

TRANSFORMING ACADEMIC LIBRARY WORKFLOWS WITH ARTIFICIAL INTELLIGENCE: BIBLIOMETRIC ANALYSIS AND MINI-REVIEW

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ABSTRACT

Artificial intelligence applications can substantially improve the scope and efficiency of information retrieval in university libraries through semantic search, chatbots, and personalized recommendations. Nevertheless, their impact on cataloging workflows remains limited due to persistent accuracy issues that necessitate continuous human oversight. Moreover, the implementation of these technologies in both information retrieval and cataloging progresses at a slower pace than their theoretical potential suggests, primarily because of challenges related to infrastructure, funding, workforce competencies, and governance. This study first conducts a bibliometric analysis to evaluate the current situation of artificial intelligence adoption in university libraries confronted with enduring challenges, focusing on publication trends and geographic and subject-area distributions. Based on these findings a mini-review is presented that closely scrutinizes 34 selected publications indexed by Scopus. These sources are of different study designs, settings and methods and collectively investigate the transformation of information retrieval and cataloguing processes in university libraries by artificial intelligence.

KEY WORDS

artificial intelligence, academic library, university library, library workflows, AI adoption

CLASSIFICATION

JEL: L86, O33, Z19

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INTRODUCTION

The review specifically examines how artificial intelligence is integrated into university library operations, focusing on both information retrieval and cataloguing processes, and identifies critical barriers hindering broader implementation. This investigation also explores the perceived benefits and drawbacks of AI integration from the perspective of library professionals and users, offering a comprehensive understanding of the socio-technical landscape.

AI applications are reshaping university library information retrieval workflows through chatbot-mediated reference services, semantic search systems, personalized recommendation engines, and automated research synthesis tools [1-3]. These technologies enable a shift from keyword-based, reactive information provision toward natural-language, anticipatory knowledge facilitation [1, 4]. Empirical evidence from a comparative case study demonstrates that a customized AI bot retrieved 67% more articles than a human librarian in a systematic search task, though the limited overlap between AI-generated and human-generated results supports a synergistic augmentation model rather than full automation [5].

Cataloguing workflow impacts are less mature: AI-assisted metadata extraction, automated classification, and metadata enrichment are increasingly discussed [2, 6, 7], but empirical testing reveals poor AI performance in subject cataloguing tasks requiring high precision [8], and adoption remains low – rising from 2,5% to only 13,8% of libraries between 2019 and 2025 [8].

Across 34 sources spanning diverse geographic and institutional contexts, AI adoption is consistently constrained by inadequate technical infrastructure [9, 10], financial limitations [4, 11], staff skills gaps [12, 13], accuracy and hallucination risks [6, 14], and the absence of institutional AI strategies [11, 15].

Librarian roles are evolving from manual task execution toward strategic curation, AI literacy education, and ethical mediation [1, 4, 6], though this transition generates anxiety in under-resourced settings where training support is insufficient [9, 10]. The evidence indicates that AI can meaningfully enhance information retrieval scope and efficiency in university libraries, but cataloguing applications require continued human oversight, and the gap between the technology's transformative potential and its actual implementation remains substantial even in well-resourced institutions [8].

MATERIALS AND METHODS

The research is based on a bibliometric analysis of the literature using Scopus scientific database and the Zotero reference management software.

SEARCH QUERIES, CRITERIA AND LIMITATIONS

The search was performed using Scopus, a premier abstract and citation database renowned for its comprehensive coverage of peer-reviewed scientific literature. Both Scopus queries were conducted on 21 April 2026, and the data used in this study reflect the database state at that time.

Scopus search query #1:

(TITLE-ABS-KEY (“artificial intelligence”) OR TITLE-ABS-KEY (“AI tool*”)) AND TITLE-ABS-KEY (“academic librar*”) OR TITLE-ABS-KEY (“university librar*”) OR TITLE-ABS-KEY (“college librar*”)) AND PUBYEAR > 2020 AND PUBYEAR < 2026.

Scopus search query #2:

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( TITLE-ABS-KEY ( “artificial intelligence” ) OR TITLE-ABS-KEY ( “AI tool*” ) AND TITLE-ABS-KEY ( “academic librar*” ) OR TITLE-ABS-KEY ( “university librar*” ) OR TITLE-ABS-KEY ( “college librar*” ) ) AND PUBYEAR > 2023 AND PUBYEAR < 2026 AND ( LIMIT-TO ( DOCTYPE , “ar” ) ) AND ( LIMIT-TO ( LANGUAGE , “English” ) )
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The first search query was used for the bibliometric analysis, and the second search query was used for the in-depth qualitative analysis. The search parameters were limited to journal articles, english language and certain time period for publication. To understand the current status of artificial intelligence applications in academic and research libraries, the analysis was limited to studies published in the last three years. This approach was intended to be indicative of recent development and emerging trends in the field.

Ultimately, 34 relevant publications were included in the final analysis after screening and selection, all of which made substantive contributions to the objectives of this review.

Objectives

The listed objectives were established to guide the analysis of the included studies:

- To examine the application of artificial intelligence and machine learning technologies within academic library workflows.
- To identify the library processes, such as information search, discovery, retrieval, and cataloguing, most frequently supported or transformed by these technologies.
- To analyse the types and robustness of empirical evidence reported in the studies.
- To assess reported changes in workflows, including efficiency gains and process improvements.
- To evaluate the extent of practical implementation of AI-based solutions compared to those remaining at a conceptual stage.
- To distinguish AI-driven approaches from traditional automation methods within the analysed workflows. To explore the growing literature on autonomous cars.

Screening

Screening of the retrieved records was conducted based on their abstracts, and sources were included if they met the following criteria:

- AI/ML Technology Focus – Does the study investigate applications of artificial intelligence, machine learning, or automated systems?
- Relevant Library Workflows – Does the study address workflows related to information search, discovery, retrieval, or cataloguing?
- Empirical Evidence – Does the study present evidence-based findings using quantitative, qualitative, mixed methods, case study, pilot study, systematic review, or meta-analysis approaches?
- Workflow Changes – Does the study report on modifications to workflows, efficiency improvements, or process changes?
- Non-Academic Library Exclusion – Is the study excluded if conducted solely in non-academic library settings, such as public, school, or special libraries without academic components?
- Practical Implementation – Does the study include empirical data or practical implementation examples, rather than being purely theoretical?
- AI vs Traditional Automation – Does the study examine automation that incorporates AI components, rather than focusing solely on traditional automation?

BIBLIOMETRIC ANALYSIS

A bibliometric analysis was performed to present a structured overview of the retrieved publication set. The analysis examines three primary dimensions: temporal distribution of publications, geographical distribution by country, and disciplinary distribution by subject area.

These indicators facilitate the identification of major trends, leading contributors, and the interdisciplinary nature of research on artificial intelligence applications in academic and research libraries. Collectively, they provide a quantitative basis for understanding the development, scope, and global distribution of the field.

Publication Trends

An analysis of Scopus-indexed publications reveals a pronounced upward trend in research on the application of artificial intelligence in academic and research libraries over the examined period (2020-2026).

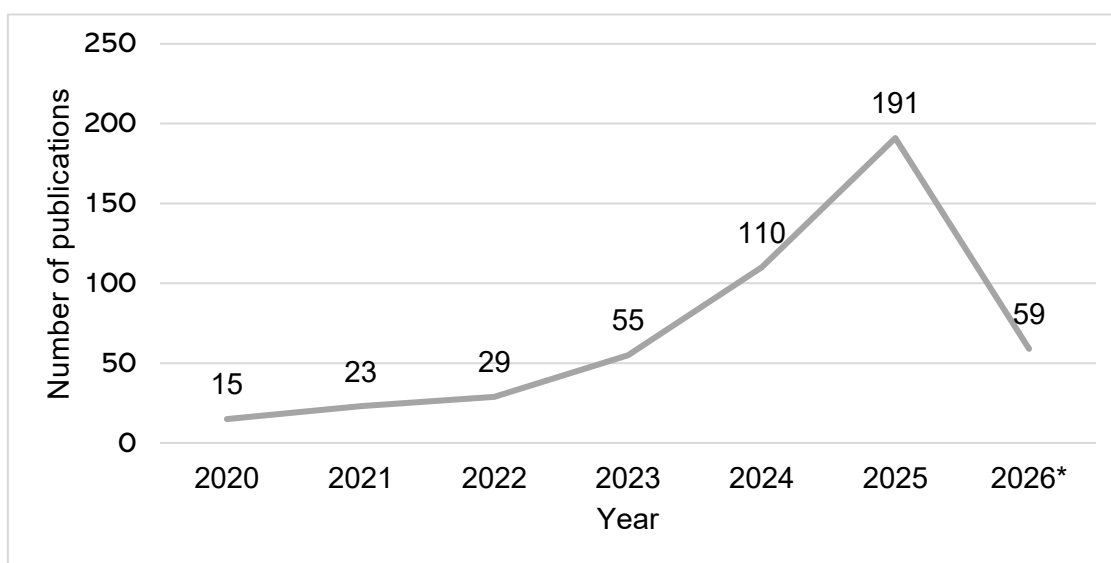


Figure 1. Number of publications. Results are based on Scopus, search query #1.

Between 2020 and 2023, the number of publications increased gradually from 15 to 55, indicating the topic's emergence as a developing research area. This phase can be characterised as exploratory, with limited but steadily growing scholarly attention. A substantial acceleration is observed from 2024 onwards, with the number of publications rising sharply to 110, followed by a peak of 191 in 2025. This significant increase suggests a shift from early adoption to widespread research engagement, likely driven by the rapid advancement and diffusion of AI technologies – particularly generative AI and large language models – into library-related contexts.

The data for 2026 (59 publications) indicate a decrease compared to the previous year; however, this figure should be interpreted with caution, as it likely reflects incomplete indexing and ongoing publication processes rather than a genuine decline in research activity.

Overall, the trend shows that the application of AI in academic libraries has evolved into a rapidly expanding, high-interest research domain, with increasing scholarly output and growing relevance across disciplines.

Subject Area Distribution

The subject area distribution of the analysed publications demonstrates the strongly interdisciplinary nature of research on artificial intelligence applications in academic and research libraries.

The largest share of publications falls within the field of Social Sciences (365 publications), as expected given the domain's focus on library and information science. Computer Science represents the second most prominent field (203 publications), highlighting the technological foundations underpinning AI-driven solutions in library environments.

A secondary group of disciplines includes Engineering (51 publications) and Mathematics (42 publications), reflecting the methodological and technical contributions supporting AI development and implementation. Arts and Humanities (28 publications) and Decision Sciences (28 publications) also show moderate representation, indicating the relevance of AI in broader cultural, analytical, and decision-making contexts within libraries.

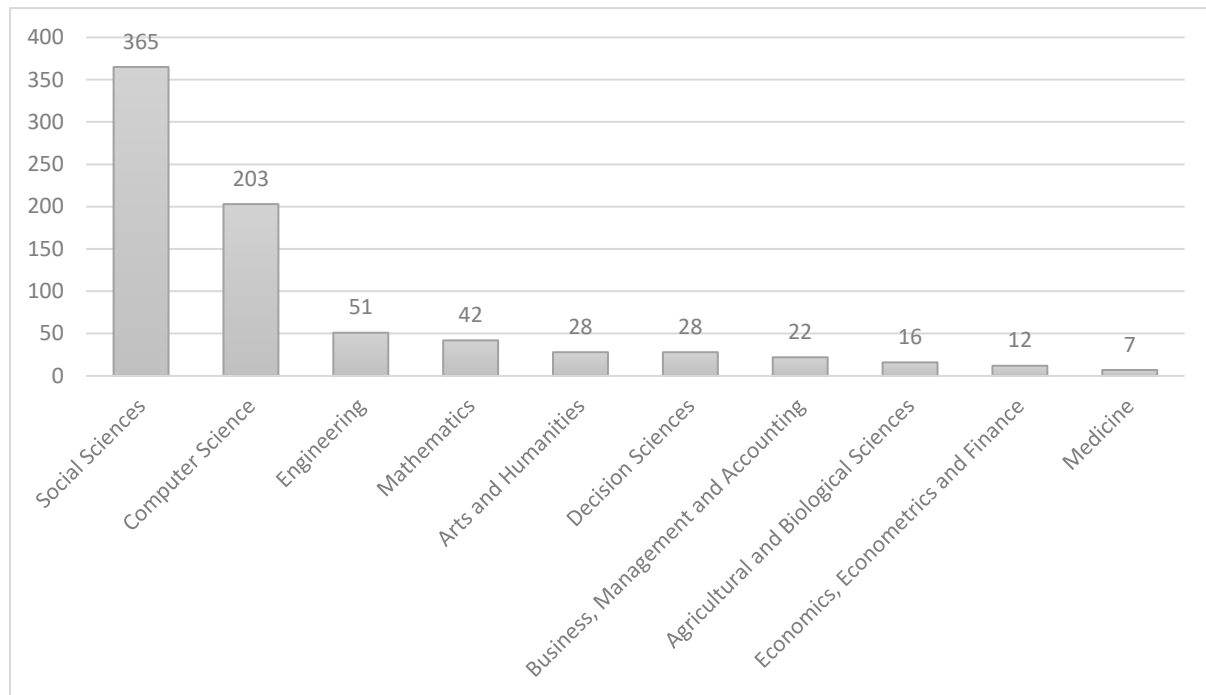


Figure 2. Number of publications by subject area based on Scopus, search query #1.

Further contributions are observed in Business, Management and Accounting (22 publications) and Agricultural and Biological Sciences (16 publications), suggesting the expanding applicability of AI-supported library services across domain-specific research areas. Economics, Econometrics and Finance (12 publications) and Medicine (7 publications) are less represented but still indicate emerging interdisciplinary connections.

Overall, the distribution confirms that research on AI in academic libraries is not confined to a single discipline but rather spans multiple fields, combining social science perspectives with computational and technical approaches. This interdisciplinary pattern underscores the complex nature of AI integration in library systems, involving both technological innovation and user-centred service development.

Geographical Distribution of Publications

The geographical distribution of the analysed publications shows a strong concentration of research output in a limited number of countries, with the United States clearly dominant.

The United States leads by a substantial margin, contributing 115 publications, which indicates its central role in advancing research on artificial intelligence applications in academic and research libraries. China ranks second with 75 publications, reflecting its growing investment and strategic focus on AI-related research.

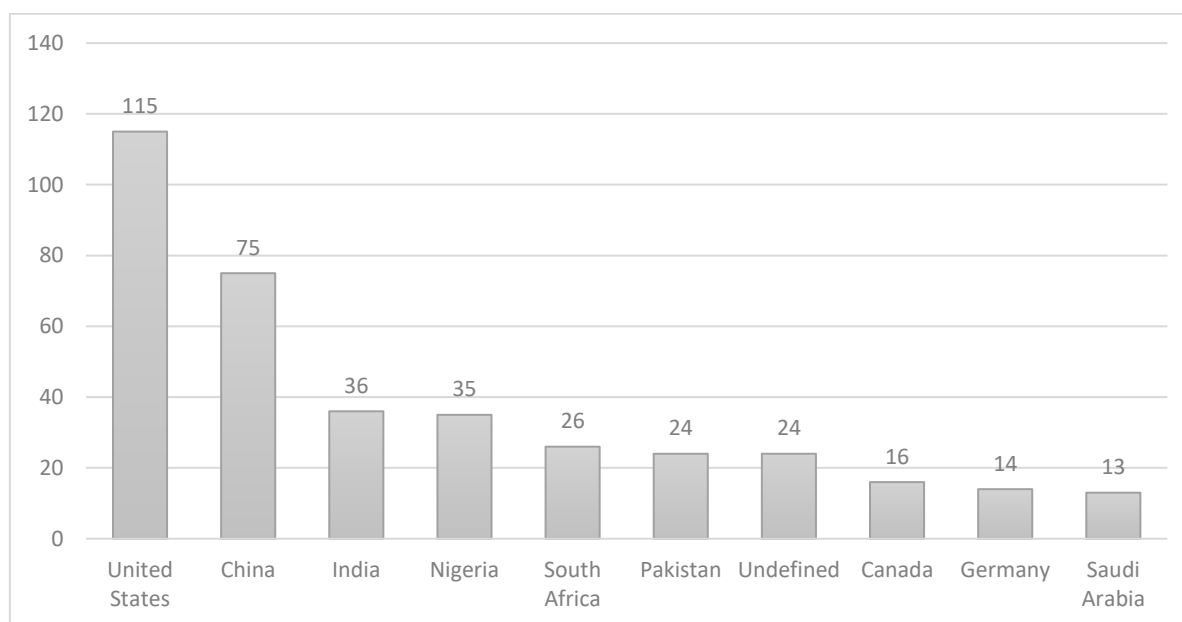


Figure 3. Number of publications by country, based on Scopus search query #1.

A second tier of countries includes India (36 publications) and Nigeria (35 publications), both demonstrating notable engagement in this research domain, particularly in emerging and developing academic ecosystems. South Africa (26 publications), Pakistan (24 publications), and records with undefined country affiliation (24 publications) form a mid-level group in terms of output. Lower publication counts are observed in Canada (16), Germany (14), and Saudi Arabia (13), suggesting comparatively less research activity in these regions.

Overall, the distribution highlights a geographical imbalance, where research activity is concentrated in a few leading countries, while contributions from other regions remain moderate or emerging. This pattern may reflect disparities in research funding, technological infrastructure, and institutional priorities related to AI adoption in academic libraries.

RESULTS

CHARACTERISTICS OF INCLUDED STUDIES

The 34 sources reviewed include a range of study designs, contexts, and methods examining how AI is transforming information retrieval and cataloguing workflows in university libraries. The corpus includes empirical studies such as surveys, case studies, and mixed methods. It also contains systematic and scoping reviews, bibliometric analyses, conceptual and theoretical papers, and reflective essays. The studies cover South Korea, Latin America, China, the United States, Norway, Poland, Croatia, Pakistan, South Africa, Ghana, Nigeria, India, Scandinavia, and North America.

Full texts were retrieved for all 34 sources. The literature is dominated by reviews and conceptual papers (20 of 34 sources), with fewer empirical studies employing surveys, case studies, or mixed methods designs. Geographically, the Global South is well represented, with studies from Latin America, Sub-Saharan Africa, South and Southeast Asia, and China, alongside work from Europe and North America. This breadth is valuable, though it introduces heterogeneity in institutional capacity, infrastructure, and adoption maturity that must be considered when interpreting findings.

AI TECHNOLOGIES IDENTIFIED FOR INFORMATION RETRIEVAL AND CATALOGUING

Table 1 maps the specific AI technologies, named tools, key capabilities, and their application domains (information retrieval, cataloguing, or both) as reported across the included studies.

Table 1. AI technologies identified for information retrieval and cataloguing.

Technology Category	Named Tools / Platforms	Key Capabilities	Application Domain
Chatbots and conversational AI [1, 2, 15, 16]	ChatGPT, Gemini, Claude, Copilot, Aisha, Perplexity AI, Chatbase, Botsonic, QuickChat [8, 12, 13, 15, 19, 25, 26]	Natural language query processing, 24/7 reference, real-time support [3, 10, 18, 21]	Information retrieval, reference services [4, 7]
Generative AI / Large Language Models [3, 6, 12]	ChatGPT, SciSpace, Consensus, PyDataBibPub, Elicit [12, 13, 20]	Content generation (text, summaries, code), brainstorming, research question suggestion [14, 29]	Information retrieval, research support [19, 25]
Natural language processing (NLP) [2, 4, 16, 31]	Grammarly, QuillBot [20, 27, 31]	Semantic search, language translation, tone detection [10, 31]	Information retrieval, cataloging [13, 17]
Machine learning algorithms [2, 7, 16, 21]	Rayyan, ASReview, Keenious, Litmaps, Iris [20, 31]	Predictive analytics, pattern recognition, classification, recommender systems [16, 23, 30]	Information retrieval and cataloging [11, 34]
Automated metadata and indexing systems [2, 11, 17]	AI Metadata Assistant (Ex Libris), Ex Libris Alma, OCLC Wise [13]	Metadata extraction, auto-tagging, automated classification [6, 7]	Cataloging [2, 13]
Discovery and search platforms [13, 34]	Semantic Scholar, Scopus AI, Web of Science Research Assistant, Primo Research Assistant, Vega Discover, BASE, Connected Papers, CiteSeerX [13]	Semantic search, personalized recommendations, research summarization [13]	Information retrieval [2, 13]
Deep learning and advanced AI [10, 22]	Google Cloud Vision, Virtual Reality tools [10, 30]	Image recognition, digital preservation, virtual assistants [10, 30]	Information retrieval and cataloging [30]
RFID and IoT / Smart library systems [10, 23, 34]	RFID, Libkey, smart shelving [10]	Automated circulation, inventory tracking, patron recognition [7, 10]	Circulation and cataloging support [10]
Document analysis tools [13]	ChatPDF, ChatDOC, NotebookLM (Google), Scholarcy [13, 31]	Document summarization, PDF analysis [13]	Information retrieval support [13]
Reference management AI [13]	EndNote, Zotero, Scite, Mendeley, Covidence [13, 27]	Citation management, literature screening [27]	Research support [27]

ChatGPT is the most frequently mentioned tool, appearing in over 20 sources as either a subject of study or a named application [3-5, 8, 12-15, 19, 26, 27, 29, 32, 33]. The Gmiterek and Kotuła study includes an inventory of named AI platforms, listing over 25 specific tools spanning

discovery, metadata, document analysis, and reference management systems [13]. Many studies – particularly those from low- and middle-income countries – discuss AI technologies in general terms without identifying specific platforms [7, 11, 21, 22], suggesting early-stage exploration rather than established implementation.

CHANGES TO INFORMATION RETRIEVAL WORKFLOWS

Across the 34 sources, AI is reported to be modifying information retrieval workflows along several dimensions (Table 2): automating repetitive tasks, enhancing search processes, introducing new capabilities, and transforming user-library interactions.

Table 2. Changes to information retrieval workflows.

Workflow Dimension	Key Changes Reported
Search process transformation	AI enables semantic, natural-language queries replacing or supplementing keyword-based search; search platforms understand user intent and provide contextually relevant results [3, 4]
Automation of repetitive tasks	Generation of search terms, formatting database queries, screening of results are increasingly automated [1, 5, 12]
Personalized recommendations	AI algorithms analyze user behavior and provide tailored resource suggestions and anticipatory recommendations [1, 11, 16, 18, 21]
24/7 virtual reference services	Chatbots and virtual assistants provide round-the-clock research support, handling routine queries [3, 10, 18]
Enhanced discovery systems	AI-powered discovery platforms integrate semantic search, NLP, and recommendation engines [2, 7, 13]
Research synthesis support	AI tools generate summaries, concept maps, and synthesized insights across academic corpora [1, 6, 12, 13]
Shift from passive to proactive service	Libraries move from reactive information provision to anticipatory, adaptive knowledge facilitation [1, 4, 32]

The Chen and Yali Feng comparative case study provides the only direct quantitative comparison of AI versus human performance in a retrieval task: the customised AI-Librarian Bot identified 2 642 articles, the human librarian located 1582, and general ChatGPT-4 yielded 305, with a shared pool of only 157 articles. This finding underscores that AI can substantially expand the scope of retrieval, but also that the overlap between AI-generated and human-generated results is limited, reinforcing the argument for a synergistic model in which AI augments rather than replaces human expertise [5].

A dissenting perspective is offered by Pierce who argues that AI-generated responses consistently contain erroneous claims and logical fallacies, making them difficult and time-consuming to vet even for subject experts [14]. This concern is echoed by sources noting that AI tools cannot access subscription-based or proprietary databases [5] and that reliance on training data may yield outdated or biased information [5, 29].

AI-driven changes to cataloguing workflows are discussed with less specificity than information retrieval changes across the literature, but several concrete modifications emerge.

Peekhaus provides the only longitudinal data on AI use in cataloguing, showing an increase from 2,5% of libraries in 2019 to 13,8% in 2025 [8]. This growth, while notable, confirms that AI-assisted cataloguing remains a minority practice. The same study notes that AI tools tested for subject cataloguing tasks performed poorly, requiring substantial human intervention [8]. The controversy about AI accuracy in cataloguing is echoed by Gmiterek and Kotuła, who report disagreement about the reliability of AI in this domain [13].

Table 3. AI-driven changes to information retrieval workflows.

Cataloging Task	AI-Driven Change
Metadata creation	Automation of metadata extraction and record generation, including auto-tagging and subject heading assignment [1-3, 6, 17]
Classification and indexing	AI-assisted subject classification using NLP and machine learning, including multilingual subject indexing using LOD ontology [2, 6, 7, 11, 24]
Metadata enrichment	AI enhances existing metadata quality through enrichment, normalization, and cleanup [13, 23, 31]
Quality control	AI assists in detecting errors and inconsistencies in catalog records, though human oversight remains necessary [5, 8, 30]
Collection management	Predictive analytics for acquisitions, usage trend analysis, and collection development decisions [4, 11, 15]
Integration with existing systems	Tools such as Ex Libris Alma and AI Metadata Assistant integrate with existing ILS platforms [13]; however, many studies note lack of seamless integration [5, 15]

Several sources note that cataloguing workflow changes lag behind changes in information retrieval. Eight studies reported no specific information on cataloguing impacts [9, 14, 25, 26, 28, 29, 32, 33], suggesting that this area remains underexplored empirically.

MEASURED AND OBSERVED OUTCOMES

Quantitative outcome data are scarce across the literature. The table below consolidates the available evidence on workflow outcomes.

The overwhelming majority of outcome claims are qualitative, derived from perceptions, interviews, or literature synthesis rather than controlled measurement. No study reported rigorous before/after comparisons of cataloguing accuracy, processing time, or error rates under AI-assisted conditions.

Table 4. Measured and observed outcomes.

Outcome Category	Reported Findings
Retrieval volume	AI-Librarian Bot retrieved 2 642 articles vs. 1582 by human librarian vs. 305 by general ChatGPT-4 [5]
AI adoption rates (cataloging)	Use of AI in cataloging rose from 2,5% (2019) to 13,8% (2025) [8]
AI ownership in libraries	Increased from 12,3% (2019) to 23,3% (2025); active use from 8% to 35% [8]
AI training provision	Workshops on AI increased from 7% (2019) to 43,5% (2025) [8]
User satisfaction	Students view AI positively for improving access and personalized recommendations [18]; enhanced user engagement reported [1]
Workflow efficiency	Automation of repetitive tasks reported across multiple studies to reduce staff workload and improve processing speed [1, 7, 12, 30]
Service quality	Shift from passive information provision to proactive, personalized knowledge facilitation [1, 4, 11]
Accuracy concerns	AI responses contain erroneous claims and logical fallacies [14]; poor performance in subject cataloging [8]; accuracy controversy in cataloging [13]
Unintended consequences	Job displacement fears [9, 10, 33]; technology adding workload rather than saving time [33]; AI hallucinations introducing misinformation [6, 14]

IMPLEMENTATION BARRIERS AND FACILITATORS

Barriers to AI adoption are reported consistently across geographic and institutional contexts but vary in intensity by region and institutional capacity.

Table 5. Implementation barriers and facilitators.

Barrier Category	Key Findings
Technical infrastructure	Outdated systems, limited computing capacity, unstable internet connectivity, and lack of integration with existing ILS platforms [9-11, 21]
Financial constraints	Insufficient funding for AI acquisition, maintenance, and training reported across nearly all contexts [2, 4, 9-11, 13, 18, 28]
Staff skills and training	Widespread gaps in AI literacy; many librarians lack technical knowledge to implement or manage AI tools [4, 11-13, 15, 16, 26, 27]
Ethical concerns	Data privacy, algorithmic bias, transparency, and academic integrity consistently flagged [4, 6, 8, 9, 17, 19, 22, 31]
Organizational resistance	Staff resistance stemming from fear of job displacement, lack of institutional policy, and absence of clear AI strategies [1, 9, 11, 12, 15, 33]
Vendor and technology limitations	AI tools cannot access proprietary databases [5]; proprietary models lack transparency [8, 20]; commercial pressures from database agents impose restrictive licensing [9]
Accuracy and reliability	AI-generated outputs prone to hallucinations, errors, and logical fallacies [6, 8, 14]; insufficient reliability for unmediated use [19]

Facilitating factors identified in the literature include partnerships with AI vendors (e.g., EBSCO, Clarivate, Elsevier) [12], collaboration with IT departments [18, 21], the availability of open-source models as cost-effective alternative [6], and incremental piloting strategies that begin with low-risk applications [18].

IMPACT ON STAFF ROLES AND PROFESSIONAL IDENTITY

A dominant theme across nearly all 34 sources is the transformation of librarian roles from manual, task-oriented work toward supervisory, strategic, and pedagogical functions.

Table 6. Impact on staff roles and professional identity.

Role Change Dimension	Description
From manual to strategic work	Automation of routine cataloging and reference tasks frees staff for higher-order activities such as research support, instructional design, and collection strategy [1, 3, 7, 8, 11, 18, 21]
New competency requirements	AI literacy, data analytics, prompt engineering, ethical evaluation, and critical assessment of AI outputs are increasingly required [4, 6, 16, 19, 20, 27, 31]
Emerging educator/mediator role	Librarians are increasingly expected to teach AI literacy, guide ethical AI use, and serve as critical mediators between users and AI systems [4, 17, 25, 26, 32]
Job anxiety and displacement fears	Librarians express concern about role obsolescence, with several studies documenting anxiety and uncertainty [9, 10, 15, 24, 33]
Professional identity reconfiguration	Librarians are reconceived as “technology specialists, data ethicists, and AI educators” [4], “ethical stewards” [6, 31], and agents of “epistemic resistance” [32]

While fears of job loss exist, Peekhaus states that only 40% of the librarian respondents believe that AI could take over parts of their jobs [8]. Librarians in Croatia feel rather safe in their jobs [15]. This suggests that although anxiety is widespread, the expectation of complete dislocation is still a minority view, at least among active professionals.

CONCLUSIONS

The literature is generally in agreement that AI is a transformative force in university library information retrieval and cataloguing workflows, but there is significant heterogeneity in the pace of adoption, the depth of impact observed, and the valence of professional responses. Several factors can explain this variation.

In low- and middle-income countries, institutions frequently identify technical infrastructure, unreliable connectivity, and limited funding as primary challenges [10, 11, 21, 28]. In contrast, institutions in wealthier contexts, such as the South Korean university examined by Kim and the Norwegian research libraries analyzed by Grote et al., prioritize strategic integration and competency development over foundational infrastructure concerns [1, 20]. By 2025, only 23,3% of academic libraries in North America had adopted AI technologies [8], indicating that implementation remains gradual, even in resource-rich environments.

Chen and Yali Feng present empirical evidence of retrieval performance improvements, reporting that a custom AI bot was able to retrieve 67% more articles than a human librarian [5]. Reported benefits for cataloging, however, are largely prospective or theoretical. Where cataloging has been empirically assessed, such as in Peekhaus that found poor AI performance in subject cataloging tasks [8], the results suggest caution is needed. This difference is likely to be a consequence of the fact that cataloging work is highly structured and standards-based (e.g. MARC, RDA) and requires a higher degree of precision than exploratory search tasks, thus presenting a more challenging problem for current AI systems.

Pierce provides a critical perspective on the mostly optimistic literature, arguing that the generation of plausible but incorrect outputs by ChatGPT represents a “qualitatively different type of misinformation” that is difficult to detect even by subject experts [14]. The problem of hallucinations has been discussed in several sources [6, 8, 19], and Kamińska identifies it as a direct threat to SDG 16 *Peace, justice and strong institutions* [6]. This tension between the computational logic of AI and the humanistic values of the library is particularly relevant in the ambiguous accountability for AI errors, as noted by Miao et al. [9].

In robust institutions, the trend towards strategic and pedagogical work is expressed in positive terms, with librarians identified as “proactive knowledge facilitators” [1] or “ethical stewards” [6]. However, in under-resourced settings, this transformation is perceived with trepidation. Chinese librarians feel “overwhelmed” with role changes without adequate training [9] and South African libraries do not have clear strategies for AI adoption [11]. Ogbo-Gebhardt et al. describe a sectoral pattern in which academic libraries focus on staff training, while public libraries focus on patron-facing programming [23]. These results indicate that the library’s primary mission orientation affects the perception and handling of AI-based role changes.

Although many sources point to the transformative potential of AI, empirical data show low levels of actual adoption. In Poland, 46% of academic libraries actively used generative AI tools while 43% indicated no perceived need [13]. In Croatia, the integration of AI into library services has so far been only moderate [15]. In South Africa, AI was not widely adopted mainly due to lack of clear implementation strategies [11]. In North America, the percentage of libraries that employ AI in their operations increased from 8% in 2019 to 35% in 2025, a notable growth but still indicating that almost two-thirds of libraries are not actively using AI [8]. There are a number of barriers, including financial, organizational, ethical and skills-related, that together create a cumulative effect that impedes adoption, even if the obstacles may be surmountable individually.

In summary, the application of AI is likely to improve the extent and efficiency of information retrieval in university libraries, especially in the area of chatbot-mediated reference, semantic search and personalized recommendation systems. Cataloging apps are still lagging in development and are not yet accurate enough to eliminate human supervision. The professional roles of librarians are expanding to include strategic curation, AI literacy, and ethical mediation, but this expansion is not uniformly supported across institutional and geographic boundaries. The best implementations are those that leverage a synergistic model, where AI is used to enhance rather than replace human expertise within a governance framework that addresses accuracy, privacy, bias, and transparency.

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