Scientometric Insights into Cybersecurity Research Output: An Indian Perspective with Global Benchmarking (2005–2025)

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Abstract

Cybersecurity is a critical technology area due to the rise in internet usage, digital data creation, cloud computing, and online transactions. India, one of the world's largest digital ecosystems, has seen significant growth in cybersecurity research. The Indian government's initiatives, like Digital India and the National Cyber Security Policy, encourage investment. A scientometric analysis shows India is making progress in cybersecurity research, with increased publications and universities becoming centers of excellence. To improve, India must publish more, increase funding, and collaborate with foreign researchers.

Keywords
Cyber Security, Digital ecosystems, Cyber security policies and research;

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1. Introduction

In the 21st century, cybersecurity has emerged as one of the most critical areas of technology, given the rapid increase in internet usage, digital data creation, cloud computing, and online transactions. The increasing sophistication of cyberattacks, especially targeting infrastructure, businesses, and individuals, has driven governments and organisations globally to invest heavily in cybersecurity solutions. Research in this area is crucial to developing advanced techniques for securing digital assets and ensuring privacy and data integrity. India, being one of the largest digital ecosystems in the world, has seen significant growth in its cybersecurity landscape, both in policy and academia. The Government of India, through initiatives like Digital India and the National Cyber Security Policy, has encouraged institutions and researchers to invest in this vital domain. A scientometric analysis provides quantitative insights into how research in this field has evolved over time, highlighting productivity, growth patterns, collaboration trends, key contributors, and global benchmarks. This study offers an in-depth scientometric overview of India's research contribution to cybersecurity, comparing it with global trends from 2005 to 2025, using Scopus-indexed data.

2. Review of Literature

Several scientometric and bibliometric studies have analyzed the trends in cybersecurity and information security. Patra et al. (2020) conducted a global overview of cybersecurity research and noted a substantial increase in publications post-2010. Gupta and Tanwar (2022) emphasized the role of Indian universities in the rapid expansion of applied research in cybersecurity. Wang et al. (2021) explored international collaboration in cybersecurity research and found that global research is moving toward open access and multi-institutional cooperation. Similarly, Kaur and Gupta (2019) performed a focused bibliometric analysis on Indian cybersecurity literature and found a preference for conference papers, often due to faster publication timelines and wider exposure. Additional studies (Choo, 2021; Saini et al., 2023) highlighted that citation impact in cybersecurity is generally higher when research is collaborative and supported by strong institutional backing. However, studies such as Dey et al. (2018) and Sharma (2021) pointed out that India’s research impact is hindered by fewer publications in high-impact journals.

3. Objectives

1. To study the publication growth of cybersecurity research in India from 2005 to 2025.
2. To compare India's contribution with global research output.
3. To identify leading Indian authors, institutions, and sponsors in cybersecurity research.
4. To examine document types, preferred publication sources, and languages.
5. To provide recommendations for improving India's global standing in cybersecurity research.

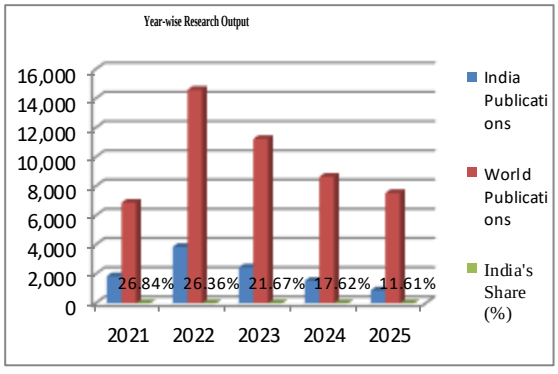
4. Data Interpretation and Analysis

1: Year-wise Research Output

The year-wise research output highlights a consistent increase in India's contribution to global Cybersecurity research from 2021 to 2025. India's share rose significantly from 11.61% in 2021 to 26.84% in 2025, indicating growing national engagement in this critical field.

Table 1: Year-wise Research Output

Year	India Pub.	World Pub.	India's Share (%)
2025	1,843	6,865	26.84%
2024	3,846	14,589	26.36%
2023	2,433	11,226	21.67%
2022	1,524	8,647	17.62%
2021	874	7,528	11.61%

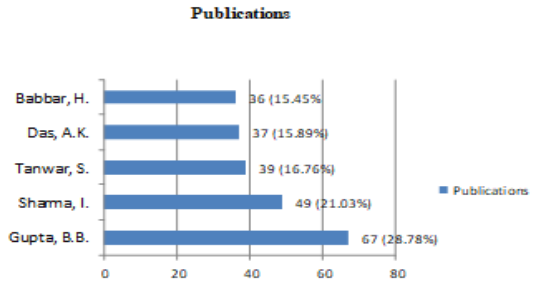


The above table and graphical representation shows that India's publication output has seen a notable increase over the years, with a peak in 2024 reaching 3,846 papers. The global publication trend has also risen steadily, peaking at 14,589 in 2024. India's contribution to global Cybersecurity research publications rose from 11.61% in 2021 to 26.84% in 2025. This indicates a growing emphasis on Cybersecurity research within India over the decade. Despite fluctuations, India's percentage share shows an upward trajectory, indicating consistent improvement.

Table 2: Top Indian Authors

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Year	No.of Articles Pub.	Share (%)
Gupta, B.B.	67	28.78%
Sharma, I.	49	21.03%
Tanwar, S.	39	16.76%
Das, A.K.	37	15.89%
Babbar, H.	36	15.45%
Total	**228**	**100%**



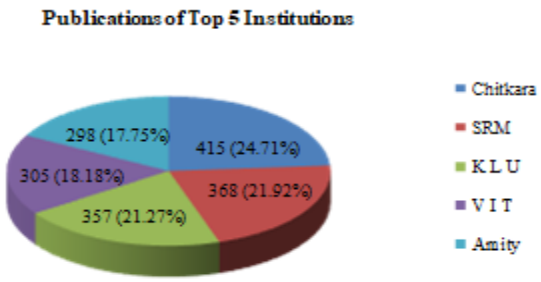
A total of 5 top research authors were identified from the Indian published bibliographic research articles for this article

Among the top Indian authors, Gupta, B.B. leads significantly with 28.78% of the total publications. Sharma, I. follows with 21.03%, indicating his substantial contribution. Tanwar, S., Das, A.K., and Babbar, H. contributes closely, each making up around 15–17%. This data highlights a concentration of research output among a few leading scholars. Gupta, B.B.'s dominance suggests his prominent role in the field. These five authors together represent a strong core of Cybersecurity research in India.

3. Top Indian Institutions

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Institute Name	No.of Pub.	(%)
Chitkara University, Punjab	415	24.71%
SRM Institute of Science & Tech	368	21.92%
K L Deemed to be University	357	21.27%
Vellore Institute of Technology	305	18.18%
Amity University	298	17.75%
Total	**1,743**	**100%**

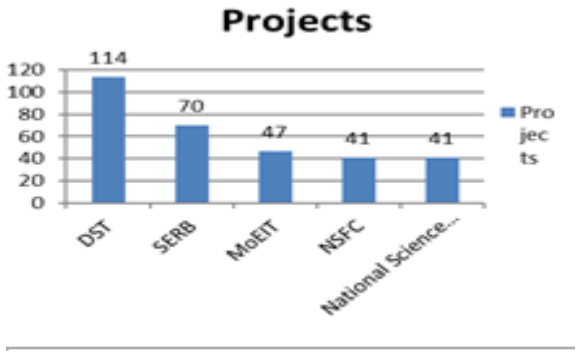


This table presents the top Indian institutions contributing to Cybersecurity research output. It highlights the comparative publication volume among five leading universities

The cited above pie chart reveals that Chitkara University leads the list with 24.71% of total publications, showing its strong emphasis on Cybersecurity research. SRM Institute of Science & Technology follows closely with 21.92%, indicating a consistent research contribution. K L Deemed to be University holds third place with a substantial 21.27%. Vellore Institute of Technology contributed 18.18%, reflecting its growing research prominence. Amity University also features among the top five with 17.75% of publications. These institutions collectively represent a robust academic foundation for Cybersecurity research in India.

Table 4: Funding Agencies (India)
Data with Percentages:

Funding Agencies (India)	Projects	(%)
DST, Ministry of Science & Technology	114	33.93%
SERB	70	20.83%
Ministry of Electronics & IT	47	13.98%
NSFC (China - Collaborative Projects)	41	12.20%
National Science Foundation (US - Collaborative)	41	12.20%
Total	**336**	**100%**

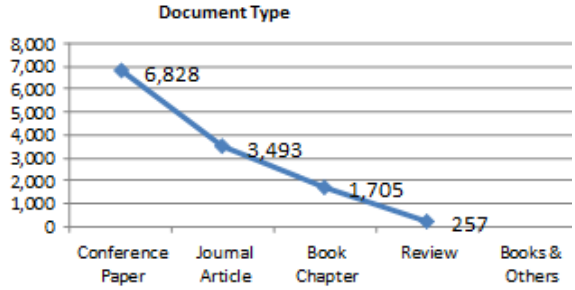


The table below presents the number of cybersecurity-related research projects funded or supported by various national and international agencies. This analysis provides insights into the relative contribution of each funding body to cybersecurity research initiatives.

Observing the above-mentioned table and bar chart, the Department of Science & Technology (DST) leads with 33.93% of the total projects, showcasing India's strong national commitment to cybersecurity research. The Science and Engineering Research Board (SERB) follows with 20.83%, supporting domestic innovation and academic involvement. The Ministry of Electronics & IT contributes 13.98%, highlighting policy-backed initiatives. Notably, international collaborations are significant: both NSFC (China) and NSF (USA) each contribute 12.20%. This suggests an increasing emphasis on cross-border cooperation in addressing cybersecurity challenges. Such diversification of funding sources reinforces the multi-dimensional nature of cybersecurity as a global concern.

Table 5: Document Type (India)

Document Type	Count	Share (%)
Conference Paper	6,828	53.6%
Journal Article	3,493	27.5%
Book Chapter	1,705	13.4%
Review	257	2%
Books & Others	228	1.5%

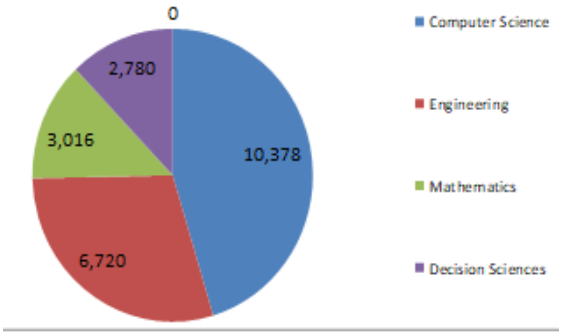


The distribution of cybersecurity research outputs from India (2005–2025) has been categorized by document type to evaluate the nature of scholarly communication and publishing preferences.
The above given table explores the Conference papers form the majority with **53.6%**, reflecting a strong inclination towards presenting research at professional gatherings. Journal articles follow at **27.5%**, highlighting peer-reviewed dissemination. **Book chapters (13.4%)** indicate contributions to edited volumes, while **reviews (2%)** and **books & others (1.5%)** comprise a minor share, pointing to less frequent use of comprehensive or secondary literature formats in this domain.

Table 6: Subject Area (India)

Subject	Count	Share (%)
Computer Science	10,378	38.9%
Engineering	6,720	25.2%
Mathematics	3,016	11.3%
Decision Sciences	2,780	10.4%

This table provides a subject-wise distribution of research publications in India. The data highlights India's research strength in technical and computational fields.



As evident from the table, Computer Science dominates the Indian research output with 10,378 publications, accounting for 38.9% of the total. Engineering follows with 6,720 publications (25.2%), reflecting a strong technical research base. Mathematics and Decision Sciences contribute 11.3% and 10.4%, respectively, indicating balanced involvement in quantitative and analytical disciplines. The combined share of these four disciplines underscores India's focused efforts in STEM-related research areas.

5. Key Points Identified

- ✓ India's research output in cybersecurity has grown rapidly post-2015.
- ✓ Indian authors prefer conferences; global authors prefer journals.
- ✓ A few authors and institutions dominate publication output.
- ✓ Government funding plays a critical role in research productivity.
- ✓ Collaboration with China and the US is increasing.

6. Recommendations & Suggestions

- ➢ Increase publication in peer-reviewed journals to improve citation impact.
- ➢ Promote interdisciplinary research involving social sciences, ethics, and policy.
- ➢ Encourage open-access publishing to enhance global reach.
- ➢ Develop national research consortia focused on cybersecurity.
- ➢ Foster collaboration with top global institutions through joint labs and MoUs.

7. Conclusion

This Scientometric analysis shows that India is making strong progress in Cybersecurity research. The number of publications has increased, and many universities are becoming centers of excellence. However, India still lags behind global leaders in terms of high-impact publications and international visibility. To improve, India must publish more journal papers, increase funding, and collaborate more with foreign researchers. These steps will help India become a global leader in Cybersecurity innovation.

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