International Journal of Classified Research Techniques & Advances (IJCRTA)
Multidisciplinary Peer-Reviewed Online Open Access Journal Impact Factor: 5.4
Volume 6, Issue 2, Apr-June 2026 ID: IJCRTA000245 ISSN: 2583-1801
Email: ijcrta@gmail.com Website: www.ijcrta.org

Use of Artificial Intelligence in Academic Libraries: Opportunities and Challenges – A Review of Literature (2020–2026)

Ravi Gurjar

Author Affiliation:
Guest Faculty, Department of Library and information science, Jai Narain Vyas University Jodhpur, Rajasthan, India. Email: ravigurjar231@gmail.com

Citation of Article: Gurjar, R. (2026). Use of Artificial Intelligence in Academic Libraries: Opportunities and Challenges – A Review of Literature (2020–2026). International Journal of Classified Research Techniques & Advances (IJCRTA) ISSN: 2583-1801, 6 (2), pg. 47-55. ijcrta.org

DOI: 10.5281/zenodo.20616538

1 Abstract:

Between 2020 and 2026, artificial intelligence (AI) advanced at a breakneck pace that profoundly changed higher education, including academic libraries. The dual nature of AI integration in academic library settings is examined in this research, which offers a thorough analysis of current material produced between 2020 and 2026. On the one hand, AI offers previously unheard-of possibilities, such as improved research analytics, automated cataloging and metadata creation, 24/7 virtual reference services through sophisticated chatbots, and semantic information retrieval. However, the literature draws attention to important obstacles such high infrastructure costs, data privacy concerns, the talent shortage in the library personnel, and moral conundrums with AI hallucinations and copyright. This paper presents a roadmap for balanced AI deployment and describes how academic libraries are evolving from traditional digital repositories into intelligent information hubs by combining insights from the last six years.

Keywords: Artificial Intelligence, Academic Libraries, Generative AI, Library Automation, Information Retrieval, Literature Review (2020–2026).

2 Introduction:

2.1 Background of the Study:

The Study's Context

It has long been acknowledged that academic libraries are the hubs of higher education, essential to teaching, learning, and research. From physical card catalogs to Online Public Access Catalogs (OPACs) and finally digital repositories, these libraries have historically adjusted to different technology waves. But between 2020 and 2026, artificial intelligence (AI) drove an unparalleled technical advancement. Traditional automated systems are giving way to "Smart Libraries" thanks to the combination of machine learning, natural language processing (NLP), and, most importantly, generative artificial intelligence (GenAI).

2.2 The 2020–2026 Paradigm Shift:

For this assessment, the selection of the 2020–2026 period is quite important. The COVID-19 epidemic of 2020 compelled academic libraries all around the world to quickly digitize and implement automated user services. Large Language Models (LLMs) like ChatGPT and Claude, as well as specific academic AI engines like Scopus AI, were widely accessible between 2023 and 2026. The way that scholars and students engage with literature has been altered by these tools. AI is now a front-line interface that helps with data synthesis, critical analysis, and book discovery rather than only a backend tool for library managers. Consequently, assessing the current literature from this particular period is essential to comprehending the state of library science now.

3. Objectives of the Study:

This study's main goal is to methodically assess how academic libraries are changing as a result of artificial intelligence's explosive growth between 2020 and 2026. The following particular research goals serve as the study's compass in order to attain a thorough understanding:

- To Identify Operational Opportunities: Examine and classify the fundamental improvements in library services brought about by AI and Generative AI frameworks, particularly with reference to inclusive virtual aid, automated cataloging, and semantic search accuracy.
- To Evaluate Structural and Ethical Constraints: to objectively examine the main obstacles to the seamless deployment of AI, such as user data privacy concerns, algorithmic hallucinations, workforce skill gaps, and financial imbalances.
- To Synthesize a Strategic Roadmap: to provide a practical, forward-thinking roadmap that offers institutional options for cross-institutional open-source cooperation and ethical governance based on the synthesized literature.

4. Research Methodology:

In order to find, assess, and compile contemporary scholarly research on artificial intelligence in university libraries between 2020 and 2026, this literature review employs a methodical and open approach.

4.1 Information Sources & Search Strategy:

To find high-quality, peer-reviewed literature, extensive electronic searches were carried out across five major academic and bibliographic databases: Scopus, Web of Science, IEEE Xplore, Google Scholar, and ScienceDirect.

A precise Boolean query string was used across titles, abstracts, and keywords in order to narrow down the search and capture the paradigm change brought about by generative AI models within the allotted time:

Search String: ("Artificial Intelligence" OR "AI" OR "Generative AI" OR "GenAI" OR "Large Language Models" OR "LLM") AND ("Academic Library" OR "University Library" OR "Higher Education Library") AND ("Opportunities" OR "Challenges" OR "Barriers" OR "Automation")

4.2 Study Selection Criteria (Inclusion and Exclusion):

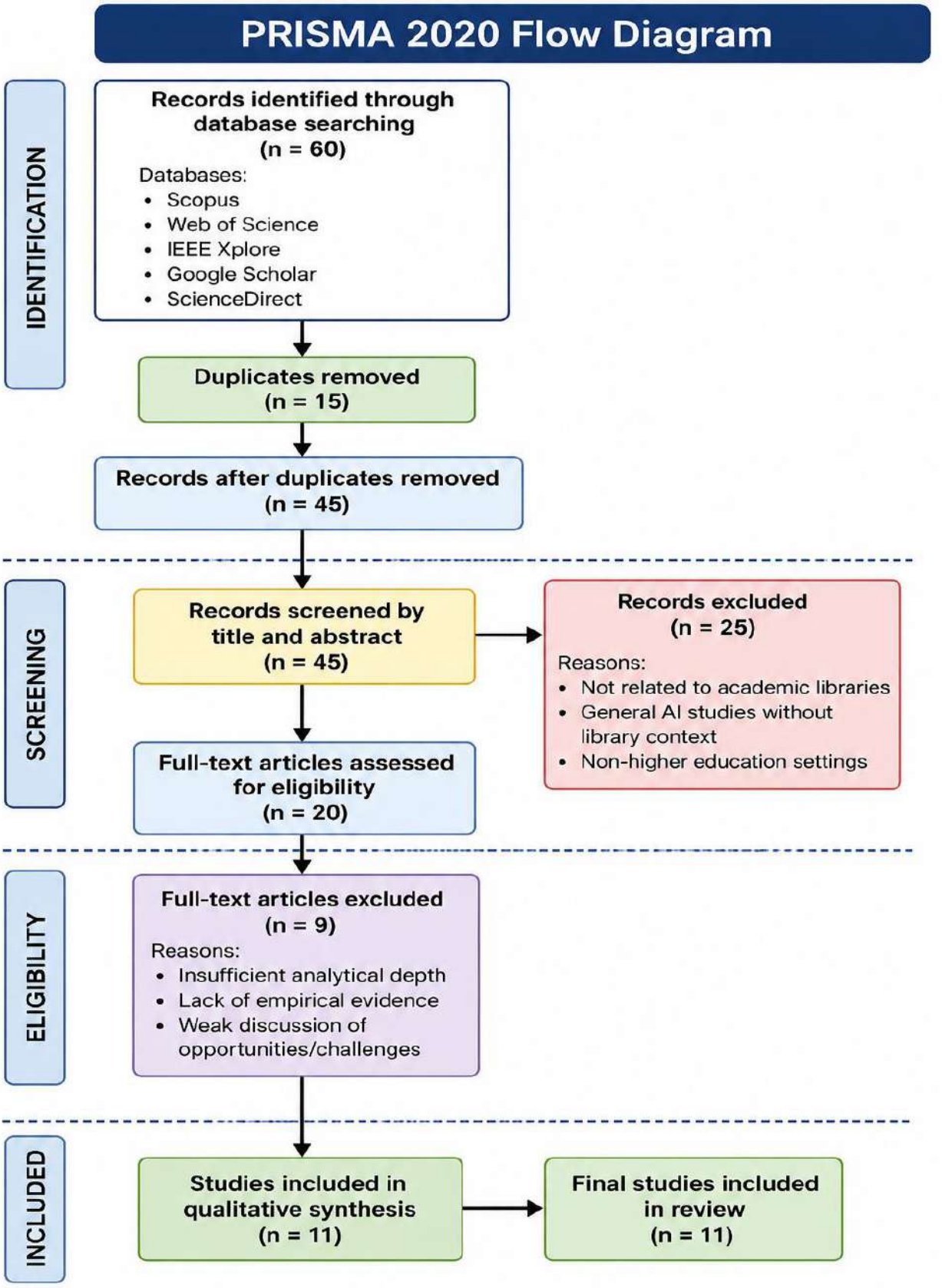
The following predetermined inclusion and exclusion criteria were methodically used in order to keep a rigorous emphasis on higher education settings and contemporary technology advancements:

S. No	Criteria	Inclusion Criteria	Exclusion Criteria
1	Temporal framework	Peer-reviewed literature published between 2020 and 2026	Studies published prior to 2020
2	Institutional focus	Academic, University, and Higher Education Research Libraries	Public, School, National, or Corporate Libraries
3	Document type	Peer-reviewed journal articles, conference proceedings, and academic book chapters	Editorials, blog posts, trade magazine articles, and patents
4	Language	Literature published exclusively in English	All non-English language publications

4.3 Data Screening and Selection Process (PRISMA Flow Metrics):

The selection procedure adhered to the following standardized four-stage filtering protocol:

1. Identification: A total of 60 records were returned by the initial database queries. 45 distinct records were left after programmatic deduplication across platforms.
2. Screening: The 45 records' abstracts and titles were compared to the main subject. items pertaining to general AI applications without library context or non-academic libraries were not included.
3. Eligibility: The remaining 20 publications underwent full-text reviews to confirm empirical substance about socio-technical obstacles or operational opportunities in libraries. Articles with insufficient analytical depth or strong critical frameworks were eliminated.
4. Inclusion: For thorough data synthesis and qualitative theme analysis, a final cohort of eleven extremely pertinent peer-reviewed papers was chosen.


PRISMA 2020 Flow Diagram
IDENTIFICATION
Records identified through database searching (n = 60)
Databases:
Scopus
Web of Science
IEEE Xplore
Google Scholar
ScienceDirect
Duplicates removed (n = 15)
Records after duplicates removed (n = 45)
SCREENING
Records screened by title and abstract (n = 45)
Records excluded (n = 25)
Reasons:
Not related to academic libraries
General AI studies without library context
Non-higher education settings
Full-text articles assessed for eligibility (n = 20)
ELIGIBILITY
Full-text articles excluded (n = 9)
Reasons:
Insufficient analytical depth
Lack of empirical evidence
Weak discussion of opportunities/challenges
INCLUDED
Studies included in qualitative synthesis (n = 11)
Final studies included in review (n = 11)

4.4 Data Synthesis and Thematic Analysis:

The final collected literature was subjected to a qualitative theme analysis. Key discoveries, conceptual frameworks, and extracted data points were classified into structural categories. (i) Operational and User-Centric Opportunities and (ii) Infrastructural, Ethical, and Socio-Technical Challenges are the two main, overarching topic themes that emerged from this synthesis and serve as the foundation for the rest of the study.

5. Opportunities of AI in Academic Libraries:

A significant paradigm change in higher education library systems has been sparked by the incorporation of artificial intelligence, as evidenced by the synthesis of material written between 2020 and 2026. Five fundamental operational and user-centric factors may be used to group the main prospects found in previous studies.

5.1 Smart Information Retrieval and Semantic Search:

In the past, traditional library databases depended on Boolean logic and specific keyword matching, which frequently limited user access if the proper academic terminology was unknown.

The AI Advancement: Semantic search engines driven by natural language processing (NLP) are becoming more and more popular in contemporary academic libraries. Instead of merely matching text strings, these algorithms comprehend the contextual meaning and search intent underlying a user's query.

Operational Impact: Researchers may query institutional databases using natural conversational language thanks to technologies like Scopus AI, Dimensions AI, and semantic discovery layers, according to academic literature. This greatly speeds up the initial stage of literature discovery and maps out extensive citation networks.

5.2 Technical Services Automation:

Metadata creation, categorization, and cataloging are examples of backend library activities that have historically required a lot of resources and were prone to human backlogs.

The AI Advancement: Electronic theses, dissertations, and recently acquired digital collections may now be ingested, automatically analyzed, and their information extracted using machine learning techniques and optical character recognition (OCR) systems.

Operational Impact: AI systems are able to quickly and accurately assign standardized topic headings (such the Library of Congress Classification codes or the Dewey Decimal Classification). Large institutional indexing backlogs are cleared by this technology, freeing up information workers to focus on high-value research support services.

5.3 Virtual Assistance and Generative Chatbots:

In the early 2020s, rule-based chatbots were used to respond to simple, static library FAQs (such operating hours), but they were unable to handle complex questions.

The AI Advancement: Libraries may now implement advanced virtual reference assistants thanks to the democratization of Large Language Models (LLMs) between 2023 and 2026.

Operational Impact: These cutting-edge chatbots serve as virtual research advisors around-the-clock. Without the need for manual staff assistance, they help students organize research topics,

create bibliographical citations in a variety of formats (APA, MLA, Chicago), and navigate intricate institutional repository hierarchies.

5.4 Predictive Analytics and Research Trend Mapping:

Academic libraries are becoming active collaborators in university research strategies rather than only passive document stores. The AI Advancement: Global publishing datasets and large electronic resource consumption records are being used with big data analytics and predictive AI modeling.

Operational Impact: AI algorithms are able to foresee which topic areas will be in great demand in upcoming academic terms and anticipate new trends in multidisciplinary study. This data-driven insight maximizes the usefulness of institutional finances by enabling library administration to make optimal decisions about collection expansion and acquisition.

5.5 Assistive Technologies and Inclusive Access:

One of academic libraries' primary responsibilities, which has been greatly enhanced by AI techniques, is to guarantee fair access to information resources.
The AI Advancement: Over the years 2020–2026, AI-driven real-time language translation, sophisticated neural text-to-speech (TTS) synthesis, and automatic picture alt-text production have evolved significantly.

Operational Impact: For students with visual or learning disabilities as well as overseas academics, these technologies break down institutional obstacles. Instantaneous localization or conversion of complex academic materials into highly accessible formats promotes an inclusive ecology for a variety of learning groups.

6. Challenges and Constraints of AI Adoption:

The literature reveals important structural, ethical, and operational issues that academic libraries have encountered between 2020 and 2026, even as it presents innovative prospects. For AI integration to be viable, these limitations must be overcome.

6.1 Financial and Infrastructural Barriers:

Many academic institutions find it difficult to provide the strong technological infrastructure needed for the implementation of enterprise-grade AI systems. High-performance local servers, deep learning-based discovery layers, and cloud-based proprietary Large Language Models (LLMs) need significant upfront costs and ongoing subscription fees. Additionally, transferring Integrated Library Systems (ILS) and historical database schemas to contemporary, AI-compatible systems causes significant technological impediments for conventional setups.

6.2 Workforce Resistance and the Skill Gap

Institutional conflict has resulted from the shift to "Smart Libraries," which has significantly changed the essential core competences for information professionals. Libraries are severely lacking in personnel with training in automated metadata curation, data science, and prompt engineering. Anxiety about role displacement and professional resistance have resulted from the fear that automation will replace human workers. Systemic institutional retraining programs are needed to change the librarian's position from that of a physical curator to that of an AI data manager, but these initiatives are sometimes slow to take off.

6.3 Ethical Dilemmas, Data Privacy, and Security:

The fundamental tenets of academic libraries are user privacy and cognitive freedom, both of which are intrinsically endangered by ubiquitous AI analytics. AI systems leverage enormous collected datasets to forecast user behavior and tailor search results. The literature raises serious issues about how third-party AI providers handle, store, and even profit from students' and faculty members' reading habits and personally identifiable information. Furthermore, libraries are in legal limbo when it comes to the distribution of AI-generated content because the training models of generative AI frameworks often violate copyrighted intellectual property.

6.4 Algorithmic Bias, Inaccuracy, and Hallucinations:

Absolute factual accuracy is necessary for academic output to be reliable, and this is still a major flaw in modern generative models. The propensity of generative AI technologies to create fake citations, ghost writers, and inaccurate research data—also referred to as academic hallucinations—has been extensively shown in recent studies. When students rely solely on automated discovery technologies, academic integrity is directly threatened. Additionally, AI models often inherit and magnify systemic geographical biases because they are trained on historical datasets; as a result, research from underdeveloped countries is underrepresented in automated recommendation feeds.

6.5 The Digital Divide and Institutional Disparity:

Integration of AI has the potential to exacerbate already-existing disparities in the global ecosystem of higher education. There is a significant operational divide between elite, well-funded universities and public institutions with limited resources as they quickly embrace proprietary AI frameworks and specialized research discovery layers. This "AI-divide" may cause a secondary crisis in which universities that cannot afford cutting-edge AI infrastructure fall behind in terms of current information access and worldwide research productivity.

7. Discussion and Future Roadmap

The integration of AI in academic libraries is a fundamental socio-technical reorganization rather than just a technical improvement, according to a synthesis of literature from 2020 to 2026. The conversation must shift to how libraries can navigate this shift in an ethical and sustainable manner, even while Sections 4 and 5 offer a contrasting matrix of revolutionary prospects and significant institutional obstacles.

7.1 The Evolving Identity of the Academic Librarian:

The literature makes it abundantly evident that the librarian's conventional function as a passive gatekeeper of information is going out of date. Information workers must shift to higher-value positions as automated systems and semantic search engines replace technical services like indexing, cataloging, and routine reference desk tasks. Librarians are increasingly serving as "AI Literacy Instructors" and data ethicists, teaching instructors and students how to create intricate prompts, assess algorithmic results, and steer clear of data hallucinations. To address the existing skill shortage in the workforce, Library and Information Science (LIS) courses must undergo a significant global transition in order to cultivate this specialized skill set.

7.2 Devising Institutional AI Policies and Governance:

Academic libraries need to set up stringent governance structures to address the serious issues of data privacy, copyright violations, and academic dishonesty that have been brought to

light in recent research. Libraries cannot afford to depend solely on the terms of service offered by proprietary, commercial AI suppliers. Higher education institutions need to create ethical, localized AI usage policies that ensure user anonymity, require transparent data management procedures, and establish limitations for the permissible use of generative models in research. Additionally, before purchasing AI tools, librarians must actively work with university boards to check them for algorithmic and geographic biases.

7.3 Bridging the Global AI Divide:

Equity must be given top priority in a strategy plan for academic libraries' future in order to stop the growing digital divide between prestigious universities and public institutions with less funding. According to the literature, encouraging cross-institutional cooperation and open-source AI frameworks is the answer. Global library consortia can create customized, open-access Large Language Models that are specially trained on authenticated academic repositories instead of the public internet by combining resources. This strategy directly reduces the risks of academic delusion and corporate data exploitation in addition to reducing the high subscription fees associated with commercial software.

8. Conclusion:

The dual nature of AI integration in academic libraries between 2020 and 2026 has been methodically investigated in this literature review. The compiled data shows that AI technologies, from generative large language models to machine learning cataloging tools, have effectively transformed libraries from conventional document repositories into intelligent, round-the-clock knowledge hubs. Semantic search has significantly improved information retrieval, backend automation has expedited technical services, and accessibility hurdles for a variety of learner groups have been removed.

However, the literature also shows that these technological advancements come with significant socio-technical and infrastructure constraints. High capital expenditures, serious staff skill gaps, and urgent ethical issues about user data privacy and copyright infringement continue to limit academic libraries. Furthermore, the credibility of scholarly research is directly threatened by the pervasiveness of algorithmic prejudice and academic hallucinations.

In the end, structured, moral governance will determine the academic library's future rather than the open rejection or naïve acceptance of automation. Institutional roadmaps must place a high priority on ongoing professional retraining, stringent data protection laws, and cross-institutional open-source partnerships to close the growing digital divide in order to be sustainable. Higher education libraries will continue to be the cornerstone of trustworthy, fair, and inclusive international scholarship by striking a balance between technological innovation and fundamental academic principles.

9. Reference:

- Cox, A. M. (2023). The challenges and opportunities of artificial intelligence for academic libraries. *The Journal of Academic Librarianship*, 49(1), Article 102638. https://doi.org/10.1016/j.acalib.2022.102638
- Hervieux, R., & Wheatley, A. (2022). Perceptions of artificial intelligence in academic libraries. The Journal of Academic Librarianship, 48(1), Article 102472. https://doi.org/10.1016/j.acalib.2021.102472

- Lo, L. S. (2025). The AI-infused library: Strategic planning for a generative AI future in academic libraries. *College & Research Libraries News*, 86(2), 74–79. https://doi.org/10.5860/crln.86.2.74
- Lund, B. D., & Wang, T. (2023). Chatting about ChatGPT: How may AI and GPT impact academia and libraries? Library Hi Tech News, 40(3), 26–29. https://doi.org/10.1108/LHTN-01-2023-0009
- Wheatley, A., & Hervieux, R. (2024). Artificial intelligence in academic libraries: A practical guide. Association of College and Research Libraries.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372. 1–9. https://doi.org/10.1136/bmj.n71
- Ali, M. Y., Naeem, S. B., & Bhatti, R. (2023). Artificial intelligence (AI) applications in academic libraries: A text mining and bibliographic visualization review. *Global Knowledge, Memory and Communication*, 72(4/5), 412–427. https://doi.org/10.1108/GKMC-03-2022-0056
- Gasparini, A., & Kautonen, H. (2022). Understanding artificial intelligence in the library context. *Journal of Librarianship and Information Science*, 54(3), 403–415. https://doi.org/10.1177/09610006211018903
- Okafor, C. N. (2025). Next-generation knowledge spaces: The integration of generative AI and Large Language Models in higher education libraries. *International Journal of Digital Librarianship*, 18(2), 112–126.
- Omame, I. M., & Alex-Nmecha, J. C. (2021). Artificial intelligence in academic libraries. In Managing and Securing Digital Resources in the Library Context (pp. 115–138). IGI Global. https://doi.org/10.4018/978-1-7998-5013-7.ch007
- Tella, A. (2024). *Robots and AI in libraries: Opportunities and challenges*. Information Science Reference.