

Mapping the Research Landscape: A Bibliometric Analysis of ‘Brainwave: A Multidisciplinary Journal’ spanning 2020 to 2023

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Abstract

“Brainwave”, a multidisciplinary quarterly e-journal, was converted from bi-annual to a quarterly journal from volume 3, 2022. It is a peer-reviewed open-access e-Journal from all the branches of Science, Engineering, Technology, Law, Management, Liberal Art, and Health Sciences.

Purpose: The purpose of the study is to find out the different bibliometric parameters i.e. Year wise distribution of the research article, authorship pattern, author’s productivity, year wise-growth of contributions, degree of collaboration, country wise-distribution of authors, subject wise-distribution of articles during the year 2020 to 2023.

Methodology: The researcher analysed Brainwave journal data using statistical techniques to assess authorship patterns, article distribution, publication growth, collaboration, citations, and productivity, distribution of articles by subject, focusing on 2020-2023 publications.

Findings: The Brainwave journal published 145 articles from 2020 to 2023, with the highest number (30.34%) in 2021 and the lowest (17.93%) in 2023. Out of 329 contributors, 47 (14.28%) were single authors and 49 (14.89%) joint authors, with a degree of author’s collaboration (DC) of 0.67. The highest author productivity was 129 (0.34) in 2021, while the lowest productivity was 50 (0.52). The journal covers various subjects, with the majority of articles (23.14%) in computational science.

Keywords: *Bibliometric, Authorship patterns, Citation analysis, Library and information science, Content Analysis, Author productivity, Degree of author’s collaboration, Scientometrics.*

Introduction

The development of modern information technology has greatly contributed to information overload in terms of the amount of information produced, how easily it is spread, and the wide audience it reaches. The management of information becomes more challenging with an

increasing amount of data, resulting in information overload. Research scholars and academicians are publishing a large number of scholarly publications on a daily basis across the world. Nowadays, in India, research has been conducted on a wide range of library and information science topics. India’s research history began with the ground breaking work of

Dr. S.R. Ranganathan, the father of Library and information Science. Bibliometric study is the most commonly used technique of research output in India. In 1969, Alan Pritchard used the term "bibliometric" for the first time in his article "Statistical bibliography or bibliometric" that was published in the "Journal of Documentation". "Biblio" means book and "metric" refers to a scale or measurement.

Bibliometrics involves applying statistical methods to bibliographic data, primarily in scientific and library contexts. It is a method that uses academic publications to gain insights into the production, organization, and interrelation of research. It also evaluates the impact of publications through citation analysis and identifies research strengths and gaps in research and informs decisions about future research.

"Brainwave: A Multidisciplinary Journal" is a Journal of the Brainware University, started in 2020. It is a peer-reviewed open-access e-Journal from all the branches of Science, Engineering, Technology, Law, Management, Liberal Art, and Health Sciences. It is converted to a quarterly journal from volume 3, 2022. The journal has published 4 volumes with 2 special issues. The main objective of the journal is to provide an intellectual platform for scholars throughout the globe and become the leading journal in the world.

Review of Literature

Various bibliometric studies have been conducted in various subject fields. This study conducted a bibliometric analysis of the 'Brainwave, a multidisciplinary journal which published research articles of various subject domain. For this purpose, the researcher scanned the 'Brainwave' journal and searched for many journal articles as well.

Das and Verma (2021) conducted an analysis of 1220 digital library research papers published by BRICS during the period 2000 to 2019. The study found that the highest number of publications (225) were co-authored, with a degree of collaboration of 0.84, collaboration co-efficient of 0.59 and a modified collaboration co-efficient of 0.61. China contributed the most papers (690), followed by India with 205. The study concludes that there is an increased focus on digital library research in BRICS countries.

Garg, K., & Tripathi, H. (2017) analyses 801 articles and examines the reasons for the sharp rise in bibliometric assessment research in India and other countries. CSIR-NISTADS is the top producing institute, contributing about one-third of the total output. The distribution of citation data shows that about one-fifth of the papers remained uncited and only 15% of the papers were cited more than 20 times. The highly cited authors were mostly from institutions belonging to the Council of Scientific and Industrial Research.

By analyzing the articles, Chaurasia shows, the journal "Annals of Library and Information Studies" has experienced a growth in contributions, with an average of 21.4 per volume. Collaborative research is preferred by most library and information scientists, with Bibliometrics being the most popular topic. The distribution of contributions is calculated by institution and geography, with citations being prevalent. Journals are cited more frequently than books. In the ranked list of cited journals, 'Annals of Library & Information Studies' occupies the 1st rank & 'Scientometrics' occupies the 2nd rank.

The journal "Library Herald" was analyzed through bibliometric analysis for the years 2011 to 2014. Kumar (2014) covered various aspects such as authorship pattern, subject wise distribution of articles, average number of references per article, forms of documents cited, and year-wise

distribution of cited journals. The analysis revealed the strengths and weaknesses of the journal that can be used for its further development. The study showed that most contributions were from India, with 89.47% and the rest from foreign sources. single author contributed 57.01% of the 114 articles while joint authors contributed the remaining 42.98%.

This article provides an overview of the history and publication output of an international journal for Translation and Interpreting Studies called Across Languages and Cultures. The journal has become a well-respected Q1 journal through publishing research from various countries. The article presents figures related to the number of articles, authorship, and citations. The second part of the study analyzes the main focuses, themes, and languages of inquiry. The journal has contributed to shaping translation research globally.

The Journal of Information Literacy is published by CILIP Information Literacy group. The present study analyzed bibliometric attributes such as article growth, authorship patterns, and article length. The study found that 239 articles were published between 2015 and 2022 with an average of 30 articles per volume. Single author publications were dominant. The number of papers in the journal fluctuates due to variations in the volume. Research articles make up the majority of the papers (39.33%) published, followed by conference updates (17.99%) and project reports (16.73%). Single authors (64.01%) dominate contributions. The degree of collaboration ranges from 0.21 to 0.66. The average number of citations per paper is 25.3. The journal received the most papers with a page count between 1 and 5.

This study conducted a bibliometric assessment of research output from Kuvempu University in Karnataka from 1990-2019 using data from the

Web of Science. The analysis covered author productivity, types of documents, individual author productivity, geographical collaboration, and research output distribution by language. In 2012, Kuvempu University had 136 publications with Electrochemistry as the top research field, accounting for 10.167% of all research. Collaboration was key, with only 0.61% of authors publishing individually. Journal articles were the primary medium of research communication, accounting for 97.041% of records. English was the only language used for publication, and Kuvempu University scientists collaborated with other countries, earning both Local and Global Citation Scores.

The IEEE Access journal has become a leading multidisciplinary journal in a short time, ranking among the top journals in Engineering and Computer Science (General). This article presents a detailed bibliometric analysis of the journal, including publishing patterns, authorship and collaboration structure, citation impact, funding patterns, and thematic structure. The gender distribution and social media visibility of the articles are also discussed, as well as their alignment with Sustainable Development Goals. The results show that the journal attracts high-quality multidisciplinary research and has increased multi-authored multidisciplinary research, with a significant percentage of articles having female first authors.

Objectives of the Study

The objectives are as follows:

- ✓ To study year wise distribution of the articles
- ✓ To find out the volume wise authorship pattern
- ✓ To identify the degree of collaboration
- ✓ To identify the year-wise growth of contributions
- ✓ To study the author's productivity

- ✓ To study the subject coverage of articles

Methodology

The researcher accessed the Brainware University website and Google Scholar and gathered bibliographical information from the journal "Brainwave." By employing diverse numerical statistical techniques, the authorship patterns, article distribution, publication growth, degree of collaboration, growth in citations and contributions, distribution of articles by subject, and the most productive authors are assessed. Furthermore, only journal publications published between 2020 and 2023 were considered in the analysis.

Data were collected from the website www.brainwareuniversity.ac.in of "Brainwave."

journal. About 12 issues from the four volumes were chosen for the study between 2020 and 2023. The bibliometric study examines various journal components, such as authorship pattern, author's productivity, degree of collaboration, distribution of articles by subject. These data were represented using basic statistical techniques.

Data Analysis

Year wise distribution of the articles

Table 1 shows the distribution of articles by year. The data indicates that 44 articles (or 39.21%) had the highest publication rate in 2021, while 26 articles (15.20%) had the lowest publication rate in 2023.

Year wise Distributions of Articles				
Year	Article	Percentage	No. of Authors	Percentage
2023	26	17.93	50	15.20
2022	41	28.28	88	26.75
2021	44	30.34	129	39.21
2020	34	23.45	62	18.84
Grand Total	145		329	

Table 1 Year wise distribution of the articles

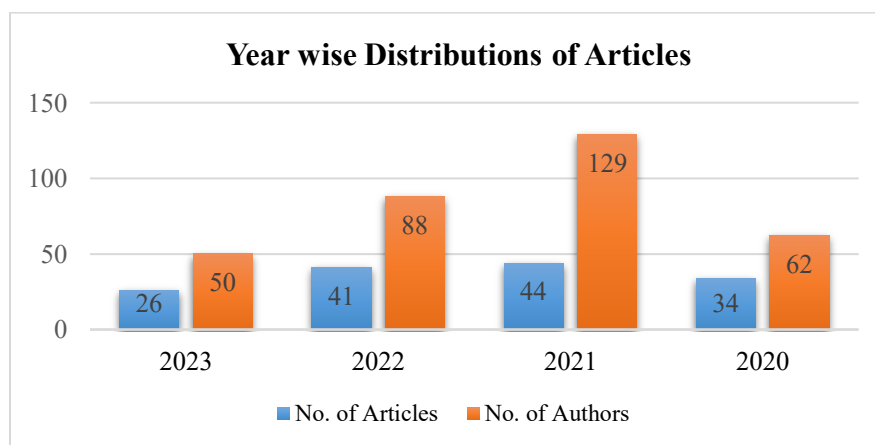


Figure 1 Year wise Distribution of the Articles

Volume-wise authorship pattern

Volume-wise Authorship Pattern											
Year	Volume	Issues	Authors Per Article							Total Papers	Total Authors
			One	Two	Three	Four	Five	Six	Seven		
2023	4	4	9	13	3	0	0	1	0	26	50
2022	3	4	15	11	8	2	4	0	0	41	88
2021	2	2	9	9	10	11	3	1	1	44	129
2020	1	2	14	16	3	0	0	0	1	34	62
Total		12	47	49	24	13	7	2	2	145	329

Table 2 Volume-wise authorship pattern

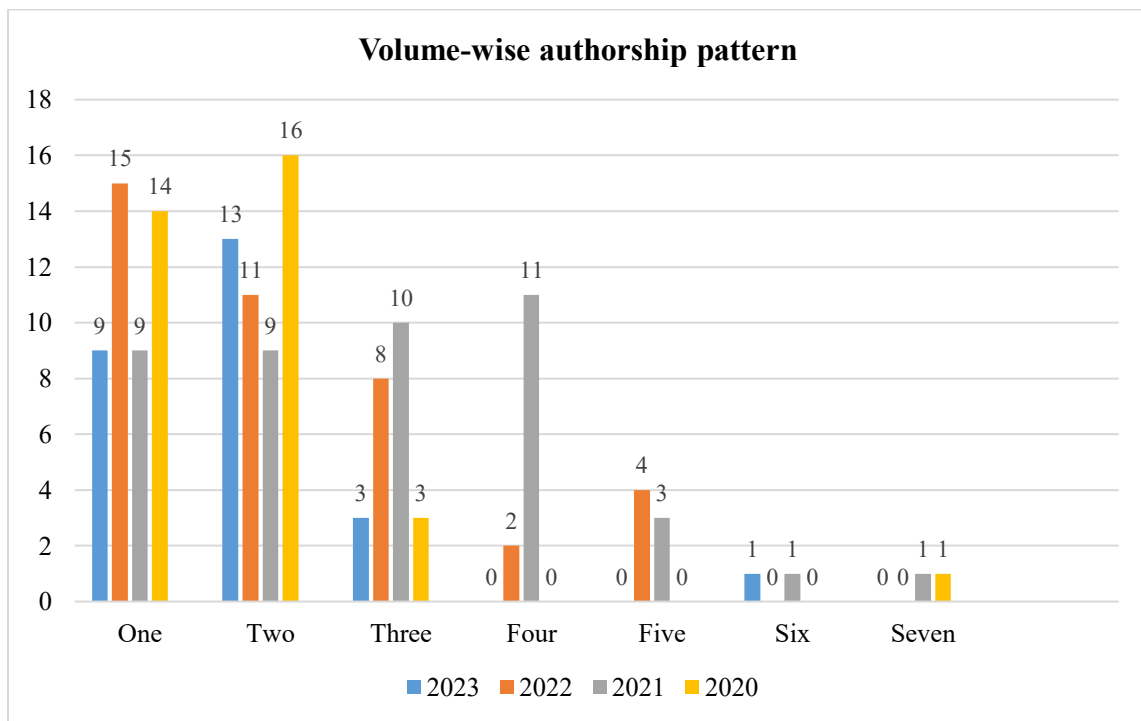


Figure 2 Volume-wise Authorship Pattern

The volume-wise authorship pattern is shown in Table 2. The authors were categorized into seven groups (i.e. single author, double authors, three authors, four authors, five authors, six authors and seven authors). Additionally, it demonstrates that out of 47 contributions made by a single author, Vol. 3 has the most (15, or 32%),

and Vol. 4 and 2 have the lowest number (9, or 12%). Of the 49 articles with double author contributions, Vol. 1 has the most contributions (16, or 27.05%), while Vol. 2 has the least number of contributions (9, or 10.58%).

Degree of Author's Collaboration

Degree of Author's Collaboration				
Year	Single Authors (NS)	Multiple Authors (NM)	Total (NM+NS)	Degree of Collaboration
2023	9	17	26	0.65
2022	15	25	40	0.63
2021	9	35	44	0.80
2020	14	20	34	0.59
Total	47	97	144	0.67

Table 3 Degree of Author's Collaboration

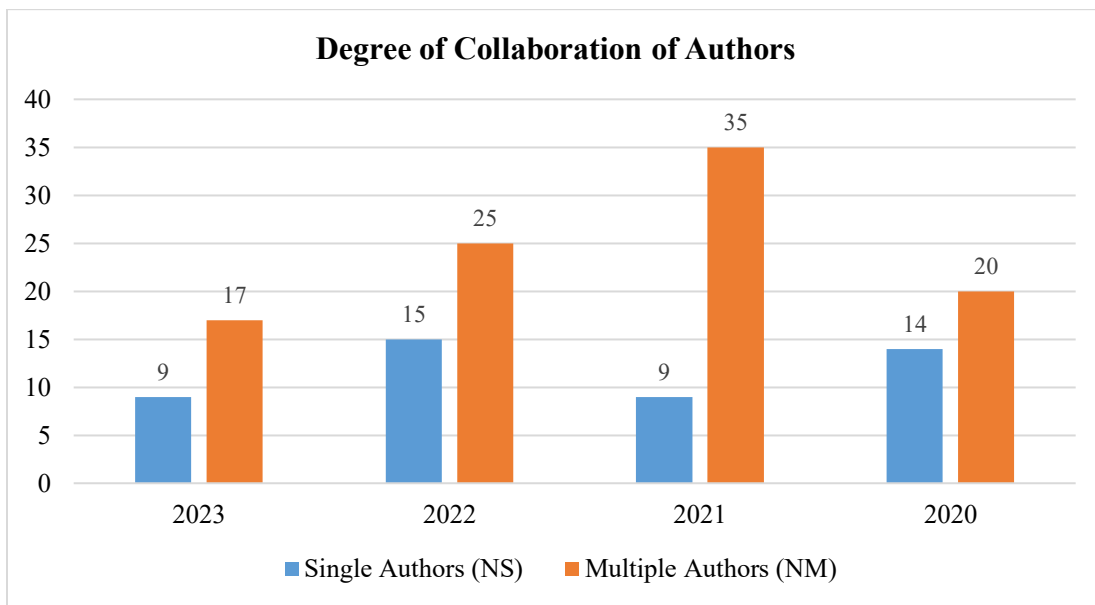


Figure 3 Degree of Author's Collaboration

Table 3 uses the formula proposed by Subramanyam (1983) to analyse the author's collaboration of Brainwave journal from 2020 to 2023.

$$DC = Nm / Nm+Ns$$

where,

DC = Degree of Collaboration

Nm = Number of multi authored research papers

Ns = Number of single authored research papers

$$DC = 97/97+47 = 0.67$$

Thus, it establishes that the DC for the entire four-year period is 0.67. The table also shows that the

DC value peaked in 2021 at 0.80 and decreased to 0.59 in 2020.

Author's Productivity

Author's Productivity				
Year	No. of Papers	Total Authors	AAPP*	Productivity per Author
2023	26	50	1.92	0.52
2022	41	88	2.15	0.47
2021	44	129	2.93	0.34
2020	34	62	1.82	0.55
Total	145	329	2.27	0.44

Table 4 Author's Productivity

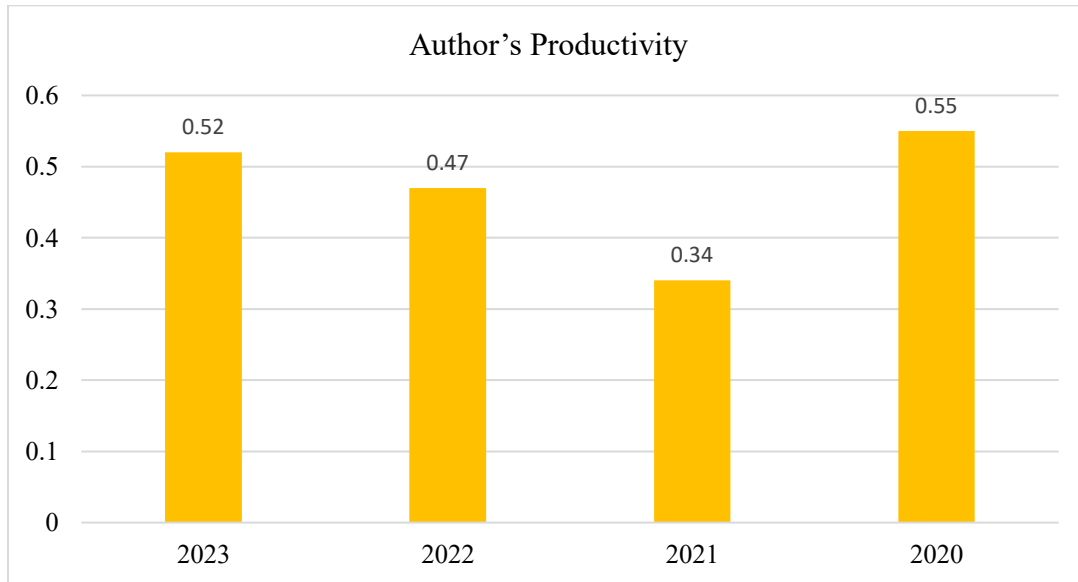


Figure 4 Author's Productivity

*Average authors per paper (AAPP) = No. of authors/No. of papers
Productivity per author = number of papers/ no. of authors

Table 4 analyses the author's productivity. It shows that in 2021, the author's productivity reached its peak at 129 (0.34). In 2023, the author's productivity was at its lowest point with a score of 50 (0.52).

Subject wise Distribution of Articles

Subject wise Distribution of Articles			
Sl. No.	Subject	No. of Articles	Percentage
1	Physics	2	1.65
2	Computer Science and Engineering	11	9.09
3	Computational Science	28	23.14
4	Law	7	5.79
5	Environmental Science	1	0.83
6	Health Science	9	7.44
7	Electronics and Communication	8	6.61
8	Museology	1	0.83
9	Atmospheric physics	3	2.48
10	Library and Information Science	5	4.13
11	Chemistry	4	3.31
12	Education	3	2.48
13	History & Culture	6	4.96
14	Management & Commerce	9	7.44
15	Health and Environmental Science	1	0.83
16	Philosophy	1	0.83
17	Literature	4	3.31
18	History and Archaeology	1	0.83
19	Allied Health Sciences	4	3.31
20	Media Science and Journalism	2	1.65
21	Pharmaceutical Technology	1	0.83
22	Information Technology	1	0.83
23	Multimedia & Animation	5	4.13
24	Apiculture	1	0.83
25	Engineering Apiculture & Technology	1	0.83
26	Literature and Culture	1	0.83
27	Media & Mass Communication	1	0.83
	Total	121	

Table 5 Subject wise Distribution of Articles

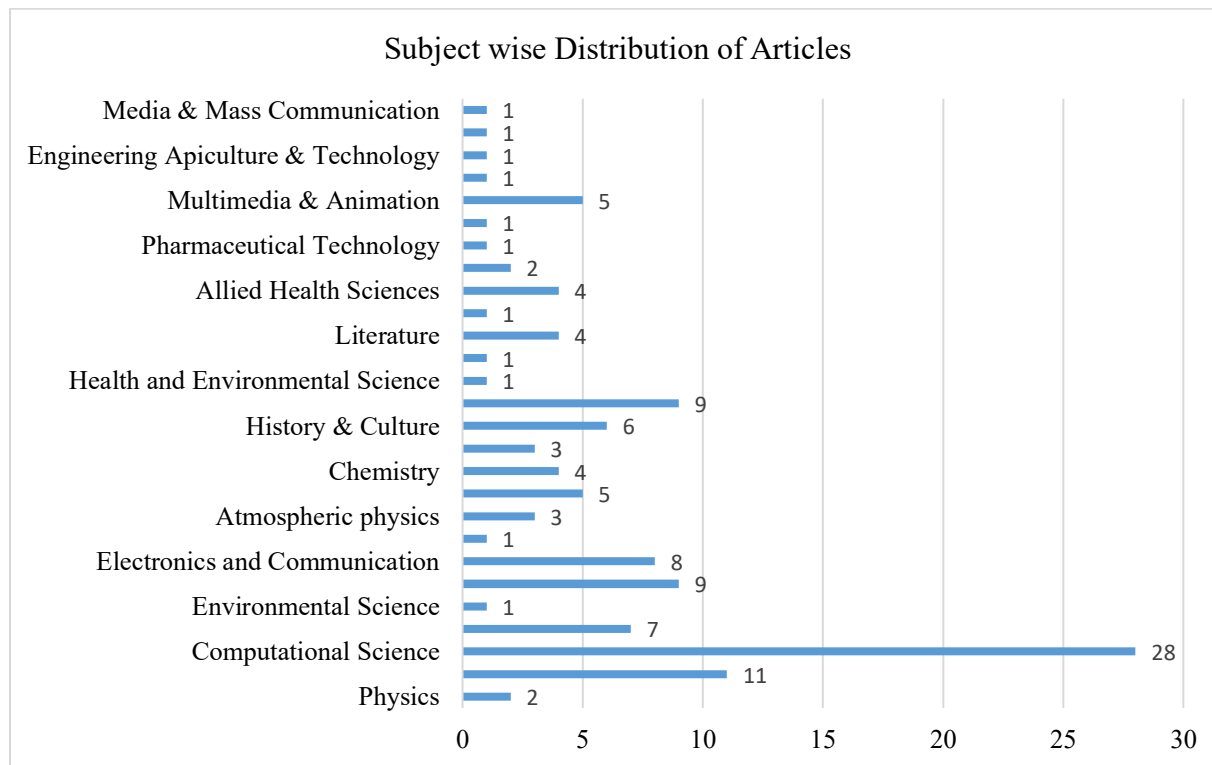


Figure 5 Subject wise Distribution of Articles

Table 5 indicated that most of the contributions appeared under Computational Science 28 (23.14%) followed by Computer Science and Engineering 11 (9.09 %), Health Science and Management & Commerce 9 (7.44%), Electronics and Communication 8 (6.61%), Law 7 (5.79%), History & Culture 6 (4.96%), Library and Information Science and Multimedia & Animation 5 (4.13%), Chemistry, Literature and Allied Health Sciences 4 (3.31%), Atmospheric physics and Education 3 (2.48%), Physics and Media Science and Journalism 2 (1.65%) and Environmental Science, Museology, Health and Environmental Science, Philosophy, History and Archaeology, Pharmaceutical Technology, Information Technology, Apiculture, Engineering Apiculture & Technology, Literature and Culture, Media & Mass Communication 1 (0.83%).

Findings

The present study indicates that 145 articles were published in the Brainwave journal during the year 2020 to 2023. The maximum number of articles is 44 (30.34%) were published in year 2021 and the lowest number of articles - 26 (17.93%) were published in the year 2023. The study found that out of 329 contributors, 47 (14.28%) contributors contributed as a single author, 49 (14.89%) of contributors contributed as joint authors and the degree of author's collaboration (DC) found is 0.67. It clearly indicates that researchers are more interested in collaborative research than independently. The value of DC was maximum in the year 2021 with 0.80 and minimum in the year 2020 with 0.59. The study revealed that the highest author's productivity - 129 (0.34) in the year 2021 and the lowest author's productivity - 50 (0.52) in the year 2023. Furthermore, the research data revealed the journal articles have covered a wide range of

subject areas such as Computational Science, Computer Science and Engineering, Health Science and Management & Commerce, Electronics and, Law, History & Culture, Library and Information Science and Multimedia & Animation, Chemistry, Literature and Allied Health Sciences, Atmospheric physics and Education, Physics and Media Science and Journalism and Environmental Science, Museology, Health and Environmental Science, Philosophy, History and Archaeology, Pharmaceutical Technology, Information Technology, Apiculture, Engineering Apiculture & Technology, Literature and Culture, Media & Mass Communication. It also revealed that most of articles submitted in the journal is in the field of Computational Science - 28 (23.14%).

Conclusion

Bibliometrics is a critical area of research that assesses the performance of researchers and their publications. It is utilized to track the scientific progress of various entities, including research groups, organizations, and universities. This study presents analytical results of publication, volume-wise authorship patterns, author productivity, degree of collaboration, author's productivity, subject wise-distribution of articles published in the 'Brainwave' journal. The journal covers various subjects, with the majority of articles in computational science. This study indicates that researchers show a greater inclination towards collaborating on research as opposed to working independently. The contributions of journal articles and citations fluctuate within a four-year span as it converted from bi-annual to quarterly frequency. Furthermore, the citations of the journal articles are not satisfactory. Being listed under UGC-Care could increase visibility and subsequently improve citations and contributions. 'Brainwave' can be found on the Brainware University website. If it were hosted on an open

access platform like DSpace, there would likely be more citations and contributions.

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