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# *MAPPING THE TRAJECTORY OF INDIAN SOCIAL SCIENCE RESEARCH: A DECADAL BIBLIOMETRIC ANALYSIS*

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## Introduction

Funding is an indispensable component for scholarly activities in academia. Investing in R&D drives a surge in scientific output, paving the way for enhanced economic and societal performance (Gondaliya & Shah, 2013).Particularly in the areas of social science research, investments are crucial in developing evidence-based insights and solutions to tackle complex societal issues and enhance the well-being of individuals and communities. Previous decadal data from the Web of Science (2014-2023) Social Science Citation Index (SSCI)(https://www.webofscience.com/) shows that only about 2040 (0.82%) publications were produced in the field of Social Sciences, compared to the total number of 247451 funded publications. It is necessary to support social science research in India to drive impactful and meaningful progress. Subsequently, the investments should be evaluated to ensure better performance and achieve the desired outcomes.Bibliometric analysis is a powerful statistical tool that facilitates a scientific and objective quantitative analysis of publications through which we can gain an in-depth understanding of a research domain, the topical hotspots, and emerging trends comprehensively and systematically (Yang et al., 2019). It has become common in bibliometrics to define research productivity as the number of publications per researcher (Abramo & D'Angelo, 2014), and analyse citations to assess research impact by determining how often subsequent publications cite a specific publication (Carpenter et al., 2014). Identifying the prominent research areas and understanding publication patterns is crucial for authors and funders to determine the best approaches for conducting research and publishing it in the appropriate venue.

In this context, the present study evaluated the growth in publications and citations over the last decade. We identified the key research areas, preferred document types for publication, and authorship patterns in funded publications.This may provide valuable insights for future research in social sciences in India.

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**REVIEW OF LITERATURE:**

We undertook an exhaustive literature search in multiple sources in order to evaluate previous research and identify research gaps. A review of select works is presented here.

Prewitt (2013) has outlined the public benefits of Social Science Researchand its contribution to understanding national security and the economy. But many times social scientists fail to communicate the importance of it (Lupia (2013). However, Lupia (2014) summarises that the value of social science is multifaceted, ranging from improving quality of life to providing information and explanations and enhancing decision-making. Funding will have a substantial impact on both the quantity and quality of research across various disciplines (Sattari et al., 2022). Funding for social sciences is significantly lower compared to natural sciences(Xu et al., 2015). When funding for research, the scale of funding, whether higher or lower, does not matter for the expected outcome or impact.Aksnes et al., (2016) report that even though expenditures have grown on R&D, productivity is lower nowadays compared to 20 years ago. That means,considering the relative growth rate over time, the productivity of funded research appears to be low. The present study is an effort to assess the relative growth rate of social science research publications.

Mahapatra (1994) investigated the relationship between the increase in publications and citations, revealing a strong correlation and an exponential growth pattern. Using such various growth curves Verma et al., (2021) provided insights into the productivity,impact, and research trends in biochemistry research in India.Subramanian, (2014) identified that collaboration in social science research has been on the rise, with an increasing degree of partnerships observed over time. A comprehensive expert peer-review based analysis of 18,500 research outputs from Italy by Thelwall et al., (2023) indicated that articles across various fields, including Economics and Statistics, as well as Political and Social Sciences, generally received higher quality ratings when authored by multiple individuals.

On an examination of the literature we reviewed, we observed that research exploring the funded publications in social sciences in the Indian scenario is scanty. There is considerable research gap. Hence, the present study based on the data from the Web of Science Social Sciences Citation Index has been envisaged. We use bibliometric mining to explore the publication and citation trends.

**RESEARCH QUESTIONS:**

The present study aims to answer the following questions:

1. What type of trend does publications and citations of Indian funded research exhibit?
2. What are the dominant subject areas in the Indian funded research?

3. What document types do authors prefer for publishing their research work?
4. What is the authorship pattern prevailing in social science research funded by Indian agencies?
5. Does Indian funded research emphasize on collaboration?

**METHODOLOGY:**

We collected records of 2040 Indian-funded research publications that were published between 2014 to 2023 and indexed in the Social Science Citation Index of Web of Science (https://www.webofscience.com/). Advanced search using the author's country affiliation (India) was employed to find publications by Indian authors and then refined to find research publications funded by Indian-funded agencies. The data was then exported asan Excel file and filtered to choose publications indexed in the Social Science Citation Index. Tabulation, statistical analysis, and graph visualization were conducted using Microsoft Excel and Statistical Package for Social Sciences (SPSS). Network visualization and mapping of the results were performed using VOSviewer (https://www.vosviewer.com/).

**RESULTS& DISCUSSION:**

**Table 1. Growth of Publications and Citations**

| Year | Np | Nc | LNp | Rp | MRp | DTp | Mean DTp | LNc | Rc | Mean Rc | DTc | Mean DTc | ACCP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 92 | 2818 | 4.52 | - | | | | 7.94 | - | | | | 30.63 |
| 2015 | 95 | 2553 | 4.55 | 0.03 | | 0.05 | | 7.85 | -0.10 | | -0.14 | | 26.87 |
| 2016 | 117 | 3075 | 4.76 | 0.21 | | 0.30 | | 8.03 | 0.19 | | 0.27 | | 26.28 |
| 2017 | 175 | 4985 | 5.16 | 0.40 | | 0.58 | | 8.51 | 0.48 | | 0.70 | | 28.49 |
| 2018 | 203 | 4524 | 5.31 | 0.15 | 0.20 | 0.21 | 0.29 | 8.42 | -0.10 | 0.12 | -0.14 | 0.17 | 22.29 |
| 2019 | 254 | 6659 | 5.54 | 0.22 | | 0.32 | | 8.80 | 0.39 | | 0.56 | | 26.22 |
| 2020 | 320 | 9888 | 5.77 | 0.23 | | 0.33 | | 9.20 | 0.40 | | 0.57 | | 30.90 |
| 2021 | 389 | 4772 | 5.96 | 0.20 | | 0.28 | | 8.47 | -0.73 | | -1.05 | | 12.27 |
| 2022 | 259 | 1604 | 5.56 | -0.41 | | -0.59 | | 7.38 | -1.09 | | -1.57 | | 6.19 |
| 2023 | 136 | 137 | 4.91 | -0.64 | -0.08 | -0.93 | -0.12 | 4.92 | -2.46 | -0.70 | -3.55 | -1.01 | 1.01 |
| **Total/ Mean** | **2040** | **41015** | | **0.04** | | **0.06** | | | **-0.34** | | **-0.48** | | **21.11** |

Np: Number of publications
Nc: Number of citations
LNp: Natural log of publications
LNc: Natural log of citations
Rp: Relative growth rate of publications
Rc: Relative growth rate of citations
MRp: Mean relative growth rate of publications
MRc: Mean relative growth rate of citations
DTp: Doubling Time of publications
DTc: Doubling Time of citations
ACCP: Average Citations Per Paper

The publications funded by Indian funding agencies, indexed in the Social Sciences Citation Index of Web of Science totalled 2040 over the past decade. These publications collectively received a substantial number of 41015 citations. On an average, 204 publications were produced per year, with each paper receiving an average of 21.11 citations.

A detailed analysis of the Relative Growth Rate revealed interesting patterns. The year 2017 saw the highest Relative Growth Rate for both publications (0.40) and citations (0.48). However, there was a decline in both publications and citations in 2022 and 2023. The mean growth rate for publications in the first five-year period (2014-2018) stood at 0.20, but the subsequent five-year period (2019-2023) experienced a mean relative growth rate of -0.08 due to the decline in 2022 and 2023. Similarly, the mean growth rate for citations was 0.12 in the first five years and -0.70 in the second five years. The mean doubling time of publications was 0.06 and of citations was 0.48.

The Kolmogorov-Smirnov test confirmed that the data does not deviate from normal distribution. Therefore, we performed a Pearson correlation test, which resulted in a correlation coefficient of 0.574 (p-value = .082). This suggests a positive correlation; however, it is not statistically significant. Therefore, we can acknowledge a positive correlation between publications and citations, but its generalization is not statistically supported.

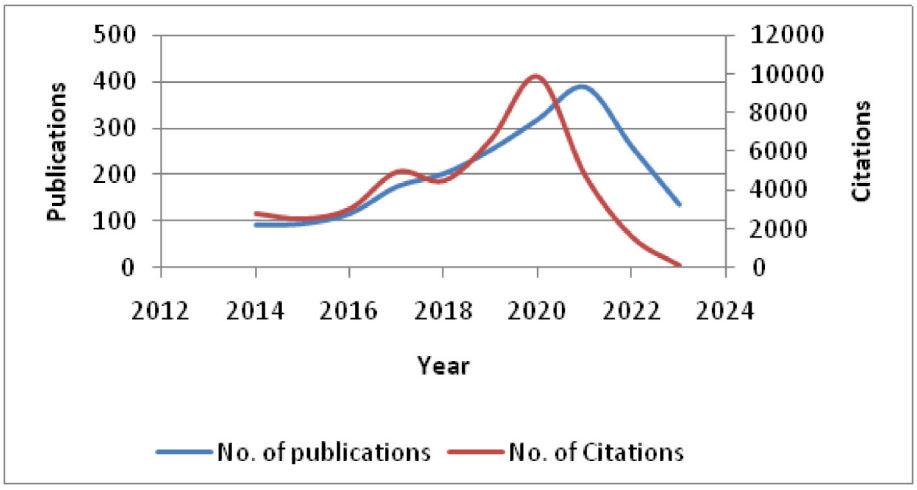


Figure 1: Growth of Publications & Citations during 2014-2023.

The year 2021 saw the highest number of publications at 389 (19.07%), followed by 2020 with 320 (15.69%) publications. There was a consistent rise in publications until 2021, after which there was a significant decline. This decline has also impacted the number of citations.

**Table 2.Top Ten Web of Science Categories**

| Sl. No. | Web of Science Subject Categories | Publications | Citations |
|---|---|---|---|
| 1. | Public, Environmental & Occupational Health | 210 | 2788 |
| 2. | Green & Sustainable Science & Technology | 174 | 3381 |
| 3. | Environmental Sciences | 172 | 3264 |
| 4. | Psychiatry | 141 | 2366 |
| 5. | Multidisciplinary Sciences | 91 | 2028 |
| 6. | Neurosciences | 80 | 1370 |
| 7. | Computer Science, Artificial Intelligence | 63 | 1657 |
| 8. | Behavioral Sciences | 51 | 902 |
| 9. | Anthropology | 45 | 411 |
| 10. | Biochemistry & Molecular Biology | 44 | 819 |

Table 2 shows the top ten subject categories of Web of Science, which made a high number of publications during 2014-2023. The most prominent subject area was "Public, Environmental & Occupational Health" (210 publications) followed by "Green & Sustainable Science & Technology" (174 publications), & "Environmental Sciences" (172 publications). The emphasis on these subject areas reflects India's commitment to Health, sustainability, and environmental issues, aligning with global trends.

**Table 3.Document Type Publications& Citations**

| Document Type | Publications | Citations |
|---|---|---|
| Articles | 1773 | 31666 |
| Reviews | 212 | 9006 |
| Editorial materials | 28 | 268 |
| Letters | 19 | 75 |
| Meeting abstract | 8 | 0 |
| **Total** | **2040** | **41015** |

Among 2040 publications, 1773 (86.91%) were articles, 212 (10.39%) were reviews, 28 (1.37%) were editorial materials, 19 (0.93%) were letters, and 08 (0.39%) were meeting abstracts.The predominance of articles (86.91%) suggests that most funded research is being disseminated in standard journal formats, which are widely accessible and citable.

**Table 4.Authorship patterns**

| Number of Authors | Publications | Percentage |
|---|---|---|
| One | 56 | 2.75 |
| Two | 375 | 18.38 |
| Three | 406 | 19.90 |
| Four | 295 | 14.46 |
| Five | 231 | 11.32 |
| Six | 174 | 8.53 |
| Seven | 125 | 6.13 |
| Eight | 85 | 4.17 |
| Nine | 68 | 3.33 |
| Ten or more | 225 | 11.03 |
| **Total** | **2040** | **100.00** |

We analysed the authorship patterns in the publications funded by Indian funding agencies. The findings demonstrate author collaborations for 97.25% of publications and only 2.75% of publications are single authored. Notably, a significant portion of publications19.90% (406 publications) feature three authors, with 18.38% (375 publications) and 14.46% (295 publications) displaying two and four authors, respectively. It is also observed that 11.03% of publications involve ten or more authors. The results reveal a strong collaborative nature of funded research works.

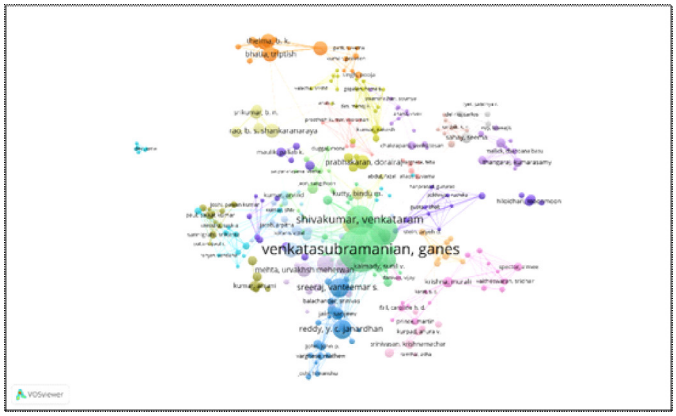


Figure 2. Collaboration Pattern

The mapping of collaboration in authorship using VOSViewer revealed that Venkata subramanian, Ganesan from the National Institute of Mental Health and Neurosciences, Bengaluru was the most prolific author with 48 publications. Following is Shivakumar, Venkataram from the same institute with 27 publications. Notably, these two authors have fostered substantial collaborations with total link strengths of 287 and 182, respectively.

**CONCLUSION:**

Based on the results, it is clear that social science research in India needs significant attention to overcome the decline in research productivity and impact. This is a call to action for social scientists and institutions to take decisive measures to elevate their research performance.Despite a downward trend in recent years, the significant research areas that Indian authors are engaged in demonstrate India's dedication to addressing global challenges such as health, sustainability, and environmental issues. Further, the collaborative nature of funded research adds an interesting dimension, as collaborative efforts can effectively address critically important issues (Bansal et al., 2019). Researchers and authors may explore author self-archiving websites to upload their publications to get better visibility for their research.

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