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Collaboration of Authorship and Co-Citation Pattern in Annals of Library and Information Studies (ALIS) during 2011-2020: An Evaluation

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Abstract

The Annals of Library and Information Studies (ALIS) is probably the most well-known journal in the library and information science discipline. This paper examines the collaboration and authorship pattern of ALIS within the study period from 2011-2020. Total 312 articles were published within 2011-2020, and a single author wrote 105 no of articles, two writers wrote 150 articles, 44 articles were written by three writers, and 13 articles were written by multiple writers. From the examination, it is Shaw that the single authorship pattern is most important in ALIS. Based on this investigation, it found that the average CC (Collaboration Coefficient) is 0.37, and mean DC (Degree of Collaboration) is 0.33, and mean MCC is 0.38, CAI (Co-authorship Index) is decreased from 115.56 to 66.032, and mean RGR decreasing from 0.44 to 0.09, mean DT increasing from 3.33 to 7.8 in this study period. According to the statistics, the highest activity index was recorded in 2015 for India (109.75), and the lowest AI (Activity index) is recorded in 2013(76.86). In 2013 the highest activity index was recorded for the world (281.89), and the lowest activity index was recorded for the world(23.31) in 2015 and B.K Sen is the highest co-cited author between DK. Gupta, B.M Gupta, and Sengupta.

Keyword: *Authorship Pattern, Annals of Library and Information Studies, Co-authorship Index, Collaboration Coefficient, Relative Growth Rate, Co-Authorship Index*

Introduction

All over the career, an author's productivity will be measured in terms of his or her performance in terms of scientific and technical output. Authors are those who participate directly in the writing of a manuscript. Through publications, the author will receive professional recognition, progress, and funding for future research. Collaboration is essential to achieve a specific purpose, bringing technical understanding, talent, and sources collectively. Collaboration means no researcher paintings together to full fill a particular intention. Collaboration can be intra-departmental, interdepartmental, inter-institutional or worldwide (among two countries). Through collaboration, unique ideas, information, information, and contemporary learning talent are compiled and generate entirely new ideas that grow the quality of a publication.

ANNALS an Overview

Annals of Library and Information Studies⁷ is a dominant quarterly journal and published unique articles, reports, reviews, short communications, and letters relating to library science, data

science. ALIS is an open access scholarly journal, published since 1954. In 1954 INSDOC published the Annals of Library Science for the first time and Dr S.R. Ranganathan became its first editor. In 1964, changed the journal's name to "Annals of Library Science and Documentation ", and in 2001 it was renamed" ALIS (Annals of Library and Information Studies).

Related Work and Background

Verma, Manoj Kumar, and Das¹, Saumenhave analyzed the scientific research publication in Tripura University from 2010 to 2019. This study is based on 503 papers published at Tripura University from 2010 to 2019. This analysis is about publication patterns, annual growth of publication, the pattern of authorship, documents classification, the pattern of collaboration, CI, collaboration co-efficient, MCC, prolific of the author, etc.

Mondal, Arup Kumar² has described the bibliometric study about the DC, RGR or Relative Growth Rate, and Doubling Time of Publication and Citation Analysis in Science and Technology Librarianship (ISTL) 2010 to 2020.

Abbasi, A, Altmann, J.and Hwang, J³. have described in their paper that there are various types of study for measuring the scholastic presentation of research based on their no. of publications, in any case, there are no examinations about evaluating the analysts. In this study, researchers represent the three analyses, and these are the researcher's collaboration and network structure of the no. of collaborations with other writers and researchers and the co-authors' productivity index.

Saravanan, G, and Dominic, J⁴ have focused in their paper on the quantitative development and growth of literature in ecology. This analysis focused on studying the article on ecology distributed in three journals. Two thousand nine hundred forty-six records were retrieved from 2003–2012. The prominent examination examples in research patterns utilizing the three contemplated journals of ten years.

Pandey, S., &Sahoo, S⁵. (2020) have conducted the study to explore research collaboration authorship patterns in the field of Semantic Digital Libraries. The analysis of each document is given the accompanying scientometrics indicators like the productivity of author, DC, collaboration coefficient, collaboration index, and modified collaboration coefficient. Correlation matrices are additionally determined and presumption drawn in terms of publications and authors.

Das, P. K⁶. (2015) has described authorship patterns based on 420 journals from 2007 to 2013. The study illustrates different types and trends of authorship, the productivity of an author, degree of collaboration, collaborative index, geographical difference, and institutional difference of an author.

Objectives of the Study

- To know year-wise authorship and distribution of publication pattern of publication.
- To calculate the CI (collaboration index), CC (collaboration coefficient), MCC (modified collaboration coefficient), DC (degree of collaboration), and CAI (Co-Authorship Index.)
- To determine publication AI (activity index), Co-citation authors.
- To calculate the title keyword frequency analysis and RGR and DT (doubling time) of publication.

Methodology

According to the investigation, 312 articles have published from 2011-2020. Data was collected from the SCOPUS database, and some articles were downloaded from the main website (<http://op.niscair.res.in/index.php/ALIS/>).⁷ MS Excel, R programming language⁹ and VOS viewer⁸ were applied for examining and analyzing. The data is then sorted, compiled, and presented in tabular and figure form, and also various parameters and formulas are used for data analysis.

Data analysis and results:

Tabulated data are analyzed and represented in different tables.

Year-wise Publication and Authorship Distribution Pattern

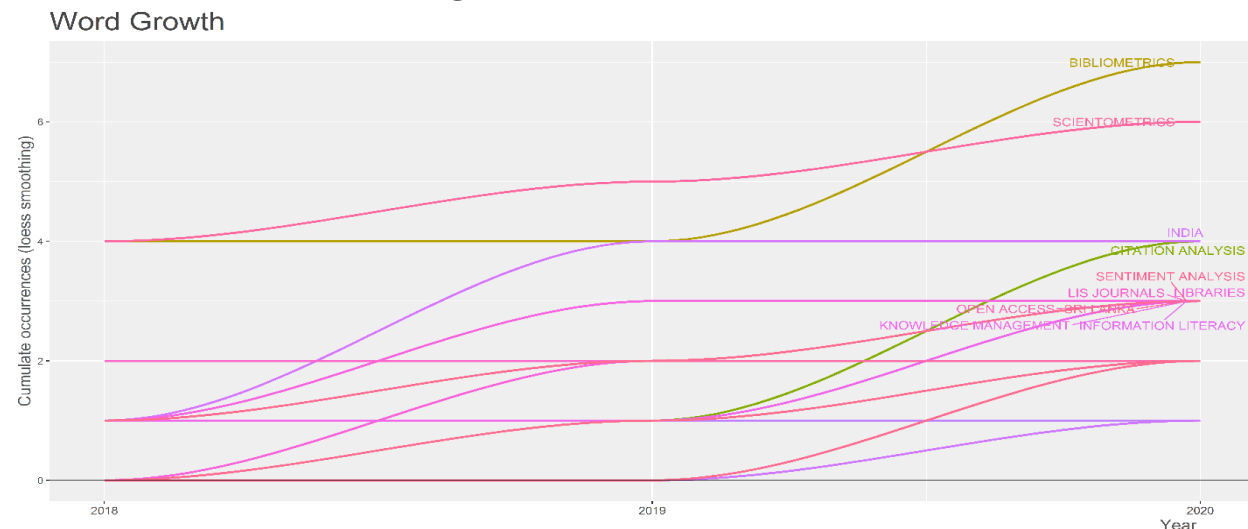
The year-wise publication and authorship distributions are shown in table 1.

Table-1: Year Wise Publication and Authorship Distribution Pattern

Year	One Author Paper	Two Authored Paper	Three Authored Paper	Four Authored Paper	Five Authored Paper	Total (Publication)
2011	14	14	7	0	1	36
2012	11	10	6	0	0	27
2013	12	18	5	0	2	37
2014	12	17	4	2	0	35
2015	18	14	4	1	1	38
2016	8	18	3	2	1	32
2017	9	17	6	0	0	32
2018	8	16	2	2	0	28
2019	7	8	4	1	0	20
2020	6	18	3	0	0	27
	105	150	44	8	5	312

From table-1 it is shown that the highest 18 articles were distributed by a single author in 2015, and in 2013, 2016, and 2020 highest 18 articles were published by double authors. In 2012 and 2017 six (6) articles were published by three authors, the highest 2 articles were published in 2014 and 2018 by four authors and during the study period highest no of the article published in 2015 is 38 and the lowest number of the article published in 2019 is twenty (20).

Year Wise Research Growth (Fig-1)



Relative Growth Rate (RGR)

Mahapatra in 1985¹⁰ introduced RGR and DT model to calculate RGR and DT of publication.

The formula for calculated RGR is:

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

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

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

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

(T2-T1) = difference between the initial time and final time.

Double Time and RGR of Publication of ALIS

The above study shows that DT (Double Time) increases from 1.69 to 7.8 from 2011 to 2020.

The Mean Double Time (2011-2014) is 1.69, the second four years (2015-2017) is 3.89, third block (2018-2020) has DT is 7.8. So, Mean DT is increasing continuously.

The formula for calculated DT is:

$$DoublingTime(Dt) = \frac{0.693}{R(\text{Growth rate})}$$

Table-2: RGR and DT

Year	No of Article	Cumulative No of Article	Log1e	Log2e	RGR	Mean RGR	DT	Mean Dt
2011	36	36	0	3.59	-	-	-	-
2012	27	63	3.59	4.14	0.55	0.44	1.25	1.69
2013	37	100	4.14	4.61	0.46		1.5	
2014	35	135	4.61	4.91	0.3		2.31	
2015	38	173	4.91	5.15	0.25	0.19	2.79	3.89
2016	32	205	5.15	5.32	0.17		4.08	
2017	32	237	5.32	5.47	0.15		4.78	
2018	28	265	5.47	5.58	0.11	0.09	6.2	7.8
2019	20	285	5.58	5.65	0.07		9.53	
2020	27	312	5.65	5.74	0.09		7.65	

From the study, we found that RGR decreases from 0.44 to 0.09 from 2011 to 2020. In the first three years, the mean RGR (Relative Growth rate) from 2011-2014 is 0.44, the second three years (2015-2017) is 0.19, the third block (2018-2020) RGR is 0.09, and in this investigation, it is clear that mean RGR is decreasing continuously.

DC (Degree of Collaboration)

DC is an estimate of the comparative relation of multiple-authored papers to the total no of published articles in a given time.

Table-3: Degree of Collaboration

Year	Single Author Paper	Multiple Authored Paper	Total	Degree of Collaboration(DC)
2011	14	22	36	0.39
2012	11	16	27	0.41
2013	12	25	37	0.32
2014	12	23	35	0.34
2015	18	20	38	0.47
2016	8	24	32	0.25
2017	9	23	32	0.28
2018	8	20	28	0.29
2019	7	13	20	0.35
2020	6	21	27	0.22
	105	207	312	$\bar{x} = 0.33$

Subramanyam (1983)¹¹ suggested the method of DC.

$$DC = 1 - \frac{f_1}{N}$$

f₁ = number of single-authored articles.

N = published the total number of articles in a year.

For example, DC for 2011 is:

$$DC = 1 - \frac{f_1}{N} = 1 - \frac{14}{36} = 1 - 0.61111 = 0.39(app.)$$

With this formula, DC was calculated for all the study periods (2011-2020).

The investigation found that the highest DC is 0.47 in 2015, and it is also found that the lowest DC is 0.22 in 2020, and the average DC of the study period (2011-2020) is 0.33.

Collaboration Coefficient (CC)

The collaboration coefficients are shown in table 4. Ajiferuke et al. (1988)¹² suggested the method for CC.

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

f_j = Number of j authored articles.

N = published total no. of articles in a year.

A = Total no. of authors per article.

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

Using the above formula table 5 is prepared:

For example, CC for 2011 is:

$$\begin{aligned}
 CC &= 1 - \frac{\sum_{j=1}^A \left(\frac{1}{j}\right) fj}{N} \\
 &= 1 - \frac{\left(\frac{1}{1} \times 14\right) + \left(\frac{1}{2} \times 14\right) + \left(\frac{1}{3} \times 7\right) + \left(\frac{1}{4} \times 0\right) + \left(\frac{1}{5} \times 1\right)}{36} \\
 &= 1 - \frac{(14 + 7 + 2.34 + 0 + 0.2)}{36} \\
 &= 1 - \frac{23.54}{36} \\
 &= 1 - 0.65 \\
 &= 0.35(\text{app.})
 \end{aligned}$$

With this formula, CC is calculated for all the study periods of (2011-2020).

Table-4: Collaboration Coefficient (CC) and Modified Collaboration Coefficient (MCC)

Year	Single Author Paper	Two Authored Paper	Three Authored Paper	Four Authored Paper	Five Authored Paper	Total	CC	MCC
2011	14	14	7	0	1	36	0.35	0.36
2012	11	10	6	0	0	27	0.33	0.35
2013	12	18	5	0	2	37	0.38	0.39
2014	12	17	4	2	0	35	0.36	0.37
2015	18	14	4	1	1	38	0.3	0.3
2016	8	18	3	2	1	32	0.42	0.43
2017	9	17	6	0	0	32	0.39	0.4
2018	8	16	2	2	0	28	0.39	0.4
2019	7	8	4	1	0	20	0.37	0.39
2020	6	18	3	0	0	27	0.41	0.42
Total	105	150	44	8	5	312	\bar{x} 0.37	\bar{x} 0.38

The study found that the highest CC is 0.42 in 2016, followed by 2020 with 0.41, and the lowest CC is found in 2015 with 0.30. The average collaboration coefficient of the study period is 0.37.

Modified Collaboration Coefficient (MCC)

The modified collaboration coefficients are shown in table no- 5. Savanur and Srikanth (2010)¹³ suggested the formula for calculation of modified collaboration coefficient (MMC) is:

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

Using the above formula table 4 is prepared:

For example, MCC for 2011 is:

$$\begin{aligned}
&= \left(\frac{36}{36-1}\right) \left\{1 - \frac{\left(\frac{1}{1} \times 14\right) + \left(\frac{1}{2} \times 14\right) + \left(\frac{1}{3} \times 7\right) + \left(\frac{1}{4} \times 0\right) + \left(\frac{1}{5} \times 1\right)}{36}\right\} \\
&= \left(\frac{36}{35}\right) \left\{1 - \frac{(14 + 7 + 2.34 + 0 + 0.2)}{36}\right\} \\
&= \left(\frac{36}{35}\right) \left(1 - \frac{23.54}{36}\right) \\
&= 1.03 \times (1 - 0.65) \\
&= 1.03 \times 0.35 \\
&= 0.36(\text{app.})
\end{aligned}$$

With this formula, MMC is calculated for all the study periods of (2011-2020).

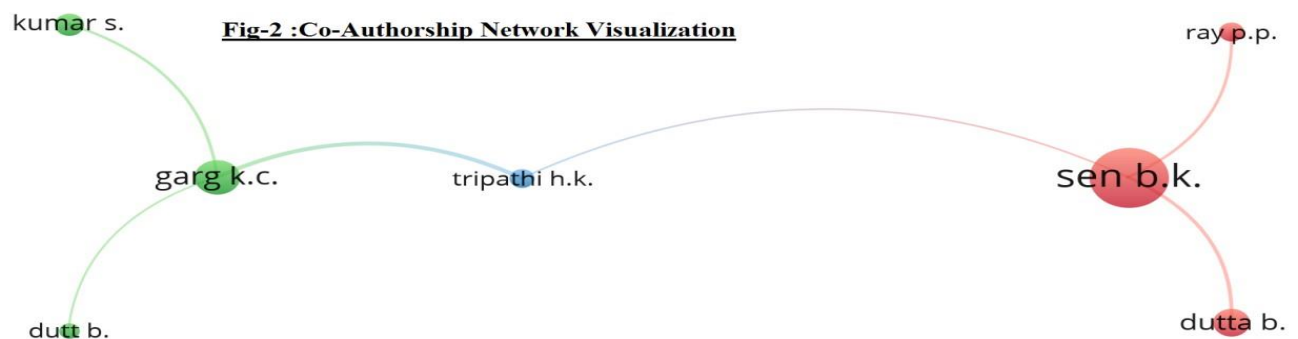
The study found that the highest MCC is 0.43 in the year 2016, followed by 2020 with 0.42 and the lowest MCC with 0.30 in 2015 and the average MCC of the study period is 0.38.

Authorship Pattern

The Authorship Pattern of publication is shown in table 5. Total 105 (33.65%) articles were published by 105 (17.68%) singled authors.150 (48.08%) articles were published by 300 (50.51%) two authors covered 50% of the publication. 44(14.1%) articles published by 132 (22.22%) three authors and four and five authored articles are very few, only 13(4.167%) out of 312. This study shows that two authorship patterns are dominant in ALIS between 2011-2020.

Table-5: Authorship Pattern

Sl No	Number of authors	No of Articles	Total No of Authors	Percentage of articles	Percentage of Authors
1	Single	105	105	33.65%	17.68%
2	Two	150	300	48.08%	50.51%
3	Three	44	132	14.1%	22.22%
4	Four	8	32	2.564%	5.387%
5	Five	5	25	1.603%	4.209%
		312	594	100%	100%



The Co-Authorship Index (CAI)

Garg& Padhi¹⁴ in the year1999, describe CAI for computing accordingly the distribution by single, two, and multi-created papers. If the value of CAI > 100 suggested that the no. of publications is higher than the mean (single or multi-author article in a particular period) and

CAI less than 100 describe that the no. of publications is lower than average, and CAI=100 describes that the no. of publications is equal to the average.

Garg& Padhi¹⁴ the year (1999) suggested the formula for calculation of Co-authorship Index (CAI) is

$$CAI = \left(\frac{\frac{N_{ij}}{N_{io}}}{\frac{N_{oj}}{N_{oo}}} \right) \times 100$$

Where,

Noo = Total number of papers for all authors and all blocks; j = 1, 2, 3, 4,5

Nio = Total output of block i;

Nij = No. of papers having j authors in block i;

Noj = number of papers having j authors for all blocks;

Using the above formula table 6 is prepared:

For example, CAI of single-author publication of 2011 is:

$$CAI = \left(\frac{\frac{14}{86}}{\frac{105}{812}} \right) \times 100 = \frac{0.783}{0.590} \times 100 = 115.56 \text{ (app.)}$$

Table 6: Co-authorship Index (CAI) distribution

Year	1 Author Paper	CAI	2 Authored Paper	CAI2	3 Authored Paper	CAI3	4 Authored Paper	CAI4	5 and more Authored Paper	CAI5	Total
2011	14	115.56	14	80.89	7	137.88	0	0	1	173.33	36
2012	11	121.06	10	77.04	6	157.58	0	0	0	0	27
2013	12	96.371	18	101.2	5	95.823	0	0	2	337.3	37
2014	12	101.88	17	101	4	81.039	2	222.86	0	0	35
2015	18	140.75	14	76.63	4	74.641	1	102.63	1	164.21	38
2016	8	74.286	18	117	3	66.477	2	243.75	1	195	32
2017	9	83.571	17	110.5	6	132.95	0	0	0	0	32
2018	8	84.898	16	118.9	2	50.649	2	278.57	0	0	28
2019	7	104	8	83.2	4	141.82	1	195	0	0	20
2020	6	66.032	18	138.7	3	78.788	0	0	0	0	27
	105	-	150	-	44	-	8	-	5	-	312

This table describes CAI value for individual authors has decreased from 115.56 to 66.032. In double authorship, the CAI has increased from 80.89 to 138.7 and for three authorship, the CAI has decreased from 137.88 to 78.788. For four and five authorships, it was below average in most years except for a few years. The most significant collaboration was observed between the four authors CAI is 278.57 and also in five authorship, CAI is 337.3.

Co-Authorship between Organization and countries-Network Visualisation

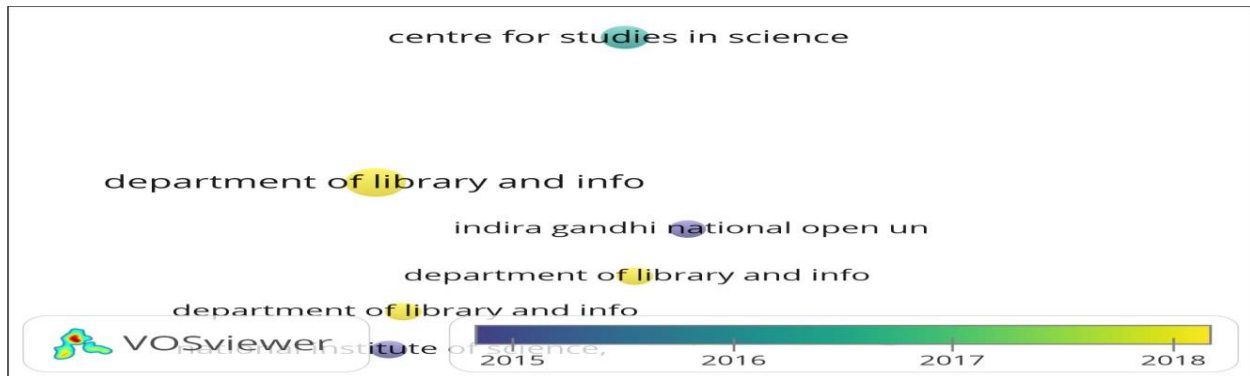


Fig-3: Co-Authorship between Organization-Network Visualization

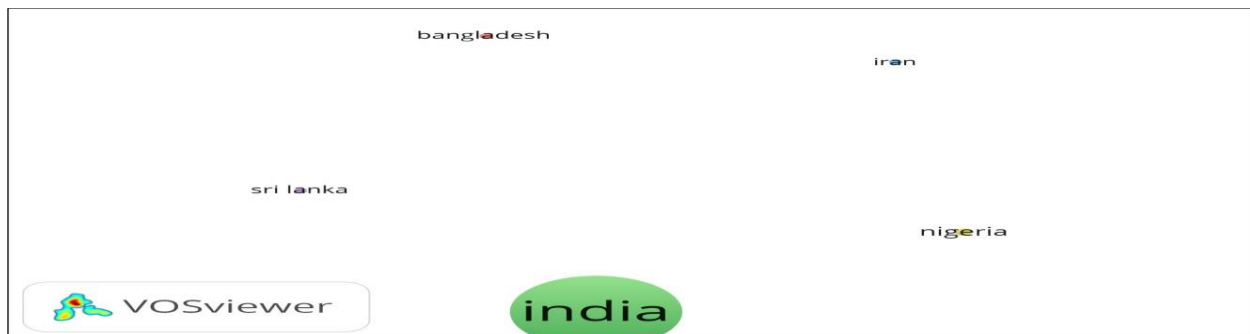


Fig-4: Co-Authorship between countries-Network Visualisation

In this above figure, we analyzed that Co-Authorship between Organization and countries-Network Visualization and those diagrams Visualised in Organization network between dept. of Library and Information and Indra Gandhi National Open University collaboration is high, and in the Authorship countries Collaboration Network Visualization we found highest collaboration in India, then Nigeria, Bangladesh, Iran, and Sri Lanka.

Activity Index (AI)

The AI (activity indexes) of publications are shown in table 7. Activity Index describes the relative examination exertion of various nations to a given field. The most AI list that has been included in Indian articles is 119.56 in 2018 and the least 79.35 in 2020. The most elevated activity index of the world, including in 2020 with 160.90, and the least is 42.315 in 2018.

Schubert, A., & Braun, T (1986)¹⁵ suggested the formula for calculation of activity index is:

$$AI = \{(I_i/I_o) / (W_i/W_o)\} \times 100$$

W_i = productivity of world in a year i

W_o = Total productivity

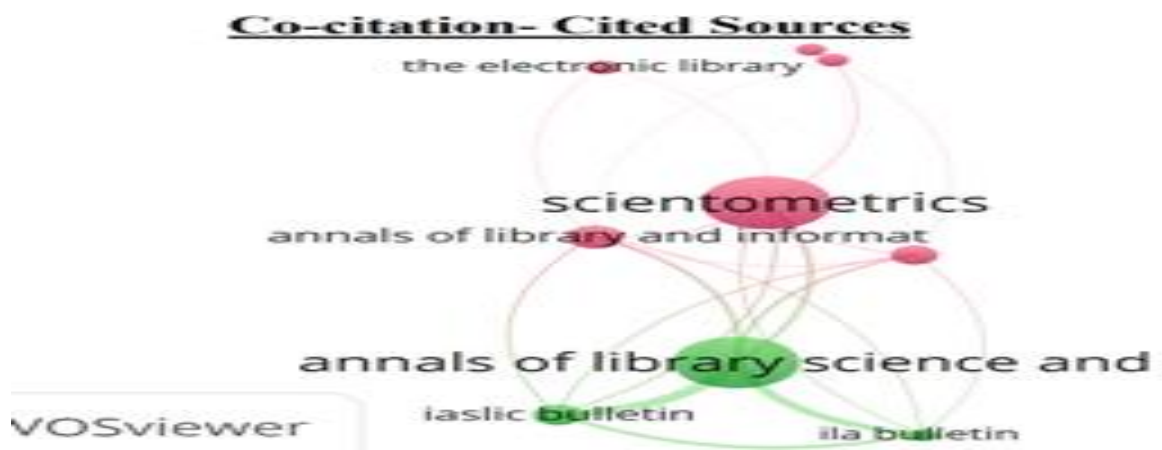
I_i = output of India in the year i

I_o = Indian total productivity

Table-07: Activity Index

Co-citation is explained as the density with which two articles or documents are cited collectively by other articles or documents. If at least one other article or document cites two documents in common, these documents are said to be co-cited. In this study period, we found that in BK.Sen is the highest co-cited author between DK. Gupta, B.M. Gupta and Sengupta , co-citation cited reference we found that S, Kumar and R. Singh// M, Foster//H, Julien; M. Gross and D. Latham// C, Ellis; F, Johnson, and Rowley// Mokhtar, X, Zhang// Y, Chang; S, Majid and S, Foo// A, Lloyd,// H, Ngo; A, Pickard, and G, Walton is the highest citation relationships in Co-citation reference.

Figure 11



Co-citation cited sources are very important in co-authorship analysis. In this figure, no 11 we found that Scientrometrics, Annals of Library Science are highly co-citation cited sources from this study period then Electric Library, IASLIC bulletin, ILA bulletin.

Conclusion

From the analysis of collected data from 2011-2020 in ALIS total of 312 articles are studied. In the year-wise distribution highest number of the article published in 2015, total 38. It shows that most articles are written by two authors, 150 out of 312 articles. The mean RGR in the first three years (2012-2014) shows 0.44, whereas the mean RGR of the last three years (2018-2020) decreases to 0.09. Similarly, the DT was increasing slowly from 1.69 to 7.8 from 2011-2020. The average DC of all year from 2011-2020 is 0.33, The average CC is 0.37 and MCC is 0.38. It shows that BK.Sen is the highest co-cited author, and India is the highest authorship country and from the keyword analysis, maximum research is going on Bibliometrics and Scientometrics and Citation Analysis.

Reference

- 1) Verma, Manoj Kumar Dr. and Das, Saumen, Authorship and Collaboration Pattern of Research Output Published by Researchers of Tripura University during 2010-2019: A Scientometric Analysis, *Library Philosophy and Practice (e-journal)*, (2020). 4359. <https://digitalcommons.unl.edu/libphilprac/4359>
- 2) Mondal, Dr Arup Kumar , A bibliometric study on DC, RGT, and DT of Publications and Citations of ISTL Journal during 2010-2020" (2021). *Library Philosophy and Practice (e-journal)*. 5672. <https://digitalcommons.unl.edu/libphilprac/5672>
- 3) Abbasi, A., Altmann, J., & Hwang, J. (2009). Evaluating scholars based on their academic collaboration activities: two indices, the RC-index and the CC-index, for quantifying collaboration activities of researchers and scientific communities. *Scientometrics*, 83(1), 1–13. <https://doi.org/10.1007/s11192-009-0139-2>
- 4) Saravanan, G., & Dominic, J. (2014). A Ten-year Bibliometric Analysis of Research Trends in Three Leading Ecology Journals during 2003-2012. *Journal of Information Science Theory and Practice*, 2(3), 40–54. <https://doi.org/10.1633/jistap.2014.2.3.4>
- 5) Pandey, S., & Sahoo, S. (2020). Research Collaboration and Authorship Pattern in the field of Semantic Digital Libraries. *DESIDOC Journal of Library & Information Technology*, 40(06), 375-381. <https://doi.org/10.14429/djlit.40.06.15680>
- 6) Das, P. K. (2015). Authorship Pattern and Research Collaboration of Journal of Informetrics. *International Journal of Information Dissemination and Technology*, 5(1), 53-62.
- 7) (<http://op.niscair.res.in/index.php/ALIS/>).
- 8) <https://www.vosviewer.com/>
- 9) <https://www.rstudio.com/products/rstudio/download/>
- 10) Mahapatra Gayatri 1994. Correlation between the growth of publications and citations: a study based on growth curves. *Annals of library science and Documentation*, 41(1), 8-12.
- 11) SUBRAMANYAN (K). Bibliometric studies of research collaboration: a review. *Journal of Information Science*; 6, 1; 1983; 33-38.
- 12) AJIFERUKE (I), BURREL (Q) and TAGUE (J). Collaborative coefficient: A single measure of the degree of collaboration in research. *Scientometrics*. 14; 1988; 421-433
- 13) SAVANUR (K) and SRIKANTH (R). Modified collaborative coefficient: a new measure for quantifying the degree of research collaboration. *Scientometrics*; 84; 2009; 365-371
- 14) GARG (K C) and PADHI (P). Scientometrics of laser research literature as viewed through the Journal of Current Laser Abstracts. *Scientometrics*; 45, 2; 1999; 251-268. (<https://doi.org/10.1007/BF02458436>)
- 15) Schubert, A., & Braun, T. (1986). Relative indicators and relational charts for comparative assessment of publication output and citation impact. *Scientometrics*, 9(5-6), 281–291.