J Data Sci. Info. Citation Studies., 2026; 5(3):373-379.
https://www.jcitation.org

Research Article

Artificial Intelligence in Library Research: A Bibliometric Analysis of Global Trends, Open Access, and Citation Impact

Kishore Dey*

Librarian, Karunamoyee Library, Barasat, West Bengal, INDIA.

ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative technology in library and information science, influencing information retrieval, digital services, knowledge organization, scholarly communication, and other library-related activities. The rapid development of AI has generated increasing scholarly interest, making it important to understand the growth and thematic evolution of research in this domain. This study aimed to examine global research trends in Artificial Intelligence in Library Research from 2016 to 2025 using bibliometric analysis. It specifically evaluated publication growth, open-access patterns, retracted articles, citation impact, Field-Weighted Citation Impact (FWCI), emerging research topics, and Article Processing Charge (APC) status. Bibliographic data was retrieved from the OpenAlex database. Following the application of predefined inclusion criteria, 6,778 documents published between 2016 and 2025 were included in the analysis. Biblioshiny and Microsoft Excel were used to analyze annual publication trends, open-access status, retractions, citation patterns, FWCI, trend topics, and APC status. The analysis demonstrated a marked and exponential increase in research output, particularly from 2021 onward, reflecting growing global interest in the application of AI within libraries. Closed-access publications constituted the largest proportion of the literature, although the combined contribution of different open-access models represented a substantial share of the research output. Trend-topic analysis identified several emerging areas, including topic modeling, computational applications, anomaly detection, online learning analytics, and AI applications in healthcare and education. The findings also revealed continued diversification of research themes as AI technologies increasingly intersect with broader information and knowledge-service domains. Artificial Intelligence in Library Research has developed into an active and rapidly expanding research area. The sustained growth in publications and the emergence of diverse interdisciplinary themes indicate increasing integration of AI into library and information science. These findings provide a useful overview of the field's development and emerging directions and may support researchers and library professionals in identifying future research opportunities.

Keywords: AI, Bibliometrics, Citations, Global trends, Library, Open access, OpenAlex.

Correspondence:
Mr. Kishore Dey
Librarian, Karunamoyee Library, Barasat, West Bengal, INDIA.
Email: kishore.ju29@gmail.com

Received: 27-08-2026;
Revised: 01-10-2026;
Accepted: 12-11-2026.

INTRODUCTION

Artificial intelligence is among the most prominent technological innovations in the twenty-first century that have impacted research, education, health care, and information technology. The use of AI technologies like machine learning, natural language processing, recommendation systems, chatbots, and generative AI has become common in library science, making these technologies increasingly relevant in the field of LIS (Cox *et al*., 2019). Increasing reliance on AI for the management of information has resulted in an extension of AI applications in the domain of libraries from mere automation of information to sophisticated data analyses and smart information retrieval systems.

The development of digital libraries, open-access platforms, and data-driven scientific communication has added another impetus to the growing research on AI in the world's libraries. Earlier literature has highlighted the importance of AI in scholarly libraries, smart libraries, information searching, and digital knowledge management (Lo *et al*., 2023). However, the sharp rise in the number of publications on AI has called for bibliometric analysis to examine the dynamics of publications, citations, open access, and new trends in the subject area. Bibliometrics can shed light on scientific productivity, significant papers, collaborations, and thematic trends within a particular scientific domain (Aria and Cuccurullo, 2017). Hence, this paper makes an effort to offer a detailed bibliometric overview of Artificial Intelligence

DOI: 10.5530/jcitation.20260005

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in Library Research during 2016-2025 based on the OpenAlex dataset.

REVIEW OF LITERATURE

The role of Artificial Intelligence has been increasingly significant as an area of research in the field of library and information science. The effects of AI on academic libraries have been explored by Cox *et al.* (2019), who found out that information services, library management, and users' interactions are being greatly influenced by AI technologies. In their environmental scan, Wheatley and Hervieux (2019) noted the rising adoption of AI-based tools in academic libraries to enhance their digitization and automation processes. The concept of Library 4.0 was introduced by Noh (2015) and is based on the incorporation of intelligence technologies in library environments of the future. Tammaro (2020) described the prospects and problems associated with applying AI to digital libraries and stressed the importance of technology adaptation for librarians. The influence of ChatGPT and generative AI on libraries and academia has been explored by Lund and Wang (2023), Lo (2023) evaluated the effects of generative AI in academic libraries and posited that AI technologies have potential benefits for improving research support services, information searching, and user assistance. Gupta and Sharma (2021) Reviewed the use of machine learning in library management systems and showed that the automation of processes through AI is a major trend in modern libraries. Fernández-Luna *et al.* (2021) paid attention to AI-based recommender systems in digital libraries and illustrated the contribution of AI to information services. Interdisciplinary approach to AI technology applications is another focus of research. For instance, Dwivedi *et al.* (2021) presented the multidimensional effects of AI in various domains, such as education, information systems, and information policy creation. In turn, Bawden and Robinson (2020) considered the impact of AI on the way people search and consume information. Similarly, the capabilities of AI are also considered and its effect on the performance of organizations.

Various works have been dedicated to bibliometric and scientometric investigations of AI research. Specifically, Aria and Cuccurullo (2017) presented Bibliometrix and Biblioshiny as critical bibliometric mapping and scientific analysis tools. Chalupka (2022) Analyzed AI use cases for bibliometric studies and showed that AI is increasingly used for assessing scholars and citation analysis Zhang *et al.* (2022). Evaluated AI-based data management practices at academic libraries and pointed out the importance of intelligent information systems. Research concerning AI and scholarly communication has become increasingly relevant. In particular, Adewojo and Oladokun (2022) analyzed the adoption of AI in academic libraries and found that accessibility and digital inclusion were the two most significant issues. Likewise, Smutny and Schreiberova (2020) discussed chatbot technologies and their educational uses, showing the increased relevance of AI for online learning platforms. Finally, Yu *et al.* (2023) described smart library services and indicated that AI-powered analytics and intelligent information systems were among the emerging topics.

The current reviewed literature suggests that Artificial Intelligence has emerged as a dynamic multidisciplinary research area in library and information science. The existing body of literature was centered around AI technologies, digital libraries, chatbots, intelligent systems, machine learning, and generative AI. Nonetheless, few empirical pieces of literature have explored scientific output, open access, citation index, FWCI, retracted articles, APC, and trending topics of Artificial Intelligence in Library Research. Thus, the proposed study will attempt to bridge this gap by conducting an extensive bibliometric analysis of Artificial Intelligence in Library Research worldwide between 2016 and 2025.

RESEARCH OBJECTIVES

- To analyse the annual scientific production of Artificial Intelligence in Library Research.
- To examine the open access publication status in the field.
- To identify the retracted publications related to the research area.
- To evaluate citation impact and FWCI of the publications.
- To explore the trend topics in Artificial Intelligence in Library Research.
- To assess the APC charge status of publications in the field.

RESEARCH METHODOLOGY

In the current study, bibliometric methodology was applied to investigate the world scientific tendencies in Artificial Intelligence in Library Research for the years 2016-2025. Bibliographic information was extracted from OpenAlex (https://openalex.org/) based on search terms connected with Artificial Intelligence and libraries. OpenAlex, as opposed to conventional proprietary databases, has been chosen as the database for this research due to its wide-ranging and non-siloed scope of coverage on worldwide research along with robust metadata and citations data.

However, the records were then filtered according to the PRISMA framework (Figure 1) (Page *et al.*, 2021). As a result of initial searches, 14,730 records were found in the database. However, limiting the date of publication within 2016-2025, applying filters in accordance with document type (articles, books, book chapters, editorials, reports, review papers) and language (English), resulted in the selection of 6,778 items for further

investigation. For data analysis and visualization, Biblioshiny (v5.3.0) and Microsoft Excel (2019) were used. For bibliometric, citation analysis, scientific mapping, and tendency visualization, Biblioshiny was applied. Microsoft Excel was applied for data organization, table construction, and graphics representation.

DATA ANALYSIS AND FINDINGS

The bibliometric data set for Artificial Intelligence in Library Research in 2016-2025 is made up of 6,778 documents which originated from 2,739 sources. This illustrates how rapidly and diversely research on Artificial Intelligence is being conducted. Annual growth rate and citations per document were 58.41% and 8.972 respectively. 23,566 researchers contributed to the research work with an average of 3.93 co-authorship per document. International collaborations made 18.22% contribution of the total publications, and journals, reviews, and book chapters constituted 94%, 5%, and 1% of the literature respectively.

Annual Productions in AI in Libraries

Scientific Production in Artificial Intelligence in Library Research from 2016-2025 shows an impressive growth pattern every year during the period of 2016-2025. The subject matter started with only 42 publications in 2016 and grew slowly with 51 publications in 2017 and 101 publications in 2018. Thereafter, there was a slow but steady increment of articles from 2019 to 2021, which included 182, 255, and 369 publications. But a tremendous increase in publications was noted from 2021 to 2025, which resulted in 538, 904, 1,672, and 2,638 publications in 2022, 2023, 2024, and 2025, respectively.

The results (Figure 2) reveal that Artificial Intelligence technologies have attracted many researchers around the world due to their increasing usage in various domains, including library and information science research. It is evident that Artificial Intelligence in Library Research has gained momentum as a dynamic area of research in recent times.

Open Access Status Analysis

In OA publishing, scholarly publications can be accessed for free online and do not come with severe restrictions. The access to closed access publications requires that the person pay for access via a subscription or other forms of payment. Gold Open Access gives access immediately for free on the publisher's website at a

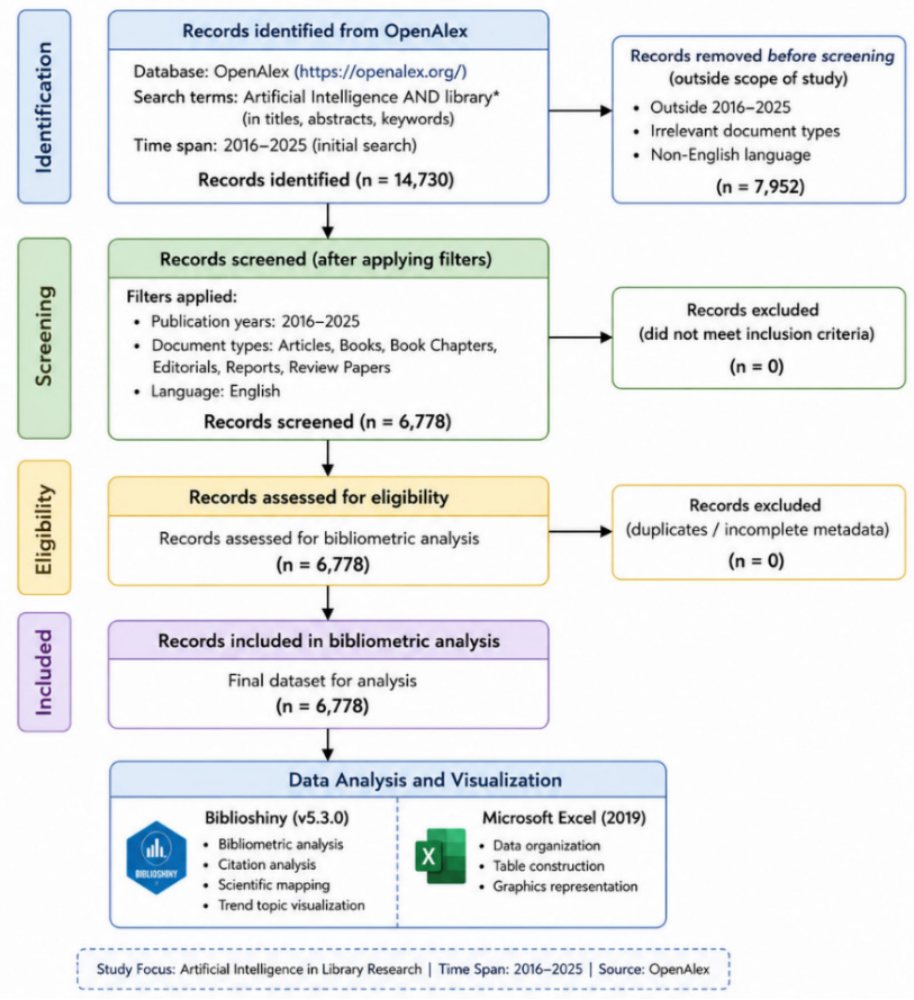

Figure 1: PRISMA flow diagram of study selection process.

Year	Articles
2016	42
2017	51
2018	101
2019	182
2020	281
2021	369
2022	538
2023	904
2024	1672
2025	2638

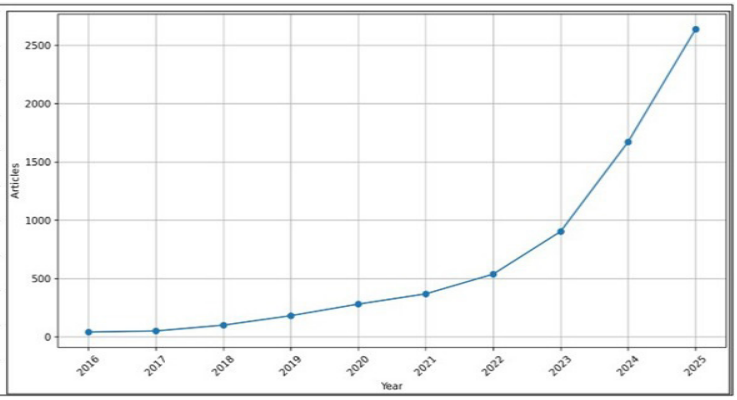

Figure 2: Year-wise publications of AI in libraries (2016-25).

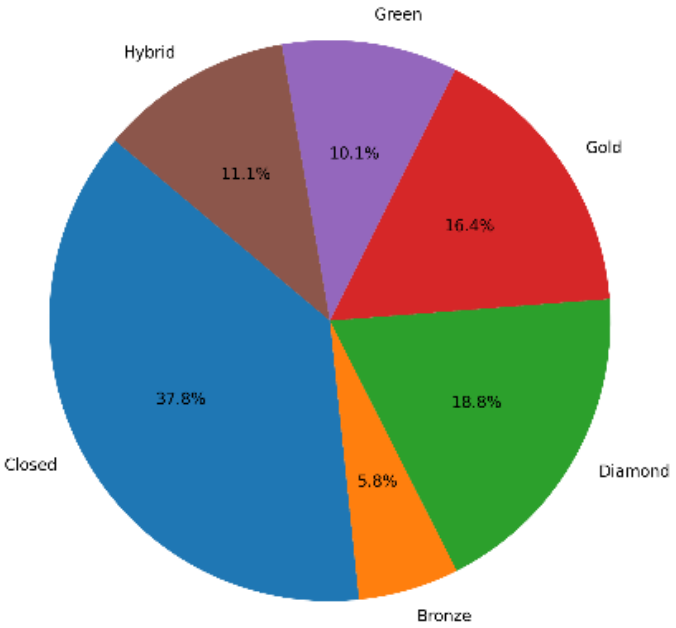

Figure 3: Open Access status in publications of AI in libraries.

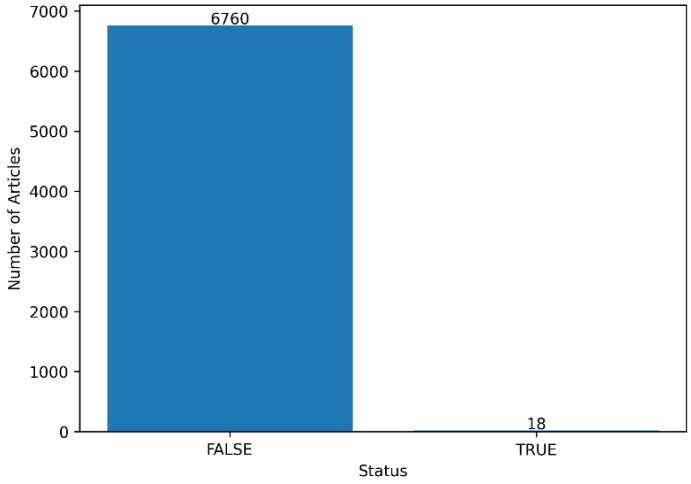

Figure 4: Retraction status in publications of AI in libraries.

cost of APCs, while Green Open Access lets the author deposit the article in repositories. The concept of hybrid OA is used by subscription journals where the option of making publications available on an open-access basis after APCs.

Analysis of the status of Open Access (OA) in Artificial Intelligence in Library Research showed that the highest number of articles fell into the closed access category. Of 6,778 publications analysed, 2,560 articles belonged to the closed access category, reflecting the fact that a large proportion of academic publishing in the field is still restricted to those with subscriptions. On the other hand, the number of diamond OA articles was 1,272, while gold OA articles stood at 1,111 articles. Moreover, there were 755 Hybrid Open Access publications, and 686 Green Open Access publications. The least number of publications was by the Bronze Open Access model with 394 publications. The results indicate that even though closed access is the common mode of publication in the area, open access models combined still account for a considerable amount of research output. This indicates the increasing global trend towards scholarly communication that is open to everybody (Figure 3).

Retraction Status Analysis

Retracted publication means an academic paper which is taken back by a publishing organization once it gets published in the name of research misconduct. The main reasons for taking back the papers include plagiarism, data manipulation, ethical misconduct, serious errors related to methodology, duplication, conflict in authorship, and any other reason that might make the publication invalid. Retraction of the paper is done to ensure that there remains no compromise in terms of academic integrity, reliability, and validity of the scholarly communication process.

The results of retracted publications analysis on Artificial Intelligence in Library Research show (Figure 4) that most of the analysed publications have not been retracted. From all 6,778 publications analysed, 6,760 papers belonged to the "FALSE" category, meaning that they did not have any retraction status. In addition, only 18 articles were classified under the "TRUE" category, signifying retracted papers in the selected corpus. The relatively small number of retractions implies that the discussed research area is quite reliable. As was mentioned above, the

small number of retractions implies that most of the research on Artificial Intelligence in the field of library sciences was conducted following good academic and ethical practices. On the other hand, it can be said that such an analysis is important for monitoring and maintaining the quality of interdisciplinary research areas.

Analysis of Citation and FWCI

Through citation analysis, it is evident that many articles published in the journal Artificial Intelligence in Library Research received significant scholarly recognition. Out of 6,778 papers, 3,785 articles were cited 50 times or more, demonstrating the increasing scholarly importance of research in this area. Furthermore, 97 articles were cited over 100 times, while 6 papers received more than 500 citations and 1 paper was cited over 1,000 times, showing that there are a few highly impactful studies in this domain. Nevertheless, 2,889 publications were not cited at all, implying that there are still some relatively new studies in this area that lack scholarly recognition (Table 1).

The impact of publications in terms of research compared to the global average in similar subject areas is also demonstrated using the Field-Weighted Citation Impact (FWCI) analysis. The FWCI is a normalized citation measure in which the number 1.0 is used for the world average citation impact. If the FWCI is more than 1, it denotes that the research is performing better compared to its average citation impact, whereas an FWCI less than 1 shows below-average citation impact. For the current study, 3,701 publications had an FWCI of more than 10, showing a very high research impact when compared with the world average. Similarly, 25 publications were found to have an FWCI of more than 50, 5 publications having an FWCI more than 100, and 1 publication had an FWCI greater than 1,000. In addition, 2,834 publications had an FWCI score of zero and 212 publications were classified as not applicable (Table 2). From a general perspective, the results from the citations and FWCI analysis indicate that there are substantial academic recognition and impact on studies related to Artificial Intelligence in Library Research.

Analysis of Trend Topics

The analysis of trend topics in Artificial Intelligence in Library Research shows (Table 3) that the subject is multidisciplinary with emerging trends in thematic areas. One of the top-ranked topics among the listed topics for Artificial Intelligence in Library Research is Topic Modelling with 1,086 cited papers. The topic represents the major significance of the technology in information classification, data mining, and data analysis in library and information studies. In addition, another highly cited topic in the study is Computational Physics and Python Applications with 746 cited papers. This means that the emerging trend in Artificial Intelligence is the use of programming, data science, and computation methods.

In addition, the topics Digital Mental Health Interventions, Anomaly Detection Techniques and Applications, Artificial Intelligence in Healthcare and Education, and Online Learning and Analytics were identified as high citation research topics. From these results, it can be concluded that research on AI-related libraries is becoming more and more associated with health informatics, educational technology, predictive analytics, and digital service systems. The consistent emergence of topics associated with health care and online learning reveals the increasing incorporation of Artificial Intelligence into multidisciplinary knowledge contexts. Thus, the trend topic analysis shows that Artificial Intelligence in Library Research is moving towards an expanded research field of AI beyond the scope of traditional library functions.

Status of Article Processing Charges (APCs)

According to the analysis of the status of APCs, a vast majority of the publications in Artificial Intelligence in Library Research were found to be APC Free. As such, out of the total number of 6,778 articles, 5,724 publications were found to fall under APC-Free. This means that a significant number of research papers were published through journals, repositories, or platforms that do not charge publication fees from authors. On the other hand, there were 1,054 publications falling under the APC Includes category. From the data provided above (Table 4), despite the rise in popularity of the APC-based publishing models, APC-free publication opportunities remain dominant in the area of research. Overall, the results provide evidence of the significance of having access to cost-effective ways of publishing research results in the field.

Table 1: Citation status in publications of AI in libraries.

Status	Articles
Not cited (0)	2889
1000>=	1
500>=	6
100>=	97
50>=	3785
Total	6778

Table 2: Field-Weighted Citation Impact in publications of AI in libraries.

Status	Articles
Not Applicable	212
Zero (0)	2834
1000>=	1
100>=	5
50>=	25
10>=	3701
Total	6778

Table 3: Top ten trend topics of AI in libraries research.

Rank	Name of the Topic	Cited Count
1	Topic Modeling	1086
2	Computational Physics and Python Applications	746
3	Infrastructure Maintenance and Monitoring	642
4	Dental Radiography and Imaging	601
5	Digital Mental Health Interventions	560
6	Anomaly Detection Techniques and Applications	528
7	Digital Mental Health Interventions	528
8	Artificial Intelligence in Healthcare and Education	497
9	Online Learning and Analytics	496
10	Artificial Intelligence in Healthcare and Education	468

Table 4: APC status in publications of AI in libraries.

Status	Articles
APC Free	5724
APC Includes	1054
Total	6778

CONCLUSION

The study of bibliometric analysis highlights the rapid development and extensive distribution of Artificial Intelligence in Library Research area during the timeframe from 2016 to 2025. According to the findings of bibliometric analysis, there has been noted a noticeable increment in scientific literature after 2021, which suggests that the incorporation of AI technologies into library and information science research is continuously increasing. Thus, it can be stated that thanks to the analysis performed by means of citations and FWCI, the field of AI in library research can be considered a highly visible and significant sphere of scientific research at an international level. In addition to this, some other tendencies have become apparent owing to bibliometric analysis. For instance, there has been detected the rising significance of open-access publication policies, interdisciplinarity of research, and economic scholarship communication. Some new tendencies in the area of AI in library research include topic modeling, online learning analytics, anomaly detection, and applications of AI technologies in the fields of healthcare and education.

This study is crucial because it offers a detailed global picture of the state of Artificial Intelligence in Library Research performance, publications, access status, citation influence, and thematic trends. Having completed all the above-listed tasks successfully, the paper has offered solid groundwork for future researchers and decision-makers. The results obtained might be useful for taking up some positive actions regarding such issues as open scholarly communications, ethical use of AI in library science, interdisciplinarity, and affordable publishing in library research. Additionally, the current paper could be used as a starting point for further studies in the areas of AI-powered library services, collaboration, scientometrics, digitalization, and advanced knowledge management systems in LIS.

ABBREVIATIONS

AI: Artificial Intelligence; **OA:** Open Access; **APC:** Article Processing Charge; **FWCI:** Field-Weighted Citation Impact; **PRISMA:** Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **LIS:** Library and Information Science.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

SUMMARY

AI is revolutionizing library and information science in areas such as information retrieval, knowledge organization, digital services, and scholarly communication. This research paper looks at the global research on library and AI from 2016 to 2025, through a bibliometric analysis of 6,778 OpenAlex indexed articles. The bibliometric analysis is carried out using Biblioshiny and Microsoft Excel in terms of growth in publication, open access, retractions, citations, FWCI, emerging trends, and APC. The results show an exponential increase in the number of studies, especially in recent years (after 2021), with closed-access articles being dominant. Emerging trends include topic modelling, applications of computation, anomaly detection, online learning analytics, and applications of AI in health and education.

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Cite this article: Dey K. Artificial Intelligence in Library Research: A Bibliometric Analysis of Global Trends, Open Access, and Citation Impact. Journal of Data Science, Informetrics, and Citation Studies. 2026;5(3):373-9.