

Factors Influencing Researchers' Adoption of AI-Powered Digital Library Services for Sustainable Academic Research Productivity: A Conceptual Review

Hussin Ali Daqal^{1*}, Mad Khir Johari Abdullah Sani¹, Ahmad Nadzri Mohamad¹, Anas Hashim Alahdal

¹Faculty of Information Science, Universiti Teknologi MARA (UiTM), Shah Alam, Selangor, Malaysia

Daqalhussin@gmail.com

madkhirjohari@uitm.edu.my

madkhirjohari@uitm.edu.my

Nadzri590@uitm.edu.my

Alahdalanas@gmail.com

Corresponding Author: Hussin Ali Daqal^{1*} (Email: Daqalhussin@gmail.com)

Abstract: Academic digital libraries are no longer limited to databases, catalogues and electronic collections. In many universities, they now include intelligent search, recommendation tools, chatbots, analytics, mobile access, repositories and preservation systems. These services can help researchers find literature more quickly, manage information more confidently and make institutional research outputs more visible. Yet researchers do not adopt such services simply because a university has introduced them. Their use depends on whether the services are useful, easy to access, trustworthy, well supported and clearly connected to research work. This conceptual review examines the factors that influence researchers' adoption of AI-powered digital library services and considers how such adoption may support sustainable academic research productivity. The paper draws only on a delimited set of studies on smart digital libraries, artificial intelligence in academic libraries, electronic resources, user satisfaction, digital preservation, mobile libraries, institutional support and scholarly communication. The synthesis identifies five central adoption factors: AI service quality and personalization; ease of use, accessibility and mobile access; AI readiness and information literacy; institutional support, infrastructure and policy; and trust, privacy, ethics and transparency. It also explains five productivity pathways: access, discovery, workflow, collaboration and visibility. The paper argues that AI-powered digital libraries should be treated as research infrastructure rather than as isolated technical projects. Their value depends on the combined strength of technology, librarians' expertise, user skills, ethical governance and long-term institutional commitment.

Keywords: AI-powered digital libraries; academic research productivity; researchers' adoption; smart libraries; digital transformation; user satisfaction; information literacy

1. Introduction

Digital libraries have become a routine part of academic work. Researchers use them to search for articles, download books, consult databases, check citations, locate datasets and deposit their own outputs. Over time, these platforms have moved beyond basic access and storage. Current discussions now include intelligent search, automated guidance, recommender systems, big data analytics, mobile access, digital preservation, integrated research information systems and, in some cases, immersive and Internet of Things based services. These changes have widened the role of the academic library from a provider of resources to an active participant in the research process (Okunlaya et al., 2022; Islam et al., 2025; Shahzad et al., 2024; Otroshchenko et al., 2026).



This development is important because research productivity is closely linked to the way scholars obtain, evaluate, organize and communicate information. Studies on electronic resources and digital libraries show that access to scholarly materials can support publication work, literature reviews, citation practices and research preparation (Ani et al., 2015; Agrawal, 2025; Bhat, 2024; Godwin & Chika, 2026). However, access alone is not enough. A library may subscribe to many databases, but researchers may still avoid them if the interface is confusing, the search results are weak, the authentication process is difficult or the service does not fit their daily workflow.

The same issue appears with AI-powered digital library services. These services promise faster discovery, better recommendations, personalized support and more efficient research management. At the same time, their actual use depends on practical and human factors such as ease of use, information literacy, trust, privacy, staff support and institutional readiness. Researchers often compare library systems with tools such as Google Scholar, which they may see as simpler and faster even when university digital libraries provide richer collections (Alotaibi et al., 2023). For this reason, the adoption of AI-powered digital library services needs to be examined as a socio-technical issue rather than as a purely technological matter.

The purpose of this paper is to organize the recent literature into a clear conceptual account of how researchers adopt AI-powered digital library services and how such adoption may contribute to sustainable academic research productivity. The focus is on academic and university library contexts, where digital library services are directly connected to scholarly communication, research output, institutional repositories and researcher support.

2. Objectives of the Article

To identify the main technological, user-related, institutional and ethical factors that influence researchers' adoption of AI-powered digital library services.

To explain how the adoption of AI-powered digital library services may support sustainable academic research productivity.

To propose a conceptual framework that can guide future empirical research and practical implementation in academic libraries.

3. Methodological Approach

The paper uses an integrative conceptual review approach. This approach is suitable because the literature on AI-powered and smart digital libraries is broad and methodologically varied. The available studies include empirical surveys, systematic reviews, scoping reviews, bibliometric analyses, conceptual papers, case studies and technology adoption studies. A meta-analysis would not be appropriate because the studies do not use the same measures or report comparable effect sizes. Instead, the review brings together the main ideas and findings in order to develop an adoption-productivity framework.

The review was intentionally delimited to the sources listed in the reference section. These studies cover academic digital libraries, artificial intelligence, recommender systems, chatbots, big data, mobile digital libraries, digital preservation, accessibility, user satisfaction, information literacy, institutional support and scholarly communication. No additional sources were added beyond this body of literature.

The analysis proceeded in three steps. First, studies on smart and AI-enabled services were examined to identify the main technological features of AI-powered digital libraries. Second, studies on user satisfaction, perceived usefulness, ease of use, mobile access, information literacy and accessibility were used to identify adoption factors. Third, studies on electronic resources, research output, repositories, digital curation and research information systems were reviewed to explain possible links with academic research productivity. The findings were then organized into themes, tables and a conceptual framework.

4. Conceptualizing AI-Powered Digital Library Services

In this article, AI-powered digital library services are understood as academic library services that use artificial intelligence or related data-driven technologies to improve access, discovery, guidance, personalization, preservation and research support. They include AI-based search engines, recommender systems, chatbots, automated metadata support, analytics dashboards, mobile interfaces, digital preservation tools and integrated research information systems (Okunlaya et al., 2022; Adeyemi et al., 2025; Islam et al., 2025; Sousa, 2025).

Compared with traditional digital library services, AI-powered services are more proactive. They can suggest materials, answer routine questions, analyze usage patterns and connect users with content that may not appear through ordinary keyword searching. They are also more dependent on data quality, interoperability and responsible governance. If metadata are inaccurate, systems are fragmented or recommendations are unclear, the usefulness of AI services becomes limited (Khan & Shahzad, 2024; Zareef & Jabeen, 2025).

It is also important not to view AI as a replacement for librarians. The literature points in the opposite direction. As services become more intelligent, librarians are expected to provide stronger support in AI literacy, research consultation, ethical use of data, metadata quality, digital curation and user training. In practice, AI can handle some routine interactions, but researchers still need human guidance when they are evaluating sources, designing searches, managing citations or making responsible decisions about digital tools (Fadeyi et al., 2026; Olatunbosun et al., 2025).

5. Factors Influencing Researchers' Adoption

5.1 AI Service Quality and Personalization

The first adoption factor is service quality. Researchers are more likely to use AI-powered digital library services when the systems return relevant results, make useful recommendations, provide reliable metadata and respond quickly to research needs. Personalization can also be valuable because researchers often work on specialized topics and may benefit from alerts, recommendations and search suggestions that reflect their discipline and previous information behavior (Alalaq, 2025; He & Bi, 2026; Wu, 2024; Kore & Urkudkar, 2025).

Service quality matters because researchers usually work under time pressure. If a tool requires too many steps or produces weak results, users may return to simpler tools even if those tools are less comprehensive. Studies of digital library quality and continued use show that perceived usefulness, satisfaction and overall system quality are closely connected to whether users continue using a digital library (Chopra et al., 2024; Khan et al., 2022; Azib et al., 2024; Berdibekova et al., 2025).

5.2 Ease of Use, Accessibility and Mobile Access

Ease of use remains one of the most practical adoption issues. Researchers may avoid advanced services when the interface is unclear, login is difficult, search filters are confusing or exported records do not work smoothly with citation tools. This explains why simple search experiences can sometimes attract more use than richer but more complicated library platforms (Alotaibi et al., 2023; Christie & Devi, 2025).

Accessibility broadens this issue. AI-powered services should be usable across different devices, levels of skill, languages and abilities. Mobile digital library studies show that flexible access can support users who need to work away from campus or outside office hours (Khomu et al., 2023). Research on visually impaired students and inclusive library policy further shows that digital services must support assistive technologies, alternative formats and inclusive design if they are to serve the whole academic community (Ibenne & Durodolu, 2024; Rathod, 2025; Panda & Kaur, 2023).

5.3 AI Readiness, Information Literacy and Research Skills

Researchers' skills strongly shape adoption. AI readiness includes awareness of AI-based services, confidence in using them and the ability to understand their strengths and limitations. Information literacy remains just as important. A researcher may use an AI search tool to find material quickly, but still needs to judge whether the sources are relevant, credible and methodologically suitable (Harish & Rathod, 2025; Godwin & Chika, 2026).

This point is important because faster discovery does not automatically mean better research. AI tools may help users locate more sources, but users must still evaluate quality, bias, context and evidence. Therefore, training should not only explain how to use a platform. It should also help researchers search strategically, check results critically, manage references and use AI-supported services responsibly.

5.4 Institutional Support, Infrastructure and Policy

Institutional support is another major factor. AI-powered digital libraries require stable funding, reliable internet, strong platforms, metadata management, cybersecurity, staff development and technical support. Without these conditions, even well-designed services may fail to become part of researchers' everyday work. Studies on digital transformation and slow internet in academic libraries show that infrastructure and staff capacity directly

affect service quality and productivity (Durodolu et al., 2024; Muslim, 2024; Khoeini et al., 2024; Ramakrishnan, 2025).

Policy support is also needed. Universities should clarify how AI tools are selected, how user data are protected, how repositories are preserved, how accessibility is tested and how librarians are trained. Evidence from Saudi Arabian universities points to the importance of user perceptions and implementation challenges in ICT-based library services (Metwally et al., 2025). This is especially relevant for higher education systems where national digital transformation agendas place increasing pressure on universities to improve research performance.

5.5 Trust, Privacy, Ethics and Transparency

Trust is central to adoption. Researchers may search for sensitive topics, unpublished ideas, grant plans or emerging collaborations. When AI-powered services use search histories, profiles or behavior data to personalize results, users need to know how their data are collected and protected. If privacy is unclear, adoption may weaken even when the service is technically useful.

The ethical issues are not limited to privacy. AI systems may reproduce bias, make recommendations that users cannot explain or privilege certain types of content. Studies on AI adoption in academic libraries emphasize privacy, consent, transparency, perceived usefulness and usability as key concerns (Olatunbosun et al., 2025; Fadeyi et al., 2026). For academic libraries, responsible AI governance is therefore part of service quality, not an optional addition.

5.6 Interoperability, Metadata Quality and Preservation

Researchers usually move between many systems: discovery tools, databases, repositories, research information systems, learning management systems, citation managers and analytics platforms. Adoption improves when these systems work together. If records are duplicated, metadata are weak or platforms are disconnected, users experience the library as fragmented rather than supportive (Khan & Shahzad, 2024; Otroshchenko et al., 2026).

Digital preservation is part of the same problem. Researchers are more likely to trust institutional repositories when they believe their outputs will remain discoverable, protected and reusable. Studies on digital curation and preservation show that repositories require policy, skills, standards and continuous maintenance (Jalaludin et al., 2025; Sousa, 2025; Zareef & Jabeen, 2025).

6. Evidence Synthesis

Table 1 summarizes the main adoption determinants identified in the reviewed literature. The table is not intended to present causal proof. Rather, it organizes recurring themes that appear across studies on AI services, digital library quality, user satisfaction, information literacy, accessibility, institutional support and ethical governance.

Table 1. Key determinants of researchers' adoption of AI-powered digital library services

Determinant	How it influences adoption	Representative sources
AI service quality and personalization	Improves relevance, search speed, recommendation value and the perceived usefulness of intelligent services.	Alalaq (2025); He and Bi (2026); Wu (2024); Kore and Urkudkar (2025)
Ease of use and accessibility	Reduces barriers created by complex interfaces, difficult authentication or inaccessible design.	Alotaibi et al. (2023); Christie and Devi (2025); Ibenne and Durodolu (2024); Rathod (2025)
AI readiness and information literacy	Helps researchers use intelligent tools critically and apply them to real research tasks.	Harish and Rathod (2025); Godwin and Chika (2026); Chipembele et al. (2025)
Institutional support and infrastructure	Provides the funding, connectivity, staff capacity and policy environment needed for sustainable services.	Durodolu et al. (2024); Muslim (2024); Khoeini et al. (2024); Metwally et al. (2025)

Trust, privacy and ethical governance	Strengthens confidence in personalized systems and reduces concerns about data use, bias and accountability.	Olatunbosun et al. (2025); Fadeyi et al. (2026); Khan et al. (2022)
Interoperability and metadata quality	Improves integration across discovery systems, repositories and research information platforms.	Khan and Shahzad (2024); Otroshchenko et al. (2026); Zareef and Jabeen (2025)
Preservation and visibility	Encourages use of repositories by protecting outputs and improving long-term discoverability.	Jalaludin et al. (2025); Sousa (2025); Kumar (2025)

7. Adoption and Sustainable Academic Research Productivity

The link between adoption and research productivity should be understood carefully. AI-powered digital libraries are unlikely to increase publication output by themselves. They contribute more indirectly by improving the conditions under which research is conducted. The literature points to five main pathways: access, discovery, workflow, collaboration and visibility.

7.1 Access Pathway

The access pathway is the most basic. When researchers can reach journals, e-books, databases, repositories and other scholarly materials from different locations, they have a stronger foundation for reading, reviewing and writing. Studies of electronic resources and digital libraries show that access can support research output, especially when users know how to locate and use the resources effectively (Ani et al., 2015; Agrawal, 2025; Bhat, 2024; Khan & Tyagi, 2025).

7.2 Discovery Pathway

The discovery pathway concerns how researchers find relevant material. AI search, recommender systems and semantic retrieval can reduce the time spent searching and help users identify resources outside their immediate discipline (Alalqa, 2025; He & Bi, 2026; Wu, 2024). This is valuable for interdisciplinary research, where terminology may differ across fields and ordinary keyword searching may miss important sources.

7.3 Workflow Pathway

The workflow pathway focuses on the daily process of doing research. Chatbots, online research guides, alerts, citation support and analytics can help researchers move from topic exploration to literature review and publication preparation with fewer interruptions (Owusu-Ansah & van der Walt, 2025; Islam et al., 2025). These services are most useful when they fit naturally into researchers' existing habits rather than requiring them to learn a separate and complicated system.

7.4 Collaboration Pathway

The collaboration pathway is linked to shared platforms, repositories and research information systems. Digital transformation in academic libraries can make institutional outputs, researcher profiles, datasets and publication records easier to locate. In turn, this can support collaboration and scholarly communication (Otroshchenko et al., 2026; Kumar, 2025).

7.5 Visibility and Preservation Pathway

The visibility pathway concerns long-term access to research outputs. Digital preservation and repository services help keep publications, datasets and institutional materials discoverable over time. This supports sustainable productivity because research value depends not only on producing outputs, but also on making them visible, reusable and preserved (Jalaludin et al., 2025; Sousa, 2025; Zareef & Jabeen, 2025).

Table 2. Adoption-productivity pathways in AI-powered digital library services

Pathway	How adoption may support productivity	Possible indicators
Access	Improves availability of journals, books, databases and repositories.	Database use; full-text downloads; remote access statistics
Discovery	Reduces search time and improves relevance of retrieved materials.	Search success; recommendation use; retrieval satisfaction
Workflow	Supports literature searching, citation work, alerts and research guidance.	Use of research guides; citation exports; chatbot interactions
Collaboration	Connects users with shared resources, institutional profiles and scholarly communication systems.	Repository deposits; co-authorship visibility; use of research information systems
Visibility	Preserves outputs and makes institutional research easier to discover and reuse.	Repository views; downloads; metadata completeness; preservation coverage

8. Proposed Conceptual Framework and Propositions

The synthesis leads to a framework in which researchers' adoption of AI-powered digital library services is shaped by five main groups of factors: AI service quality and personalization; ease of use, accessibility and mobile access; AI readiness and information literacy; institutional support, infrastructure and policy; and trust, privacy, ethics and transparency. Adoption then supports research productivity through access, discovery, workflow, collaboration and visibility. The relationship is also influenced by moderating conditions such as interoperability, metadata quality, funding sustainability and inclusive design.

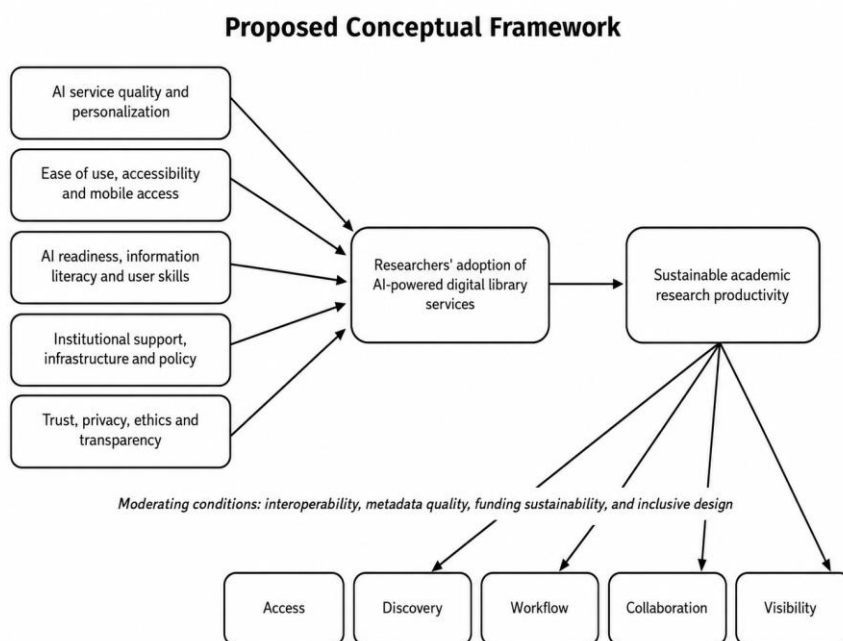


Figure 1. Conceptual framework linking AI-powered digital library adoption with sustainable academic research productivity

The framework treats adoption as continued and meaningful use, not simply first-time trial. A researcher may test an AI search tool once, but the value of the service appears only when it becomes part of a regular research

routine. For this reason, adoption should be measured through frequency of use, range of services used, continued intention, satisfaction, trust and perceived contribution to research tasks.

P1. AI service quality and personalization positively influence researchers' adoption of AI-powered digital library services.

P2. Ease of use, accessibility and mobile access positively influence researchers' adoption of AI-powered digital library services.

P3. AI readiness, information literacy and research skills positively influence researchers' adoption of AI-powered digital library services.

P4. Institutional support, infrastructure and policy positively influence researchers' adoption of AI-powered digital library services.

P5. Trust, privacy, ethics and transparency positively influence researchers' adoption of AI-powered digital library services.

P6. Researchers' adoption of AI-powered digital library services positively contributes to sustainable academic research productivity through access, discovery, workflow, collaboration and visibility pathways.

P7. Interoperability, metadata quality, funding sustainability and inclusive design strengthen the relationship between adoption and sustainable productivity.

Table 3. Suggested constructs and indicators for future empirical testing

Construct	Conceptual meaning	Example indicators
AI service quality	The extent to which AI-enabled services provide relevant, reliable and timely support.	Search relevance; recommendation accuracy; chatbot usefulness
Ease of use and accessibility	The extent to which services are simple, inclusive and available across devices.	Navigation simplicity; mobile access; assistive technology support
AI readiness and information literacy	Users' confidence and ability to use AI-supported services critically.	AI awareness; search skills; evaluation skills
Institutional support	The organizational support needed to sustain AI-powered library services.	Training; funding; policy clarity; staff support
Trust and ethical governance	Users' confidence that services are transparent, fair and privacy-protective.	Privacy confidence; consent clarity; perceived transparency
Adoption	Researchers' continued and meaningful use of AI-powered digital library services.	Frequency of use; continued intention; satisfaction; service range
Sustainable academic research productivity	The contribution of library services to ongoing research activity and visibility.	Publications; repository deposits; citation support; collaboration; visibility

9. Discussion

The review shows that AI-powered digital libraries should be understood as part of the research environment of the university. Their value does not come only from the presence of intelligent tools. It comes from the way these tools are connected to resources, people, policies and research practices. This explains why the same technology can produce different outcomes in different institutions.

For researchers, the most visible benefits are likely to be faster access, more focused discovery and better support for research routines. For librarians, the shift creates new responsibilities in AI literacy, data ethics, digital

curation, metadata quality and research consultation. For universities, the implication is that digital library development should be included in institutional research strategy rather than treated only as a library-level project.

The discussion also shows why trust and usability are as important as technical innovation. Researchers are unlikely to depend on systems that are difficult to navigate, produce unclear recommendations or fail to explain how data are used. AI-powered digital libraries therefore need transparent policies, accessible design, continuous training and regular user feedback.

The Saudi higher education context gives this topic particular relevance because universities are working within wider digital transformation and research productivity agendas. ICT-based library services in Saudi universities already show both opportunity and implementation challenges (Metwally et al., 2025). Future adoption strategies should therefore combine technology investment with user training, policy development, ethical governance and measurable research support outcomes.

10. Theoretical and Practical Implications

Theoretically, the paper links digital library adoption with sustainable academic research productivity. Earlier studies often discuss user satisfaction, electronic resources, AI readiness, digital preservation, mobile access or institutional repositories separately. The proposed framework brings these areas together and shows how adoption may contribute to research productivity through several pathways rather than through one simple direct effect.

Practically, the framework can help academic libraries plan AI-powered services more carefully. Libraries should evaluate whether their systems are useful, accessible, trusted and integrated with researchers' work. They should also provide training that helps researchers use AI-supported discovery critically. At the policy level, universities should support sustainable funding, metadata quality, privacy protection, repository integration and inclusive service design.

11. Limitations and Future Research

This paper has limitations. It is a conceptual review based on a delimited reference set, so it does not claim to cover every study published on AI-powered digital libraries. The reviewed studies also vary in method, context and quality. Many rely on perceptions such as satisfaction, usefulness or intention to use, while fewer studies directly measure publications, citations, collaboration networks or grant outcomes. For that reason, the paper avoids making strong causal claims about research productivity.

Future research should test the framework empirically. Surveys could measure AI service quality, ease of use, trust, AI readiness, institutional support, adoption and productivity as separate constructs. Structural equation modelling could examine direct and indirect effects. Interviews would also be useful because they can explain why researchers trust, ignore or avoid AI-powered services. Longitudinal studies could examine whether adoption is associated with changes in literature review quality, repository deposits, collaboration or publication output over time.

12. Conclusion

AI-powered digital library services are becoming important to academic research, but their success depends on more than technical availability. Researchers adopt these services when they are useful, easy to use, accessible, trustworthy, supported by the institution and clearly connected to research work. Adoption can support sustainable academic research productivity through better access, improved discovery, smoother workflows, stronger collaboration and greater visibility of research outputs.

The central argument of this paper is that AI-powered digital libraries should be implemented as socio-technical research infrastructure. Technology, librarians, researchers, institutional policy, ethical governance and preservation systems all need to work together. When these conditions are present, digital libraries can move from being resource platforms to becoming active partners in sustainable academic research productivity.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Acknowledgment

The authors would like to express their sincere gratitude to the Faculty of Information Science, Universiti Teknologi MARA (UiTM), for its academic support. Appreciation is also extended to colleagues and supervisors whose guidance and feedback supported the development of this manuscript.

References

1. Adeyemi, I., Muhammed-Jamiu, R., Muhammed, I. O., Mustapha, R. T., Mustapha, M., Musa, Z., & Salman, A. (2025). Big data applications and management for digital library services in selected academic libraries in Kwara state, Nigeria. *Digital Library Perspectives*, 41(2), 229-246. <https://doi.org/10.1108/dlp-06-2024-0090>
2. Adjei, S., & Plockey, F. D. (2026). Library 5.0 and immersive technologies in Ghanaian academic libraries: The role of VR and AR in transforming user experience. *Asian Journal of Information Science and Technology*, 16(1), 1-6. <https://doi.org/10.70112/ajist-2026.16.1.4363>
3. Agrawal, G. (2025). Digital libraries and research output: Transforming knowledge access and scholarly productivity in the 21st century. *Journal of Library and Information Communication Technology*, 14(2), 87-100. <https://doi.org/10.5958/2456-9399.2025.00019.7>
4. Alalqa, A. S. (2025). AI-powered search engines. *ShodhAI: Journal of Artificial Intelligence*, 2(1), 49-62.
5. Alotaibi, F. A. A., Johnson, F., & Rowley, J. (2023). Google Scholar or University Digital Libraries: A comparison of student perceptions and intention to use. *Journal of Librarianship and Information Science*, 55(4), 906-920.
6. Ani, O. E., Ngulube, P., & Onyancha, B. (2015). Perceived effect of accessibility and utilization of electronic resources on productivity of academic staff in selected Nigerian universities. *SAGE Open*, 5(4). <https://doi.org/10.1177/2158244015607582>
7. Azib, N. A., Abu, R., Rafie, S. K., & Tokiran, N. S. M. (2024). Evaluating user satisfaction with digital library services: A study of academic libraries in higher education institutions. *International Journal of Research and Innovation in Social Science*, 8(12), 4511-4517. <https://doi.org/10.47772/ijriss.2024.8120379>
8. Berdibekova, S., Normatov, S., Juraeva, D., Quدراتova, M., & Sayfieva, L. (2025). Analysis of user satisfaction of academic digital libraries: A case of Uzbekistan. *Environment Technology Resources Proceedings*, 2, 49-55. <https://doi.org/10.17770/etr2025vol2.8583>
9. Bhat, S. K. (2024). The role of digital libraries in enhancing information accessibility: A study. *International Journal for Multidisciplinary Research*, 6(6). <https://doi.org/10.36948/ijfmr.2024.v06i06.32585>
10. Chipembele, M., Ngandwe, E., Monde, M., & Ndalambe, E. (2025). Adoption of artificial intelligence in academic libraries in African universities: A scoping review. *International Journal for Sciences and Technology*, 16(3). <https://doi.org/10.71097/ijst.v16.i3.8003>
11. Chopra, G., Misra, P., & Bhaskar, P. (2024). Evaluation of digital library continuous usage: Role of digital library overall quality, perceived usefulness and user satisfaction. *International Journal of Information Systems and Change Management*, 14(1), 30-53.
12. Christie, G. A., & Devi, K. S. (2025). Effects of ease of use and usefulness on user satisfaction in academic library self-service. *Tibannandu: Jurnal Ilmu Perpustakaan dan Informasi*, 9(2), 101-113. <https://doi.org/10.30742/tb.v9i2.4494>
13. Durodolu, O., Iroaganachi, M., & Otunla, J. N. (2024). Effects of slow internet on academic library staff productivity and job satisfaction. *Berkala Ilmu Perpustakaan dan Informasi*, 20(2), 435-447. <https://doi.org/10.22146/bip.v20i2.14705>
14. Fadeyi, V. O., Bamidele, V., & Akoh, T. H. (2026). Users and library staff perception, perceived usefulness and usability of artificial intelligence integration in university digital libraries in Southwestern Nigeria. *Journal of Library Services and Technologies*, 8(1), 77-86. <https://doi.org/10.47524/jlst.v8i1.87>
15. Godwin, O., & Chika, F. B. (2026). The impact of electronic resources on academic research productivity in Nigerian universities: A systematic review of empirical evidence. *International Journal of Integrative Research*, 3(12), 891-898. <https://doi.org/10.59890/ijir.v3i12.113>
16. Harish, C. K., & Rathod, D. (2025). The role of information literacy in enhancing faculty research productivity: A case study of Mangalore University-affiliated colleges. *International Journal of Research in Library Science*, 11(2). <https://doi.org/10.26761/ijrls.11.2.2025.1869>
17. He, Y., & Bi, R. (2026). Personalized recommendation algorithms for enhancing user experience in academic digital libraries based on cross-modal and temporal modeling. *International Conference on Communication, Information and Digital Technologies*. <https://doi.org/10.1117/12.3088985>
18. Ibenne, S. K., & Durodolu, O. (2024). Exploring factors shaping library engagement and satisfaction: A study of students with visual impairment in South-Eastern Nigeria. *Journal of Access Services*, 21(3), 169-186. <https://doi.org/10.1080/15367967.2024.2356091>
19. Islam, M., Islam, M. K., Wider, W., Butdiswan, S., Ahmad, S., Chakrabarty, R., Matin, M. A., & Ahmad, N. (2025). Big data, chatbots, and data mining: Transforming academic libraries: A bibliometric analysis. *New Review of Academic Librarianship*, 32(1), 24-51. <https://doi.org/10.1080/13614533.2025.2544531>
20. Jalaludin, U. N., Rosly, N. E., Sahriman, S. H., Rosihidin, A. Z., & Kadir, M. R. A. (2025). Digital preservation in digital libraries: A systematic literature review. *International Journal of Research and Innovation in Social Science*, 9(1)4186-4199 <https://doi.org/10.47772/ijriss.2025.9010326>

21. Khan, A., Rafi, M., Zhang, Z., & Khan, A. (2022). Determining the impact of technological modernization and management capabilities on user satisfaction and trust in library services. *Global Knowledge, Memory and Communication*, 72(6/7), 593–611. <https://doi.org/10.1108/gkmc-06-2021-0095>
22. Khan, S. A., & Shahzad, K. (2024). Key features of digital library management system (DLMS) for developing digital libraries: An investigation from LIS practitioners in Pakistan. *Journal of Librarianship and Information Science*, 56(1), 29–42.
23. Khan, Z., & Tyagi, S. (2025). Study on the utilization patterns of e-resources and services by academic users in central university libraries. *International Journal for Multidisciplinary Research*, 7(2). <https://doi.org/10.36948/ijfmr.2025.v07i02.52843>
24. Khoeini, S., Noruzi, A., Naghshineh, N., & Sheikhshoaei, F. (2024). Designing the digital transformation model of public university libraries in Iran based on Delphi method. *Digital Library Perspectives*, 41(1), 45–73. <https://doi.org/10.1108/dlp-06-2024-0100>
25. Khomo, M. P., Naicker, N., Chisita, C. T., & Rajkoomar, M. (2023). Factors contributing to the successful development and use of mobile digital libraries: A systematic literature review. *Digital Library Perspectives*, 39(3), 353–370. <https://doi.org/10.1108/DLP-08-2022-0062>
26. Kore, H. P., & Urkudkar, S. H. (2025). A comparative study of AI-powered digital libraries and traditional digital libraries. *Gurukul International Multidisciplinary Research Journal*, 13(5), 20–24. <https://doi.org/10.69758/gimrj/2505i5vxiip0004>
27. Kumar, B. R. (2025). Digital libraries developed as knowledge hubs in India. *Academic Research Journal of Science and Technology*, 2(5), 1–9. <https://doi.org/10.63300/arjst0205202501>
28. Metwally, A. S. M., Alotaibi, F., Alzahrani, S., Alrubia, M. M., Alqahtani, A., & Abdelati, M. H. (2025). Examining user perceptions and challenges in the adoption of ICT-based library services within Saudi Arabian universities. *Veredas Do Direito*, 22, e3527. <https://doi.org/10.18623/rvd.v22.n3.3527>
29. Muslim, S. (2024). Assessing the impact of digital transformation on access, user experience, and knowledge management in academic libraries. *Journal of Asian Multicultural Research for Educational Study*, 5(3). <https://doi.org/10.47616/jamres.v5i3.547>
30. Okunlaya, R. O., Abdullah, N. S., & Alias, R. A. (2022). Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education. *Library Hi Tech*, 40(6), 1869–1892. <https://doi.org/10.1108/lht-07-2021-0242>
31. Olatunbosun, A., Ogunjobi, D. T., Inioluwa Esther, A., Oluwadare, O., & Olaide, A. G. (2025). A review of ethical and data privacy challenges in the adoption of artificial intelligence technologies in Nigerian academic libraries. *International Journal of Science and Research Archive*, 17(03), 285–297. <https://doi.org/10.30574/ijrsra.2025.17.3.3228>
32. Ortega-Martínez, E., Pacheco-Mendoza, J., García Meléndez, H. E., Ortiz-Díaz, E. M., & Saavedra-Alamillas, C. (2021). Digital services adapted by libraries in Mexico to COVID-19 pandemic: A critical review. *Digital Library Perspectives*, 37(1), 3–17. <https://doi.org/10.1108/dlp-07-2020-0063>
33. Otroshchenko, M., Kramarenko, O., Hudkov, S., Maletova, O., & Utkina, M. (2026). Digital transformation in academic libraries: Implementing integrated research information systems for enhanced scholarly communication and institutional knowledge management. *Digital Library Perspectives*, 42(2), 396–412. <https://doi.org/10.1108/dlp-08-2025-0122>
34. Owusu-Ansah, S., & van der Walt, T. (2025). Improving online research guides for instructions and utilization in Ghanaian universities: Insights from users. *Global Knowledge, Memory and Communication*. <https://doi.org/10.1108/gkmc-05-2024-0279>
35. Panda, S., & Kaur, N. (2023). Enhancing user experience and accessibility in digital libraries through emerging technologies. In K. P. Sinhamahapatra et al. (Eds.), *Digital libraries: Sustainable development in education* (pp. 676–703). Proceedings of the International Symposium on Digital Libraries: Sustainable Development in Education, Indian Institute of Technology Kharagpur, India, November 21, 2023.
36. Ramakrishnan, D. (2025). Digital libraries in transition: An analysis of emerging trend and future directions. *Advanced International Journal for Research*, 6(6), 1–13. <https://doi.org/10.63363/aijfr.2025.v06i06.2622>
37. Rathod, M. (2025). Transforming academic libraries for inclusive and digital-first higher education: A comparative study of policy, practice and innovation in India and the United States. *Asian Research Journal of Arts & Social Sciences*, 23(8), 221–231. <https://doi.org/10.9734/arjass/2025/v23i8761>
38. Shahzad, K., Khan, S. A., & Iqbal, A. (2024). Factors influencing the adoption of Internet of Things (IoT) in university libraries: A systematic literature review. *The Electronic Library*, 42(2), 174–195. <https://doi.org/10.1108/el-07-2023-0174>
39. Sousa, N. M. T. (2025). Integration of artificial intelligence in the digital preservation of academic repositories and scientific data in higher education libraries. *Digital Library Perspectives*, 42(2), 280–300. <https://doi.org/10.1108/DLP-06-2025-0074>
40. Wu, D. (2024). Relations of customized recommendation and user satisfaction in library service: A regulated mediation model in psychological dimension. In Proceedings of the 2024 5th International Conference on Education Development and Studies (ICEDS '24) (pp. 71–76). Association for Computing Machinery. <https://doi.org/10.1145/3669947.3669962>

41. Xiao, N. (2022). The construction path of university smart library based on digital twin. In 2022 2nd International Conference on Consumer Electronics and Computer Engineering (ICCECE) (pp. 35–38). IEEE. <https://doi.org/10.1109/ICCECE54139.2022.9712798>
42. Yuniarto, D., Setiadi, D., Ningrum, D. W. N., Aprilianti, R., Kartiwa, A., & Mahardika, F. (2025). Examining the impact of artificial intelligence implementation on enhancing research productivity in higher education. In 2025 13th International Conference on Cyber and IT Service Management (CITSM) (pp. 1–5). IEEE. <https://doi.org/10.1109/CITSM67730.2025.11291318>
43. Zareef, M., & Jabeen, M. (2025). A systematic review of digital curation services in academic libraries: Navigating policies, skills and challenges. *Digital Library Perspectives*, 41(3), 518–543. <https://doi.org/10.1108/DLP-10-2024-0158>