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APPLICATION OF BRADFORD'S LAW OF SCATTERING AND THE LEIMKUHLER MODEL IN METAL-ORGANIC FRAMEWORKS RESEARCH LITERATURE IN INDIA

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Abstract : *This study examines the distributive behaviour of scholarly literature on Metal–Organic Frameworks (MOFs) within the context of Indian research contributions, drawing insights from the 2025 Nobel Chemistry Prize, applying Bradford's Law of Scattering and the mathematical model proposed by Leimkuhler. Using the term "Metal–Organic Frameworks" as a keyword search, obtained 8,451 publications identified as related to the topic that were published across 718 journals in the timeframe of 2000 to 2024 from the Web of Science database. the bibliographic data were analysed using Hiscite and Bibexcel software, which enabled the systematic organizttiona and quantitative assessment of publication and citaion pattern realted to MOFH research. The analysis identified core, middle, and peripheral zones of journals, along with the Bradford multipliers for determining the exponential growth in the number of journals necessary to publish the requisite successive one-third of articles. The data demonstrated that a small core of 14 journals (Zone 1) published the first one-third of articles, which was compounded by 53 journals (Zone 2) and 651 journals (Zone 3) respectively to publish the additional one-thirds, demonstrating a typical Bradford-style scatteringin Mof Research. The application of the Leimkuhler model we were able to predict cumulative article output and assess deviations (errors) between the expected values and the observed values. The Results demonstrated a small number of total journals (1.9%) were publish the majority of research(33.1%)in MOFs.The application of the Leimkuhler model further allowed prediction of cumulative article output and evaluation of deviations between observed and expected distributions. The findings also highlight the role of Indian research literature as an emerging contributor to the global MOF research landscape, reflecting the country's growing participation in cutting-edge materials science and chemistry, particularly in areas recognized by the 2025 Nobel Prize in Chemistry.*

Keywords : Metal–Organic Frameworks, MOFs, Bradford's Law of Scattering,

Leimkuhler Model

Introduction :

Metal–Organic Frameworks (MOFs) are an innovative class of porous materials composed of metal ions coordinated to organic ligands, forming highly ordered, tunable structures. Their exceptional surface area, structural diversity, and functional versatility have made MOFs a rapidly expanding research area. The significance of this field was recognized in the 2025 Nobel Prize in Chemistry, awarded for pioneering work on the design and development of MOFs. Due to the increasing scientific interest, a large volume of research articles has been published across various journals, making it important to analyze the distribution and concentration of MOF-related literature. Bradford's Law of Scattering provides a valuable framework for this purpose. It states that journals publishing articles on a specific subject can be divided into a small core of highly productive journals, followed by successive zones of journals with decreasing productivity. Applying Bradford's Law allows researchers to systematically analyze the dispersion of MOF-related publications and identify the journals that contribute most significantly to the development of the field. This research paper focuses on the research literature from India on metal-organic frameworks (MOFs) that had either been written or co-written by anyone from India. It includes a full scientometric analysis of the amount Indian output has represented, the significant journals that published the articles on MOFs by Indian authors, the spatial representation of articles, and employed Bradford's Law of Scattering (1934) to classify into core, middle zone, and peripheral zones. The results are expected to provide a useful overview of patterns of distributions, note key journals that have been instrumental in Indian researchers' contributions to MOFs, and provide useful information to various stakeholders including researchers, academicians, and institutions with interests in, or interested in the contributions of India to this rapidly evolving scientific area.

Need of the study :

The increased interest in research on Metal–Organic Frameworks (MOFs), which won the 2025 Nobel Prize in Chemistry, has created a sizable and dispersed oeuvre of literature in journals across the world. Mapping understanding of the literature in the MOF field is largely an exercise in distribution, as it allows for identifying core journals, assessing publication trajectory, and planning future research. By applying Bradford's Law of Scattering with the Leimkuhler Model, Provides the discipline with a rigorous, mathematical understanding of journal productivity in MOF research. This will enable researchers to identify influential journals and further our comprehension of how knowledge moves and is circulated in the scientific community context with this subject matter. The contribution of Indian research literature is also highlighted in this research, as India makes up a smaller share of the research output worldwide, yet it is reflective of India's growing engagement and future relevance in MOF research and scholarship. The findings in this research substantiate a foundation for knowledge of how to effectively manage literature,

Review of literature :

Polyzou (2025) examined bibliometric indicators in neurochemistry and cancer literatures, using Bradford's Law and the Leimkuhler model to evaluate the patterns of source dispersion and journal concentration. This study further emphasized the value of these models as a tool for measuring saturation in research, and assessing concentrations and identifying high-impact journals in biomedical fields, which will continue to be relevant in 21st century scientometric study. Mahajan (2024) also applied Bradford's Law of Scattering and the Leimkuhler model to electronics research indexed in the Web of Science, determining the core journals that comprise the center of electronics scholarship, and their findings partly validated Bradford's distribution with the Leimkuhler model adopting the notion of normalized, Bradford-like distribution in yet another unique disciplinary context. Arya et al (2024) conducted a scientometric study on Type 1 Diabetes Mellitus literature and found that the Bradford-Leimkuhler pattern effectively delineated a small core of journals behind most of the field's output. They confirmed the applicability of Bradford's Law to biomedical literature, and affirmed its utility in collection development, as many librarians have suggested, variously over the years. Shi et al. (2024) completed a large-scale bibliometric mapping of circulating tumor DNA research (2003-2023) that utilized Bradford's Law to demonstrate key publication sources. The authors showed, in the context of cancer literature, that in combination with the Leimkuhler model Bradford's Law footprint effectively demonstrated concentration of high-impact oncology journals, and assisted in resource management for cancer research. Xie et al. (2024) investigated cancer research within the framework of vascular normalization, using Bradford's Law to cluster journals and delineate publication zones. Findings supported the use of the law for modern biomedical data and demonstrated the increasing speed of multi-disciplinary involvement across cancer studies. Gupta and Singh (2023) studied Bradford distributions using the Leimkuhler model on various datasets to assess the degree of agreement between the mathematical model and observed scattering. Findings suggest that the Leimkuhler model provides reasonable estimates for the exponential growth of journal zones, validating its utility for analytical purposes in scientometrics. Yumnam and Singh (2023) applied Bradford's Law and the Leimkuhler model with a focused application in India's cancer research output (1989–2019). The study appeared in Science & Technology Libraries, and as part of its findings, identified India's main cancer research journals, as well as establishing the reliability of the Leimkuhler model to explain the pools of journals as a reference for evaluating national research activity. Anaisce (2023) evaluated biotic integrity literature using Bradford's Law from environmental sciences. The finding evidence for unevenness in the distribution of available sources, the study demonstrated the flexibility of the law when evaluating bibliometric outcomes from ecology-informed studies.Das (2023) utilized Bradford's Law to analyze LI S doctoral theses published at NEHU (1994–2018). The results showed that LIS research follows traditional Bradford patterns, which provides evidence that Bradford's Law is still relevant for understanding the dynamics of academic thesis production. Debnath and Kumar (2021) examined Bradford's Law and Central University publications. They claimed the law is useful in practice for evaluating transparency and scholarship production of journals or academic

units. The authors emphasized the law is valuable in understanding knowledge concentration in systems of scholarship. Sarkar, Borgohain, and Verma (2021) examined the information science literature utilizing both Bradford's Law and the Leimkuhler model. The analysis showed a strong theoretical correspondence between the observed data and Leimkuhler distribution, indicating empirical confirmation. Gupta (2022) investigates AI research trends through Bradford's Law and Leimkuhler modeling finding that AI literature evidences classical scattering with an increased core of journals as the field is interdisciplinary. Kumar (2021) integrates a modified Bradford's Law of Scattering examining the medical and surgical fields found that specialized subfields produce more concentrated journals than would be expected on a standard Bradford distribution thus bridging a theoretical refinement of Bradford's Law with applied bibliometric publication needs.

Research methodology :

This research utilizes an online literature survey to examine the publications related to Metal-Organic Frameworks (MOFs) during the period from 2000 to 2024. Bibliographic information was sourced from the Web of Science (WoS) database for the expression "Metal-Organic Framework" and an additional filter applied for Indian affiliations, constructing the repository of publications authored or co-authored by authors in India. A total of 8,451 records were downloaded in plain text for review. Data onbif cated journals, number of articles, year of publication, authoring, and citations were all collected relative to the bibliographic information. HistCite and Bibexcel were utilized for the bibliometric review of the data set. The journals were compiled into Bradford's zones, which define core, middle, and peripheral journals. The tabulation and graphical data accumulations by year of articles launched and journal productivity would be documented in Google Sheets based on the objectives of the study. The estimate for cumulative articles could be measured mathematically with the Leimkuhler model, which also calculated Bradford multipliers while noting deviations/error between what was observed and what was predicted, whereby providing an overall quantitative measure of the scattering of Indian literature on MOFs across journals.

Objectives of the study :

1. To List out the Ranking of top 20 Journals based on Number of Publications
2. To know the scattering of scientific literature in Journals by Rank Order
3. To test the distribution Bradford's Law of Scattering.
4. To find out the distribution of journal publications in Bradford's Zones
5. To analyse MOF research journals using the Leimkuhler Model to identify core, middle, and peripheral journals.

Table 1 an Overview of Metal–Organic Frameworks Research Literature in India

Study Coverage , Database& Tool	Authorship Patterns
Period of Study: 2000-2024	Total Authors: 42117
Database: Web of Scinece	Unique Authors: 20023
Anlysis Tool : Hiscite & Bibiexcel	Single-authored Documents: 116
Bibliometric Indicators	Multi-authored Documents: 42001
Total Publications: 8451	Authors per Document (Average): 4.98
h-index: 207	Documents per Author (Average): 0.167
Total Citations: 27,9218	**Research Coverage & Keywords**
Average Ciation Per Year:11168.72	Countries Collabortion:787
Times Cited :33.05	Research Areas: 105
Publication Sources	Affiliations: 1,625
Journals Covered: 718	Affiliations with Subdivisions: 2,199
Document Types: 16	Total Keywords: 6,247

Analysis :

Table 1 Indicates that research on Metal–Organic Frameworks (MOFs) appears to be concentrated in publications originating from the United States and the United Kingdom, with Inorganic Chemistry, Crystal Growth & Design, and Dalton Transactions having the most articles. The existence of high-impact journals such as Chemical Engineering Journal and Journal of Materials Chemistry A suggests that research into MOFs is being published more broadly than just chemistry specific journals or those exclusively focused on chemistry-based study.

Table 2 Ranking of top 20 Journals in Metal–Organic Frameworks Reaserch Literature

Sl.No.	Journals	No. of Publications	Country of Origin	Rank
1	Inorganic Chemistry	338	United States	4.7
2	Crystal Growth & Design	310	United States	3.4
3	Dalton Transactions	305	United Kingdom	3.3
4	New Journal Of Chemistry	235	United Kingdom	2.5
5	Journal Of Molecular Structure	232	Netherlands	4.7
6	Crystengcomm	196	United Kingdom	2.6
7	Chemistryselect	182	United Kingdom	1.9
8	Inorganica Chimica Acta	156	Netherlands	3.2
9	ACS Applied Materials & Interfaces	153	United States	4.7
10	RSC Advances	153	United Kingdom	3.3
11	Polyhedron	142	United Kingdom	2.6
12	Chemistry-A European Journal	141	Germany	5.1
13	Journal Of Materials Chemistry A	138	United Kingdom	6.2
14	Chemical Communications	118	United Kingdom	5.1
15	Chemical Engineering Journal	116	Netherlands	10.3
16	Coordination Chemistry Reviews	116	United Kingdom	23.5
17	Inorganic Chemistry Communications	116	United States	5.4
18	ACS Applied Nano Materials	112	United States	3.6
19	ACS Omega	110	United States	3.6
20	International Journal of Hydrogen Energy	101	United Kingdom	4.5

Mathematical Formulation of Bradford's Law:

According to Bradford's Law, the articles about a specific subject are spread through journals. When journals are ordered from the most to the least number of articles produced, we can see the journals cluster into zones, which all produce roughly the same number of articles. In other words, through a ranking journal based on productivity, we could differentiate three zones contain an article representing about one-thirds of total articles.

Empirical Form of Bradford's Law :

Bradford (1934) expressed the relationship as: 1:n:n2

Where:

1 → number of journals in the core zone (Zone 1)

n → Bradford multiplier (constant)

n^2 → number of journals in the third zone

Scattering of Scientific Literature in journals by Rank Order Bradford's Law Table :

The dataset demonstrates the use of Bradford's Law of Scattering (Bradford, 1934) in the reviewed literature, revealing a concentrated output of articles in a limited number of publications. The 718 journals added 8,451 articles, with the initial rankings indicating that a limited number of journals have high publication output. The first 14 journals, for example, had a total of 2,799 articles, which is approximately one-third of the total output, reflecting the core zone. As the rankings increase, there is a reduction in the number of articles published by each journal. Meanwhile, the cumulative number of journals increases significantly, highlighting the geometric scattering, which aligns with the Bradford distribution. The second zone was also noted for all articles from journals ranked from 15–67, with a total of 2,837 articles produced in this case. The final zone of publications was identified from 651 journals, which produced 2,815 articles, resulting in the final third of the total number of articles retained. Finally, the logarithmic values of n cumulative journals (Log n = 0.0–6.6) confirm the exponential growth of journals at the periphery. The typical Bradford attributes of the core producing a higher proportion of research articles at a small rate compared to additional journals exhibiting a low output yet equally contribute to the overall number are confirmed by measurement logs.

Table 3 Bradford's Law of Journal Scattering

Rank	No. of Articles per Journal	Cumulative No. of Journal	Total No. of Articles	Cumulative No. of Articles	Log(n) N
1	1	1	338	338	0.0
2	1	2	310	648	0.7

3	1	3	305	953	1.1
4	1	4	235	1188	1.4
5	1	5	232	1420	1.6
6	1	6	196	1616	1.8
7	1	7	182	1798	1.9
8	1	8	156	1954	2.1
9	2	10	306	2260	2.3
10	1	11	142	2402	2.4
11	1	12	141	2543	2.5
12	1	13	138	2681	2.6
13	1	14	118	2799	2.6
14	3	17	348	3147	2.8
15	1	18	112	3259	2.9
16	1	19	110	3369	2.9
17	1	20	101	3470	3.0
18	1	21	91	3561	3.0
19	1	22	90	3651	3.1
20	2	24	160	3811	3.2
21	1	25	69	3880	3.2
22	1	26	67	3947	3.3
23	1	27	62	4009	3.3
24	1	28	61	4070	3.3
25	1	29	59	4129	3.4
26	1	30	56	4185	3.4
27	1	31	54	4239	3.4
28	2	33	106	4345	3.5
29	1	34	50	4395	3.5
30	3	37	147	4542	3.6
31	1	38	48	4590	3.6
32	3	41	138	4728	3.7
33	1	42	45	4773	3.7
34	1	43	44	4817	3.8
35	1	44	43	4860	3.8
36	1	45	39	4899	3.8
37	4	49	152	5051	3.9
38	4	53	144	5195	4.0
39	3	56	105	5300	4.0
40	1	57	34	5334	4.0
41	1	58	33	5367	4.1
42	4	62	128	5495	4.1
43	1	63	31	5526	4.1
44	1	64	29	5555	4.2

45	1	65	28	5583	4.2
46	1	66	27	5610	4.2
47	1	67	26	5636	4.2
48	2	69	50	5686	4.2
49	5	74	120	5806	4.3
50	5	79	115	5921	4.4
51	4	83	88	6009	4.4
52	2	85	42	6051	4.4
53	4	89	80	6131	4.5
54	2	91	38	6169	4.5
55	5	96	90	6259	4.6
56	2	98	34	6293	4.6
57	4	102	64	6357	4.6
58	3	105	45	6402	4.7
59	11	116	154	6556	4.8
60	12	128	156	6712	4.9
61	12	140	144	6856	4.9
62	10	150	110	6966	5.0
63	9	159	90	7056	5.1
64	10	169	90	7146	5.1
65	17	186	136	7282	5.2
66	11	197	77	7359	5.3
67	23	220	138	7497	5.4
68	28	248	140	7637	5.5
69	44	292	176	7813	5.7
70	53	345	159	7972	5.8
71	106	451	212	8184	6.1
72	267	**718**	267	**8451**	**6.6**

Step 1: Bradford Multiplier Formula

For three zones:

$J_1:J_2:J_3=1:n:n^2$

Bradford multiplier :

$$n = \sqrt{\frac{J_3}{J_1}}$$

$$n_1 = \frac{J_2}{J_1}, \quad n_2 = \frac{J_3}{J_2}$$

Multiplier (n) :

$$n = \sqrt{\frac{651}{14}} = \sqrt{46.5} \approx 6.82$$

Zone wise Ratio

$$n_1 = \frac{J_2}{J_1} = \frac{53}{14} \approx 3.79$$

$$n_2 = \frac{J_3}{J_2} = \frac{651}{53} \approx 12.28$$

Table 4 Bradford's Multiplier

Zones	**No. Journals**	**No.Article**	**Multiplier Factors**
Z 1	14(1.9%)	2799(33.1%)	
Z 2	53(7.4%)	2837(33.6%)	3.79
Z 3	651(90.7%)	2815(33.3%)	12.28
	718	**8451**	6.82

2. Application of Bradford's Law using the Leimkuhler Model :

The Leimkuhler model (Leimkuhler, 1967) gives mathematical expression to Bradford's Law of Scattering and it enables a transition from descriptive counts in bibliometrics to quantitative prediction. Important here is that we can express mathematical cumulative articles G(r) as a function of cumulative journals (r) rather than dividing journals by discrete zones. This greatly enhances our ability to indicate core, middle, and bottom zones of journals and define the Bradford multipliers (growth in the number of total journals needed to keep constant the number of articles).

Leimkuhler (1967) has expressed Bradford's empirical law in continuous mathematical form in the following way :

G(r)=k ln⁡(1+ar)G(r) = k\ln(1 + ar)G(r)=k ln(1+ar)

Where G(r) is the cumulative counts of article from the first r journals, k is the Bradford constant, a is the scattering constant. The continuous form permits us to model the same principle expressed again in the three equiproductive zones:

Zone 1 (Core/Nucleus) : A small number of journals (J1) produced the first one-third of total articles (G(r) = k ln(1+ar) for r.

Zone 2 (Middle zone) : A larger number of journals (J2), were required to contribute the remainder to the one-third of articles at the next one-third of J1 and appropriate J1 and the larger number of journals would have n1=J2/J1 as the multiplier.

Zone 3 (Peripheral zone) : The largest number of journals (J3) produced the last one-third of articles, and J3 and J2 would demonstrate that the exponential factor associated with scaling of the number of journals would be the second multiplier n2=J3/J2.

Then, Bradford's n would be √J3/J representing the geometric growth of journals across the zones, Leimkuhler modeling can be employed by plotting cumulative articles G(r) as a function of cumulative journals r, for further visibility of the scattering.

G(r)=kln(1+ar), where:

G (r)	Cumulative number of articles from the first r journals
r	Cumulative number of journals arranged in decreasing productivity
k	Bradford constant (scaling factor)
a	Scattering constant
ln	Natural logarithm

This logarithmic model gives a smooth curve describing the cumulative distribution of articles over journals.

Estimation of Constants

If total number of journals = R

Rand total number of articles = G(R)

G(R), then the constant k is derives as

$$k = \frac{G(R)}{\ln(1 + aR)}$$

and a can be determined empirically from the dataset.

Step 2: Estimate Constants k and a

We can approximate k using the core zone (Z1):

$K = G_1/\ln(1+ar_1)$

where G_1= articles and r1=14 journals.

To estimate *a,* we use the fact that the cumulative articles for total journals

(r = 718) = 8451

8451= k ln(1+a·718)

Using these two equations simultaneously, we can solve for k and a.

Table 5 Bradford Error Calculation

Zone	Journals (r)	Observed (G(r))	Expected (G(r))	Error
Z1	14	2799	G1	E1
Z2	67 (14+53)	5636	G2	E2
Z3	718	8451	G3	E3

Use Three-Zone Approximation

For three zones:

$G(r)=k\ln_{f_0}(1+ar)$

Assume k= number of articles in core zone = 2799

Estimate *a* using total journals and articles:Discov Oncol

$8451=2799\cdot \ln(1+a\cdot 718)$

$\ln_{f_0}(1+718a)= 8451/ 2799 = 3.018$

$\ln(1+718a)= e^{3.018} =2045$

$1+718a=e3.018=20.45$

Calculate Expected Articles per Zone

$G(r)=2799\cdot \ln(1+0.0271\cdot r)$

Z1(r=14):

$G(14)=2799\cdot\ln(1+0.0271\cdot 14)=2799\cdot\ln(1.3794)=2799\cdot 0.321=898$

Z2 (r = 14+53 = 67) :

$G(67)=2799\cdot\ln(1+0.0271\cdot 67)=2799\cdot\ln(2.8147)=2799\cdot 1.034=2894$

Z3 (r = 718) :

$G(718)=2799\cdot\ln (1+0.0271\cdot 718)=2799\cdot\ln_{f_0}(20.45)=2799\cdot 3.018=8451G$

Table 6 Calculation of Errors

Zone	Observed (G)	Expected (G)	Error (G_{obs}-G_{exp})
Z1	2799	898	1901
Z2	5636	2894	2742
Z3	8451	8451	0

This simple method gives an aThis straightforward approach provides an estimation; Z3 is an exact fit since it used to determine a, however, Z1 and Z2 are underestimating. The model permits error calculations, which arithmetically express the difference between cumulative observed articles and cumulative articles expected for the logarithmic equation. These errors suggest the degree of correspondence between real world journal output and ideal Bradford distribution. By assessing the deviations, scholars can qualify knowledge concentration, recognize core highly productive journals, and assess literature dispersion through lower peripheral journals. The Leimkuhler model implements a better measurement of accuracy, visualization, and analysis to bibliometric studies for Bradford's Law. Bradford's Law of Scattering applies to Metal–Organic Frameworks (MOFs) literature, and the Leimkuhler model successfully quantifies it. The Leimkuhler model enabled the study to estimate cumulative articles, calculate Bradford multipliers, and measure deviations between expected and observed outputs. The model confirms the geometric progression of journal productivity validating that Bradford's law holds true for MOF research in India.

Findings of the study :

The bibliometric study includes 8,451 research literature focused on Metal-Organic Frameworks (MOFs) published in India from 2000-2024, in 718 journals demonstrated the definite triangulation of Bradford's Law of Scattering. The results of the distributions show that the literature of research is highly concentrated in a small core of journals. The first zone of 14 journals produced the first third (2,799 articles) of the total publications. The second zone had 53 journals contributing to the second third of articles (2,837). The total third, or the Matter Zone, is represented by the remaining 651 journals producing the final third of the (2,815 articles). These distributions demonstrated a typical Bradford type distribution whereby a small number of core journals dominates sourcing the deposit of knowledge, with the remainder of the journals progressively produce fewer and less articles. While this quantitative findings reconfirm the MOF research area does reflect this geometric progression of journal productivity as it relates to the traditional scattering of scientific literature. Using the Leimkuhler model, the present study also estimated expected cumulative articles and altered the predicted model when creating realistic deviations and/or errors from the basis, or observed articles values, yielding to errors in the core and middle zones and reasonable real-world journal productivity deviation from the predicted model values.These findings highlight a number of notable implications. First off, this research outlines journals that can be deemed "influential" for the purposes of MOF research and can assist others—researchers, librarians, policy implementation, or collection development—in developing collection or literature retrieval strategies. Secondly, this analysis produces evidence of successful utilization of the Leimkuhler model for quantitatively analyzing the scattering of knowledge, demonstrating a means to predict and visualize cumulative article growth. This research further confirms there is a limited set of journals that dominate journal output, but many peripheral journals contribute at meaningful levels to the overall diversity and breadth to the literature of MOFs emphasizing the need for inclusivity in coverage of literature for bibliometric assessments and for determining the success of research.

Limitation and suggestion :

The research confines itself to publications in the Web of Science, covering the years 2000 to 2024, and the associated search term "Metal-Organic Frameworks". Some pertinent publications, particularly those which appear in Indian journals not indexed in the Web of Science, may not be included. Deviations from the Leimkuhler model standards show that the pattern of publication does not entirely conform to Bradford's Law. Additional works should include multiple database selection, examine spatio-temporal trends and citation activity, and utilize sophisticated bibliometric tools to conduct investigations into collaboration and emergent sub-fields of the Indian research community in MOF research.

Conclusion :

The study demonstrates the verification of Bradford's Law of Scattering as the pattern of MOF research articles. A relatively small core of journals publishes the majority of the articles in the literature, while a substantial amount of peripheral journals contribute smaller numbers and progressively fewer. The utilization of the Leimkuhler model enabled a quantitative metric for cumulative articles, Bradford multipliers, and the differences between what was found and what was expected. The results suggest that 14 journals produced one-third of the publications, 53 journals produced one-third, and the remaining third produced by 651 journals, showing an exponential increase in the number of journals required to produce the successive articles. This analysis highlights the top publishing and leading journals related to MOFs and demonstrates how mathematical modeling can be utilized in bibliometric studies to provide information about concentrated versus scattered knowledge. Patterns associated with Indian research literature, while making up a small portion of the global output, make a significant contribution to those journal groups representing the core and peripheral zones; this is notable as overall Indian activity represent a growing role in MOF research, which is part of the patterns exhibited in this literature. Knowledge of these various patterns is useful for in-country researchers and librarians, as well as outside researchers and scholars and policymakers, to glean information on literatures' differential contributions to various targeted journals and how that might impact and shape literature retrieval methods for journal selection strategy and technical knowledge acquisition, given that the variation in literature class organization of peripheral journals is incredibly significant to the field for its variety, breadth, and completeness of all knowledge within the literature for these studies.

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