

# Productivity Patterns of Authors in DESIDOC Journal of Library and Information Technology: A bibliometric Approach

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## ABSTRACT

*The study analysed the author productivity, year wise productivity, year wise growth rate of publications, application of Lotka's law, applicability of Price's square Root law and 80/20 Rules, year wise authorship pattern and Length of paper during the period of 2011-2015.*

**Keywords:** Author productivity, Authorship patterns and DESIDOC Journal of Library & Information Technology.

## INTRODUCTION

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. 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. 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 know the author productivity;
2. To find out the year wise productivity;
3. To trace out year wise growth rate of publications; and
4. To find out the length of paper

### **Hypothesis of the Study**

The hypothesis formulated for the study as

1. More years have negative growth rate of publications; and
2. Maximum papers have 5-10 range of pages.

### **Scope and Limitations of the study**

The study is confined to the productivity patterns of authors in DRDO-DESIDOC journal of library and information technology. The study is also limited to the span of period 2011-2015.

### **Research Methodology**

The research papers published by the researchers in the DRDO-DESIDOC journal of library and information technology during the period of 2011-2015 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 of 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.

### **Review of Literature**

**V. Sivasubramanian (2000)** analyzed the authorship pattern, the range and the frequency of references cited and examines year-wise distribution of papers. It also shows subject wise break up of papers and average length of papers provided in the articles for the period 1989-1998. The result indicates that the trend is toward single authorship and there exists a high degree of collaboration in coffee research.<sup>33</sup>

**Neerja Verma, Rajnish Tamrakar and Priyanka Sharmab (2007)** In their study, analysis of 131 contributions of the journals entitled 'Annals of Library and Information Studies' published during 1999-2005. They examined year wise, institution wise, state wise distribution of contributions,

authorship pattern, citation analysis, length of contributions etc. The study is also revealed that the journals were the most cited publication amongst the library and information scientists.<sup>38</sup>

**J. B. Patil (2010)** An articles published in Herald of Library Science for authorship pattern, degree of collaboration and geographical distribution of papers. The majority of the papers were single authored. The degree of collaboration was found to be 0.30.<sup>27</sup>

**M. Kumar and A. L. Moorthy (2011)** This study highlights the bibliometric analyses of DESIDOC Journal of Library and Information Technology during 2001-2010. The analysis covers various parameters like growth pattern, content coverage, authorship pattern, Subject -wise distribution of articles, etc.<sup>17</sup>

**K. P. Singh and Bebi (2014)** presented a bibliometric study of the journal Library Herald for the period of 10 years (2003–2012) in which 234 articles was published during the marked period. Study examines the various bibliometric parameters such as authorship pattern, gender-wise, geographical distribution, major authors and their affiliations, topical mapping and length of articles. Study finds that 48.72% (114) articles were contributed by single authors.<sup>32</sup>

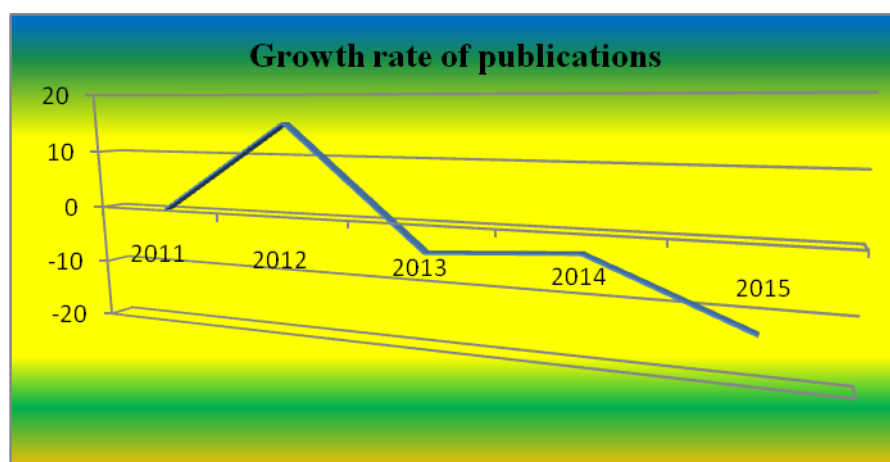
**M. M. Brissett (2015)** Author presented the existence of online journal, School library Research from 1998-2012. Author's name, nature of authorship, gender and occupation were analyzed. Lotka's law was applied to measure author productivity.<sup>7</sup>

**Table no. 1: Year Wise Productivity**

Sr. No.	Year	Publication
1	2011	55
2	2012	65
3	2013	62
4	2014	60
5	2015	53
Total		295

From the above table, most productive year was 2012, as total productivity in this year was 65 publications, followed by 62 publications in 2013, 60 publications in 2014 and 55 publications in 2011.

**Figure no. 1: Year wise growth rate of publications**



It can be noted from table no. 1 and figure no. 1 that, there are ups and downs in growth rate of publication for the present study while during the years 2013, 2014 and 2015 which years have negative growth rate. This indicates that “**More years have negative growth rate of publications**” (hypothesis no. 1) is valid.

**Table no. 2 :Application of Lotka’s Law: Distribution of Publications**

No. of Papers	Author		Total Contributions	
	Number of Author	Percentage	Total no. of Contributions	Percentage
1	369	85.42	369	66.73
2	37	8.57	74	13.38
3	15	3.47	45	8.14
4	2	0.46	8	1.45
5	5	1.16	25	4.52
6	2	0.46	12	2.17
7	1	0.23	7	1.26
13	1	0.23	13	2.35

It can be observed from table no. 2 that, distribution is characterized by dispersion of papers over a large number of researchers with low productivity, and the concentration of contributions is in the hands of few highly productive authors. It can be observed that 93.99% of authors have published 2 or less papers, and they represent as a whole 80.11% of total contribution. On the other hand 6.01% of the total authors have contributed 3 or more paper representing 19.89% of the total papers produced.

**Table no. 3: Applicability of Price’s square Root Law and 80/20 Rules**

Authors	No. of Authors	Papers	
		No. of Papers	Percentage
Square root of total authors	21	95	17.17
Ten percent of total authors	43	144	26.04
Twenty percent of total authors	86	207	37.43
Thirty percent of total authors	130	251	45.39
Forty percent of total authors	173	294	53.16

It can be observed from table no. 3 that, square root of total authors is 20.78 i.e. around 21 authors, contributed 17.17% of the total papers, which is much below 50% predicted by De Solla Price. Similarly it is observed that 10% and 20% of the authors contributed only 26.04% and 58.85% of the total papers respectively. This is much below the 80% as predicted by 80/20 rules. . It can be observed

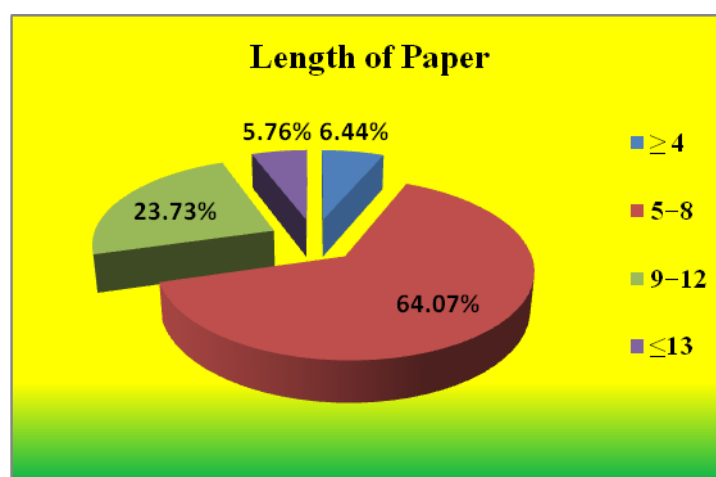
that near about 45.39% papers are contributed by 30% authors while 53.16% papers are contributed by 40% of total authors.

**Table no. 4: Year wise authorship pattern**

Year	Authors					Total
	1	2	3	4	5	
2011	21	24	8	1	134	55
2012	23	30	10	1	142	65
2013	27	26	7	2	035	62
2014	18	28	9	5	042	60
2015	16	25	10	1	137	53
<b>Total Papers</b>	<b>105</b>	<b>133</b>	<b>44</b>	<b>10</b>	<b>3</b>	<b>295</b>

It can be observed from the table no. 4 that 35.59% papers were single authored, 45.08% two authored and 14.91% three authored which indicates that collaboration up to 3 authors is prominent. It is also found that most productive year was 2012, followed by 2013, 2014 and 2011. The year 2011-2015 are clearly indicating that the research is being shifted from solo to team, because tendency to collaborate 2-5 authors have been evident during the years 2011-2015. It is further observed that, in the year wise authorship pattern the highest number of single authored publications, two authored publications, three authored publications and four authored publications are 27 in 2013, 30 in 2012, 10 in two years 2012 & 2015 and 5 in 2014 year respectively. 42 publications are found in the year 2012 and 2014 which were highest numbers of multi authored publications, followed by 37 in 2015, 35 in 2013 and 34 in 2011.

**Figure no. 2: Length of Paper**



From the figure no. 2, aptly reflects the distribution of length of papers during the period of study. Out of 295 papers, the highest range of papers i.e. 64.07% papers had 5-8 pages, followed by 23.73% had 9-12 pages and 6.44% had less than or equal to 4 pages. The lowest range being 5.76% papers in the range of greater than or equal to 13 pages. It can be further noted that on an average 64.07% and 23.73% papers were published with 5-8 and 9-12 pages respectively. This indicates that **“Maximum papers have 5-10 range of pages”** (hypothesis no. 2) is valid.

## **Findings**

1. Total 295 papers are published during the period of 2011-2015. Most productive year was 2012, as total productivity in this year was 65 publications, followed by 62 publications in 2013, 60 publications in 2014 and 55 publications in 2011. (Table no. 1)
2. (Table no. 1 and figure no. 1) There are ups and downs in growth rate of publication for the present study while during the years 2013, 2014 and 2015 which years have negative growth rate. This indicates that **“More years have negative growth rate of publications” (hypothesis no. 1)** is valid.
3. It can be observed that 93.99% of authors have published 2 or less papers, and they represent as a whole 80.11% of total contribution. On the other hand 6.01% of the total authors have contributed 3 or more paper representing 19.89% of the total papers produced. (Table no. 2)
4. Square root of total authors is 20.78 i.e. around 21 authors, contributed 17.17% of the total papers, which is much below 50% predicted by De Solla Price. Similarly it is observed that 10% and 20% of the authors contributed only 26.04% and 58.85% of the total papers respectively. This is much below the 80% as predicted by 80/20 rules. . It can be observed that near about 45.39% papers are contributed by 30% authors while 53.16% papers are contributed by 40% of total authors. (Table no. 3)
5. 35.59% papers were single authored, 45.08% two authored and 14.91% three authored which indicates that collaboration up to 3 authors is prominent. It is also found that most productive year was 2012, followed by 2013, 2014 and 2011. The year 2011-2015 are clearly indicating that the research is being shifted from solo to team, because tendency to collaborate 2-5 authors have been evident during the years 2011-2015. It is further observed that, in the year wise authorship pattern the highest number of single authored publications, two authored publications, three authored publications and four authored publications are 27 in 2013, 30 in 2012, 10 in two years 2012 & 2015 and 5 in 2014 year respectively. 42 publications are found in the year 2012 and 2014 which were highest numbers of multi authored publications, followed by 37 in 2015, 35 in 2013 and 34 in 2011. (Table no. 4)
6. The highest range of papers i.e. 64.07% papers had 5-8 pages, followed by 23.73% had 9-12 pages and 6.44% had less than or equal to 4 pages. The lowest range being 5.76% papers in the range of greater than or equal to 13 pages. It can be further noted that on an average 64.07% and 23.73% papers were published with 5-8 and 9-12 pages respectively. This indicates that **“Maximum papers have 5-10 range of pages” (hypothesis no. 2)** is valid. (figure no. 2)

## **Implications**

Based on the results/findings of the study the following are the implications

1. Authors should increase their length of papers range.
2. Authors with highest publications should be given rewards.
3. Understanding research activity is one of the motivating factor, the authors undertake research activity to the maximum extent possible and should write research papers on the area of interested research field.
4. Research is a continuously process; the authors should publish their research work on regular basis.

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