DOI : 10.32344/jld/v11/i1/2025/14-37

# Exploring the Dynamics of Robotics Research : A Bibliometric Study

**Prathibha S. N.**
Research Scholar
DoS&R in Library & Information Science
KSOU, Mukthagangothri, Mysuru.
pratibha.goudar@gmail.com
ORCID ID : 0000-0002-8847-6227

**Shilpa Rani N. R.**
Asst. Professor
DoS&R in Library & Information Science,
KSOU, Mukthagangothri, Mysuru.
shilparani.nr@gmail.com
ORCID ID : 0000-0002-3322-8576



**ABSTRACT**

Purpose : The main purpose of the study was to investigate the on Robotics Technology Research done in India over all 10 years.

Methodology : The data for this investigation were sourced from the Web of Science. The WoS database was used to find publications on Robotics Technology research published between 2015 and 2024. Over the study period, 2445 documents were analyzed. VOS viewer was used to prepare a co-authorship and co-occurrence map based on the bibliographic data gathered.



Findings : The highest research productivity, accounting for 358 papers (14.64%), was recorded in 2022. Data spanning ten calendar years, comprising 2445 records, were collected. This study also highlights the contributions of publishers to research in robotic technology. The IEEE emerged as the leading publisher, with 358 publications, Additionally, author Parhi, Dayal R. was identified as the most prolific contributor & most cited author 344 during this period, with 32 publications.



Originality/ Value : annual contributions to the global robotics literature, the formats and languages they publish, the number of publications documenting the yearly output of robotics research, the degree of international collaboration, and more

**Keywords :**

***Robotics Technology, Bibliometric Study, Web of Science, Research Output***

## 1. INTRODUCTION

A group of methods known as "bibliometrics" are used to analyze scientific and technological activity quantitatively. Using statistical and mathematical tools, these methods quantify researchers' scientific contributions. Measuring national research performance concerning international trends is the primary goal of scientometric investigations. The collection of techniques used to gauge the creation and sharing of scientific knowledge is known as scientometrics and bibliometrics. Sociologists and historians use scientometrics as one of their measuring instruments and methods (Derek de Solla Price and Vasilij Vasilevich



Nalimov whins). Bibliometrics refers to 'the application of mathematical and statistical methods to books and other communication mediums,'(Pritchard, Alan). Nalimov defined 'scientometrics' as 'the application of those quantitative methods which deal with the analysis of science viewed as an information process.' Therefore, bibliometrics focuses on broader information processes, while scientometrics precisely measures science communication. Although Lotka's law of scientific productivity (1926) and Bradford's famous statement on scattering (1934) are key milestones in bibliometrics, the formal study of bibliometrics and scientometrics began in the late 1960s. Research in bibliometrics evolved into a recognized field during the 1970s and 1980s. Robotics technology is the use of science, engineering, and technology to create machines that can perform tasks in place of or in addition to humans. Robots can be used in various industries, including manufacturing, surgery, and agriculture. The present study focuses on the Research Productivity of Robotics Technology.



## 2. REVIEW OF LITERATURE

Vrontis (2022) conducted a study to organize the body of knowledge regarding intelligent automation and to identify the main benefits and difficulties it presents for human resource management (HRM). Study identified 45 articles that investigate artificial intelligence & robotics. According to the findings, intelligent automation technologies offer a novel method of staff management and business performance improvement, opening up many HRM prospects. Ness's (2023) highlighted in his study on the link between artificial intelligence and software-driven robotic systems, covering a range from mobile robots and uncrewed aerial vehicles to increasingly prevalent semi-autonomous automobiles. Nonetheless, the noticeable disparity between the algorithmic realm and the physical world poses a hurdle for current



systems in attaining the envisioned objective of crafting intelligent and user-friendly robots proficient in effectively engaging with and manipulating our human-centric environment. Dixon (2020). The study contributes to the developing field by presenting initial evidence at the firm level regarding the influence of robots on labour and productivity. study employs comprehensive data that includes metrics for robot investments, employment, and firm practices within the Canadian business landscape from 2000 to 2015. It also observes a consistent rise in firms' investments in robotics, particularly with the proliferation of more general-purpose robots adopted across diverse industries. Basumatary, B. (2023) carried out an investigation to analyze specific literature primarily addressing the applications of robotics technology. Scientometric and altimetric tools were utilized to assess research publications.



Bibliographic information from research publications was meticulously examined from the Scopus database, and 71 articles were chosen, predominantly concentrating on robotic technology in libraries. Liang (2023) examined the research trends about using robotics in occupational safety and health. The study quantitatively investigated the connections in the literature on robotics applications using the scientometric approach. In this study 137 pertinent publications are collected from 2012 to 2022 from the Scopus database. VOS viewer was used to perform keyword co-occurrence, cluster, bibliographic coupling, and co-citation analysis. Moghadami (2022) examines in his study on the scientific output about the application of artificial intelligence in the management and crisis response to COVID-19. Utilizing the scientometric approach, co-occurrence analysis of words has been employed. The research encompasses a population of 2,816 documents within the theme of "artificial intelligence during the COVID-19 pandemic," as indexed in the Scopus database.



## 3. STATEMENT OF THE PROBLEM

Bibliometric methods can be used to determine research productivity, which also produces new scientific information. The publication trend is crucial for assessing the nation and its institutions.

Research and development centres attract scholars' interest by contributing to various fields of study. An attempt is made to examine the specific robotics technology research productivity in the current study "Exploring the Dynamics of Robotics Research : A Bibliometric Study."



## 4. OBJECTIVES

- To identify the year-wise growth and productivity of literature on Robotics Technology
- To study the authorship pattern
- To find out the selected document types of literature on Robotics Technology
- To identify the geographical distribution of research productivity
- To examine the top 10 journals and countries

## 5. SCOPE & LIMITATIONS

To create a comparative picture of Indian research performance and determine India's position among the various countries, the study intends to map the structure of robotics research literature production in India at the national level in the context of worldwide performance. The study establishes future course predictions based on the authorship pattern analysis and country of publications.



## 6. METHODOLOGY

The Web of Science database was consulted to collect the required data for this study. A total of 2445 research publications were obtained to meet the requirements of the present study. The published papers on scientific literature related to Robotics Technology were first searched in the Web of Science database, then extracted and downloaded along with all bibliographic elements. Advanced search options in the WoS database were used to find publications on Robotics Technology research published between 2015-2024. Search Strategy TS=("robotics" OR "robotic system" OR "autonomous robot" OR "industrial robot" OR "humanoid robot" OR "medical robotics" OR "service robots" OR "swarm robotics" OR "AI in robotics" OR "robotic automation" OR "robotic control") data. VOS viewer was used to prepare a co-authorship and co-occurrence map based on the bibliographic data gathered.



## 7. DATA ANALYSIS & INTERPRETATION

The scientific field of robotics includes computer science, electrical engineering, mechanical engineering, and other fields. Robots' design, building, use, and operation are the subjects of robotics.

**Table No. 1 :** Growth of India's Research in Robotics Technology

| Year | Total Publications | Percentage | Cumulative Documents | Cumulative Percentage |
|---|---|---|---|---|
| 2015 | 162 | 6.62 | 162 | 6.62 |
| 2016 | 196 | 8.00 | 358 | 14.62 |
| 2017 | 218 | 8.91 | 576 | 23.53 |
| 2018 | 238 | 9.73 | 814 | 33.26 |
| 2019 | 201 | 8.22 | 1015 | 41.48 |
| 2020 | 221 | 9.03 | 1236 | 50.51 |
| 2021 | 228 | 9.32 | 1464 | 59.83 |
| 2022 | 358 | 14.64 | 1822 | 74.47 |
| 2023 | 294 | 12.02 | 2116 | 86.49 |
| 2024 | 329 | 13.45 | 2445 | 100 |
| Total | 2445 | 100% | | |



**Figure No. 1 :** Growth of India's Research in Robotics Technology

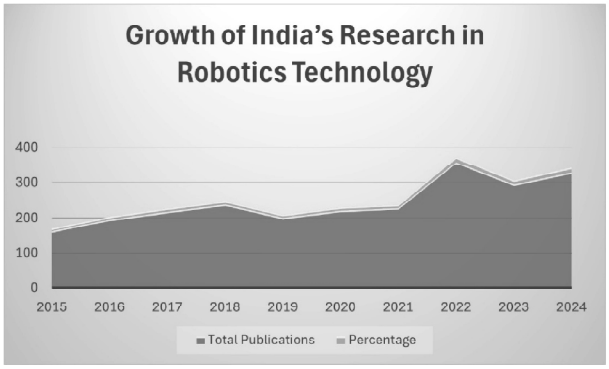





Table No. 1 depicts the growth of research productivity in robotics technology over ten years, from 2015 to 2024. A total of 2445 documents were analyzed during the study period. The highest research productivity, comprising 358 documents (14.64%), was recorded in 2022, followed by 2024 with 329 papers (13.45%). In 2023, productivity increased to 294 documents (12.2%), which increased to 238 (9.73%) in 2018. The year 2021 witnessed 228 papers (9.32%), followed by 221 documents (9.03%) in 2020 and 218 documents (8.91%) in 2017. Research output grew in 2019, with 201 papers (8.22%), and peaked at 196 (8%) in 2016. In 2015, the number of documents decreased slightly to 162 (6.62%).

**Table No. 2 :** Document Type Data

| Document Type | No. of Publications | Percentage |
|---|---|---|
| Article | 1026 | 41.96 |
| Proceedings Paper | 1188 | 48.58 |
| Meeting Abstract | 6 | 0.24 |
| Review Article | 202 | 8.26 |
| Editorial Materials | 17 | 0.69 |
| Letter | 6 | 0.24 |
| Total | 2445 | 100 |

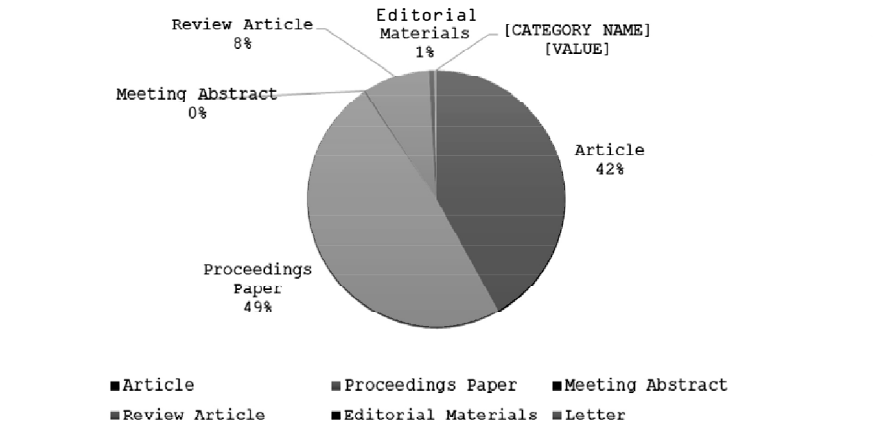



**Figure No. 2 :** Document Type

Table No. 2 shows the data collected from the Web of Science database literature on robotics Technology research publications. The maximum number of proceedings paper, 1188 (48.58%), account for the largest share of research output, emphasizing the significance of conferences in disseminating robotics, was tracked from article, with 1026 (41.96%) publications.

Review articles, with 202 (8.26%) records, make up a notable portion, reflecting the increasing interest in summarizing and analyzing advancements in robotics, followed by editorial materials with 17 (0.69%) records, and letters & meeting abstracts with 6 (0.24%) records respectively.

Overall, the data suggests that robotics research is highly conference-driven, with significant contributions from journal articles and review papers, demonstrating both the rapid evolution of the field and the need for continuous assessment of emerging trends.



**Table No. 3 :** Most productive and collaborative authors

| Sl.No | Most Productive Author | TP | TC | CPP | TLS |
|---|---|---|---|---|---|
| 1 | Parhi, Dayal R. | 32 | 344 | 10.75 | 48 |
| 2 | Nandi, G. C. | 19 | 251 | 13.21 | 14 |
| 3 | Kumar, Priyadarshi Biplab | 14 | 150 | 10.71 | 26 |
| 4 | Kashyap, Abhishek Kumar | 12 | 173 | 14.42 | 14 |
| 5 | Semwal, Vijay Bhaskar | 10 | 503 | 50.30 | 3 |
| 6 | Gehlot, Anita | 10 | 149 | 14.90 | 23 |
| 7 | Singh, Rajesh | 9 | 140 | 15.56 | 23 |
| 8 | Mukherjee, Arijit | 9 | 65 | 7.22 | 4 |
| 9 | Akram, Shaik Vaseem | 8 | 134 | 16.75 | 22 |
| 10 | Muni, Manoj Kumar | 8 | 127 | 15.88 | 20 |
| 11 | Sahu, Chinmaya | 8 | 46 | 5.75 | 18 |
| 12 | Kumar, Saroj | 7 | 63 | 9.00 | 16 |
| 13 | Kattepur, Ajay | 7 | 46 | 6.57 | 8 |
| 14 | Rastogi, Naveen | 7 | 37 | 5.29 | 11 |
| 15 | Sharma, Kaushlendra | 7 | 29 | 4.14 | 0 |
| 16 | Baranwal, Neha | 6 | 64 | 10.67 | 9 |
| 17 | Rath, Hemant Kumar | 6 | 63 | 10.50 | 8 |
| 18 | Prakash, Ravi | 6 | 53 | 8.83 | 0 |
| 19 | Priyadarshi, Neeraj | 6 | 52 | 8.67 | 18 |
| 20 | Kausar, Nasreen | 6 | 32 | 5.33 | 5 |

*TP=Total Publications; TC= Total Citations;*
*CPP= Citations per Paper; TLS= Total Link Strengths*



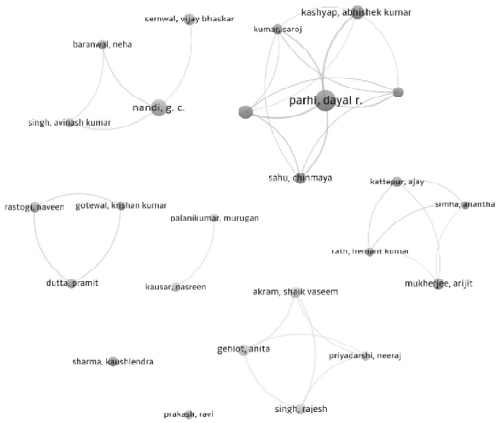



**Figure No. 3 :** Most Collaborative Authors Co-Authorship Network

The data analysis reveals that Parhi, Dayal R. is the most productive author with 32 publications, followed by Nandi, G. C. (19) and Kumar, Priyadarshi Biplab (14). At the same time, Semwal and Vijay Bhaskar stand out with the highest citations per paper (50.30) despite having only 10 publications, indicating a significant research impact. Parhi, Dayal R. also has the highest total link strength (TLS : 48), suggesting extensive collaboration, whereas some authors, like Sharma, Kaushlendra (TLS : 0) and Prakash, Ravi (TLS : 0), show minimal network connectivity. High citation counts among authors with fewer publications, such as Akram, Shaik Vaseem (CPP : 16.75) and Singh, Rajesh (CPP : 15.56), indicate the quality of their contributions. This study highlights that while productivity contributes to visibility, the true impact of research depends on citation influence and collaboration strength.



**Table No. 4 :** Profile and Collaboration of Top 20 Indian Organizations

| Sl.No | Name of the organization | TP | TC | TLS |
|---|---|---|---|---|
| 1 | Indian Institute of Technology | 153 | 1850 | 57 |
| 2 | National Institute of Technology | 102 | 1354 | 46 |
| 3 | Vellore Institute of Technology | 58 | 875 | 33 |
| 4 | Indian Institute of Technology | 53 | 515 | 13 |
| 5 | Indian Institute of Science | 49 | 808 | 9 |
| 6 | Indian Institute of Technology Madras | 43 | 333 | 17 |
| 7 | Indian Institute of Technology Delhi | 40 | 417 | 20 |
| 8 | Amrita Vishwa Vidyapeetham | 35 | 265 | 5 |
| 9 | Indian Institute of Technology Kharagpur | 32 | 292 | 16 |
| 10 | Amrita University | 31 | 214 | 5 |
| 11 | Jadavpur University | 30 | 598 | 9 |
| 12 | Indian Institute of Technology Kanpur | 30 | 310 | 6 |
| 13 | SRM Institute Science & Technology | 25 | 113 | 7 |
| 14 | Indian Institute of Technology Patna | 22 | 705 | 4 |
| 15 | Bits Pilani | 21 | 119 | 3 |
| 16 | Lovely Profess University | 20 | 250 | 21 |
| 17 | Chandigarh University | 18 | 185 | 19 |
| 18 | Amity University | 18 | 168 | 6 |
| 19 | Indian Inst Technology Guwahati | 17 | 281 | 4 |
| 20 | VIT University | 17 | 198 | 5 |

*TP=Total Publications; TC= Total Citations; TLS= Total Link Strengths*



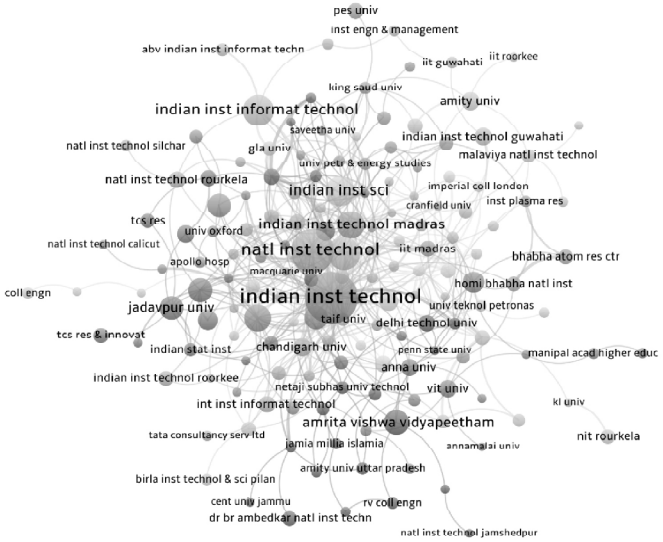



**Figure No. 4 :** Profile and Collaboration of Top 20 Indian Organizations

The Indian Institute of Technology (IIT) leads in research productivity, with 153 publications and 1850 citations, demonstrating both high output and impact, further supported by the highest Total Link Strength (TLS : 57), indicating strong collaborations. The National Institute of Technology (NIT) follows with 102 publications and 1354 citations, showing significant research influence (TLS : 46). Other top contributors include the Vellore Institute of Technology (58 publications, 875 citations, TLS : 33) and the Indian Institute of Science (49 publications, 808 citations, TLS : 9), indicating substantial academic contributions. Indian Institute of Technology Patna (22 publications, 705 citations, CPP : 32.05) exhibits strong research impact despite lower publication volume. While Chandigarh University (TLS : 19) and Lovely Professional University (TLS : 21) show moderate research output, their collaboration networks are comparatively strong. The data highlights that institutional impact depends not only on the number of publications but also on citation influence and collaboration strength.

**Table No. 5 :** Most Collaborative Countries Network with India

| Sl.No | Country | TP | TC | TLS |
|---|---|---|---|---|
| 1 | India | 2444 | 28048 | 1263 |
| 2 | USA | 203 | 4886 | 484 |
| 3 | England | 87 | 1715 | 252 |
| 4 | Saudi Arabia | 73 | 1807 | 181 |
| 5 | Peoples R China | 71 | 2039 | 229 |
| 6 | Germany | 56 | 1457 | 197 |
| 7 | Italy | 43 | 954 | 166 |
| 8 | South Korea | 43 | 915 | 96 |
| 9 | Australia | 42 | 1153 | 105 |
| 10 | France | 39 | 881 | 159 |
| 11 | Singapore | 37 | 828 | 89 |
| 12 | Spain | 34 | 1176 | 155 |
| 13 | Malaysia | 32 | 265 | 72 |
| 14 | Japan | 30 | 406 | 100 |
| 15 | Canada | 28 | 602 | 104 |
| 16 | Netherlands | 24 | 516 | 98 |
| 17 | U Arab Emirates | 22 | 460 | 63 |
| 18 | Taiwan | 22 | 356 | 62 |
| 19 | Ethiopia | 22 | 192 | 52 |
| 20 | Vietnam | 19 | 584 | 38 |

*TP=Total Publications; TC= Total Citations;*
*TLS= Total Link Strengths*



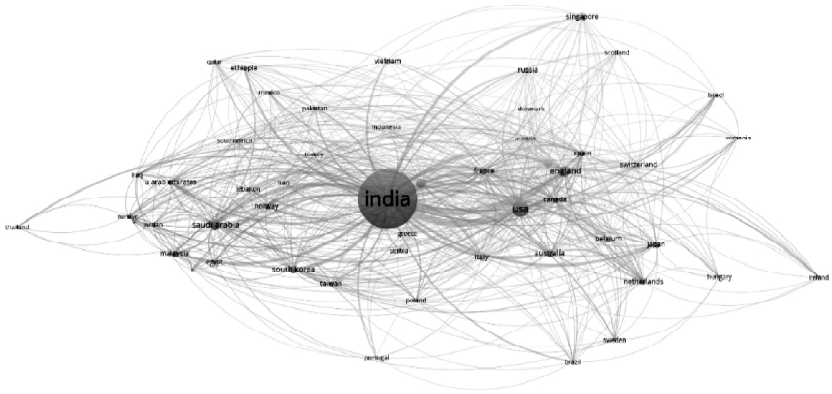



**Figure No. 5 :** Most Collaborative Countries Network with India



India leads in research productivity with 2,444 publications and 28,048 citations, highlighting its dominant contribution to the field. It also has the highest Total Link Strength (TLS : 1,263), indicating strong international collaborations. The USA (203 publications, 4,886 citations, TLS : 484) follows, with a significantly higher citation impact per paper, reflecting research quality. England (87 publications, 1,715 citations, TLS : 252) and China (71 publications, 2,039 citations, TLS : 229) also demonstrate high research influence. Saudi Arabia (73 publications, 1,807 citations, TLS : 181) and Germany (56 publications, 1,457 citations, TLS : 197) show substantial contributions with robust collaborative networks. Countries such as Italy, South Korea, and Australia have moderate publication output but strong citation impact and collaboration strength. Despite fewer publications, Vietnam (19 publications, 584 citations, TLS : 38) and Belgium (18 publications, 775 citations, TLS : 106) exhibit high citation impact. The data suggests that while India dominates in volume, countries like the USA, England, and China contribute significantly to research impact and global collaborations.

**Table No. 6 :** Most Productive Journals and their Citation Network

| Sl.No | Source | TP | TC | TLS |
|---|---|---|---|---|
| 1 | Materials Today-Proceedings | 61 | 557 | 285 |
| 2 | IEEE Access | 47 | 969 | 566 |
| 3 | International Conference on Robotics And Smart Manufacturing (Rosma2018) | 30 | 380 | 142 |
| 4 | Multimedia Tools and Applications | 24 | 127 | 331 |
| 5 | Ifac Papers online | 22 | 62 | 97 |
| 6 | Industrial Robot-The International Journal of Robotics Research And | 19 | 144 | 282 |
| 7 | IEEE Sensors Journal | 18 | 359 | 150 |
| 8 | Sensors | 18 | 281 | 154 |
| 9 | IEEE Robotics And Automation Letters | 18 | 211 | 257 |
| 10 | Journal Of Intelligent & Robotic Systems | 18 | 205 | 429 |
| 11 | Robotica | 18 | 88 | 316 |
| 12 | Journal Of Minimal Access Surgery | 17 | 211 | 19 |



मनोमयः अयं हि पुरुषः
JLD : Vol. 11. No. 1. January- 2025
p-14-37
www.jld.net.in

| | | | | |
|---|---|---|---|---|
| 13 | Soft Computing | 15 | 137 | 304 |
| 14 | Computers & Electrical Engineering | 13 | 389 | 162 |
| 15 | ACS Applied Materials & Interfaces | 12 | 274 | 30 |
| 16 | Proceedings Of The Advances In Robotics (Air'17) | 12 | 70 | 47 |
| 17 | Robotics And Autonomous Systems | 11 | 351 | 112 |
| 18 | Wireless Personal Communications | 10 | 210 | 50 |
| 19 | Sustainability | 10 | 154 | 130 |
| 20 | Journal Of Robotic Surgery | 10 | 55 | 25 |

*TP=Total Publications; TC= Total Citations;*
*TLS= Total Link Strengths*



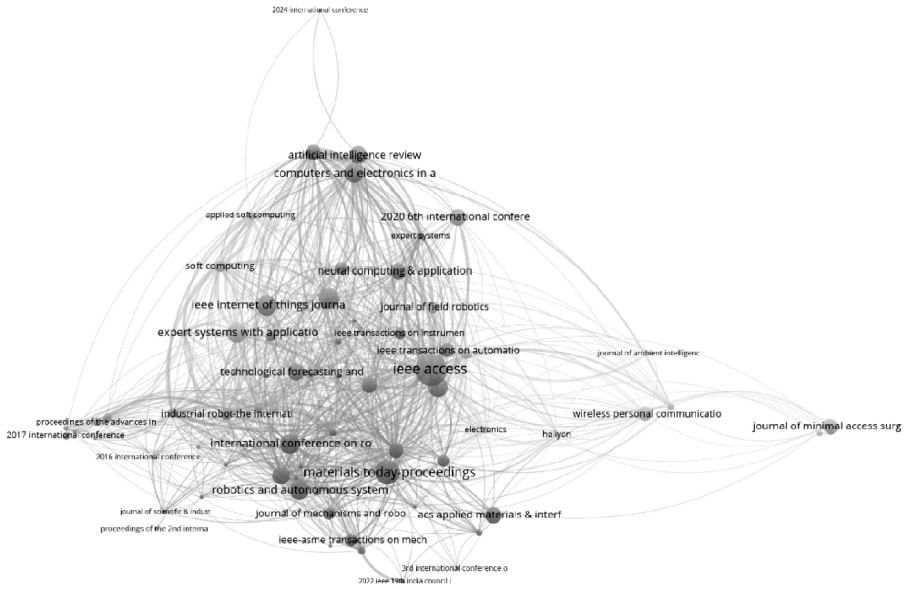



**Figure No. 6 :** Most Productive Journals and their Citation Network

Materials Today : Proceedings is the most productive source, with 61 publications and 557 citations. It also has the highest total link strength (TLS : 285), indicating strong research visibility and collaborations. IEEE Access follows with 47 publications and the highest citation count (969 citations, TLS : 566), reflecting significant research impact and connectivity.



International Conference on Robotics and Smart Manufacturing (ROSMA 2018) ranks third in productivity (30 publications, 380 citations, TLS : 142), showing that conference proceedings play a key role in disseminating research.

Among journals, Multimedia Tools and Applications (24 publications, 127 citations, TLS : 331) and Journal of Intelligent & Robotic Systems (18 publications, 205 citations, TLS : 429) demonstrate substantial influence.



IEEE Sensors Journal (18 publications, 359 citations, TLS : 150) and Sensors (18 publications, 281 citations, TLS : 154) also highlight the growing importance of sensor technology in robotics research.

High-impact journals like Expert Systems with Applications (9 publications, 382 citations, TLS : 235) and Robotics and Autonomous Systems (11 publications, 351 citations, TLS : 112) exhibit strong citation performance despite lower publication numbers.

Conference proceedings, such as IFAC PapersOnline (22 publications, 62 citations, TLS : 97) and Proceedings of Advances in Robotics (AIR'17) (12 publications, 70 citations, TLS : 47), emphasize the role of specialized conferences in the field.

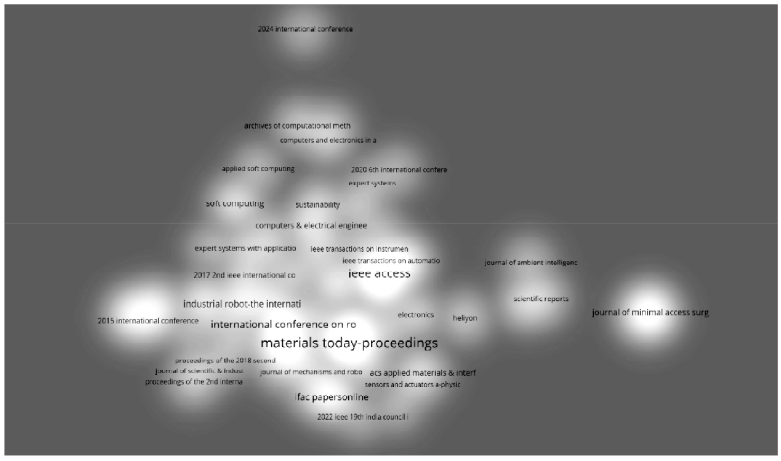
The data suggests that IEEE journals and conferences dominate robotics research, with interdisciplinary sources like Soft Computing (15 publications, 137 citations, TLS : 304) also playing a significant role.

Journals with high TLS, such as the Journal of Intelligent & Robotic Systems (TLS : 429) and Robotica (TLS : 316), indicate strong research networking and influence.

**Table No. 7 :** Top 10 Most Prolific Source Name

| Sl.No | Publisher | TP | TC | TLS |
|---|---|---|---|---|
| 1 | Materials Today-Proceedings | 61 | 557 | 285 |
| 2 | Ieee Access | 47 | 969 | 566 |
| 3 | International Conference On Robotics And Smart Manufacturing (Rosma2018) | 30 | 380 | 142 |
| 4 | Multimedia Tools And Applications | 24 | 127 | 331 |
| 5 | Ifac Papers online | 22 | 62 | 97 |
| 6 | Industrial Robot-The International Journal Of Robotics Research | 19 | 144 | 282 |
| 7 | Ieee Sensors Journal | 18 | 359 | 150 |
| 8 | Sensors | 18 | 281 | 154 |
| 9 | Ieee Robotics And Automation Letters | 18 | 211 | 257 |
| 10 | Journal Of Intelligent & Robotic Systems | 18 | 205 | 429 |






**Figer No. 7 :** Top 10 Most Prolific Source Name

The analysis of publication sources reveals that Materials Today : Proceedings is the most productive outlet with 61 publications, accumulating 557 citations and a Total Link Strength (TLS) of 285, indicating strong research dissemination. However, IEEE Access (47 publications, 969 citations, TLS : 566) exhibits the highest citation impact, reflecting the high quality and influence of articles published in this journal.



The International Conference on Robotics and Smart Manufacturing (ROSMA 2018) ranks third in productivity (30 publications, 380 citations, TLS : 142), highlighting the importance of conference proceedings in robotics research. Among journals, Multimedia Tools and Applications (24 publications, 127 citations, TLS : 331) and Journal of Intelligent & Robotic Systems (18 publications, 205 citations, TLS : 429) show strong research impact and collaboration networks. IEEE Sensors Journal (18 publications, 359 citations, TLS : 150) and Sensors (18 publications, 281 citations, TLS : 154) emphasize the significance of sensor-based research in robotics. IEEE Robotics and Automation Letters (18 publications, 211 citations, TLS : 257) also have a high TLS, suggesting extensive research connectivity. Overall, the data highlights that IEEE journals dominate impact and collaboration, while conference proceedings such as ROSMA 2018 and IFAC Papers Online (22 publications, 62 citations, TLS : 97) play a crucial role in disseminating cutting-edge research in robotics and automation.



**Table No. 8 :** Keywords Analysis

| Sl.No | Keyword | Key Words occurrences | TLS |
|---|---|---|---|
| 1 | Robotics | 287 | 839 |
| 2 | Design | 119 | 432 |
| 3 | Artificial Intelligence | 97 | 487 |
| 5 | Deep Learning | 79 | 271 |
| 6 | System | 78 | 342 |
| 7 | Path Planning | 77 | 219 |
| 8 | Navigation | 73 | 321 |
| 9 | Algorithm | 68 | 265 |
| 10 | Robot | 66 | 202 |
| 11 | Machine Learning | 63 | 258 |
| 12 | Model | 58 | 245 |
| 13 | Computer Vision | 58 | 154 |
| 14 | Mobile Robot | 56 | 188 |
| 15 | Systems | 52 | 226 |
| 16 | Sensors | 48 | 216 |

| | | | |
|---|---|---|---|
| 17 | Classification | 47 | 184 |
| 18 | Performance | 46 | 156 |
| 19 | Robots | 45 | 192 |
| 20 | Soft Robotics | 45 | 147 |
| 21 | Humanoid Robot | 43 | 120 |
| 22 | Swarm Robotics | 43 | 111 |
| 23 | Internet Of Things | 38 | 164 |
| 24 | IOT | 37 | 188 |

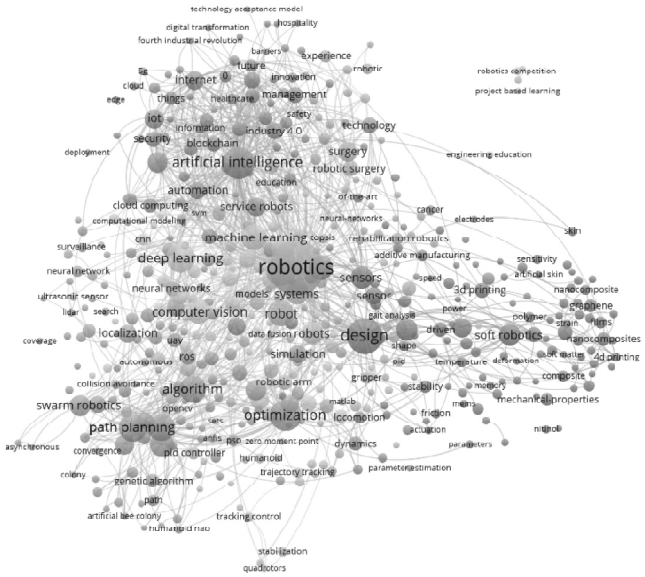



**Figure No. 8 :** Keywords Analysis

The keyword analysis highlights "Robotics" as the most frequently occurring term (287 occurrences, Total Link Strength (TLS) : 839), confirming its centrality in the research field.

"Design" (119 occurrences, TLS : 432) and "Artificial Intelligence" (97 occurrences, TLS : 487) also appear prominently, underscoring the growing integration of AI in robotics. "Optimization" (97 occurrences, TLS : 375) and "Deep Learning" (79 occurrences, TLS : 271) indicate strong research emphasis on improving robotic performance and intelligence.



Keywords such as "Navigation" (73 occurrences, TLS : 321), "Path Planning" (77 occurrences, TLS : 219), and "Algorithm" (68 occurrences, TLS : 265) suggest a focus on autonomous systems and movement efficiency. "Machine Learning" (63 occurrences, TLS : 258) and "Computer Vision" (58 occurrences, TLS : 154) reinforce the role of data-driven approaches in robotics research. Additionally, "Mobile Robot" (56 occurrences, TLS : 188) and "Sensors" (48 occurrences, TLS : 216) emphasize real-world applications and adaptability in robotic systems. Emerging trends such as "Soft Robotics" (45 occurrences, TLS : 147) and "Swarm Robotics" (43 occurrences, TLS : 111) highlight research on flexible, bio-inspired, and collaborative robotic systems. The presence of "Internet of Things (IoT)" (38 occurrences, TLS : 164) and its variant "IOT" (37 occurrences, TLS : 188) indicates increasing connectivity and integration of robotics with intelligent systems. The data reveals that robotics research is interdisciplinary, incorporating AI, optimization, navigation, and IoT, with strong linkages between machine learning, computer vision, and autonomous systems.



## 9. FINDINGS, SUGGESTIONS AND CONCLUSION

Collection of articles that may be found listed in the Web of Science, the current study conducts a Bibliometric analysis of the production of robotics research literature, paying particular attention to research output from India. Ten calendar years' worth of data, totalling 2445 records, had been collected, organized, categorized by carefully chosen fields within the records, and then examined. The present study aims to analyze the research productivity trend on the title "Robotics Technology" research publications worldwide during 2015-2024 based on the Web of Science database.



- A total of 2445 documents were analyzed during the study period. The highest research productivity, comprising 358 documents (14.64%), was recorded in 2022, followed by 2024 with 329 papers (13.45%). In 2023, productivity increased to 294 documents (12.2%), which rose to 238 papers (9.73%) in 2018.

- A total of 2445 research publications found that a maximum number of proceedings Papers, 1188 (48.58%), account for the largest share of research output, emphasizing the significance of conferences in disseminating robotics, was tracked from article, with 1026 (41.96%) publications. Review articles with 202 (8.26%) records.

- During the period, author Parhi, Dayal R. is the most productive author with 32 publications, followed by Nandi, G. C. (19) and Kumar, Priyadarshi Biplab (14), while Semwal, Vijay Bhaskar stands out with the highest citations per paper (50.30) despite having only 10 publications, indicating significant research impact. Parhi, Dayal R. also has the highest total link strength (TLS : 48), suggesting extensive collaboration, whereas some authors, like Sharma, Kaushlendra (TLS : 0) and Prakash, Ravi (TLS : 0), show minimal network connectivity. High citation counts among authors with fewer publications.

- This study identifies the Publisher contributions of researchers in robotic technology. Materials Today : Proceedings is the most productive outlet with 61 publications, accumulating 557 citations and a Total Link Strength (TLS) of 285, indicating strong research dissemination. However, IEEE Access (47 publications, 969 citations, TLS : 566) exhibits the highest





citation impact, reflecting the high quality and influence of articles published in this journal. The International Conference on Robotics and Smart Manufacturing (ROSMA 2018) ranks third in productivity (30 publications, 380 citations, TLS : 142), highlighting the importance of conference proceedings in robotics research.



मनोमयः अयं हि पुरुषः
JLD : Vol. 11. No. 1. January- 2025
p-14-37
www.jld.net.in

## REFERENCES


Basumatary, B., Yuvaraj, M., Verma, N. K., & Verma, M. K. (2023). Mapping of the selected literature on robotic technology applications in libraries based on Scopus database : a subjective computational review. Library Hi Tech.

Batcha, M. S. (2017). Research output analysis on robotic technology : A scientometric study. Indian Journal of Information Sources and Services, 7(1), 25-31.





Batcha, M. S. (2017). Research output analysis on robotic technology : A scientometric study. Indian Journal of Information Sources and Services, 7(1), 25-31.



Bock, T. (2015). The future of construction automation : Technological disruption and the upcoming ubiquity of robotics. Automation in construction, 59, 113-121.

Dixon, J., Hong, B., & Wu, L. (2020). The employment consequences of robots : Firm-level evidence. Ontario : Statistics Canada.

Gaud, N. (2019). A critical analysis of scientific productivity of the 'robotics' research in India during 2009-2018. Library Philosophy and Practice (e-journal), 2345.

Gwak, J., Garg, H., & Jan, N. (2023). Investigation of robotics technology based on bipolar complex intuitionistic fuzzy soft relation. International Journal of Fuzzy Systems, 25(5), 1834-1852.

Kumar, A. (2021). Research trend on Robotics during 2009-2018 : A scientometric analysis based on Scopus database. Library Philosophy and Practice (e-journal), 4312.




Liang, C. J., & Cheng, M. H. (2023). Trends in robotics research in occupational safety and health : a scientometric analysis and review. International journal of environmental research and public health, 20(10), 5904.

López-Belmonte, J., Segura-Robles, A., Moreno-Guerrero, A. J., & Parra-González, M. E. (2021). Robotics in education : a scientific mapping of the literature in Web of Science. Electronics, 10(3), 291.



Moghadami, M., Hedayati Khoshemehr, A., Mohammadi, H., & Naghdinejad, A. (2022). Artificial Intelligence Technology and the Covid-19 Crisis : A Scientometric Study. International Journal of Knowledge Processing Studies, 2(3), 30-46.

Ness, S., Shepherd, N. J., & Xuan, T. R. (2023). Synergy Between AI and Robotics : A Comprehensive Integration. Asian Journal of Research in Computer Science, 16(4), 80-94.

Rani, S., Jain, A., & Castillo, O. (2020). Research trends on fuzzy logic controller for mobile robot navigation : A scientometric study. Journal of Automation Mobile Robotics and Intelligent Systems, 14.

Ravichandran, S., Siva, N., & Vivekanandhan, S. (2022). Research trend on Robotics during 2012-2021 : A scientometric analysis. International Journal of Scientific Engineering and Applied Science (IJSEAS), 8(5), 28-45.

Seyito?lu, F., & Ivanov, S. (2021). Service robots as a tool for physical distancing in tourism. Current issues in tourism, 24(12), 1631-1634.



Vidal, M. S., Tantengco, O. A. G., Gamo, N. M. S., & Lee, K. Y. (2022). Scientometric analysis of global research output in robotic gynecologic surgery. International Journal of Surgery Open, 47, 100544.

Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2022). Artificial intelligence, robotics, advanced technologies and human resource management : a systematic review. The International Journal of Human Resource Management, 33(6), 1237-1266.

Zhou, Y., & Li, H. (2022). A scientometric review of soft robotics : Intellectual structures and emerging trends analysis (2010-2021). Frontiers in Robotics and AI, 9, 868682.