Artificial Intelligence Integration in Global Social Science Research: A Metric Analysis

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Abstract

This scientometric study analyzes the integration and impact of AI in global and Indian social science research from 2014 to 2023 using the Scopus database. Major outcomes identify China, the United States, and India as main contributors, with significant contributions from organizations such as Symbiosis International. The study found a considerable rise in AI-related publications, mostly in conference papers and journals. Major authors such as Yogesh K. Dwivedi have significant citation impacts, highlighting the importance of collaboration with other authors. The study concludes that although artificial intelligence (AI) has enormous social and economic benefits, it also has drawbacks like unfairness and unemployment, thus it is necessary to balance the application of AI.

Keywords: Scientometric analysis; AI in social science; Artificial intelligence; AI and society; Global impact; Research trend

1. Introduction

Artificial intelligence (AI) is the simulation of human intelligence by machines (Mehak Kumar & Mehta, 2023). Machines mimic human activities and decision-making processes such as speech recognition, image recognition, and natural language processing (Xiumei Mo, 2023). AI tasks like visual perception, speech recognition, decision-making, and language translation demonstrate intelligence comparable to that of humans and animals (Singh & Haju, 2022). AI is changing several fields by automating tasks that formerly required human intelligence, resulting in optimal and efficient decision-making processes. The technology collects, processes, and learns from data to effectively conduct automated tasks, impacting daily life through applications such as autopilot technology, chatbots, and digital assistants. AI is a multifaceted field that allows robots to mimic human cognitive functions and perform tasks beyond human capability. These technologies improve social data analysis accuracy by tackling difficulties like bias, completeness, and feature selection (Oreški, 2023; Menke et al., 2023). AI in social science can help address societal difficulties, but it also has risks such as bias. Strategies and behavioral models can assist in reducing harm while promoting positive outcomes (Morini, 2023). AI in social science aids society by improving customer

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service, contentment, and efficiency in electronic transactions. It improves community services, yet issues like unemployment and a lack of job prospects persist (Bakhodirovich et al., 2022). Overall, this scientometric analysis provides a thorough picture of AI's incorporation into worldwide research landscapes, focusing on its revolutionary impact across multiple areas.

2. Literature Review

Artificial intelligence (AI) is quickly expanding worldwide and affecting both everyday life and specialist disciplines like clinical research (Pollock et al., 2024). AI, which includes machine learning, deep learning, robots, and natural language processing, has enormous potential for innovation. Its incorporation into art, literature, and music alters creativity while raising concerns about its societal and environmental consequences (Lipska, 2024). AI is progressively addressing complicated challenges and improving decision-making across sectors. AI and machine learning extract insights from large datasets in social sciences, hence boosting sectors such as economics and education (Di Franco & Santurro, 2023; Bhagat & Singh, 2022). AI techniques such as decision trees improve decision-making (Zhang, 2023). Integrating AI with social research expands knowledge and tackles obstacles (Bhattamisra et al., 2023; Arfi et al., 2023). AI is transforming healthcare and sustainable development in India, enhancing results and addressing public health concerns (Gupta et al., 2024; Saha & Saxena, 2023). Ethical considerations such as employment displacement must be addressed to achieve balanced advancement (Duan, 2024; Wahab, 2024).

3. Objectives

1. To analyze the growth patterns of artificial intelligence (AI) research across various disciplines to understand the evolution of AI integration in the context of global research.

2. To determine the position of India among the top ten countries for futuristic study.

3. To categorize the published documents by format on the influence of AI on social science research in India.

4. To analyze the patterns of growth to understand how social science research in India has changed in terms of AI integration.

5. To examine new trends and research priorities within social science research.

6. To examine the top Indian affiliations according to article publishing during the study period.

7. To analyze the citation impact based on collaborative strength and number of documents.

8. To map out the collaboration network among social science researchers.

4. Methodology

To meet the present objectives, a comprehensive and systematic methodology is proposed (Table 1). It includes a systematic approach to analyzing the growth patterns and impact of artificial intelligence (AI) research in the context of global and Indian social scientific disciplines. First, an article search is performed
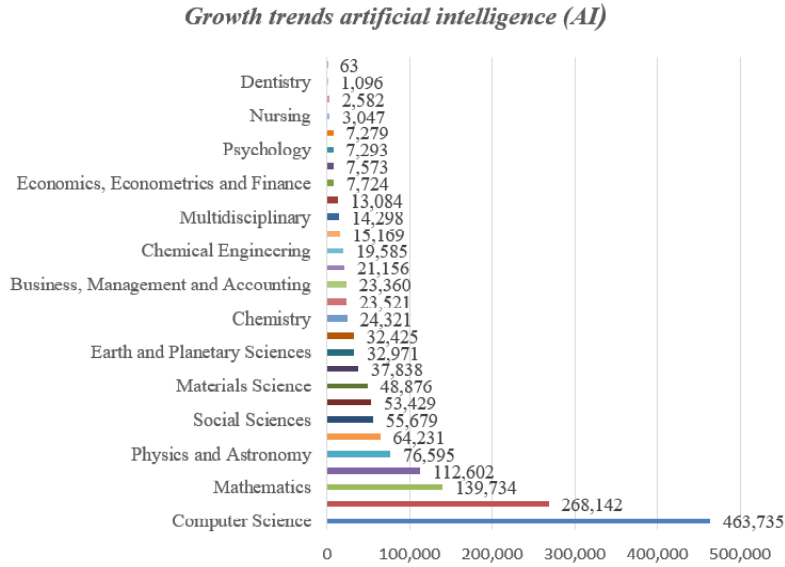
using a customized query such as "Artificial Intelligence," "AI," "Machine Learning," "Deep Learning," "Natural Language Processing," and "NLP" along with words like "research," "study," "application," or "experiment" from the SCOPUS database. The search is limited to publication years (2014-2023). The collected papers are then filtered by subject area (SOCI) to focus exclusively on social science research. Further refining is used to narrow the search to publications about India, highlighting the country's contributions and positioning in the global AI research landscape. Only journal publications are considered to ensure academic rigor and relevance. The result of these search stages generates a selection of papers that serve as the foundation for further analysis. To achieve the goals, numerous analytical methodologies are used, such as scientometric analysis, content analysis, and network analysis, performed using VOSviewer software. These methodologies allow for the analysis of growth patterns, the identification of top countries, the investigation of AI's impact on social science research in India, the assessment of research trends and priorities, and the evaluation of collaboration patterns and citation impact. This methodological approach provides a complete understanding of AI's integration and impact on social science research both internationally and in India, allowing for insights into research direction, emerging trends, and collaborative dynamics in the field.

Table 1: Details of search procedure and results from SCOPUS database

Search Steps	Total Found	Filter
Start Search		
Search for Articles		
Query: (Artificial Intelligence OR AI OR Machine Learning OR Deep Learning OR Natural Language Processing OR NLP) AND (research OR study OR application OR experiment)	9,94,061 on 19, April, 2024	
Limit by Year: (PUBYEAR > 2013 AND PUBYEAR < 2024)	7,75,930	YEAR RANG
Limit by Subject Area: (SOCI)	55,679	SUBJECT AREA
Limit by Affiliation: (India)	4,856	AFFILCOUNTRY
Limit by Document Type: (Article)	2,040	DOCTYPE (ar)
Limit by Source Type: (Journal)	2,036	SRCTYPE (j)
End Search		

5. Data Analysis

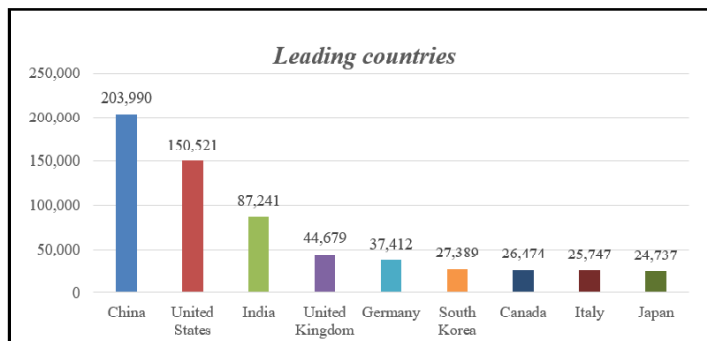### 5.1. Growth trends of artificial intelligence (AI) research across various disciplines

Growth trends artificial intelligence (AI)

Discipline	Value
Dentistry	63
	1,096
	2,582
Nursing	3,047
	7,279
Psychology	7,293
	7,573
Economics, Econometrics and Finance	7,724
	13,084
Multidisciplinary	14,298
	15,169
Chemical Engineering	19,585
	21,156
Business, Management and Accounting	23,360
	23,521
Chemistry	24,321
	32,425
Earth and Planetary Sciences	32,971
	37,838
Materials Science	48,876
	53,429
Social Sciences	55,679
	64,231
Physics and Astronomy	76,595
	112,602
Mathematics	139,734
	268,142
Computer Science	463,735

Figure 1: Growth trends of artificial intelligence (AI) research across various disciplines

The Scopus database analysis for the years 2014 to 2023 highlights significant trends in research output across various disciplines, with Computer Science leading at 463,735 documents, Engineering, mathematics, and medicine also made major contributions. Despite having fewer documents than STEM fields 55,679 social sciences are however very important for addressing common issues and influencing policy. The present analysis underscores the significance of Social Sciences in addressing global concerns via interdisciplinary approaches and recommends further investigation into their patterns, partnerships, and subjects in subsequent research.

5.2. Leading countries and position of India among top 10 leading countries

Leading countries

Country	Value
China	203,990
United States	150,521
India	87,241
United Kingdom	44,679
Germany	37,412
South Korea	27,389
Canada	26,474
Italy	25,747
Japan	24,737

Figure 2: Leading countries and position of India among top 10 leading countries

China is the leading producer of research documents (203,990), followed by the US (150,521) and India (87,241), according to Scopus data from 2014 to 2023. India's strong academic output positions it prominently among top research nations such as the UK, Germany, and Japan, demonstrating its increasing power and competence in international research. This shows that India has the ability to contribute significantly in terms of both volume and quality of research output. Additional examination may research into India's principal areas of influence, its research partnerships, and its comparative standing in innovation and technology transfer when compared to other leading nations.

5.3. Types of documents based on AI influencing social science research in India
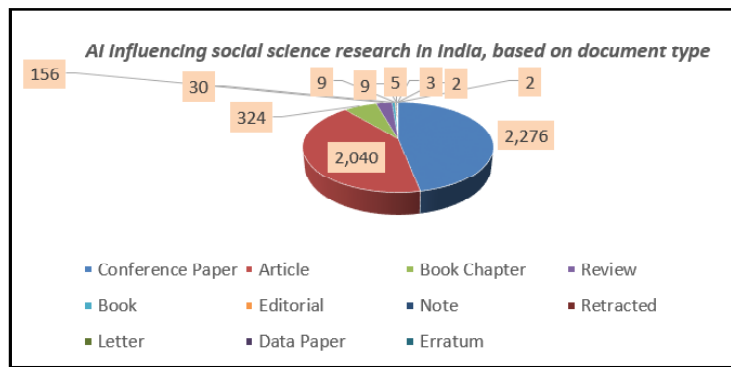
Figure 3: Types of documents based on AI influencing social science research in India

Conference papers and articles are the most common document formats, according to the statistics, suggesting that sharing knowledge through these channels is highly valued. The fact that articles are a vital medium for disseminating in-depth research findings underscores the importance of academic publications in examining the interface between artificial intelligence and social sciences. By shedding light on the changing dynamics between AI and social sciences and directing future research and policy decisions, an analysis of these papers can offer insightful information on how AI affects disciplines like sociology, psychology, economics, and political science.

5.4. Growth trends of artificial intelligence (AI) research across various time frames.
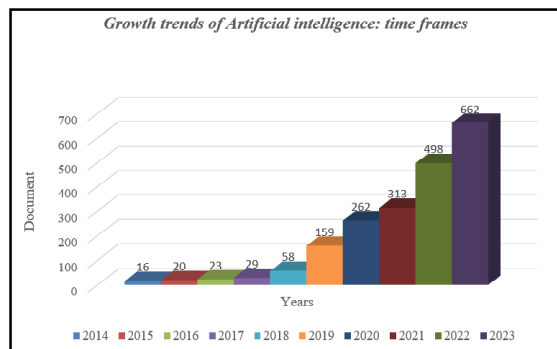
Figure 4: Growth trends of artificial intelligence (AI) research across various time frames

The data shows a consistent upward trend in the number of published documents over time, with 16 in 2014 rising to 662 in 2023. This substantial increase implies that interest and investment in the field covered by the documents are increasing, probably due to new developments, wider acceptance, and increased funding or focus areas. The largest increases are observed in the most recent years, particularly from 2018 onward, suggesting that there may have been a breakthrough or pivotal event that sped up research and discussion in this area. This trend highlights the dynamic nature of the field and reflects the growing role it plays in academic and practical contexts.

5.5. Publication from top 10 journals
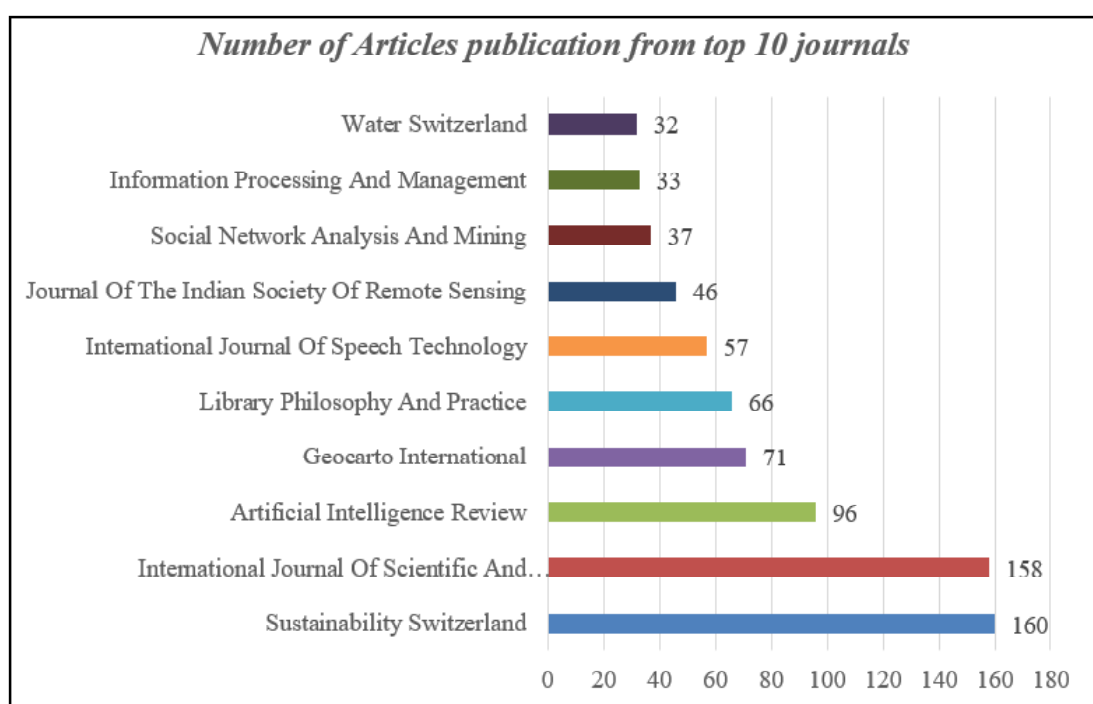
Figure 5. Publication from top 10 journals

"Sustainability Switzerland" and "International Journal of Scientific and Technology Research" lead the way in covering sustainability and multidisciplinary technology among the top 10 journals, which represent a wide range of academic interests. "Artificial Intelligence Review" follows closely, highlighting the explosion of AI research. Other publications that concentrate on specialized fields like geospatial sciences and voice technology include "Geocarto International" and "International Journal of Speech Technology," respectively. This diversity highlights new directions in multidisciplinary study, the effects of technology, and studies that are sector-specific, all of which are indicative of how scholarly inquiry is changing.

**5.6. Top affiliations in India based on article publications between 2014 and 2023**
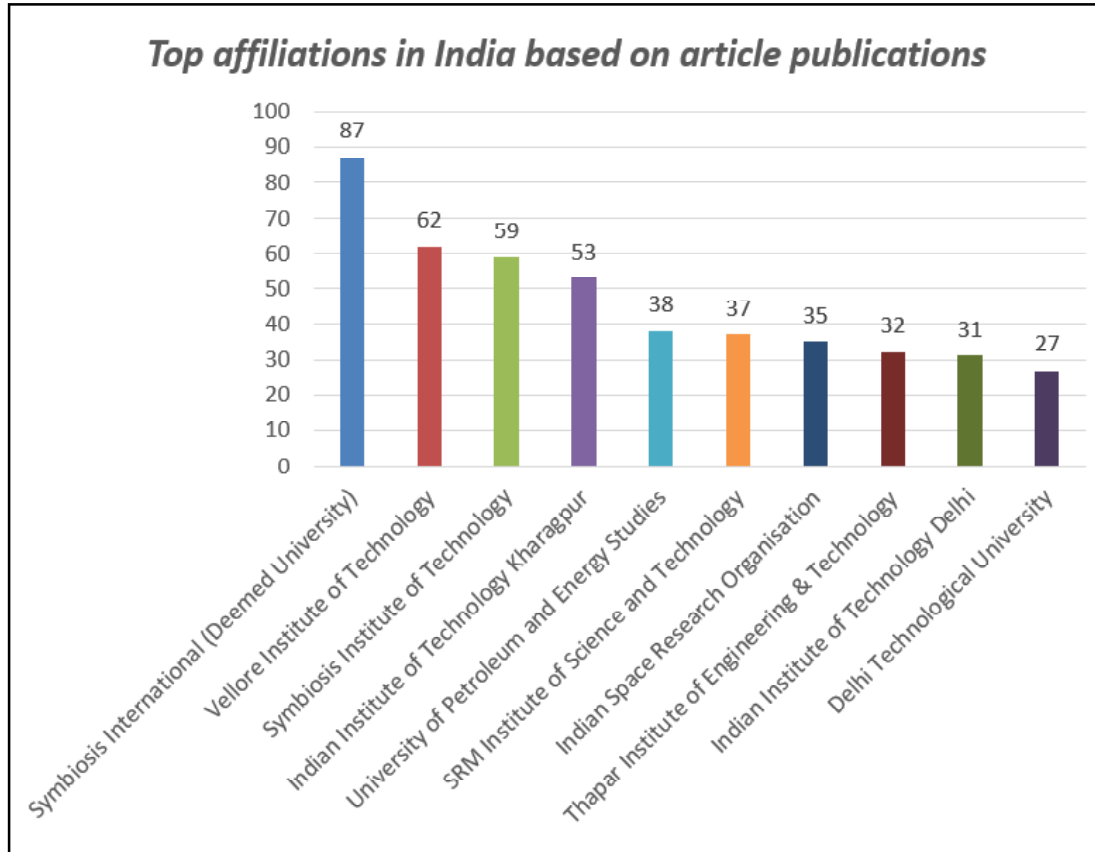
Figure-6. Top affiliations in India based on article publications between 2014 and 2023

The top affiliations in India are shown in the table, which is based on article articles from 2014 to 2023. The largest number of publications is 87 from "Symbiosis International (Deemed University)", followed by 62 from "Vellore Institute of Technology" and 59 from "Symbiosis Institute of Technology". Prominent establishments such as the "Indian Space Research Organization," "Indian Institute of Technology Delhi," and "Indian Institute of Technology Kharagpur" are also included. Their research areas of interest, patterns of collaboration, and overall impact might all be further examined, offering insights into India's research environment and institutional strengths.

5.7. Citation impact based on collaborative strength and number of documents.

Table 2: Citation impact based on collaborative strength and number of documents

| Author	Documents	Citations	Total Link/Collaboration
Pham, Binh thai	17	1043	27
Saha, Asish	13	336	26
Arabameri, Alireza	10	281	22
Chakrabortty, Rabin	10	282	21
Costache, Romulus	10	207	21
Prakash, Indra	14	863	21
Chowdhuri, indrajit	10	258	20
Pham, Quoc bao	10	208	13
Al-Ansari, Nadhir	10	550	9
Kotecha, Ketan	14	118	3
Kumar, Satish	11	173	3
Chatterjee, Sheshadri	12	751	1
Dwivedi, Yogesh K.	11	1872	1
Kumar, Anil	10	138	0
Kumar, Neeraj	10	338	0
Talukdar, Swapan	12	154	0
Verma, Manoj Kumar	10	46	0
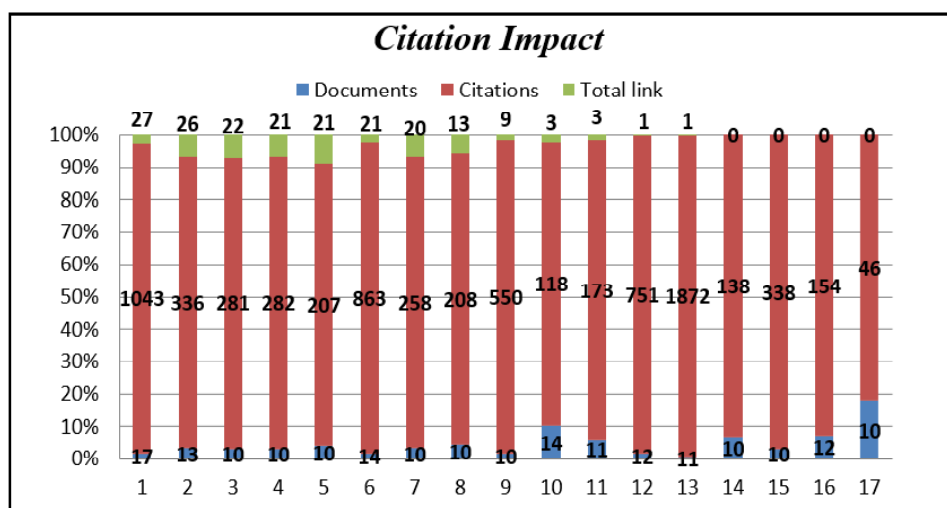
Figure7: Citation impact based on collaborative strength and number of documents

The table 2 and figure 7 shows the scholarly output and influence of the authors, including the number of publications, the impact of citations, and the collaborative linkages. Prominent individuals such as Yogesh K. Dwivedi and Binh Thai Pham have a high citation count in comparison to their publication counts, indicating noteworthy impact. The authors display varying degrees of collaborative linkages. Asish Saha and Binh Thai Pham, for example, demonstrate active collaboration, while Anil Kumar and Neeraj Kumar show fewer links. This analysis highlights author differences in terms of productivity, impact of citations, and collaborative participation. It also implies a correlation between the number of publications and citations, with notable exceptions denoting important research influence. Authors with high total strengths with maximum number of documents include Pham, Binh Thai (17), and Prakash, Indra (14). Pham, Binh Thai, and Prakash, Indra are among the authors with high total strengths. Total strength is a composite metric that combines citations and publications to determine an author's overall impact. On the other hand, authors with fewer papers and citations, such as Kumar, Anil, and Kumar, Neeraj, exhibit lower total strengths. The total link represents the total contributions with the other authors. The highest collaboration (27) associated with Pham, Binh Thai followed by Saha, asish (26).

5.8. Collaboration networks between social science researchers
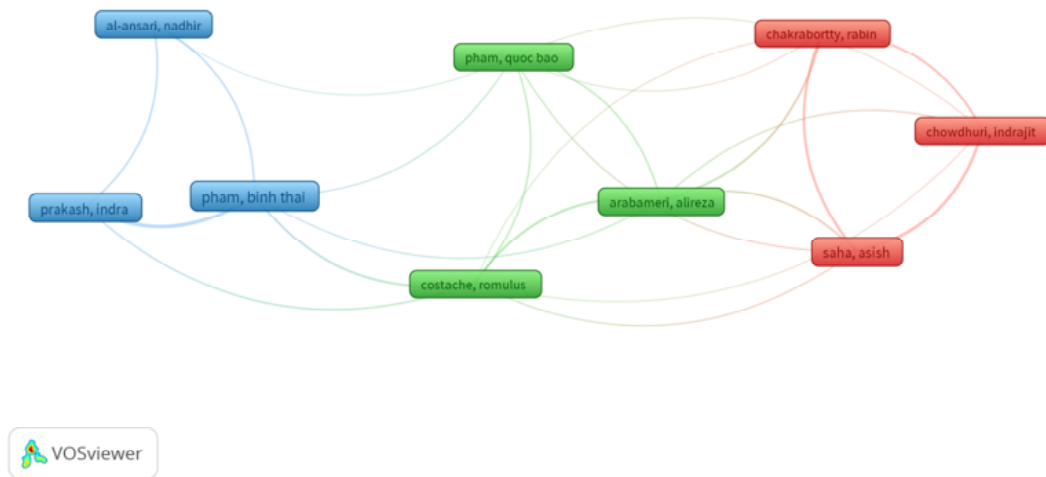
Figure 8: Collaboration networks between social science researchers

Only nine authors out of 6208 fulfill the requirements of collaborating on at least ten documents and having at least ten citations. Three clusters have been identified from the collaboration patterns of these nine authors. In Cluster 1, Saha, Asish; Chowdhuri, Indrajit; and Chakrabortty, Rabin work together. In Cluster 2,

Costache, Romulus; Pham, Quoc Bao; and Arabameri, Alireza work together. Another cooperative group in Cluster 3 is made up of Pham, Binh Thai; Prakash, Indra; and Al-Ansari, Nadhir. This classification helps standardize the analysis and understanding of collaboration networks among these authors.

6. Findings and Discussions

The field of computer science has the most documents (463,735), followed by engineering, mathematics, and medicine. The social sciences, albeit containing fewer papers (55,679), have a considerable impact on policy and societal issues. China creates the most research documents, with 203,990, followed by the United States (150,521) and India (87,241). India's academic production ranks among the top research nations. Conference papers and publications are the most preferred formats, demonstrating their relevance in knowledge dissemination. Articles, particularly on AI and social sciences, are essential for obtaining precise study results. The number of published documents has steadily increased from 16 in 2014 to 662 in 2023, demonstrating expanding interest and developments. The largest increases happened after 2018, indicating breakthroughs or crucial occurrences. The best-known publications include "Sustainability Switzerland," "International Journal of Scientific and Technology Research," and "Artificial Intelligence Review." Prominent Indian institutions include "Symbiosis International (Deemed University)" and "Vellore Institute of Technology." Notable writers such as Yogesh K. Dwivedi and Binh Thai Pham have a high citation count, suggesting substantial effect. Collaboration patterns differ across writers, with some actively cooperating and others forming less connection. Total strength, which includes citations and publications, demonstrates total influence with nine authors matching the criterion for considerable collaboration and citation, resulting in three separate collaborative networks.

7. Limitations

Firstly, when studying trends in AI progress across disciplines, it is crucial to look at how AI techniques are being integrated into less traditional social science fields such as anthropology and social work, where full application and understanding may be lacking. Secondly, identifying specific fields where India could fall short or flourish might reveal flaws in the country's status as an AI research leader. A comparative analysis of AI deployment strategies or instructional approaches in India and other leading countries might be useful for future study. Furthermore, examining how alternative AI-based document formats influence research in social sciences may show anomalies in how these studies are used and conducted. Discovering weak or understudied relationships among researchers during cooperation network mapping might help to focus efforts on improving the strength and effect of collaborative activities. Filling these gaps may have a significant influence on how AI is understood and implemented in worldwide social science research.

8. Recommendation

It is recommended that interdisciplinary collaboration be fostered by bringing professionals together from various domains to approach challenging problems from diverse perspectives. Researchers can generate novel solutions by combining their different talents and viewpoints, which would not be possible within the

limits of a single subject. Fostering international partnerships also facilitates the cross-border interchange of ideas, resources, and best practices. Collaborating with various nations enriches the research process while also promoting cultural understanding and global cooperation. In terms of research communication, diving further into new fields such as the interface of artificial intelligence (AI) and social sciences can provide fascinating findings with far-reaching implications. By encouraging scholars to produce in-depth articles and papers on these themes, we can better comprehend how AI affects society and vice versa. This level of communication influences not only academic discourse but also policy decisions and public debates about AI technologies. Supporting educational institutions that provide major research outputs is critical for developing talent and promoting innovation. By investing in these universities and sponsoring research initiatives, we enable academics to do innovative work and make significant contributions to their disciplines. Recognizing and praising collaborative contributions promotes teamwork and information sharing. Furthermore, investing in developing talent through resources for learners and early-stage researchers provides a consistent supply of knowledge for future innovation. Promoting emerging journals with various themes stimulates the dissemination of new research and facilitates multidisciplinary collaboration. Analyzing research impact beyond standard measures such as social consequences and practical applications helps to align research goals with societal demands, maximizing research benefits for mankind.

9. Conclusion

AI is transforming numerous sectors by assisting with activities that used to need human intelligence. This study shows how AI research has expanded globally, particularly in computer science, engineering, and the social sciences. India is an important contributor, demonstrating a good research presence. The study focuses on key publications, esteemed universities, and researcher cooperation. With rapid development, it is necessary to address ethical challenges and collaboration across disciplines. To maximize the value of AI research, we should further worldwide collaborations, support research institutes, and disseminate discoveries broadly. This will help AI research progress and benefit society.

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