South American Publishing

SAP Social AI. 2025; 1:22
doi: 10.62486/sai202522

SYSTEMATIC REVIEW

Adoption of Artificial Intelligence Technologies among Librarians in Higher Education Libraries: Systematic Review

Adopción de Tecnologías de Inteligencia Artificial entre Bibliotecarios en Bibliotecas de Educación Superior: Una Revisión Sistemática

Juliet Chinedu Alex-Nmecha[1], Esther David Josiah Okai[2], Uche Iheanyi Peter[3], Bolaji David Oladokun[4]

[1]Rivers State University, Library Department. Port Harcourt, Rivers State, Nigeria.
[2]Abia State University, Department of Library and Information Science. Uturu, Nigeria.
[3]Enugu State University of Science and Technology. Agbani, Nigeria.
[4]Federal University of Technology, Department of Library and Information Technology. Ikot Abasi, Akwa Ibom State, Nigeria.

Cite as
Alex-Nmecha JC, Josiah Okai ED, Iheanyi Peter U, Oladokun BD. Adoption of Artificial Intelligence Technologies among Librarians in Higher Education Libraries: Systematic Review. SAP Social AI, 2025; 1:22. https://doi.org/10.62486/sai202522

Publication History
Submitted: 12-04-2025
Revised: 22-06-2025
Accepted: 25-07-2025
Published: 26-07-2025

Corresponding author
Bolaji David Oladokun

ABSTRACT

Introduction: artificial intelligence is used to support teaching, research, and information access in higher education. Libraries are part of this development because they handle large amounts of information and provide services that benefit from automation and advanced data processing. This study reviews current evidence on how artificial intelligence is being used in academic libraries and why this area of research is important for professional practice.
Method: a systematic review was conducted using the PRISMA framework. Peer-reviewed articles and conference papers published between 2019 and 2025 were searched in Scopus, LISA, Web of Science, and Google Scholar. After screening for relevance, removing duplicates, and assessing quality, forty-eight studies were included. The studies were examined through thematic analysis to identify common directions in technology use, librarian skills, adoption patterns, and the difficulties reported in the literature.
Results: the review identifies four central areas of activity. These include the introduction of artificial intelligence tools for user support and technical services, the development of skills required by librarians, the varied pace of adoption across regions, and the presence of institutional and technical challenges that influence implementation. Together, these areas provide an overview of current work on artificial intelligence in academic libraries.
Conclusion: the review shows that artificial intelligence is becoming more common in academic library operations, but effective use depends on continuous skills development, supportive policies, and improved institutional readiness. The study offers a consolidated view that can guide responsible planning and future decision-making in higher education libraries.

Keywords: Artificial Intelligence; Librarian Competencies; AI Technologies; Higher Education; Libraries.

RESUMEN

Introducción: la inteligencia artificial se utiliza cada vez más para apoyar la enseñanza, la investigación y el acceso a la información en la educación superior. Las bibliotecas forman parte de este avance porque gestionan grandes volúmenes de información y ofrecen servicios que se benefician de la automatización y del procesamiento avanzado de datos. Este estudio revisa la evidencia disponible sobre cómo se emplea la inteligencia artificial en las bibliotecas académicas y por qué esta línea de investigación es importante para la práctica profesional.
Método: se realizó una revisión sistemática guiada por el marco PRISMA. Se buscaron artículos revisados por pares y ponencias de conferencias publicados entre 2019 y 2025 en Scopus, LISA, Web of Science y Google Scholar. Después de filtrar por relevancia, eliminar duplicados y evaluar la calidad, se incluyeron cuarenta y ocho estudios. Los estudios fueron analizados mediante un enfoque temático para identificar las principales tendencias en el uso de tecnologías, las habilidades de los bibliotecarios, los patrones de adopción y las dificultades señaladas en la literatura.
Resultados: la revisión identifica cuatro áreas centrales de trabajo. Estas incluyen la incorporación de herramientas de inteligencia artificial para el apoyo al usuario y los servicios técnicos, el desarrollo de habilidades necesarias para los bibliotecarios, el ritmo variable de adopción entre regiones, y la presencia de desafíos institucionales y técnicos que influyen en la implementación. En conjunto, estas áreas ofrecen una visión general del trabajo actual sobre inteligencia artificial en bibliotecas académicas.
Conclusión: la revisión muestra que la inteligencia artificial es cada vez más frecuente en las operaciones de las

© 2025; The Authors. This Open access article is distributed under the Creative Commons Attribution 4.0 license (https://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

bibliotecas académicas, aunque su uso efectivo depende del desarrollo continuo de habilidades, de políticas adecuadas y de una mayor preparación institucional. El estudio ofrece una visión integrada que puede orientar la planificación responsable y la toma de decisiones en las bibliotecas de educación superior.

Palabras clave: Inteligencia Artificial; Competencias del Bibliotecario; Tecnologías de IA; Educación Superior; Bibliotecas.

INTRODUCTION

Artificial intelligence (AI) has evolved in recent decades, primarily in response to growing demands for efficiency, large-scale data processing, personalised services, and automated decision-making across sectors.[1,2,3] These needs have driven the development of AI systems capable of performing tasks such as natural language processing, predictive analytics, image recognition, recommender functions, and automated classification, capabilities that directly align with the operational requirements of libraries. As AI systems advanced, libraries, particularly those in higher education, began adopting them to enhance discovery, streamline technical processes, and improve user engagement.

In the library domain, AI has been applied in diverse ways. Early systems focused on automating cataloguing, metadata extraction, and indexing, but more recent applications include conversational chatbots for reference services,[4] plagiarism-detection platforms, intelligent discovery layers,[5] recommender systems,[6] and analytics-driven decision support tools.[7] These technologies have emerged in direct response to libraries' increasing workload, the complexity of digital collections, and user expectations for personalised, real-time services.

A growing body of studies has examined the use of AI systems among librarians. Research from North America shows early adoption of AI-enabled discovery, chatbots, and automated plagiarism detection.[4,8] Studies in Asia reveal selective but expanding applications, often driven by institutional investments in digital transformation.[9,10,11] Work from African contexts highlights growing awareness but limited adoption due to infrastructural and skills-related constraints.[6,12,13] Most importantly, findings across these regions consistently point to challenges relating to competencies, policy preparedness, and uneven adoption paths.

Despite this expanding literature, gaps remain in synthesizing what types of AI technologies are actually available to librarians, what competencies they possess to use them, how extensively these systems have been adopted in higher education libraries, and the persistent challenges that hinder effective integration. Existing studies tend to focus either on perceptions, awareness, or specific applications without offering a consolidated understanding of the broader adoption. Thus, there is a need for a systematic review that brings together evidence across regions and contexts.

This study, therefore, provides a comprehensive synthesis of AI adoption among librarians in higher education libraries, focusing on the technologies used, competencies required, extent of adoption, and existing challenges. By consolidating current knowledge, the study offers insights that can support policy development, capacity building, and strategic planning for AI integration in academic libraries. Therefore, the need to explore the adoption of AI technologies by librarians in higher education libraries becomes necessary currently. Hence, this paper aims to review and synthesize existing evidence on the adoption of artificial intelligence technologies in higher-education libraries, focusing on the types of AI systems used, the competencies of librarians, the extent of adoption, and the challenges affecting implementation.

METHOD

This study adopted a systematic literature review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. PRISMA offers a structured approach for reporting evidence-based studies by following four stages, including identification, screening, eligibility, and inclusion. Its rigor has made it applicable in information and library science research.[14] The choice of SLR is appropriate because the study seeks to synthesize empirical and conceptual evidence on the intersection of AI technologies, librarian competencies, and adoption in higher education institutions.

The literature search focused on English-language, peer-reviewed articles and conference papers published between 2019 and 2025. This timeframe was chosen to capture the most recent discourse on AI adoption in libraries, given the surge of interest in AI applications during and after the COVID-19 pandemic. The databases searched included Scopus, LISA, Web of Science, and Google Scholar, selected for their strong coverage of peer-reviewed publications in library and information science. Search terms were developed to reflect the study (AI technologies, competencies, and adoption) and their application in higher education libraries. The following combinations of keywords were applied: For Scopus, LISA and Google Scholar databases: TITLE-ABS-KEY ("artificial intelligence" OR "AI technologies" OR "chatbot*" OR "machine learning" OR "robotics" OR "expert system*" OR "natural language processing" OR "recommender system*" OR "large language model*" OR "ChatGPT" OR "Gemini") AND (Librar* OR "academic librar*" OR "higher education librar*" OR "university librar*") AND (competenc* OR skill* OR adoption OR awareness OR perception*). For Web of Science database, the search keywords are: TS ("artificial intelligence" OR "AI technologies" OR "chatbot*" OR "machine learning" OR "robotics" OR "expert system*" OR "natural language processing" OR "recommender system*" OR "large language model*" OR "ChatGPT" OR "Gemini") AND (Librar* OR "academic librar*" OR "higher education librar*" OR "university librar*") AND (competenc* OR skill* OR adoption OR awareness OR perception*). These search terms were broad enough to capture literature on AI applications in academic libraries while being specific to competencies and adoption

in higher education contexts. Filters were applied to document type (journal articles and conference proceedings) and to the field of Library and Information Science.

The initial search yielded 472 journal articles and conference papers, which were exported to an Excel spreadsheet for management. Duplicate and triplicate records were removed, resulting in 334 articles. Titles and abstracts were screened for relevance, reducing the number to 141 articles for full-text review. During the eligibility stage, articles not related to academic libraries, librarians' competencies, or AI adoption were excluded. Specifically, 78 articles were excluded because they focused on general ICT applications or AI outside the context of higher education libraries. Fifteen (15) articles could not be retrieved in full text and were also excluded. At the conclusion of the process, 48 articles met all the criteria and were included for analysis and synthesis (figure 1).[15]

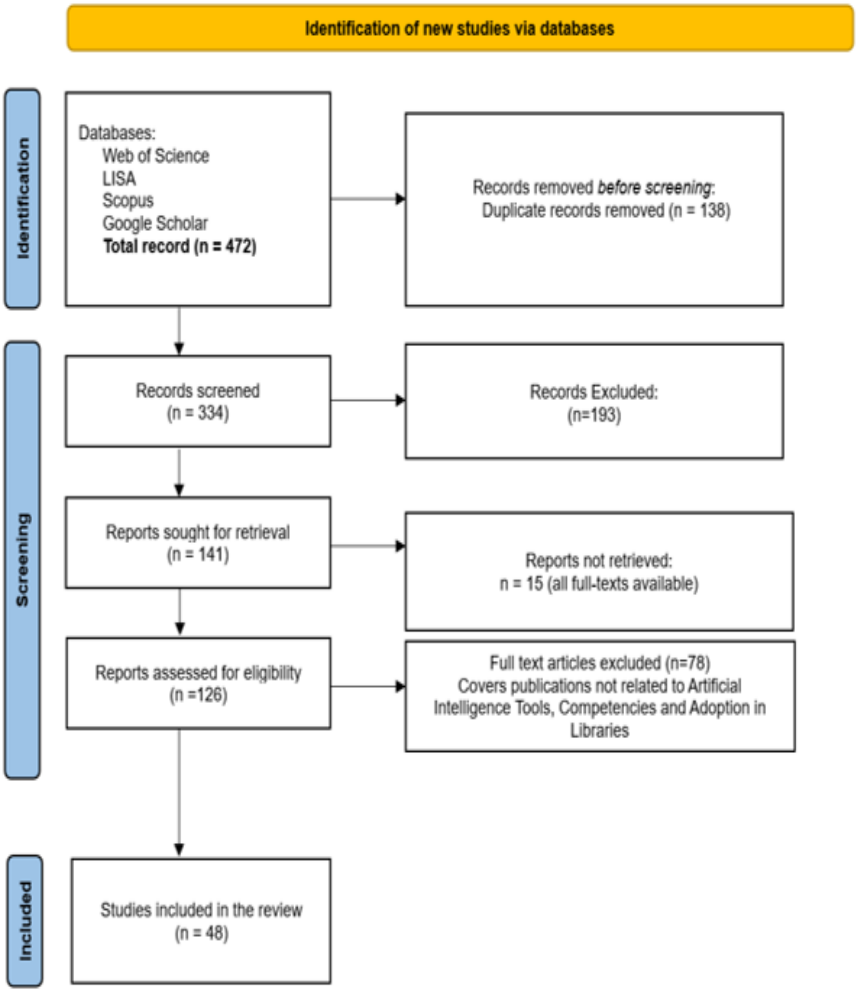


Figure 1. Procedure for Inclusion and Exclusion

Data from the included studies were extracted into an Excel sheet. The synthesis process involved thematic analysis, grouping findings according to the study objectives: identification of AI technologies, assessment of competencies, extent of adoption, barriers to adoption, and strategies for improvement. To ensure validity and accuracy, both researchers were involved in each stage of the process, such as searching, screening, eligibility, and inclusion. Each stage of screening was repeated three times over a week to minimize bias and errors. Cross-checking was also performed to validate the consistency of the extracted data.

RESULTS

Research Characteristics

The study comprises 48 articles published between 2023 and 2025. Holistically, this study consists of 46 peer-reviewed journals and 2 conference papers. In addition, the graphical distribution of articles by year of publication reveals a steady growth in scholarly contributions on artificial intelligence in academic libraries between 2019 and 2025 (figure 2). In the years between 2019 and 2020, the number of publications was relatively low, reflecting the emergent stage of interest in AI within the library and information science field. A noticeable increase is observed beginning in 2021, suggesting that the COVID-19 pandemic and the subsequent acceleration of digital transformation may have contributed to growing research interest in AI applications in libraries. By 2022 and 2023, the number of articles significantly rose, indicating that researchers were increasingly exploring the implications, opportunities, and challenges posed by these technologies in academic library contexts.

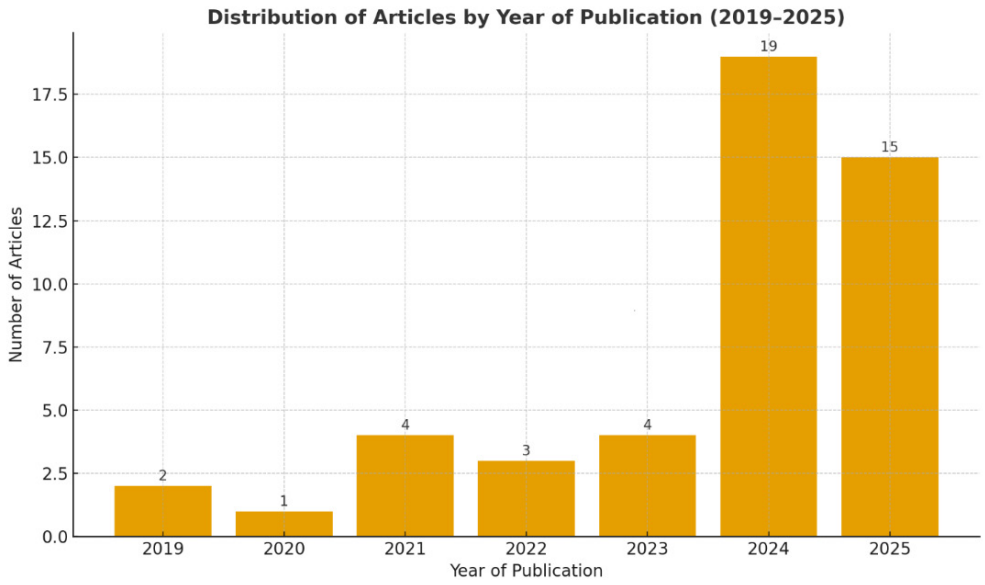


Figure 2. Distribution of articles by year of publication

The distribution of articles across journals and conferences, as shown, reveals an interesting pattern about where most of the scholarly contributions in the literature are concentrated. A closer look at the chart shows that while several journals hosted one article, a few journals and conference outlets appeared more, indicating a clustering of research dissemination in particular outlets (figure 3). Given available data, journals such as The Journal of Academic Librarianship, Information Development, Open Information Science, and New Review of Academic Librarianship emerged as some of the most common platforms for publishing on the subject. These outlets accounted for more than one contribution each, suggesting that they serve as preferred or popular venues for scholarship in artificial intelligence applications within libraries. On the other hand, a wide range of other journals such as Business Information Review, Journal of Information Literacy, Library Hi Tech, The Reference Librarian, and others featured only one article each, highlighting the broad spread of interest in the subject across the information science field.

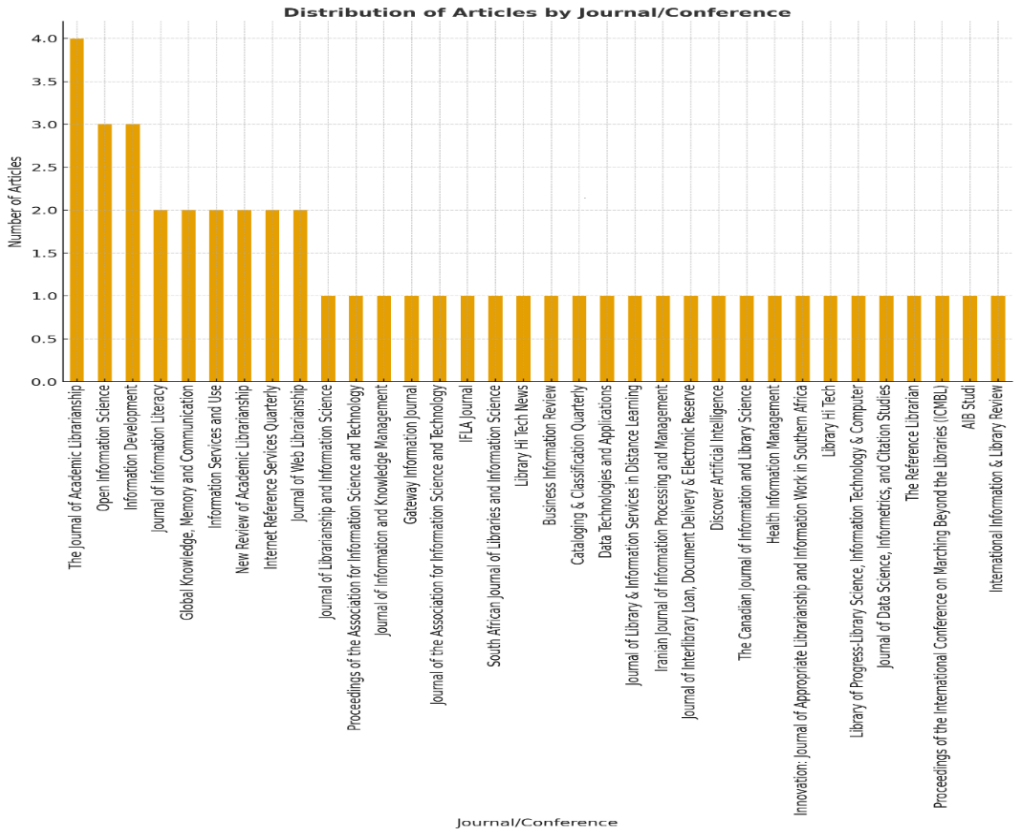


Figure 3. Articles published in journals and proceedings

Types of AI technologies available and used by librarians in higher education institutions

The finding identifies a variety of AI technologies that are either available for library use or are already being applied in higher education institutions. These technologies cut across user services, technical services, analytics, and instructional support, reflecting the diverse roles of libraries. One of the most widely reported AI applications in libraries is the use of chatbots and virtual assistants. These technologies are employed to provide round-the-clock reference services, answer asked questions, and guide users in navigating library resources. Studies in Nigeria and Pakistan report that librarians are adopting chatbots to improve user support and extend services beyond staffed hours.[9,12] Similarly, a study documents their use in Canada and the United States, where librarians highlight chatbots as a leading example of AI adoption. Another significant category of AI technologies available to and used by librarians includes AI-enabled search and recommendation systems.[4] These technologies use natural language processing and machine learning to improve resource discovery, provide personalised recommendations, and enhance retrieval accuracy. Michalak and Ellixson[5] note that AI discovery layers embedded in library platforms are increasingly adopted to enrich user experiences. Studies similarly report that academic libraries use AI-driven recommendation engines to tailor content to students and researchers.[6,16]

In addition, the automation of cataloguing and metadata generation is another area where AI technologies are being applied. Machine learning algorithms and natural language processing technologies are used to extract metadata from digital collections, classify large corpora, and generate subject headings. Ali et al.[17] observe that librarians rely on such AI technologies to enhance cataloguing efficiency, while Ahmad et al.[7] identify competencies in handling big data analytics for library operations. Michalak and Ellixson[5] also point to AI applications in metadata correction and enrichment, which librarians supervise for accuracy. Also, plagiarism detection technologies such as Turnitin, iThenticate, and other similarity-checking software are adopted AI-based technologies in academic libraries. These are used not only by faculty and students but also by librarians as part of research support services. Studies highlight librarians' role in teaching users to interpret the results of such technologies and integrate them into academic integrity training.[18,19] Hervieux and Wheatley[4] also document adoption in North American libraries, where plagiarism detection is a routine service supported by librarians.

The literature also identifies technologies that directly support research and learning, including automated citation managers, AI-driven summarisation technologies, and generative AI writing assistants. Librarians are not only users of these technologies but also guide students and researchers in their ethical and effective use.[20,21,22,23,24] Studies librarians encourage the use of AI-supported learning technologies, but stress the need for critical evaluation to avoid overreliance. Further, AI is increasingly used in analytics for decision-making in collection development, usage trend analysis, and service improvement. Ahmad et al.[7] highlight librarians' involvement in big data analytics for improving service delivery. Literature document the use of AI-based analytics in understanding user behaviour, predicting resource demand, and informing strategic planning.[15,25,26,27,28,29] These technologies are often embedded in library dashboards or provided by vendors, enabling librarians to make data-driven decisions. Further, several studies report the use of AI-powered Optical Character Recognition (OCR) and semantic indexing technologies to digitise and process large archival collections. These technologies are particularly valuable in libraries digitising legacy collections and making them machine-readable.[25,26,27,28,29] Also, AI-based text mining and entity extraction are used in research support to aid systematic reviews and knowledge discovery.[3,17,30,31,32,33,34]

Competencies librarians possess in the use of AI technologies for library service delivery

The literature identifies a range of competencies that librarians currently possess or are developing in relation to artificial intelligence (AI) for service delivery. Several studies show that librarians are equipped with basic digital literacy and data-handling skills that form the foundation for AI adoption. These include proficiency in using library management systems, bibliometric technologies, and basic data analysis platforms, which allow librarians to interpret outputs from AI-driven systems. Some studies highlight competencies in big data analytics interpretation, while others report librarians' ability to work with information technology technologies in the digital era as a precursor to AI use.[22,35,36,37,38,39,40] These foundational skills are widespread but not yet advanced enough for full-scale AI development.

One of the clearest competencies lies in metadata curation, classification, and cataloguing. Studies reveal that librarians possess strong skills in evaluating and refining AI-automated metadata, which ensures the accuracy of cataloguing and indexing. It was noted that librarians are adept at applying domain-specific standards to improve the results of AI-generated metadata.[25,34,41,42,43] This shows librarians' competencies in acting as human supervisors of machine-driven processes. Another major competency is the ability to integrate AI into teaching and learning. Librarians are already skilled in delivering information literacy training, and this extends to guiding users in the ethical and effective use of AI technologies. Studies stress librarians' capacity to embed AI literacy into curricula, teaching students how to critically assess AI outputs, avoid misinformation, and use AI for research support.[22,28,36,44,45,46] This pedagogical competence is one of the strongest across contexts, positioning librarians as educators in AI literacy.

The literature consistently identifies librarians' ability to evaluate AI technologies through professional judgement and ethical awareness. It was emphasized that competencies in understanding policies, data ethics, and AI literacy guidelines for libraries.[20,23,25,47] Similarly, some scholars state librarians are competent at reflecting on the risks, biases, and ethical dilemmas of AI integration in library practice.[20,47,48,49] Many librarians demonstrate competence in configuring and managing AI-enabled user-facing systems, such as chatbots, recommendation systems, and plagiarism checkers. Findings report that librarians are able to deploy AI applications in user services.[12,32,40,41] These competencies are typically less technical and more operational, but they allow librarians to deliver effective front-line AI-enabled services. Finally, the literature points to librarians' competencies in managing projects, collaborating with IT professionals, and aligning AI use with institutional goals. Studies stress librarians' abilities to strategize

around AI adoption, even if they lack coding skills.[22,25,34,48] Competence here lies not in building systems but in integrating AI projects into broader library operations and liaising with other professionals for successful implementation.

Extent of adoption of AI technologies in libraries of higher education institutions

The findings reported that while awareness of artificial intelligence (AI) in academic libraries is high, the actual extent of adoption remains relatively limited and uneven across institutions and regions. For instance, empirical studies in Nigeria and other African contexts reveal that most librarians acknowledge the importance of AI but report low levels of implementation, with AI often confined to experimental projects or policy discussions rather than widespread operational use.[12,16,50,51,52] Similarly, studies indicate that adoption is still in its infancy, constrained largely by infrastructural and financial limitations.[15,33,53,54]

In contrast, studies from Asia, particularly in Pakistan, India, and Turkey, show a growing but selective adoption of AI, with applications concentrated in specific service areas such as cataloguing automation, discovery services, and chatbots for user support. Librarians in these settings often report that AI has not yet been fully integrated into core library operations, but isolated deployments demonstrate significant potential.[17,20,25,55,] A similar pattern emerges where librarians demonstrate awareness of ethical issues and potential applications, but practical adoption is still relatively low and uneven across institutions.[22,56,57]

Findings from North America and Europe suggest a higher degree of adoption, though still uneven and often mediated by vendor solutions. For example, surveys of librarians in Canada and the United States highlight the use of AI-driven discovery layers, plagiarism detection software, and chatbots, but emphasize that adoption is piecemeal rather than systematic across institutions.[4,58] Across contexts, the adoption of AI is more advanced in user-facing applications (such as virtual assistants, recommendation systems, and plagiarism checkers) than in back-end functions like advanced analytics or metadata automation. Most studies stress that institutional capacity, availability of training, and policy frameworks strongly influence the extent to which AI technologies move from discussion to active deployment.[51,52] Where AI has been adopted, it is often vendor-driven, with libraries relying on commercial discovery platforms, rather than internally developed or locally adapted solutions.[23,44,55,58]

Challenges hindering the effective adoption of AI technologies among librarians in higher education institutions

Findings revealed that infrastructure and cost constraints hinder effective adoption of librarians in the use of AI technologies. Many studies from lower- and middle-income contexts emphasise that libraries lack reliable internet bandwidth, modern servers, and budgetary headroom for licences or custom development; as a result, AI projects often stay at pilot stage or rely on vendor-hosted solutions that the institution cannot sustain long-term.[12,51] Closely linked is a pervasive skills and training deficit. Across surveys and reviews, librarians report conceptual awareness of AI but limited hands-on skills in data science, model evaluation, or systems integration; most feel more comfortable teaching about AI or configuring vendor technologies than developing or maintaining AI systems themselves.[58]

The third major challenge is policy, governance, and ethical concerns. Authors highlight uncertainty about acceptable uses, data privacy, bias, and accountability for AI outputs, concerns that slow adoption because institutions hesitate to deploy technologies without clear policies or guidance.[17,19] Ethical literacy and governance frameworks are often absent or embryonic; where they do exist, they substantially accelerate responsible adoption, but many libraries report waiting for university-level policy or national guidance before scaling solutions. In addition, a strategic and organisational obstacle is the buy-versus-build dilemma and vendor dependency. Several studies note that many libraries rely on commercial discovery platforms and vendor-supplied chatbots, which reduces the need for in-house technical skill but increases lock-in, recurring costs, and reduced control over data and customization.[16,22]

Data quality, interoperability, and legacy systems are also frequent technical blockers. Libraries' existing catalogues, digitised collections, and institutional data often require cleaning, standardisation, and enrichment before AI-driven analytics or NLP can work reliably; integration with legacy ILS and authentication systems further complicates deployment.[19,46,52] Finally, cultural resistance, professional anxiety, and competing priorities slow adoption. Several papers document librarian anxieties about job displacement, concerns about the quality of AI-generated content, and a preference for focusing scarce time on core services.[4]

CONCLUSIONS

This systematic review set out to examine how artificial intelligence is being adopted in higher education libraries and to bring together existing evidence on the technologies in use, the competencies needed by librarians, the degree of adoption, and the factors that influence implementation. The review shows that artificial intelligence is becoming an important part of library practice as institutions seek better ways to manage information resources, support users, and improve service delivery. Although specific technologies and levels of readiness vary across regions, there is clear movement toward more technology assisted library operations.

The studies reviewed make it clear that successful adoption of artificial intelligence depends on more than the availability of tools. Librarians require continuous learning opportunities, supportive institutional policies, and access to reliable infrastructure. Where these conditions are present, artificial intelligence is more likely to be used in meaningful and sustainable ways. Where they are lacking, adoption remains slow and limited. The broader implication of the review is that librarians continue to play a central role in guiding the responsible and effective use of artificial intelligence. Their expertise in information management, instruction, and ethical practice remains essential as libraries integrate new technologies. Continued investment in professional development, policy development, and collaboration across departments will be necessary for libraries to benefit from artificial intelligence in a responsible and well coordinated manner.

However, the study has some limitations. First, the study relied primarily on secondary data from published literature, which may not fully capture emerging practices or context-specific innovations in different regions. This reliance also means that the findings are shaped by the scope, depth, and methodological rigor of the reviewed studies, which varied considerably. Second, the study did not include empirical field data such as surveys or interviews with practicing librarians, which could have provided richer and more context-specific evidence on real-world practices. Finally, the rapidly evolving nature of AI technologies means that some findings may quickly become outdated as new technologies and competencies emerge. Future research should address these limitations by conducting empirical investigations that capture librarians' lived experiences, adoption strategies, and user feedback across different institutional contexts. Comparative studies between developed and developing regions, as well as longitudinal studies tracking the evolution of AI competencies and adoption in libraries over time, would also provide deeper insights to strengthen practice and policy.

FINANCING

The authors did not receive financing for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Juliet C. Nmecha.
Data curation: Bolaji D. Oladokun.
Formal analysis: Esther David Okai.
Methodology: Uche I. Peter.
Resources: Bolaji D. Oladokun, Esther David Okai.
Supervision: Juliet C. Nmecha.
Drafting - original draft: Juliet C. Nmecha, Esther David Okai, Uche I. Peter, Bolaji D. Oladokun.
Writing - proofreading and editing: Juliet C. Nmecha, Esther David Okai, Uche I. Peter, Bolaji D. Oladokun.

REFERENCES

1. Olatunbosun IE, Olatunbosun AR. Artificial Intelligence and Risk Management in Financial Institutions: Evidence from the UK Banking Sector. EthAIca. 2025;4:436. https://doi.org/10.56294/ai2025436

2. Olatunbosun IE, Olatunbosun AR. Artificial Intelligence for Fraud Detection and Portfolio Optimization: Insights from UK Financial Institutions. EthAIca. 2025;4:437. https://doi.org/10.56294/ai2025437

3. Oladokun BD, Osahon Igbinovia M, Orubebe ED, Olatunbosun IE. Exploring Academic Librarians' Perception towards Artificial Intelligence in Nigerian Polytechnics. EthAIca. 2025;4:438. https://doi.org/10.56294/ai2025438

4. Hervieux S, Wheatley A. Perceptions of artificial intelligence: A survey of academic librarians in Canada and the United States. J Acad Librariansh. 2021;47(1):102270.

5. Michalak R, Ellixson D. AI-Driven Discovery: How Litmaps Shapes Research and Teaching & Learning. Ser Libr. 2024;85(5-6):117-129.

6. Danquah MM, Dadzie PS, Gyesi K, Yeboah F, Nyarko CY. Artificial intelligence implementation strategies for Ghanaian academic libraries: A scoping review. J Acad Librariansh. 2024;50(6):102975.

7. Ahmad K, JianMing Z, Rafi M. An analysis of academic librarians competencies and skills for implementation of big data analytics in libraries: a correlational study. Data Technol Appl. 2019;53(2):201-216.

8. Yoon J, Andrews JE, Ward HL. Perceptions on adopting artificial intelligence and related technologies in libraries: public and academic librarians in North America. Libr Hi Tech. 2022;40(6):1893-1915.

9. Asim M, Arif M, Rafiq M, Ahmad R. Investigating applications of Artificial Intelligence in university libraries of Pakistan: An empirical study. J Acad Librariansh. 2023;49(6):102803.

10. Subaveerapandiyan AA, Gozali AA. AI in Indian libraries: prospects and perceptions from library professionals. Open Inf Sci. 2024;8(1):20220164.

11. Çakmak T, Eroğlu Ş. The use of artificial intelligence in university libraries in Türkiye: Practices, and perspectives of library directors. Inf Dev. 2025;41(3):642-655.

12. Abayomi OK, Adenekan FN, Abayomi AO, Ajayi TA, Aderonke AO. Awareness and perception of the artificial intelligence in the management of university libraries in Nigeria. J Interlibr Loan Doc Deliv Electron Reserve. 2021;29(1-2):13-28.

13. Lulu-Pokubo EP, Okwu E. Librarians' awareness towards the use of artificial intelligence technologies for Sustainable library services. Bus Inf Rev. 2025;42(1):20-28.

14. Michalak R, Ellixson D. Buy versus build: Navigating Artificial Intelligence (AI) tool adoption in academic libraries. Inf Serv Use. 2024;44(4):316-326.

15. Faulkner A, Reiter L. Career advancement in academic libraries: A systematic review. J Acad Librariansh. 2025;51(3):103046.

16. Okunlaya RO, Syed Abdullah N, Alias RA. Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education. Libr Hi Tech. 2022;40(6):1869-1892.

17. Ali MY, Naeem SB, Bhatti R. Artificial intelligence technologies and perspectives of university librarians: An overview. Bus Inf Rev. 2020;37(3):116-124.

18. Ndungu MW. Integrating Basic Artificial Intelligence Literacy into Media and Information Literacy Programs in Higher Education: A Framework for Librarians and Educators. J Inf Lit. 2024;18(2):122-139.

19. Nehra SS, Bansode SY. Exploring the prospects and perils of integrating artificial intelligence and ChatGPT in academic and research libraries (ARL): Challenges and opportunity. J Web Librariansh. 2024;18(3):111-132.

20. Akakpo MG. Skilled for the future: Information literacy for AI use by university students in Africa and the role of librarians. Internet Ref Serv Q. 2024;28(1):19-26.

21. Sousa NMT. Academic libraries as hubs of artificial intelligence competency. Discov Artif Intell. 2025;5(1):221.

22. Hasan N, Saifullah M, Hashmi AH. Application of artificial intelligence in libraries: Benefits and drawbacks. J Data Sci Informetr Cit Stud. 2024;3(2):98-105.

23. Echedom AU, Okuonghae O. Transforming academic library operations in Africa with artificial intelligence: Opportunities and challenges: A review paper. New Rev Acad Librariansh. 2021;27(2):243-255.

24. Ali MY, Richardson J. AI literacy guidelines and policies for academic libraries: A scoping review. IFLA J. 2025;03400352251321192.

25. Dube TV, Rammutloa MW, Matatiele R. Skills and competencies of academic librarians to use information technology technologies in the digital era: A systematic literature review. Inf Dev. 2024;02666669241302054.

26. Cox A. Academic librarian competencies and artificial intelligence. S Afr J Libr Inf Sci. 2024;90(2):1-9.

27. David-West BT, Ig-worlu MO. AI-driven future: Strategies and skills development for Nigerian librarians. Gateway Inf J. 2023;24(1-2):20-32.

28. Elsayed AM, Abusharhah MM. Artificial Intelligence adoption, perceptions, and ethical literacy among Arab academic librarians: A survey. J Acad Librariansh. 2025;51(5):103083.

29. Sharifabadi SR, Shamsi A, Heidari H. AI literacy among librarians in Qom: a case study in Iran. AIB Studi. 2025;65(1):99-114.

30. Andersdotter K. Artificial intelligence skills and knowledge in libraries: Experiences and critical impressions from a learning circle. J Inf Lit. 2023;17(2):107-130.

31. Adu KK. Artificial Intelligence in Academic Libraries: Threats, Opportunities, and Anxiety Levels. J Libr Inf Serv Distance Learn. 2025:1-20.

32. Ajani YA, Tella A, Salawu KY, Abdullahi F. Perspectives of librarians on awareness and readiness of academic libraries to integrate artificial intelligence for library operations and services in Nigeria. Internet Ref Serv Q. 2022;26(4):213-230.

33. Alam AF, Subaveerapandiyan A, Mvula D, Tiwary N. AI literacy and Zambian librarians: A study of perceptions and applications. Open Inf Sci. 2024;8(1):20220166.

34. Asemi A, Ko A, Nowkarizi M. Intelligent libraries: a review on expert systems, artificial intelligence, and robot. Libr Hi Tech. 2021;39(2):412-434.

35. Barsha S, Munshi SA. Implementing artificial intelligence in library services: a review of current prospects and challenges of developing countries. Libr Hi Tech News. 2024;41(1):7-10.

36. Cox AM, Mazumdar S. Defining artificial intelligence for librarians. J Librariansh Inf Sci. 2024;56(2):330-340.

37. Cox A. How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions. J Assoc Inf Sci Technol. 2023;74(3):367-380.

38. Cox AM, Pinfield S, Rutter S. The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. Libr Hi Tech. 2019;37(3):418-435.

39. Dei Patris B, Atmi RT, Shukry AIM, Idris Z, Rahman KA. Integrating Artificial Intelligence (AI) in School Libraries: Improving Educational Support and Advancing Librarian Competencies. J Inf Knowl Manag. 2025;15(SI1).

40. Deshen M, Noa A. Librarians' AI Literacy. Proc Assoc Inf Sci Technol. 2024;61(1):883-885.

41. Haris M, Ansari AJ, Malik BA, Lund BD, Ali N. Artificial intelligence in academic libraries: a survey of users' perception and adoption. Glob Knowl Mem Commun. 2025.

42. Harper C, Groth P. The Librarian Skillset and the Needs of Artificial Intelligence. Catalog Classif Q. 2025:1-20.

43. Harisanty D, Anna NEV, Putri TE, Firdaus AA, Noor Azizi NA. Leaders, practitioners and scientists' awareness of artificial intelligence in libraries: a pilot study. Libr Hi Tech. 2024;42(3):809-825.

44. Hlatshwako Z, Tsabedze V. Unlocking the future: exploring librarian's perspectives and readiness for artificial intelligence integration in eswatini libraries. J Web Librariansh. 2024;18(3):149-168.

45. Kalbande D, Yuvaraj M, Verma MK, A S, Suradkar P, Chavan S. Exploring the integration of artificial intelligence in academic libraries: a study on librarians' perspectives in India. Open Inf Sci. 2024;8(1):20240006.

46. Karina Lira Da Silva E, dos Santos AA, Maria dos Santos Bahia Jacintho E, Marques Chaíça B. Trends in Library Services and the Competencies of the Librarian. Can J Inf Libr Sci. 2024;47(2):3-10.

47. Khademizadeh S, Shekari MR. Artificial Intelligence Literacy: The Necessity of Curriculum Transformation and the Role of Librarians in Teaching It. Iran J Inf Process Manag. 2025;40(3):825-864.

48. Khademizadeh S, Shekari MR. Artificial intelligence literacy: today's need for health librarians, the need for future libraries. Health Inf Manag. 2024;21(2):62-64.

49. Modiba M, Ngulube P. Artificial intelligence for the management of library and information services in academic libraries in the Fifth Industrial Revolution. Innovation. 2024;(68):3-16.

50. Molaudzi AI, Ngulube P. Use of artificial intelligence innovations in public academic libraries. IFLA J. 2025;03400352241301780.

51. Oladokun BD, Abduldayan FJ, Akanbiemu AA. Leave No one Behind: Empowering Librarians with AI Skills and Competencies in the Libraries of 5IR. New Rev Acad Librariansh. 2025;1-19.

52. Oladokun BD, Ogunjimi BE, Oyetola SO, Orubebe ED, Enakrire RT. Library management in an era of disruption: Assessing skills and knowledge of future academic librarians in Nigeria. Inf Dev. 2025;02666669251350380.

53. Patel K, Patel B, Patel P, Patel B. Intelligent Libraries: Perception and Proficiency in Artificial Intelligence among Knowledge Custodians. Libr Prog (Libr Sci Inf Technol Comput). 2024;44(3).

54. Pence HE. Future of artificial intelligence in libraries. Ref Libr. 2022;63(4):133-143.

55. Shahzad K, Khan SA, Iqbal A. Identifying librarians' readiness to leverage artificial intelligence for sustainable competence development and smart library services. Glob Knowl Mem Commun. 2024.

56. Siddiqui ZA. The Future of Libraries: Skills, Challenges, and Innovative Visions for Future. In: Proc Int Conf Marching Beyond the Libraries (ICMBL 2024). Springer Nature; 2025. p. 78.

57. Sultana R, Atikuzzaman M. Are Academic Libraries of Bangladesh Ready to Implement Artificial Intelligence? Int Inf Libr Rev. 2025:1-14.

58. Wheatley A, Hervieux S. Artificial intelligence in academic libraries: An environmental scan. Inf Serv Use. 2019;39(4):347-356.

APPENDIX

Table 1. Details of selected publication included in the study

S/n	Authors	Year	Title	Journal/Proceedings	Method Employed
	Abayomi, O. K., Adenekan, F. N., Abayomi, A. O., Ajayi, T. A., & Aderonke, A. O.	2021	Awareness and perception of artificial intelligence in the management of university libraries in Nigeria	*Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*	Survey
	Adu, K. K.	2025	Artificial Intelligence in Academic Libraries: Threats, Opportunities, and Anxiety Levels	*Journal of Library & Information Services in Distance Learning*	Survey/Conceptual
	Ahmad, K., JianMing, Z., & Rafi, M.	2019	An analysis of academic librarians competencies and skills for implementation of big data analytics in libraries: a correlational study	*Data Technologies and Applications*	Correlational study
	Ajani, Y. A., Tella, A., Salawu, K. Y., & Abdullahi, F.	2022	Perspectives of librarians on awareness and readiness of academic libraries to integrate artificial intelligence for library operations and services in Nigeria	*Internet Reference Services Quarterly*	Survey
	Akakpo, M. G.	2024	Skilled for the future: Information literacy for AI use by university students in Africa and the role of librarians	*Internet Reference Services Quarterly*	Conceptual/Opinion
	Alam, A. F., Subaveerapandiyan, A., Mvula, D., & Tiwary, N.	2024	AI literacy and Zambian librarians: A study of perceptions and applications	*Open Information Science*	Survey
	Ali, M. Y., & Richardson, J.	2025	AI literacy guidelines and policies for academic libraries: A scoping review	*IFLA Journal*	Scoping review
	Ali, M. Y., Naeem, S. B., & Bhatti, R.	2020	Artificial intelligence technologies and perspectives of university librarians: An overview	*Business Information Review*	Overview/Conceptual
	Andersdotter, K.	2023	Artificial intelligence skills and knowledge in libraries: Experiences and critical impressions from a learning circle	*Journal of Information Literacy*	Case study/Experiential
	Asim, M., Arif, M., Rafiq, M., & Ahmad, R.	2023	Investigating applications of Artificial Intelligence in university libraries of Pakistan: An empirical study	*The Journal of Academic Librarianship*	Survey/Empirical
	Barsha, S., & Munshi, S. A.	2024	Implementing artificial intelligence in library services: a review of current prospects and challenges of developing countries	*Library Hi Tech News*	Review
	Çakmak, T., & Eroğlu, Ş.	2025	The use of artificial intelligence in university libraries in Türkiye: Practices, and perspectives of library directors	*Information Development*	Survey/Interviews
	Cox, A.	2024	Academic librarian competencies and artificial intelligence	*South African Journal of Libraries and Information Science*	Conceptual/Discussion
	Cox, A. M., & Mazumdar, S.	2024	Defining artificial intelligence for librarians	*Journal of Librarianship and Information Science*	Conceptual/Theoretical
	Cox, A.	2023	How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions	*Journal of the Association for Information Science and Technology*	Conceptual/Framework
	David-West, B. T., & Ig-worlu, M. O.	2023	AI-driven future: Strategies and skills development for Nigerian librarians	*Gateway Information Journal*	Conceptual/Review
	Danquah, M. M., Dadzie, P. S., Gyesi, K., Yeboah, F., & Nyarko, C. Y.	2024	Artificial intelligence implementation strategies for Ghanaian academic libraries: A scoping review	*The Journal of Academic Librarianship*	Scoping review

	Dei Patris, B., Atmi, R. T., Shukry, A. I. M., Idris, Z., & Rahman, K. A.	2025	Integrating Artificial Intelligence (AI) in School Libraries: Improving Educational Support and Advancing Librarian Competencies	*Journal of Information and Knowledge Management*	Conceptual/Framework
	Deshen, M., & Noa, A.	2024	Librarians' AI Literacy	*Proceedings of the Association for Information Science and Technology*	Conference paper
	Dube, T. V., Rammutloa, M. W., & Matatiele, R.	2024	Skills and competencies of academic librarians to use information technology technologies in the digital era: A systematic literature review	*Information Development*	Systematic literature review
	Echedom, A. U., & Okuonghae, O.	2021	Transforming academic library operations in Africa with artificial intelligence: Opportunities and challenges	*New Review of Academic Librarianship*	Review
	Elsayed, A. M., & Abusharhah, M. M.	2025	Artificial Intelligence adoption, perceptions, and ethical literacy among Arab academic librarians: A survey	*The Journal of Academic Librarianship*	Survey
	Haris, M., Ansari, A. J., Malik, B. A., Lund, B. D., & Ali, N.	2025	Artificial intelligence in academic libraries: a survey of users' perception and adoption	*Global Knowledge, Memory and Communication*	Survey
	Harper, C., & Groth, P.	2025	The Librarian Skillset and the Needs of Artificial Intelligence	*Cataloging & Classification Quarterly*	Conceptual/Discussion
	Hasan, N., Saifullah, M., & Hashmi, A. H.	2024	Application of artificial intelligence in libraries: Benefits and drawbacks	*Journal of Data Science, Informetrics, and Citation Studies*	Review
	Hervieux, S., & Wheatley, A.	2021	Perceptions of artificial intelligence: A survey of academic librarians in Canada and the United States	*The Journal of Academic Librarianship*	Survey
	Hlatshwako, Z., & Tsabedze, V.	2024	Exploring librarian's perspectives and readiness for artificial intelligence integration in Eswatini libraries	*Journal of Web Librarianship*	Survey
	Kalbande, D., Yuvaraj, M., Verma, M. K., A, S., Suradkar, P., & Chavan, S.	2024	Exploring the integration of artificial intelligence in academic libraries: a study on librarians' perspectives in India	*Open Information Science*	Survey
	Karina Lira Da Silva, E., dos Santos, A. A., Maria dos Santos Bahia Jacintho, E., & Marques Chaíça, B.	2024	Trends in Library Services and the Competencies of the Librarian	*The Canadian Journal of Information and Library Science*	Conceptual/Discussion
	Khademizadeh, S., & Shekari, M. R.	2025	Artificial Intelligence Literacy: The Necessity of Curriculum Transformation and the Role of Librarians in Teaching It	*Iranian Journal of Information Processing and Management*	Conceptual/Framework
	Khademizadeh, S., & Shekari, M. R.	2024	Artificial intelligence literacy: today's need for health librarians, the need for future libraries	*Health Information Management*	Conceptual/Opinion
	Michalak, R., & Ellixson, D.	2024	Buy versus build: Navigating Artificial Intelligence (AI) tool adoption in academic libraries	*Information Services and Use*	Case study/Discussion
	Modiba, M., & Ngulube, P.	2024	Artificial intelligence for the management of library and information services in academic libraries in the Fifth Industrial Revolution	*Innovation: Journal of Appropriate Librarianship and Information Work in Southern Africa*	Conceptual/Discussion
	Molaudzi, A. I., & Ngulube, P.	2025	Use of artificial intelligence innovations in public academic libraries	*IFLA Journal*	Survey/Discussion
	Ndungu, M. W.	2024	Integrating Basic Artificial Intelligence Literacy into Media and Information Literacy Programs in Higher Education	*Journal of Information Literacy*	Conceptual/Framework

	Nehra, S. S., & Bansode, S. Y.	2024	Prospects and perils of integrating artificial intelligence and ChatGPT in academic and research libraries	*Journal of Web Librarianship*	Conceptual/Discussion
	Okunlaya, R. O., Syed Abdullah, N., & Alias, R. A.	2022	Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education	*Library Hi Tech*	Conceptual/Framework
	Oladokun, B. D., Abduldayan, F. J., & Akanbiemu, A. A.	2025	Leave No one Behind: Empowering Librarians with AI Skills and Competencies in the Libraries of 5IR	*New Review of Academic Librarianship*	Conceptual/Review
	Oladokun, B. D., Ogunjimi, B. E., Oyetola, S. O., Orubebe, E. D., & Enakrire, R. T.	2025	Library management in an era of disruption: Assessing skills and knowledge of future academic librarians in Nigeria	*Information Development*	Survey/Empirical
	Patel, K., Patel, B., Patel, P., & Patel, B.	2024	Intelligent Libraries: Perception and Proficiency in Artificial Intelligence among Knowledge Custodians	*Library of Progress-Library Science, Information Technology & Computer*	Survey
	Pence, H. E.	2022	Future of artificial intelligence in libraries	*The Reference Librarian*	Conceptual/Discussion
	Shahzad, K., Khan, S. A., & Iqbal, A.	2024	Identifying librarians' readiness to leverage artificial intelligence for sustainable competence development and smart library services	*Global Knowledge, Memory and Communication*	Survey/Empirical
	Sharifabadi, S. R., Shamsi, A., & Heidari, H.	2025	AI literacy among librarians in Qom: a case study in Iran	*AIB Studi*	Case study
	Siddiqui, Z. A.	2025	The Future of Libraries: Skills, Challenges, and Innovative Visions for Future	*Proceedings of the International Conference on Marching Beyond the Libraries (ICMBL)*	Conference paper
	Sousa, N. M. T.	2025	Academic libraries as hubs of artificial intelligence competency	*Discover Artificial Intelligence*	Conceptual/Discussion
	Subaveerapandiyan, A. A., & Gozali, A. A.	2024	AI in Indian libraries: prospects and perceptions from library professionals	*Open Information Science*	Survey
	Sultana, R., & Atikuzzaman, M.	2025	Are Academic Libraries of Bangladesh Ready to Implement Artificial Intelligence?	*International Information & Library Review*	Survey
	Wheatley, A., & Hervieux, S.	2019	Artificial intelligence in academic libraries: An environmental scan	*Information Services and Use*	Environmental scan/ Review