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Bibliometric Analysis of Global Research Trends in the ChatGPT Literature

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ABSTRACT

Recent years have seen an explosion of research in Natural Language Processing (NLP). Among the most popular recent innovations is OpenAI's ChatGPT. Bibliometric analyses of ChatGPT's scholarly contributions are becoming increasingly important as it continues to develop. This paper presents a bibliometric overview of 16,862 scholarly works on ChatGPT, spanning its inception through 2025. It analyses research productivity, author visibility, citations, keyword co-occurrence, and journal and author productivity. Data were collected from the Web of Science Core Collection and analyzed using Microsoft Excel and VOSviewer. The results show that most ChatGPT publications were journal articles; authors preferred collaboration to individual authorship; the United States was the leading contributor to ChatGPT research; and Stanford University ranked first among institutions. Based on the analysis, ChatGPT's distribution across journals did not follow Bradford's Law of Scattering.

KEYWORDS: ChatGPT, bibliometrics, artificial intelligence, Web of Science, Bradford's Law, VOSviewer.

1. INTRODUCTION

Academics and industry have been transformed by digital technologies and artificial intelligence (AI), altering the way students, teachers, policymakers, and decision-makers interact, learn, and share knowledge. A widely used AI model in this field is OpenAI's ChatGPT, which generates human-like responses and summarises complex information with ease (Lund & Wang, 2023). The Generative Pre-trained Transformer (GPT) is a natural language generation model developed by OpenAI.To generate meaningful, human-like content (OpenAI, 2023), it learns to predict the next word in each text. Compared to GPT-1 (117 million), released in 2018, GPT-3.5, released on November 30, 2022, has approximately 1,500 times as many parameters (175 billion). According to O'Connor (2022), ChatGPT can automate tasks such as generating examination questions, assignments, and academic essays. Stokel-Walker (2022) explains how ChatGPT is changing established practices, including essay writing, and could reduce the need for traditional tasks and assessments.

The potential applications of ChatGPT include customer service, education, healthcare, and entertainment. The tool can be used in education to provide students and faculty members with answers to their questions and to facilitate

interactive learning experiences. Healthcare professionals can use ChatGPT to provide patients with information on medical conditions and treatments, summarise the literature, generate educational content, and handle administrative tasks. In entertainment, it can be used to generate creative writing, music, and art, allowing artists to express themselves creatively. ChatGPT enables businesses to provide 24/7 customer service, helping customers find answers and resolve problems. ChatGPT is a versatile language model that can adapt to new situations, making it valuable across a variety of fields.

Bibliometrics is the organization, classification, and quantitative evaluation of publication patterns at macro- and micro-levels of communication, including authorship, using mathematical and statistical methods (Sengupta, 1985). Hood and Wilson (2001) applied bibliometric methods to an increasing range of topics. The British Standards Institution (1976) defines bibliometrics as the application of mathematical methods to the study of documents and publication patterns. In general, bibliometrics uses quantitative and qualitative methods to describe how a field is evolving through its scholarly literature. At present, no systematic bibliometric study appears to cover ChatGPT research specifically from 2021 to 2025. Therefore, this study provides a detailed bibliometric analysis of chatbot-related literature, with a predominant focus on ChatGPT.

2. REVIEW OF LITERATURE

Numerous bibliometric studies on ChatGPT have been published. García-Carreño (2025) examined global trends in ChatGPT research in the social sciences during the digital era. ChatGPT is an artificial intelligence system based on the Generative Pre-trained Transformer language model developed by OpenAI. García-Carreño highlighted its applications in disciplines such as medicine, education, cell biology, and biotechnology. Using the Scopus database, the study identified 220 English-language articles on ChatGPT. It concluded that it represents a paradigm shift in the social sciences by connecting technology with human inquiry, fostering innovation, and redefining traditional research practices. Zhang, Xie, and Xu (2025) used CiteSpace, VOSviewer, and Bibliometrix to examine trends and growth in research on ChatGPT in education from 2023 to 2025. They found that the United States, China, and Turkey were the leading countries in terms of publication output. Velmurugan (2025) conducted a bibliometric analysis of ChatGPT in medicine and similarly found that most publications originated in the United States.

Oliński, Krukowski, and Sieciński (2024) conducted a bibliometric analysis of ChatGPT in the social sciences, drawing on 814 research papers retrieved from Scopus. They applied VOSviewer to analyze co-citations, keywords, and international collaboration. The study suggested that the openness of the education sector may facilitate the adoption of emerging technologies in teaching and learning and identified potential directions for future research and visibility. Zheltukhina et al. (2024) conducted a bibliometric analysis and overview of publications on ChatGPT in educational research. VOSviewer was used to analyze 82 Scopus-indexed publications to identify themes and patterns.Among the results of their study, ChatGPT was the most widely used for teaching nursing and medical students. In 2023, Ahmed and Sab found 333 research outputs related to ChatGPT in the Web of Science Core Collection. We analyzed the data with Biblioshiny and VOSviewer. Using bibliometric indicators, authors, institutions, countries, and journals were analyzed. 8.982% of the publications were published in Annals of Biomedical Engineering.

Duke University in the United States accounted for the largest share of publications (1.80%), and Springer Nature was the most productive publisher. Kirtania (2023) emphasised that the benefits of ChatGPT for researchers include data visualisation, analysis, and interpretation. The author also suggested that ChatGPT can help scholars understand and analyse large amounts of data, potentially enhancing research productivity. Farhat et al. (2023) analyzed the scholarly footprint of ChatGPT using bibliometric tools and techniques to evaluate publication output, citations, and collaboration patterns.

3. OBJECTIVES OF THE STUDY

- To examine the distribution of ChatGPT literature by document type
- To examine the distribution of languages in ChatGPT publications
- To identify the top 15 productive and impactful organisations in ChatGPT research
- To identify the most productive and impactful countries in ChatGPT research
- To identify the top 15 productive and impactful authors in ChatGPT research
- To identify the top 15 productive and impactful keywords in ChatGPT research
- To analyze journals publishing ChatGPT research
- To apply Bradford's Law of Scattering
- To map co-authorship and keyword co-occurrence networks

4. METHODOLOGY

The data required for the analysis were retrieved from the Science Citation Index Expanded™ (SCI-Expanded™) within the Web of Science Core Collection (Clarivate Analytics, Philadelphia, PA, USA). A study flow diagram, constructed in accordance with the proposed reporting guidelines for bibliometric studies, is presented in Figure 1 (Koo & Lin, 2023).

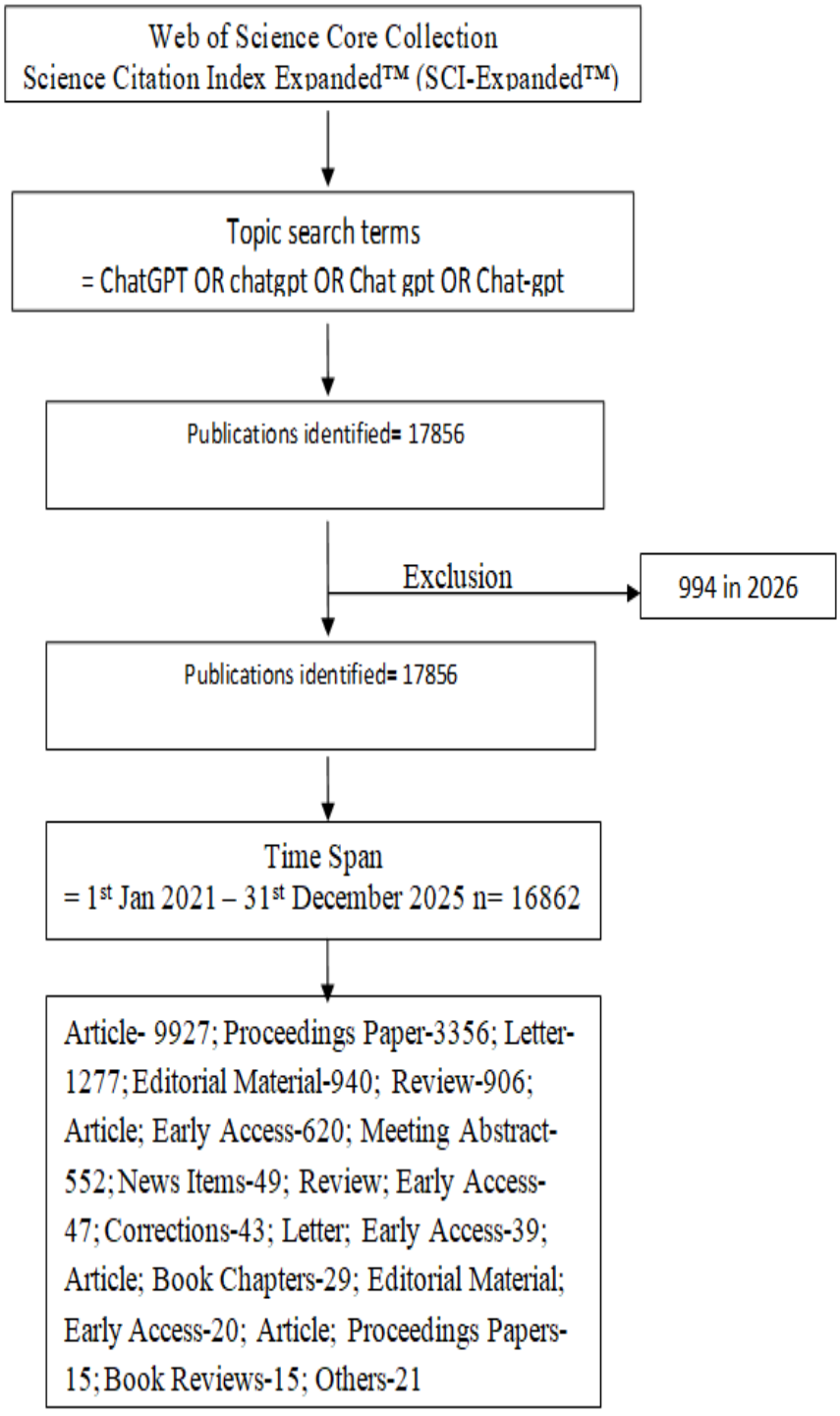

Figure 1. Study flow diagram (source: author)

The search was conducted on a single day, February 15, 2026. The SCI-Expanded database within the Web of Science Core Collection was searched using the Topic (TS) field: TS = (ChatGPT) OR TS = (Chat-GPT) OR TS = (Chat GPT). The search retrieved 17,856 records published between January 2001 and February 2026. Because 2026 was incomplete, 994 records from that year were excluded. The analysis, therefore, included 16,862 records published through December 2025. The publication language was restricted to English using the Web of Science language field tag (LA) to ensure accurate interpretation of the results.

Microsoft Excel and VOSviewer version 1.6.20 for Microsoft Windows (Centre for Science and Technology Studies, Leiden University, the Netherlands) were used for the analysis (van Eck & Waltman, 2010). With VOSviewer, we constructed and visualized keyword co-occurrence networks based on author keywords and keywords Plus, identifying clusters of related terms, their frequency of occurrence, and relevant topics.

5. DATA ANALYSIS

This paper is organized into several sections. Section 2 presents the literature review, Section 3 states the objectives, and Section 4 describes the methodology and analytical criteria used in the bibliometric analysis. Section 5 presents the results and provides insights into current trends and the state of the field. Section 6 summarizes the major findings, and conclusions.

5.1. Document Type

The document-type distribution comprised 29 categories of ChatGPT literature. More than half of the publications were articles (8,933; 52.98%), which received 142,948 global citations and averaged 16.00 citations per paper. Proceedings papers ranked second, accounting for 3,356 documents (19.90%), 19,122 global citations, and an average of 5.69 citations per paper. Letters ranked third, with 1,277 documents (7.57%) and an average of 6.24 citations per paper.

Table 1. Types of documents on ChatGPT

S. No.	Document Type	Records	Percentage	Total Citations	Citations per Paper
1	Article	8933	52.98	142948	16.00
2	Proceedings Paper	3356	19.90	19122	5.69
3	Letter	1277	7.57	7973	6.24
4	Editorial Material	940	5.57	18463	19.64
5	Review	906	5.37	25858	28.54
6	Article; Early Access	620	3.68	1471	2.37
7	Meeting Abstract	552	3.27	106	0.19
8	News Item	49	0.29	836	17.10
9	Review: Early Access	47	0.28	175	3.72
10	Correction	43	0.26	35	0.84
11	Letter; Early Access	39	0.23	16	0.41
12	Article; Book Chapter	29	0.17	9	0.31
13	Editorial Material; Early Access	20	0.12	444	22.2
14	Article; Proceedings Paper	15	0.09	182	12.13
15	Book Review	15	0.09	1	0.06
16	Others	21	0.12	121	5.76
Total		**16862**	**100**	**217760**	**8.82**

Other document types included data papers, retractions, corrections, early-access articles, publications with expressions of concern, retracted publications, editorial materials, book chapters, book reviews, meeting abstracts, and reviews in book chapters.

5.2. Distribution of Languages in ChatGPT Research

Table 2 presents the language-wise distribution of ChatGPT publications. A total of 26 languages were represented. English was the leading language, accounting for almost 98% of the documents (16,459 records). Spanish ranked second with 159 publications, followed by German (66). Other languages included Croatian (8), Korean (6), Bulgarian (5), Polish (4), Catalan (3), Ukrainian (3), and Hungarian, Icelandic, Malay, and Slovenian (2 each). Arabic, Czech, Danish, Dutch, Norwegian, an unspecified language, and one non-English category each accounted for one publication.

Table 2. Distribution of Language on ChatGPT

.S. No.	Language	Records	Percent	TLCS	TGCS
1	English	16459	97.7	41465	217446
2	Spanish	159	0.9	14	140
3	German	66	0.4	42	81
4	Portuguese	33	0.2	7	15
5	Russian	26	0.1	4	7
6	Turkish	26	0.1	9	28
7	French	19	0.1	3	6
8	Italian	16	0.1	0	4
9	Chinese	14	0.1	1	8
10	Others	44	0	13	25
Total		**16862**	**100**	**41558**	**217760**

5.3. Top 15 Productive and Impactful Organizations in ChatGPT Research

Table 3 and Figure 2 present the top 15 most productive and impactful organisations contributing to ChatGPT research, as indexed in Web of Science from January 2021 to December 2025. Among 13,043 institutions, Stanford University was the leading identified institution, with 195 publications (1.1% of the total), 7,410 global citations, and an average of 38 citations per paper. The Mayo Clinic and Harvard Medical School followed with 171 and 170 publications, respectively, indicating the substantial participation of leading medical institutions in ChatGPT research. In terms of citation impact, Stanford University also recorded the highest number of global citations among the top 15 most productive organisations. Despite a comparatively lower publication count of 66 papers, the University of Cambridge achieved 62.74 citations per paper, the highest average in the ranking. Brown University similarly demonstrated a strong impact, with 51.43 citations per paper.

Table 3. Top 15 productive and impactful organizations in ChatGPT research

Top 15 Productive Organizations in ChatGPT						
S. No	**Institution**	**Records**	**Percentage**	**Total Local Citations**	**Total Global Citations**	**Citations per Paper**
1	Unknown	280	1.6	1816	3999	14.28
2	Stanford University	195	1.1	1344	7410	38.00
3	Mayo Clin	171	1.0	467	2547	14.89
4	Harvard Med Sch	170	1.0	834	3311	19.48
5	University of Toronto	149	0.8	708	3957	26.56
6	Natl Univ Singapore	142	0.8	382	2511	17.68
7	Zhejiang University	134	0.8	105	1349	10.07
8	Chinese AcadSci	132	0.7	705	2669	20.22
9	Tsinghua University	129	0.7	134	1816	14.08
10	University of Illinois	124	0.7	335	1499	12.09
11	Shanghai Jiao Tong University	119	0.7	230	2098	17.63
12	Chinese University of Hong Kong	116	0.6	339	2802	24.16
13	Nanyang Technological University	115	0.6	185	2637	22.93
14	Univ Calif San Diego	109	0.6	817	3053	28.01
15	Peking University	108	0.6	232	1637	15.16
Top 15 Impactful organizations in ChatGPT						
S. No	**Institution**	**Records**	**Percentage**	**Total Local Citations**	**Total Global Citations**	**Citations per Paper**
1	Stanford University	195	1.1	1344	7410	38.00
2	University of Cambridge	66	0.4	870	4141	62.74
3	Unknown	280	1.6	1816	3999	14.28
4	University of Toronto	149	0.8	708	3957	26.56
5	Harvard Med Sch	170	1.0	834	3311	19.48
6	Brown University	61	0.3	321	3137	51.43
7	University of California, San Diego	109	0.6	817	3053	28.01
8	Johns Hopkins University	97	0.5	920	3000	30.93
9	Chinese University of Hong Kong	116	0.6	339	2802	24.16
10	Monash University	101	0.6	569	2724	26.97
11	Chinese AcadSci	132	0.7	705	2669	20.22
12	Nanyang Technological University	115	0.6	185	2637	22.93
13	Mayo Clin	171	1.0	467	2547	14.89
14	University of Coll Dublin	63	0.4	215	2541	40.33
15	National University of Singapore	142	0.8	382	2511	17.68

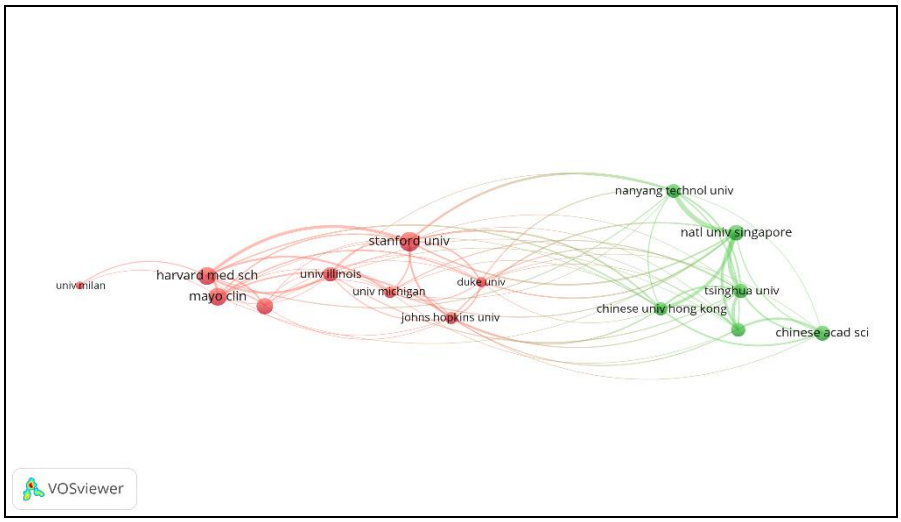

Figure 2. Organizational collaboration network in ChatGPT research

5.4. Top Productive and Impactful Countries in ChatGPT Research

Table 4 and Figure 3 present the top 15 productive and impactful countries in ChatGPT research, revealing substantial differences in research productivity and citation impact. The United States was the leading contributor, with 5,273 publications (29.5% of the total). It also recorded the highest citation indicators: 17,489 total local citations, 84,457 total global citations, and 16.02 citations per paper. These results highlight the dominant role of the United States in both knowledge production and research influence. China ranked second with 2,622 publications (14.7%), reflecting its substantial investment and growing leadership in artificial intelligence research. With 12.20 citations per paper, China accumulated 3,954 local citations and 31,979 global citations. In terms of publications, the United Kingdom ranked third with 1,124 publications and Turkey fourth with 1,119. With 20,862 global citations and 18.56 citations per paper, the United Kingdom achieved a much higher citation impact than Turkey, with 7,881 global citations and 7.04 citations per paper. Ranking by citation indicators differs somewhat from ranking by publication output. Even though the United States and China remained at the top of the rankings, several countries improved their relative standings when citation impact was taken into account. In terms of global citations, the United Kingdom remained one of the most influential contributors with 20,862 citations and 18.56 citations per paper. Among global citations, Germany ranked fourth due to its quality and international relevance. Although Switzerland and the United Arab Emirates were not among the most productive countries, they ranked among the most influential contributors based on their citation impact.

Table 4. Top 15 productive and impactful countries in ChatGPT research

Top 15 Productive Countries on ChatGPT						
S. No	**Country**	**Records**	**Percentage**	**Total Local Citations**	**Total Global Citations**	**Citations per Paper**
1	USA	5273	29.5	17489	84457	16.02
2	China	2622	14.7	3954	31979	12.20
3	UK	1124	6.3	4602	20862	18.56

4	Turkey	1119	6.3	2250	7881	7.04
5	Germany	1074	6.0	1970	14582	13.58
6	India	1062	5.9	2328	10576	9.96
7	Italy	774	4.3	1752	8972	11.59
8	Canada	746	4.2	1656	11552	15.49
9	Australia	675	3.8	2784	13667	20.25
10	Spain	605	3.4	1199	5515	9.12
11	Japan	499	2.8	862	5278	10.58
12	Saudi Arabia	461	2.6	706	6042	13.11
13	South Korea	452	2.5	930	5676	12.56
14	Singapore	349	2.0	1464	8534	24.45
15	Brazil	343	1.9	448	3207	9.35

Top 15 Impactful countries on ChatGPT

S. No.	Country	Records	Percentage	Total Local Citations	Total Global Citations	Citations per Paper
1	USA	5273	29.5	17489	84457	16.02
2	China	2622	14.7	3954	31979	12.20
3	UK	1124	6.3	4602	20862	18.56
4	Germany	1074	6.0	1970	14582	13.58
5	Australia	675	3.8	2784	13667	20.25
6	Canada	746	4.2	1656	11552	15.49
7	India	1062	5.9	2328	10576	9.96
8	Italy	774	4.3	1752	8972	11.59
9	Singapore	349	2.0	1464	8534	24.45
10	Turkiye	1119	6.3	2250	7881	7.04
11	U Arab Emirates	268	1.5	663	7206	26.89
12	Saudi Arabia	461	2.6	706	6042	13.11
13	South Korea	452	2.5	930	5676	12.56
14	Switzerland	304	1.7	1243	5527	18.18
15	Spain	605	3.4	1199	5515	9.12

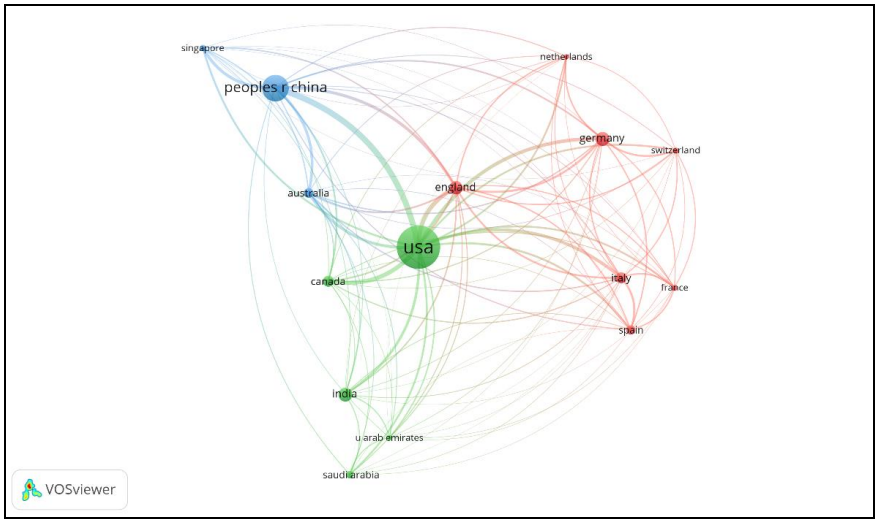

Figure 3. Collaboration network of the top 15 countries

5.5. Top 15 Productive and Impactful Authors in ChatGPT Research

Table 5 presents the top 15 productive and impactful authors in ChatGPT-related research based on publication output and citation performance. A total of 48,790 authors contributed to the literature; only the highest-ranked authors were analyzed. Among the most prolific contributors, Wiwanitkit V ranked first with 252 publications, accounting for 1.4% of the total records. Daungsupawong H followed with 159 publications, while Kleebayoon A ranked third with 76. These authors made substantial contributions to ChatGPT-related research, particularly in healthcare and interdisciplinary domains.

Citation-based analysis revealed a different group of influential authors. Despite having only 10 publications, Ting DSW ranked first with 2,566 global citations. Thirunavukarasu AJ ranked second with 2,530 global citations, while Tan TF ranked third with 2,370. These authors produced highly cited works that substantially influenced the direction of ChatGPT research. Sallam M also stood out, with 20 publications and 2,209 global citations, demonstrating a notable combination of productivity and influence.

Table 5. Top 15 productive and impactful authors in ChatGPT research

Top 15 Productive Authors in ChatGPT						
S. No.	**Author**	**Records**	**Percentage**	**Total Global Citations**	**Citations per Paper**	**TLCR**
1	Wiwanitkit V	252	1.4	229	67.50	230
2	Daungsupawong H	159	0.9	64	23.83	156
3	Kleebayoon A	76	0.4	161	42.33	54
4	Zhang Y	59	0.3	1525	464.42	175
5	Liu Y	58	0.3	654	198.25	80
6	Thongprayoon C	55	0.3	633	197.92	166
7	Cheungpasitporn W	54	0.3	655	203.42	175
8	Wang Y	54	0.3	423	143.75	119

9	Kim J	51	0.3	803	235.33	110
10	Matsubara S	46	0.3	160	65.83	125
11	Li X	44	0.2	1137	334.25	79
12	Wang FY	43	0.2	1238	328.75	203
13	Wang J	42	0.2	451	160.83	166
14	Miao J	41	0.2	684	214.25	174
15	Li Y	40	0.2	292	95.42	108

Top 15 Impactful Authors in ChatGPT

S. No.	Author	Records	Percentage	Total Global Citations	Citations per Paper	TLCR
1	Ting DSW	10	0.1	2566	662.67	58
2	Thirunavukarasu AJ	6	0.0	2530	649.50	88
3	Tan TF	4	0.0	2370	596.83	22
4	Aggabao R	1	0.0	2266	566.50	0
5	Cheatham M	1	0.0	2266	566.50	0
6	De Leon L	1	0.0	2266	566.50	0
7	Diaz-Candido G	1	0.0	2266	566.50	0
8	Elepaño C	1	0.0	2266	566.50	0
9	Kung TH	1	0.0	2266	566.50	0
10	Madriaga M	1	0.0	2266	566.50	0
11	Maningo J	1	0.0	2266	566.50	0
12	Medenilla A	1	0.0	2266	566.50	0
13	Sillos C	1	0.0	2266	566.50	0
14	Tseng V	1	0.0	2266	566.50	0
15	Sallam M	20	0.1	2209	580.08	106

5.6. Top 15 Productive and Impactful Keywords in ChatGPT Research

Table 6 and Figure 4 present the top 15 productive and impactful keywords identified in ChatGPT-related publications. As a result of the analysis, both the most frequently used keywords and those that have significant scholarly influence can be identified. The keyword "ChatGPT" leads the research landscape, appearing in 8,475 publications (47.5% of the total) and garnering 128,255 global citations. Following closely are the keywords "Language" (3,330 records), "Intelligence" (2,819), "Artificial" (2,788), "Large" (2,746), and "Models" (2,721). Collectively, these terms highlight the strong connection between ChatGPT research, artificial intelligence (AI), and large language models (LLMs). Furthermore, keywords such as "Education" (1,914 records), "Generative" (1,714), and "Analysis" (1,474) highlight an increasing interest in the applications of ChatGPT, especially within educational contexts.“Medical” emerged as one of the most influential keywords, generating 22,660 global citations and 23.36 citations per paper, highlighting the substantial impact of ChatGPT research in healthcare and the medical sciences. Keywords such as “Education,” “Generative,” “Performance,” and “Models” also demonstrated strong citation performance, indicating sustained academic interest in evaluating ChatGPT's applications.

Table 6. Top 15 productive and impactful keywords

Top 15 Productive keywords						
S. No.	**Word**	**Records**	**Percentage**	**Total Local Citations**	**Total Global Citations**	**Citations per Paper**
1	Chatgpt	8475	47.5	31162	128255	15.13
2	Language	3330	18.6	6462	50842	15.27
3	Intelligence	2819	15.8	9247	37187	13.19
4	Artificial	2788	15.6	9047	37408	13.42
5	Large	2746	15.4	5094	43511	15.85
6	Models	2721	15.2	5161	43940	16.15
7	Education	1914	10.7	5483	35627	18.61
8	Generative	1714	9.6	3246	27082	15.80
9	Analysis	1474	8.3	2386	13674	9.28
10	Using	1376	7.7	2268	16190	11.77
11	Based	1230	6.9	1672	9102	7.40
12	Performance	1099	6.2	3916	15611	14.20
13	Learning	1015	5.7	1206	10333	10.18
14	Comparative	996	5.6	1275	6228	6.25
15	Medical	970	5.4	3960	22660	23.36
Top 15 Impactful keywords						
S. No	**Word**	**Records**	**Percentage**	**Total Local Citations**	**Total Global Citations**	**Citations per Paper**
1	Chatgpt	8475	47.5	31162	128255	15.13
2	Language	3330	18.6	6462	50842	15.27
3	Models	2721	15.2	5161	43940	16.15
4	Large	2746	15.4	5094	43511	15.85
5	Artificial	2788	15.6	9047	37408	13.42
6	Intelligence	2819	15.8	9247	37187	13.19
7	Education	1914	10.7	5483	35627	18.61
8	Generative	1714	9.6	3246	27082	15.80
9	Medical	970	5.4	3960	22660	23.36
10	Review	800	4.5	1510	16765	20.96
11	Using	1376	7.7	2268	16190	11.77
12	Performance	1099	6.2	3916	15611	14.20
13	Research	705	3.9	2454	14229	20.18
14	Potential	529	3.0	3305	13830	26.14
15	Analysis	1474	8.3	2386	13674	9.28

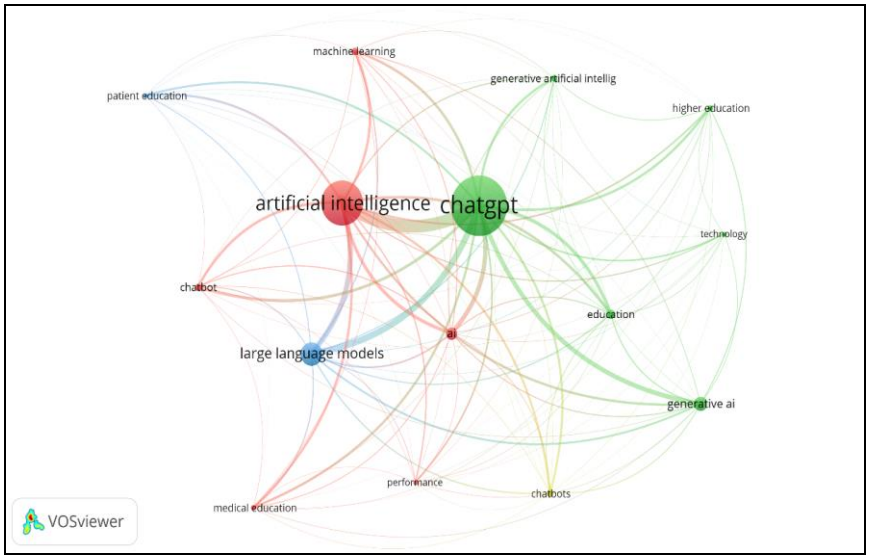

Figure 4. Network visualization of the top 15 keywords in ChatGPT research

5.7. Journal Analysis

The distribution of ChatGPT literature across productive journals is shown in Table 7. We analysed the top 15 journals from a dataset of 5,137 journals. There were 245 research papers published in the Cureus Journal of Medical Science, which had 6,127 global citations and an average of 25.01 citations per paper. With 176 papers, 2,901 global citations, and 16.48 citations per paper, Scientific Reports ranked second. There were 168 papers, 4,883 global citations, and 29.07 citations per paper in the Journal of Medical Internet Research, which ranked third.

Table 7. Top 15 productive journals in ChatGPT research

Rank	Journal	Records	Percentage	Total Global Citations	Citations per Paper
1	Cureus Journal of Medical Science	245	1.4	6127	25.01
2	Scientific Reports	176	1.0	2901	16.48
3	Journal of Medical Internet Research	168	0.9	4883	29.07
4	Computers and Education: Artificial Intelligence	132	0.7	4301	32.58
5	JMIR Medical Education	127	0.7	5471	43.08
6	IEEE Access	124	0.7	2351	18.96
7	Education Sciences	123	0.7	3620	29.43
8	Applied Sciences-Basel	109	0.6	1166	10.70
9	Frontiers in Education	90	0.5	1032	11.47
10	PLOS One	90	0.5	828	9.20
11	BMC Medical Education	88	0.5	759	8.63
12	Digital Health	81	0.5	389	4.80
13	Frontiers in Artificial Intelligence	80	0.4	1633	20.41
14	International Journal of Human-Computer Interaction	79	0.4	1578	19.97
15	Annals of Biomedical Engineering	78	0.4	1489	19.09

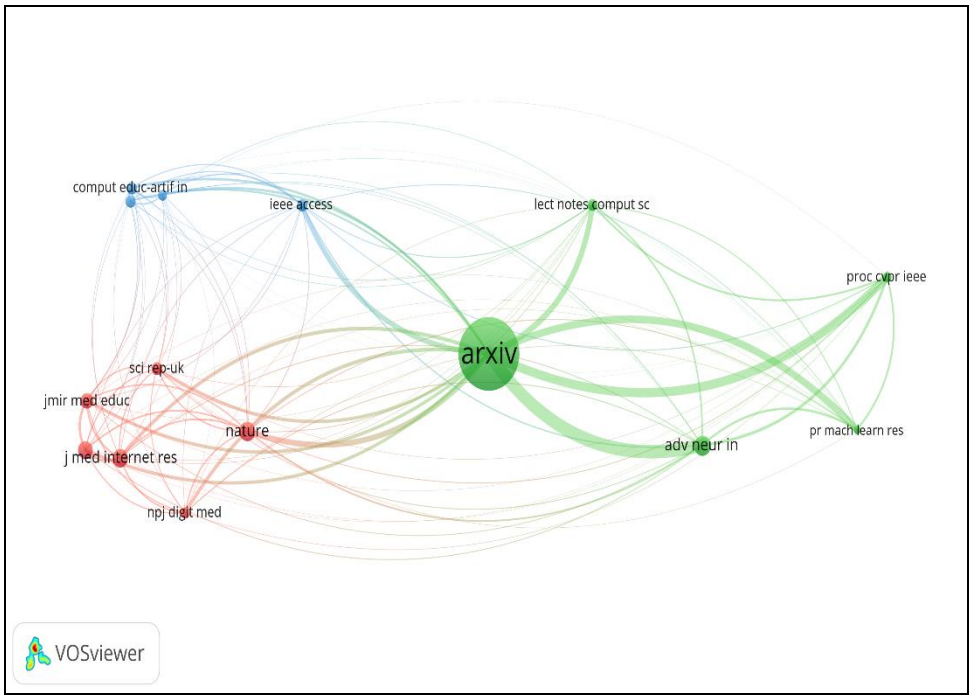

Figure 5. Co-citation network visualization of the top 15 journals

The map groups the top 15 journals into three clusters. Cluster 1 contains six journals: Cureus Journal of Medical Science, Journal of Medical Internet Research, JMIR Medical Education, Nature, NPJ Digital Medicine, and Scientific Reports. Cluster 2 contains five sources: Advances in Neural Information Processing Systems, arXiv, Lecture Notes in Computer Science, Proceedings of Machine Learning Research, and Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. Cluster 3 contains four journals: Computers and Education: Artificial Intelligence, Education and Information Technologies, IEEE Access, and Sustainability.

5.8. Bradford's Law of Scattering

Bradford's Law (1934) identifies a core group of journals by arranging journals in decreasing order of productivity, with the most productive journals appearing first and the least productive last. According to the Law, journals can be divided into several zones, each producing approximately the same number of articles, with the number of journals in successive zones increasing. The relationship among the zones is commonly expressed as $1:n:n^2$. In the present study, 16,862 articles were distributed across 5,137 journals during the study period.

Table 8. Bradford's Law of Scattering applied to ChatGPT journals

S. No	No. of Journals	Research Output	Total Research Output	Cum, no of Research Output
1	1	245	245	245
2	1	125	125	370
3	1	120	120	490
4	1	91	91	581

5	1	82	82	663
6	1	79	79	742
7	1	77	77	819
8	1	75	75	894
9	2	74	148	1042
10	1	73	73	1115
11	1	71	71	1186
12	1	70	70	1256
13	1	69	69	1325
14	1	68	68	1393
15	1	66	66	1459
16	1	65	65	1524
17	1	63	63	1587
18	4	61	244	1831
19	1	60	60	1891
20	1	58	58	1949
21	1	56	56	2005
22	1	55	55	2060
23	1	53	53	2113
24	1	51	51	2164
25	2	41	82	2246
26	2	43	86	2332
27	1	42	42	2374
28	2	40	80	2454
29	1	35	35	2489
30	2	25	50	2539
31	1	22	22	2561
32	2	30	60	2621
33	4	31	124	2745
34	**3**	30	90	2835
35	2	25	50	2885
36	1	22	22	2907
37	**2**	20	40	2947
38	4	16	64	3011
39	6	14	84	3095
40	5	27	135	3230
41	7	26	182	3412
42	2	25	50	3462
43	3	24	72	3534

44	4	23	92	3626
45	3	22	66	3692
46	5	21	105	3797
47	4	20	80	3877
48	7	19	133	4010
49	11	18	198	4208
50	14	17	238	4446
51	13	16	208	4654
52	19	15	285	4939
53	23	14	322	5261
54	**27 (210)**	13	351	**5612**
55	37	12	444	6056
56	31	11	341	6397
57	48	10	480	6877
58	50	9	450	7327
59	60	8	420	7747
60	94	7	658	8405
61	106	6	636	9041
62	171	5	855	9896
63	**282 (879)**	4	1128	**11024 (5412)**
64	468	3	1404	12428
65	854	2	1708	14136
66	**2726 (4048)**	1	2726	**16862 (5838)**
	2102	**2721**	**16862**	

Table 9. Zone-wise distribution of journals

Zone	**Total Journals**	**Journals (%)**	**Total Articles**	**Articles (%)**	**Multiplier**
Zone 1	210	4.09	5612	33.28	-
Zone 2	879	17.11	5412	32.10	4.18
Zone 3	4048	78.80	5838	34.62	4.60
Total	5137	100	16862	100	4.39(mv)*

Table 9 presents the distribution of journals publishing ChatGPT research across three zones. Zone 1, the nuclear or core zone, comprises 210 journals (4.09%) that produced 5,612 articles (33.28%); these were therefore identified as the core journals. Zone 2 comprises 879 journals (17.11%) that published 5,412 articles (32.10%). Zone 3 comprises 4,048 journals (78.80%) that published 5,838 articles (34.62%). The observed journal distribution was therefore 210:879:4,048. The Bradford multiplier was 4.18 between Zones 1 and 2 and 4.60 between Zones 2 and 3, producing an average multiplier of 4.39. However, the observed relationship did not fit Bradford's expected distribution precisely. The results show that 210 journals made the core contribution, whereas the final zone contained a much larger number of journals, reflecting a highly dispersed body of literature.

6. MAJOR FINDINGS

The major findings are summarized below.

- ✓ Articles in peer-reviewed journals constituted the majority of scholarly publications (52.98%), followed by proceedings papers (19.90%).
- ✓ *Stanford University ranked number one for productivity, while Cambridge University had the highest citation impact per publication.*
- ✓ In terms of ChatGPT research publication output, local and global citations, and collaborative impact, the United States led, followed by China and the United Kingdom. *Globally, India ranked sixth in research productivity*.
- ✓ A prolific author does not necessarily have the most influence. *Wiwanitkit V published the most papers, but Ting DSW and Thirunavukarasu AJ achieved significantly greater citation impact, indicating stronger scholarly influence.*
- ✓ Using keywords, it was found that research on ChatGPT primarily focused on artificial intelligence, large language models (LLMs), natural language processing, medical applications, education, performance evaluation, and generative artificial intelligence.
- ✓ *Healthcare has emerged as a major application domain for ChatGPT research, as indicated by the highest citation impact of the keyword "Medical".*
- ✓ The most productive journals for publishing ChatGPT research were Cureus Journal of Medical Science, Scientific Reports, and Journal of Medical Internet Research.
- ✓ Thus, Bradford's Law did not apply to journal scattering. Despite the core zone's 210 journals, the remaining publications were distributed across more journals than the Law would predict, demonstrating ChatGPT's interdisciplinary character.

CONCLUSION

This bibliometric study conducted a comprehensive analysis of 16,862 papers indexed in the Web of Science Core Collection from 2021 to 2025. In addition to documenting publication growth, the analysis reveals the structural characteristics, intellectual foundations, collaborative networks, and thematic evolution of this rapidly developing field. The study provides a useful benchmark for understanding global trends in ChatGPT publications. It reveals scientific impact, collaborations, and major topics by analyzing publication patterns. Researchers, academic institutions, policymakers, funding agencies, and library professionals can use the findings to advance ethical, collaborative, and impactful research in an era of generative artificial intelligence by providing an empirical base for future bibliometric studies.

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