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An appraisal of Authorship and Collaboration pattern in IASLIC Bulletin (2011-2018)

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The present study is an attempt to evaluate the authorship and collaboration pattern in IASLIC bulletin during the year 2011-2018. Total 162 articles published during the study period and out of which only 59 articles are published by single author and rest 103 articles are published by two or more than two authors. So it is clear from the study that multiple authorship patterns are prominent in the journal. In the study it has been counted that the average collaboration index is 1.76, average degree of collaboration is 0.64, average collaboration coefficient is 0.56, and average modified collaboration coefficient is 0.34, average relative growth rate is 0.25 and average doubling time is 2.92 during the year 2011-2018.

Keywords: Authorship pattern, degree of collaboration, collaboration index, collaboration coefficient, modified collaboration coefficient, relative growth rate, doubling time, scientometric, IASLIC Bulletin

Introduction

Authorship provides substantial intellectual, practical contribution and accountability to a publication in any field of study. Authorship pattern is a significant part of any bibliometric, scientometric, informetric and other metric studies. Scientific researches are becoming collaborative where research projects are being carried out by more than one people by engaging mentally and physically. Multi authored papers are increasing rapidly in every field offering some degree of collaboration between authors. Many believe that the collaboratively produced research papers carry more reliability in articles. Believing the positive outcomes of collaborations authors are becoming dynamic to do joint researches. It has become an important implementation in scientific researches in producing good quality research papers. Multi-authored collaboration are steadily increasing providing opportunities to the individual to

access the various ideas and sources, exchange of information, learning new skills, more efficiency and higher quality of results and finally improve the quality of the articles. Considering the trend Price (1963)¹ stated that “by 1980 the single-author paper will be extinct” and scholarly publications will “move steadily toward infinity of authors per paper”. Collaboration coefficient (CC) is a measure of collaboration in research that reproduces in the mean number of authors per paper and the proportion of multi-authored papers. Thus, collaboration plays an important role in productivity and the library and information science domain is no exception.

IASLIC Bulletin

Indian Association of Special Libraries and Information Centers (IASLIC) a non-profit organization was established in the year 1955 at Kolkata to shore up the development of special libraries in India. IASLIC Bulletin - an official organ of the Indian Association of Special Libraries and Information Centers is a well known journal in the field of Library and Information Science published from India. It was first published in 1956. The journal is committed to the advancement and dissemination of the fundamental and applied knowledge of Library and Information Science in an accessible form to professional colleagues who have a common interest in the field in this country and abroad. This is a peer-reviewed quarterly publication. The journal publishes research papers, book reviews, short communications, proceedings and papers. IASLIC Bulletin is abstracted /indexed in: Library and Information Science Abstracts (LISA); INSPEC; Indian Library Science Abstracts (ILSA); Guide to Indian Periodical Literature.

Literature Review

Many studies have been carried out earlier by different authors regarding the authorship and collaboration pattern as a part of the study of bibliometric in different journals of various fields. As the library and information science journals are concerned few studies related to authorship and collaborative pattern in publication are vivid. Notable are, Yadav, Singh and Verma (2019)² conducted the study titled “Authorship and Collaboration Pattern in SRELS Journal of Information Management during 2008-2017: An Evaluation”. Based on the data collected the study counted the average collaboration index, average collaboration coefficient, average degree of collaboration, average relative growth rate, activity index and average

doubling time of publications appeared in the journal during 2008-2017. The study revealed that the multiple-authorship pattern is prominent in the journal. Mondal & Jana (2018)³ studied the collaboration and authorship trend in leading Indian LIS journal during the years 2012-2017. The study evaluated the collaborative authorship trend on using different parameters and revealed the following: the multi-authored articles are dominating the LIS publications, maximum collaboration occur in intra-institutional and inter-institutions within state level. The study also calls for the collaboration among LIS schools to produce more quality works for emerging and innovative research. Siamaki et al. (2014)⁴ conducted a study on collaboration and co-authorship patterns in library and information science studies in Iran between the years 2005-2009. Total 942 articles were published in Iranian library and information science journals during the study period out of which 506 articles were published by single researchers and 436 were collaborative between two or more authors. Based on the data the study presented the average collaboration coefficient and average collaboration index of authorship.

Objectives of the Study

1. To know the year wise publication distribution pattern.
2. To identify the year wise authorship distribution of publications.
3. To measure the collaboration index.
4. To measure the collaboration coefficient.
5. To find out degree of collaboration.
6. To assess the modified collaboration coefficient.
7. To know the relative growth rate and doubling time.

Methodology

For the purpose of this study, IASLIC Bulletin has been selected as the source journal. In the present paper, the 32 issues of the 8 volumes, i.e., Vol. 56-63 (2011-2018) of this journal have been selected for the study. All the papers from 4 volumes have been scanned and analyzed with the help of spreadsheet. During the year 2016 two issues that is issue no. 2 & 3 appeared in the same issue. The investigation being fairly analytical, data have been divided into specific subdivisions and discussed in the light of the objectives identified for the study. The design of

the analysis includes the following categories like authorship, collaboration pattern, relative growth rate, and doubling time.

The following scientometric indicators have been used in the study;

The collaboration Index (CI) counted by the formula which is suggested by the Lawani (1980);

The degree of collaboration (DC) counted by the formula which is suggested by the Subramanyam (1983);

The collaboration coefficient (CC) counted by the formula which is suggested by the Ajiferuke et al. (1988);

The modified collaboration coefficient (MCC) counted by the formula which is suggested by Savanur and Srikanth (2010); and

Relative Growth Rate and Double Time model which is suggested by Mahapatra in 1994.

Result and Discussion

A total number of 162 articles published during the period 2011-2018 have been recorded for the present study.

Table-1 Year-wise distribution of Publications

Year	Vol. No.	Issue No.	No. of Articles	% of Articles
2011	56	4	23	14.19
2012	57	4	23	14.19
2013	58	4	18	11.12
2014	59	4	23	14.19
2015	60	4	18	11.12
2016	61	4	16	9.87
2017	62	4	22	13.59
2018	63	4	19	11.73
Total		32	162	100%

During the study period 2011 – 2018, 162 articles were published in IASLIC Bulletin. The above table-1 shows that the maximum numbers of articles 23 (14.19%) were published in 56, 57 and 59 volumes appeared in the year 2011, 2012 and 2014. Followed by 22(13.59%)

articles in 2017, 19(11.73%) articles in 2018, 18(11.12%) articles come out in the year 2013 and 2015. The minimum numbers of articles 16(9.87%) were published in the year 2016 because the two issues 2 & 3 of volume 61 appeared in the same issue.

Table-2 Year wise Authorship distribution of publication

Authorship	2011	2012	2013	2014	2015	2016	2017	2018	No. of Articles	% of Articles	Total Authors
Single Author	12	9	8	13	4	4	6	3	59	36.42	59
2 Authors	8	9	9	10	12	9	12	14	83	51.24	166
3 Authors	3	5	1	0	2	3	4	2	20	12.34	60
Total Articles	23	23	18	23	18	16	22	19	162	100%	0
Total Authors	37	42	29	33	34	31	42	37	0	0	285

Table 2 reveals the authorship pattern of the articles published during the period of study 2011 - 2018. The joint authorship is found prominent. Among them 83 (51.24%) articles were authored by two authors and 20 (12.34%) articles by three authors jointly. The percentage of single authored articles was 59 (36.42%). This indicates the increasing collaboration on authorship pattern.

Collaboration Index

The below table-3 shows the collaboration index of the publications which are published in IASLIC Bulletin during the years 2011 - 2018. The average collaboration index 1.76 has been counted during the study period 2011-2018. The highest CI 31.32 found in the year 2018 and the lowest CI 1.61 found in the year 2011.

The collaboration Index (CI) counted by the formula which is suggested by the Lawani (1980)⁵ as:

$$CI = \frac{\sum_{j=1}^A jf_j}{N}$$

Where,

j = the number authors in an article i.e. 1, 2, 3

f_j = the number of j authored articles

N = the total number of articles published in a year, and

A = the total number of authors per articles

Hence, table 3 is calculated by the using above formula thus:

CI for 2011 is

$$\begin{aligned} CI &= \frac{\sum_{j=1}^A j f_j}{N} \\ &= \frac{(1 \times 12) + (2 \times 8) + (3 \times 3)}{23} \\ &= \frac{(12) + (16) + (9)}{23} \\ &= \frac{37}{23} \\ &= 1.61 \end{aligned}$$

Similarly, the value of CI is calculated for all the corresponding years.

Table-3 Collaboration Index

Year	Single Authored Paper	Two Authored Paper	Three Authored Paper	Total	Collaboration Index
2011	12	8	3	23	1.61
2012	9	9	5	23	1.83
2013	8	9	1	18	26.17
2014	13	10	0	23	13.87
2015	4	12	2	18	28.34
2016	4	9	3	16	27.25
2017	6	12	4	22	1.91
2018	3	14	2	19	31.32
Total	59	83	20	162	1.76

Degree of Collaboration

The table-4 determines the degree of collaboration during the study period 2011-2018. The average degree of collaboration 0.64 has been counted during the period of study. The maximum average degree of collaboration found in the year 2018 which is 0.85, followed by 0.78 in the year 2015. The lowest average degree of collaboration is 0.44 in the year 2014. The degree of collaboration (DC) counted by the formula which is suggested by the Subramanyam (1983)⁶ as mention below:

$$DC = 1 - \frac{f1}{N}$$

Where,

f1 = the number of single-authored articles

N = the total number of articles published in a year

Hence,

$$\begin{aligned} \text{DC for the year 2011 is: } & DC = 1 - \frac{f1}{N} \\ & = 1 - \frac{12}{23} \\ & = 1 - 0.52 \\ & = 0.48 \end{aligned}$$

Similarly, the value of DC is calculated for all the corresponding years.

Table-4 Degree of Collaboration

Year	Single Authored Paper	Multi Authored Paper	Total	Degree of Collaboration
2011	12	11	23	0.48
2012	9	14	23	0.61
2013	8	10	18	0.56
2014	13	10	23	0.44
2015	4	14	18	0.78
2016	4	12	16	0.75
2017	6	16	22	0.73
2018	3	16	19	0.85

Total	59	103	162	0.64
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Collaboration Coefficient (CC)

Table-5 revealed the collaboration coefficient during the period of study 2011-2018. The average collaboration coefficient 0.56 found during the year of the study. The highest collaboration coefficient is counted in the year 2018 with 0.43, followed by the year 2016 with 0.41 and the lowest collaboration coefficient noticed in the year 2014 with 0.21.

The collaboration coefficient (CC) counted by the formula which is suggested by the Ajiferuke et al. (1988)⁷ as mention below:

$$CC = 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j}\right) j f_j}{N}$$

Where,

j = the number authors in an article i.e. 1, 2, 3

f_j = the number of j authored articles

N = the total number of articles published in a year, and

A = the total number of authors per articles

Thus, table 5 is calculated by the using above formula thus:

CC for 2011 is

$$\begin{aligned}
 CC &= 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j}\right) j f_j}{N} \\
 &= 1 - \frac{\left(\frac{1}{1} \times 12\right) + \left(\frac{1}{2} \times 8\right) + \left(\frac{1}{3} \times 3\right)}{23} \\
 &= 1 - \frac{12 + 4 + 1}{23} \\
 &= 1 - \frac{17}{23} \\
 &= 1 - 0.74 \\
 &= 0.26
 \end{aligned}$$

Similarly, the value of CC is calculated for all the corresponding years.

Table-5 Collaboration Coefficient (CC)

Year	Single Authored Paper	Two Authored Paper	Three Authored Paper	Total	Collaboration Coefficient (CC)
2011	12	8	3	23	0.26
2012	9	9	5	23	0.34
2013	8	9	1	18	0.28
2014	13	10	0	23	0.21
2015	4	12	2	18	0.40
2016	4	9	3	16	0.41
2017	6	12	4	22	0.39
2018	3	14	2	19	0.43
Total	59	83	20	162	0.56

Modified Collaboration Coefficient (MCC)

The below table-6 revealed the modified collaboration coefficient during the period of study 2011-2018. The average modified collaboration coefficient 0.34 comes out during the year 2011-2018. The highest modified collaboration coefficient is counted in the year 2018 with 0.46, followed by the year 2016 with 0.44 and the lowest modified collaboration coefficient found in the year 2014 with 0.23.

The modified collaboration coefficient (MCC) counted by the formula which is suggested by Savanur and Srikanth (2010)⁸ as given below:

$$MCC = \left(\frac{N}{N-1} \right) \left\{ 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j} \right) j f_j}{N} \right\}$$

Thus, table 6 is calculated by using the above formula thus:

MCC for 2008 is

$$MCC = \left(\frac{N}{N-1} \right) \left\{ 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j} \right) j f_j}{N} \right\}$$

$$\begin{aligned}
&= \left(\frac{23}{22}\right) \left\{ 1 - \frac{\left(\frac{1}{1} \times 12\right) + \left(\frac{1}{2} \times 8\right) + \left(\frac{1}{3} \times 3\right)}{23} \right\} \\
&= (1.04) \left\{ 1 - \frac{12 + 4 + 1}{23} \right\} \\
&= (1.04) \left\{ 1 - \frac{17}{23} \right\} \\
&= (1.04) \{1 - 0.73\} \\
&= 1.04 \times 0.27 \\
&= 0.28
\end{aligned}$$

Similarly, the value of MCC is calculated for all the corresponding years.

Table-6 Modified Collaboration Coefficient

Year	Single Authored Paper	Two Authored Paper	Three Authored Paper	Total	Modified Collaboration Coefficient (MCC)
2011	12	8	3	23	0.28
2012	9	9	5	23	0.36
2013	8	9	1	18	0.27
2014	13	10	0	23	0.23
2015	4	12	2	18	0.43
2016	4	9	3	16	0.44
2017	6	12	4	22	0.40
2018	3	14	2	19	0.46
Total	59	83	20	162	0.34

Relative Growth Rate and Double Time of Publication

Table 7 exhibits the relative growth rate and doubling time of publications published in IASLIC Bulletin during 2011-2018. The Relative Growth Rate (RGR) is the increase in number of articles or pages per unit of time. “The growth rate of publication has been calculated on the basis of RGR and Dt model, which is suggested by Mahapatra in 1994⁹.” The result revealed that

the relative growth rate decrease from 0.70 in 2011 to 0.13 in 2018. The mean relative growth rate for first two years during 2011-2018 is 0.35. There is increase in mean relative growth rate 0.39 during 2013-2014, whereas remaining two blocks of two years mean growth rate is reducing continuously and in the last block mean growth rate is 0.15.

The doubling time is the time required to just double the existing amount with a given growth rate. It can be applied for the calculation of the time required to become double of the existing amount of publications, citations and pages etc. which tend to grow over the time. It is directly related to the relative growth rate (RGR). If one uses a natural logarithm, this difference has a value of 0.693 (Beaie and Acol, 2009)¹⁰. The value of doubling time (Dt) for different years are increased from 0.99 in 2011 to 5.33 in 2018. Correspondingly the mean rate of doubling time also increased from 0.49 in 2011 to 4.71 in 2018.

The relative growth rate and doubling time is calculated using the following formula:

$$RGR = \frac{W2 - W1}{T2 - T1}$$

Where,

RGR = Growth Rate over the specific period of the interval,

W1 = Loge (natural log of the initial number of contributions)

W2 = Loge (natural log of the final number of contributions)

T1 = the unit of initial time

T2 = the unit of final time

The formula of corresponding Dt for contributions and pages measurement.

$$Doubling\ Time\ (Dt) = \frac{0.693}{R}$$

Where,

R = Relative Growth rate

Table-7 Relative Growth Rate and Double Time of Publication

Year	No. of Articles	Cumulative no. of Articles	Log1e	Log2e	RGR	Mean RGR	Dt	Mean Dt
2011	23	23	-	3.14	-		-	

2012	23	46	3.14	3.83	0.70	0.35	0.99	0.49
2013	18	64	3.83	4.16	0.33	0.39	2.1	2.17
2014	23	87	4.16	4.47	0.31		2.24	
2015	18	105	4.47	4.65	0.19	0.16	3.65	4.3
2016	16	121	4.65	4.80	0.14		4.95	
2017	22	143	4.80	4.96	0.17	0.15	4.08	4.71
2018	19	162	4.96	5.09	0.13		5.33	

Conclusion

Collaborative working has many benefits to researcher. It provides an opportunity to learn an alternative ways of doing things or writing research papers. Authorship pattern is changing towards multi-authorship. The trend of collaborating research has been seen in the publications published in IASLIC Bulletin during 2011 – 2018. Among the total 162 articles published during the study period, it is found that 59 articles were published by single author and rest 103 articles were published by two or more than two authors. So it is clear from the study that multiple authorship patterns are prominent in the journal. Collaboration index, the degree of collaboration, collaboration coefficient, modified collaboration coefficient, were calculated from the data which was published during the period of study. It is found that the average collaboration index is 1.76, average degree of collaboration is 0.64, average collaboration coefficient is 0.56, average modified collaboration coefficient is 0.34, average relative growth rate is 0.25 and average doubling time is 2.92 during the year 2011-2018. The result revealed that there is trend of team research amid joint authorship with higher collaboration coefficient is vivid in the IASLIC Bulletin during the study period 2011 – 2018. This indicates that there is spirit of collaborative work among LIS research communities. The study calls for the appropriate policies that encourage interdisciplinary and cross boundary collaboration among research members in LIS field in our country. There is lack of funding in almost all LIS research programmes. Implementing mentorship and pilot funding policies that advantageously improve collaboration output is strongly needed, and that can be a useful approach in creative interaction among the LIS research communities.

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