

Managing Islamic Academic Libraries in Indonesia in the Era of Society 5.0 and Artificial Intelligence: Readiness and Challenges Analysis

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ABSTRACT

This study analyzes the readiness and challenges encountered by Islamic academic libraries in Indonesia in adapting to AI-driven digital transformation. Employing a literature review approach, the research synthesizes findings from academic studies, institutional reports, and related literature to examine four central aspects: technological readiness, focusing on the adoption of AI and automation in library operations; human resource readiness, assessing librarians' competencies in managing digital systems; implementation challenges, identifying obstacles such as limited infrastructure, financial constraints, and digital literacy deficits; and development strategies, offering recommendations to enhance digital library services while upholding Islamic educational values. The findings revealed that while several Islamic academic libraries have initiated steps toward digitalization, persistent barriers hinder comprehensive implementation. Notably, disparities in infrastructure and professional capacity highlight the urgent need for strategic action. The study concludes that successful digital transformation requires sustained investment in technology, ongoing professional development for librarians, and inter-institutional collaboration. Strengthening these areas will enable Islamic academic libraries to evolve into dynamic digital knowledge hubs that contribute meaningfully to academic advancement in the Society 5.0 era.

Keywords: Library Management; Islamic Academic Libraries; Technology in Library; Technology Acceptance; Librarian Competencies

1. INTRODUCTION

The rapid advancement of technology has ushered the world into the era of Society 5.0, where digital technology, artificial intelligence (AI), and the Internet of Things (IoT) are integrated into various aspects of life, including the education sector. Islamic higher education institutions in Indonesia, as institutions responsible for nurturing Muslim

intellectuals, must also adapt to these changes, particularly in library management. Library management in Islamic higher education is not only responsible for providing high-quality reading materials but also for offering technology-based services that enhance accessibility and efficiency for users.

However, the readiness of libraries to face the 5.0 era and AI (Huang et al., 2023) implementation remains a challenge (Makarti & Lestari, 2025). Various obstacles, such as limited digital infrastructure, a shortage of professionals skilled in library technology, and resistance to change, hinder the optimization of libraries utilizing advanced technology (Ginting et al., 2023). Furthermore, there is still a lack of research discussing how Islamic principles can be integrated into the digital transformation of libraries to create a system that remains aligned with Islamic values.

The knowledge gap in this study lies in the limited number of studies that specifically analyze the readiness of Islamic higher education libraries in adopting AI technology and the Society 5.0 concept (Phamela et al., 2024). Most previous studies have focused on the general digitalization of libraries without considering institutional readiness, human resources, and the unique challenges faced by Islamic higher education institutions in Indonesia.

This study differs from previous research as it explores the readiness of Islamic higher education libraries to face the 5.0 era with a holistic approach encompassing technology, human resources, and the integration of Islamic values in AI-based library management. The main focus of this study includes: first, Technology Readiness: analyzing the extent to which Islamic higher education institutions have adopted AI technology and automation systems in library management. Second, Human Resource Readiness: evaluating the competency level of librarians in managing technology-based libraries. Third, Implementation Challenges: identifying the main obstacles in implementing AI and 5.0 technology in Islamic higher education libraries. Fourth, Development Strategies: formulating strategic recommendations to help Islamic higher education libraries adapt to the digital era while maintaining Islamic principles.

Library management encompasses various aspects, including planning, organizing, implementation, and evaluation (Hamudy et al., 2024). In the context of Islamic higher education, library management must consider the need for adequate Islamic literature and a management system aligned with Islamic values.

One of the key principles in library management is collection planning, which involves selecting books and library materials that align with the Islamic education curriculum and students' academic needs. Additionally, resource management is a crucial aspect that includes managing human resources, budget allocation, and providing library facilities that enhance user comfort (Tim, 2024).

User services are also a primary concern in library management, encompassing loan services, returns, and literacy guidance for students and lecturers to improve the effectiveness of library utilization. In the digital era, technology use is becoming increasingly important to enhance the efficiency of collection management and user services, including implementing library automation systems that accelerate searches and access to library materials.

Libraries in Islamic higher education institutions face various challenges in their management. One of the main obstacles is budget constraints, as many Islamic higher education institutions have limited funding for acquiring adequate technology and library facilities. Additionally, the shortage of professional staff is another factor hindering library

optimization, particularly due to the lack of librarians with expertise in information technology and artificial intelligence (Rodin, 2020).

Another challenge is the low reading interest among students and educators, necessitating special programs to enhance literacy and make the library an attractive learning center. Furthermore, access to technology remains a barrier for some libraries, as not all have been able to adopt information technology that can improve service efficiency and expand access to academic resources (Efendi et al., 2023).

To overcome the various challenges faced, a comprehensive library development strategy is needed. One crucial step is optimizing funding and establishing collaborations with various parties, including the government, private institutions, and educational endowments, to ensure sufficient budgets for developing library facilities and technology. Moreover, improving librarian quality is a priority by providing regular training to ensure they are more professional in managing existing resources and keeping up with technological advancements.

In order to improve access to digital information, digital literacy programs are an essential part of the development strategy. Activities such as training on utilizing artificial intelligence for information retrieval and digital literacy seminars for students and educators can enhance their understanding of modern technology. Additionally, the development of AI-based digital libraries enables broader access for students and educators from various locations, thereby expanding the reach and efficiency of library services in the digital era.

Library management in Islamic higher education institutions in Indonesia plays a crucial role in supporting the learning process and academic research. With the right strategies, existing challenges can be addressed, enabling libraries to serve as effective literacy centers in the digital era.

2. METHODS

This study employed a literature review approach to explore the contemporary landscape of library management and the integration of artificial intelligence (AI) within Islamic higher education institutions. By utilizing this method, the study systematically identified, examined, and synthesized a broad range of scholarly and institutional sources relevant to the research focus, following the rationale outlined by Syukur et al. (2024).

A variety of data sources were consulted to ensure comprehensive coverage of the topic. Scientific journals and academic articles, both national and international, provided critical insight into the technological evolution of library systems, the use of AI in library management, and the challenges confronting Islamic university libraries. Reference books and research reports contributed theoretical foundations and contextual understanding, particularly in relation to the conceptual frameworks of library management, the application of technology in librarianship, and the policy environment surrounding Islamic higher education in Indonesia.

To complement these sources, the study incorporated official policy documents and regulatory frameworks issued by the Ministry of Religious Affairs and the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia. These materials outlined the administrative structures and policy mandates governing Islamic academic libraries. In addition, the study engaged with trusted online publications from reputable research institutions and professional library organizations. These sources provided current

perspectives on digital library transformation, AI-based automation, and broader information service trends in the context of the Society 5.0 paradigm (O’Gorman & MacIntosh, 2015).

Data collection was conducted through a documentation study method, involving a systematic review of both printed and digital academic materials. Literature searches were carried out using recognized academic databases, including Google Scholar, ScienceDirect, Springer, DOAJ, and the National Library of Indonesia’s digital repository. To ensure the relevance and academic quality of the materials, the study applied strict inclusion criteria. Only sources that addressed the core themes of library management, AI technology, or Society 5.0, and that had been published within the last decade were included. Furthermore, publications were selected based on their academic credibility, favoring those issued by reputable journals or scholarly institutions.

Exclusion criteria were also clearly defined. The study omitted sources lacking scholarly rigor, including opinion-based pieces, non-peer-reviewed articles, and unverified web content. Publications considered outdated or disconnected from current technological advancements were also excluded, following the guidance of Mazhar (2021).

The collected data were then analyzed using content analysis. This process began with data reduction, during which relevant information was selected and summarized from the reviewed literature. The study then organized the data into thematic categories that reflected key dimensions of the research: library management practices, AI implementation, institutional challenges, and the preparedness of Islamic higher education libraries in navigating the demands of Society 5.0. The final stage of analysis involved synthesizing the findings to form a comprehensive overview of the opportunities and constraints associated with digital transformation in these academic library settings, in line with the framework proposed by Nicmanis (2024). Through this structured approach, the study established a nuanced understanding of how Islamic university libraries are responding to technological change and positioned itself to critically assess their readiness for AI integration and the demands of a knowledge-driven society.

3. RESULTS AND DISCUSSION

The Concept of Libraries in the Society 5.0 Era and AI

The Society 5.0 era was first introduced by the Japanese government as a response to the rapid development of digital technology during the Fourth Industrial Revolution (Industry 4.0). This concept emphasizes the integration of advanced technologies such as Artificial Intelligence (AI), big data, the Internet of Things (IoT), and robotics to enhance human well-being and create a more human-centered society. In the library sector, this transformation has led to significant changes in the way information is managed, presented, and accessed by users (Rohayati & Abdillah, 2024).

Libraries are no longer merely storage and lending facilities for physical books; they have transformed into data and information centers based on digital technology that can be accessed globally. Modern libraries integrate AI technology to optimize various aspects of their services, including advanced reference search systems, personalized reading recommendations, and the use of chatbots as virtual assistants for library users (Nasir & Tyagi, 2024). The implementation of artificial intelligence (AI) and big data enables libraries to provide faster, more accurate, and user-oriented services. With AI-based catalog systems, users can find references more easily and efficiently. For example, searching for reading

materials, which previously took a long time, can now be completed in seconds thanks to machine learning-based matching algorithms. Additionally, AI-powered chatbots allow library users to access information and assistance at any time, even outside the library's operating hours.

Furthermore, the concept of digital libraries continues to evolve, allowing users to access collections from anywhere and at any time. This greatly supports the learning process for students, lecturers, researchers, and the general public who need high-quality information.

Library Transformation with AI Technology

The implementation of AI in libraries brings various innovations that transform workflows and services. Some key aspects of library transformation with AI technology include:

- 1) Smart Catalog System. With AI, libraries can develop more advanced and intuitive catalog systems. This technology allows users to search for books, journals, or scientific articles using relevant keywords, even through voice or image-based searches.
- 2) Chatbots and Virtual Assistants. Many modern libraries have implemented AI-powered chatbots to assist patrons in quickly finding information. These chatbots can answer common questions, provide guidance on using the library system, and help users conduct reference searches.
- 3) Automated Collection Management. AI also aids in library collection management, including monitoring book usage, analyzing borrowing trends, and recommending new acquisitions based on user interests.
- 4) Collection Scanning and Digitization. To enhance accessibility, libraries are increasingly digitizing their physical collections. AI plays a role in processing digital documents, such as text scanning using Optical Character Recognition (OCR), which allows users to search for text in documents that were previously only available in image or print formats.
- 5) Book Security and Tracking. AI and IoT also contribute to library security systems, such as the use of Radio Frequency Identification (RFID) for book tracking (G. S. & Mulimani, 2024).

Adaptation Strategies for Islamic University Libraries

As centers of knowledge grounded in Islamic values, Islamic university libraries must develop comprehensive strategies to enhance services and information accessibility. The following are some key strategies that can be implemented:

1. Investment in Technological Infrastructure

One of the essential steps in the digital transformation of Islamic university libraries involves the strategic enhancement of technological infrastructure. To achieve this, educational institutions must allocate sufficient budgetary resources to support the development of modern and efficient library technologies. A key component of this investment is the improvement of internet networks, ensuring that users have stable and high-speed access to digital resources both on campus and remotely. In parallel, the adoption of cloud-based storage solutions plays a critical role in managing digital collections such as e-books, academic journals, and digitized Islamic manuscripts, enabling broader accessibility and more effective content preservation. Furthermore, the integration of artificial

intelligence into library systems offers significant advantages. AI can assist in refining reference searches, analyzing borrowing patterns, and delivering personalized reading recommendations based on user behavior and preferences, thereby enhancing the overall user experience and information retrieval efficiency (Yuliati AS, Ernawati et al., 2024).

2. Training and Development of Human Resources (HR)

Technological advancements in the library sector will not yield optimal results without the parallel development of competent human resources. For digital transformation to be effective, both librarians and users must possess the necessary skills to engage with emerging technologies. Accordingly, providing targeted education and training becomes a critical component in supporting the transition to digital library systems.

Training initiatives should address several core competencies. Participants need to develop the ability to utilize artificial intelligence in library services, including the use of chatbots for user interaction, automated systems for reference searches, and AI-driven digital catalog platforms that enhance resource discoverability. Equally important is the capacity to manage metadata effectively and to undertake digitization efforts that preserve and organize library collections for easy and structured access. Another essential area of training involves digital data security. Librarians and users must understand how to safeguard sensitive information, implement cybersecurity best practices, and apply encryption and privacy protection techniques to minimize exposure to cyber threats (Kalangit et al., 2022).

These educational efforts not only enhance the operational capacity of libraries but also ensure that all stakeholders are well-prepared to participate in and benefit from the evolving landscape of digital information services.

3. Collaboration with Islamic Research Institutions and Publishers

To enhance library collections and expand access to Islamic academic resources, Islamic universities must actively pursue collaborative partnerships with research institutions and Islamic publishers. Such collaborations play a vital role in supporting the development of well-rounded and accessible digital library collections.

Partnerships with Islamic research institutions can facilitate the co-development of journals, scholarly books, and digital manuscript repositories that serve the broader academic community. These joint efforts not only enrich the content available within university libraries but also foster knowledge exchange across institutional boundaries. Collaboration with Islamic publishers further enables libraries to offer access to a wide array of digital books, particularly those focused on Islamic studies as well as other relevant academic disciplines. Additionally, the exchange of data and academic references among Islamic libraries strengthens the collective resource base, allowing institutions to provide more diverse, inclusive, and comprehensive collections to their users (Amaliah et al., 2024). Such strategic alliances significantly contribute to the advancement of academic inquiry and the digital transformation of library services in Islamic higher education.

4. Implementation of Data Security Policies

As libraries increasingly digitize their collections and services, data security has emerged as a critical area of concern. The protection of digital systems must be prioritized to safeguard users' personal information and prevent breaches that could compromise institutional integrity. Ensuring the confidentiality, integrity, and availability of library data requires the implementation of comprehensive and proactive security measures.

One essential measure involves the use of data encryption, which secures personal information and restricts access to authorized individuals. In addition, the adoption of two-factor authentication provides an extra layer of security by ensuring that only verified users can access the digital library environment. To remain resilient against evolving threats, library systems must undergo regular security updates that patch vulnerabilities and enhance defense mechanisms against cyberattacks. Equally important is the cultivation of cybersecurity awareness among both librarians and users. By providing education on how to recognize and avoid phishing attempts, malware, and other digital threats, libraries can foster a culture of vigilance and shared responsibility in maintaining data security (Persadha et al., 2024). These measures, when integrated into the daily operations of digital libraries, contribute significantly to building a secure and trustworthy information environment for the academic community.

Readiness of Islamic College Libraries in Facing the Digital Era

1. Technological Infrastructure

To keep pace with ongoing advancements in artificial intelligence (AI) and digital technologies, Islamic university libraries must be supported by adequate and reliable technological infrastructure. A stable internet connection stands as a foundational requirement, as it enables uninterrupted access to digital catalogs, electronic journals, and a wide range of online library services. Without consistent connectivity, users may face significant barriers in retrieving and utilizing academic resources effectively.

Equally important is the implementation of AI-based digital catalog systems. These systems significantly enhance the efficiency of information retrieval by offering intelligent search functionalities, generating personalized book recommendations based on user behavior, and automating various aspects of collection management. The integration of such technologies not only improves the user experience but also optimizes internal library operations.

In tandem with these technological advancements, safeguarding data remains a top priority. Ensuring the security of both user information and digital collections is essential to maintaining the integrity and trustworthiness of library systems. The adoption of robust cybersecurity protocols protects institutional assets from unauthorized access and supports the long-term sustainability of digital services (Lamba, 2022).

2. Library Human Resource Development

Digital transformation in libraries depends not only on the availability of advanced technologies but also on the capacity of human resources to engage with and manage these tools effectively. As such, the training and upskilling of librarians must be prioritized to ensure they are well-equipped to operate within increasingly digital environments.

Training programs should emphasize the use of AI-based information systems, particularly in conducting reference searches that enhance the accuracy and relevance of retrieved academic content. In addition, librarians need to develop proficiency in managing digital collections, including the effective use of academic reference management tools such as Mendeley or Zotero, which support citation organization and research productivity. Equally important is the cultivation of knowledge in data security and digital information management. Librarians must understand how to protect sensitive data, maintain the integrity of digital records, and implement best practices in information governance (Eje & Dushu, 2018).

By strengthening the technological and managerial competencies of library staff, Islamic university libraries can more effectively navigate the demands of digital transformation and support a more dynamic and secure academic information ecosystem.

3. Integration with Academic Repositories

Connecting digital collections with academic repositories such as Garuda, DOAJ, and Google Scholar expands access for students and lecturers to the latest research. With an integrated system, the library can become a primary reference center for academics (Puspita et al., 2024).

4. Strengthening Partnerships and Collaboration

To enhance the quality of library services, Islamic universities must foster strategic collaborations with other educational institutions, digital publishers, and AI service providers. These partnerships serve as critical drivers in the development of resource-rich, technologically advanced, and user-centered library environments.

Through collaboration with academic publishers and database providers, universities can secure broader access to digital learning resources, including e-books, journals, and specialized academic content. This access enriches the library's collection and ensures that users benefit from up-to-date and diverse scholarly materials. In parallel, joint initiatives such as training programs and workshops offer librarians opportunities to strengthen their digital competencies. These capacity-building activities are essential for equipping staff with the skills needed to manage digital platforms, integrate AI-based services, and support users in navigating complex information systems (Nurdiana et al., 2023).

The rapid advancement of digital technology and the integration of Artificial Intelligence (AI) have brought both opportunities and challenges for Islamic college libraries in Indonesia. As centers for academic knowledge and Islamic scholarship, these libraries must adapt to Society 5.0 by ensuring accessibility, efficiency, and inclusivity in information services. This discussion explores the readiness and challenges faced by Islamic college libraries in adopting AI and digital transformation, as well as strategies to enhance their role in higher education institutions.

Technological Readiness and Digital Infrastructure

One of the primary aspects of digital transformation in Islamic college libraries is technological readiness. The transition from conventional to digital libraries requires an advanced technological infrastructure that supports automation, AI-driven cataloging, and cloud-based repositories. However, many Islamic higher education institutions in Indonesia face challenges in achieving these standards due to limited financial resources and inadequate digital infrastructure.

The implementation of AI in library management systems, such as automated indexing, AI-powered search engines, and personalized recommendations, can significantly improve efficiency. However, these advancements require high-speed internet, robust cloud storage, and secure digital platforms, which are still lacking in many institutions. Investment in technology must be prioritized to modernize library services and ensure seamless integration with digital academic resources.

Human Resource Development and Digital Literacy

Technological advancement alone is insufficient without skilled human resources. Librarians and administrative staff must be equipped with digital literacy and AI

competencies to manage modern library systems effectively. However, the lack of trained personnel in AI applications, metadata management, and cybersecurity remains a challenge in Islamic college libraries.

Regular training programs and professional development courses are essential to enhance digital competencies among librarians. Institutions should collaborate with technology experts and academic networks to provide workshops, certifications, and mentorship programs. The adoption of AI and automation should be accompanied by proper training to enable librarians to utilize AI-powered tools for research assistance, cataloging, and data analysis.

Digitization of Islamic Collections

A significant challenge in the digital transformation of Islamic college libraries is the limited availability of digitized Islamic literature. Many Islamic books, manuscripts, and journals remain in print form, restricting accessibility for students, researchers, and scholars. Digitization efforts are necessary to preserve and expand the reach of Islamic academic resources.

Collaboration with Islamic research institutions, national archives, and international repositories can facilitate the large-scale digitization of Islamic literature. AI-driven Optical Character Recognition (OCR) technology can be employed to convert printed texts into digital formats, enabling searchability and accessibility. Establishing open-access digital libraries for Islamic studies will enhance the availability of authentic academic resources and contribute to global Islamic scholarship.

Data Security and Privacy Concerns

As Islamic college libraries transition to digital platforms, data security and user privacy become critical concerns. Digital libraries store vast amounts of sensitive user data, including browsing history, personal information, and research preferences. The risk of data breaches, cyberattacks, and unauthorized access must be mitigated through advanced cybersecurity measures.

Implementing encryption technologies, multi-factor authentication, and AI-driven threat detection systems can safeguard digital assets and user data. Additionally, libraries must comply with national and international data protection regulations to ensure ethical handling of information. Librarians should be trained in cybersecurity awareness to prevent phishing attacks, malware infiltration, and unauthorized data access.

Challenges in AI Integration

Although AI presents transformative opportunities for library management, its implementation in Islamic college libraries faces several challenges. The high cost of AI development and integration poses financial constraints for institutions with limited budgets. Additionally, ethical concerns regarding AI-driven content curation and decision-making processes must be addressed to align with Islamic principles.

Ensuring the ethical use of AI in library services requires transparency and adherence to Islamic values. AI algorithms should be designed to respect cultural sensitivities and academic integrity while providing unbiased recommendations. Moreover, collaboration with AI researchers specializing in ethical AI frameworks can help create AI-powered library systems that align with Islamic teachings.

Strategies for Strengthening Islamic College Libraries in the Digital Era

To enhance the role of Islamic college libraries in Society 5.0, several strategic initiatives must be pursued. Prioritizing investment in digital infrastructure such as high-speed internet, cloud storage, and AI-powered systems is essential and can be accelerated through partnerships with technology providers. Equally critical is the continuous training of librarians in AI literacy, data management, and cybersecurity, supported by international collaborations to facilitate knowledge exchange.

A national digitization effort targeting Islamic manuscripts, books, and journals should be established, with AI-based OCR technologies enhancing accessibility and searchability. At the same time, robust cybersecurity measures—including encryption, secure authentication, and AI-driven threat detection—must be implemented alongside strict data protection policies. Collaborations with AI developers are also needed to create culturally sensitive, ethical AI services, including chatbots and virtual assistants that improve user engagement and academic support. Through these coordinated efforts, Islamic college libraries can become dynamic centers of knowledge in the digital age while remaining grounded in cultural and educational values.

The integration of AI and digital transformation in Islamic college libraries in Indonesia is an inevitable progression in the era of Society 5.0. While significant challenges exist, such as technological limitations, human resource gaps, and data security concerns, strategic investments and collaborative efforts can drive successful adaptation. Strengthening digital infrastructure, enhancing librarian competencies, accelerating digitization efforts, and implementing robust cybersecurity measures will ensure that Islamic college libraries remain relevant and effective in supporting academic and Islamic scholarship. By embracing AI and digital advancements while upholding Islamic values, these libraries can become global centers for knowledge dissemination and research excellence.

4. CONCLUSION

The Society 5.0 era and artificial intelligence (AI) present both challenges and opportunities for Islamic university libraries in Indonesia to transform into more modern and relevant institutions that meet the needs of the times. With thorough preparation, investment in infrastructure, and the development of highly skilled human resources, libraries can navigate the digital era more effectively. Through the right strategic steps, libraries can continue to grow as centers of literacy, research, and innovation, providing significant benefits to users and educational institutions as a whole.

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Rhoni Rodin: Writing original draft preparation. Ideas; formulation or evolution of overarching research goals and aims.

CONFLICT OF INTERESTS

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