

Exploring the Applicability of Lotka's Law: Bibliometric Insights into the Preservation and Conservation of Libraries

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Received: 23 December 2024

Accepted: 29 June 2025

Abstract

The study focused on publishing trends, most productive institution, authorship pattern, most prolific author, lengthwise distribution of articles, articles with the highest citations and an attempt to apply Lotka's Law. For the marked time (1992-2023), this study involves a bibliometric analysis of 233 research articles published in the Web of Science Core Collection database from 1990 to 2023. A preliminary search determined 468 papers, which were further filtered using the established parameters and then 233 articles were all investigated. The study revealed there is almost no growth of number of publications on 'preservation and conservation of libraries' within specified time period. The top leading journal found in this study is Restaurator with 186 (79.83%) publications published by Walter De Gruyter GmbH from Germany. Banik, G is most prolific author and ranked first with highest number of publications (n=7) followed by three authors on the second rank. The most cited article is 'Phytate - a potential conservation agent for the treatment of ink corrosion caused by iron gall inks' authored by Neevel, Jg. K-S Test confirmed that Lotka's Law of Scientific Productivity is fit for the collected articles on 'Preservation and conservation of libraries'.

Keywords: Preservation, Conservation, Bibliometrics, Lotka's Law, Web of Science (WoS).

1. Introduction

The preservation and conservation of libraries and their resources constitute a critical area within the field of library and information science, addressing the long-term safeguarding of documentary heritage housed in libraries. These practices encompass a broad spectrum of preventive and remedial strategies aimed at mitigating the physical, chemical, biological, and environmental threats that jeopardize the integrity of materials such as books, manuscripts, archival records, and other library assets. As libraries continue to serve as stewards of both cultural memory and scholarly communication, the importance of systematic preservation and conservation efforts has become increasingly pronounced in the face of aging collections, technological obsolescence, and shifting institutional priorities. Over the decades, a substantial body of literatures has emerged, documenting diverse aspects of preservation science, conservation methodologies, digitization practices, environmental management, and

institutional policies related to the maintenance of library holdings. These literatures serve not only as a record of professional knowledge and innovation but also as a valuable corpus for meta-level analysis of the field's scholarly development. Analyzing these literatures provide insights into prevailing research trends, the intensity and direction of scholarly communication, and the productivity and collaboration patterns of contributors engaged in this domain.

The present study undertakes a comprehensive bibliometric analysis of the existing literatures on the preservation and conservation of libraries. Drawing upon published researches indexed in Web of Science Core Collection databases, the study aims to examine the volume, growth, and thematic contours of academic output in this area. A particular emphasis is placed on the application of Lotka's Law, a foundational bibliometric model that describes the frequency distribution of scientific productivity among authors. By testing the applicability of Lotka's Law to the literature on preservation and conservation of libraries, this study seeks to assess author productivity patterns and evaluate the extent to which contributions in this field align with established bibliometric norms. Through this dual approach, combining bibliometric analysis with Lotka's law application, the study offers a structured understanding of the intellectual landscape underpinning preservation and conservation research within the library science domain.

2. Literature Review

The bibliometric study performed by Nishanthi et al. (2023) on the conservation and preservation of palm leaf manuscripts highlighted the most often referenced paper "Sciences and the global on methods, questions, and theory" authored by Sivasundaram S. The most productive author highlighted in the study was Draper J. from Thailand. Another bibliometric analysis of publications published in *Studies in Conservation* conducted by Dogruer (2022) highlighted the British Museum (UK) as the most productive institution in the study. The bibliometric study conducted by Banerjee and Basu (2021) on disaster awareness research revealed that the highest number of papers has been published in 2020 and the lowest numbers being published in 2011. The authorship pattern indicated that the discipline is dominated by multi-authored papers (93.43%). In another bibliometric study of Paul and Dutta (2024) on altmetrics, it is observed that University of Wolverhampton stands as the most productive institution in the concerned research field. United States claimed the most productive country followed by United Kingdom. The research productivity of library and information science (LIS) authors of the Arab League is investigated by Siddique et al. (2021) by using bibliometric methods. The study highlighted publication trends, growth of publications in past few years. The Study also identified the areas requiring further research. Singh and Jaiswal (2024) attempted to apply Lotka's Law over the collected dataset of articles on Archaeology retrieved from Web of Science Core Collection Database. However, the K-S test implies that collected set of articles do not fit for the Lotka's Law. Similarly, Nagaiah et al. (2021) also employed Kolmogorov-Smirnov (K-S) test to examine the applicability of Lotka's law in the literature of open education resources but Lotka's law does not fit within the literature on open educational resources (OER). In the area of "Cloud Computing Research" Savanur and Devi (2015) explored the applicability of Lotka's law using a variety of approaches, including Sen's Method, Pao's Method, and Maximum Likelihood Method, and then validated using the Kolmogorov-Smirnov (KS) Test. The Study conducted by Arya and Jaiswal (2022) also discovered that Lotka's inverse square law is inapplicable to the dataset of diabetes mellitus type 1. Bisaria (2020) examined Lotka's law on productivity among Library and Information Science (LIS) professionals who published journal articles in LIS journals from India, the US, and the UK using Pao's method, and verified the results using the Kolmogorov-Smirnov (KS) test. The

authors' data set from India provides evidence that the observed authorship data supports Lotka's law when applied individually. Similarly, Naqvi and Fatima (2018) studied the applicability of Lotka's law for international business literature published in Journal of World Business. The study finds that Lotka's distribution is applicable to the literature which was further confirmed by using Chi-square and K-S statistics tests. Chaturbhuj and Sadik (2020) assessed Lotka's law of author productivity in the field of thermodynamics using Kolmogorov-Smirnov (K-S) test on the data and discovered that Lotka's law is confirmed with a 0.003 level of significance. However, Lotka's inverse square law does not fit the present data.

Only collection development is not the task of libraries but keeping those collections intact for its user and long-time use is also important task of libraries. So, it is obvious that 'Preservation and conservation' plays a vital role in field of library and information science. Therefore, conducting the bibliometric study of these articles is the need of hour. The numbers of bibliometric research studies have been carried out in different fields of library and information science. The reviewed literature exposed that no significant study has been conducted yet in field of 'Preservation and Conservation' with the context of libraries. So, this study is designed to fill this gap.

3. Objectives of the Study

The objectives of this research study are following:

1. To determine the year-wise distribution of articles.
2. To identify the most productive institution.
3. To depict the authorship pattern and collaboration index.
4. To identify the most prolific author.
5. To find out the citation-wise distribution of articles.
6. To determine the language-wise distribution of articles.
7. To find out length-wise distribution of articles.
8. To study the applicability of Lotka's law in literature output.

4. Hypothesis

Bibliometric research often draws upon established statistical laws and indicators to examine the patterns, structure, and productivity of scholarly communication. Among these, Lotka's Law of Scientific Productivity is one of the most widely recognized. It states that the number of authors publishing n articles is inversely proportional to the square of n , indicating that a small proportion of authors are responsible for a large share of publications, while the majority contribute only one article. In the context of the present study, authorship data within the field of Preservation and Conservation of Libraries and their resources is examined to assess whether the observed distribution of author productivity corresponds with the theoretical distribution proposed by Lotka. This directly relates to Objective 8 of the study, which focuses on evaluating the applicability of Lotka's Law to the literature collected on this subject. The outcome of this analysis will offer insight into whether the research output in this field follows a typical pattern of scientific productivity or reflects unique authorship dynamics. Accordingly, the following hypothesis has been formulated: ***"Lotka's Law of Scientific Productivity applies to the authorship distribution of articles on 'Preservation and Conservation of Libraries'."***

5. Methodology

The data is collected from Web of Science (WoS) Core Collection Database under the Science Citation Index Expanded (Sci-Expanded), Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (AHCI) using the syntax:

"((ALL=(("Preservation"AND"Conservation"*))AND(*"Library"OR"Libraries"*))))AND WC=(*Information Science & Library Science*)) AND DT=(*Article*)"*

The data set is further refined by using an additional filter i.e. time span: 1990 to 2023. As on 13 February 2024, this search syntax retrieved 235 records. The records of 1990 and 1991 are excluded for better interpretation of data because both the year contained only one record each. The Bibliographical data of 233 articles are exported into MS Excel worksheets. In order to do data analysis utilizing bibliometric approaches and methods, raw data is examined, filtered, tabulated, and analyzed quantitatively.

Goodness of fit Test: The current study applied the Kolmogorov Smirnov test (K S Test) to assess Lotka's Law.

Table - 1: Profile of data collection

Inclusion Criteria		Articles
Database	Web of Science core collection database	-
Date	13 February, 2024	-
Search String	<i>(ALL=((<i>"Preservation"AND"Conservation"</i>))AND(<i>"Library"OR"Libraries"</i>))))</i>	468
Web of Science Categories	Information Science Library Science	266
Document types	Article	235
Time span	1990 to 2023 (after excluding 1990 and 1991)	233

6. Data Analysis and Interpretation

6.1 Year - wise distribution of articles

Table 2 depicts that highest number of articles 37 (15.88%) has published during 1996-1999. It is followed by time span of 2008-2011 with 34 (14.59%) articles. The least number of articles 21 (9.01%) has published during 2000-2003. The growth of articles publications till 2011 is fluctuating. It is also observed that there is almost stagnant growth in number of articles published within specified time period.

Table - 2: Year - wise distribution of articles

S.N.	Time span	Number of articles	Percentage
1	1992-1995	28	12.02
2	1996-1999	37	15.88
3	2000-2003	21	9.01
4	2004-2007	26	11.16

5	2008-2011	34	14.59
6	2012-2015	28	12.02
7	2016-2019	31	13.30
8	2020-2023	28	12.02
Total		233	100.0

6.2 Institutional ranking by articles output

The table 3 represents institutions of the authors collaborated in the articles. Although total 285 institutions have been identified from 219 articles as 14 articles do not contain data in the field being analyzed. Table 3 also represents top three ranked institutions among 285 institutions which are producing larger number of articles. Academy of Fine Arts Vienna (n=7) is ranked first in number of publications. Top 3 productive institutions are located in Austria. Three institutions are ranked second with 5 publications each following four institutions with ranked third with four publications each. There are 277 institutions with less than four publications.

Table - 3: Institutional ranking by articles output

S. N.	Institutions	Country	Articles	Rank
1	Academy of Fine Arts Vienna	Austria	7	1
2	Austrian National Library	Austria	5	2
3	Boku University	Austria	5	2
4	National University Library	USA	5	2
5	Natural History Museum London	England	4	3
6	Netherlands Organization Applied Science Research	Netherland	4	3
7	University of Illinois System	USA	4	3
8	University of Rome Tor Vergata	Italy	4	3

6.3 Journals ranking by articles output

Table 4 depicts that the top leading journal found in this study is Restaurator-International Journal for the Preservation of Library and Archival Material (Restaurator) with 186 (79.83%) articles published by Walter De Gruyter GmbH from Germany. The other top most leading journals found in this study are IFLA Journal-International Federation of Library Associations with 9 (3.86%) articles followed by Library Resources & Technical Services 6 (2.58%) articles. There are nineteen journals with only one publication.

Table - 4: Journals ranking by articles output

S. N.	Journal Title	Articles	Rank
1	Restaurator	186	1
2	IFLA journal - International Federation of Library Associations	9	2
3	Library resources & technical services	6	3
4	Libri	4	4

5	Library Trends	4	4
6	Zeitschrift Fur bibliothekswesen und bibliographie	3	5
7	International Information & Library Review	2	6

6.4 Authorship Pattern

Table 5 shows that single author contribution accounted nearly 100 (43.40%) articles of overall publication while contribution by two authors accounted to 48 (20.43%) articles. Table 5 shows that there are 42 (17.87%) articles with three authors, 22 (9.36%) articles with four authors, 10 (4.26%) articles with five authors, 6 (2.55%) articles with six authors and 5 (2.13%) articles with more than 6 authors.

Table - 5: Authorship pattern

S. N.	Authorship Pattern	Articles	Percentage
1	Single Author	100	43.40
2	Two Authors	48	20.43
3	Three Authors	42	17.87
4	Four Authors	22	9.36
5	Five Authors	10	4.26
6	Six Authors	6	2.55
7	More than six authors	5	2.13
Total		233	100.0

Degree of collaboration

The present study has used the formula given by Subramanyam (1983) for calculating degree of collaboration.

$$C = Nm / (Nm + Ns) \dots\dots\dots(i)$$

Where C = Degree of Collaboration

Nm = Number of multi authored contributions

Ns = Number of single authored contributions

$$C = 133 / (133 + 100)$$

$$C = 0.5708$$

Thus, approximately 57% of the articles usually have more than one author, indicating that authors in the subject of 'Preservation and conservation of libraries' tend to collaborate more.

6.5 Collaboration Index

The number of writers who contributed to the production of the papers is studied to determine a trend over time. This information is represented by the collaboration index (CI), which is calculated as given in the equation.

$$CI = \text{Number of authors} / \text{Number of publications}$$

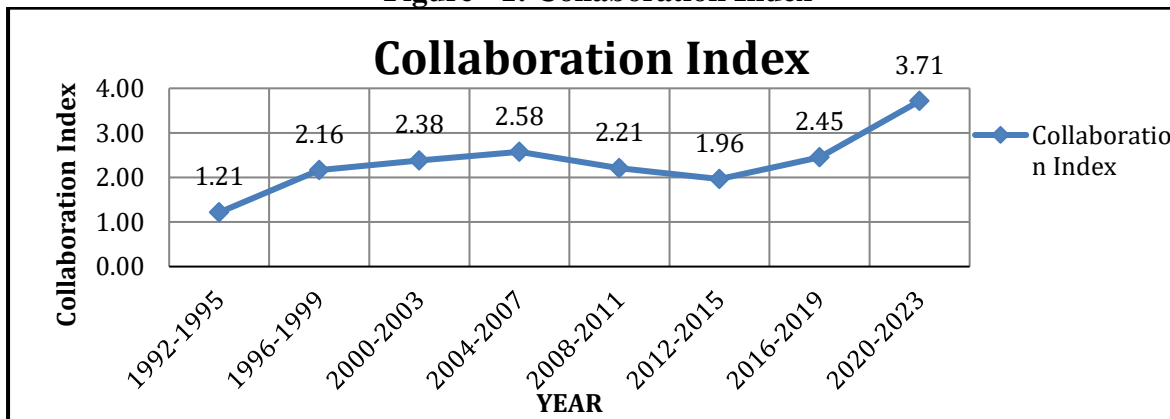
The table 6 depicts that collaboration index is highest in time span of year 2020-2023 i.e 3.71. It indicates that nearly 4 authors contributed to each article published in time span of 2020-2023. Least value of collaboration index is found in time span of year 1992-1995 i.e. 1.21. It

also indicates that only 1 author contributed to each article published in time span of 1992-1995. The figure 1 depicts that there has been continuous rise in collaboration index since 1992 to 2007. Thereafter, it declined till the 2015. Again from 2020, collaboration index value rises up-to 3.71 in time span of 2020-2023.

Table - 6: Collaboration Index

Publication Years	No. of Articles	No. of authors	Collaboration Index
1992-1995	28	34	1.21
1996-1999	37	80	2.16
2000-2003	21	50	2.38
2004-2007	26	67	2.58
2008-2011	34	75	2.21
2012-2015	28	55	1.96
2016-2019	31	76	2.45
2020-2023	28	104	3.71

Figure - 1: Collaboration Index



6.6 Authors ranking by articles output

To identify productive authors, authors are ranked according to their quantity of articles published over time. Table 7 depicts that Banik, G is most prolific author and ranked first with highest number of publications (n=7) followed by three authors on the second rank with six publications by each of them. Kolar, J secured third rank with five publications followed by five authors (n=4) who secured fourth rank. Eleven authors with three publications have secured fifth rank. There are 418 authors with less than 4 articles publications.

Table - 7: Authors ranking by articles output

S. N.	Authors	Articles	Rank
1	Banik, G	7	1
2	Baatz, W	6	2
3	Brueckle, I	6	2
4	Eyb-green, S	6	2
5	Kolar, J	5	3
6	Durovic, M	4	4

7	Henniges, U	4	4
8	Letnar, MC	4	4
9	Zervos, S	4	4
10	Zhang, MF	4	4

6.7 Citation - wise Distribution of articles

Citation - wise distribution of articles refers to how frequently articles are cited by other scholarly works. It's basically a way to understand how influential different sources are within a field.

Table - 7.1: Citation - wise Distribution of articles

Times Cited	No. of articles	% of 233
0	58	24.89
1	41	17.60
2	19	8.16
3	15	6.44
4	15	6.44
5	8	3.43
6	9	3.86
7	10	4.29
8	7	3.00
9	5	2.15
10	7	3.00
More than 10	39	16.74
Total	233	100.0

The table 7.1 depicts that nearly one fourth of articles have zero citations. And 41 (17.6%) articles received only one citation. There are 39 (16.74%) articles that have received more than 10 citations. A comprehensive list of frequently cited articles is available in Table 7.2. Top cited article '*Phytate - a potential conservation agent for the treatment of ink corrosion caused by iron gall inks*' is authored by Neevel, Jg and it is published in the journal Restaurator. One fact needs to be highlighted is top 10 highly cited articles are published in the journal Restaurator.

Table - 7.2: Top ten cited articles (Journal: Restaurator)

S. N.	Title	Authors	DOI	Times Cited
1	Phytate - a potential conservation agent for the treatment of ink corrosion caused by iron gall inks.	Neevel, Jg	10.1515/rest.1995.16.3.143	152
2	Mechanism of Autoxidative degradation of cellulose.	Kolar, J	10.1515/rest.1997.18.4.163	89

3	Effect of gamma rays on pure cellulose paper as a model for the study of a treatment of biological recovery of biodeteriorated books.	Adamo, AM; Giovannotti, M; Magaudda, G; Zappala MP; Rocchetti, F; Rossi, G.	10.1515/rest.1998.19.1.41	53
4	Ink corrosion aqueous and non-aqueous treatment of paper objects - State of the art	Reissland, B	10.1515/rest.1999.20.3-4.167	52
5	On the rate of paper degradation: Lessons from the past.	Calvini, Paolo; Gorassini, Andrea	10.1515/REST.2006.275	47
6	Aqueous deacidification - with calcium or with magnesium.	Bansa, H	10.1515/rest.1998.19.1.1	45
7	Gelatine in historical paper production and as inhibiting agent for iron-gall ink corrosion on paper.	Kolbe, G	10.1515/REST.2004.26	44
8	The role of chitosan in improving the ageing resistance of rosin sized paper.	Basta, AH	10.1515/REST.2003.106	39
9	Effect of pH and carbonyls on the degradation of alkaline paper - Factors affecting ageing of alkaline paper.	Malesic, J; Kolar, J; Strlic, M	10.1515/REST.2002.145	37
10	Non invasive techniques for the investigation of foxing stains on graphic art material.	Choisy, P; DelaChapelle, A; Thomas, D; Legoy, MD	10.1515/rest.1997.18.3.131	31

6.8 Language - wise distribution of articles

Language - wise distribution of articles helps to understand the trend of language in which research is published.

Table - 8: Language - wise distribution of articles

S. N.	Language	Articles	% of 233
1	English	223	95.71
2	German	4	1.72
3	Spanish	2	0.86
4	Portuguese	2	0.86
5	French	1	0.43
6	Japanese	1	0.43
Total		233	100.0

Based on the information provided in table 8, it is evident that English language hold 223 (95.70%) articles followed by German, Spanish, Portuguese, French and Japanese with 4 (1.72%), 2 (0.86%), 2 (0.86%), 1 (0.43%), 1 (0.43%) articles respectively. Like other studies

this study also found that English is dominant language for writing article. English language facilitates easier collaboration and wider audience reach.

6.9 Length - wise distribution of articles

Analysis of number of pages of articles tells us about the number of articles that fall into different ranges of number of pages. This distribution also depicts the preferred length of articles by its contributors.

Table - 9: Length - wise distribution of articles

S. N.	Number of Pages	Articles	% of 233
1	0-9	35	15.02
2	10-19	115	49.36
3	20-29	64	27.47
4	30-39	13	5.58
5	40-49	6	2.58
Total		233	100.0

The table 9 depicts that most preferred length of articles by its contributors are in the range of 10-19 pages, i.e. 115 (49.36%) and lowest contributions are in the range of 40-49 pages i.e., 6 (2.58%).

7. Lotka's Law of Scientific Productivity

In 1926, Alfred J Lotka formed a general equation about the frequency distribution of scientific productivity of authors based on the publications: $x^n \cdot y = C$

Where 'x' is the number of articles published (1, 2, 3, 4....) and 'y' is the number of authors with frequency 'x' number of articles; 'n' is an exponent that is constant for a given set of data; and 'C' is a constant. When n=2 is used for a data set then the law is called the 'Inverse square law of scientific productivity. (Lotka, 1926)

In data analysis, the number of authors in corresponding to number of contributions made is analyzed. It is represented in the table 10.1, second column of table 10.1 include number of articles (represented by x) and the third column include data of number of authors corresponding to x number of articles and it is represented by y. Table 10.1 represents that there are 428 total number of authors who have contributed their articles in the field of 'Preservation and conservation of libraries' during 1992-2023. Out of them, 356(83.18%) authors contributed only one article in the total contribution. Whereas 51 (11.92%) authors contributed two articles, 11 (2.57%) authors contributed three articles.

Table 10.1: Authors' productivity of articles

S. No.	No. of Articles (x)	No. Of Authors(y)	% of 428
1	1	356	83.18
2	2	51	11.92
3	3	11	2.57
4	4	5	1.17

5	5	1	0.23
6	6	3	0.70
7	7	1	0.23
Total		428	100.0

Table 10.2: Lotka's Law: Author Productivity

S. N.	x	y	X = log x	Y = log y	X ²	XY	(y/Σy)	Σ (y/Σy)	f _e =c/x ⁿ	Σf _e	D = Σ(y/Σy) - Σf _e
1	1	356	0	2.551	0.000	0.000	0.832	0.832	0.8451	0.8451	D _{max} = 0.0131
2	2	51	0.301	1.707	0.091	0.514	0.119	0.951	0.1015	0.9466	0.0044
3	3	11	0.477	1.041	0.228	0.497	0.026	0.977	0.0294	0.9760	0.0010
4	4	5	0.602	0.698	0.362	0.420	0.012	0.989	0.0122	0.9882	0.0008
5	5	1	0.699	0.00	0.489	0.000	0.002	0.991	0.0061	0.9943	0.0033
6	6	3	0.778	0.477	0.605	0.371	0.007	0.998	0.0035	0.9978	0.0002
7	7	1	0.845	0.00	0.714	0.000	0.002	1.000	0.0022	1.0000	0.0000
Total	428	3.702	6.474	2.488	1.802	-	-	-	-	-	-

Applicability of Lotka's Law

This study will constitute Kolmogorov Smirnov test (K S Test) for checking the applicability of Lotka's law on the collected data of articles.

7.1 Applicability of K S Test

Determination of the exponents 'n', 'c' & 'cv'

The values of 'n', 'c' and 'Critical value' of the data set have been determined with the aid of computations done in Table 11.2 in order to evaluate the applicability of Lotka's Law on the current data set of articles.

- i. **Calculation of exponent 'n'**
- ii. The first step in the application of Lotka's law is to determine the value of exponent 'n' which is to be determined by the Linear Least Square (LLS) method which is given by Pao (1985) using the following formula.

$$n = \frac{7*1.802 - 3.702*6.474}{7*2.488 - (3.702)^2}$$

$$n = - 3.058$$

Thus the value of *n* (absolute value) is 3.058

Estimation of value 'c'

The value of parameter *n* is calculated as, *n* = -3.058. 'c' can be calculated with the following formula using absolute value of *n*.

$$c = \frac{1}{\sum \frac{1}{x^{3.058}}}$$

$$c = \frac{1}{1.1832}$$

$$c = 0.8451$$

Estimation of value 'cv'

The test is performed at 0.01 level of significance, when sample size is greater than 35, the critical value (c.v.) of significance is calculated by following formulae. (Pao, 1985)

$$C.V. = \frac{1.63}{\sqrt{428 + \sqrt{\frac{428}{10}}}}$$

$$C.V. = \frac{1.63}{\sqrt{434.5421}}$$

$$C.V. = \frac{1.63}{20.8456}$$

$$c.v. = 0.07819$$

Thus the value of the exponent determined by the above mention formula are $n = -3.058$, $c = 0.8451$ and $c.v. = 0.07819$.

Table 10.2 shows the number of articles x , the number of authors y , and their respective natural logarithms. The total value of all the logarithms of article x is 3.702 and the total value of logarithms of authors y is 6.474. Based on the above data, it can be concluded that large number of authors have contributed a few numbers of articles while few authors have contributed a large number of articles. In table 10.2, f_e is the expected frequency that is obtained by formula, $f_e = c/x^n$. So here, $f_e = 0.8451/x^{3.058}$ (as absolute value of $n=3.058$ will be used). Difference is shown in the last column of Table 10.2 and is computed by subtracting the cumulative expected frequency from the cumulative observed frequency: $|\sum(y/\sum y) - \sum fe|$. This difference, in its absolute value, is shown in the last column of table 10.2. The maximum value obtained is $D_{max} = 0.0131$. If we check the statistical table it will be observed that at 0.01 level of significance, K-S Statistics = $1.63/\sqrt{y}$. Here, y is the number of authors observed during the study which is total 428 (from Table 10.2)

$$\begin{aligned} \text{K-S Statistics} &= 1.63/\sqrt{428} \\ &= 1.63/20.688 \\ &= 0.07879 \end{aligned}$$

Here, $D_{max} = 0.0131$ is lower than K-S Statistics i.e. 0.07879, the given data is fit for Lotka's law. The critical value for the given data set is 0.07819 which is greater than D_{max} value

0.0131 which also indicates that Lotka's law is followed in the present study. Hence the Lotka's law is satisfied on collected data of articles.

8. Findings and Conclusion

Finding is the most crucial section of a research study as it provides an overview of the main conclusions drawn from the investigation and interprets the relevance and meaning of the results. The findings, we obtained in this study are given below:

1. There is almost no growth of number of publications on 'preservation and conservation of libraries' within specified time period.
2. The top productive institution is Academy of Fine Arts Vienna (n=7). It is located in Austria.
3. The top leading journal in this study is Restaurator with 186(79.83%) articles published by Walter De Gruyter GmbH from Germany.
4. Single author contribution accounted nearly 100(43.40%) articles of overall publication. Contribution by two authors accounted to 48(20.43%) articles). There are 42(17.87%) articles with three authors, 22(9.36%) articles with four authors, 10(4.26%) articles with five authors, 6(2.55%) articles with six authors and 5(2.13%) articles with more than 6 authors.
5. Degree of Collaboration is 0.5708 indicating that approximately 57% of the publications usually have more than one author indicating that authors on the given area of study tends to collaborate more.
6. Collaboration index is highest in time span of year 2020-2023 i.e. 3.71. It indicates that nearly 4 authors contributed to each article published in time span of 2020-2023. Least value of collaboration index is found in time span of year 1992-1995 i.e. 1.21. It also indicates that nearly 1 author contributed to each article published in time span of 1992-1995.
7. Banik, G is most prolific author and ranked first with highest number of publications (n=7) followed by three authors on the second rank with six publications by each of them. He is research scientist at University Life Sciences (BOKU) in Vienna and guest professor at University of Applied Arts Vienna. (Banik & Brückle, 2010)
8. English language occupies 1st rank with around 223(95.70%) articles. This is followed by German, Spanish, Portuguese, French and Japanese with 4 (1.72%), 2 (0.86%), 2 (0.86%), 1 (0.43%), 1 (0.43%) articles respectively. English is dominant language and authors prefer to write in English.
9. The most preferred length of articles by its contributors are in the range of 10-19 pages, i.e. 115 (49.36%) articles and lowest contributions are in the range of 40-49 pages i.e., 6 (2.58%) articles.
10. Nearly one fourth of articles have zero citations. And 41 (17.6%) articles received only one citation. Also 39(16.74%) articles received more than 10 citations. The most cited article is '*Phytate - a potential conservation agent for the treatment of ink corrosion caused by iron gall inks*' authored by Neevel, Jg and it is published in the journal Restaurator. Top 10 highly cited articles in this study have also published in same journal.
11. In KS Test of Lotka's law, $n=3.058$ (absolute value), $c = 0.8451$ and the critical value (c.v.) is 0.07819. $D_{\max} = 0.0131$ is lower than K-S Statistics 0.07879, the given data is fit for Lotka's law. The critical value for the given data set is 0.07819 which is greater than D_{\max} value 0.0131 which also indicates that Lotka's law suits well on collected data set of articles.

12. K-S Test confirmed that Lotka's Law of Scientific Productivity is fit for the collected articles on 'Preservation and conservation of libraries'.

This study provides an understanding of research on 'Preservation and conservation of libraries' and provides new ideas on the conceptual framework of this field's study. The study analysis reveals that this field is being neglected and research on this topic is still insufficient as publication growth is nearly steady. Findings of this study have immediate relevance for academics. Academics can utilise these findings to comprehend the conceptual framework of study on 'Preservation and conservation of libraries'. *Restaurator* is transcendent Journal in the field of preservation and conservation covering nearly 80% of articles published. In addition, these findings may have implications for public bodies, since bibliometric analyses have recently become a tool for the evaluation of the productivity of academics, as well as other larger units such as departments, universities, or research Institutions (Alcaide-Ruiz et al., 2022).

9. Limitations of the study

Although this study adds substantial knowledge to the domain, it has limitations. The sample is drawn from only one database i.e. Web of Science core database. Despite the database's capacity, certain relevant articles may remain lacking. Nonetheless, we think the sample of articles appropriately represents the research on 'Preservation and conservation of libraries' throughout the study period. This study does not include any articles published after data retrieval. Search string used in the study is not exhaustive in its coverage of the entire knowledge of domain. The search string used in this study aims to identify the core literature where fundamental concepts of 'preservation and conservation' only are explicitly discussed together, rather than merely implied or addressed in isolation. This study identifies the most explicit discussions of the topic, avoiding literature from related but distinct fields.

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