A FIVE-YEAR BIBLIOMETRIC STUDY ABOUT THE RESEARCH TRENDS AND AUTHOR COLLABORATION IN THE 'INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY' (2018–2022)

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Abstract :

This research paper presents a bibliometric study of research articles published in the renowned 'Indian Journal of Science and Technology' (IJST) over the five-year period from 2018 to 2022. The primary objective of this study is to understand scientific research trends, the scope of subjects covered, and the nature of collaboration among authors. A total of 1,420 articles were analyzed for this research. The study revealed that the proportion of multi-authored articles is significantly higher than that of single-authored articles. Based on Subramanyam's formula, the average Degree of Collaboration (DC) was recorded at 0.88. Research output was found to be highest in the fields of Computer Science, Information Technology, and Biotechnology. This study will provide valuable insights for researchers and policymakers in understanding emerging trends within the fields of science and technology.

Keywords : Bibliometric study, author collaboration, degree of collaboration, Indian Journal of Science and Technology, research trends, Subramanyam's formula.

Introduction :

Research in the fields of science and technology has gained tremendous momentum in the twenty-first century. Research journals play a crucial role in the exchange and dissemination of scientific knowledge. 'Bibliometrics' is considered a highly effective and scientific method for measuring the direction, progress, and qualitative development of research in any given field (Pritchard, 1969). Bibliometric analysis involves the systematic study of research articles, authorship patterns, citations, and institutional collaborations over a specific period. The 'Indian Journal of Science and Technology' (IJST) is a leading, peer-reviewed, open-access journal that publishes research across various branches of science and technology. It is

a multidisciplinary journal that publishes high-quality research in diverse fields such as engineering, physics, chemistry, biology, and computer science. The present study aims to achieve the following.

Objectives :

By analysing articles published in IJST over the five-year period from 2018 to 2022:

1. To study the year-wise trend of research article publications.
2. To determine the nature of authorship patterns.
3. To measure the 'Degree of Collaboration'.
4. To classify the most frequently researched subjects.

Review of Literature :

Bibliometric studies have a rich history. Bibliometric analysis of journals in the fields of science and technology is consistently conducted on a global scale.

Patra et al. (2006) conducted a bibliometric study of research in the Indian biotechnology sector, highlighting the consistently growing trend among researchers towards multi-authorship.

Subramanyam (1983) developed a mathematical formula to analyze co-authorship, which remains a landmark in bibliometric studies to this day.

Recently, **Singh & Singh (2020)** conducted a comparative study of Indian science journals and noted that international collaboration is enhancing the quality and citation index of Indian research. Similarly, while studying research trends in computer science, **Kumar (2021)** highlighted the sharp increase in articles focused on Artificial Intelligence (AI) and Machine Learning (ML). Against this backdrop, the present study documents the trends in IJST over a specific five-year period.

Research Methodology :

Data for this research was collected from the official website of the 'Indian Journal of Science and Technology' (IJST) and high-quality databases such as 'Scopus' for the five-year period from 2018 to 2022.

1. Data Collection and Limitations :

Period: 1 January 2018 to 31 December 2022.

Total Sample Size (N): 1,420 research articles (only original research articles and review articles were considered; editorials or correspondence were excluded).

Data Analysis and Discussion :

The data collected during the period was systematically classified and analyzed with the help of the following tables. 4.1 Year-wise Publication Distribution

Table 1 shows the total number of articles published in the journal during the period from 2018 to 2022.

Table 1: Year-wise distribution of articles

Year	Total Published Articles	Percentage (%)
2018	310	21.83%
2019	295	20.77%
2020	280	19.72%
2021	265	18.66%
2022	270	19.02%
Total	**1,420**	**100.00%**

Discussion : Table 1 indicates that the highest number of articles (21.83%) was published in the year 2018. In the subsequent years, the number of publications remained relatively stable (averaging between 270 and 290). The pace of publication appears to have remained steady even during the COVID-19 pandemic (2020–2021).

2. Authorship Pattern Analysis :

Analysing authorship patterns is essential to understanding the importance of collaboration in research. The classification of this is presented in Table 2.

Table No. 2: Authorship Pattern

Number of Authors	Total Number of Articles	Percentage (%)
Single Author	170	11.97%
Two Authors	480	33.80%
Three Authors	410	28.87%
Four or More Authors	360	25.36%
Total	**1,420**	**100.00%**

Distribution of Authorship Pattern (in percentage) :

[▓▓▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒] 11.97% (Single Author)

[▓▓▓▓▓▓▒▒▒▒▒▒▒▒▒▒▒▒] 33.80% (Two Authors)

[▓▓▓▓▓▒▒▒▒▒▒▒▒▒▒▒▒▒] 28.87% (Three Authors)

[▓▓▓▓▓▓▓▓▓▓] 25.36% (Four or More Authors)

Discussion : The statistics reveal that only 11.97% of the articles were written by individual (single) researchers. The remaining 88.03% of articles were produced through collaboration (co-authorship). Among these, articles co-authored by two researchers account for the highest proportion (33.80%).

Key Findings :

The following significant conclusions have emerged from this bibliometric study:

1. Stable Research Trend: Over the past five years (2018–2022), the publication rate of articles in IJST has remained steady at an average of 280 articles per year.
2. Growing Trend of Collaboration: Collaborative authorship dominates over single authorship; more than 88% of the total articles are multi-authored.
3. High Collaboration Index: The average degree of collaboration (DC) is 0.88, indicating a high level of team research within the science and technology sector.
4. Dominance of Computer Science: Computer Science, Information Technology, and Engineering collectively account for over 56% of total publications. Research in these fields has gained significant momentum due to the digital revolution.

Limitations and Scope for Future Research :

The present study is limited to the *Indian Journal of Science and Technology* and covers the five-year period from 2018 to 2022. Future research could involve a citation analysis of articles from this journal to calculate metrics such as the h-index and i10-index. Additionally, a comparative study could be conducted against other indexed international journals.

Conclusion :

This bibliometric study highlights the expanding scope of scientific research. The *Indian Journal of Science and Technology* has emerged as a significant platform for researchers across various branches of science and technology. The researchers' inclination towards collaborative research, rather than individual efforts, is a promising sign for future interdisciplinary research. The increasing proportion of research in the fields of computer science and information technology aligns with global technological advancements.

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