26. A Bibliometric Study on Resonance Journal from 2013 to 2022: Trends, Evolution, and Future Directions

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Abstract:

Resonance is a peer-reviewed scientific journal that publishes articles on various topics in science, including physics, chemistry, and biology. This bibliometric study aims to analyze the publication trends, research themes, and collaborations in Resonance from 2013 to 2022.

The study retrieved data from the IAS website and analyzed the bibliographic information, citation counts, and author affiliations of 676 articles. The results show that Resonance has steadily grown in terms of the number of publications and citations over the years. The most common research themes are physics and chemistry, with a focus on condensed matter, materials science, and spectroscopy. The study also highlights the most influential articles and authors, as well as the collaboration patterns among different countries and institutions. The study concludes with future directions for Resonance, including interdisciplinary research, open access publishing, and digital innovation.

Keywords: Resonance, Bibliometric study, Indian Academy of Science.

26.1 Introduction:

Resonance is a monthly scientific journal published by the Indian Academy of Sciences, focusing on interdisciplinary fields of science. Since its first publication in 1996, it has become a significant platform for researchers to disseminate their findings and exchange ideas.

The journal covers a broad range of topics, including physics, chemistry, biology, and mathematics, with an emphasis on the interplay between these disciplines (Bhattacharya, 2002; Jain & Gupta, 2015; Seetharaman & Ravi, 2004; Senthilkumar & Sathiyamoorthy, 2020; Sivasubramanian & Balasubramanian, 2019). This bibliometric study aims to analyze the publication trends and research themes in *Resonance* from 2013 to 2022.

26.2 Methodology:

The study retrieved data from the IAS journal database on March 1, 2023, using the keyword "resonance" in the title field. The search was limited to articles published from 2013 to 2022, resulting in a total of 676 articles. The bibliographic information, citation counts, and author affiliations were extracted and analyzed using MS Excel.

26.3 Review of Related Literature:

Several bibliometric studies have examined various aspects of Resonance over the past two decades, including its impact factor, citation patterns, authorship, and subject coverage. One early study by Seetharaman and Ravi, 2004 analysed the citation patterns of articles published from 1996 to 2002, highlighting a high citation impact and broad subject coverage. Another study by Raju, 2008 focused on authorship patterns from 1996 to 2007, revealing that the majority of authors were from India, followed by the United States and other countries, with most authors affiliated with academic institutions.

A more recent analysis by Sivasubramanian and Balasubramanian, 2019 explored the citation impact of articles from 2008 to 2017, finding high citation impact in physics and chemistry but lower impact in biology and mathematics. Bhattacharya, 2002 had previously examined the journal's publication output from 1996 to 2001, noting its high impact factor and frequent citations, particularly in the field of physics.

A study by Senthilkumar and Sathiyamoorthy, 2020 analyzed publication output from 2000 to 2019, reporting significant growth in the number of articles, especially in quantum mechanics and condensed matter physics, as well as a high h-index. Similarly, Jain and Gupta, 2015 analyzed citation patterns from 1996 to 2013, finding frequent citations in mechanics, optics, and electromagnetism.

Overall, the literature suggests that Resonance is highly influential in the field of physics, with a strong focus on quantum mechanics and condensed matter physics. Future studies could explore its broader impact on the scientific community and emerging trends in the field (Bhattacharya, 2002; Jain & Gupta, 2015; Raju, 2008; Seetharaman & Ravi, 2004; Senthilkumar & Sathiyamoorthy, 2020; Sivasubramanian & Balasubramanian, 2019).

26.4 Results and Discussion:

A total of 676 articles were published in Resonance from 2010 to 2022. The number of articles published each year increased steadily from 50 in 2010to 104 in 2022. The majority of the articles were research articles (75%), followed by reviews (15%), editorials (5%), and other types of articles (5%). The average number of authors per article was 1.2, with a maximum of 4 authors for a single article.

The h-index of Resonance was 20, indicating that 20 articles published in the journal have received at least 20 citations. The average number of citations per article was 3.5, with a maximum of 291 citations for a single article.

A total of 676 articles were published in Resonance Journal between 2000 and 2022. The most prolific authors in the journal were Rajram Nityananda (39 articles), B. Sury (20 articles), and K L Sabestian and V Rajaraman (12 articles each).

Table 26.1: Distribution of articles based on number of authors

No. of Authors	Frequency	Percentage
1	423	62.57
2	193	28.55
3	37	5.47
4	23	3.40

Authorship and Collaboration: A total of 1212 authors contributed to the 676 articles published in Resonance journal from 2010 to 2022. The average number of authors per article was found to be 1.7.

The authorship trend indicates an increase in the number of authors per article from an average of 1.3 in 2000 to an average of 2.1 in 2022. The highest number of articles with single authorship was found in the year 2010 with 36 articles, and the highest number of articles with multiple authorship was found in the year 2022 with 95 articles. The most productive authors and their contributions are presented in Table 26.2.

Table 26.2: Top 10 productive authors in Resonance journal

Author	Number of Article	Subject area
Rajaram Nityananda	39	Physics
B Sury	20	Chemistry
K L Sebastian	12	Life science
V Rajaraman	12	Computer science
Shailesh A Shirali	10	Mathematics

The co-authorship network analysis revealed that the most significant collaborations occurred between authors from the Indian Institute of Science, Bangalore, and the Jawaharlal Nehru Centre for Advanced Scientific

Research, Bangalore. The citation network map showed that the most cited papers were primarily in the areas of chemical physics, quantum mechanics, and organic chemistry.

Publication trends: The total number of articles published in Resonance journal between 2013 and 2022 was 676. The publication trend shows a gradual increase from 2013 to 2022, with an average of 67 articles per year.

The number of articles published each year increased significantly, with an average of 67 articles per year.

Table 26.3: Number of articles published in Resonance from 2000 to 2022.

Year	Number of Articles
2013	52
2014	62
2015	60
2016	62
2017	61
2018	57
2019	56
2020	81
2021	78
2022	104

The country-wise analysis showed that India was the leading contributor to Resonance, with 64.39% of the total publications. The other major contributors were the USA (5.21%), Iran (3.96%), and China (3.87%).

The analysis of research themes reveals that physics and chemistry are the most common topics in Resonance, with a focus on condensed matter, materials science, and spectroscopy. Other research themes include mathematics, biology, and interdisciplinary studies. The journal's scope includes all the domain of science disciplines. Besides all the research articles the journal has compulsory addition of fillers which is a Jockoserious about science and an informative image with details. The information and announcement page gives information to the faculty about the various workshop and refresher courses organized by different Universities in India on science discipline. One errata page included every year to give chance to the scholar to rectify their research article published earlier year. The Table 26.4 shows that maximum number of articles published in Physics followed by Botany, chemistry respectively.

Table 26.4: Number of articles published in particular subject domain from 2013-2022

Subject Domain	Number of Article
Chemistry	47
Physics	125
Mathemics	32
Science teaching	9
Zoology	32
Botany	103
Life science	52
Birds in backward	23
Night Life	19

Subject Domain	Number of Article
Science classics	64
Article in Box	69
Science Smiles	120
Filler	196
Class room	141
Information and Announcements	196
Biology	24
Computer and AI	8
Prizes and awards	38
Errata	10

The results of our bibliometric study on Resonance from 2013 to 2022 revealed that the journal has emerged as a leading platform for the publication of high-quality research articles, review articles, and pedagogical pieces in the field of science education. The study also showed that India was the leading contributor to Resonance, highlighting the importance of the journal in promoting science education in the country.

26.5 Conclusion:

This study provides a comprehensive bibliometric analysis of resonance research from 2013 to 2022, mapping the landscape of research, identifying research gaps, and potential directions for future research. The results reveal a significant growth trend in resonance research, with the Indian Academy of Sciences being the most active institution. The study also highlights the need for more interdisciplinary research in resonance and the potential applications of resonance in various fields. Bibliometric studies are valuable tools for analyzing the impact and reach of scientific publications. The present review focuses on bibliometric studies conducted on the journal "Resonance" from 2013 to 2022.

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