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Research Productivity Trends of DESIDOC Journal of Library and Information Technology (DJLIT) during 2011-2020: A Bibliometric Analysis

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Abstract

This paper intends to glance at the DESIDOC Journal of Library & Information Technology (DJLIT) research productivity over ten years (2011-2020). The paper illustrates the various bibliometric factors in the Journal DJLIT, which published 588 publications during 2011-2020. As per the analysis, in 2012, most of the papers were published with the highest growth rate of 20.68 %. The productivity of the authors shows that a total of 1144 authors published 588 papers, with an average of 0.51% per author. The degree of collaboration varies from 0.53 to 0.75, with 0.65 being the average. The author B.M. Gupta has the most publications, and Garg K.C. has the most ACPP 3.27 in seven journals.

Keywords: Bibliometrics, DESIDOC, DJLIT, Authorship pattern, Reference pattern, Relative growth rate

Introduction

Bibliometrics is the application of statistical methods and techniques to the analysis of a discipline's published literature. Alan Pritchard coined the word "bibliometrics" in a paper titled "Statistical Bibliography or Bibliometrics?" published in 1969. He explained the term as "the implementation of mathematical and statistical analysis to books as well as other forms of communication." A bibliometric analysis is a specific quantitative tool for measuring bibliographies to assess and evaluate a subject's progression. At this time, bibliometrics is becoming more versatile and interdisciplinary. These bibliometric assessments focus on the authorship pattern, article distribution, geographic distribution, pattern of contributions and contributors, major productive authors, degree of collaboration, and other important bibliometric patterns. Bibliometric studies aimed to evaluate global research output and use bibliometric approaches to explain the evolution of a scientific field. Bibliometrics is now one of the interdisciplinary research areas, with implications in almost every research field.

Research publications are considered the primary medium for socializing research outcomes and original concepts in a domain. They also aid in the comprehensive study of a topic and serve as sources of literature progression in any area of research. These publications are one of the most significant products of investigations since it communicates the research findings to the rest of the globe in journal papers. DJLIT is open access, bi-monthly peer-reviewed journal. It was established in 1980 and aims to introduce current developments in information technology to LIS. The journal is seeking original research papers in the area of information technology. It aims to bring up-to-date information technology advances as they relate to Library and Information Science.

Objectives

The study was focused on the following objectives in the contexts of bibliometric factors reported in DJLIT between 2011 and 2020. The study was conducted to analyze the trends in published papers.

- To assess the distribution of articles and the annual growth rate of publication in the DJLIT journal between 2011 and 2020.
- Assess the relative growth rate (RGR) and the time to doubling (DT).
- To examine the volume and issue-wise authorship pattern of articles.
- To ascertain the productivity of the author and degree of collaboration (DC).
- To calculate the pattern of reference distribution by calculating the average number of references per article.
- To find out the highest number of contributions made by the top ten most prolific authors, as well as their ranking on total publications and citation rank

Literature review

Bansal (2013) reports that 391 papers were published in the DESIDOC Journal of Library & Information Technology during the study period (2001-2012). Over two time spans, 2001-2006 and 2007-2012, the study examines the pattern of authorship, subject's coverage, citation analysis of the references, geographic distribution reported in the DESIDOC journal. In 2012, 65 cumulative papers were written. Joint collaborators contribute 61.4 percent, with India accounting for the vast majority of outputs. During the study period, Dr. BM Gupta published most papers (26) in the journal. The majority of papers (65%) are between 6 and 10 pages long.

Pandita (2014) investigated a bibliometric analysis on the DESIDOC Journal of Library and Information Technology (DJLIT) from 2003 to 2012, in which 366 articles were published. The research discovered that the journal has 147 articles with two authors, followed by 139 articles. During the investigation period, the journal published an average of 6.20 articles per issue, with a total of 5063 references, resulting in 13.83 references per article, and discovered that the highest citation rate was found in Vol. 31.

Singh and Bebi (2014) conducted a bibliometric analysis on Library Herald from the specified period (2003-2012). The journal published 234 papers during the study period, with 114 (48.72%) being single-authored and 90 (38.50%) being double-authored. Nosrat Riahinia was the most active author, contributing 16 articles over the study period. The majority of the publication came from India (81.6%).

Brahma and Verma (2018) reviewed the Malaysian Journal of Library and Information Science from 2007 to 2016, discovering that the year 2011 had the most articles published (28), including an average of 9.33 publications per issue. The study revealed that 40.09% of total articles were published with the contributions of two authors, following three authors (25.24%). Malaysia was ranked first with 31.17% contribution in total published articles, and India was ranked second with 8.50% contribution, and the DC was 0.76, and each article had an average of 31.11 references.

Haque et al. (2019) conducted a bibliometric study of the E-Journal of Library Philosophy and Practice from 2014 to 2018. According to the study, 1046 articles were published, with 2018 having the most (421) papers published. The survey results also revealed that two author patterning was the most preferred (39.67%) type of author patterning among published articles. The average percentage of paper collaboration between 2014 and 2018 was 0.71. 2223 authors contributed 1046 papers, and per author, the average number of publications was 0.47.

Methodology

The research focused on bibliometric analysis, which intends to review the specifics of the published articles in the journal (DJLIT) over ten years (2011 -2020). A total of 588 papers were collected from 60 issues of 10 volumes listed on the website. Data collected from the website (<https://publications.drdo.gov.in/ojs/index.php/djlit>) were retrieved, checked, and analyzed as per the study's objectives. MS Excel was used for analyzing the accumulated data, and they were portrayed in tables and figures.

Analysis of Data

Volume-Wise Distribution of Articles

Table I and Figure I depict the volume-wise publication growth of DJLIT from 2011 to 2020, reflecting a total of 588 articles issued in 10 volumes. In 2012, the maximum number of papers 70 (11.90%), were published in volume 32, followed by 65 (11.05 %) in volume number 33, 63 (10.71%) in volume number 34, 61 (10.37 %) in volume number 38, and lowest 51 (8.67 %) papers in volume number 36. Fig. 1 illustrates the publication growth of DJLIT.

Table-I: Distribution of Articles (Volume-Wise)

YEAR	VOLUME	ISSUE	ISSUE WISE ARTICLE						TOTAL	%
			1	2	3	4	5	6		
2011	31	6	8	9	7	14	10	10	58	9.86
2012	32	6	11	11	13	13	12	10	70	11.9
2013	33	6	13	10	10	12	9	11	65	11.05
2014	34	6	9	12	11	10	10	11	63	10.71
2015	35	6	9	8	11	10	8	8	54	9.18
2016	36	6	8	7	9	9	10	8	51	8.67
2017	37	6	10	10	11	9	10	9	59	10.03
2018	38	6	11	11	11	10	10	8	61	10.37
2019	39	6	7	12	8	9	8	10	54	9.18
2020	40	6	8	8	7	9	10	11	53	9.01
TOTAL ISSUES -		60	95	100	94	106	98	96	588	

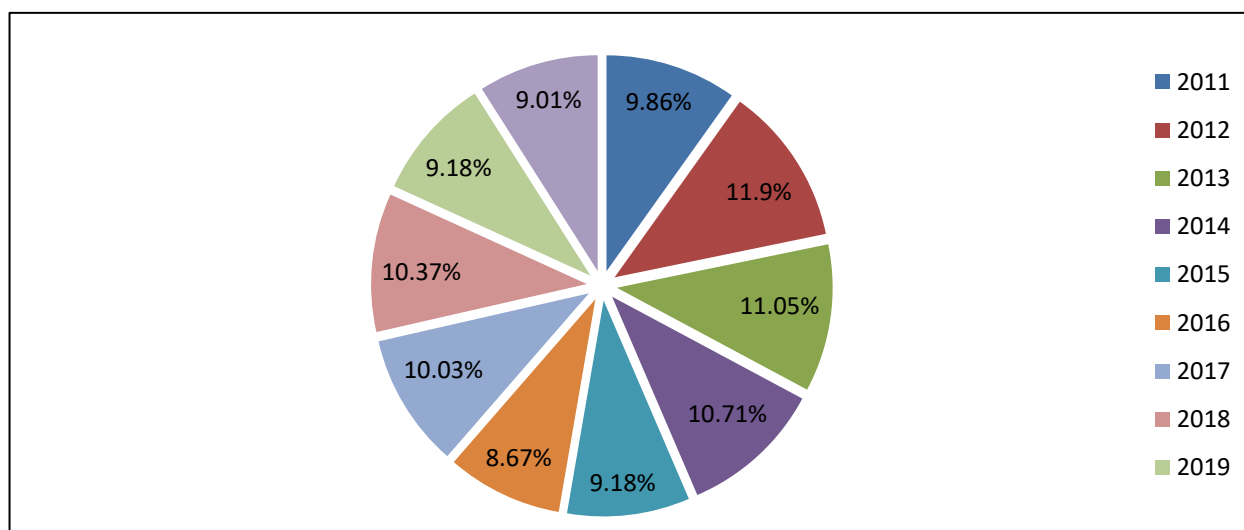


Figure I: Publication Growth of DJLI

Annual Growth of Publication

Table II indicates the year-wise progression of publications, and it was noticed that the growth of publications is positive in 2012, 2017, 2018, and 2019, while negative in 2013,2014,2015,2016, and 2020. The year 2012 had the highest growth rate throughout the study period (20.68%). The formula had been used to calculate the publication's growth rate as follows -

$$r = \frac{P_1 - P_0}{P_0} \times 100$$

- Where r directs the publication growth rate in percentage
- P0 directs the total number of publications in the base year.
- P1 directs the total number of publications in the current year.

Table-II: Annual growth Rate (AGR) of Publication

Year	Total Papers	AGR	Publication Growth Rate (%)
2011	58	0	0
2012	70	12	20.68
2013	65	-5	-7.14
2014	63	-2	-3.07
2015	54	-9	-14.28
2016	51	-3	-5.55
2017	59	8	15.68
2018	61	2	3.38
2019	54	7	11.47
2020	53	-1	-1.85
			Average: 1.93

Relative Growth Rate (RGR) and Double Time

The publication growth rate was calculated using Mahapatra's RGR and Dt model, which he created in 1985. 1985 (Mahapatra). The following formula is used to measure the relative growth

rate and doubling time =
$$RGR = \frac{W_2 - W_1}{T_2 - T_1}$$

Where,

- RGR denotes the growth rate over a given interval span,
- W1 denotes the loge of the interval (natural log of the initial number of contributions)
- W2 = Loge (natural log of the final number of contributions)
- T1 is the initial time unit.
- T2 denotes the final time unit.

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

Where,

- R= Growth rate

Table III and Figure II display the relative growth rate and doubling time of articles published in DJLIT from 2011 to 2020. The relative growth rate has been found to have decreased from 0.79 to 0.1. The average relative growth rate for the first five years of 2011-2015 is 0.33, while the mean growth rate for the remaining five years is declined to 0.13. It demonstrates that there is a significant gap between the first and second blocks.

The corresponding doubling time (Dt) for different years is progressively increasing from 0.88 to 6.93 from 2011 to 2020. The average frequency of doubling time for the first five years is 1.74 and the remaining five years is 5.55. The average mean relative growth rate of publications is 0.23. The analysis shows that the average mean growth of the article has shown a decreasing trend during the observation period, and the doubling time seems to have resulted in an increasing trend from later to initial stages.

Table-III: Relative Growth Rate and Double Time of Publication

Year	No of Papers	Cumulative no. of articles	W1	W2	Relative Growth Rate(RGR)	Mean RGR	Doubling time (Dt)	Mean Dt
2011	58	58	0	4.06	-----	0.33	-----	1.74
2012	70	128	4.06	4.85	0.79		0.88	
2013	65	193	4.85	5.26	0.41		1.69	
2014	63	256	5.26	5.54	0.28		2.48	
2015	54	310	5.54	5.73	0.19		3.65	
2016	51	361	5.73	5.89	0.16	0.13	4.33	5.55
2017	59	420	5.89	6.04	0.15		4.62	
2018	61	481	6.04	6.18	0.14		4.95	
2019	54	535	6.18	6.28	0.1		6.93	
2020	53	588	6.28	6.38	0.1		6.93	

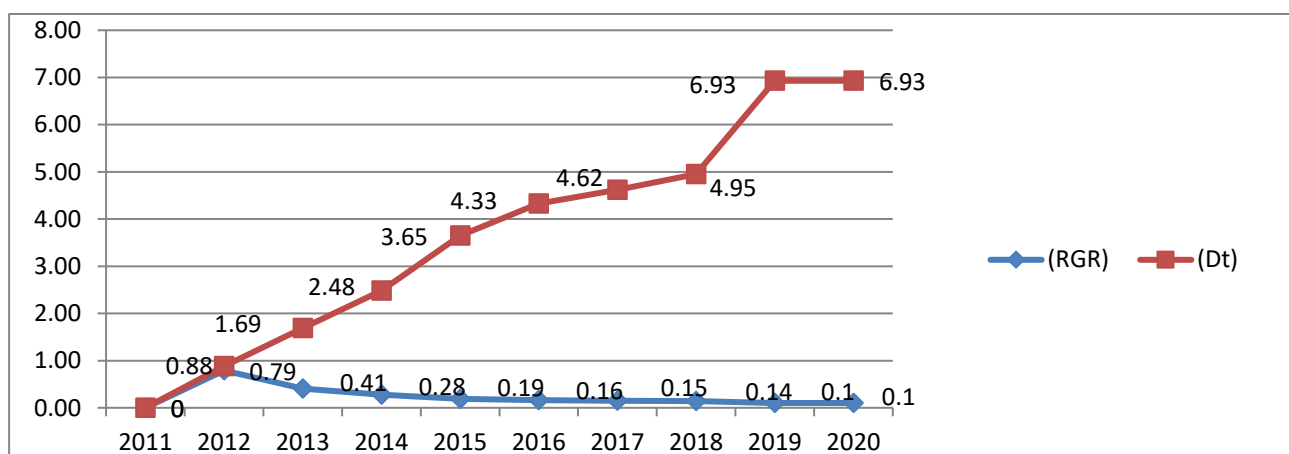


Figure II: Relative Growth Rate and Double Time

Author Productivity

Table IV portrays the productivity per author and the average number of authors per paper of research publications from 2011 to 2020. The authors' average frequency per paper was 1.94 for 588 publications published between 2011 and 2020. The year 2013 had the leading publications per author (0.58). The analysis determined that sum of 1144 authors contributed to 588 papers by an average output of 0.51 for each author.

Table IV: Author Productivity Wise Distribution

Year	Total Articles	Total Authors	Average Author Per Paper(AAPP)	Productivity Per Author(PPA)
2011	58	107	1.84	0.54
2012	70	127	1.81	0.55
2013	65	111	1.7	0.58
2014	63	124	1.96	0.5
2015	54	106	1.96	0.5
2016	51	100	1.96	0.51
2017	59	115	1.94	0.51
2018	61	132	2.16	0.46
2019	54	110	2.03	0.49
2020	53	112	2.11	0.47
Total	588	1144	1.94	0.51

Authorship Pattern

Table-V and Figure III were created to provide a clearer illustration of the authorship pattern of 488 papers published throughout the journal's ten volumes. The table shows that two authors contributed the most articles over ten years, with 265 (45.06%), single-author with 201 (34.18%), and three authors with 87(14.79 %). Furthermore, it was discovered that only 35 (5.95 percent) of the publications had more than three authors.

Table-V: Authorship Pattern of Articles

Year	Volume	One Author	Two Author	Three Author	More Than Three Author	Total
2011	31	24	24	7	3	58
2012	32	26	30	12	2	70
2013	33	30	26	7	2	65
2014	34	21	28	9	5	63
2015	35	17	25	10	2	54
2016	36	18	22	8	3	51
2017	37	17	34	6	2	59
2018	38	15	28	13	5	61
2019	39	16	25	9	4	54
2020	40	17	23	6	7	53
Total		201(34.18%)	265(45.06)	87(14.79%)	35(5.95%)	588

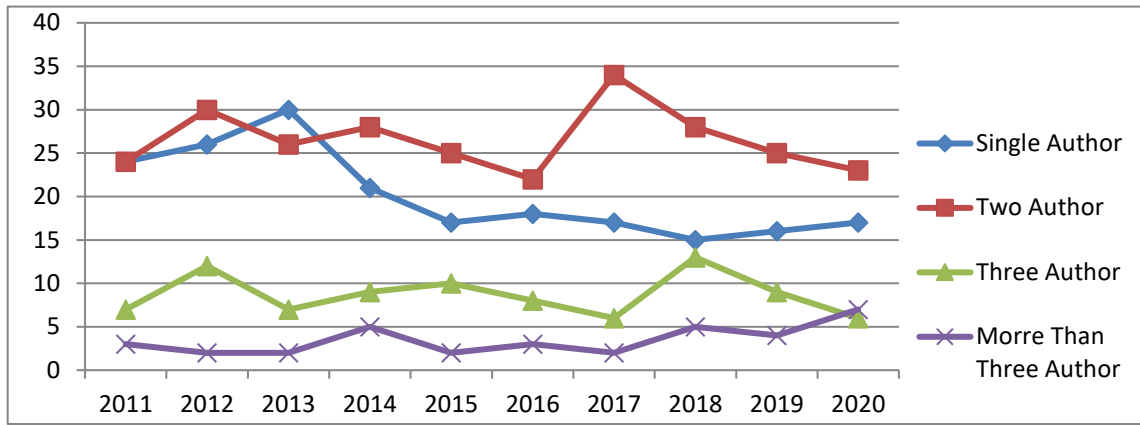


Figure III: Authorship Pattern of Articles

Degree of Author Collaboration in DJLIT

Table VI and Figure IV displays the ratio of collaborative papers to total papers throughout the specified timeframe using the formula proposed by Subramanyam (1983), which is-

$$DC = N_m / (N_m + N_s)$$

Where , DC = Degree of Collaboration,

N_m = Multiple Authored Publications

N_s = Single Authored Publications

$$DC = 387 / (387 + 201) = 0.65$$

The result demonstrates that within ten years, the average degree of author collaboration is 0.65. The table illustrates that the value of DC was at its highest in 2018 at 0.75 and lowest at 0.53 in 2013.

Table VI: Degree of Author Collaboration in DJLIT during 2011-2020

Year	Single Author (N _s)	Multi Authored (N _m)	Total(N _s +N _m)	DC
2011	24	34	58	0.58
2012	26	44	70	0.62
2013	30	35	65	0.53
2014	21	42	63	0.66
2015	17	37	54	0.68
2016	18	33	51	0.64
2017	17	42	59	0.71
2018	15	46	61	0.75
2019	16	38	54	0.7
2020	17	36	53	0.67
TOTAL	201	387	588	0.65

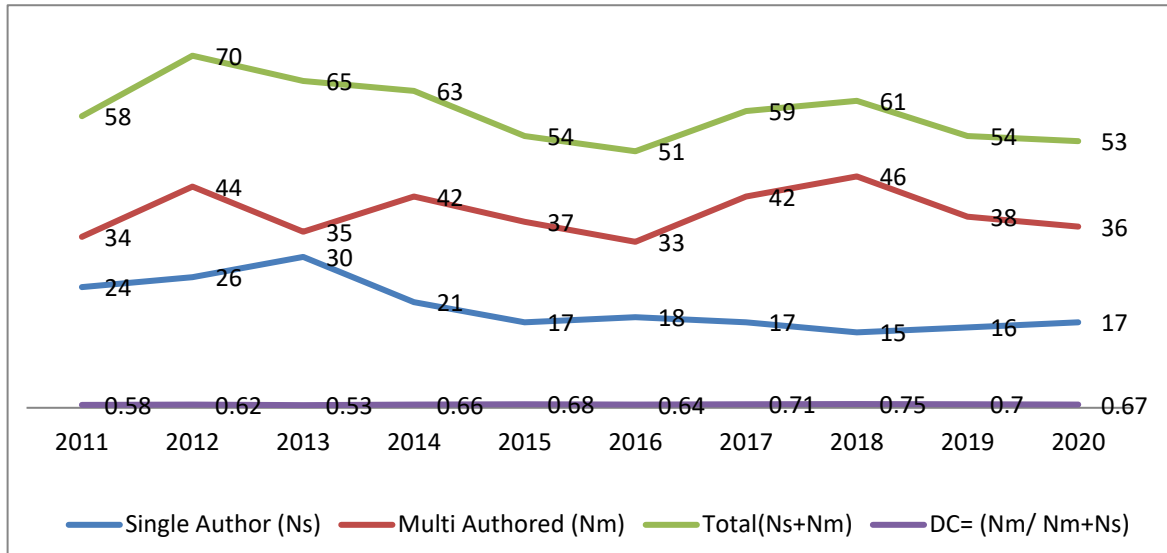


Figure IV: Degree of collaboration

Top Ten Prolific Authors

Table VII lists the top ten most prominent authors along with the number of publications they contributed. B.M. Gupta contributed the most articles (19), followed by Dhawan SM and Ramaiah C.K, who contributed 14 papers. Table 7 also reveals the average number of citations per paper (ACPP). The author B.M. Gupta has generated the most publications, while Garg K.C. has obtained the most ACPP 3.27 in seven articles.

Table VII: Top Ten Authors

Author	No. of Articles	No. of citations	ACPP (Average citation per paper)
Gupta, B.M.	19	63	3.31
Dhawan, S.M.	11	23	2.09
Ramaiah, C.K.	11	27	2.45
Gupta, R.	9	35	3.88
Tripathi, M.	9	20	2.22
Bhardwaj, R.K.	8	24	3
Pandita, R.	8	22	2.75
Garg, K.C.	7	46	6.57
Madhusudhan, M.	7	20	2.85
Ram, S.	7	21	3

Reference Distribution Pattern

The following table VIII has been generated to present a detailed representation of the patterns of reference distribution in published articles in the journal throughout the study timeframe. Between 2011 and 2020, 10748 references were quoted from 588 publications, resulting in an average of 18.27 references per paper. The table highlight that Vol. 39 contains the highest average of 25.29 references per article among other articles, while Vol. 34 produces the lowest average of 14.82 references per article.

Table VIII: Reference Distribution Pattern

Year	Vol.	Articles	Issue Wise No Of References						Total References & ((%)	Cumulative References & (%)	Avg. Ref per Article
			1	2	3	4	5	6			
2011	31	58	97	206	138	235	171	165	1012 (9.41)	1012 (9.42)	17.44
2012	32	70	97	158	236	166	306	169	1132 (10.53)	2144 (19.95)	16.17
2013	33	65	97	133	254	135	141	222	982 (9.13)	3126 (29.09)	15.10
2014	34	63	118	215	156	136	142	167	934 (8.68)	4060 (37.79)	14.82
2015	35	54	138	142	154	137	168	154	893 (8.30)	4953 (46.10)	16.53
2016	36	51	146	105	175	151	144	86	807 (7.50)	5760 (53.61)	15.82
2017	37	59	205	226	149	152	172	195	1099 (10.22)	6859 (63.84)	18.62
2018	38	61	207	322	254	230	160	179	1352 (12.57)	8211 (76.43)	22.16
2019	39	54	195	283	148	204	214	322	1366 (12.70)	9577 (89.14)	25.29
2020	40	53	243	152	121	199	237	219	1171 (10.89)	10743	22.09
Total =588			1543 (14.35)	1942 (18.06)	1785 (16.60)	1745 (16.23)	1855 (17.25)	1878 (17.47)	10748 (100)	10743	18.27

Findings

- 588 papers were published during the ten years, with the maximum number of publications 11.90% in 2012, followed by 11.04% publications in 2013 and in 2014, 10.71% articles were published in Vol. 34.
- The average mean for the relative growth rate of publications is .23 and for Dt is 3.4 over the study period. The average mean growth of the article has shown a decreasing trend, and the doubling time seems to have resulted in an increasing trend from later to initial stages.
- The authors' average frequency per paper was 1.94, and the average number of publications per author is 0.51 for 588 publications published between 2011 and 2020.
- The Authorship Pattern of articles for ten years revealed that two authors contributed the most articles for ten years, with 265 (45.06%), single-author with 201 (34.18%), and three authors with 87(14.79 %). Furthermore, it was discovered that only 35 (5.95 percent) of the publications had more than three authors.
- Within ten years (2011-2020), the average degree of author collaboration is 0.65. The table illustrates that the value of DC was at its highest in 2018 at 0.75 and lowest at 0.53 in 2013
- B.M. Gupta contributed the most articles (19), followed by Dhawan SM and Ramaiah C.K, who contributed 14 papers. Garg K.C. has obtained the most ACP 3.27 in seven articles.
- Based on a reference distribution pattern, 10743 references were outlined from 588 publications, including an average of 18.27 references for each article. Vol. 39 has the highest average of 25.29 references per paper, while Vol. 34 has the lowest average of 14.82 references per article. Issue 2 has the highest number of references with 1942 (18.06%), Issue 6 placed second with 1878 (17.47%), and Issue 5 with 1855(17.25%) ranked third.

Conclusion

The global acceptance of bibliometric approaches in various disciplines has resulted in the significant expansion of literature and its subsequent aspects. The method is effective for a range of specific purposes, such as journal selection for libraries, illustrating the benefits of a respective field, assessing scientific development, and ascertaining scientific attributes. These studies assessed research, pointing the way for new areas to be explored, and journal bibliometric studies aid in recognizing research phenomena in a particular area of research.

The DJLIT is an important journal in the field of library and information science. The current study sheds light on the research productivity of the journal articles chosen for the study over the last ten years. The study is based on bibliometric methods for quantifying major contributions; assessment of research production also investigates the degree of collaboration among the contributors. According to this study, the journal's average growth rate was 1.93% per year, with a degree of collaboration of 0.65%. The study concludes that the authors are attempting to maximize collaborative writings. This journal on LIS covers a wide range of topics, emphasizing advanced studies and research.

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