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# Citation Patterns followed in Research Papers of the DESIDOC Journal of Library & Information Technology

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## **Abstract**

*The paper presents Citation patterns of 6914 citations appearing in 399 papers published in DESIDOC Journal of Library & Information Technology from 2012 to 2018. The researcher identified in the paper were Volume wise Analysis of Citations per Article, authorship pattern, forms of literature, Chronological Analysis of Citations and a ranked list of top 25 cited Library Science journals. The most cited author of DESIDOC Journal of Library & Information Technology was Gupta B.M. The study finds that highest number of citations was single authored (51.59 %), and 6.72 % citations were from books and only 55.07% citations were from journals. Chronological distribution of cited reference has been analyzed that maximum number of citations are covered during the period of 2001-2010 i.e. 55647 (38.18 %).*

**Key words:** Citation analysis, Authorship pattern, DESIDOC Journal of Library and Information Technology

## **1. INTRODUCTION**

Citation analysis is an indirect method to assess the information/sources used by various categories of users. It is a worthwhile area of research and refers to references in one text to another text, with information on where that text can be found. It is useful for understanding subject relationships, authorship pattern, impact, publication trends, and so on. With citation analysis one can evaluate and interpret citations received by articles, authors and other indications of scientific activities. It is a major area of

bibliometric research, which uses various methods of citation analysis to establish relationships between authors or their work. Analysis of references at the end of the documents published in journals is one of the few major indicators for the extent of usage of journals. Ranking of journals using citation analysis is a key aspect of knowledge management and collection development in academic and research libraries. The present study analyses the citations appended in the DESIDOC Journal of Library & Information Technology (DJLIT) issues during 2012 to 2018. DJLIT is one of the premier journals of library and information science being published in India. It is brought out by Defence Scientific Information and Documentation Centre (DESIDOC), a constituent establishment of Defence Research and Development Organisation (DRDO). DJLIT has just completed 38 years of its publication.

## **2. LITERATURE REVIEW**

Before writing this paper; authors have studied some of the basic and some research articles describing citation analysis. **Smith (1981)** discussed about the citation analysis. Citation implies a relationship between a part or the whole of the cited document and a part or the whole of the citing document. The citation analysis has been marked by the invention of new techniques and measures, the exploitation of new tools, and the study of different units of analysis. The researcher also discussed many problems and ways of handling them in statistical analysis like Multiple authorship, Self-citations, Homographs, Synonyms, Implicit Citations, Fluctuations with time, Field variations. She also described two major themes- use of citations as tools for the librarian and use of citations as tools to analyze research activity. **Chikate and Patil (2008)** evaluated the citation analysis of theses in Library and Information Science submitted to University of Pune. They covered 27 LIS theses submitted to the University of Pune between the year 1982 and 2005. A total of 6,257 citations were found in all 27 theses. Researchers have used SPSS software for the data analysis. References were photocopied and each reference was categorised according to format or genre, i.e., book, journal, report, conference proceedings, newspaper, thesis/dissertation, and reference book. It is revealed that among all resources; the most cited journal is College and Research Libraries journal followed by 'Scientometrics'. In their paper **Kumar and Moorthy (2011)** presented Bibliometric analysis of DESIDOC Journal of Library & Information Technology during 2001-2010. The analysis covers various parameters like growth pattern, content coverage, authorship patterns, subject-wise distribution of

articles, etc. The paper find out that 3428 references sourced by the authors, 1382 were quoted from the journals. The study shows that the authors from government research institutes (104), and universities (139) were the main contributors. **Singh and Bebi (2013)** explained that Citation Analysis of Ph.D. Theses in Sociology Submitted to University of Delhi during 1995-2010. The study covers the 5766 citations taken out from 25 Ph.D. theses of sociology. The study explained that of several parameters like authorship pattern, forms of literature, country-wise scattering of citations, distribution of Indian and foreign citations and a ranked list of top cited sociology journals. The study find out that highest number of citations was single authored (83.94 %), and 67.23 % citations were from books and only 22.20 % citations were from journals, country-wise scattering of citations reveals that 2536 (45.52 %) citations were from India and it was followed by USA and UK. **Baskaran (2014)** executed citation analysis during the years 2003–2012, when the study was conducted, the SSCI database contained about 1942 publications and all the type of materials are included, 12502 references were received during the set period of study. The author analysed several parameters like, year-wise publications and citations distribution, geographic distribution, institution-wise distribution, top ranked authors with their citations etc. As a result of the study; it was found that Journal of American Society for Information Science and Technology was popular journal in LIS area. The numbers of publications brought out by the universities are much higher than in research institutions. Dongare and **Khaparde (2016)** write on Bibliometric analysis of Current Science Journal published during 2000-2010. Authors analysed types of documents cited and identified core journals. Also, had an analysis of authorship patterns of citations along with the calculation of collaboration coefficient. Chronological distribution of cited reference has been analysed that maximum number of citations are covered during the period of 1991-2000 i.e. 55647 (40.80%). **Weerasinghe (2017)** studied citation analysis of library and information science (LIS) for collection development. The data was extracted from articles published in the Journal of the University Librarians Association (JULA) of Sri Lanka, during the years 2010-2015 from the SLJOL database. The study covered 46 articles that revealed 803 citations. The core journals were identified by the application of the Bradford's law of scattering. It was revealed that the Journal of Academic Librarianship was the highly preferred journal by LIS researchers of Sri Lanka.

### **3. OBJECTIVES OF THE STUDY**

The study is conducted towards the following objectives:

- To know the volume wise analysis of citations per article
- To find out form wise distribution of cited documents
- To investigate the chronological growth of DESIDOC Journal of Library & Information Technology
- To study authorship pattern of the published literature
- To rank most cited author of the published literature
- To identify most cited literature

### **4. METHODOLOGY**

Present study analyses the references used in articles published in the DESIDOC Journal of Library & Information Technology journal during 2012 to 2018. This is a well-known online as well as print journal. For the present study 42 issues of the 7 volumes of DESIDOC Journal of Library & Information Technology journal are selected. The total numbers of records were 6914. The data was extracted in Microsoft Excel format and analyzed according to the set objectives of the research. The data was analyzed for exploring various types of productivity and citation patterns of authors have used for their papers.

### **5. ANALYSIS AND INTERPRETATIONS**

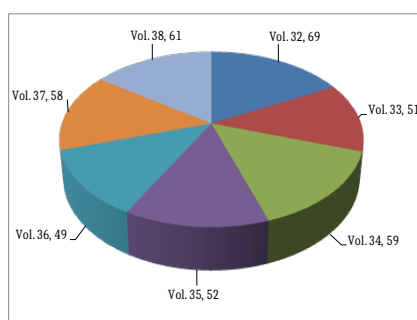
All seven volumes of DJLIT are collected for this study. References of each article are listed in the excel file. According to set the objectives all parameters are checked and analysed as follows. Analysed data is presented in tables and figures by using simple percentage methods.

#### **5.1 Volume wise Analysis of Citations per Article**

Table 1 displays volume number, year of publication of the volume, volume wise published articles, and total number of citations recorded per volume and average citation per article as well. According to this table total numbers of articles published during the year 2012 to 2018 are 399 and 6914 citation is calculated in all volumes.

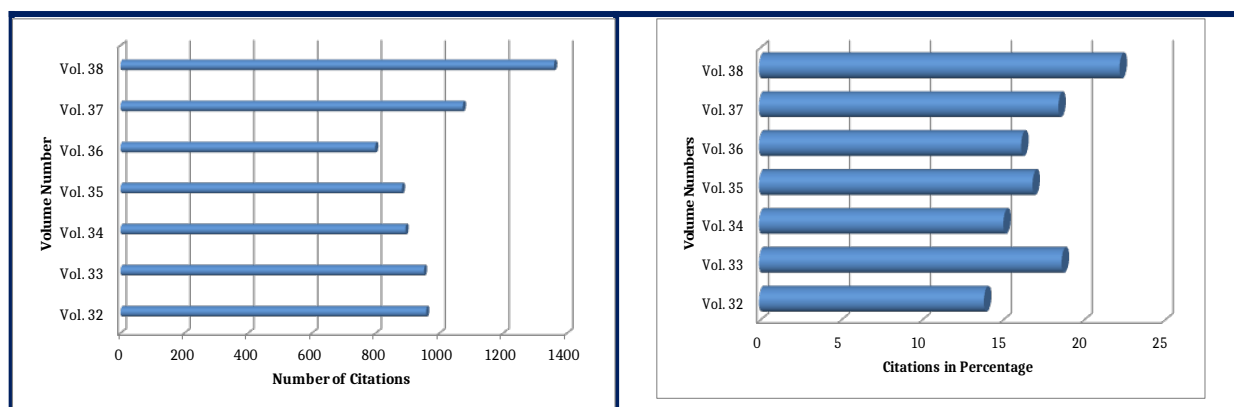
**Table 1: Volume wise Analysis of Citations per Article**

Vol. No.	Year	No. of Articles	No. of Citations	Average Citation Per Article
Vol. 32	2012	69	958	13.9
Vol. 33	2013	51	951	18.7
Vol. 34	2014	59	893	15.1
Vol. 35	2015	52	882	16.9
Vol. 36	2016	49	798	16.2
Vol. 37	2017	58	1073	18.5
Vol. 38	2018	61	1359	22.28
<b>Total</b>		<b>399</b>	<b>6914</b>	



**Figure 1 : Article published Per Volume**

Figure 1 shows volume wise analysis of published articles. It is observed that maximum 69 articles published in Volume No.32; whereas minimum 49 articles in Volume No.36.



**Figure: 1.1**

**Figure: 1.2**

**Volume wise Analysis of Citations per Article**

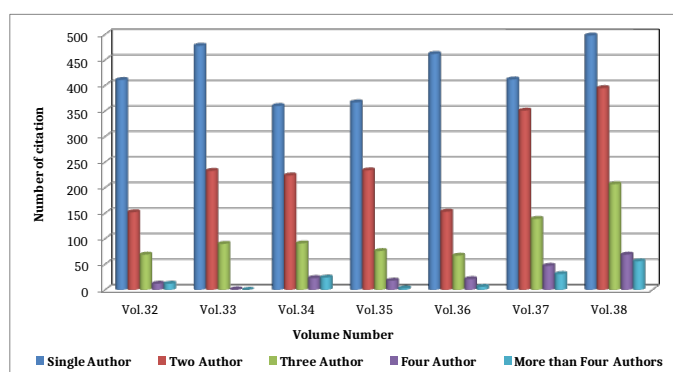
According to Figure 1.1 the volume wise analysis of citations per article is maximum 1359 in the Volume No.38 and minimum 798 in the Volume No.36. When it is analysed volume wise average citations in percentage; it shows a different picture. As per the Figure 1.2; Volume No.38 has maximum average citation i.e. 22.28%; whereas Volume No.32 has minimum average citation i.e. 13.9%. It means total number of citations per volume and average citation per volume has a difference. Compared to published articles, given citation is less in comparison of Volume No.38.

## 5.2 Authorship Pattern of Citations

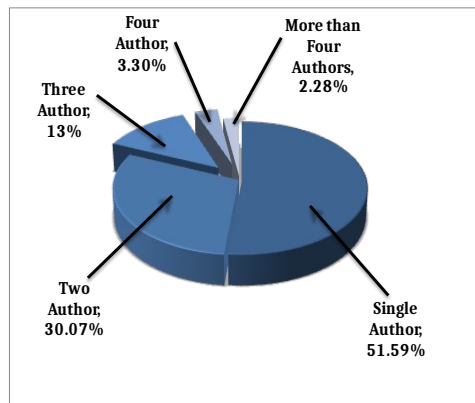
The table 2 and figure 2 & 3 indicates that out of total number of 6914 citations; highest 51.59% i.e. 2988 citations are of single author, followed by 30.07% i.e. 1742 citations of two authors, 13% i.e. 739 citations are of three authors, 3.30% i.e. 191 citations are of four authors. The finding also shows that the least citations are by more than four authors 2.28% i.e. 132 citations respectively.

**Table 2: Authorship Pattern of Citations**

Volume No.	Single Author	Two Author	Three Author	Four Author	More than four Author	No. of citation
32	411	152	69	12	12	656
33	478	233	90	1	0	802
34	360	224	91	23	24	722
35	367	234	76	18	3	698
36	462	153	67	21	6	709
37	412	351	139	47	31	980
38	498	395	207	69	56	1225
<b>Total</b>	<b>2988</b>	<b>1742</b>	<b>739</b>	<b>191</b>	<b>132</b>	<b>5792</b>
<b>Percentage of citation</b>	<b>51.59%</b>	<b>30.07%</b>	<b>13%</b>	<b>3.30%</b>	<b>2.28%</b>	<b>100%</b>



**Figure 2: Volume wise Analysis of Citations According to Authorship Pattern**



**Figure 3: Citations According to Authorship Pattern**

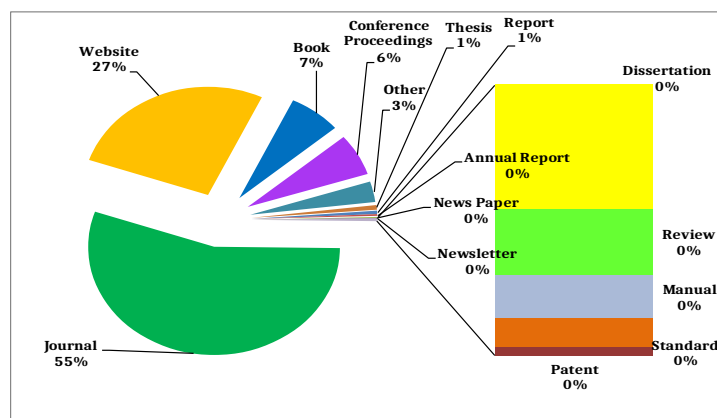
### 5.3 Form wise Analysis of Citations

Contributors of DJLIT cited documents of various forms which include articles of journal, information from websites with their URLs, books and chapters from edited books, conference proceedings, theses and dissertations, reports, newspapers and periodicals. Sometimes researchers cite radio talk, interviews, videos, audios, public lectures or speeches and many more to authentic their content. Authors of this article listed out forms used for the citations. On the basis of their usage rank is given from 1 (highly preferred citation form) to 16 (least preferred citation form). Table 3 is the result of form wise analysis of all citations.

**Table 3: Form wise Analysis of Citations**

Documents	Citations	Rank	%
Journal	3808	1	55.07
Website	1851	2	26.77
Book	465	3	6.72
Conference/ Seminar proceedings	436	4	6.30
Other (form is not mentioned)	212	5	3.07
Thesis	47	7	0.68
Report	35	8	0.51
Annual Report	17	9	0.25
News Paper	11	10	0.16
Newsletter	7	11	0.1
Dissertation	12	12	0.17
Review	6	13	0.09
Manual	4	14	0.06
Standard	3	15	0.04
Patent	1	16	0.01
<b>Total</b>	<b>6915</b>		<b>100</b>





**Figure 4: Form wise Analysis of Citations**

Table 3 and figure 4 shows distribution of different forms of cited literature used by the contributors of the DESIDOC Journal of Library & Information Technology during 2012 to 2018. Analysis of data indicates that the journals are the major form of media used with citation count of 55.07% i.e. 3808 citations of total literature used. So, periodicals are the first hand original and latest information in the subject and are most preferred channel of information use. Amongst citations of nonperiodical sources; website occupy 2<sup>nd</sup> preference with 26.77% i.e. 1851 citations followed by books with 6.72% i.e. 465 citations, while the conference/seminar proceeding at the 4<sup>th</sup> rank having 6.30% i.e. 436 citations and remaining 2.07 % i.e. 143 citations are from literature like patent, thesis, report, review, manual, newspaper, dissertation, and standards. Individually they are the meagre part of the citation volume. Counted value of individual form is less than 1% for each forms of literature that is why it is clubbed and come to 2.07% of entire citation and presented in inset figure.

#### 5.4 Chronological Analysis of Citations

The period-wise distribution of citations was measured by number of year which elapsed between the publications of a cited document and presented in table 4.

**Table 4: Chronological Analysis of Citations**

Sr. No.	Year	No. of Citation	Percentage
1	1901-1910	2	0.02
2	1911-1920	1	0.01
3	1920-1930	9	0.13
4	1931-1940	5	0.07
5	1941-1950	15	0.22
6	1951-1960	13	0.19
7	1961-1970	61	0.89
8	1971-1980	108	1.56
9	1981-1990	203	2.93
10	1991-2000	682	9.86
11	2001-2010	2640	38.18
12	2011-2018	2230	32.25
13	Not Mentioned	946	13.69
<b>Total</b>		<b>6915</b>	<b>100</b>

The table 4 shows that citations of all seven volumes are divided into 10 periods of ten years each time slot. The maximum number of citations are selected items published during the period of 2001-2010 accounting to 38.18% i.e. 2640 citations followed by year 2011-2018 accounting to 32.25% i.e. 2230 citations. Whereas, in the period of 1991-2000; citations have claimed 9.86% i.e. 682 citations in term of chronological distribution of citations. However, it is noticed that among all 6915 citations; 13.69% i.e. 946 citations have not mentioned year of publication.

### 5.5 Publication of Special Issues

As shown in Table 5, the analysis of data indicates that during the years 2012-2018, eighteen special issues were published. Emphasis was given on general papers as well as other routine and special sections were included in these issues of the journal. The journal published maximum number five special issues in the year 2012. In 2013 four special issues, 2014 three special issues, 2015 two special issues, 2016 two special issues, 2017 and 2018 one special issue each were published. It can be noticed that current topics of readers' interest such as Embedded Librarianship, Intellectual Property Rights, Trends in Online Exhibitions, Libraries and Social Media Networks, Marketing and Public Relations in Libraries are addressed in these special issues.

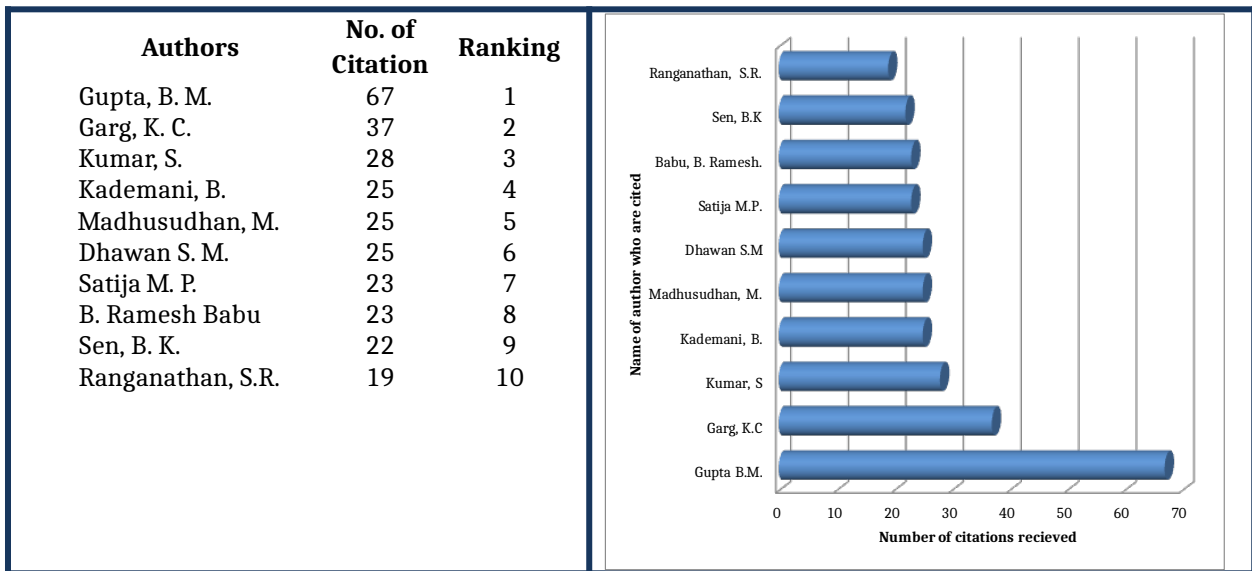
**Table 5: Special issues published during 2012-2018**

<b>Sr. No.</b>	<b>Title of the Special Issue</b>	<b>Details of the Issue</b>
1	Agricultural Information Systems and Services in India	January 2012, 32(1)
2	E-Books	March 2012, 32(2)
3	Intellectual Property Rights	May 2012, 32(3)
4	Digital Preservation	July 2012, 32(4)
5	Open Source Software for Libraries	September 2012, 32(5)
6	Corporate Social Responsibility and Public Libraries	January 2013, 33(1)
7	Health Information Systems and Services	March 2013, 33(2)
8	Applications of Online Exhibitions	May 2013, 33(3)
9	Knowledge Organisation	July 2013, 33(4)
10	Trends in Online Exhibitions	March 2014, 34(2)
11	Indian Contribution in Scientometrics	May 2014, 34(3)
12	Embedded Librarianship: Changing Role of Librarian in Digital Age	November 2014, 34(6)
13	Libraries and Librarianship: Status, Issues and Trends	May 2015, 35(3)
14	Libraries and Librarianship in India: Status, Information Technology Applications and Trends - Part II	July 2015, 35(4)
15	Marketing and Public Relations in Libraries	May 2016, 36(3)
16	Libraries and Social Media Networks	September 2016,36(5)
17	Library & Information Science Education	January 2017,37(1)
18	Commemorative Issue on DRDO@60	January 2018,38(1)

## 5.6 Ranking of the Most Cited Authors

Table 6 shows ranking of the Most Cited Authors of DESIDOC Journal of Library & Information Technology. The rank is given to the top ten authors to avoid a long list. Among the authors, S. R. Ranganathan, B. K. Sen, S. M. Dhawan, M. P. Satija, B. Ramesh Babu, M. Madhusudhan, B. Kedamani, K. C. Garg and B. M. Gupta are some of the notable authors who are cited frequently by the contributors of seven issues of DJLIT journal which are considered for the study. Among these authors; Gupta, B.M. with 67 times citations gets the first rank followed by Garg, K.C. with 37 times citation. As an individual author; Kumar, S. was cited 28 times and gets 3<sup>rd</sup> rank. Ranganathan, S. R. was cited 19 times and stands on 10<sup>th</sup> rank. Ranking of authors is one of the criteria in Citation analysis, it helps in determining the authoritativeness and the qualitiveness of different works brought out by various subject experts. It stresses and influences the quality of selection of various source materials intended for its target audience.

**Table 6: Ranking of the Most Cited Authors**



**Figure 5: Ranking of most cited authors**

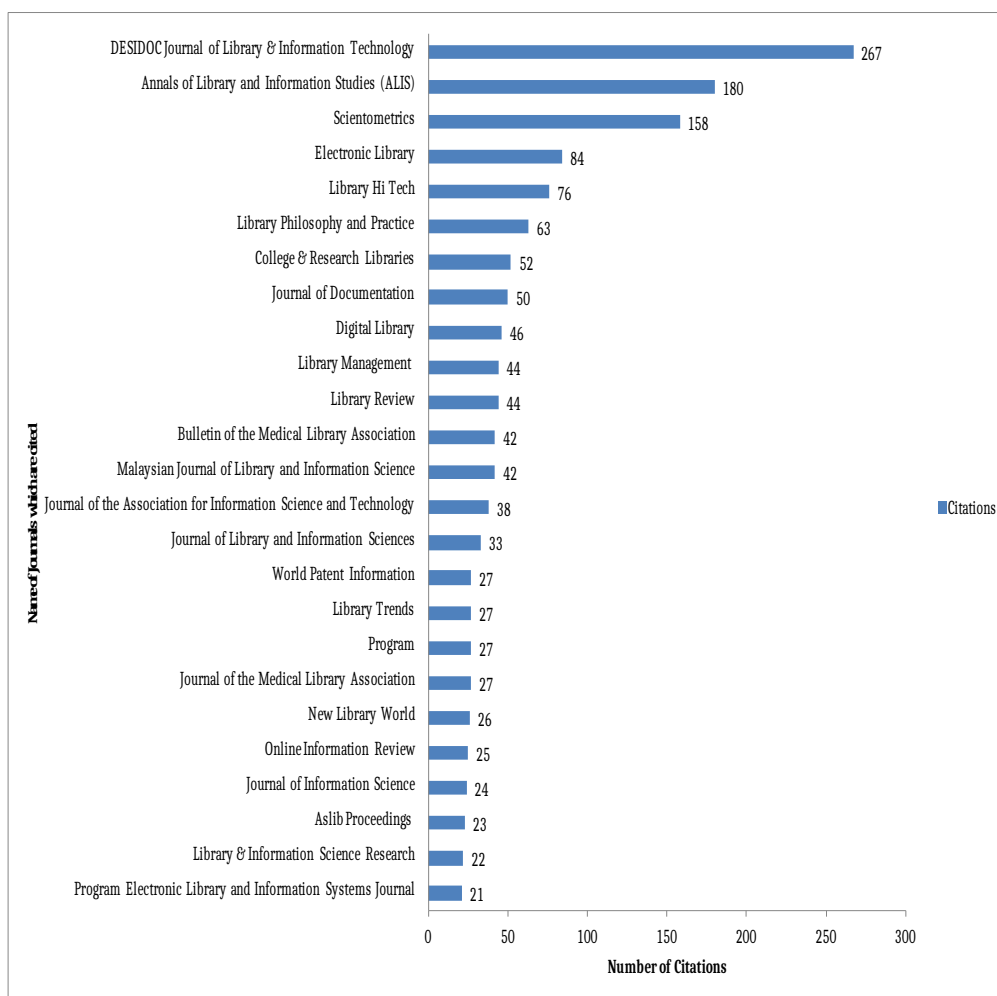
### 5.7 Ranking of the Cited Journals

The ranked list of core journals as reflected in the citations is presented in Table 7. From which the study finds that top two journals namely, DESIDOC Journal of Library & Information Technology with 267 (1<sup>st</sup> rank) and Annals of Library and Information Studies (ALIS) 180 times (2<sup>nd</sup> rank) selected for citations, which shows that articles from these two journals are highly cited, followed by Scientometrics 158 (3<sup>rd</sup> rank), Electronic Library 84 (4<sup>th</sup>) and Library Hi Tech by 76 citations standing on 5<sup>th</sup> rank. With the help of above mentioned table and figure; authors of this article would like to bring some findings to the reader's notice; that, Library Management and Library Review journals received 10<sup>th</sup> rank equally with 44 citations. Bulletin of the Medical Library Association and Malaysian Journal of Library and Information Science received 42 citations equally and stands on 11<sup>th</sup> rank. Authors of this journal gave preferences to some well-known journals like World Patent Information, Library Trends, Program and Journal of the Medical Library Association for references equally with 27 citations and got 14<sup>th</sup> rank.

**Table 7: Ranking of the Cited Journals**

Sr. No.	Cited Journal	No. of	Rank
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		Citations	
1.	DESIDOC Journal of Library & Information Technology	267	1
2.	Annals of Library and Information Studies (ALIS)	180	2
3.	Scientometrics	158	3
4.	Electronic Library	84	4
5.	Library Hi Tech	76	5
6.	Library Philosophy and Practice	63	6
7.	College & Research Libraries	52	7
8.	Journal of Documentation	50	8
9.	Digital library	46	9
10.	Library Management	44	10
11.	Library Review	44	10
12.	Bulletin of the Medical Library Association	42	11
13.	Malaysian Journal of Library and Information Science	42	11
14.	Journal of the Association for Information Science and Technology	38	12
15.	Journal of Library and Information Sciences.	33	13
16.	World Patent Information	27	14
17.	Library Trends	27	14
18.	Program	27	14
19.	Journal of the Medical Library Association	27	14
20.	New Library World	26	15
21.	Online Information Review	25	16
22.	Journal of Information Science	24	17
23.	Aslib Proceedings	23	18
24.	Library & Information Science Research	22	19
25.	Program electronic library and information systems Journal	21	20



**Figure 6: Ranking of the Highly Cited Journals**

## 6 DISCUSSIONS

This paper can be concluded with the findings as Volume wise distributions of citations per article published during 2012-2018 are 399 and the total number of citations is 6914. Year wise analysis of citations reveals that the average number per article is maximum (22.28%) in the year 2018 and it also seen minimum (13.9%) in the year 2012. The analysis of authorship pattern in DJLIT during 2012 to 2018 reveals that 51.59 % of citations given to papers written by single authors and 48.41% are co-authors. It also finds the highest numbers of citations (55.07%) are recorded from journal articles followed by website, book and conference proceedings. Whereas patent, thesis, report, review, manual, newspaper, dissertation, and standards are on least priority for referencing. The chronological distribution of citations shows that maximum number of citations are published during the period of 2001-2010 i.e. 2640 (38.18%). The ranking of authors depicted that ‘Gupta B.M.’ is the highly cited author ranked first author with 67 citations. The findings of this study demonstrate that among the rank list of journals, DESIDOC Journal of Library & Information Technology occupies the first

rank accounting for 267 of total journal citations followed by *Annals of Library and Information Studies (ALIS)* with 180 citations.

## 6. CONCLUSION

Citation analysis is a time-consuming and in-depth method for determining the usefulness of libraries' collection to support education and research activities. The data of subscribed journals that were cited in reference list of academic publications were analysed in this study. Citation analysis of journals helps not only to find journals that are being used but also to identify relevant and top ranking journals in particular subject areas. The study identifies that with the increasing number of publications, the number of citations are also increased.

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Information products and 60+ students for research projects and dissertations for suitable degrees. Her area of interest is LIS Education, Knowledge Management, Professional Ethics, Philosophy of Dr. Ranganathan, Library Management, all-round development of students, Content analysis, and writing for the future generation.



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