

Bibliometrics analysis of DJLIT with special reference to Productivity Patterns of Authors from beginning to 2015

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ABSTRACT

The paper focused to measure the productivity patterns of authors in DESIDOC journal of library & information technology during the period of 2011-2015. It is also highlighted on proposed research, DRDO- DESIDOC, objectives, hypothesis, scope and limitations of the study, research methodology, productivity of authors: language wise distribution, length of paper, RGR and doubling time for publications, authorship trend and authorship pattern in DJLIT, findings and Implications.

Keywords: Author productivity, Authorship patterns, Relative Growth Rate and Doubling Time

INTRODUCTION

Knowledge is a human resource which has the ability to consolidate the valuable results of human thinking and civilization through different times. More reading, writing, learning and teaching which increase the depth of Knowledge. It is the totality of understanding of nature and its features for improved quality of life of human society. Because of this, knowledge has been increasing in volume, dimension and directions. Knowledge is wisdom, which enlightens brain and mind. The increasing demands of man have led him to learn more. Man is continuously making research for investigating new things and discovering the means to have his daily needs fulfilled. Productivity has become a household word which is total measure of the efficiency of author who generated interested publications with references. The citation analysis is being used as a tool for evaluation of research contributions made by scientific community. The publication of the information gathered by the author is a prestige to the institution. It is necessary for the institution to make aware outside world about their output. Bibliometrics is a technique to identify the research trends in a subject, trends in authorship and collaboration in research core periodicals in a disciplines, obsolescence and dispersion of scientific literature and useful in estimating the comprehensive of secondary periodicals and studying the author productivity and many other features.

Proposed Research

A lot of information professionals have used different terms for bibliometrics and other laws. The pioneering work was statistical analysis of the literature by Cole and Eagles in 1917, Second attempt was made by Hulme in 1923. He used the term "Statistical bibliography to refer the application of quantitative techniques to libraries. He defined statistical bibliography as "to shed light on the process of written communication and of the nature and course of development of a discipline by means of counting the various facts of written communication" (Kumar and Kumar 2005). Dr. S. R. Ranganathan in 1948 at the ASLIB conference held at Lamington, Spa coined the term Librametry on the lines of Biometry, Econometry, Psychometry,

etc. (Guha, 1993). Several subdisciplines such as, Bibliometrics, Scientometrics and Infometrics have emerged. The term informetrics is comparatively speaking, a recent development and is often used to include both Bibliometrics and Scientometrics. The British Standards Documentation Term (1976) defines bibliometrics as “Study of the use of documents and patterns of publications in which mathematical and statistical methods have been applied”. Merton and Garfield in 1963 reported that the rate of increase in multiple authorship varies from one subject area to another. Beverly Clarke in 1964 pointed out the view of Price and concluded with a generalization as regards the increasing trend towards multiple authorship is not valid for science as a whole.

DRDO- DESIDOC

DESIDOC started functioning in 1958 as Scientific Information Bureau (SIB). It was a division of the Defence Science Laboratory (DSL) which is presently called Laser Science & Technology Centre. The DRDO library which had its beginning in 1948 became a division of SIB in 1959. In 1967 SIB was reorganised with augmented activities and named Defence Scientific Information and Documentation Centre (DESIDOC). It still continued to function under the administrative control of DSL. DESIDOC became a self-accounting unit and one of the laboratories of DRDO on 29 July 1970. The Centre was functioning in the main building of Metcalfe House, a landmark in Delhi and a national monument. In August 1988 it moved to its newly built five-stored building in the same Metcalfe House complex. Since it became a self-accounting unit, DESIDOC has been functioning as a central information resource for DRDO. It provides S&T information, based on its library and other information resources, to the DRDO headquarters, and its various laboratories at various places in India and also various publications as [Defence Science Journal](#) (Bi-Monthly), [Defence Life Science Journal](#), [DESIDOC Journal of Library and Information Technology](#) (Bi-Monthly), DRDO Newsletter (Monthly), DRDO Samachar and Hindi Video Magazine (Monthly), [Technology Focus](#) (Bi-Monthly), [Prodyogiki Vishesh](#) (Quarterly) and CRYSTAL: [Technical Bulletin of SSPL](#) (Bi-Annual). DESIDOC Journal of Library & Information Technology (DJLIT) is a peer-reviewed, open access, bi-monthly journal that publishes original research and review papers related to IT applied to library activities, services, and products and its covered include automation, digitisation, user interfaces, networks, hardware and software development, and technology. It was formerly known as DESIDOC Bulletin of Information Technology (DBIT).

Objective of the Study

Present study has been undertaken with a view

- To measure productivity patterns of authors in DESIDOC Journal of Library & Information Technology.

However, specific objective of the study are:

1. To find out language wise productivity;
2. To find out the length of paper
3. To know the author productivity; and
4. To identify relative growth rate and doubling time for publications.

Hypothesis

Following were the hypothesis formulated for the study as

1. More the publications are published in English language;
2. More papers have more length of papers;
3. There is a significant change in relative growth rate and doubling time for publication publishing in DESIDOC Journal of Library and Information Technology;
4. Publications of multi authors are more than single author; and
5. As increasing the collaborating authors, decreasing the research productivity.

Scope and Limitations of the Study

1. The study is confined to the productivity patterns of DESIDOC Journal of Library and Information Technology.

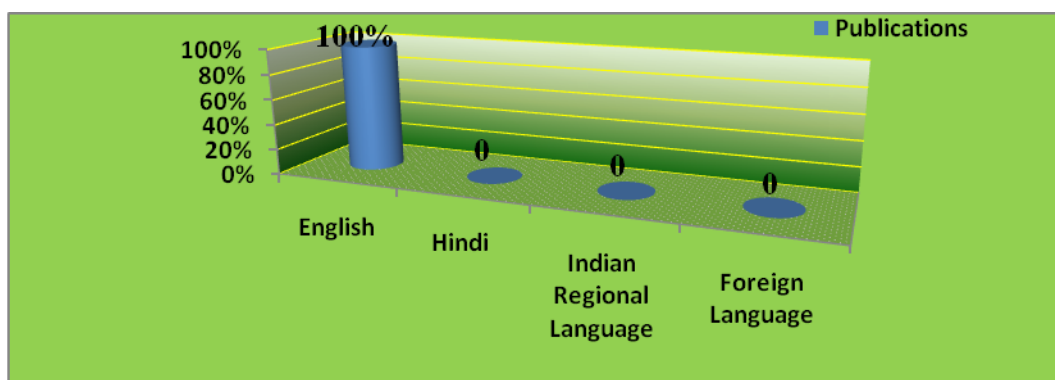
2. The study is also limited to the productivity patterns of authors who published their publications in the DESIDOC Journal of Library and Information Technology which is the DRDO publication located in Delhi.
3. The study is also limited to the papers published in total 35 volumes during the period of 1981-2015.

Research Methodology

The research papers published by the researchers in the DRDO-DESIDOC journal of library and information technology during the period of 1981-2015 were taken as the prime source for the present study. The study is based on the data retrieved from DRDO- DESIDOC Web-site. Collected data has been analyzed by statistical techniques and presented data in tabular as well as in graphical form. In graphical form, Pie Charts and Line Graphs are used for presentation. For the purpose analyzing

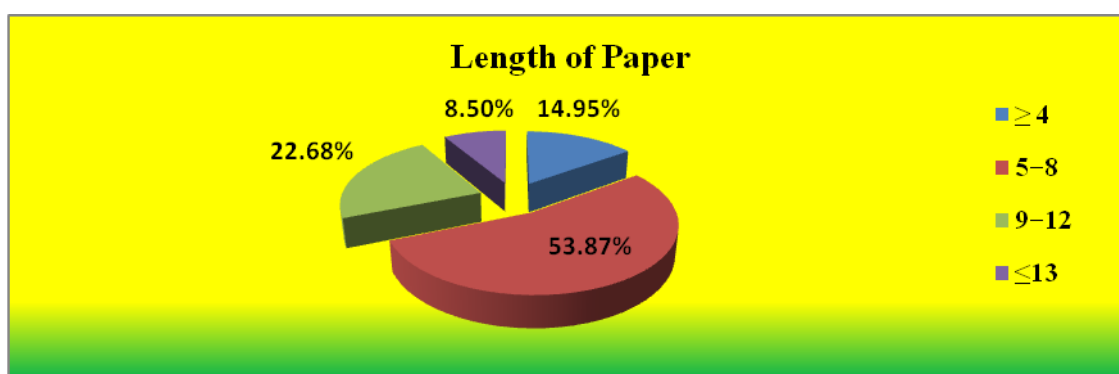
the data collected, some statistical techniques have also been used. In addition, some of the tools, techniques used for analyzing includes bibliometrics tools and techniques to come to the conclusions.

Figure no. 1: Productivity of Authors: Language Wise Distribution



From the above figure, 100% publications are published in alone English language by 893 contributors, means the DESIDOC Journal of Library and Information Technology is dominated by English language. This indicates that the hypothesis “**More the publications are published in English language**”(hypothesis no.1) is valid.

Figure no. 2 : Length of Paper



From the above figure, aptly reflects the distribution of length of papers during the period of study. Out of 776 papers, the highest range of papers i.e. 53.87% papers had 5-8 pages, followed by 22.68% had 9-12 pages and 14.95% had less than or equal to 4 pages. The lowest range being 8.50% papers in the range of greater than or equal to 13 pages. In other word, maximum papers have 5-8 range of pages whereas minimum papers have highest range of pages, means the range of pages of greater than or equal to 13 have very few papers i.e. 8.50% papers. This indicates that “**More papers have more length of papers**” (hypothesis no. 2) is invalid.

Table no. 1: Relative Growth Rate [R(a)] and Doubling Time [Dt(a)] for publications

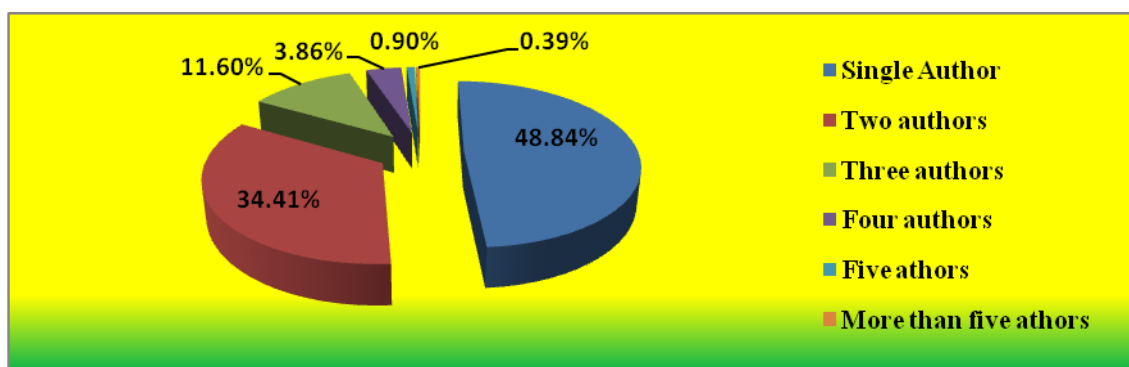
Sr. no.	Year	No. of Publications	Cumulative of Publications	W ₁	W ₂	R(a)	Mean R(a)	Dt(a)	Mean Dt(a)
1	1981	6	6	-	1.791759	-	0.26	-	2.71
2	1982	5	11	1.791759	2.397895	0.61		1.14	
3	1983	1	12	2.397895	2.484907	0.09		7.7	
4	1984	5	17	2.484907	2.833213	0.34		2.04	
5	1985	5	22	2.833213	3.091042	0.26		2.66	
6	1986	4	26	3.091042	3.258097	0.17	0.17	4.08	4.25
7	1987	6	32	3.258097	3.465736	0.21		3.3	
8	1988	7	39	3.465736	3.663562	0.20		3.47	
9	1989	5	44	3.663562	3.784190	0.12		5.78	
10	1990	7	51	3.784190	3.931826	0.15		4.62	
11	1991	6	57	3.931826	4.043051	0.11	0.14	6.3	5.97
12	1992	10	67	4.043051	4.204693	0.16		4.33	
13	1993	5	72	4.204693	4.276666	0.07		9.9	
14	1994	8	80	4.276666	4.382027	0.11		6.3	
15	1995	21	101	4.382027	4.615121	0.23		3.01	
16	1996	26	127	4.615121	4.844187	0.22	0.15	3.15	5.59
17	1997	26	153	4.844187	5.030438	0.19		3.65	
18	1998	23	176	5.030438	5.170484	0.14		4.95	
19	1999	20	196	5.170484	5.278115	0.11		6.3	
20	2000	14	210	5.278115	5.347108	0.07		9.9	
21	2001	10	220	5.347108	5.393628	0.05	0.06	13.86	12.03
22	2002	15	235	5.393628	5.459586	0.07		9.9	
23	2003	19	254	5.459586	5.537334	0.08		8.66	
24	2004	14	268	5.537334	5.590987	0.05		13.86	
25	2005	14	282	5.590987	5.641907	0.05		13.86	
26	2006	18	300	5.641907	5.703782	0.06	0.11	11.55	6.98
27	2007	34	334	5.703782	5.811141	0.11		6.3	
28	2008	50	384	5.811141	5.950643	0.14		4.95	
29	2009	50	434	5.950643	6.073045	0.12		5.78	
30	2010	48	482	6.073045	6.177944	0.11		6.3	
31	2011	55	537	6.177944	6.285998	0.11	0.10	6.3	7.43
32	2012	65	602	6.285998	6.400257	0.11		6.3	
33	2013	61	663	6.400257	6.496775	0.10		6.93	
34	2014	60	723	6.496775	6.583409	0.09		7.7	
35	2015	53	776	6.583409	6.654153	0.07		9.9	
						Mean R(a)	0.14	Mean Dt(a)	6.42

From the above table, The RGR was calculated by breaking the whole period in to 7 period intervals as 1981 to 1985 (5 years), 1986 to 1990 (5 years), 1991 to 1995 (5 years), 1996 to 2000 (5 years), 2001 to 2005 (5 years), 2006 to 2010 (5 years) and 2011 to 2015 (5 years). It is observed that the relative growth rate R(a) publications has steadily decreased from 0.61 in 1982 to 0.07 in 2015. The mean relative growth rate of publications has declined from 0.26 in 1981-1985, 0.17 in 1986-1990, 0.14 in 1991-1995 and slightly increased with the average mean relative growth of 0.15 from 1996-2000, then declined from 0.06 in 2001-2005 and increased with the average mean relative growth of 0.11 from 2006-2010, then declined from 0.10 in 2011-2015. The doubling time of publication has increased from 1.14 in the 1982 to 9.9 in the year 2015. The mean doubling time of publication has increased from 2.71 from the year 1981-1985, 4.25 from the year 1986-1990 to 5.97 from the year 1991-1995. The mean doubling time is decreased to 5.59 from the year 1996-2000, then increased to 12.03 from the year 2001-2005 and again declined to 6.98 from 2006-2010. The mean doubling time is increased to 7.43 from the year 2011-2015. Therefore it can be concluded that the mean relative growth rate of publication has shown an increasing trend. The mean doubling time has shown a declined trend. In general, mean relative growth rate for publication is 0.14 and mean doubling time for publications in 6.42 years. Hence, this indicates that **“There is a significant change in relative growth rate and doubling time for publication publishing in DESIDOC Journal of Library and Information Technology”**(hypothesis no. 3) is valid.

Table no. 2: Authorship Trend in DJLIT

Sr. No.	Authors	Number of Articles	Percentage	Cumulative Article	Cumulative Percentage
01	Single	379	48.84	379	48.84
02	Two	267	34.41	646	83.25
03	Three	90	11.60	736	94.85
04	Four	30	3.86	766	98.71
05	Five	07	0.90	773	99.61
06	More than Five	03	0.39	776	100
Total		776	100.00		

It can be observed from the table, the study regarding the authorship trend in the DESIDOC Journal of Library and information Technology from 1981 to 2015 shows that majority of the papers are multiple authored papers 397(51.16%). single authored papers constitute 379 (48.84%) of the total papers. Papers having two authors are 267 (34.41%) and papers having three authors are 90 (11.60%). The remaining 5.15% of papers have more than three authors. The trend appears to be that the highest number of joint authors; the lesser the numbers of papers they constitute. The two authors have contributes 267 papers; the three and four authors combined contributed only 120 papers. More than five authors have contributed only 10 papers. It is inferred that the multi authored papers are more in number of publications than other single authored papers. Hence, this indicates that **“Publications of multi authors are more than single author”** (hypothesis no. 4) is valid.

Figure no. 3: Authorship Pattern in DJLIT

From the above figure, the study regarding the authorship trend among the 397 collaborative papers out of total 776 papers, the largest group of 34.41% of papers was contributed by two authors, followed by 11.60% of three authors, 3.86% of four authors and 0.90% of five authors. Significant portion of papers, about 94.85% are covered by single authors, two authors and three authors partnership, means the collaborating authors increase, the research productivity decreases. Hence, this indicates that **“As increasing the collaborating authors, decreasing the research productivity” (hypothesis no. 5)** is valid.

Findings

1. Total 776 publications were published in total 35 volumes during the period of 1981 – 2015.
2. During the 35 years time period, contributors have contributed 776 publications, giving 22.17 publications per year.
3. 100% publications are published in alone English language by 893 contributors, means the DESIDOC Journal of Library and Information Technology is dominated by English language. This indicates that the hypothesis **“More the publications are published in English language” (hypothesis no.1)** is valid. (Figure no. 1)
4. An aptly reflects the distribution of length of papers during the period of study. Out of 776 papers, the highest range of papers i.e. 53.87% papers had 5-8 pages, followed by 22.68% had 9-12 pages and 14.95% had less than or equal to 4 pages. The lowest range being 8.50% papers in the range of greater than or equal to 13 pages. In other word, maximum papers have 5-8 range of pages whereas minimum papers have highest range of pages, means the range of pages of greater than or equal to 13 have very few papers i.e. 8.50% papers. This indicates that **“More papers have more length of papers” (hypothesis no. 2)** is invalid. (Figure no. 2)
5. As regard the relative growth rate and doubling time, the RGR was calculated by breaking the whole period in to 7 period intervals as 1981 to 1985 (5 years), 1986 to 1990 (5 years), 1991 to 1995 (5 years), 1996 to 2000 (5 years), 2001 to 2005 (5 years), 2006 to 2010 (5 years) and 2011 to 2015 (5 years). It is observed that the relative growth rate R(a) publications has steadily decreased from 0.61 in 1982 to 0.07 in 2015. The mean relative growth rate of publications has declined from 0.26 in 1981-1985, 0.17 in 1986-1990, 0.14 in 1991-1995 and slightly increased with the average mean relative growth of 0.15 from 1996-2000, then declined from 0.06 in 2001-2005 and increased with the average mean relative growth of 0.11 from 2006-2010, then declined from 0.10 in 2011-2015. The doubling time of publication has increased from 1.14 in the 1982 to 9.9 in the year 2015. The mean doubling time of publication has increased from 2.71 from the year 1981-1985, 4.25 from the year 1986-1990 to 5.97 from the year 1991-1995. The mean doubling time is decreased to 5.59 from the year 1996-2000, then increased to 12.03 from the year 2001-2005 and again declined to 6.98 from 2006-2010. The mean doubling time is increased to 7.43 from the year 2011-2015. Therefore it can be concluded that the mean relative growth rate of publication has shown an increasing trend. The mean doubling time has shown a declined trend. In general, mean relative growth rate for publication is 0.14 and mean doubling time for publications in 6.42 years. Hence, this indicates that **“There is a significant change in relative growth rate and doubling time for publication publishing in DESIDOC Journal of Library and Information Technology” (hypothesis no. 3)** is valid. (Table no. 1)
6. The study regarding the authorship trend in the DESIDOC Journal of Library and information Technology from 1981 to 2015 shows that majority of the papers are multiple authored papers 397(51.16%). single authored papers constitute 379 (48.84%) of the total papers. Papers having two authors are 267 (34.41%) and papers having three authors are 90 (11.60%). The remaining 5.15% of papers have more than three authors. The trend appears to be that the highest

number of joint authors; the lesser the numbers of papers they constitute. The two authors have contributed 267 papers; the three and four authors combined contributed only 120 papers. More than five authors have contributed only 10 papers. It is inferred that the multi authored papers are more in number of publications than other single authored papers. Hence, this indicates that **“Publications of multi authors are more than single author” (hypothesis no. 4)** is valid.(Table no. 2)

7. The study regarding the authorship trend among the 397 collaborative papers, the largest group of 34.41% of papers was contributed by two authors, followed by 11.60% of three authors, 3.86% of four authors and 0.90% of five authors. Significant portion of papers, about 94.85% are covered by single authors, two authors and three authors partnership, means the collaborating authors increase, the research productivity decreases. Hence, this indicates that **“As increasing the collaborating authors, decreasing the research productivity” (hypothesis no. 5)** is valid.(Table no. 3)

Implications

1. Productivity of DESIDOC Journal of Library and Information Technology is very few in 35 years time period. There is need to publish more than 60 papers in each volume so that huge productivity will be made.
1. It is suggested that more than three authors have need to increase their publications.
2. The authors should increase their length of paper range.
3. The DESIDOC Journal of Library and Information Technology is a DRDO publications which should encourage and motivate the authors to contribute their strongly contributions in the field of IT applied to library activities, services and products so that publications will be increased by authors.
4. The authors with highest publications should be given rewards by DESIDOC organization.
5. There is a need to provide incentives and awards to the eminent and outstanding authors depending on their level.

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