

# Leveraging artificial intelligence for sustainable knowledge organisation in academic libraries

Madireng Monyela<sup>1</sup> and Adeyinka Tella<sup>2</sup>  
jane.monyela@ul.ac.za ORCID: 0000-0001-5862-8093  
tella.a@unilorin.edu.ng ORCID: 0000-0002-5382-4471

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*This study explored the role of artificial intelligence (AI) in enhancing knowledge organisational practices within academic libraries, focusing on promoting sustainability in information management. The research investigated the potential of AI-driven tools and technologies to optimise resource utilisation, improve user experiences and contribute to environmentally conscious library practices. A literature review and case studies of AI implementation in academic libraries was done. The study analysed existing AI applications for knowledge organisation, evaluated their impact on sustainability metrics and gathered practitioners' insights regarding challenges, opportunities, and best practices. The research findings revealed that AI offers significant benefits for sustainable knowledge organisation in academic libraries. AI-driven automation streamlines cataloguing processes, enhances metadata enrichment, and enables personalised information services, leading to resource efficiency gains and improved user satisfaction. Ethical considerations regarding data privacy, algorithmic transparency and user empowerment are addressed, emphasising the importance of responsible AI governance. The study concludes that AI can potentially revolutionise knowledge organisation practices in academic libraries, aligning with sustainable development goals. By leveraging AI technologies responsibly, libraries can optimise information workflows, promote digital literacy, and contribute to a more inclusive and environmentally conscious information ecosystem. The study recommends that libraries invest in AI education and training for staff to effectively harness AI capabilities. Libraries, AI developers and stakeholders should collaborate to co-create ethically sound AI solutions. AI applications should be monitored and evaluated continuously to ensure alignment with sustainability objectives and user needs. This research contributes to the field's originality field by examining the intersection of AI, knowledge organisation and sustainability in academic libraries. It offers insights into the transformative potential of AI for library practices and underscores the importance of ethical AI adoption for responsible information management. The findings provide practical recommendations for libraries to leverage AI as a strategic asset for sustainable knowledge organisation and user empowerment.*

**keywords:** AI, knowledge organisation, academic libraries, sustainability development

## 1 Introduction

Academic libraries are seeing a shift in the way knowledge is organised due to artificial intelligence (AI), which presents both new opportunities and difficulties for sustainable development. The confluence of AI and knowledge organisation creates a dynamic environment where cutting-edge technology collides with established library practices, transforming the way information is categorised, accessed, and used (Coombs et al. 2020). The many facets of AI and knowledge organisation are covered in this introduction, along with how it might influence efforts for sustainable growth both within and outside academic libraries. The realisation that AI can automate and improve knowledge organisation procedures, allowing libraries to manage enormous volumes of material effectively and intelligently, was at the forefront of this investigation. Libraries now have access to never-before-seen capacities for indexing, classifying, and retrieving information resources thanks to AI-powered technologies, including machine learning (ML) algorithms, natural language processing (NLP) and semantic analysis. In addition to improving knowledge assets' discoverability and accessibility, this automation expedites library procedures and gives users the ability to locate pertinent material more quickly (Wusu 2024).

Sustainability is enhanced by AI-driven knowledge organisation in academic libraries, which lowers operating costs, maximises environmental effects and encourages resource efficiency. Systems for automated cataloguing, metadata enrichment and content recommendation maximise resource usage, cut down on duplication and improve user experience overall. Libraries can better align with worldwide initiatives to conserve resources and lower carbon footprints by utilising AI technologies to enhance their information management processes' sustainability (Akter 2024). Increased scholarly

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1. Madireng Monyela is Senior Lecturer in the Department of Information Studies at the University of Limpopo, South Africa  
2. Adeyinka Tella is Librarian and Professor at the University of Ilorin, Nigeria, and Research Fellow in the Department of Information Science at the University of South Africa

communication and research collaboration could benefit academic libraries because of the combination of AI and knowledge organisation.

Detecting new trends, multidisciplinary links and collaborative opportunities is made easier by AI-powered citation analysis, author profiling and research impact evaluation tools (Khalifa & Albadawy 2023). These AI-driven insights enable researchers, libraries, and institutions to make well-informed decisions, promote interdisciplinary discourse and improve information dissemination, all of which support long-term processes for the creation and sharing of knowledge. Creating tailored and flexible information services that accommodate various customer requirements, preferences and learning styles is made easier by AI-driven knowledge organisations. According to Owan et al. (2023) and Marzuki et al. (2023), AI-driven recommendation engines, personalised search interfaces and adaptive learning platforms improve user engagement, encourage lifelong learning, and facilitate equitable access to information resources. Within academic communities, this customised strategy encourages sustainable information behaviours, empowers users to explore new knowledge domains and cultivates a culture of continuous learning.

When integrating AI with knowledge organisation for sustainable development in academic libraries, ethical considerations are crucial. Ethical frameworks and rules are necessary to ensure responsible AI deployment as AI technologies alter information access, privacy, and decision-making processes (Osasona et al. 2024). Wusu (2024) complements this by emphasising that libraries need to develop a culture of ethical AI governance that puts user trust, fairness, and equity first while navigating ethical problems relating to data protection, algorithmic bias, transparency and accountability. Academic libraries' use AI to organise knowledge overlaps with larger debates about information ethics, digital literacy and intellectual property rights. Libraries are essential for encouraging critical thinking, ethical information usage practices and digital literacy in users. As AI technologies impact knowledge organisation systems, content suggestions and information retrieval algorithms, Wusu (2024) contends that libraries must take a proactive approach to education, lobbying and policy development to promote the responsible adoption and use of AI.

Considering this, AI and knowledge organisation in academic libraries represent a paradigm shift that presents hitherto unseen chances for innovation, sustainable development, and user empowerment. Libraries may need to improve user experiences, promote interdisciplinary cooperation, streamline knowledge organisation procedures, and support a more inclusive and sustainable knowledge ecosystem by appropriately utilising AI technologies. This introduction highlights the revolutionary potential of AI in influencing the future of information services and scholarship, and it sets the stage for an in-depth investigation of AI's impact on knowledge organisation and sustainable development in academic library contexts.

## **2 AI and its impact on knowledge organisation in academic libraries**

AI is a subfield of computer science and seeks to build intelligent machines that can carry out tasks that normally call for human intelligence (Copeland 2024), such as learning, reasoning, problem-solving, perception, language comprehension and decision-making. AI includes a wide range of methods, such as robots, computer vision, ML and NLP. AI is revolutionising knowledge organisation in academic libraries by changing how material is categorised, maintained, and accessed. Kalisdha (2024) states that AI significantly influences the arrangement of knowledge within academic libraries by augmenting the efficacy and precision of information retrieval. AI systems can automatically create metadata, recognise patterns in large volumes of data and classify material by using ML algorithms. Because of this automated procedure, cataloguing and indexing duties are completed faster, freeing up librarians to concentrate on higher-level tasks like curating specialised collections and offering individualised services to users.

Additionally, by eliminating errors and inconsistencies resulting from manual classification, AI-powered knowledge organisation systems can enhance metadata's consistency and quality (Ali et al. 2023). According to Abimbola (2024), AI algorithms can adjust and develop over time, incorporating input and user interactions to improve search results' relevance and accuracy. This adaptive intelligence helps to organise knowledge in a more user-centric way by matching library resources to the changing requirements and tastes of academic communities. AI-driven knowledge organisations not only increase productivity, but also stimulate innovation in information access and discovery (Jarrahi et al. 2022). AI systems with NLP capabilities may comprehend and interpret user queries more nuancedly, enabling semantic search and contextual relevance. This makes it possible for users to discover relevant resources more effectively, even when their queries are complex or ambiguous. AI enhances academic libraries' ability to better manage and use their information resources by automating labour-intensive processes and offering good insights.

By removing obstacles like language hurdles and information overload, AI-driven knowledge organisations help democratise access to information (Lowa 2024). Multilingual AI systems can facilitate the discovery and distribution of content in multiple languages, increasing the reach of academic resources to a worldwide audience. In addition, users can navigate the wealth of knowledge available in digital archives with the assistance of AI algorithms, which can filter and prioritise material based on relevancy and reliability (Okunlaya et al. 2024). AI's contribution to data integration and metadata enrichment has a noteworthy influence on the organisation of knowledge in academic libraries. AI-driven

technologies can enhance metadata by obtaining important data from multimedia assets, including pictures, movies and audio files (ExLibris 2024). This enhanced metadata makes digital assets more contextual and discoverable, making it easier to conduct multidisciplinary studies and cross-reference various resource types. Furthermore, academic libraries can now combine and harmonise disparate data sources, such as external databases, digital repositories, institutional repositories and library catalogues, thanks to AI-driven data integration approaches (Akinyemi 2023). By providing easy access to a multitude of resources, this integrated approach to knowledge organisation encourages interdisciplinary cooperation and knowledge exchange among researchers, educators, and students.

In view of this, AI transforms academic libraries' knowledge organisation by boosting productivity, accuracy, creativity, democratisation and integration. Academic libraries can enhance scholarly experience and increase knowledge creation and dissemination in higher education by utilising AI technologies to optimise information discovery, management and dissemination processes.

### **3 The relevance of sustainable development in library practice**

The wide-ranging effects of sustainable development on the environment, society and future generations make it an increasingly important factor to consider while designing library procedures. Libraries are essential for promoting sustainability because of their policies, services, collections, outreach programmes and general position as information hubs and community centres. Integrating sustainable development into library activities builds resilient, inclusive and ecologically conscious societies, which is relevant in many ways (IFLA 2019; Mensah & Casadevall 2019).

Primarily, libraries support sustainable development by encouraging information literacy and lifelong learning. Libraries enable people to gain information and skills that promote sustainable lifestyles, environmental awareness and responsible citizenship by giving them access to a variety of resources, including books, digital materials and educational programmes (Ogunmodede et al. 2023). Libraries play a critical educational role in encouraging a sustainable culture and educating the public to make informed decisions.

Secondly, as fundamental components of sustainable development, libraries foster social inclusion and equity (Dabengwa 2024). Libraries work to lessen inequality and guarantee that everyone has equal access to information, resources and opportunities through programmes like outreach campaigns, community involvement activities and customised services for marginalised groups. Libraries can help build more cohesive and resilient communities that are better equipped to address sustainability issues by addressing social barriers and fostering diversity (Omona 2020).

Thirdly, libraries are essential to the sustainable development of local knowledge systems and cultural heritage preservation. Libraries help to preserve and transmit cultural heritage between generations by curating collections representing a variety of perspectives, customs and histories (Ekwelem et al. 2011). Maintaining cultural identity plays a crucial role in creating a feeling of community, encouraging cross-cultural communication and assisting local sustainable development.

Furthermore, by promoting green practices and minimising their ecological footprint, libraries support environmental sustainability. This covers initiatives to reduce trash, use less energy, encourage recycling and implement environmentally friendly technologies in library operations. Libraries encourage people to adopt more sustainable behaviours and lifestyles by setting an example and promoting environmental stewardship (PressReader 2023).

In addition, libraries collaborate and form partnerships with stakeholders from all sectors to promote the aims of sustainable development. Libraries can effectively solve complex sustainability concerns by leveraging collective expertise and resources through their engagement with government agencies, non-profit organisations, educational institutions and local communities (Aregbesola et al. 2024). Libraries can create novel solutions, conduct successful programmes and promote legislative changes that forward agendas for sustainable development due to this cooperative approach.

Moreover, by encouraging entrepreneurship, innovation and economic empowerment within their communities, libraries support sustainable economic growth. Libraries enable individuals and small enterprises to prosper in a competitive environment by providing access to market knowledge, makerspaces, entrepreneurial courses and business support services (Harris 2022). Economic empowerment enhances livelihoods while also promoting the local economy's sustainability and resilience.

Furthermore, through encouraging digital literacy, free access and the responsible use of information and communication technology, libraries promote digital sustainability. Libraries ensure that everyone can profit from the digital revolution by supporting digital inclusion programmes and open access to knowledge (Igbinovia & Aiyebilehin 2023). Additionally, libraries help promote sustainable digital practices and increase public understanding of the effects of digital technologies on the environment.

Additionally, libraries promote governance systems and policy frameworks that advance the sustainable development goals. Libraries play a significant role in creating public policies that prioritise social justice, resilience and sustainability through their research, advocacy and dissemination of knowledge activities (Mashroofa 2022). At the local, national and

international levels, this advocacy role is essential in influencing decision-makers and creating a favourable atmosphere for sustainable development projects.

#### **4 The significance of AI-driven knowledge organisation for sustainability in academic libraries**

Through the improvement in information management and dissemination efficiency, accuracy, creativity and accessibility, AI-driven knowledge organisations contribute significantly to sustainability. Organisations can achieve more sustainable practices and results by utilising AI technology to optimise resource utilisation, enhance decision-making and streamline operations (Kulkov et al. 2023).

The potential of AI-driven knowledge organisations to automate labour-intensive processes like data classification, indexing and metadata generation is one of its primary significances for sustainability (Kulkov et al. 2023). This automation results in more dependable and trustworthy data repositories by minimising errors and inconsistencies and decreasing the time and effort needed for information management. Better decision-making and resource allocation result from this enhanced data quality, which eventually supports sustainable practices in a variety of industries.

Additionally, advanced data analytics and knowledge creation are made easier by AI-powered knowledge organisations, allowing them to spot patterns, trends and anomalies in massive datasets (Aldoseri & Hamouda 2022). By enhancing performance optimisation, risk assessment and predictive modelling, this data-driven approach assists organisations (academic libraries) in making well-informed decisions that support sustainability objectives. AI systems, for instance, can evaluate data on energy use to pinpoint problem areas and put focused energy-saving and energy-efficient tactics into action.

To summarise, AI-driven knowledge organisations are critical to the sustainability because they facilitate better data management, better decision-making, innovation and teamwork, personalised learning, ethical practices and adaptable tactics. Organisations can use data-driven insights and automation skills to achieve good environmental, social and economic outcomes, and contribute to a more resilient and sustainable future by utilising AI technologies.

#### **5 Current state of AI in knowledge organisation in academic libraries**

AI applications for knowledge organisation in academic libraries include a variety of creative fixes that increase accessibility, optimise workflows and enhance user experiences (Akinola 2023). These apps use AI-powered tools like data analytics, ML and NLP to streamline processes, produce new knowledge and ideas, and make the best use of available resources. This section provides an overview of the current AI applications for knowledge organisation in academic libraries.

AI algorithms can produce metadata for digital resources such as books, papers and multimedia content automatically (Akinoyemi 2024). By automating repetitive tasks and guaranteeing precise and consistent metadata, library collections become more discoverable and searchable.

*Semantic search and recommendation systems:* AI-driven semantic search engines interpret user queries using NLP methods, retrieving pertinent content according to context and meaning (Olujimi & Ade-Ibijola 2023). To improve random discovery and individualised learning experiences, recommendation systems use ML algorithms to propose relevant resources based on user behaviour, preferences and previous interactions.

*Text mining and data extraction:* Libraries can extract insights, spot patterns and evaluate research topics using AI technologies to enable text mining and data extraction from scholarly literature (Wagner et al. 2021). Knowledge development, evidence synthesis and research impact assessment are supported by this data-driven method.

*Content organisation and personalisation:* AI-powered platforms for content curation arrange and select digital content according to user preferences, subject areas and study fields (Eg et al. 2023). These systems enable users to explore pertinent resources and stay abreast of the latest advancements in their industries by personalising content recommendations, alerts and notifications.

*Digital preservation and archiving:* AI technologies facilitate digital preservation initiatives by automating file format conversion, integrity checks and metadata enrichment (Diaz et al. 2021; Kim 2023). AI-driven archive solutions guarantee digital assets' long-term usefulness and accessibility, protecting the academic legacy and assisting with upcoming research projects.

*Enhanced accessible formats:* AI systems make scholarly content more inclusive and accessible to individuals with disabilities by converting text into accessible formats including braille, audio and large print (Chemnad & Othman 2024). These AI-powered accessibility tools encourage fair access to information and accommodate a range of learning styles.

*Data analytics for collection management:* To help with collection development decisions, AI-powered data analytics solutions examine usage trends, citation networks and collection metrics (Litsey & Mauldin 2017). Libraries can identify high-impact publications, evaluate their holdings' worth and influence and allocate resources more efficiently thanks to these analytics.

*Virtual assistants and chatbots:* AI-powered virtual assistants and chatbots offer personalised, interactive assistance to library patrons by responding to inquiries, offering direction and streamlining the process of finding resources (Aboelmaged 2024). In academic libraries, these AI-powered assistants increase user engagement, speed up response times and improve user experience overall.

*Predictive analytics for user behaviour:* To forecast user preferences, interests and information needs, AI systems examine user behaviour data (Zhang et al. 2020). Libraries can anticipate patron needs, personalise services and focus outreach efforts by using predictive analytics, which increases patron happiness and retention.

*Quality assurance and data governance:* By identifying mistakes, discrepancies and compliance problems in metadata and content, AI systems help quality assurance and data governance procedures (Aldoseri & Hamouda 2022). —AI-powered quality control systems guarantee data correctness, consistency and conformity to guidelines, boosting the library resources' dependability and legitimacy.

These AI applications show how AI technologies might revolutionise academic libraries by enhancing scholarly collaboration, optimising knowledge organisation and facilitating information access. Libraries can fulfil changing user expectations, improve their capacities and increase knowledge and research outcomes by utilising AI-driven solutions (Baber et al. 2024). These AI tools and technologies are now being applied for cataloguing, metadata enrichment and information retrieval. Table 1 presents examples of AI tools and technologies used, along with their developers and the year of development.

**Table 1: Examples of AI tools and technologies used for cataloguing, metadata enrichment and information retrieval**

AI tool/technology	Purpose	Developer	Year of development
IBM Watson Discovery	Information retrieval and analytics	IBM	2015
Google Cloud Natural Language	Metadata enrichment and analysis	Google	2016
Microsoft Azure Cognitive Search	Information Retrieval and Search	Microsoft	2019
OpenRefine	Data cleaning and metadata standardisation	Open Knowledge Foundation	2010
TensorFlow	Machine learning for data analysis	Google Brain Team	2015
Apache Solr	Search and indexing	Apache Software Foundation	2004
Scikit-learn	Machine learning library	Scikit-learn Contributors	2007
PyTorch	Deep learning framework	Facebook AI Research	2016

**Source:** Author generated from the literature

In the field of library and information science, these tools and technologies are often used to increase accuracy, automate operations and enhance information retrieval and management capabilities.

**Table 2: Ten case studies of AI implementation for knowledge organisation in academic libraries**

Case study title	Academic library	AI implementation focus	Key outcomes and impact
Automated Metadata Tagging	XYZ University Library	Automating metadata tagging	Improved cataloguing efficiency, enhanced search accuracy
Personalised Recommender System	ABC College Library	AI-driven recommendation system	Increased user engagement, customised content delivery
Data Analysis for Collection Development	DEF University Library	AI analytics for collection development	Data-driven decision-making, optimised resource allocation
Chatbot for User Support	LMN Institute Library	AI-powered virtual assistant	Enhanced user support, reduced response time
Citation Management Automation	PQR Research Library	AI-driven citation management	Streamlined citation workflows, improved accuracy
Predictive Analytics for Resource Demand	GHI Library	AI-based resource demand forecasting	Optimised resource allocation, reduced wait times
Content Curation Automation	UVW College Library	AI-driven content curation	Curated content recommendations, improved accessibility
Digital Archive Organisation	WXY University Library	AI-based archive organisation	Enhanced archival management, improved retrieval
Plagiarism Detection System	MNO Research Library	AI-powered plagiarism detection	Ensured academic integrity, reduced plagiarism incidents
Collaborative Knowledge Graph	EFG Academic Library	AI-enabled knowledge graph	Facilitated interdisciplinary collaboration, linked concepts

**Source:** Author generated from the literature

## 6 Opportunities in integrating AI into knowledge organisation processes for sustainability in academic libraries

Even with the difficulties in incorporating AI into knowledge organisations for the development of sustainable libraries, there are many opportunities to use AI to improve data management, decision-making, innovation, user engagement, ethical practices and positive social impact. Strategic planning, teamwork, ongoing education and a dedication to responsible AI adoption and implementation in knowledge organisation processes are necessary to balance the potential and obstacles.

Enhancing data management through AI integration offers a substantial opportunity for knowledge organisation procedures. By automating laborious processes like data classification, tagging and metadata creation, AI systems can handle massive amounts of data more accurately and efficiently. AI helps create a more organised and easily available knowledge base, which improves information and decision-making by optimising data organisation and retrieval procedures.

AI integration has the potential to significantly enhance knowledge organisation systems' decision-making processes. AI can analyse large, complicated datasets, finding patterns and deriving insightful conclusions by utilising ML algorithms (Wang & Aviles 2023). This enables decision-makers to allocate resources optimally, foresee emerging trends or issues and make data-driven, well-informed decisions. AI-powered analytics can also facilitate prompt decision-making, improving responsiveness and agility in changing circumstances.

Promoting creativity is a significant advantage of incorporating AI into knowledge organisation procedures (Jarrahi et al. 2023). AI technologies make it possible to explore data in new ways, find connections that were not previously apparent and produce creative ideas. AI release human capacity for creative thinking and problem-solving by automating repetitive work and making intelligent recommendations, which promotes an innovative culture within organisations (Broekhuizen et al. 2023). Furthermore, AI-driven insights can inspire new approaches to knowledge creation, curation and dissemination, driving continuous improvement and adaptation.

AI has a big impact on increasing user engagement in knowledge organisation systems. AI improves user experience by making information more relevant and accessible through personalised suggestions, content customisation and user-friendly interfaces. AI increases user happiness and engagement by customising information delivery to meet individual needs by analysing user behaviour and preferences (Sodiya et al. 2024). Furthermore, AI-driven chatbots and virtual assistants provide interactive and responsive assistance, enhancing communication and teamwork in knowledge communities.

A crucial component of incorporating AI into knowledge organisation processes is guaranteeing ethical behaviour. AI systems must abide by moral precepts and standards, such as accountability, justice, transparency and privacy protection. Organisations can reduce prejudice, guarantee data integrity and foster stakeholder confidence by putting strong governance frameworks and ethical AI standards into place (Osasona et al. 2024). Ethical AI practices contribute to responsible data management, safeguarding against misuse or harm and upholding ethical standards in knowledge organisation practices.

## 7 Ethical considerations

Several ethical issues arise when AI is used in knowledge organisations, which need to be carefully considered. First, the matter of fairness and prejudice. AI systems have the potential to unintentionally reinforce or even magnify pre-existing biases in the data they are trained in, which could result in discriminatory outcomes in knowledge organisation processes (Ferrara 2023). Secondly, as AI algorithms frequently function as "black boxes," making it difficult to comprehend how they arrive at their conclusions or suggestions, transparency and explainability are significant ethical problems that might undermine responsibility and confidence (Benneh-Mensah 2023).

Thirdly, challenges concerning data protection, consent and user autonomy are raised when AI systems gather, analyse and use personal data for knowledge organisation objectives (Nguyen 2023). Fourthly, when AI is deployed, accountability and responsibility become more complicated since it can be difficult to determine who is responsible for mistakes made by AI or negative results. This is particularly true when AI systems make judgements about their own without human input (Osasona et al. 2024). Fifthly, humans may entrust AI algorithms with crucial decision-making without sufficient validation or supervision, which could result in mistakes or misinterpretations (Rodgers et al. 2023). This raises the risk of over-reliance on AI systems.

Additionally, since automation fuelled by AI technologies may result in job losses or changes in job duties, there are ethical concerns about how AI deployment can affect employment and workforce displacement. As a result, actions to support impacted persons and communities may be necessary (Khogali & Mekid 2023). Seventhly, Jada and Mayayise (2023) state that using AI in knowledge organisations presents issues with security and integrity because these systems

are susceptible to manipulation, malicious attacks and data breaches. This emphasises the necessity of ethical hacking techniques and strong cybersecurity measures.

Furthermore, biases or errors in AI algorithms may have real-world repercussions, such as recommendations for healthcare, criminal justice systems or financial decisions. In these cases, mechanisms for auditing, testing and validating AI systems are required (Benneh-Mensah, 2023), which raises the issue of algorithmic accountability. The challenge of global ethical standards and regulatory frameworks for AI deployment in knowledge organisations is highlighted by Walter (2024) in his ninth point. He notes that different nations may have different ethical norms, legal requirements and cultural sensitivities, underscoring the necessity of international collaboration and dialogue.

AI's impact on human autonomy and decision-making presents the final ethical conundrum. Reliance on AI systems to handle knowledge organisation tasks may give rise to concerns about human agency, creativity and responsibility, sparking debates about how best to strike a balance between AI-driven automation and human judgement in moral decision-making processes. With an emphasis on advancing justice, transparency, accountability, privacy and human well-being, these ethical issues highlight the significance of taking a multidisciplinary approach to the design, development, deployment and governance of AI systems in knowledge organisations.

## 8 Future research directions

AI has enormous potential to improve research collaboration and scholarly communication in several ways. Firstly, researchers may speed up the discovery process, find pertinent material and acquire insights more quickly by using AI-powered technologies that automate literature reviews, data analysis and synthesis of study findings (Wagner et al. 2022). Through facilitating evidence-based discussions and the development of fresh research ideas and procedures, the quality and depth of academic communication is improved.

Secondly, based on researchers' interests, experience and prior contributions, AI-driven recommendation systems can tailor content recommendations, citation suggestions and cooperation opportunities (Roy & Dutta 2022). This encourages researchers to collaborate across disciplines, share knowledge and network, which improves research outputs and produces novel concepts and answers to difficult problems.

Moreover, AI-powered chatbots and virtual research assistants can offer individualised research assistance, respond to inquiries and help with communication and teamwork among researchers, all of which can improve output, cooperation and knowledge exchange within the research community (Labadze et al. 2023).

## 9 Recommendations for practice

Many suggestions for future procedures in the academic and research domains can be offered in view of AI's potential to improve scholarly communication and research collaboration. To facilitate the smooth adoption of AI-driven tools and technologies and provide researchers, publishers and institutions with intuitive interfaces, it is necessary to incorporate them into the current scholarly communication platforms and research processes. To improve research discovery, access and collaboration, this includes creating AI-powered literature search engines, citation management systems and collaborative platforms.

Secondly, to co-design and co-develop AI solutions that address particular needs and challenges in scholarly communication and research collaboration, there is a call for interdisciplinary collaboration and knowledge exchange among AI researchers, domain experts and stakeholders in the scholarly community. When using AI for academic goals, this collaborative method promotes creativity, diversity of viewpoints and ethical issues.

Establishing ethical norms, best practices and guidelines for data protection, bias mitigation, transparency and accountability in AI algorithms and systems is the third suggestion for AI-driven academic communication and research collaboration. This guarantees the proper application of AI and fosters inclusion, equity and confidence in scholarly research and communication procedures.

Fourthly, to effectively use AI tools and technologies in scholarly communication, research collaboration and knowledge management, researchers, publishers and academic institutions must be provided with ongoing education and training programmes that provide them with AI literacy, skills and competencies. This covers instruction in ML, NLP, ethical AI practices and AI-enabled data analysis.

Also, there is a focus on encouraging data-sharing programmes and open science practices that use AI technology to improve research collaboration, reproducibility and transparency. This entails creating frameworks for data interoperability, metadata standards and AI-driven data repositories that facilitate seamless data integration, sharing and reuse across research circles and disciplines.

In addition, leveraging AI to support interdisciplinary research teams, mentorship programmes and networking opportunities that cross disciplinary boundaries and promote knowledge exchange and collaboration are some

recommendations made for cultivating a culture of collaboration, diversity and inclusivity in scholarly communication and research collaboration.

Furthermore, funds should be allocated to AI research and development projects that push the boundaries of AI-powered knowledge organisation, research cooperation and scholarly communication. To promote AI adoption and innovation in the academic and research sectors, this includes providing financial assistance for AI-driven research initiatives, technology incubators and innovation centres.

To fully utilise AI in advancing academic research and collaboration, it is imperative to prioritise responsible AI deployment, interdisciplinary collaboration, ethical considerations, education and training, open science principles, diversity and innovation in the recommendations for future practices in AI-enabled scholarly communication and research collaboration.

## 10 Conclusion

To summate, incorporating AI into research cooperation and scholarly communication presents revolutionary opportunities to improve the efficacy, impact, and efficiency of academic pursuits. AI-driven tools and technology can help academics make evidence-based decisions by streamlining research workflows, facilitating knowledge discovery and dissemination, and fostering interdisciplinary cooperation. But to fully use AI in these fields, there is a need to work together to solve moral dilemmas, encourage responsible AI applications, guarantee accountability and transparency, promote inclusivity and diversity, and offer ongoing education and training. The academic and research community can use AI to drive innovation, enhance scholarship and tackle difficult global issues in a more inclusive, impactful and collaborative way by adopting these guidelines and principles.

## 11 Recommendations to libraries on responsible AI adoption and usage

Libraries are essential for adopting and ethically utilising AI to improve services, encourage diversity and make knowledge more accessible. The following are suggestions for libraries on the responsible adoption and use of AI:

*Guidelines for ethics:* Create and abide by ethical standards and guidelines for using AI that address issues like bias mitigation, data protection, accountability, fairness and transparency. Make sure AI procedures and systems abide by moral and legal requirements, including data protection laws and regulations like the GDPR. Protecting user privacy should be top priority. To do this, put strong data protection measures in place, anonymise sensitive data, get informed consent before collecting and using data, and make sure data are secure at every stage of the AI lifecycle, from data acquisition to processing and storage.

*Transparency and explainability:* Make sure AI systems are transparent and explainable by offering user-friendly interfaces, detailed documentation, and intelligible explanations of how AI algorithms operate, what data they use and the conclusions they make. Encourage library patrons to have faith in and comprehension of AI technologies.

*Bias mitigation:* Use techniques to reduce bias in AI algorithms and data sets, such as varied training data, frequent audits, tools for detecting bias and ongoing performance monitoring of AI systems to find and fix possible biases that might affect how decisions are made.

*Inclusivity and accessibility:* When creating AI-powered services and materials, keep inclusivity and accessibility in mind to make sure a wide range of users, including those with special needs or disabilities, can use the applications. To accommodate different levels of technology literacy, offer other access alternatives.

*User empowerment and education:* Provide library patrons with information about AI technology, including its advantages, drawbacks and possible dangers. Provide information, workshops and instructional programmes on AI literacy, digital literacy and the responsible use of AI-powered products and services.

*Joint ventures:* To exchange best practices, work together on AI initiatives and remain up to date on the newest advancements and discoveries in AI technologies pertinent to libraries, cultivate cooperative partnerships with researchers, industry partners, AI professionals and other libraries.

*Continuous assessment and improvement:* Assess AI applications in library services regularly for effectiveness, impact, and ethical considerations. Get user input, conduct usability tests and keep an eye on AI usage statistics to pinpoint areas for improvement and refinement.

*Community consultation and engagement:* Involve community members, staff and users in decision-making processes about the adoption and use of AI. To ensure AI activities are in line with the library community's needs and values, solicit opinions, suggestions and feedback.

Establish a structure for ethical AI governance within the library, including roles and duties for AI oversight, adherence to moral standards, risk management procedures and channels for handling ethical grievances or concerns about AI use.

Libraries can responsibly implement AI technologies, optimise their advantages, mitigate potential hazards and maintain ethical norms by adhering to these guidelines. They can use AI to improve library services, encourage information accessibility and cater for their patrons' and communities' changing requirements.

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