contributors.

2. RELATED STUDIES

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

Jena (2006) made an exhaustive bibliometric study of Fibre and Textile Research and unfolded the publication trend of this Indian journal from 1996 to 2004.

Ramakrishnan and Ramesh Babu (2007) analyzed the literature output in the field of hepatitis from three bibliographic databases, namely MEDLINE, CINAHL and IPA, and found that collaboration in authorship pattern is prevalent, averaging 0.85.

Asha (2007) analyzed articles and citations in Demography India from 1972-2001 and identified core areas of demographic studies, including article contributions by country and geographic areas, authorship patterns and collaboration, most cited journals, bibliographic forms of cited documents, average age of citations, and rate of citations per article.

Bharvi et al. (2007) analyzed 1,317 papers published in the first fifty volumes from 1978 to 2001 of the international journal Scientometrics and found that the US share of the papers is constantly on the decline while that of the Netherlands, India, France and Japan is on the rise and that the scientometric output is dominated by the single-authored papers.

According to Thanuskodi (2010) the majority of articles of bibliometric study contain bibliographic references to journals, books, conference proceedings, dissertations, etc.

Thanuskodi (2010) 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.

Ram (2011) analyzed data in the PubMed database for the period of 1996-2010 to study the growth of research on Artemisia, including research distribution by country, type of publications, journal authorship patterns, and Indian publication activity on Artemisia.

Swain (2011) conducted a bibliometric study of Library Philosophy and Practice from 2004 to 2009 and revealed the partial compliance of authorship productivity pattern of LPP with Lotka's Law at a slightly greater n value.

Hussain and Fatima (2011) evaluated the characteristics of the Chinese Librarianship: an International Electronic Journal from 2006 to 2010 through a bibliometric analysis.

Thanuskodi (2012) conducted a bibliometric study of Indian Journal of Agricultural Research and showed that out of 602 articles joint authors contributed 564 (93.69%) articles while the rest 38 (6.31%) articles were contributed by single author. Study reveals that most of the contributions are from India with 98.67 % and the rest 1.33% only from foreign sources.

Dillip K. Swain and Panda (2012) evaluated the characteristics of the Journal of Intellectual Property Rights from 2002 to 2010 through a Bibliometric analysis and revealed that contributed maximum articles to JIPR were India, USA, UK, China, and Switzerland. Maximum Indian contributions to JIPR are hailed from Delhi, followed by West Bengal and Karnataka. The estimated half-life of journals is found to be 8 years.

3. OBJECTIVES OF THIS STUDY

The present study has been undertaken with the objective of analysing the following aspects:

To make an analysis of articles published in D-Lib Magazine from 2003 to 2012.
To classify the number of contributions published during the period of study
To find out the year wise distribution of articles
To learn the authorship pattern
To study the length of articles
To learn the subject coverage of articles
to determine the number of cited documents and the average number of references per article.
to classify the number and forms of documents cited.
to categorize the year-wise distribution of cited journals.

4. METHODOLOGY

Methodology applied in the present study is bibliometric analysis which is used to study in detail the bibliographic features of the articles and citation analysis of reference appended at the end of each article, published in D-Lib Magazine from 2003 to 2012. The data pertaining to D-Lib Magazine 361 articles made from volume 9 in 2003 to volume 18 in 2012. All the bibliographic details were noted and a computerised database is then created for in-depth analysis.

5. ANALYSIS

All the details such as authors, title, year of publication, pagination, institutional affiliation etc of all articles published form 2003 to 2012 were recorded for the following analysis.

5.1 Distribution of Contribution

Table-1 Year wise Distribution of Articles

Year	Vol. No.	No. of issues	No. of contribution	Percentage
2003	9	12	52	11.41
2004	10	12	40	11.08
2005	11	12	54	14.96
2006	12	12	38	10.53
2007	13	12	27	7.47
2008	14	12	26	7.21
2009	15	12	31	8.58
2010	16	12	29	8.03
2011	17	12	33	9.15
2012	18	12	31	8.58
Total		**120**	**361**	**100.00**

The D-Lib Magazine regularly publishes in international journals of repute. The journal published 361 research papers during the period of study i.e. from 2003 to 2012. The journal on an average has published 36 research papers per year. The above table showed that the maximum numbers of articles were published in the year 2005 with 54 articles and minimum in the year 2008 with 26 articles. The number of research publications of D-Lib Magazine for the period 2003-2012 has been given year wise in table-1.

Table-2 Distribution of Articles (Issue-wise)

Month	Volume Number										Total
	9	10	11	12	13	14	15	16	17	18	
Jan/Feb	11	5	8	2	2	5	6	8	10	4	61
Mar/Apr	11	7	8	9	2	3	5	4	5	4	58
May/Jun	11	10	7	8	7	4	6	4	4	4	65
Jul/Aug	4	3	9	4	5	4	3	4	4	8	48
Sep/Oct	8	6	13	8	5	6	5	5	6	5	67
Nov/Dec	7	9	9	7	6	4	6	4	4	6	62
Total	**52**	**40**	**54**	**38**	**27**	**26**	**31**	**29**	**33**	**31**	**361**

The table 2 reveals distribution of articles (Issue-wise). Volume No. 11 shows the highest number of total articles. The second highest position is occupied by Volume No. 9. It is followed by volume 10. The lowest number of total articles in volume 14. The contribution of articles in volume 11 is more in Sep/Oct.

Table-3 Subject wise Distribution of Articles

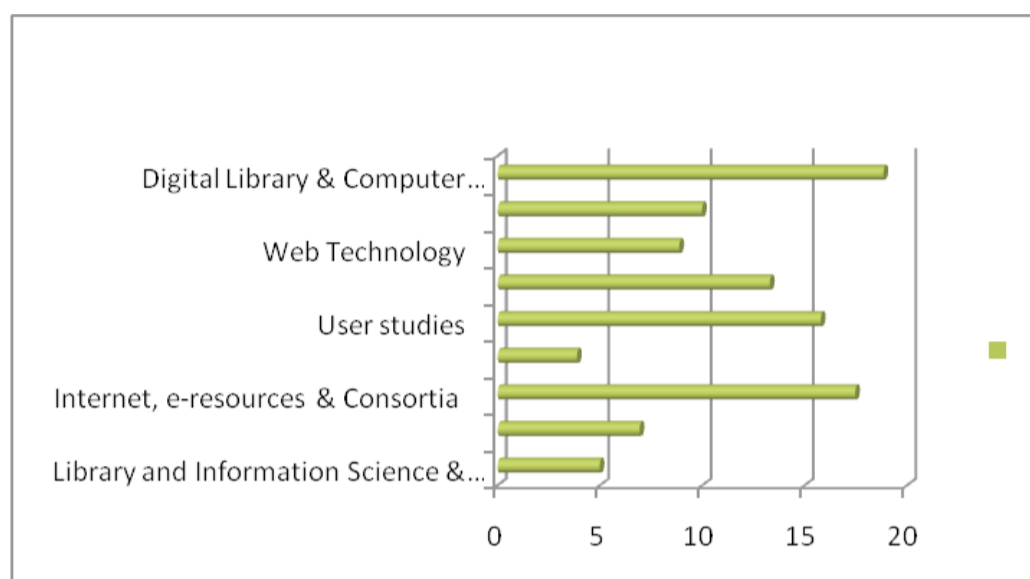| Subject	No. of Articles	Percentage
Library and Information Science & Information Literacy	18	4.98
Library Profession & Academic / Public / Special Libraries	25	6.93
Internet, e-resources & Consortia	63	17.46
Bibliometric studies	14	3.87
User studies	57	15.78
Archives / Open Source Software	48	13.29
Web Technology	32	8.87
Library Automation	36	9.98
Digital Library & Computer Application	68	18.84
Total	**361**	**100.00**

Fig.1 Subject wise distribution of Articles

The table 3 above showed that majority of the contributions appeared under digital library and computer application 68 (18.84%) followed by Internet, e-resources and consortia 63 (17.46%), user studies 57 (15.78%), open source software 48 (13.29%), Library automation 36 (9.98%) and Web technology 32 (8.87 %) [Fig.1].

5.2 Authorship Pattern

Table-4 Authorship Pattern

Year	Number of Authors					Total
	1	2	3	4	5 & more	
2003	18	14	9	8	3	52
2004	17	6	6	7	4	40
2005	17	16	8	7	6	54
2006	11	14	5	4	4	38
2007	9	9	5	1	3	27
2008	11	7	1	3	4	26
2009	9	9	8	3	2	31
2010	7	9	6	2	5	29
2011	13	10	4	4	2	33
2012	8	7	7	4	5	31
Total	**120**	**101**	**59**	**43**	**38**	**361**
Percentage	**33.25**	**27.98**	**16.34**	**11.91**	**10.52**	**100.00**

Collaborative research is very much a feature of the library and information Science especially during the 21st century. It is a natural reflection of complexity, scale and costs of modern investigations in Library and Information Science. Multi authorship provides different measures of collaboration in the subject. Table 4 reveals the authorship pattern of the articles published during the period of study. Maximum number of articles were contributed by single author 120 (33.25%). This is followed by two authors with 101 (27.98%) articles, three authors were contributed 59 articles (16.34%), four authors were contributed 43 articles (11.91) and five and more authors were contributed 38 (10.52%) of the total articles.

5.3 Degree of collaboration in the Indian Journal of Agricultural Research

The formula given by K. Subramanyam is useful for determining the degree of collaboration in quantitative terms. The study followed the same formula which is mathematically put as:

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

Where C = Degree of Collaboration
   NM = Number of Multi authored papers
   NS = Number of Single authored papers

In the present study

   NM = 241
   NS = 120
   Thus C = 0.667

Thus the degree of collaboration in D-Lib magazine is 0.667 which clearly indicates its dominance upon individual contribution.

Table-5 Year-wise Authorship pattern

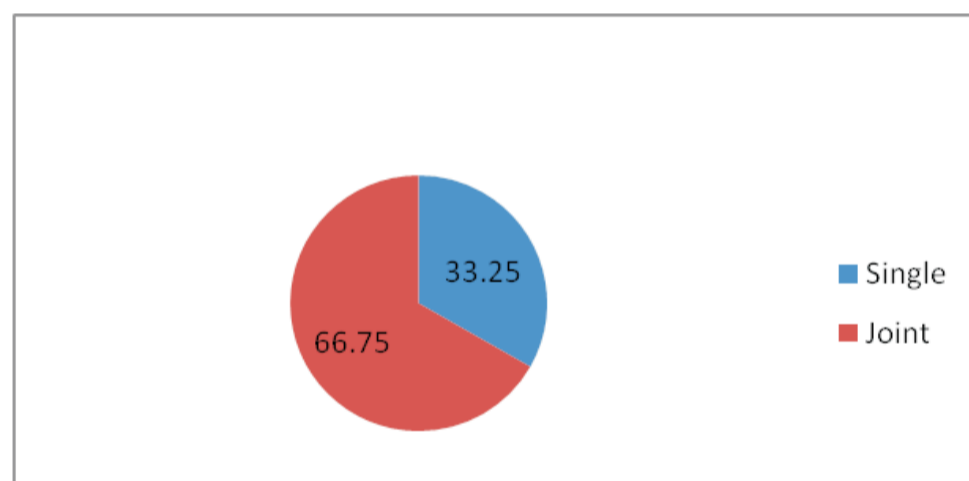| Authors hip	Year										Total	Percen tage
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		
Single	18	17	17	11	9	11	9	7	13	8	120	33.25
Joint	34	23	37	27	18	15	22	22	20	23	241	66.75
Total	**52**	**40**	**54**	**38**	**27**	**26**	**31**	**29**	**33**	**31**	**361**	**100.00**

Fig.2 Authorship pattern

The above table-5 showed that out of 361 articles joint authors contributed 241 (66.75%) articles while the rest 120 (33.25%) articles were contributed by single author [Fig.2].

5.4 Institution wise Contribution

Table-6 Institution-wise contribution of articles

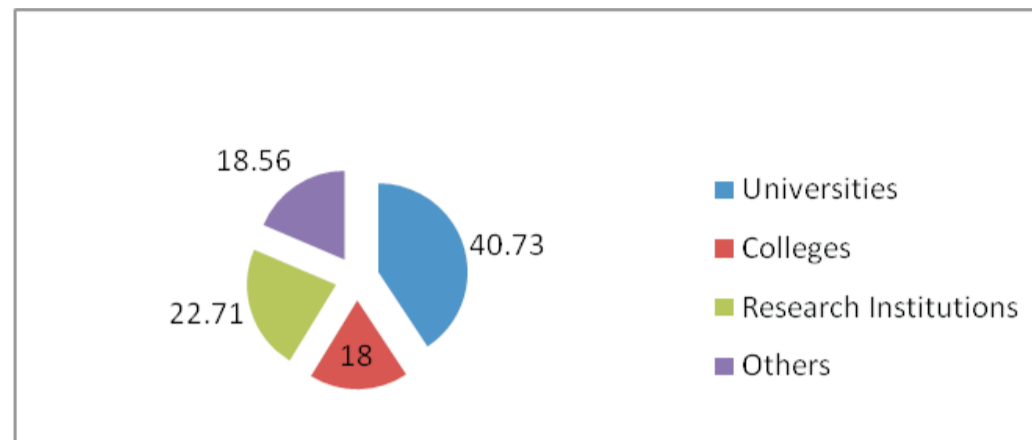| Name of the Institution	No. of Articles	Percentage
Universities	147	40.73
Colleges	65	18.00
Research Institutions	82	22.71
Others	67	18.56
Total	**361**	**100.00**

Fig.3 Institution-wise contribution of articles

The table 6 envisages the institution wise contributors. These sectors have been grouped into five distinct categories for the convenience of the study. The highest contributions were from universities with 147 (40.73%). This is followed by research institutions with 82 (22.71%) and Colleges 65 (18.00%). The remaining 67 articles (18.56%) were contributed by other agencies like public organisations etc [Fig.3].

5.5 Length of Articles

Table-7 Length of Articles

Pages	Year										Total	Percentage
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		
1-4	5	3	2	3	-	-	-	1	2	-	16	4.43
5-8	14	10	11	9	7	7	8	4	7	9	86	23.82
9-12	21	13	22	15	11	11	12	15	14	10	144	39.89
13 & more	12	14	19	11	9	8	11	9	10	12	115	31.86
Total	**52**	**40**	**54**	**38**	**27**	**26**	**31**	**29**	**33**	**31**	**361**	**100.00**

Table 7 reveals that the majority of articles 144 (39.89) have the length of 9-12 pages followed by 115 (31.86%) articles with more than 13 pages, 86 (23.82%) articles with 5-8 pages and the remaining 16 (4.43%) articles have the length of 1-4 pages.

6. CITATION ANALYSIS

The references provided by the authors at the end of their articles are the basis of citation analysis. Citation traces a connection between two documents, one which cites and the other which is cited. Citation analysis is one of the popular methods applied to derive the following benefits.

6.1 Year-wise Distribution of citations

Table-8 Year-wise Distribution of Citations

Year	No. of Citations	Percentage
2003	1043	14.09
2004	824	11.13
2005	1117	15.08
2006	754	10.18
2007	562	7.58
2008	496	6.69
2009	637	8.59
2010	575	7.77
2011	712	9.62
2012	687	9.27
Total	**7407**	**100.00**

The above table 8 showed that maximum number of citations 1117 (15.08 %) produced in 2005 followed by 1043 (14.09%) citations in 2003, 824 (11.13%) citations in 2004, 754 (10.18%) citations in 2006 and 712 (9.62%) in the year 2011.

6.2 Forms of Documents cited

Table-9 Forms of Document cited

Forms of Document	Total No. of Citation	Percentage
Journals	3656	49.36
Seminar/Conference Proceedings	1315	17.76
Websites	954	12.88
Books	594	8.01
Research Reports	322	4.34
Special Publications	185	2.49
Dissertations	135	1.82
Reference Books	85	1.14
Abstracts	64	0.86
Annual Reports	52	0.70
Newsletters	45	0.60
Total	**7407**	**100.00**

The table 9 above showed that majority of the contributors preferred journals as the source of information which occupied the top position with the highest number of citations 3656 (49.36%) of the total 7407 citations followed by Seminar / Conference Proceedings with 1315 (28.68%) citations, websites with 954 (12.88%) citations, books with 594 (8.01%) citations, research reports with 322 (4.34%) citations, special publications with 185 (2.49%) citations, dissertations with 135 (1.82%) citations, reference books with 85 (1.14%), abstracts with 64 (0.86%) citations, annual reports with 52 (0.70%) citations and newsletters with 45 (0.60%)citations. It is found that the researchers preferred journal articles more frequently for their research work, than any other types of communication channels.

Table-10 Authorship pattern of cited references

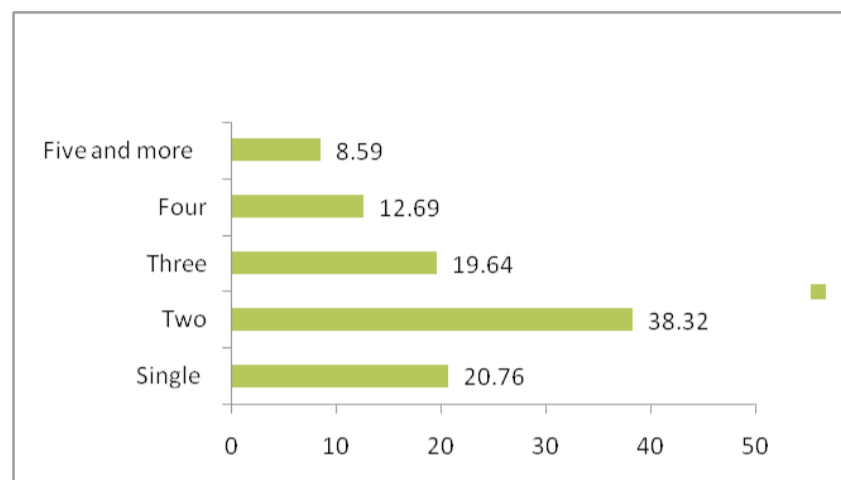| Authorship pattern	Total No. of Citation	Percentage
Single	1537	20.76
Two	2838	38.32
Three	1455	19.64
Four	940	12.69
Five and more	637	8.59
Total	7407	100.00

Fig.4 Authorship pattern of cited references

On analysing the extent of collaborations, it was found that 38.32% citations (2838) involved two authors followed by 20.76% citations (1537) involved single author, 19.64% citations (1455) involved three authors, 12.69% citations (940) involved four authors and 8.59% citations (637) involved five and more authors [Fig.4].

7. FINDINGS AND CONCLUSIONS

Bibliometrics is the analysis of the structure of literature using various tools, counting, rank-frequency distributions, and citation analysis; and although the structure of literature is basic to all disciplines, it is particularly important in the area of information retrieval. The journal has published 361 articles during the period of study. The maximum number of contributions are joint authors with 241 (66.75%). The present study showed that majority of the contributions appeared under digital library and computer application 68 (18.84%) followed by Internet, e-resources and consortia 63 (17.46%), user studies 57 (15.78%), open source software 48 (13.29%), Library automation 36 (9.98%) and Web technology 32 (8.87 %). The study revealed that the highest contributions were from universities with 147 (40.73%). This is followed by research institutions with 82 (22.71%) and Colleges 65 (18.00%). The remaining 67 articles (18.56%) were contributed by other agencies like public organisations etc. The study also showed that majority of the contributors preferred journals as the source of information which occupied the top position with the highest number of citations 3656 (49.36%) of the total 7407 citations followed by Seminar / Conference Proceedings with 1315 (28.68%) citations, websites with 954 (12.88%) citations. D-Lib Magazine is the highly preferred journal for communication by the agricultural scientists.

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