

## **Measuring Research Productivity of International Journal of Digital Library Services (IJODLS) by using Bibliometric Indicators**

**Dr. Akhandanand Shukla**

Assistant Professor  
Deptt. of Library & Information Science  
Mizoram University, Aizawl  
Email: akhandanandshukla@gmail.com

**NG Thermi Moyon**

M. Phil. Scholar  
Deptt. of Library & Information Science  
Mizoram University, Aizawl  
Email: ngthermi@gmail.com

***Abstract** - Paper measures research productivity of the journal IJODLS using bibliometric indicators. The journal publishes 154 research papers during the study period and was examined in terms of distribution of articles, authorship pattern, the degree of collaboration, and geographical distribution of articles, the rate of obsolescence etc. Results have been drawn from the analysis and found that two authorship is prevalent in the journal with 0.59 Degree of Collaboration; Nigeria is the top most contributor amongst foreign countries whereas India is the top most contributor of the articles for the journal; Maharashtra is the highest contributor amongst the Indian States and Union Territories; Journal Articles were found as the most prevalent source for citation; and 8 years is the calculated half-life of the journal citations.*

**Keywords:** Bibliometrics, Research Productivity, DOAJ, IJODLS, Open Access.

### **Introduction**

The International Journal of Digital Library Services (IJODLS) is an academic journal provides free access to research information to the international community without financial, legal or technical barriers. The aim of IJODLS is to enable the dissemination of research articles to global community without restriction usually through the Internet. The journal follows Open Access (OA) philosophy. Thus, all articles published under open access can be accessed by anyone with Internet connection. Abstracts and full texts (usually in PDF format) of all articles published in the journal are freely accessible to everyone immediately after publication. On the observations of many research conducted in the field of bibliometrics and scientometrics, we deduced that “research productivity is one of the important indicators to measure the performance of the field or individual scholar or institution or databases or the publication medium”.

The word ‘Bibliometrics’ first appeared in 1969 in Alan Pritchard’s article ‘Statistical Bibliography or Bibliometrics’ in the December issue of the Journal of Documentation. He described it as the “*application of mathematics and statistical methods to books and other media of communication*”. In a later article, “*bibliometrics and information transfer*”. Pritchard explained bibliometrics as the “*metrology of the information transfer process and its purpose is analysis and control of the process*”. The British Standard Glossary of Documentation Terms explained bibliometric as the “study of the use of documents and patterns of publication in which mathematical and statistical methods have been applied” (Pritchard, 1969 cited in Hertzal, 2003). There is no doubt that Open Access provides access

to the scholarly literature very effectively. Nowadays, throughout the world scholarly literature is distributed online on the Internet in various forms, free of charge and free from copyright and licensing restrictions by publishers and institutions. The Directory of Open Access Journals (DOAJ) is a directory which listed Open Access journals published in the world from all disciplines and presently there are now more than 11,500 open access journals listed in the DOAJ. In the field of Library and Information Science (LIS), there are 158 journals and 18,501 articles (as on 31-03-2016). Indian contribution to LIS journals in DOAJ is very less i.e. only six journals.

### **Review of Literature**

Gogoi & Barooah (2016) in their study revealed that papers from journals of Indian origin have greatly been used by the scholars and year-wise distribution of journals indicated that journal articles published during 2000-09 were highly preferred. Further, they found that in the field of Chemistry as a whole researcher mostly cites works of 10-20 years old from recent; and collaborative works were more than individual works. Velmurugan & Radhakrishnan (2016) conducted a study and found that more than 97% works were published jointly, so far, the Degree of Collaboration was 0.97 which shows the highest level of collaborative works. In a study, conducted by Mondal & Saha (2015) on the journal JILA from 2008-2014, found the steady growth of publications during the study period and degree of collaboration was 0.55. It was found that majority of the authors belongs to one place only. Thavamani (2015) examined the authorship trends of contributions in the Indian Journal of Forensic Medicine & Toxicology during 2007 to 2013 and concluded that an average number of authors per paper is more than 3 and average productivity per author is less than half (0.5). Moreover, the majority (86%) of the contributions were collaborative works, so the Degree of Collaboration arrived at 0.862 accordingly.

Awasthi & Jaiswal (2015) found the considerable increase in the archiving of library science journals over the years in DOAJ and print journals archive was more than online journals archive. In a study conducted over DOAJ by Maity & Teli (2015) observed maximum productivity in the field of Library and Information Science was in Information and Communication Technology followed by Library and Society, Library Association, and Library Management. Further, single author's productivity was very high in numbers than collaborative works. Nashipudi & Ravi (2015) examined DOAJ to measure quantitative data of Indian scholarly journals and found that only 649 journals in open access form available from India. Devendra (2014) investigated 140 free full text online journals through DOAJ in Environmental Science and analyzed based on country-wise distribution, language-wise distribution, institutions-wise distribution of publishers, distributions of subject headings, their accessibility of archives of online journals etc. and found that the United States publishes more open access journals (14.29%) in Environmental Science whereas Indian contribution is only 5%. English was the dominating language for publishing articles in the field of Environmental Science.

### **Scope of the Study**

The scope of the study is confined to open access Library & Information Science (LIS) journal "International Journal of Digital Library Services (IJODLS)" published from India and indexed in Directory of Open Access Journals (DOAJ). The time frame of the study has been selected from 2011 to 2015 for five years. It is published "Quarterly" i.e. 4 issues per year. There are 154 research papers/ articles published during the study period.

## Objectives of the Study

The objectives of the study are to:

- Examine the year wise distribution of articles.
- Find the authorship pattern.
- Assess the degree of collaboration among authors.
- Find out geographical distribution of articles.
- Determine the obsolescence of LIS literature.
- Determine the obsolescence of literature in the field.

## Hypotheses

The hypotheses of the study are:

H1: Solo research is less preferred than collaborative research.

H2: Time has an inverse relationship with the growth of citation.

## Research Methodology

The study was designed to investigate the research productivity of journal "IJODLS" through bibliometric indicators. The survey and observation methods of research were found appropriate to undertake the study. The journal has been retrieved from its website (<http://www.ijodls.in/>). The survey was conducted for retrieving 154 research papers, which is the *n* value for the study; from the year January 2011 to December 2015 i.e. 5 years. The data obtained were tabulated, organized, and analyzed by the use of MS-Excel and SPSS as statistical tools and techniques.

## Data Analysis and Interpretation

### Year wise Distribution of Articles

Table 1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	1	2	22	14.28
2012	2	4	35	22.72
2013	3	4	31	20.12
2014	4	4*	55*	35.71
2015	5	4**	11**	7.14
<b>Total</b>		<b>18</b>	<b>154</b>	<b>100</b>

\*Articles from three issues, \*\* Articles from one issue only.

Table 1 displays the details of published articles in 14 issues of 5 volumes of the journal "IJODLS" from the year 2011-2015. In the year 2014, the journal has published 4 issues for the Volume 4, but article's record was not available during the study period on the journal's website for one issue i.e. March issue, so that data displayed in the column of Volume 4 is for the remaining three issues of Volume 4. Similarly, for Volume 5, the website of journal displays article's record for only one issue i.e. December issue, so that data displayed in the column of Volume 5 is only one issue whereas other three issues published but records are not displayed on the website. On the observation of table 1, whatever data has been collected based on the survey, it has been found that major contributions of research papers to the journal published in Volume 4 (35.71%) followed by Volume 2 (22.72%). Volume 5 has the

lowest publication percentage till date i.e. 7.14% of total articles published in the journal due to no availability of data for other three issues of the Volume.

### Issue wise Distribution of Articles

Table 2: Distribution of Articles – Issue wise

Issues (Month)	Volume Number					Total	%
	1	2	3	4	5		
March	-	13	9	-	-	22	14.28%
June	-	7	8	17	-	32	20.77%
September	8	8	6	23	-	45	29.22%
December	14	7	8	15	11	55	35.71%
<b>Total</b>	<b>22</b>	<b>35</b>	<b>31</b>	<b>55</b>	<b>11</b>	<b>154</b>	<b>100%</b>

Table 2 indicates issue wise publications of articles in five volumes. On the observation, it has been an inference that during March issue there was less number of publications (14.28%) to the journal while June issue of the journal had 20.77% publications. September issue has 29.22% paper contribution to the journal whereas December issue of the journal has the highest number of published articles i.e. 35.71%. In this journal, issue wise articles distribution found to be increased gradually from March to December.

### Authorship Pattern

Table 3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 3, it has been found that 40.9% articles published in the name of one (single) author of the total publications in the journal. There were 44.15% articles published in the name of two authors of the total publications while 14.28% articles published in the name of three authors of total publications to the journal. There were only 0.64% articles published in the name of four authors. From the analysis, it has been observed that two authorship pattern is most prevalent in the journal followed by single authorship and three authorships respectively. Further, Table 3 also reveals the total number of authors i.e. 269 authors contributed 154 research papers to the journal. Out of the total number of authors, 34.57% belongs to Volume 4 of the journal followed by Volume 2 (25.27%), Volume 3 (18.95%), Volume 1 (14.49%), and Volume 5 (6.69%).

Table 3: Authorship Pattern of the Journal

Year	Volume	No. of Authors				Total Articles	Total Authors (%)
		One	Two	Three	Four		
2011	1	9	9	4	-	22	39 (14.49)
2012	2	13	11	11	-	35	68 (25.27)
2013	3	13	16	2	-	31	51 (18.95)
2014	4	23	27	4	1	55	93 (34.57)
2015	5	5	5	1	-	11	18 (6.69)
<b>Total</b>		<b>63</b>	<b>68</b>	<b>22</b>	<b>1</b>	<b>154</b>	<b>269 (100)</b>
<b>Percentage</b>		<b>40.9</b>	<b>44.15</b>	<b>14.28</b>	<b>0.64</b>	<b>100</b>	

## Degree of Collaboration

Table 4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total (Ns+ Nm)	Degree of Collaboration
2011	1	9	13	22	0.59
2012	2	13	22	35	0.62
2013	3	13	18	31	0.58
2014	4	23	32	55	0.58
2015	5	5	6	11	0.54
<b>Total</b>		<b>63</b>	<b>91</b>	<b>154</b>	<b>0.59</b>

The Degree of Collaboration (C) of the contributors has been derived using the Subramanyam formula:

$$\text{Degree of Collaboration (C)} = \frac{Nm}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$C = \frac{88}{88+66=154} \text{ or } C = 0.59$$

The Degree of Collaboration has been calculated for the year 2011-2015. Single author contribution is 63 and multiple authors' contribution is 91. Volume wise Degree of Collaboration of the journal falls in the range of 0.54 to 0.62. The Degree of Collaboration of the journal is 0.59 which shows the good presence of collaborative research among authors of the journal. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.

## Geographical Distribution of Articles

Table 5: Geographical Distribution of Articles

Year	National	Foreign	National + Foreign	Total No. of Articles
2011	17	2	3	22
2012	31	4	-	35
2013	25	6	-	31
2014	49	6	-	55
2015	10	1	-	11
<b>Total</b>	<b>132</b>	<b>19</b>	<b>3</b>	<b>154</b>
<b>Percentage</b>	<b>85.71</b>	<b>12.33</b>	<b>1.94</b>	<b>100</b>

Table 5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: National, Foreign, and National + Foreign. On the observation, it has been found that 85.71% articles belonged to national contribution and 12.33% belonged to foreign contribution. The National contribution is more than the foreign contribution to the journal. There were very few contributions (1.94%) belong to national and foreign collaboration. On the analysis, it has been found that since the journal is of Indian origin, the highest number of articles submitted and published by India in the journal. The Foreign contribution of articles to the journal is less than national because of geographic distance as well as less popularity of the journal due to recent in existence.

## Country-wise Distribution of Authors

Table 6: Country wise Distribution of Authors

Rank	Country	Total No. of Authors	Percentage
1	India	229	85.13
2	Nigeria	14	5.20
3	Pakistan	7	2.60
4	Saudi Arabia	7	2.60
5	Iran	3	1.11
6	Swaziland	2	0.74
7	Ghana	2	0.74
8	Tanzania	2	0.74
9	Ethiopia	1	0.37
10	Australia	1	0.37
11	Fiji	1	0.37
<b>Total</b>		<b>269</b>	<b>100</b>

Table 6 shows the country wise distribution of authors. India has the highest number of contributors (85.13%) to the journal followed by Nigeria (5.20%), Pakistan and Saudi Arabia (2.6% each), Iran (1.11%), Swaziland, Ghana, and Tanzania (0.74% each), Ethiopia, Australia, and Fiji (0.37% each). The journal has about 15% authors from foreign countries and rests were from India which displays its comparatively fair international acceptance and presence amongst LIS professionals than other journals. Among foreign countries authors, 35% authors belong to Nigeria only that indicates wider journal's popularity among Nigerian authors. Pakistan and Saudi Arabia each have 17.5% authors share among foreign contributors.

## State-wise Distribution of Indian Authors

Table 7: State wise Distribution of Indian Authors

Rank	Name of the State	No. of Authors	Percentage
1	Maharashtra	33	14.41
2	Tamil Nadu	28	12.22
3	Andhra Pradesh	25	10.91
4	Karnataka	24	10.48
5	Chandigarh	15	6.55
6	Uttar Pradesh	14	6.11
7	Punjab	11	4.80
8	Jammu & Kashmir	11	4.80
9	Madhya Pradesh	11	4.80
10	New Delhi	9	3.93
11	Kerala	9	3.93
12	Haryana	8	3.49
13	Odisha	6	2.62
14	Rajasthan	6	2.62
15	Uttarakhand	5	2.18
16	Puducherry	4	1.74
17	Himachal Pradesh	4	1.74
18	West Bengal	2	0.87



19	Assam	2	0.87
20	Gujarat	1	0.43
21	Goa	1	0.43
<b>Total</b>		<b>229</b>	<b>100</b>

Table 7 shows state wise distribution of Indian authors. Maharashtra (14.41%) has the highest number of contributors to the journal followed by Tamil Nadu (12.22%), Andhra Pradesh (10.91), Karnataka (10.48%), Chandigarh (6.55%), Uttar Pradesh (6.11%), Punjab, Jammu and Kashmir, and Madhya Pradesh (4.8% each) etc. Indian contributors to the journal belong to 21 States and Union Territories of India which display journal’s wider acceptance amongst Indian LIS professionals.

### Forms of Documents Cited

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal “IJODLS”. From the analysis of table 8, it has been observed that “Journal Articles” are most prevalent in terms of citations/references in research articles. There were total 2122 citations received to 154 research articles published in the journal during study period, and more than 58% citations belong to Journal Articles followed by Web based Resources (15.78%), Books and Reference Sources (12.58%), articles published in Conference/ Seminar Proceedings (6.22%), Miscellaneous Items (2.73%), Research/Project Reports (2.4%), and Theses/Dissertations (1.46%). By the analysis of table 8, it has been an inference that "Journal Articles" are the first choice, Web based Resources as a second choice, Books and Reference Sources as the third choice, and Conference/Seminar Proceedings as the fourth choice as a citation for writing a research paper by authors. Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field due to restricted access to such information sources.

Table 8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	1248	58.81
2	Web based Resources	335	15.78
3	Books and Reference Sources	267	12.58
4	Conference/Seminar Proceedings	132	6.22
5	Miscellaneous Items	58	2.73
6	Research/ Project Reports	51	2.40
7	Theses/ Dissertations	31	1.46
<b>Total</b>		<b>2122</b>	<b>100</b>

### Chronological Distribution of Citations

Table 9: Chronological Distribution of Citations

Years	Journal Articles	Web based Resources	Books and Reference Sources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1960	2 (0.16%)	-	6 (2.24%)	-	-	-	-	8 (0.37%)
1961-1970	13 (1.04%)	-	4 (1.49%)	-	-	-	-	17 (0.80%)
1971-1980	4 (0.32%)	-	6 (2.24%)	-	-	-	4 (12.90)	14 (0.65%)

							(%)	
1981-1990	39 (3.12%)	-	24 (8.98%)	2 (1.51%)	1 (1.72%)	3 (5.88%)	3 (9.67%)	72 (3.39%)
1991-2000	184 (14.74%)	9 (2.68%)	57 (21.34%)	15 (11.36%)	5 (8.62%)	4 (7.84%)	2 (6.45%)	276 (13%)
2001-2010	735 (58.89%)	95 (28.35%)	144 (53.93%)	104 (78.78%)	40 (68.96%)	42 (82.35%)	20 (64.51%)	1180 (55.60%)
2011-2015	271 (21.71%)	231 (68.95%)	26 (9.73%)	11 (8.33%)	12 (20.68%)	2 (3.92%)	2 (6.45%)	555 (26.15%)
<b>Total</b>	<b>1248</b>	<b>335</b>	<b>267</b>	<b>132</b>	<b>58</b>	<b>51</b>	<b>31</b>	<b>2122</b>

The chronological distribution of citations to the journal articles has been given in Table 9. The citations from the journal articles have been divided into 7-time frames having a periodicity of 10 years each. The citations before 1960 were enclosed within the cluster up to 1960 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 9, it has been observed that IJODLS research papers prefer most of the citations of 2001-2010 (55.60%), 2011-2015 (26.15%), and 1991-2000 (13%) time periods. It indicates that 94.75% literature cited in the research papers of the IJODLS are within the period of 1991-2015 i.e. 25 years duration. Further categorically, citations belong to Journal Articles covered from 2001-2010 (58.89%), 2011-2015 (21.71%), and 1991-2000 (14.74%). Within the Journal Articles category, 95.34% citations are within the period of 1991-2015. Web based Resources as a form of citations appeared during 1991-2000 time period first time in the journal articles and all the citations are within 1991-2015 time periods. More than 68% citations are within last five years i.e. from 2011-2015 in case of Web based Resources. Citations in the form of Books and Reference Sources also have 53.93% citations within 2001-2010, 21.34% within 1991-2000, and 9.73% within 2011-2015 time periods. The major citations (85%) are within 1991-2015 time periods in case of Books and Reference Sources. In case of Conference/ Seminar Proceedings, 78.78% citations are within 2001-2010 followed by 1991-2000 (11.36%), and 2011-2015 (8.33%). In this case, 98.47% citations are within 1991-2015 time periods. In the cases of Miscellaneous Items (98.26%), Research/ Project Reports (94.11%), and Theses/ Dissertations (77.41%) major citations are within 1991-2015 time periods. From the analysis, it has been evident that literature older than 25 years (published before 1991) have not been used more by researchers of the journal and they have the tendency to use the latest literature published in any form within the field of LIS. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/ researchers followed by Web based Resources, Books and Reference Sources, and Conference/ Seminar Proceedings.

### Obsolescence of LIS Literature

Table 10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference /Seminar Proceedings	Misc. items	Research /Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	751 (60.17%)	95 (35.58%)	305 (91.04%)	85 (64.39%)	37 (63.79%)	26 (50.98%)	16 (51.61%)	1315	1315
11-20	393 (31.49%)	103 (38.57%)	29 (8.65%)	42 (31.81%)	19 (32.75%)	21 (41.17%)	8 (25.80%)	615	1930
21-30	67 (5.36%)	42 (15.73%)	1 (0.29%)	3 (2.27%)	2 (3.44%)	3 (5.88%)	2 (6.45%)	120	2050
31-40	19 (1.52%)	15 (5.61%)	-	2 (1.51%)	-	1 (1.96%)	2 (6.45%)	39	2089
41-50	14 (1.12%)	4 (1.49%)	-	-	-	-	3 (9.67%)	21	2110
51-60	2 (0.16%)	4 (1.49%)	-	-	-	-	-	6	2116



61-70	2 (0.16%)	3 (1.12%)	-	-	-	-	-	5	2121
71+		1 (0.37%)	-	-	-	-	-	1	2122
<b>Total</b>	<b>1248</b>	<b>267</b>	<b>335</b>	<b>132</b>	<b>58</b>	<b>51</b>	<b>31</b>	<b>2122</b>	

The table 10 displays frequency of citations appeared in the articles published in the journal IJODLS and obsolescence of literature cited in those articles. The total 2122 citations were classified into 8 time zones, each having the time duration of 10 years. These 2122 citations were also categorized according to their form of the document. From the table 10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles rate of obsolescence is less than 10 years, Books and Reference Sources up to 20 years, Web based Resources, Conference/ Seminar Proceedings, Miscellaneous Items, Research/ Project Reports, and Theses/ Dissertations are 10 years. The calculated rate of obsolescence or half-life of citations to the journal is 8.076 years. The calculation method for the rate of obsolescence can be observed from the study of Shukla & Moyon (2017) which is available at <http://digitalcommons.unl.edu/libphilprac/1530>.

### Testing of Hypotheses

*Hypothesis 1: Solo research is less preferred than collaborative research.*

For the testing of this hypothesis, the null hypothesis is required that has been given as:

*H<sub>0</sub>: There is no significant difference between solo research and collaborative research.*

Chi Square ( $X^2$ ) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency ( <i>fo</i> )	Expected Frequency ( <i>fe</i> )
Solo Research	63	77
Collaborative Research	91	77

Computation of  $X^2$  with the data given in above table 11.

Table 11: Computation of  $X^2$  for IJODLS

	<i>fo</i>	<i>fe</i>	<i>fo - fe</i>	$(fo - fe)^2$	$(fo - fe)^2 / fe$
Solo Research	63	77	-14	196	196/77=2.54
Collaborative Research	91	77	14	196	196/77=2.54
<b>Total</b>	<b>154</b>	<b>154</b>		<b>392</b>	<b>392/77=5.09</b>

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1. From the critical value of Chi-Square table, the values of  $X^2$  distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated  $X^2$  value is 5.09 which is greater than critical  $X^2$  value 3.84 at .05 level. This rejects the null hypothesis and proves that solo research is less preferred than collaborative research.

*Hypothesis 2: Time has an inverse relationship with the growth of citation.*

Pearson Correlation is a test to know the degree of association (correlation) between two variables. Here association has been observed between Time and Growth of Citations.

Table 12: Correlation of IJODLS

<b>Correlations</b>			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.716**
	Sig. (2-tailed)		.000
	N	76	76
Citations	Pearson Correlation	-.716**	1
	Sig. (2-tailed)	.000	
	N	76	76

\*\* . Correlation is significant at the 0.01 level (2-tailed).

There is a significant adverse (negative) relationship between time and growth of citations ( $r = -.716$ , significant at .01 level). Therefore,  $H_2$  is accepted. The correlation has been measured between time and citations and found that there is a significant adverse (negative) relationship for the journal “IJODLS”. This proves the hypothesis that time has an inverse relationship with the growth of citations to the journals. As time passes in backward movement (from 2015-1950-1900), there should be the number of citations from recent to old but it is not so, and if time passes in forward movement (1900-1950-2015), there should be the number of citations from old to recent. But in both the conditions, it has been found an adverse correlation between time and growth of citations.

### Research Findings

The analysis of the data collected through survey and observation have revealed a number of findings which are listed below:

1. The journal has published 154 articles in 14 issues of 5 Volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 4 and Volume 2 have published the major percentage of research papers to the journal i.e. 35.71% and 22.72% respectively.
2. As per issue wise publications of articles in five volumes, it has been found that December issue (35.71%) of the journal has the highest number of published articles followed by September issue (29.22%) whereas March issue has the least number of publications to the journal i.e. 14.28%.
3. In the study of authorship pattern for the journal, it has been found that two authorship pattern (44.15%) is most prevalent in the journal followed by single authorship (40.9%). Further, the study also reveals that 269 authors contributed 154 research papers to the journal, out of which 34.57% authors belongs to Volume 4 of the journal followed by Volume 2 with 25.27% authors.
4. The Degree of Collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.59 which indicated the significant amount of collaborative research among authors of the journal.
5. In the analysis of the geographical distribution of articles in the journal, it has been found that majority (85.71%) of research papers belonged to national contribution whereas 12.33% research papers belong to foreign contribution. Besides these, only few research papers (1.94%) have national and foreign collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. The International contribution of articles to the journal is very less than national and it might be due to geographic distance and less popularity of the journal due to very recent in origin.

6. Further, analysis based on the country wise distribution of authors, it has been observed that India has the highest number of contributors (85.13%) to the journal. The journal has 14.87% contributors from overseas which display its international reach, distribution, acceptance, and presence amongst LIS professionals. Nigerian authors (35%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7. Further, analysis based on state wise distribution of authors within India, it has been observed that Maharashtra (14.41%) has the highest number of contributors to the journal followed by Tamil Nadu (12.22%), Andhra Pradesh (10.91), and Karnataka (10.48%). Indian contributors to the journal belong to 21 States and Union Territories of India which display journal's wide acceptance amongst Indian LIS professionals.
8. The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (58.81%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (15.78%), and Books and Reference Sources (12.58%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9. The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (55.60%), 2011-2015 (26.15%), and 1991-2000 (13%) time periods. It indicates that majority (94.75%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10. The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8 years.
11. From the testing of significance of hypothesis (H1) with Chi-Square test, it has been found that journal "IJODLS" prefer collaborative research than solo research.
12. From the testing of correlation between time and growth of citations in hypothesis (H2) with Pearson Correlation, it has been found that all the journals have a significant adverse relationship between time and growth of citations and thus hypothesis (H2) is accepted.

## **Conclusions**

The journal has published 154 research papers contributed by 269 authors during the study period; two authorship patterns are most prevalent in the journal followed by single authorship which indicates collaborative research in journal articles and supported by Degree of Collaboration of the journal (0.59) also. The National contribution of articles is more than the foreign contribution. It gives the impression that journal has much popularity within the country than overseas. The similar results have been observed by other studies conducted by Shukla & Moyon (2016, 2017). Moreover, the journal is of recent in origin, so have overseas availability up to 10 foreign countries that are a positive indication for the journal to prove its significance at international level. Nigeria is the highest contributor of research papers to the journal amongst foreign countries which is a good indication that amongst foreign authors, Nigerian researchers found it (journal) suitable to publish their research with Indian journal. Amongst the Indian States and Union Territories, 25 States and Union Territories were covered by the journal; and Maharashtra is the highest contributor of articles to the journal. The "Journal Articles" found to be the most prevalent source of information for writing the research papers. The similar results have been observed by other studies conducted by Shukla & Moyon (2016, 2017). The published articles of the journal have used latest resources as

citations that were not older than 25 years (published before 1991) from the today. The similar results have been observed by other studies conducted by Shukla & Moyon (2016, 2017). The calculated half-life (rate of obsolescence) of the journal is 8 years which give an impression that growth of literature is faster in the field of LIS as it is proved that “less the half-life will confirm the faster growth of literature”. The research papers published in collaboration is more than research published in solo authorship, and time duration has an inverse relation with the growth of literature proved in the study.

## References

1. Awasthi, Shipra, & Jaiswal, Babita. (2015). Library and Information Science journals in DOAJ: a bibliometric study. *International Journal of Scientific & Engineering Research*, 6(8), 1476-1481.
2. Das, Tapas Kumar. (2013). A bibliometric analysis of contributions in the journal 'Library Trends'. *Library Philosophy and Practice*. Retrieved on September 1, 2016, from <http://digitalcommons.unl.edu/libphilprac/1014/>
3. Devendra Kumar. (2014). A bibliometric analysis of Directory of Open Access Journal (DOAJ): Environmental Science (1972-2013). *E-Library Science Research Journal*, 2(5), 1-12. Retrieved on March 6, 2016, from [www.lsrj.in/UploadedArticles/214.pdf](http://www.lsrj.in/UploadedArticles/214.pdf)
4. Directory of Open Access Journal (DOAJ). Retrieved on March 1, 2016, from <https://doaj.org/search?source>
5. Gogoi, Manisha, & Barooah, Pronab Kumar. (2016). Bibliometric analysis of Indian Journal of Chemistry, Section B to study the usage pattern of information in the field of Material Science. *Library Philosophy and Practice*. Available at <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3519&context=libphilprac>
6. Hertzfel, Dorothy H. (2003). Bibliometrics history. In: Drakes, Miriam A. (ed.), *Encyclopedia of Library and Information Science* (2<sup>nd</sup> ed., pp. 288-328). Marcel Dekker: New York.
7. International Journal of Digital Library Services. (n.d.). Available at <http://www.ijodls.in/about-journal.html>
8. Maity, Asish & Teli, Soumen. (2015). A bibliometric analysis on the Directory of Open Access Journals (DOAJ) in the subject domain of LIS from the year 2004-2014. *International Journal of Innovative Research in Science, Engineering and Technology*, 4(4), 1955-1962.
9. Mondal, D. & Saha, S. (2015). Journal of Indian Library Association during 2008-2014: a bibliometric study. *Journal of Indian Library Association*, 51(1), 27-33.
10. Nashipudi, M. & Ravi, B. (2015). Contribution of India to Universe of Knowledge in DOAJ: A case study. *International Journal of Information Dissemination and Technology*, 5(3), 171-175.
11. Pandita, Ramesh. (2013). Annals of Library and Information Studies (ALIS) journal: a bibliometric study (2002-2012). *DESIDOC Journal of Library & Information Technology*, 33(6), 493-497.
12. Rattan, G. K. & Gupta, K. (2012). Bibliometric analysis of Malaysian Journal of Library and Information Science: 2007-2011. *International Journal of Information Dissemination and Technology*, 2(4), 307-312.
13. Roy, S. B., & Basak, M. (2013). Journal of Documentation: a bibliometric study. *Library Philosophy and Practice*. Available at <http://digitalcommons.unl.edu/libphilprac/945>

14. Satyanarayana, D. (2014). TOURISMOS: a bibliometric study. *Journal of Tourism and Hospital*, 3(2). Retrieved on 15<sup>th</sup> June 2016, from <http://www.omicsgroup.org/journals/tourismos-a-bibliometric-study-21670269.1000124.php?aid=30126>
15. Thavamani, K. (2015). Journal of Forensic Medicine and Toxicology: a bibliometric study. *International Journal of Information Dissemination and Technology*, 5(2), 118-122.
16. Velmurugan, C., & Radhakrishnan, N. (2016). Indian Journal of Biotechnology: a bibliometric study. *Innovare Journal of Science*, 4(1), 1-7.
17. Wankhede, R. S., Kakde, B. B., & Bhikaji, K. S. (2015). A bibliometric analysis of the Urban Library Journal on DOAJ. *Knowledge Librarian: An International Peer Reviewed Bilingual*

