

Bibliometric Mapping of Research Publications from Mahatma Gandhi University, Kerala

¹Anzar A, ²Dr. M. Yasmin

¹PhD Research Scholar, Madurai Kamaraj University, Madurai.

²College Librarian, SFR College for women, Sivakasi.

Abstract: This paper is a Bibliometric analysis of the productivity of research and impact of publications by Mahatma Gandhi University in the period of 2017-2026. Publication data was retrieved from Web of Science database and analyzed on various bibliometric parameters, which include annual growth of publications, citation impact, productivity of authors, collaboration, journals performance, research areas, keywords and trends. There was a total of 2,895 publications during the period under study. It was found that there have been fluctuating trends in annual growth of research outputs, with 2025 showing the maximum publication outputs. In citation impact, it was observed that older publications have higher citation impact, with 2018 showing maximum mean citations per article. Productivity of author analysis showed that Thomas Sabu is the most prolific researcher with regard to publications, citations and impact. Research collaboration analysis shows that there have been many collaborations both nationally and internationally, with major contributors being countries such as France, South Africa, USA and China. From the domain-wise analysis, Materials Science Multidisciplinary, Polymer Science and Chemistry appear to be the dominant research domains. From the keyword analysis, 'Nanoparticles,' 'Composites' and 'Nanocomposites' are found to be the keywords appearing the most often, suggesting active research in the field of nanotechnology and materials. From the trend topic analysis, there appears to be a shift towards emerging topics like renewable energy, supercapacitors, water treatment, carbon quantum dots and sustainable technologies.

Keywords: Research Productivity; Citation Impact; Research Collaboration; Mahatma Gandhi University; Bibliometrics; Web of Science.

1. Introduction

Mahatma Gandhi University (MGU) situated in Kottayam, Kerala, India was founded in 1983 and is one of the best public universities of the country. Named after the Father of the Nation, Mahatma Gandhi, the University was established with the aim of developing excellence in education, research and innovations. In time, MGU has emerged as a distinguished institute of learning that provides various undergraduate, graduate and doctoral courses through its teaching departments, affiliated colleges and research centers. MGU is known for its academic excellence, inter-disciplinary research work and scientific advancements.

The faculty of the university is highly involved in doing research in various domains like material sciences, chemistry, physics, nanotechnology, environmental sciences, biotechnological and engineering. The increase in the quantity of publications and citations indicates the rise in scientific prestige and international prominence of the institution. In the current era of research, scientometrics provides useful information about the trends, efficiency, impacts and collaborations in scholarly research activities. Hence, the evaluation of the research activities of Mahatma Gandhi University becomes important to identify the scientific contributions, research strengths and global positioning of the university. This study endeavors to conduct the scientometric investigation of the research activities of Mahatma Gandhi University

2. Review Of Literature

The assessment of the impact and productivity of research has gained significance in the recent past as a way of assessing the performance of academic institutions as well as formulating strategy decisions. By looking at the trends in publications and citations, as well as studying the effects of institutional variables on research productivity, the above-stated pieces of work exhibit the different methodologies used to assess research performance. This review of literature captures the research productivity of Mahatma Gandhi University and other higher education institutions.

A scientometric analysis was done on the research performance of the University of Kerala from 2014 to 2023 using 2,286 records in the Web of Science database by Kumar and Padma (2025). It is shown by the authors that there was a consistent trend upwards year after year in terms of the research produced, due to the structural change of the university towards Chemistry, Materials Science and Physics. According to the individual indicator analysis, the most productive author is Sankararaman S., while the one with the greatest citation impact was found to be Anirudhan T.S. with a powerful h-index of 34. Also, the authors used network centrality mapping to pinpoint Pillai V.P.M. as the critical bridge among the research groups inside the university.

Kumar (2020) has performed a scientometric analysis on the research productivity of IIT (ISM) Dhanbad during 2000 to 2019 based on data obtained from the Web of Science database. The research covered the areas of publication trend, author characteristics, collaborative trends, funding agency, prolific authors, source journals and citation impact. In total, 6,962 publications have been analyzed, showing a notable rise in the level of research productivity over the period under study. The field of engineering stood out as the dominant research field, followed by Physics, Computer Science and Chemistry. The research shows that the USA was the lead foreign collaborating nation.

Chaturbhuj and Batcha (2021) carried out scientometric analysis of the academic publications of the University of Mumbai between the years 2001 and 2019 from the Web of Science database. This study considered 3,205 research articles, proceedings and reviews to gauge the research output of the university. The results indicated that the most prolific year for publication for this institution was 2008 with a total of 57,357 citations achieved during the study period. This study considered the collaboration activities of the university by looking at both domestic and international collaborations. Engineering was established to be the most specialized discipline of this university through Specialization Index. The most popular journal of publication was identified to be the Industrial & Engineering Chemistry Research.

3. Objectives

Analyzing academic papers and research trends in the Mahatma Gandhi University (MGU), located in Kottayam, Kerala is the study's goal. As stated below, the primary goals are framed with the unique idea behind the current investigation:

- To find out the annual publication productivity of faculty members of the Mahatma Gandhi University from 2017 to 2026.
- To Identify the most prolific authors of the University during the period and their contributions.
- To assess the citation impact of faculty publications through metrics such as h-index, g-index and total citations.
- To examine the country-wise collaboration patterns in faculty research output.

4. Methodology

Data was gathered from the Web of Science on June15, 2026, using the search term “affiliation Mahatma Gandhi University, Kerala” which returned 2,895 records. These records were then imported into Microsoft Excel for data cleaning and preparation. To analyze the data, the authors used the Bibliometrix R package

version 4.1 through the Biblioshiny web app, along with tools available in the Web of Science. Microsoft Excel was employed to visualize the results and to clearly present publication trends, journal impact, author productivity, and collaboration networks. VOSviewer was used to analysis the network visualizations. This approach provides a clear summary of research from the Mahatma Gandhi University highlighting key contributors and trends over the last ten years.

5. Analysis Of Data

5.1 Annual Growth of publications

Figure 1 indicates the growth in the number of publications generated per year by Mahatma Gandhi University in the period of time 2017-2026. During the study period, 2,895 publications were counted. Publications increased slowly from 268 documents in 2017 to 282 in 2019 at 2.61 percent and 2.55 percent annual growth rate correspondingly. A substantial growth was observed in 2020 where the sum of publications reached 335, indicating a high annual growth rate of 18.79 percent. After that year, the university faced a decreasing trend where the output decreased to 324 in 2021 to 306 in 2022 and to 283 in 2023, resulting in negative annual growth rates. A slight improvement was noted in 2024 when the output reached 285 publications. The maximum number of publications was reported in 2025 amounting to 340 documents and indicating a considerable annual growth rate of 19.30 percent. Contrariwise, 2026 had the lowest number of publications of 197 at -42.06 percent annual growth rate, which could probably be attributed to partial data collection.

Table 1: Annual Growth of Publications in Mahatma Gandhi University

Year	Documents	Annual Growth	Cumulative Total	Annual Growth %
2017	268	0	268	0
2018	275	7	543	2.61
2019	282	7	825	2.55
2020	335	53	1160	18.79
2021	324	-11	1484	-3.28
2022	306	-18	1790	-5.56
2023	283	-23	2073	-7.52
2024	285	2	2358	0.71
2025	340	55	2698	19.30
2026	197	-143	2895	-42.06
Total	2895			

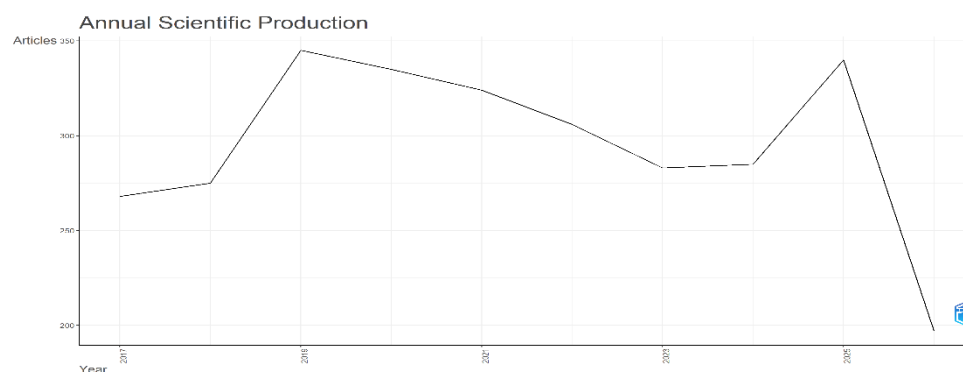


Figure 1: Annual Scientific Productions

5.2 Productivity Based on Citations

The citation impact of the articles published from Mahatma Gandhi University between the years 2017 to 2026 is shown in Table 2 below. According to the results, the older articles have received higher citation impact because of the longer citation window. In all years, articles published in 2018 received the maximum mean total citations per article of 40.10 followed by 2017 which had a mean citation per article of 31.87. Even though the most published year was 2019 with 345 articles, the mean citation per article was comparatively lower at 26.17. The mean citation per article gradually reduced from 23.89 in 2020 to 9.79 in 2024 and then further reduced to 3.53 in 2025 and 0.45 in 2026. Similar pattern was noted in mean total citations per year which were highest for articles published in 2018 with 4.46 citations, 2023 (4.25) and 2022 (3.98). This clearly shows good annual citation impact. However, there was a steady reduction in citable years from 10 years in 2017 to 1 year in 2026. Zafrunnisha (2024)

Table 2: Annual Total Citation of Publications Mahatma Gandhi University

Year	Mean TC per Article	No. of Records	Mean TC per Year	Citable Years
2017	31.87	268	3.19	10
2018	40.10	275	4.46	9
2019	26.17	345	3.27	8
2020	23.89	335	3.41	7
2021	23.76	324	3.96	6
2022	19.92	306	3.98	5
2023	16.99	283	4.25	4
2024	9.79	285	3.26	3
2025	3.53	340	1.76	2
2026	0.45	197	0.45	1

5.3 Impact Metrics of Faculty Members

Table 3 shows the author impact of the top academic staff of Mahatma Gandhi University according to the parameters of h-index, g-index, m-index, total citations (TC) and number of publications (NP). Of all the listed authors, Thomas Sabu gained the greatest research impact with an h-index value of 79, g-index value of 119, m-index of 7.9, 24,210 total citations and 818 publications, which proves his high scholarly productivity and impact. In the second place is Kalarikkal Nandakumar with an h-index of 46, who was cited 7,687 times and produced 334 publications. In the third place is Anilkumar Gopinathan with an h-index of 34 and 3,503 citations from 175 publications. Other writers, like Mathew Beena and Radhakrishnan E. K. as well proved their significance in terms of research impact with h-indices of 29 and 27 correspondingly. The rest of the authors listed (Biju P. R., Joseph Cyriac, Thomas S., Unnikrishnan N. V., and Jisha M. S.) have h-indices between 20 and 26, which shows their average academic achievements. Nevertheless, authors Thomas S. and Jisha M. S., though having published less papers than others, show their citation impact by means of high g-indices. V, A. (2024)

Table 3: Author Impact of the Faculties of Mahatma Gandhi University

S. No	Authors	h_index	g_index	m_index	TC	NP
1	Thomas Sabu	79	119	7.9	24210	818
2	Kalarikkal Nandakumar	46	70	4.6	7687	334
3	Anilkumar Gopinathan	34	46	3.4	3503	175
4	Mathew Beena	29	56	2.9	3706	128
5	Radhakrishnan E. K.	27	46	2.7	2522	126
6	Biju P. R.	26	36	2.6	2053	132
7	Joseph Cyriac	25	35	2.5	1919	121
8	Thomas S.	21	39	2.1	1569	46
9	Unnikrishnan N. V.	21	31	2.1	1112	55
10	Jisha M. S.	20	41	2	1749	42

TC – Total Citation; NP – Number of Publications

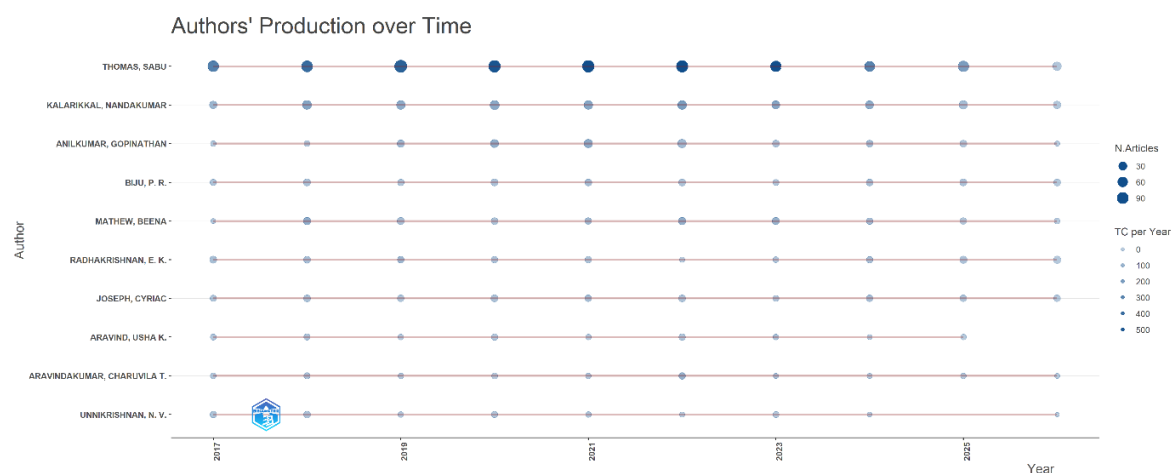




Figure 3: Corresponding Authors Countries

5.5 Journal Impact Metrics

Table 5 reveals the impact metrics of the journals of faculty members of Mahatma Gandhi University through h-index, g-index, m-index, citations and number of publications. According to the results, International Journal of Biological Macromolecules ranks first in terms of impact metrics of journals, with h-index (28), g-index (50), 2,517 citations and 50 publications, indicating its considerable impact. On the other hand, Chemistry Select ranked first having the most quantity of publications (67) out of the mentioned journals, while it had an h-index of 19 and 861 citations. New Journal of Chemistry and Royal Society of Chemistry were the two journals that received substantial citations (837 and 826 respectively). Additionally, ACS Omega ranked fifth with 649 citations and h-index of 14. Journal of Applied Polymer Science, Microbial Pathogenesis and Applied Surface Science exhibited similar research impact with h-indices ranging from 12 to 13. Among these journals, Environmental Science and Pollution Research gained a relatively high number of citations (522) through 22 publications. Priyadarsini and Poorna (2024)

Table 5: Journal Impact Metrics of Faculty Members

S.No	Source	h_index	g_index	m_index	Citations	No.of Publications
1	International Journal of Biological Macromolecules	28	50	2.8	2517	50
2	Chemistryselect	19	26	1.9	861	67
3	New Journal of Chemistry	18	28	1.8	837	37
4	Royal Society of Chemistry	17	28	1.7	826	29
5	ACS Omega	14	25	1.556	649	31
6	Journal of Applied Polymer Science	13	20	1.3	508	37
7	Microbial Pathogenesis	13	17	1.3	461	17

8	Applied Surface Science	12	17	1.333	425	17
9	Environmental Science and Pollution Research	12	22	1.2	522	22
10	Journal of Alloys and Compounds	12	20	1.2	438	21

5.6 Research Areas by Document Output

Distribution of the publication outputs among various research areas highlights the major strengths of the faculty members in terms of disciplinary fields. The field with the most publications is Materials Science Multidisciplinary with 547 papers constituting 21.05 percent of the total publication outputs of the university. It is followed by the field of Polymer Science with 434 papers constituting 16.71 percent of the total publication outputs. Third on the list is the discipline of Chemistry Multidisciplinary with 336 publications (12.93 percent). There were 262 publications (10.08 percent) in the discipline of Chemistry Physical. Physics Applied also accounts for 207 publications (7.97 percent). Other important disciplines include Physics Condensed Matter (145 publications; 5.58 percent), Nanoscience & Nanotechnology (144; 5.54 percent) and Environmental Sciences (143; 5.50 percent). Each of the disciplines of Chemistry Applied and Engineering Chemical accounts for 132 publications (5.08 percent). These findings highlight the fact that the university has achieved considerable strength in materials science, chemistry, physics, nanotechnology and engineering disciplines.

Table 6: Research Area of Faculty Members Publications

S.No	Research Area	No.of Documents	% Share
1	Materials Science Multidisciplinary	547	21.05
2	Polymer Science	434	16.71
3	Chemistry Multidisciplinary	336	12.93
4	Chemistry Physical	262	10.08
5	Physics Applied	207	7.97
6	Physics Condensed Matter	145	5.58
7	Nanoscience & Nanotechnology	144	5.54
8	Environmental Sciences	143	5.50
9	Chemistry Applied	132	5.08
10	Engineering Chemical	132	5.08

5.7 Key Word Occurrences

The Table 7 shows the most frequent terms from the published literature from the Mahatma Gandhi University, which depicts the major research trends and topics. Out of all the keywords, 'Nanoparticles' is the term which has been used maximum times (237 times). It reflects that there is extensive work being done on the topic of nanotechnology. Composites have been mentioned 159 times, behavior (151), mechanical properties (147), which means that there is substantial study occurring on the topic of materials science and engineering. The

keyword nanocomposites have been used 146 times and it again reflects that there is an excellent contribution of this university in the field of advance materials. Other frequently used keywords include performance (124), green synthesis (112) and morphology (112), and it shows the emerging trend of sustainable and structural material. There are 91 uses of silver nanoparticles, while there are 90 times uses of films and photoluminescence, which show that there is some kind of research going on the area of nanomaterial and optics. Degradation (88), water (86), in-vitro (85) and fabrication (84) show the research going on environmental science, biotechnology and material fabrication technique.

Table 7: Most frequent words of Mahatma Gandhi University Publications

S. No	Words	Occurrences
1	Nanoparticles	237
2	Composites	159
3	Behavior	151
4	Mechanical-Properties	147
5	Nanocomposites	146
6	Performance	124
7	Green Synthesis	112
8	Morphology	112
9	Silver Nanoparticles	91
10	Films	90
11	Photoluminescence	90
12	Degradation	88
13	Water	86
14	In-Vitro	85
15	Fabrication	84

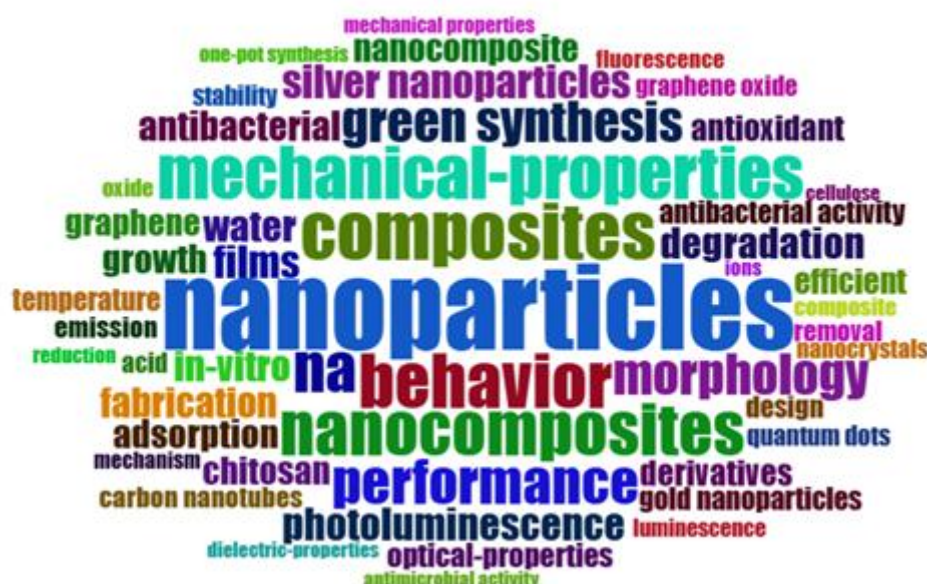


Figure 4: Word cloud of Keywords

5.8 Trend Topics Analysis

Trend topic analysis provides an indication of how research themes in the publications by Mahatma Gandhi University changed over the years 2017-2025. The chart shows a change in research themes from traditional material studies and biochemistry to the advanced studies of nanotechnology and energy storage as well as environmental sustainability and water treatment. Research themes that stood out in the early years of interest (2017-2019) included removal of dyes, biochemistry, thin coatings, biocomposites, and aqueous solutions. However, in the period between 2019 and 2022, the number of themes studied was related to materials science which include composites, nanocomposites, mechanical properties, morphology, nanoparticles, and silver nanoparticles, showing the development in advanced material research. Emerging topics of the years 2022 include nanocellulose, carbon quantum dots, sensors, conversion, renewable energy, and wound healing, showing research in the development of interdisciplinary knowledge in the university. In the latest years (2024-2025), themes of interest were water splitting, supercapacitors and renewable energy, showing that the university had a rising trend in research on sustainable energy and environmental solutions. The large sizes of nodes for the keyword's nanoparticles, composites, mechanical properties, and supercapacitors show their high frequency of use and importance of the research.

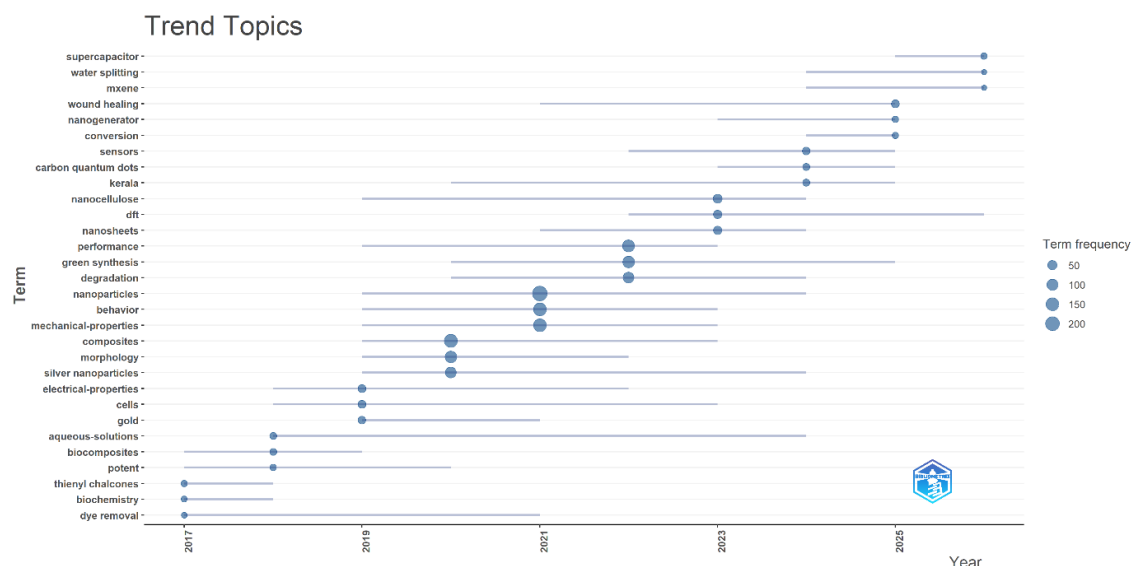


Figure 5: Trend Topics of Mahatma Gandhi University

5.9 Network Visualizations

Figure 6 below shows the author collaboration network of the publications of the institution. Here the relationships among the researchers have been identified through the pattern of co-authorships. The nodes stand for the authors and the linking lines are indicative of research collaboration. Thomas, Sabu is the most dominant and central author with the biggest node and maximum collaborative links. Thus, he has made the greatest contributions towards the research outputs of the institution. He collaborates with other researchers like Biju, P. R., Anilkumar, Gopinathan and Mathew, Beena. Another important cluster is around the researcher Biju, P. R., who collaborates with other researchers like Saritha, A. C., Mathew, Sanu and Simon, Sanu. The presence of more than one interconnected node indicates the extent of collaboration and knowledge exchange among the researchers. Peripheral nodes having lesser number of links indicate lack of collaboration. The network shows that the research productivity is mainly influenced by some dominant authors who act as collaborators and knowledge centers of the institution.

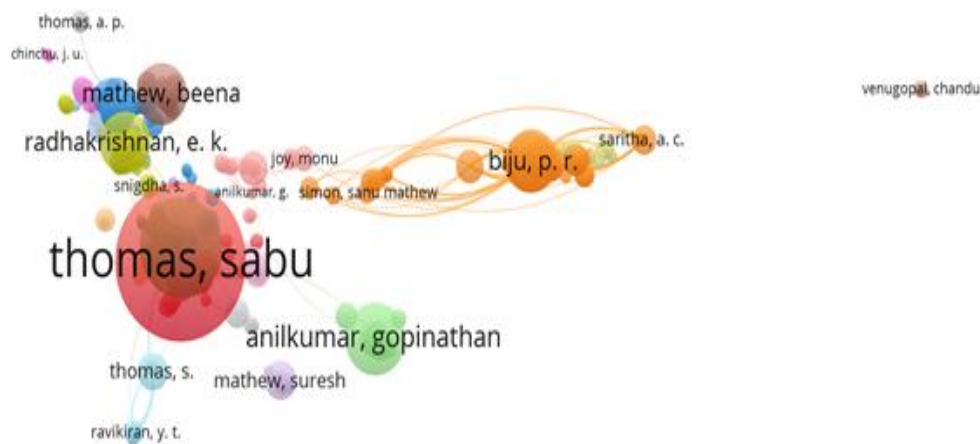


Figure 6: Citation Analysis of Authors

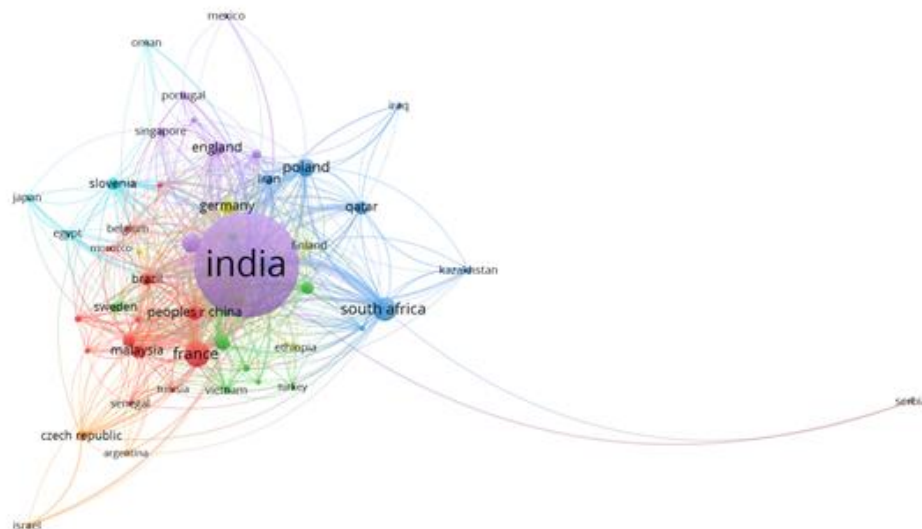


Figure 7: Co-Authorship Analysis of Countries

The figure 7 depicts the network of collaborations among nations, where the node size shows the number of publications produced while links stand for research collaborations. India is the biggest and most central node with the most productive research and international research collaborations. India has established noteworthy collaborations with countries like South Africa, Poland, Germany, England, China, France, Malaysia and Brazil. South Africa and Poland are also notable connecting nodes of the network. A few other countries have made their contributions in smaller numbers of collaborations while Serbia is a peripheral node. The network showcases noteworthy international collaboration, with India having the lead role in encouraging international research collaboration.

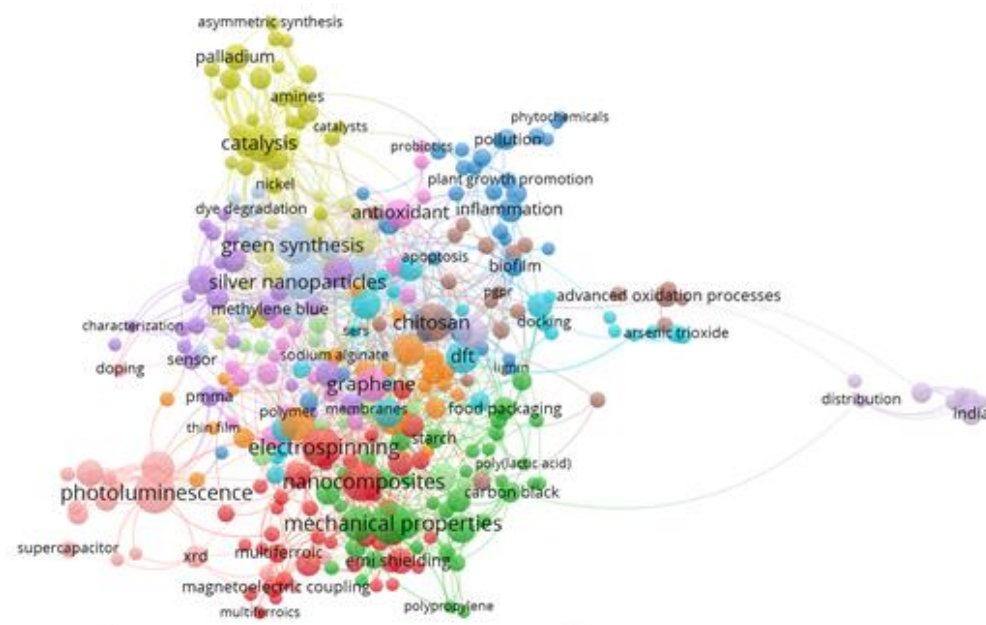


Figure 8: Co-Occurrence of Author Keywords

Figure 8 depicts the co-occurrence network of the keywords used in this field. The larger nodes represent the commonly used keywords in the literature review, while the lines depict the connection between the co-occurrence of the keywords in the literature reviewed. The keyword "India" is the largest node and the most prominent one, meaning that it forms the main focus of the dataset. The major keywords such as "graphene," "nanocomposites," "silver nanoparticles," "electrospinning," "mechanical properties," "green synthesis," "photoluminescence," "catalysis" and "chitosan" are interconnected and constitute densely connected clusters. This reflects some active research themes which have emerged in this field.

6. Conclusion

The current bibliometric study offers a thorough analysis of the academic papers published by the Mahatma Gandhi University of Kerala from 2017 to 2026 by employing data acquired from the Web of Science database. The results show that there has been steady increase in research output with substantial contributions in the fields of materials science, polymer science, chemistry, nanotechnology and environmental sciences. Citation analysis proves that early publications have received more scholarly impact whereas the author impact metrics show that Thomas Sabu is the most productive and impactful scholar. The study also shows strong collaboration between domestic and international scholars from countries like France, South Africa, US, China and Poland. Publication of academic papers in high impact international journals has helped the university to increase scientific visibility. The keyword and trends analysis reveal that there has been a clear shift towards emerging research domains like nanomaterials, renewable energy, super capacitors, carbon quantum dots and sustainable technologies. It can be concluded that Mahatma Gandhi University has developed a multidisciplinary research profile with rising international reputation. The discoveries provide valuable insights for researchers, administrators and policymakers in formulating future research strategies, strengthening collaborations and promoting excellence in scientific research.

7. Reference:

- [1] Anbukkarasi, S., & Sivasekaran, K. (2025). Mapping a Decade of Biodiversity Research in India: A Scientometric Perspective. *College Libraries*, 40(4), 31-40.

- [2] Anbukkarasi, S., &Sivasekaran, K. (2025). Scholarly Publications in The Field of Disaster Risk Reduction-A Critical Evaluation. *South India Journal of Social Sciences*, 23(4), 67-71.
- [3] Anbukkarasi, S., Sivasekaran, K., &Rethi, M. (2023, August). Research Output on Artificial Intelligence in India: A Scientometric Study. In *International Conference on Advances in Artificial Intelligence and Machine Learning in Big Data Processing* (pp. 25-36). Cham: Springer Nature Switzerland.
- [4] Ashokumar, P., &Sivasekaran, K. (2017). Mapping Of Global Level Authorship Trends In Clinical Neurology Using Scientometric Analysis. *International Journal of Library Science and Information Management (IJLSIM)*, 3(2), 68-73.
- [5] Aswathy, S., &Gopikuttan, A. (2013). Productivity pattern of universities in Kerala: A scientometric analysis. *Annals of Library and Information Studies (ALIS)*, 60(3), 176-185.
- [6] Aswathy, S., &Gopikuttan, A. (2015). Bibliometric observation of publication output of university teachers: A study with special reference to physics. *J. Sci. Res.*, 4(1), 14-19.
- [7] Chaturbhuj, S., &Sadik Batcha, M. (2021). Scientometric Analysis of Scholarly Publications of University of Mumbai from 2001 to 2019. *Library Philosophy and Practice*, 0_1-15.
- [8] Chithiraiavel, S., Sivasekaran, K., &Ramalinagam, J. (2020). Global research output on eosinophilia literature: a scientometric analysis. *Library Philosophy and Practice*, 1-23.
- [9] Gopikuttan, A., &Aswathy, S. (2014). Publication productivity of University of Kerala: A scientometric view. *DESIDOC Journal of Library & Information Technology*, 34(2).
- [10] Kumar, S. (2020). Scientometric analysis of research productivity of IIT (ISM) Dhanbad. *Library Philosophy and Practice*, 1-18.
- [11] NK, S., Cherukodan, S., & TK, M. S. (2015). Research Productivity of Universities in Kerala: Growth and Trends.
- [12] Priyadarsini, P. G., and Poorna, K. (2024). A bibliometric study on mHealth and artificial intelligence. *ShodhKosh: Journal of Visual and Performing Arts*, 5(7), 38–46. <https://doi.org/10.29121/shodhkosh.v5.i7.2024.1854>
- [13] Ramasamy, R. U., Sivasekaran, K., &Navasakathi, C. (2013). Scientometric Analysis of Thorium Research in India: A Case study. *Global Research Analysis*, 4, 80-82.
- [14] Sivakumar, B. (2018). Analysis of the Publications of the KSR College of Engineering: A Bibliometric Study. *Journal of Advancements in Library Sciences*, 4(3), 1-7.
- [15] Sivankalai, S., Sivasekaran, K., &Virumandi, A. (2021). Measuring the honey bee research output: Scientometrics analysis from 2004 to 2019. *International Journal of Modern Agriculture*, (2), 2199-2209.
- [16] Sivasekaran, K. (2015). Literature Output on Rice in India: A Scientometric Study K. Sivasekaran. *Journal of Advances in Library and Information Science*, 4(1), 40-47.
- [17] Sivasekaran, K., Sivankalai, S., &Stanley, P. (2021). Bats are the only flying Mammal: A Scientometric Analysis. *Library Philosophy and Practice*, 1-20.
- [18] V, A. (2024). Scientometric analysis and titles word linkage in doctoral thesis of vegetable pathology during the period of 2007–2019. *International Journal of Research -GRANTHAALAYAH*, 12(10), 85–97. <https://doi.org/10.29121/granthaalayah.v12.i10.2024.5827>
- [19] Zafrunnisha, N. (2024). LIBRIES: Library and information science research e-journal: A bibliometric analysis. *International Journal of Research -GRANTHAALAYAH*, 12(6), 139–146. <https://doi.org/10.29121/granthaalayah.v12.i6.2024.6020>