Global Trends and Future Prospects in Research Support Services: A Scientometric Study on the Role of Artificial Intelligence

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ABSTRACT

This study investigates the role of Artificial Intelligence (AI) on research support services through a scientometric analysis of global trends and future directions. The analysis draws on data retrieved from the Scopus database, covering 199 publications from 2015 to 2024. By analysing publication growth, citation patterns, subject-wise distribution, geographic contributions, and collaboration networks, the study highlights AI's expanding role in academia. Findings reveal a significant rise in publications from 2015 to 2024, with education as the dominant field. While citation trends indicate scholarly influence, Altmetrics show limited public engagement. Co-authorship analysis identifies strong regional ties but weak interdisciplinary and international collaboration. Keyword mapping highlights key AI applications in research support. The study suggests that promoting global collaboration, encouraging interdisciplinary approaches, and utilising social media may further support the effective integration of AI into research support services, enhancing their efficiency and accessibility.

Keywords: Artificial intelligence; Research support services; Library services; Scientometric; Altmetric; Academic libraries

1. INTRODUCTION

The impact of Artificial Intelligence (AI) on research support services is multifaceted, influencing various aspects of academic and scientific research, library management, and service provision. AI has significantly enhanced the efficiency and quality of library services by improving collection management and personalising service delivery, although challenges such as staff training and data privacy remain[1]. Academic libraries are leveraging AI to enhance research support services, such as data management and open access publishing, thereby promoting research integrity and productivity[11]. In the broader context of service provision, AI is seen as both an augmentative tool for human capabilities and a potential threat to jobs, with its impact on service provision still being explored[5]. Scientometric analysis using AI, particularly through Generative Pre-trained Transformers (GPT), has shown a continuous growth in AI-related research from 2013 to 2022, highlighting the interdisciplinary nature and global engagement in AI research[12]. AI's role in academic research is transformative, enhancing data analysis, automating tasks, and enabling new methodologies, which improves the efficiency, scope, and quality of research[7]. AI-driven tools are revolutionising scientific research by enhancing data analysis and hypothesis generation, particularly in fields such as genomics and climate science, while also raising ethical concerns about transparency and reproducibility[6]. The integration of AI in open science has introduced platforms like Iris.ai and semanticscholar.org, which aid researchers in literature search and analysis, though challenges such as trust, ethics, and the risk of fake science persist[4]. Moreover, AI tools automate routine research processes, enhance data analysis, and improve the visibility and dissemination of research results, although they also pose ethical challenges that require responsible use[3]. The integration of AI in research libraries has altered information retrieval and resource curation, presenting both opportunities and challenges, including privacy concerns and the evolving roles of librarians[10]. AI's use in various sectors, including healthcare, finance, and education, highlights its transformative potential through predictive analytics and personalised services, underscoring the importance of interdisciplinary strategies to maximize its benefits[9]. The development of AI-enabled research support tools, like those used for COVID-19 literature classification, exemplifies AI's role in swiftly identifying relevant research, which is crucial for timely scientific advancements[13]. Furthermore, AI tools support academic research and publishing by aiding in information retrieval, literature review, and plagiarism checking, although challenges in their use necessitate careful consideration and recommendations for effective implementation[15]. Finally, AI-driven creativity support tools are reshaping traditional workflows by

providing co-creative capabilities, although they also present challenges in managing AI errors and defining the boundaries of AI as a co-creator. While AI is increasingly integrated into academic settings, few scientometric studies specifically explore its role in research support services. Existing literature often addresses broader educational or information science contexts, overlooking AI's impact on tools like data management, grant writing, and academic publishing. Moreover, there is limited longitudinal, data-driven analysis tracking the evolution and future direction of AI-enhanced research support.

Analysing scientific literature using metrics enables the assessment of growth in a specific research domain, highlighting prolific authors, countries, and patterns of collaboration across regions. This study represents the first effort to examine existing research on AI-driven research support services. It employs scientometric measure to identify research trends and utilises Altmetrics to gauge the social impact and engagement of published studies in this field. Overall AI's impact on research support services is profound, offering enhanced capabilities and efficiencies while also presenting new challenges and ethical considerations that must be addressed to maximize its benefits. This study is justified by the need to understand how AI is transforming research support services in academia. As AI tools become integral to scholarly workflows, scientometric analysis provides valuable insights into global trends, key contributors, and emerging themes. These findings help bridge a critical knowledge gap and inform evidence-based decisions for enhancing institutional research support through AI.

2. OBJECTIVES

- Analyze the chronological development in research on AI-driven research support services from 2015 to 2024;
- Determine the leading authors and countries contributing to this field of research;
- Recognize the majority of impactful documents based on citation count and Altmetric Attention Score (AAS);
- Examine co-authorship patterns and country participation to assess collaboration in the chosen research areas;
- Identify emerging trends through keyword analysis.

3. METHODOLOGY

This study employs scientometric and altmetric indicators to examine the growth trends of published literature on AI-powered research support services. Scientometrics quantitatively assesses scientific communication. However, scientometric parameters are primarily applied at the analysis's macro, meso, and micro levels. The macro level reflects global scientific contributions, the meso level analyzes research output from affiliations, institutions, or universities, and the micro level focuses on individual researchers' contributions within a specific field[2,8]. This study utilises scientometric parameters to examine literature on AI-driven research support services in teaching and learning, using the Scopus database. The study utilizes two methods: scientometrics for science mapping and altmetrics to evaluate social media engagement with publications.

The data collection was conducted in two phases. 1st, published literature on AI-driven research support services from the past ten years was retrieved from the Scopus database. Scopus, an Elsevier database, is a vast abstract and citation resource offering bibliographic information on scholarly literature across multiple disciplines. The data extraction from Scopus was performed using the following search terms: (TITLE-ABS-KEY "library services" OR "research support service" AND "Artificial Intelligence"). The initial search yielded 199 documents. After refining the results by restricting the period to "2015–2024" and limiting the language to English, the dataset was reduced to 157 items for the study. The finalised set of 157 items was exported in .csv format for advancing analysis.

The 2nd stage tracked the AAS and Mendeley readership of the 10 most cited research publications. The search process began with the authors using the
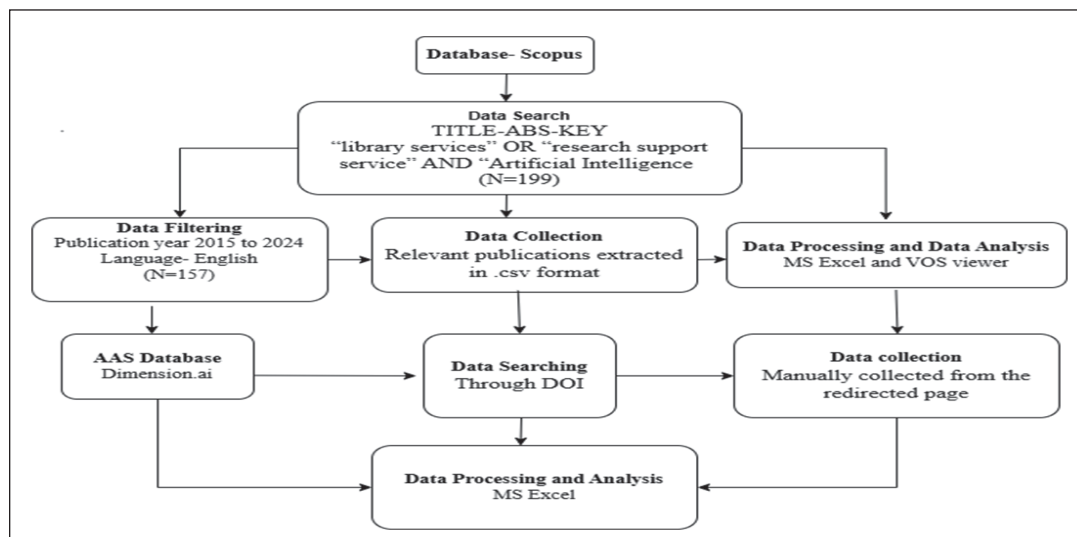

Figure 1. Data collection process from the scopus database and AAS retrieval procedure from the dimensions.ai database.

Dimensions.ai database to collect Altmetric data for evaluating social attention. Data were retrieved using each publication's Digital Object Identifier (DOI) by entering it into the search box and selecting the "DOI" option in the Dimensions.ai (https://dimensions.altmetric.com/) database. The AAS and Mendeley readership scores were documented in an MS Excel sheet for further analysis. Data from both search processes were examined in MS Excel to identify trends and bibliographic details, including publication year, author, DOI, journal name, and affiliation. Additionally, scientific mapping was conducted using VOSviewer software, which enabled network visualisation of co-authorship, country collaborations, institutional affiliations, and keyword co-occurrence. Fig. 1 presents the data collection process workflow.

4. DATA ANALYSIS AND INTERPRETATION

4.1 Trends in Publication and Citation Growth

Figure 2 illustrates the annual growth of publications and citations in AI-driven research support services. Initially, research in this field progresses at a steady pace, but over time, it gains momentum. The number of publications rises from just 2 in 2015 to 65 in 2024, reflecting a significant acceleration in scholarly interest. The analysis of literature growth is performed manually in an MS Excel sheet by tallying the number of research publications each year. This trend suggests that researchers increasingly recognise and explore this field over time. The figure then illustrates the citation growth rate, showing that while publications have increased, citations have also grown. The highest citation count was recorded in 2023-2024. However, since citations generally accumulate over a longer period, there is potential for publications to receive more citations in the coming years.

4.2 Disciplinary Allocation of Research Publications

The disciplinary distribution of research publications on AI-driven research support services offers insights into their evolving applications across different fields. The distribution of research on AI-driven research support services was manually analysed by systematically reviewing the titles and abstracts of each paper in an Excel sheet. Findings indicate that this field is predominantly applied in educational platform, as its primary goal is to simplify complex tasks, making it highly relevant to research activities. Researchers have focused on integrating AI-driven research support services into social sciences and computer sciences, along with other domains such as arts and humanities, mathematics, engineering, physics & astronomy, etc. Fig. 3 shows the subject wise distribution of research publication.

4.3 Countries with the Highest Research Publication Output

Table 1 presents the top 10 most influencial countries based on the citation received and number of publications (NP). China emerges as the leading contributor to AI-driven research support services, with 27 publications and 278 citations. India ranks second with 26 publications and 188 citations, followed by Nigeria (23 publications, 154 citations), the United States (22 publications, 277 citations), Pakistan (12 publications, 176 citations), and the UK (8 publications, 145 citations). Additionally, countries such as Indonesia, Malaysia, Saudi Arabia, and South Africa have also made significant contributions with notable citation counts over the years. However, the collaboration analysis indicates that researchers tend to work within their national or regional clusters, limiting cross-country partnerships that could further enhance the field's development.
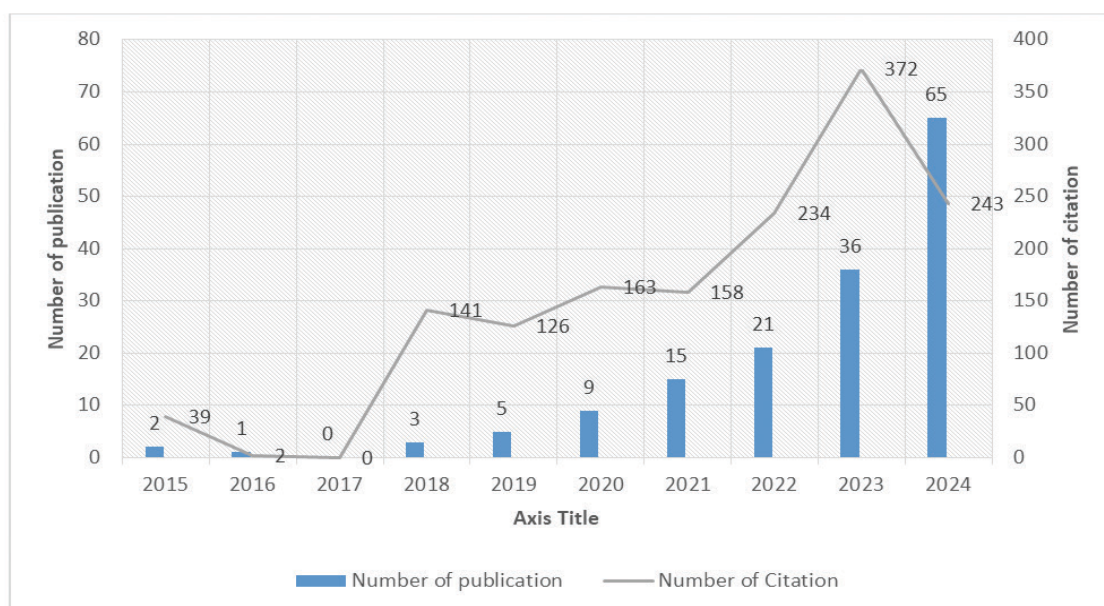

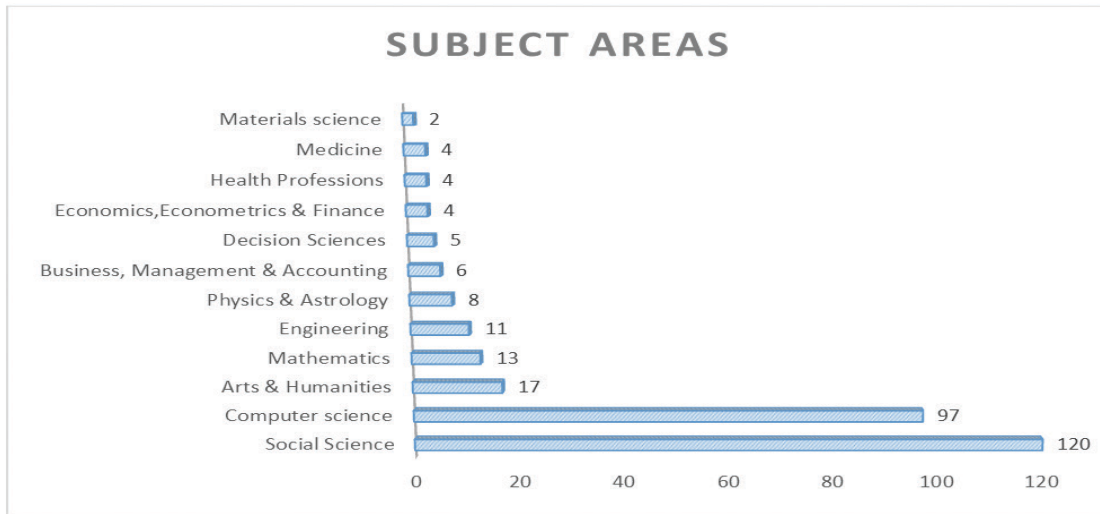**Figure 2. Annual growth of publications and citations.**

Figure 3. Disciplinary distribution of research publication.

Table 1. Highly influential countries

S. No.	Country	NP	Total citations
1	China	27	278
2	India	26	188
3	Nigeria	23	154
4	United States	22	277
5	Pakistan	12	176
6	United Kingdom	8	145
7	Malaysia	6	166
8	South Africa	6	46
9	Saudi Arabia	5	28
10	Indonesia	5	47

4.4 Key Documents Ranked by Citation Count and Altmetrics Attention Score (AAS)

Table 2 presents the top 10 most influential publications on AI-driven research support services, ranked by citation count and Altmetrics Attention Score (AAS) to assess their public impact through social media. AAS is an article-level metric that measures public engagement through views, likes, shares, reads, and tweets. Introduced by Jason Priem in 2010, Altmetrics assess the impact of scholarly communication, tracking how and why research is discussed or shared online. Since citations are a traditional metric that takes longer to accumulate, Altmetrics has been introduced to measure the straight away public impact of research work. The citation counts of the papers were identified using an MS Excel sheet, where citations were sorted from highest to lowest. Based on this ranking, the top 10 research papers were selected for the study. The analysis of citation metrics and AAS highlights a gap between scholarly impact and public engagement. While some articles have high citation counts, their Altmetrics scores remain low, indicating limited visibility on social media and other public platforms. Among the top ten articles, "*Artificial Intelligence (AI) Library Services: Innovative Conceptual Framework for the Digital Transformation of University Education by Rifqah Olufunmilayo Okunlaya*", *Norris Syed Abdullah, and Rose Alinda Alias,* published in Library Hi Tech (2022), has received the highest number of citations (150). However, the absence of an Altmetrics Attention Score (AAS) suggests that the article has had limited circulation among the general public on social media. The study "*How to Make the Library Smart? The Conceptualisation of the Smart Library*" by *Gaohui Cao, Mengli Liang, and Xuguang Li,* published in the journal Electronic Library in 2018, is the second most cited article, with 91 citations and an Altmetrics Attention Score (AAS) of 2.

Among the most highly cited articles, the highest AAS is recorded for "*Perceptions of Artificial Intelligence: A Survey of Academic Librarians in Canada and the United States*" by *Sandy Hervieux* and *Amanda Wheatley*, published in Journal of Academic Librarianship in 2021, with an AAS of 36. Altmetrics also tracks Mendeley's readership to show a publication's reach among readers. Mendeley provides data on readership, including geographical distribution and academic status. It helps measure how

researchers engage with a study. The AAS was collected from the Dimensions.ai database using the DOIs of each paper. This database displays AAS along with scores from various social media platforms such as Twitter, Facebook, and Mendeley. The analysis reveals that the publications "*Maturing Research Data Services and the Transformation of Academic Libraries*" by *Andrew M. Cox, Mary Anne Kennan, Liz Lyon, Stephen Pinfield, and Laura Sbaffi* (2019) published in Journal of Documentation, along with "*Use of Artificial Intelligence in Library Services: Prospects and Challenges*" by *Abid Hussain* (2023) published in the journal Library Hi Tech News, have the highest Mendeley readership, each with 302 reads. Based on the AAS of top-cited publications, social media engagement in this field is relatively low. Greater efforts are needed to promote AI-driven research support services through social media for increased visibility.

4.5 Co-authorship of Authors

In AI-driven research support services, Fig. 4 presents a network visualisation of author collaboration, with clusters distinguished by different colors. The structure reveals strong intra-cluster cooperation but lacks inter-cluster connections (Trinidad *et al.,*). Using VOSviewer, co-authorship analysis was conducted with a minimum threshold of two publications per author, identifying 34 out of 302 authors meeting this criterion. The absence of connecting lines between clusters suggests that collaborations are confined to similar topics, with little engagement across diverse research areas. Overall, the level of author collaboration remains low.

4.6 Co-authorship of Countries

Collaboration between countries in AI-driven research support services research forms a global network of author connections. Fig. 5 presents a VOSviewer-generated visualisation of country co-authorship, where each colored circle represents a country, and its size reflects the number of associated documents. Among 39 contributing countries with at least two documents, 23 met the threshold, forming a network visualisation map. These 23 countries are grouped into five clusters: Cluster 1 in red includes China, Germany, Ghana, Kenya, and Spain; Cluster 2 (green) features Australia, Iran, the UK, and the US; Cluster 3 (blue) comprises India, Oman, Thailand, and Zambia; Cluster 4 (yellow) contains Nigeria and South Africa; and Cluster 5 (purple) includes Pakistan and Saudi Arabia. Encouraging global partnerships could foster knowledge exchange and accelerate advancements in AI-driven research support services.

Table 2. Top-cited articles with their AAS and reader count

| S. No	Title	Citation	AAS	Mendeley
1.	Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education *By Rifqah Olufunmilayo Okunlaya., Norris Syed Abdullah., Rose Alinda Alias.*	150	NA	0
2.	How to make the library smart? The conceptualisation of the smart library *By Gaohui Cao., Mengli Liang., Xuguang Li.*	91	2	283
3.	Maturing research data services and the transformation of academic libraries *By Andrew M. Cox., Mary Anne Kennan., Liz Lyon., Stephen Pinfield., Laura Sbaffi.*	88	18	302
4.	ChatGPT and Its Possible Impact on Library Reference Services *By Xiaotian Chen.*	67	14	174
5.	Perceptions of artificial intelligence: A survey of academic librarians in Canada and the United States *By Sandy Hervieux., Amanda Wheatley.*	65	36	225
6.	Artificial intelligence arrives in the library *By Bruce Massis.*	61	8	173
7.	Industrial revolution 4.0: implication to libraries and librarians *By Abid Hussain.*	56	NA	0
8.	Use of artificial intelligence in the library services: prospects and challenges *By Abid Hussain.*	59	7	302
9.	Smart talking robot Xiaotu: Participatory library service based on artificial intelligence *By Fei Yao., Chengyu Zhang., Wu Chen.*	47	4	188
10.	Research on the application of information technology of Big Data in Chinese digital library *By Shuqing Li., Zhiyuan Hao., Li Ding., Xia Xu.*	41	NA	0
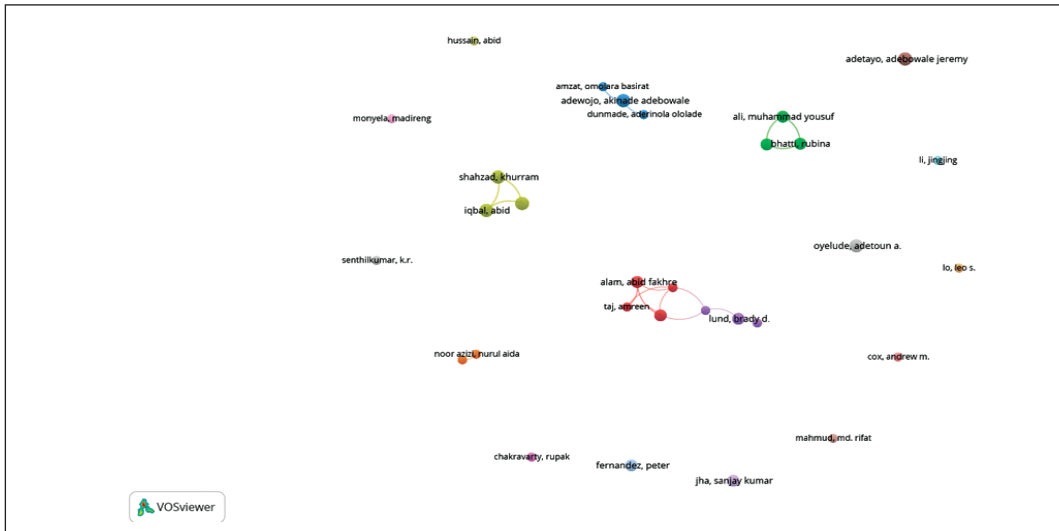
Figure 4. Co-authorship of author.
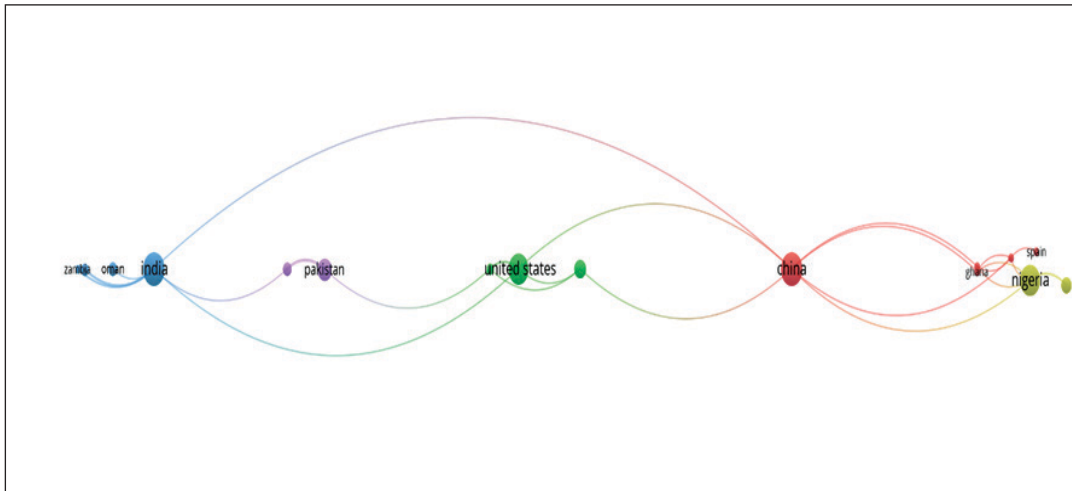
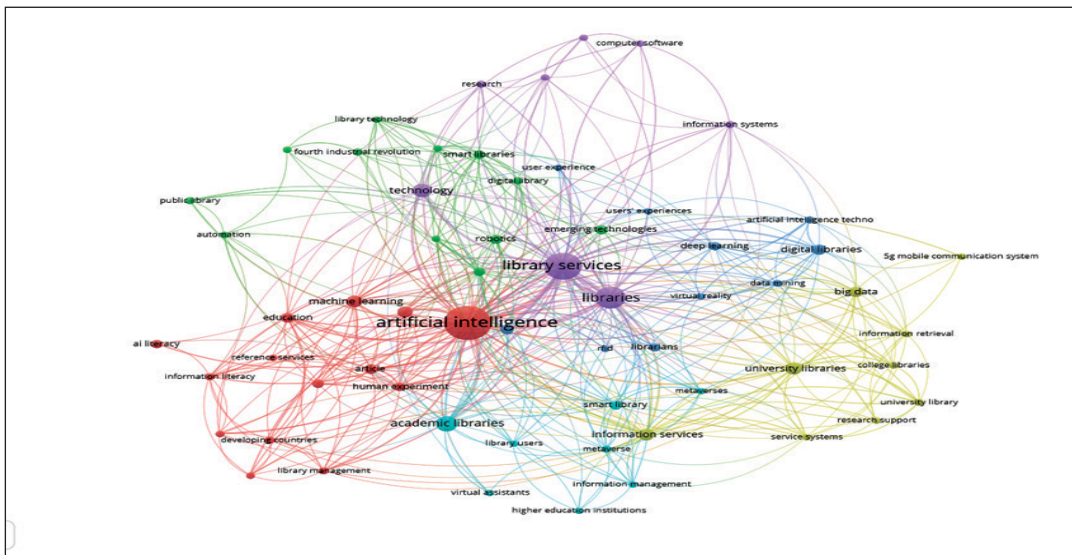**Figure 5. Country-wise co-authorship.**

Figure 6. Keyword analysis.

4.7 Keyword Analysis

To map the intellectual structure of research in this field, this study created a network visualisation to identify research trends by highlighting frequently occurring keywords across documents. Fig. 6 illustrates the co-occurrence of keywords using VOSviewer's clustering method. Each keyword is represented by a colored circle (node), where the size indicates its frequency, and connecting lines signify co-occurrence relationships. Larger font sizes denote higher keyword appearances, while uniform cluster colors indicate closely related terms. Using a complete counting algorithm, keywords occurring at least five times were analysed. of 684 keywords, 69 met the threshold, forming six clusters with 684 links. Cluster 1 (red) comprises 14 keywords focusing on AI-driven research support services, including AI literacy, artificial intelligence, ChatGPT, education, library management, machine learning, and natural language processing. Cluster 2 (green) consists of 12 keywords related to AI applications in automation, cataloging, digital literacy, emerging technologies, and the Fourth Industrial Revolution. Cluster 3 in blue includes 9 keywords highlighting the role of AI in chatbot development, data mining, deep learning, and digital libraries. Cluster 4 (yellow) features 8 keywords centered on research support, big data, college libraries, and information retrieval. Cluster 5 (violet) contains 6 keywords related to computer software, electronic publishing, and information systems. Finally, Cluster 6 (light blue) consists of 7 keywords associated with academic libraries, higher education, smart libraries, virtual assistants, and the metaverse.

5. DISCUSSION

The study highlights the significant growth and evolving trends in AI-driven research support services. The increase in publications from 2015 to 2024 demonstrates a rising scholarly interest in this field, with a steady increase in citation counts suggesting ongoing relevance and influence. The predominance of AI-driven research support services in education indicates their role in simplifying complex tasks, particularly in research and academic settings. The interdisciplinary nature of this research is evident in its application across social sciences, computer sciences, arts and humanities, and engineering. In educational contexts, AI services are expanding the horizons of learning by personalising education and assessing student competencies, which necessitates an integrated approach to their implementation[16]. However, education remains the dominant area, reflecting the integration of AI in research activities. Geographically, China, India, Nigeria, the United States, Pakistan, and the UK emerge as leading contributors, showcasing a strong global engagement with AI-driven research support services. While traditional citation metrics highlight influential studies, Altmetrics provide insights into public engagement, revealing limited social media discussions. The highest-cited studies, such as those exploring smart libraries and AI applications in research support, show substantial scholarly influence but lack widespread public interaction. The need for greater social media promotion to enhance research visibility is evident. Collaboration patterns indicate strong intra-cluster cooperation but limited inter-cluster engagement. Co-authorship analysis reveals minimal cross-disciplinary collaborations, suggesting that researchers primarily work within their subject domains. This highlights an opportunity for increased interdisciplinary research efforts to expand AI-driven research support services. The network visualisation of contributing countries reveals five distinct clusters, reinforcing regional collaborations rather than extensive international cooperation. Enhancing global research partnerships could further drive innovation and adoption of AI-driven research support services. Keyword analysis identifies six thematic clusters, emphasising different dimensions of AI applications in research support. These include AI literacy, education, automation, digital literacy, research support, and smart libraries.

The presence of emerging technologies, chatbots, deep learning, and information retrieval within these clusters reflects the dynamic nature of this field. However, the fragmented nature of research topics suggests that stronger connections between subfields could lead to more integrated advancements in AI-driven research support services. Overall, the study highlights the increasing prominence of AI-driven research support services while identifying gaps in interdisciplinary collaboration and public engagement. Strengthening international research networks, encouraging cross-disciplinary studies, and leveraging social media for wider dissemination could significantly enhance the impact and adoption of AI-driven research support services in the future.

6. CONCLUSION

This study provides a comprehensive scientometric analysis of AI-driven research support services, highlighting trends in publication growth, citation influence, and patterns of research collaboration. The steady rise in AI-focused publications and citations underscores its expanding role in optimising research workflows, knowledge management, and scholarly communication across diverse disciplines. Despite this progress, challenges such as limited interdisciplinary integration, underutilisation of social media for broader outreach, and inadequate engagement with non-academic audiences persist. Addressing these issues requires a deliberate focus on fostering cross-sector collaboration, enhancing digital dissemination strategies, and cultivating inclusive research ecosystems. Future research should investigate the untapped potential of AI in underrepresented areas like the arts and humanities, as well as high-impact fields such as medical, legal, and policy research. Additionally, there is a need to evaluate the effectiveness of AI tools in improving research productivity, user satisfaction, and the precision of information retrieval. Incorporating data from multiple

sources-including Web of Science, Dimensions.ai, and regional databases-will enrich the understanding of global and local research dynamics, offering a more nuanced view of AI's contributions.

By bridging current gaps in knowledge, collaboration, and data coverage, the field can move toward a more holistic and impactful application of AI in research support services. This evolution holds the potential to make scholarly resources more accessible, equitable, and aligned with the changing needs of the global research community.

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