Collaborative Measures And Authorship Pattern Of Iaslic Bulletin – A Scientometric Analysis

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ABSTRACT-

The present study is examined the collaborative measures and authorship pattern of IASLIC Bulletin during 2013-2022. Total 211 contributions published during the study period out of which 59 articles are published by single author and 152 articles are published by two or more than two authors. It is clear from the study that multiple authorship patterns are prominent in IASLIC Bulletin. In the study it has been counted that average degree of collaboration was 1.72, the average coefficient index was 1.97, the average collaboration coefficient was 0.39, the average modified collaboration coefficient was 0.61, the average relative growth rate was 0.23, and the average time to double was 3.46. It is clear from the study findings that the majority of combined authorship and low collaboration coefficient in the IASLIC Bulletin which reveals that combined research is predominant during the study.

KEYWORDS: Collaborative measures, Authorship pattern, IASLIC Bulletin, Scientometric Analysis,

INTRODUCTION

The dimension of multi-authored articles and the typical number of authors per publication are calculated as coefficients in research analysis. A scientific study's ability to work collaboratively and its reliability is indicated by the number of authors. Recent studies have specifically demonstrated that the collaborative writers generate much more research outputs than solitary authors. Effective scientific research, which is attracting the internationally prominence, relies heavily on collaboration. A researcher plainly signals that the study will receive a lot of critical attention and acceptance when they begin co-authoring publications with other scholars. Researchers are far more motivated to collaborate on projects when they are engaged in collaborative research, which leads to the publication of more academic papers.

Better author collaboration in scientific studies is becoming a goal shared by all researchers and scientists. Collaboration is therefore, a crucial technique for enhancing the scientific research and aids readers in appreciating the complex layout of scientific papers created by multidisciplinary research teams. Depending on the number of people participating, there is a link between collaboration and productivity that aids in advancing the tendencies towards collaboration in the current environment. Access to a range of ideas and resources, information sharing, developing new skills, producing findings more quickly and of higher quality, and improving the quality of the publications are the key advantages of scientific collaboration.

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.

REVIEW OF LITERATURE

Bhargav & Doraswamy (2023) studied an evaluation of authorship and collaboration pattern of Ph.D. theses in Mechanical Engineering submitted to Jawaharlal Nehru Technological University, Hyderabad. Total 4998 journal articles are cited during the study period out of which 1269(25.39%) articles by single author and 3729 (74.61%) are contributed by two or more authors. It is clear from the study that multiple authorship patterns are prominent in the discipline of mechanical engineering and its sub-fields. In the study it has been counted that the average collaboration index was 2.42; average degree of collaboration 0.75, collaboration coefficient 0.46 and average modified collaboration coefficient 0.46, average relative growth rate 0.67 and average doubling time was 0.54.

Doraswamy & Sambasiva Rao (2023) did a study an evaluation of authorship and collaboration pattern in the University News– A Weekly Journal of Higher Education from 2013 to 2022. During the research study period of 2013–2022, 2803, articles published in University News shows a trend towards individual research. The majority of articles (1911) without collaboration have been identified. Out of 563 papers, 892 (31.82%) papers are contributed by two or more authors. The average collaboration index was 1.38, the average degree of collaboration was 0.32, the average collaboration coefficient was 0.17, the average modified collaboration coefficient was 0.17, the average relative growth rate was 0.23, and the average time to double was 3.60. It is clear from the study findings that the majority of individual authorship and low collaboration coefficient in the University News which reveals that individual research is predominant during the study.

Naheem, Sivaraman & Saravanan (2022) examined the authorship pattern and research collaboration in the field of synthetic biology. Data for the study was obtained from the Web of Science Core Collection database of Clarivate Analytics from 2005 to 2019. This study finds that the average number of authors per paper in the present data set is 4.56. The average productivity per author is 0.22, which shows that the number of authors is increasing and the number of publications. The authorship pattern showed a remarkable increase in the number of multi-authored publications. The current data show a positive correlation between the number of publications and the number of authors. Further the study finds higher rates of mean values of collaboration indicators (CI = 4.5576, DC = 0.8863, CC = 0.6483 and MCC = 0.6495) also proved the better rates of collaborations among authors in this field. The study concludes that the researchers in synthetic biology prefer team research to solo research.

Das & Verma (2021) did a scientometric analysis of the authorship and collaboration pattern of Annals of Library and Information Studies Journal during 2009-2018. The analysis focused on the distribution pattern of articles, author's productivity, collaboration pattern and Collaborative coefficient and citation impact over time. The study revealed that the highest 12.57% of articles were published in the year 2010. The majority of articles are double authored with 47.03% of the total contribution. The degree of collaboration among the authors was found 0.66, which means collaborated papers are increasing. The more collaboration work led to get more visibility worldwide and get the most citation to increase the value of paper as well the reputation of the journal.

Gaud, Singh and Singh (2019) did a scientometric analysis of authorship pattern and collaborative coefficient of library

professional's competency on research publications during 1999-2018. Information obtained from the Scopus database. 433 articles overall published on the subject were identified in the database. The investigation came to the conclusion that the majority of the papers (171) published during the study period had a single author. The majority (11.78%) of the papers published in the year 2015. The year 2000 saw the greatest growth rate ever, whereas 1999 saw the lowest. With 174 papers published, the United States came in first place among the top five contributors.

OBJECTIVES OF THE STUDY

The objectives of the present study are:

To know the year wise distribution and annual growth rate of publications.

To find out the authorship pattern of publications.

To measure the collaboration index, collaboration coefficient, and modified collaboration coefficient.

To find out the degree of collaboration

To know the relative growth rate and doubling time.

METHODOLOGY

The purpose of the present study, IASLIC Bulletin has been selected as the source journal. In the present research study, the 40 issues of the 10 volumes, i.e. Vol. 58-67 (2013-2022) of this journal have been selected. A total 211articles published in IASLIC Bulletin between the years 2013-2022. In order to collect the data all the articles information (article name, number of authors, state/country, corresponding author etc.) were collected from the proposed journal then the data were examined and analyzed with the help of MS-Excel software. With the aid of the appropriate equations, the data was collected and scanned to examine various aspects relating to the

collaboration index, coefficient of collaboration, modified coefficient of collaboration, degree of collaboration, and relative growth rate and doubling time of IASLIC Bulletin.

The Annual Growth Rate (AGR) is calculated with the help of the formula developed by Kumar and Kaliaperumal as mentioned below:

$$AGR = \frac{Endt\ Value - First\ Value}{First\ Value} \times 100$$

The collaboration Index (CI) is calculated with the help of the formula developed by the Lawani as mentioned below:

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

Where,

j = the number of authors in an article i.e. 1, 2, 3, 4………..

fj = the number of authored articles

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

A = the total number of authors per articles

The Collaboration of Coefficient (CC) is calculated with the help of the formula developed by Ajiferuke et al as mentioned below:

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

Where,

j = the number of authors in an article i.e. 1,2,3,4,…..

fj = the number of j authored articles

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

A = the total number of authors per article

The Modified Collaboration Coefficient (MCC) is calculated with the help of the formula developed by Savanur and Srikanth as given below:

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

The Relative Growth Rate and Double Time (RGR& DT) is calculated with the help of the formula developed by Mahapatra as mentioned below:

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

Where, RGR = Relative Growth Rate the specific period of the interval,

W1= Log$_e$ (natural log of the initial number of contributions

W2= Log$_e$ (natural log of the final number of contributions

T1= the unit of the initial time

T2= the unit of the final time

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

Where, R is growth rate.

The Degree of Collaboration (DC) is calculated with the help of the formula developed by Subramanyam as mentioned below:

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

f$_1$ = the number of single authored papers

N= the total number of papers published in a year

ANALYSIS AND INTERPRETATION OF DATA

The data was analyzed according to the objectives and discussed in the following paragraphs.

Year wise distribution of publications and annual growth rate

Table 1 shows that year wise distribution of publication and the annual growth rate of IASLIC Bulletin.

Table 1: Year wise distribution of publications and annual growth rate

S.No.	Volume No	Year	No. of articles	Percentage	Annual Growth Rate
1	58	2013	18	8.53	0
2	59	2014	23	10.90	27.78
3	60	2015	18	8.53	-21.74
4	61	2016	21	9.95	16.67
5	62	2017	22	10.43	4.76
6	63	2018	19	9.00	-13.64
7	64	2019	22	10.43	15.79
8	65	2020	21	9.95	-4.76
9	66	2021	25	11.85	19.05
10	67	2022	22	10.43	-12.00
TOTAL			**211**	**100.00**	

It is evident from Table 1 that there are total 211 articles published during the study period out of which maximum 25 (11.85%) articles are published in the year 2021 followed by the year 2014 is second highest publications with 23 (10.90%) article and the years 2017, 2019 and 2022 is a third highest publications with 22 (10.43%) articles. The lowest contributions have been counted in the years 2013 and 2015 with 18 (8.53%) articles. It also evident from that the highest annual growth rate of publications in IASLIC Bulletin was recorded in the year 2014 (27.78) followed by the year 2021 (19.05) and the lowest annual growth rate was recorded in 2015 (-21.74).

Authorship Pattern of IASLIC Bulletin Publications

Table 2 shows the authorship pattern of IASLIC Bulletin during the period of 2013-2022.

It is evident from Table 2 that out of 211 articles, 117 articles contributed by two authors, followed by 59 articles by single authors, 24 articles by three authors, 6 articles by four authors, 4 articles by five author and one article contributed by six authors. It is also reveals that the highest 16 articles published in the year 2021 by two authors, highest 12 articles published by single authors in year2014, in the years 2016. 2017, 2019, 2021 and 2022 maximum 4 articles published by three authors, in the year 2016 four articles

Table 2: Authorship pattern of publications

S.No	Year	Authorship Pattern						Total
		One	Two	Three	Four	Five	Six	
1	2013	8	9	1	--	--	--	18
2	2014	12	11	--	--	--	--	23
3	2015	4	13	1	--	--	--	18
4	2016	4	4	4	4	4	1	21
5	2017	6	12	4	--	--	--	22
6	2018	3	14	2	--	--	--	19
7	2019	5	13	4	--	--	--	22
8	2020	9	12	--	--	--	--	21
9	2021	5	16	4	--	--	--	25
10	2022	3	13	4	2	--	--	22
TOTAL		59	117	24	6	4	1	211

published by four authors, four articles published in the year 2016 by five authors and only one article published in the year 2016 by six authors.

Collaboration Index

The year wise Collaboration Index (CI) of IASLIC Bulletin is shown in Table 3.Table 3 shows that the collaboration index of the IASLIC Bulletin which are published during the study period. The average collaboration index 1.97 has counted during the study period i.e 2013-2022.The highest collaboration index 3.14 found in the year 2016 and the lowest collaboration index 1.48 found the in the year 2014.

Collaboration of Coefficient (CC)

The year wise Collaboration of Coefficient

(CC) of IASLIC Bulletin is shown in Table 4.

Table 4 shows that the overall average collaboration coefficient of ISASLIC Bulletin journal is 0.39 during the study period. The highest collaboration coefficient is 0.56 in the year 2016, followed by 0.48 in the year 2022 and the lowest collaboration coefficient is 0.24 in the year 2014.

Modified Collaboration Coefficient (MCC)

The year wise Modified Collaboration Coefficient (MCC) of IASLIC Bulletin is shown in Table 5.

Table 5 shows that the overall average modified collaboration coefficient of IASLIC journal is 0.61 during the study period. The highest modified collaboration coefficient is 0.59 in the year 2016, followed by 0.50 in the year 2022 and the lowest modified collaboration coefficient is 0.25 in the year 2014.

Table 3: Collaboration Index of IASLIC Bulletin

S.No	Year	Authorship Pattern						Total	CI
		One	Two	Three	Four	Five	Six		
1	2013	8	9	1	--	--	--	18	1.61
2	2014	12	11	--	--	--	--	23	1.48
3	2015	4	13	1	--	--	--	18	1.83
4	2016	4	4	4	4	4	1	21	3.14
5	2017	6	12	4	--	--	--	22	1.91
6	2018	3	14	2	--	--	--	19	1.95
7	2019	5	13	4	--	--	--	22	1.96
8	2020	9	12	--	--	--	--	21	1.57
9	2021	5	16	4	--	--	--	25	1.96
10	2022	3	13	4	2	--	--	22	2.23
TOTAL		**59**	**117**	**24**	**6**	**4**	**1**	**211**	**1.97**

Table 4: Collaboration Coefficient of IASLIC Bulletin

S.No	Year	Authorship Pattern						Total	CC
		One	Two	Three	Four	Five	Six		
1	2013	8	9	1	--	--	--	18	0.29
2	2014	12	11	--	--	--	--	23	0.24
3	2015	4	13	1	--	--	--	18	0.40
4	2016	4	4	4	4	4	1	21	0.56
5	2017	6	12	4	--	--	--	22	0.39
6	2018	3	14	2	--	--	--	19	0.44
7	2019	5	13	4	--	--	--	22	0.42

8	2020	9	12	--	--	--	--	21	0.29
9	2021	5	16	4	--	--	--	25	0.43
10	2022	3	13	4	2	--	--	22	0.48
TOTAL		**59**	**117**	**24**	**6**	**4**	**1**	**211**	**0.39**

Table 5: Modified Collaboration Coefficient

| S.No | Year | Authorship Pattern | | | | | | Total | MCC |
		One	Two	Three	Four	Five	Six		
1	2013	8	9	1	--	--	--	18	0.31
2	2014	12	11	--	--	--	--	23	0.25
3	2015	4	13	1	--	--	--	18	0.42
4	2016	4	4	4	4	4	1	21	0.59
5	2017	6	12	4	--	--	--	22	0.41
6	2018	3	14	2	--	--	--	19	0.46
7	2019	5	13	4	--	--	--	22	0.44
8	2020	9	12	--	--	--	--	21	0.30
9	2021	5	16	4	--	--	--	25	0.45
10	2022	3	13	4	2	--	--	22	0.50
TOTAL		**59**	**117**	**24**	**6**	**4**	**1**	**211**	**0.61**

Relative Growth Rate and Double Time of Publication

The Relative Growth Rate and Double Time (RGR& DT) of IASLIC Bulletin is shown in Table 6.

Table 6 shows that the relative growth rate and doubling time of articles published in IASLIC Bulletin during 2013-2022. The growth rate of publications has been calculated on the basis of RGR and DT model, which is developed by Mahapatra in 1985. It has been noticed that the relative growth rate decrease from the rate of 0.82 to 0.11 from 2013 to 2022. The mean relative growth rate for first four years during 2013 to 2016 is 0.37 whereas second block of three years mean growth rate is reducing continuously and in the last block mean growth rate is 0.13 it shows that there is a big difference in comparison to the first block. The corresponding doubling time for different years is gradually increasing from 0.85 to 6.30 from 2013 to 2022. The mean rate of doubling

Table 6: Relative Growth Rate and Double Time of Publication

Year	No. of Articles	Cumulative No. of Articles	Log1e	Log2e	RGR	Mean RGR	DT	Mean DT
2013	18	18	0	2.89	--		--	
2014	23	41	2.89	3.71	0.82		0.85	
2015	18	59	3.71	4.08	0.37	0.37	1.87	1.26
2016	21	80	4.08	4.38	0.30		2.31	
2017	22	102	4.38	4.63	0.25		2.77	
2018	19	121	4.63	4.80	0.17	0.19	4.08	3.73
2019	22	143	4.80	4.96	0.16		4.33	
2020	21	164	4.96	5.10	0.14		4.95	
2021	25	189	5.10	5.24	0.14	0.13	4.95	5.40
2022	22	211	5.24	5.35	0.11		6.30	

time for the first block to last block is increasing from 1.26 to 5.40 from 2013 to 2022. The rate of relative growth rate is decreasing when corresponding doubling time is increasing during the study period.

Table 7 determines the degree of collaboration during the study period. The average degree of collaboration 0.72 has been counted during the period of study. The maximum average degree of collaboration is 0.86 in the year 2022, followed by 0.84 in the year 2018, 0.81 in the year 2016 and 0.80 in the year 2021. The lowest average degree of collaboration is 0.48 in the years 2014.

Number of articles Vs Authorship Pattern

Table 8 shows that the number of articles vs authorship pattern of IASLIC Bulletin

publications which is published during the study period.

Table 8 shows that a total number of 415 authors have contributed 211 articles, where double authored articles are rated highest with 117 articles followed by single authored are by 59 articles, three authored are by 24 articles, four authored are by 6 articles, five authored papers are by 4 articles and six authored are by only one article. It can be concluded that more number of articles are contributed by multiple authors in IASLIC Bulletin journal from 2013 to 2022.

FINDINGS AND CONCLUSION

A total 211 articles were published in ten volumes of IASLIC Bulletin during the period i.e 2013-2022, out of which maximum 25 (11.85%) articles were published in the year

Table 7: Degree of Collaboration of IASLIC Bulletin

S.No	Year	Single authored articles	Multiple authored articles	Total articles	Degree of Collaboration
1	2013	8	10	18	0.56
2	2014	12	11	23	0.48
3	2015	4	14	18	0.78
4	2016	4	17	21	0.81
5	2017	6	16	22	0.73
6	2018	3	16	19	0.84
7	2019	5	17	22	0.77
8	2020	9	12	21	0.57
9	2021	5	20	25	0.80
10	2022	3	19	22	0.86
TOTAL		59	152	211	0.72

Table 8: Number of Articles Vs Authorship pattern

S.No	No. of authors	No. of articles	Total No. of authors	Percentage of articles	Percentage of authors
1	Single	59	59	27.96	14.22
2	Two	117	234	55.45	56.38
3	Three	24	72	11.37	17.35
4	Four	6	24	2.84	5.78
5	Five	4	20	1.90	4.82
6	Six	1	6	0.48	1.45
TOTAL		211	415	100.00	100.00

2021 followed by the year 2014 is second highest publications with 23 (10.90%) article and the years 2017, 2019 and 2022 is a third highest publications with 22 (10.43%) articles. The lowest contributions were seen in the years 2013 and 2015 with 18 (8.53%) articles.

The highest annual growth rate of publications in IASLIC Bulletin was recorded in the year 2014 (27.78) followed by the year 2021 (19.05) and the lowest annual growth rate was recorded in 2015 (-21.74).

Out of 211 articles, 117 articles were contributed by two authors, followed by 59 articles by single authors, 24 articles by three authors, 6 articles by four authors, 4 articles by five authors and one article contributed by six authors

The average collaboration index was recorded at 1.97 during the study period i.e 2013-2022.The highest collaboration index was recorded at 3.14 in the year 2016, while the lowest collaboration index was at 1.48 recorded in the year 2014.

The overall average collaboration coefficient was recorded at 0.39 during the study period. The highest collaboration coefficient was 0.56 in the year 2016, followed by 0.48 in the year 2022; and the lowest collaboration coefficient was recorded at 0.24 in the year 2014.

The average modified collaboration coefficient was recorded at 0.61 during the study period. The highest modified collaboration coefficient was 0.59 in the year 2016, followed by 0.50 in the year 2022; and the lowest modified collaboration coefficient was recorded at 0.25 in the year 2014.

The study revealed the related growth rate decreased from the rate of 0.82 in 2013 to 0.11 in 2022. The mean relative growth rate for first four years during 2013 to 2016 was 0.37 whereas second block of three years mean growth rate is reducing continuously and in the last block mean growth rate is 0.13.

The corresponding doubling time for different years is gradually increasing from 0.85 in 2013 to 6.30 in 2022. The mean rate of doubling time for the first block to last block was seen increasing from 1.26 in 2013 to 5.40 in 2022 The rate of relative growth rate is decreasing when corresponding doubling time was increasing during the study period.

The average degree of collaboration was recorded at 0.72 during the period of study. The maximum average degree of collaboration was recorded 0.86 in the year 2022, followed by 0.84 in the year 2018, 0.81 in the year 2016 and 0.80 in the year 2021. The lowest average degree of collaboration was recorded at 0.48 in the year 2014.

A total number of 415 authors have contributed 211 articles, wherein the double authored articles were the highest with 117 articles followed by single authored are by 59 articles, three authored are by 24 articles, four authored are by 6 articles, five authored papers are by 4 articles and six authored are by only one article. It can be concluded that more number of articles are contributed by multiple authors in IASLIC Bulletin journal from 2013 to 2022.

During the research study period of 2013–2022, 211 articles published in IASLIC Bulletin shows a trend towards combined research. The majority of articles (152) with collaboration have been identified. Out of 211 papers, 59 (27.96%) papers are contributed by single authors. Collaboration index, the degree of collaboration, collaboration coefficient, modified collaboration coefficient, relative growth rage and doubling time were calculated from the data which is published during the

research period of study. The average collaboration index was 1.97, the average degree of collaboration was 0.72, the average collaboration coefficient was 0.39, the average modified collaboration coefficient was 0.61, the average relative growth rate was 0.23, and the average time to double was 3.46. It is clear from the study findings that the majority of combined authorship and low collaboration coefficient in the IASLIC Bulletin which reveals that combined research is predominant during the study.

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