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Authorship Trends and Collaborative Research: A Bibliometric Analysis of Annals of Library and Information Studies 2011-2020

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Abstract

The paper represents the results of the "Authorship Trends and Collaborative Research: A Bibliometric Analysis of Annals of Library and Information Studies 2011-2020". In this present paper, an attempt has been made to analyze authorship trends and collaborative dynamics of research output with respect to the Annals of Library and Information Studies. A bibliometric analysis carried on 591 authors and 312 research output in this journal during 2011-2020. The study examines growth of research contribution, authorship trends, most prolific research contributors, length of the contributions, geographic distribution of the contributions and degree of collaboration. The findings of the study reflect, maximum 38 articles contributed during the year 2015 and maximum number of 74 authors contributed during the year 2013. Authorship pattern shows majority of contribution from collaborative authors, maximum contributed by authors from India and most prolific author is Dr.B.K Sen contributed 20 articles during 2011-2020. The outcomes obtained present study a roadmap for intensifying the research in the field library and information science.

Keywords- *1 Bibliometrics, 2 Annals of Library and Information Studies (ALIS),3 Authorship pattern, Research Trends, 4 Degree of collaboration*

Introduction

Bibliometrics is, truly placed, the study and assessment of the publication pattern of all varieties of scholarly communication and their contributors. The term bibliometrics was authored by A. Pritchard in 1969 with the motive of bibliometrics is the exercising of numerical and statistical tools to illuminate the growth of scholarly communication, and furthermore the attributes and formative course of conceptual framework by counting and evaluating the various elements of research work. The bibliometric studies mainly put emphasizes on the normalities related with the scattering across some prescribed structure of literature.

Bibliometrics has developed from the investigation of the attributes of writings to the advancement of academic networks. More noteworthy availability to the approaches for bibliometrics has included to the turn of experiences and arrangement of conceptual structures. These conceptual structure works, thusly, have been established on a scholarly network is recognized by bibliometric information.

Annals of Library and Information Studies

Annals of Library and Information Studies (ALIS) previously published as Annals of Library Science and Documentation. It is a well-established quarterly circulated journal in the field of Library and Information Studies published by CSIR - National Institute of Science Communication and Information Resources (CSIR-NISCAIR), New Delhi. It is a open access journal, published since 1954. ALIS publishes original research works, short communications, survey reports, book reviews and documents related to library science, documentation, computer applications and information technology listed in library science.

Literature Review

Dhiman (2000) in his work on "Ethnobotany Journal: A ten years bibliometric study" analysed year-wise distribution of articles, authorship pattern, geographical distribution, citation analysis and length of articles contributed in the journal (**Dhiman, A.K. 2000**). Patra, Bhattacharya and Verma (2006) in their study on "Bibliometric study of literature on bibliometrics" examined growth pattern, primary journals, and authors' contribution in the field of bibliometics study by using data quoted in 'Library and Information Science (LISA)'. Findings of the study shows that growth pattern of literature does not indicate any systematic pattern (**Patra, S.K., Bhattacharya, P., & Verma, N., 2006**). Mahapatra and Jena (2006) in their study carried out study on 40 journals includes 875 scholarly articles to evaluate authorship pattern, various category of journals, geographical distribution, year-wise growth of journals, subject-wise distribution of articles, length of articles and journal's productivity (**Mahapatra, R. K. and Jena, Padmanav (2006**). Verma, Tamrakar and Sharma (2007) discovered that most of the articles were two authored input in the journal and widely contribution of articles were from Delhi (**Verma, N., Tamrakar, R., & Sharma, P. 2007**). Dixit, S., &Katore, V.V (2007) in their paper "A bibliometric analysis of journal of the Indian society for cotton improvement 1995-2004" analysed total 998 references were cited in the journal consisting of 37.14% from journals followed by 33.14% from books. The individual research work that got maximum citation of 44 references was published in year 2008 (**Dixit, S., and Katore, V.V. 2007). Bakri and Willett (2008**) conducted study on "The *Malaysian Journal of Library and Information Science*, 2001-2006: A Bibliometric Study" to analysed year-wise growth of publication, number of references per research article, length of articles, geographical distribution of articles and author collaboration pattern (**Bakri, A. and Willett, P. 2008**). Thanuskodi (2010) carried out study on "Journal of social sciences: A bibliometric study" discoursed on research output performance contributed by social scientists in the field of social science. The study broadly covers year-wise growth of articles, subject-wise distribution of papers, count of references per research articles, forms of cited documents etc (**Thanuskodi, S. 2010**).

An another study conducted by Mamdapur&Govanakoppa, &Rajgoli (2011) on "Baltic Astronomy (2000-2008)– A bibliometric study" described that authorship pattern, geographic distribution, length of research paper and so on. Findings of the study shows majority of authors from USA and India ranked 21st rank in articles contribution (**Mamdapur, G. M. N., Govanakoppa, R. A., &Rajgoli, I. U. 2011**). Nosheen and Sajjad (2011) commenced studied on 111 research articles published in he "*Pakistan Journal of Library and Information Science*" during 1995-2010 to outlined year-wise distribution of articles, geographical distribution, length of articles, number of citation, author productivity and extend of author collaboration pattern (**Nosheen, Fatima Warraich and Sajjad, Ahmad, 2011**). Rattan and Gupta (2012) carried out "Bibliometric Analysis of Malaysian Journal of Library & Information Science" for the period

2007-2011. The findings of the study shows that out of 100 scholarly contributions, joint authors contributed 73% articles while single author contributed only 27% articles *(***Rattan, GurjeetKaurl and Gupta, Kamini, 2012**). Velmurugan (2013) studies "Bibliometric analysis with special reference to Authorship Pattern and Collaborative Research Output of Annals of Library and Information Studies for the Year 2007–2012". The findings shows that multiple authors contributing more research articles than single author contribution (**Velmurugan C, 2013**). Similarly in another study conducted by Khaparde and Pawar (2013) analyzed "Authorship Pattern and Degree of Collaboration in Information Technology", described that multiple authors collaboration contribution are showing greater since past decade as against single author contribution in the emerging scientific contributions in the area of information technology (**Khaparde V, Pawar S, 2013**). Amsaveni, Manikandan and Manjula (2013) demonstrated the authorship pattern in all divisions of Bioinformatics. The results of the study reflects that single author contribution is less than two authors collaboration research articles (**Amsaveni N, Manikandan M, Manjula M, 2013**). Navaneethakrishnan (2014) conducted study for the year 1960-2012, "Authorship patterns and degree of collaboration of Sri Lankan scientific publications in Social sciences and Humanities – a picture from SCOPUS". The findings of the study depicts that research contribution made by multiple authors is relatively more than single author publications (**Navaneethakrishnan S, 2014**).

Palliwal (2015) conducted "Scientometric Analysis of Annals of Library and Information Studies (ALIS): 2009-2013" discovered that 177 articles were published and majority of them were multi-authored showing increasing collaborative trends (**Paliwal, S., 2015**). Paremeshwar and Kolle (2016) studied "Publication Trends in Annals of Library and Information Studies: A Bibliometric Analysis" for the year 2006-2015 examines year wise growth of articles, institutional contributions, authorship pattern, geographical distribution of publications. Findings depicts total 335 articles were contributed in the journal. Maximum contributed articles were from multi-authored and they quoted 575 citations on an average of 1.72 citations each article (**Parameshwar, S., & Reddy Kolle, S., 2016**). Biradar and Tadasad (2016) in their work on "Authorship Pattern and Collaborative Research in Economics" considered that research contributions done by the collaborative authors showing upward trend than single author publications (**Biradar N, Tadasad P.G, 2016**). Ashok and Dalve (2016) in their article on "Authorship Pattern and Degree of Collaboration in Academic Emergency Medicine" concludes that during their period of study, contribution of collaborative pattern of research was showing increasing trends (**Ashok SP, Dalve D., 2016**). Paper presented in Seminar by Abdi & et al. (2018) stated that, by scrutinizing 2913 articles published in 'Information Processing and Management journal' during1980-2015, identified top 10 authors and institutions contributed 67.15% research articles in the journal (**Abdi, A., Idris, N., Alguliyev, R. M., &Aliguliyev, R. M., 2018**). Abu and Verma (2019) in their study on "Authorship Trends and Collaborative Patterns on Annals of Library and Information Studies" discovered 377 articles were published during the period of 2007-2017 and maximum contribution i.e 246 were multi-authored. The average number of publication is 34 research articles per year and total degree of collaboration (DC) is 0.65 (**Abu, K.S and Verma, Sapna, 2019**). Nath and Jana (2020) conducted study on "Bibliometric Analysis of Annals of Library and Information Studies (ALIS)" for the year 2008-2018, analysed 11 volumes consisting of 44 issues and 377 articles published by 723 authors. Findings of the study revealed that authors from India contributed most of the research papers i.e 63.43% and Dr.B.K Sen, was the highest contributor with -26 published articles (**Nath, Amit and Jana, Sibsankar 2020**).

Objectives

The present study has been commenced with the following objectives: -

1. To determine year-wise distribution of contribution published during the period of study.
2. To determine year-wise Authorship Pattern of Contributions per volume.
3. To find out the total number of authors v/s total number of articles.
4. To find out the Authorship Pattern with cumulative distribution of publication.
5. To study the single and co-authorship distribution of articles.
6. To rank the most prolific authors.
7. To study the length of articles.
8. To classify the geographical distribution of contributors.
9. To ascertain the measure of collaboration: Degree of Collaboratio (DC), Collaboration Index (CI) and Collaboration Coefficient (CC) on the data under study.

Hypothesis

1. There is positive relationship found between number of articles and number of authors for a given period 2011-2020.
2. There is positive relationship found between single author and Co-authorship distribution for a given period 2011-2020.

Scope and Limitations

The present research work is concerned to the data collection from 10 volumes including 40 issues of the ALIS journal for the period of 2011-2020. The present work may not be completed representatives of all the attributes, but it precisely gives a publication trends and authorship contribution pattern.

Methodology

The data for the present study were derived from the Annals of Library and Information Studies (ALIS), in which eacharticle published during 2011-2020 were examined.

The study provides detailed interpretations associated to year of publication, volume, issues, author's contributions, pagination, geographical description etc. were chronicled for the purpose of operating bibliometric analysis. All the data are recorded and presented in a tabular form and MS Excel software was used to analyse the recorded data. Results based on the analysed data; findings have been presented.

Analysis of the data collected

All the bibliographic details from the year 2011-2020 related to 10 volumes (Volume 58 to Volume 67) covering 312 articles published by distinguished authors globally were recorded and interpreted for the purpose of carried out bibliometric analysis as
explicated below.

Table 1**: Year wise Distribution of Contributions**

Year	Vol No.	Issue No.				No. of Contributions	Percentage (%)
		1	2	3	4		
2011	58	10	10	9	7	36	11.54
2012	59	6	6	8	7	27	8.65
2013	60	9	9	9	10	37	11.86
2104	61	9	8	11	7	35	11.22
2015	62	6	7	9	16	38	12.18
2016	63	10	8	8	6	32	10.26
2017	64	10	6	6	10	32	10.26
2018	65	8	7	7	6	28	8.97
2019	66	6	4	5	5	20	6.41
2020	67	6	5	8	8	27	8.65
Total		**80**	**70**	**80**	**82**	**312**	**100**

Table 1 highlights distribution of 312 articles in the ALIS from the year 2011-2020 is presented tabular form in both Volume-wise and Issue-wise. The maximum number of articles were published in the year 2015 (12.18%), followed by 2013 (11.86%) and 2011 (11.54%). In 2019, only 20 (6.41%) articles were published in ALIS which was counted minimum number during 2011-2020.

Table -2 **Year - Wise Authorship Pattern of Contributions**

Year	Vol.	One Author	Two Author	Three Author	Four Author	Five Author	Six Author	Total
2011	58	14	15	6			1	36
2012	59	11	10	6				27
2013	60	12	18	5		1	1	37
2104	61	12	18	3	2			35

2015	62	18	14	4	1	1		38
2016	63	8	18	3	2	1		32
2017	64	9	17	6				32
2018	65	8	16	2	2			28
2019	66	8	8	4				20
2020	67	6	18	3				27
Total		**106 (33.97%)**	**152 (48.72%)**	**42 (13.46%)**	**7 (2.25%)**	**3 (0.96%)**	**2 (0.64%)**	**312 (100%)**

Figure 2.1 Year - Wise Authorship Pattern of Contributions

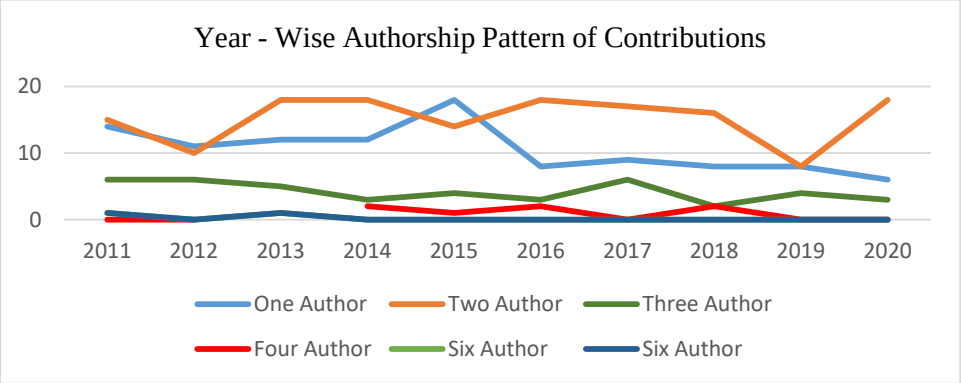


Table 2 and figure 2.1 presents the authorship pattern of the articles. The two authors articles were highest in ALIS i.e. 152 (48.72%), followed by single author 106 (33.97%), three authors 42 (13.46%). The 7 (2.25%) articles were published under the joint authorship of four authors, 3 (0.96%) articles were published under the joint authorship of five authors and only 2 (0.64%) articles were published under the joint authorship of six authors in ALIS during 2011-2020. The present data shows upward trend on the way to collaborative research.

Table 3 **– Total number of Authors v/s Total Number of Articles**

Year	Total Authors	Total Articles
2011	68	36
2012	49	27
2013	74	37
2014	65	35
2015	67	38
2016	66	32
2017	61	32
2018	54	28
2019	36	20
2020	51	27
Total	**591**	**312**

Figure 3.1 Total number of Authors v/s Total Number of Articles

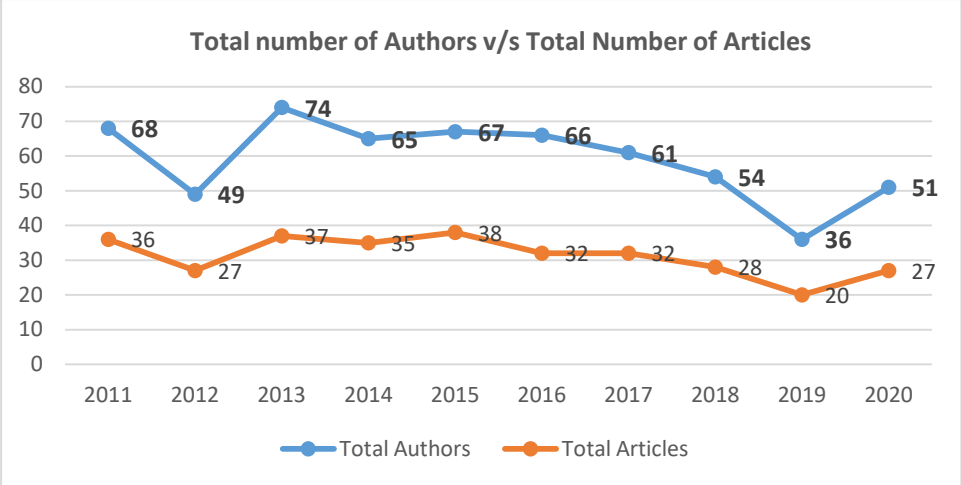


Table 3 and figure 3.1 describes Total number of Authors v/s Total Number of Articles during 2011-2020. The figure 3.1 replicates total number of authors are showing growing trend with the greater number of contribution.

Testing of Hypothesis

Further, to calculate the collaboration coefficient between number of articles and number of authors with respect to time. The coefficient of correlation results is 0.96, df=9, P<0.05. The result shows there is a positive high significant correlation found between number of articles and number of authors. Hence the null hypothesis is rejected and alternative hypothesis is accepted and indicates that there is positive high correlation found between the numbers of articles v/s number of authors during 2011-2020.

Table -4 **Authorship Pattern with Cumulative Distribution**

Authorship Pattern	No. of Publications	Cumulative Publications	Percentage (%)
One Author	106	106	33.97
Two Author	152	258	48.72
Three Author	42	300	13.46
Four Author	7	307	2.25
Five Author	3	310	0.96
Six Author	2	312	0.64
Total	**312**	**1281**	**100**

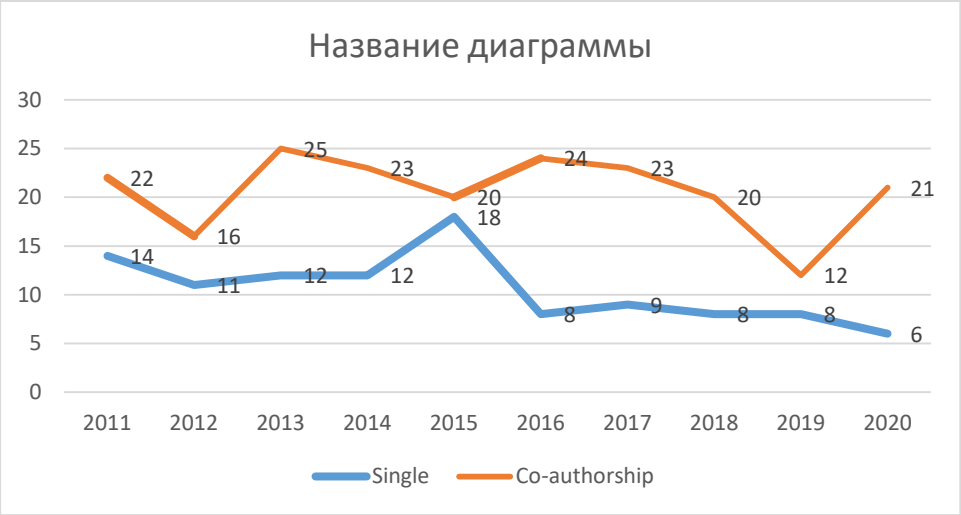
Table -4 shows cumulative distribution of authorship pattern. Among 312 publications, 258 of them has been published either by single author or by two authors, which indicates that the researchers either prefer to work in single or in small group of two as opposed to large group.

Table -5 **Single and Co-authorship Distribution**

Year	Volume	Single	Co-authorship	Total
2011	58	14	22	36
2012	59	11	16	27
2013	60	12	25	37
2014	61	12	23	35
2015	62	18	20	38
2016	63	8	24	32
2017	64	9	23	32
2018	65	8	20	28
2019	66	8	12	20
2020	67	6	21	27

Total		**106**	**206**	**312**

Figure 5.1 Single and Co-authorship Distribution



From table 5 and figure 5.1, we can comprehend that majority of the publication in ALIS during 2011-2020 are collaborative research (206) as compared to single author publications (106). It reveals that the researchers are more interested in doing collaborative research.

Testing of Hypothesis

Further to calculatethe collaboration coefficient between single author and Co-authorship distribution for a given period 2011-2020. The coefficient of correlation results is 0.14, df=9, P<0.05. The result shows there is a low significant correlation found between single author and Co-authorship distribution. Hence, the null hypothesis is rejected and alternative hypothesis is accepted and indicate that here is low positive correlation is found between single author and co-authorship during 2011-2020.

Table -6 **Most Prolific Authors**

Name of the Author	No. of Contribution
B.K.Sen	20
K.C.Garg	11
B.M.Gupta	8
Dutta, Bidyarthi	8
PrathaPratimRay	7
Shamprasad M. Pujar	7
Tripathi, H.K	6
BharviDutt	5
Shri Ram	5
Anup Kumar Das	5
JibanK.Pal	5

Table -6 shows most prolific authors of ALIS during 2011-2020 were B.K.Sen who topped the list with contribution of 20 research articles each, followed by K.C. Garg with 11 articles scored 2nd rank and pursued by B.M. Gupta and Bidyarthi Duttawith 8 articles each.

Table -7 **Length of Articles**

Year	Volume	1-5	6-10	11-15	16-20	More Than 20
2011	58		26	10		
2012	59	3	16	6	1	1
2013	60	5	29	3		
2104	61	6	21	7		1
2015	62	13	20	5		
2016	63	4	20	7	1	
2017	64	7	20	4	1	
2018	65	7	15	5		
2019	66	4	14	2		
2020	67	4	16	6	1	
Total		**53**	**197**	**55**	**4**	**2**

Figure 7.1 Length of articles

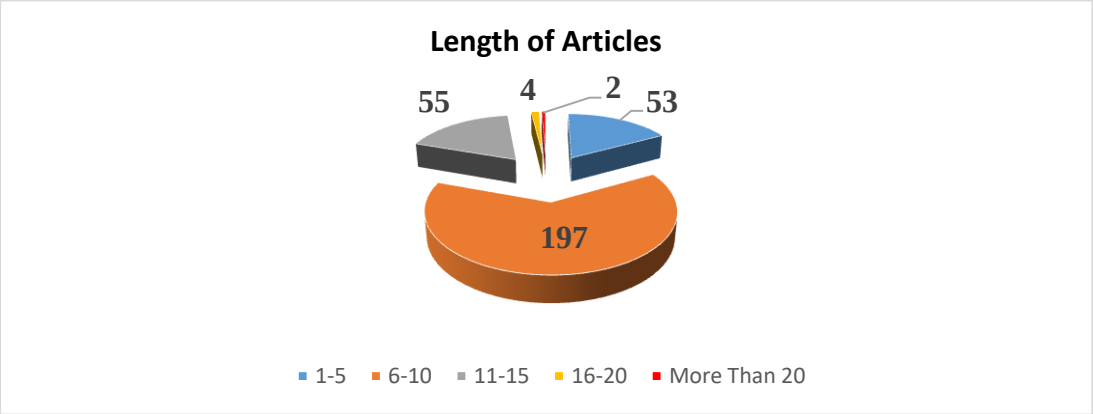


Table 7 and pie graph figure 7.1shows the length of articles published in ALIS during 2011-2020. Majority of 197 articles were published within page length of 6-10, followed by 55 articles published within page length of 11-15.

Table – 8 **Geographical Distribution of Contributors**

Year	Volume	National	International	Both
2011	58	25	10	1
2012	59	20	7	
2013	60	28	9	
2104	61	31	3	1
2015	62	27	10	1
2016	63	24	8	
2017	64	26	6	
2018	65	24	4	
2019	66	15	5	
2020	67	16	11	
Total		**236**	**73**	**3**

Table 8.1 Geographical Distribution of Contributors

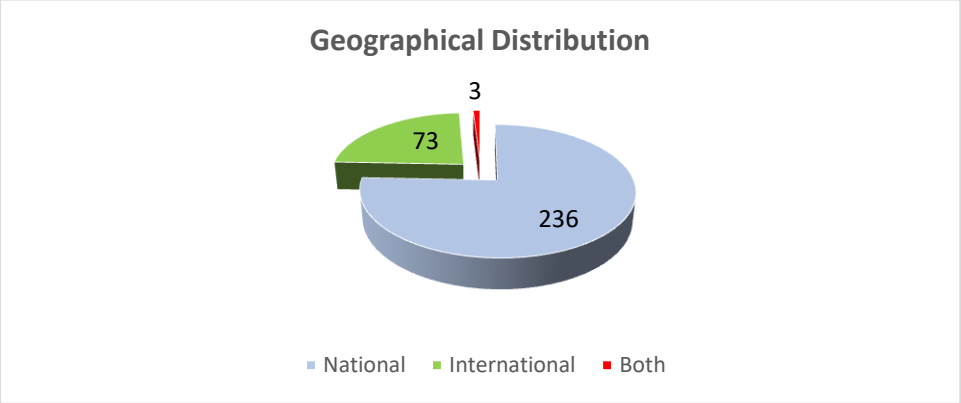


Table 8 and pie graph figure 8.1 describes country's contribution in terms of research productivity during 2011-2020. Out of 312 total research articles, maximum number of publication of 236 articles contributed by India, followed by 73 articles contributed by authors from rest of the world. Total number of 3 articles were contributed by both India and International authors collectively.

Table -9 **Degree of Collaboration**

Year	Volume	Single	Co-authorship	Total	DC
2011	58	14	22	36	0.61
2012	59	11	16	27	0.59
2013	60	12	25	37	0.68
2104	61	12	23	35	0.66
2015	62	18	20	38	0.53
2016	63	8	24	32	0.75
2017	64	9	23	32	0.72
2018	65	8	20	28	0.71
2019	66	8	12	20	0.6
2020	67	6	21	27	0.78
Total			**206**	**312**	**.66**

Degree of Collaboration (DC): The formaula for degree of collaboration (DC) is given by Subramanyam (Subramanyam, 1983) as follows.

$$DC = \frac{N_m}{N_m + N_s},$$

where, Nm= Number of multi-authored articles, and Ns= Number of single authored articles.

The analysis of Degree of Collaboration shows that in 2011 it was 0.61 and it has increased to 0.66 in the year 2020. Except a slightdecrease in 2012 showing 0.59 and in 2015 showing 0.53. The overall Degree of Collaboration of ALIS during 2011-2020 is 0.66. This indicates the increasing trend incollaborative publications.

Table -10 **Authorship pattern and Collaborative Index (CI)**

Year	Vol	One Author	Two Author	Three Author	Four Author	Five Author	Six Author	Total Joint Authors	Total Joint Publication	CI
2011	58	14	15	6			1	54	22	2.45
2012	59	11	10	6				38	16	2.38
2013	60	12	18	5		1	1	62	25	2.48
2104	61	12	18	3	2			53	23	2.3
2015	62	18	14	4	1	1		49	20	2.45
2016	63	8	18	3	2	1		58	24	2.42
2017	64	9	17	6				52	23	2.26
2018	65	8	16	2	2			46	20	2.3
2019	66	8	8	4				28	12	2.33
2020	67	6	18	3				45	21	2.14
Total		**106**	**152**	**42**	**7**	**3**	**2**	**485**	**206**	**2.35**

Collaboration Index (CI): The formaula of collaboration index is given by Lawani (Lawani, 1980) as follows. $CI = Totalauthors/Totaljointpapers$

Table 10 shows the authorship pattern and Collaborative Index (CI), in ALIS during 2011-2020. The variation of Collaborative Index from lowest 2.30 in the year 2014 & 2018 respectively and highest 2.48 in the year 2013.

Table -11 **Collaboration Coefficient (CC) of ALIS**

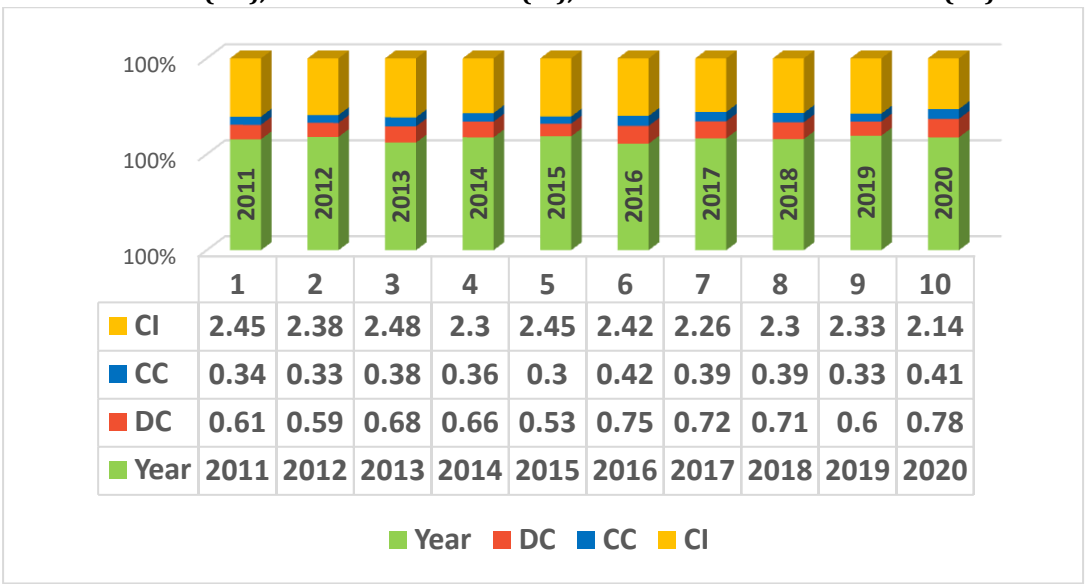
Year	Volume	One Author	Two Author	Three Author	Four Author	Five Author	Six Author	CC
2011	58	14	15	6	0	0	1	0.34
2012	59	11	10	6	0	0	0	0.33
2013	60	12	18	5		1	1	0.38
2014	61	12	18	3	2	0	0	0.36
2015	62	18	14	4	1	1	0	0.3
2016	63	8	18	3	2	1	0	0.42
2017	64	9	17	6	0	0	0	0.39
2018	65	8	16	2	2	0	0	0.39
2019	66	8	8	4	0	0	0	0.33
2020	67	6	18	3	0	0	0	0.41
Total		**106**	**152**	**42**	**7**	**3**	**2**	**0.36**

Collaboration Coefficient (CC): The formula for collaboration coefficient (CC) is given by Ajiferuke et al. (1988).

$$CC = 1 - \frac{\sum_{j=1}^{A} (1/j) f_i}{N}$$

Table 11 shows the Collaborative Co-efficient of ALIS has increased from 0.34 in 2011 to 0.41 in 2020 indicating that research contribution made by authors is fairly collaborative with an average CC of 0.36. There is a constant increase in CC from 2011 to 2020 with slightly fall in year 2014 with 0.30. The over all CollaborativeCoefficient is 0.36 , which shows their high degree of Collaboration observed in ALIS during 2011-2020.

Degree of Collaboration (DC), Collaboration Index (CI), and Collaboration Coefficient (CC)



	1	2	3	4	5	6	7	8	9	10
CI	2.45	2.38	2.48	2.3	2.45	2.42	2.26	2.3	2.33	2.14
CC	0.34	0.33	0.38	0.36	0.3	0.42	0.39	0.39	0.33	0.41
DC	0.61	0.59	0.68	0.66	0.53	0.75	0.72	0.71	0.6	0.78
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

The above figure presents the comparative analysis of various indicators of collaboration DC, CI, and CC for the journal ALIS for the year 2011-2020.

Findings of the study

1. Maximum number of articles were published in the year 2015 (12.18%), followed by 2013 (11.86%) and 2011 (11.54%). In 2019, only 20 (6.41%) articles were published in ALIS which was counted minimum number during 2011-2020.
2. The two authors articles were highest in ALIS i.e. 152 (48.72%), followed by single author 106 (33.97%), three authors 42 (13.46%). Authorship pattern shows majority of contribution from collaborative authors as against single author.
3. The study showing growing trend with the more number of contribution. Additionally, testing of hypothesis concluded that the null hypothesis is rejected, and alternative hypothesis is accepted and indicates that there is positive high correlation found between the number of articles v/s number of authors during 2011-2020.
4. Authorship Pattern with Cumulative Distribution indicate that out of 312 publications, 258 articles have been published either by single author or by two authors, which indicates that the researchers either prefer to work in single or in small group of two as opposed to large group.
5. The study comprehend that the researchers are more interested in doing collaborative research. Furthermore, testing of hypothesis shows that the null hypothesis is rejected, and alternative hypothesis is accepted and indicate that here is low positive correlation is found between single author and co-authorship during 2011-2020.
6. The most prolific authors of ALIS during 2011-2020 were Sen, B.K who topped the list with contribution of 20 research articles each, followed by Garg, K.C with 11 articles scored 2nd rank.
7. Majority of articles were within page length of 6-10 published during 2011-2020.
8. The study illustrates out of 312 total research articles, maximum number of publications of 236 articles contributed by India, followed by 73 articles contributed by authors from rest of the world. Total number of 3 articles were contributed by both India and International authors collectively.
9. Degree of Collaboration shows that in 2011 it was 0.61 and it has increased to 0.66 in the year 2020.

10. Authorship pattern and Collaborative Index (CI), in ALIS during 2011-2020. The variation of Collaborative Index from lowest 2.30 in the year 2014 & 2018 respectively and highest 2.48 in the year 2013.
11. Overall Collaborative Coefficient is 0.36, which shows their high degree of Collaboration observes in ALIS during 2011-2020.

Conclusion

Bibliometric study on Annals of Library and Information Studies (ALIS) journal for the period of 2011-2020 presented a detailed picture of the authorship trends and collaborative research. The study indicates different facet i.e authorship trend, length of articles, most prolific authors, geographical distribution and so on. The research work stressed on collaborative patterns only for the period of 2011-2020 and offers an opportunity for further research with the trends of forthcoming issues of ALIS.

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