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Library readiness in the era of liquid modernity : Analysing the response of IAIN Curup Library to technological dynamics

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Abstract

Purpose. This study explores the responses of academic libraries to technological advancements, focusing on the IAIN Curup Library in Indonesia, and evaluates its adaptation to the evolving dynamics of liquid modernity.

Methodology. Using the E-Readiness Assessment Models as a framework, the research examines the library's technological infrastructure, human resources, regulatory environment, and digital engagement.

Result and Discussion. The findings highlight that while the library has established strong technological foundations, including digital repositories and automation systems, there remain significant gaps in its readiness for adopting newer technologies such as artificial intelligence and digital libraries. They already overcame the library's digital competencies with workshops and self-teaching, but its lack of specific AI regulations and librarian skills is also addressed.

Conclusion. The study underscores the need for continuous professional development, digital services and the creation of comprehensive policies to facilitate AI integration. The research contributes to understanding how academic libraries can effectively respond to technological changes while maintaining alignment with institutional goals and broader societal shifts toward digital engagement.

1. Introduction

Academic libraries play a pivotal role in supporting higher education and research by providing essential access to information and resources. As the digital era advances, the integration of technology within these libraries has become a necessity, shaping not only the way libraries operate but also how they meet the diverse needs of users (Adarkwah et al., 2024; Bawack, 2019). The challenge facing academic libraries today is not just about adopting new technologies, but how to adapt these technologies within the academic and cultural contexts of universities to stay relevant in a rapidly changing environment (Cox, 2020, 2023; Hamad et al., 2024). In particular, as academic libraries respond to the needs of a technologically advanced generation, they must also align their services with the

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shifting demands of users who expect timely, efficient, and easily accessible information (Farag et al., 2021; Trembach & Deng, 2020). Understanding how libraries navigate this transformation is vital for evaluating their effectiveness in providing high-quality academic support.

Technology in libraries, as an essential part of the information society, has become a critical area of study in the development of academic libraries due to its crucial role in knowledge management and the dissemination of information. This shift reflects broader social dynamics, as explained by Zygmunt Bauman's concept of liquid modernity. In liquid modernity, Bauman describes contemporary society as characterized by rapid change, instability, and decentralization (Bauman, 2013). Traditional structures such as stable jobs, long-term relationships, and secure social roles have become unpredictable and sometimes temporary, creating a widespread sense of uncertainty (Bauman, 2005, 2013, 2023). Bauman argues that this uncertainty is at the heart of the modern experience, where individuals navigate a world where stability is increasingly difficult to find (Palese, 2013). The concept of identity has shifted from something fixed to a flexible and continually evolving project, shaped by consumption and social pressure (Palese, 2013). Liquid modernity highlights the uncertainty and instability that characterize this shift, as libraries must continually adjust to the evolving technological landscape (Bauman & Haugaard, 2008; Ngulube & Vincent Mosha, 2025; Yao & Gao, 2022). This adaptation process is increasingly influenced by emerging technologies like artificial intelligence (AI), big data, and machine learning, which promise to revolutionize library services and user interaction (Ajani et al., 2022; Cox et al., 2019). As academic libraries embrace these innovations, the challenge lies not only in their technological readiness but also in how these changes align with broader institutional goals, including teaching, learning, and research support (Shahzad et al., 2024).

Several studies have explored the integration of advanced technologies in academic libraries, providing a clear picture of the technological landscape and the challenges libraries face. Research by Huang et al. (2023) examined the varying strategies for AI implementation across universities in the UK and China, revealing regional differences in how academic libraries approach technological adoption. Similarly, studies in African academic libraries (Adarkwah et al., 2024; Sultana & Atikuzzaman, 2025) show that while there is a strong desire to integrate AI, several barriers, such as funding and infrastructure, hinder progress. The adoption of AI is not merely a technical challenge but also an ethical one, as librarians must navigate issues of data privacy, bias, and the potential impact of AI on employment (Buitrago-Ciro et al., 2025; Wheatley & Hervieux, 2020). Studies have also delved into the impact of AI and digital tools on library management and user experience. Research by Ogungbenro et al. (2025) focused on how AI is transforming cataloguing practices in Nigerian academic libraries, suggesting that AI technologies can significantly improve the speed and accuracy of metadata creation. Similarly, research in Bangladesh (Atikuzzaman, 2025) highlighted the opportunities AI offers for enhanced user interactions, although challenges such as insufficient training and limited infrastructure persist (Ridley, 2022; Tella & Odunola, 2023). Academic libraries, particularly those in developing regions, must therefore adopt a strategic approach that incorporates technological readiness, professional development, and user-centered design to foster successful implementation.

Despite these advancements, gaps remain in understanding how libraries can effectively balance the demands of technological adoption with the dynamics of academic culture. The integration of AI and other technologies raises questions about the future role of library staff and their professional competencies (Cox, 2023; Ridley, 2022). The role of academic librarians is transforming, as they are increasingly required to be not just information providers but also technology experts and digital literacy advocates (Buitrago-

Ciro et al., 2025; Hamad et al., 2024). This shift challenges the traditional competencies of librarianship and necessitates continuous professional development to ensure that library staff can effectively support new technological systems. Moreover, concerns about the ethical implications of AI, such as job displacement and bias, must be addressed to ensure that the adoption of these technologies does not undermine the values of academic libraries (Ajani et al., 2022; Michalak & Ellixson, 2025).

This study seeks to address these gaps by focusing on the responses of academic libraries to the dynamic changes in technology and how they align themselves with the evolving academic culture. Specifically, this research aims to explore the strategies libraries employ to integrate emerging technologies like AI into their operations and how these strategies align with the fast-paced changes in academic environments. By examining the challenges and opportunities faced by libraries, this study will contribute valuable insights into the ongoing transformation of academic libraries in the context of technological innovation and cultural adaptation. Furthermore, it will provide recommendations for libraries seeking to enhance their services and remain at the forefront of academic support in the digital age.

the sociological implications of digital libraries, particularly within the framework of Bauman's liquid modernity, are rarely discussed. Bauman argues that in the world of liquid modernity, social institutions, including libraries, must continually adapt to new conditions. Digital libraries in Islamic higher education institutions must be able to integrate religious values with information technology to create a learning environment that is inclusive and responsive to the changing times (Sumardi et al., 2021). Therefore, it is important to explore how libraries can serve as a bridge between tradition and innovation, and how technology can optimize information accessibility for all users (Abdul Rahman & Mohezar, 2020; Rodés-Paragarino et al., 2019; Zhu et al., 2024). Building an effective technology-based library in Islamic higher education can help address the challenges of information access and support more inclusive and relevant learning. How Islamic higher education libraries adapt to technology and the dynamics of knowledge in this context of change is crucial to understanding the challenges they face, including aspects of cost, technical complexity, and user acceptance of new technologies.

2. Method

This study uses a qualitative case study design to explore how academic libraries, exemplified by the IAIN Curup Library, reflect and contribute to the dynamics of liquid modernity as proposed by Bauman. The study aims to understand the changing structure of knowledge in the production, distribution, and consumption of knowledge within an increasingly fluid and digitally mediated socio-cultural context. Data collection was conducted through a combination of direct observation, semi-structured interviews, and literature analysis. The primary informants selected were the head of the IAIN Curup Library. The documents analyzed included institutional reports, user feedback summaries, library policies, and digital infrastructure plans, providing contextual insights into institutional strategies and operational practices. Data was analyzed using thematic analysis following Braun & Clarke, which involved: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report (Braun & Clarke, 2019). The interview guide is based on the e-Readiness Assessment Models developed by Asia-Pacific Economic Cooperation (APEC) or United Nations Conference on Trade and Development (UNCTAD). The key indicators used are: technological infrastructure, human resources, regulatory environment, and digital engagement (Marcel, 2015; Mohammed & Ibrahim, 2013).

3. Results and discussion

3.1 Library Transformation in the Context of Liquid Modernity

Libraries, in their evolution, are increasingly adopting technology, which reflects a broader transformation in how knowledge is stored, accessed, and distributed. This shift, particularly within the framework of Zygmunt Bauman's concept of liquid modernity, can be seen as a response to the instability and uncertainty that mark the rapid pace of social change. Bauman (2005) argues that in a liquid modern society, identities and social structures are no longer fixed or bound by tradition, and this is evident in the shift from traditional libraries to more technologically advanced platforms. This shift provides greater flexibility for users, allowing them to access knowledge without being restricted by physical location or specific times. Digitalization, along with the integration of other technologies like artificial intelligence (AI) and virtual reality (VR), decentralizes knowledge, making it more accessible and fluid, in line with the instability that characterizes liquid modernity (Atikuzzaman, 2025; Bauman, 2013; Haygood & Serrano, 2020). Therefore, libraries are no longer merely places for storing data; they serve as bridges to a broader world of knowledge, enabling rapid transformations in how individuals understand the world (Chaudhari, 2018).

The term "library technology" encompasses a broad range of systems designed to store, manage, and distribute information in digital and virtual formats, making it easier for users to access and utilize. This includes digital libraries, AI-driven tools, and immersive environments like VR that enhance the user experience (Dr. Manjunatha S, 2022; Velmurugan, 2023). Technology plays a crucial role in improving information services, especially in meeting the growing demand for diverse types of information in the digital era (Arum & Marfianti, 2021). In higher education, particularly in Islamic universities, these technological advancements have had a profound impact, especially in the dissemination of religious texts that were once only available in physical form. By converting religious literature like tafsirs, fiqh, and other texts into digital formats, students can now access a vast array of resources without needing to visit physical libraries, overcoming the limitations of physical access to resources (Cobo & Naval, 2013). Additionally, AI tools can personalize research assistance, offering tailored recommendations and enhancing search capabilities, while VR can offer virtual experiences of library environments, simulating traditional learning spaces in a virtual context (Sultana & Atikuzzaman, 2025; Wheatley & Hervieux, 2020). While these technologies make knowledge more accessible, they also present challenges in ensuring the quality and integrity of information. As Dawson (2006) noted, the key issue in digital libraries is ensuring the accuracy of the information provided. Technologies such as AI and VR require rigorous validation processes to ensure the accuracy and credibility of the data, demanding continuous oversight and the development of robust evaluation systems (Sumardi et al., 2021). These technological innovations not only change how academic activities are conducted but also create new challenges in maintaining the long-term sustainability of libraries in the evolving information landscape.

The transformation of libraries through technology is a direct reflection of the changing dynamics of society in the context of Bauman's liquid modernity. As libraries transition from traditional, centralized institutions to adaptive, decentralized, and flexible systems, they are responding to the fluidity and instability of the modern world. The integration of AI, digital libraries, and VR technologies, while offering exciting opportunities for personalized and immersive learning, also presents challenges in terms of maintaining the quality and integrity of information. Libraries must address these challenges by developing

strong validation systems, ensuring accessibility, and maintaining ethical standards as they continue to evolve in the digital age. As such, library technology not only transforms the way knowledge is accessed but also how it is produced, shared, and understood in an increasingly interconnected and fluid world.

3.2 Response of Academic Libraries to Technological Changes

The findings from this interview suggest that the transformation of libraries into digital formats is not merely a response to technological advancements but also a structural and cultural adaptation to the conditions of modern society, as described by liquid modernity. In Bauman's framework, liquid modernity is characterized by instability, uncertainty, and rapid changes in social and institutional orders (Bauman, 2005; Cheyette, 2020). As explained by the head of the library, the digital library has become a symbol of the institution's flexibility in responding to the dynamics of an era that is no longer stable and bound by physical boundaries. E-Readiness Assessment Models are strategic tools used to evaluate how prepared an organization or institution is to adopt and integrate Information and Communication Technology (ICT) (Marcel, 2015). These models assess multiple dimensions, including technological infrastructure, human resources, regulatory environment, and digital engagement (Marcel, 2015; Mohammed & Ibrahim, 2013). These models help institutions identify gaps, benchmark progress, and create action plans to improve their digital capacity in line with emerging technological demands. An Exploratory Study of Library Responses to Technology

3.4.1 Technological Infrastructure

> *Perpustakaan kami sudah memiliki beberapa perangkat yang mendukung civitas akademika dalam mencari buku dan artikel seperti jaringan internet yang kuat, ada computer yang disediakan di perpustakaan, ada e-repository untuk menampung karya dosen dan tenaga kependidikan, dan juga ada website e-theses berisi skripsi, tesis, dan disertasi mahasiswa. Dalam pengelelolaan perpustakaan juga kami sudah menggunkaan otomasi perpustakaan seperti SLiMS untuk mengelola bahan Pustaka, Eprint (seperi yang saya bilang tadi) untuk menampung karya dosen dan mahasiswa. Untuk pemeliharaannya kami dibantu oleh TIPD (Unit Pangkalan Data IAIN Curup) untuk me-maintains server dan internet. Dan juga untuk website khusus perpustakaan seperti E-prints dan SLiMS kami punya teknisi sendiri yang biasa menghandle jika terjadi error*

translation of the interview transcript.

> Our library already has several devices that support the academic community in finding books and articles, such as a strong internet network, computers provided in the library, an e-repository for storing works by faculty and staff, and a website for e-theses that contains student theses, dissertations, and research papers. In library management, we also use library automation systems like SLiMS to manage library materials and Eprints (as mentioned earlier) to store faculty and student works. For maintenance, we are assisted by TIPD (the IAIN Curup Data Base Unit) to maintain the servers and internet. We also have our own technicians who handle any errors related to the library's website, such as E-prints and SLiMS

The library has established a basic foundation for technological infrastructure, as evidenced by its strong internet network, available computers for users, and an e-repository system for storing faculty and staff work. Additionally, the library utilizes SLiMS (Senayan Library Management System) for automating library processes, such as managing library materials and E-prints for storing academic works like theses and dissertations. This infrastructure is supported by the university's TIPD (Data Base Unit), which helps maintain servers and internet connectivity. A dedicated technical team also manages issues related to the website and other library technologies, ensuring a robust system for both students and faculty. This setup is consistent with findings from studies (Sumardi et al., 2021) that emphasize the importance of strong technological infrastructure for libraries to meet the growing demands of the digital era. However, the implementation of newer technologies such as artificial intelligence (AI) has yet to be explored in depth, suggesting that while the infrastructure is solid, there remains a gap in readiness for more advanced tech applications (Ajani et al., 2022).

Seen through Bauman's framework of liquid modernity, this situation highlights a clear instance of structural lag. Bauman argues that in an era where change is rapid and fluid, institutional structures built on stable, rigid, and hierarchical models often struggle to adapt at the same speed as technological innovation. The library's infrastructure, though well-established, represents a form of institutional solidity: it functions efficiently for existing needs but lacks the fluidity required to incorporate more complex, emerging technologies like AI.

This structural lag creates a mismatch between the library's current digital capabilities and the demands of a liquid, technology-driven environment where flexibility, continuous innovation, and anticipatory adaptation are crucial. As technologies evolve at a pace that outstrips organizational readiness, the library must shift from maintaining stability to embracing ongoing transformation. This will require not only infrastructural upgrades but also strategic planning, capacity building, and the cultivation of a more fluid technological mindset aligned with the dynamics of liquid modernity.

3.4.2 Human Resources

> *Oh tiap tahun kami selalu berusaha untuk mengirim pustakawan untuk mengikuti konferensi perpustakaan digital. tahun ini saja kami sudah mengirim bu Sulis untuk hadir di konferensi ini. Selain itu kami juga selalu memfasilitasi pustakawan kami dalam bentuk dana untuk meningkat kompetensi teknologinya. Untuk pustakawan yang masih muda, mereka juga belajar secara otodidak dari internet.*

translation of the interview transcript.

> Every year, we always make an effort to send librarians to attend digital library conferences. This year, we sent Ms. Sulis to attend the conference. Additionally, we always provide funds to support our librarians in improving their technological skills. For younger librarians, they also learn on their own through the internet.

The library exhibits a proactive orientation in developing its human resources, evidenced by continuous efforts to strengthen staff competencies in digital librarianship. The institution regularly sends librarians to technology-focused conferences such as those

attended by Sulis and provides financial support for additional training. Younger librarians also engage in independent online learning, allowing them to stay informed about emerging library technologies (Hussain & Khan, 2025). These initiatives indicate a learning culture that is adaptive and open to technological change.

Despite these efforts, there remains a noticeable gap in formal, structured training related to advanced technologies, particularly Artificial Intelligence. While AI has yet to be fully integrated into library operations, the absence of targeted capacity-building programs suggests that staff readiness is still developing. As Velmurugan (2023) emphasizes, continuous and systematic professional development is vital for equipping librarians to adopt and manage new technologies effectively especially in academic settings where AI tools are becoming increasingly central to information management.

This gap between existing competencies and the demands of emerging technologies is further reinforced by infrastructural limitations. The finding that the library's digital infrastructure is not yet AI-ready resonates with Ajani et al. (2022) who highlight persistent digital divides that hinder technological advancement in many institutions. More importantly, this condition illustrates what Bauman identifies as "structural lag" within liquid modernity: institutions, built on solid and slow-moving bureaucratic structures, struggle to keep pace with fast, fluid technological change. While individual librarians demonstrate agility through self-learning and conference participation behaviors characteristic of liquid adaptability the institution's structural arrangements (training systems, governance frameworks, and technological infrastructure) remain comparatively rigid.

Within the context of liquid modernity, this tension between individual fluidity and institutional solidity becomes a key challenge. The library is attempting to navigate an environment defined by rapid technological shifts, yet its organizational structures and resource systems have not fully transitioned into the flexible, anticipatory forms required for sustainable adaptation. Thus, the library's HR development efforts are commendable but still constrained by deeper structural lags that limit the full integration of advanced technologies like AI.

3.4.3 Regulatory Environment

> *Ada beberapa kebijakan yang sudah kami terapkan dan juga berkoordinasi juga dengan wakil rector I terkait bagaimana merepositori karya dosen dan mahasiswa. Namun regulasi terkait Artificial intelligence kami belum punya, karena AI ini masih baru bagi kami dan kami perlu juga kajian ulang bagaimana penerapan AI di perpustakaan. Repository kami terbuka untuk umum. Bisa diakses 24 jam dan full access. Ini juga jadi gambling bagi kami karena di beberapa perguruan tinggi membuka akses untuk beberapa BAB saja.*

translation of the interview transcript.

> There are several policies that we have implemented, and we also coordinate with the vice rector regarding how to manage the repository of faculty and student works. However, we don't have specific regulations related to Artificial Intelligence yet, as AI is still new to us, and we need to review how AI can be applied in the library. Our repository is open to the public, available 24/7 with full access. This is a bit risky for us because some universities only provide access to certain chapters.

The regulatory environment in the IAIN Curup Library demonstrates a transitional and fluid state, particularly in responding to emerging technologies such as Artificial Intelligence. The library has already implemented several policies related to repository management and maintains coordination with the vice rector regarding the handling of faculty and student works. However, the absence of specific regulations governing AI use indicates a regulatory gap that reflects the institution's cautious stance toward rapidly evolving technologies. Although AI presents potential benefits, the library acknowledges the need for further study to determine appropriate, context-sensitive applications (Buitrago-Ciro et al., 2025).

The decision to provide full, 24/7 open access to the institutional repository aligns with global movements toward openness in scholarly communication (Cobo & Naval, 2013). Yet, this openness is perceived internally as a "gambling" an acknowledgement of risk given that many institutions still limit access to selected chapters or sections. This tension between openness and risk illustrates the library's position within an environment marked by uncertainty and fast-paced change.

When viewed through Bauman's concept of liquid modernity, the situation becomes clearer. Liquid modernity describes a social condition where structures, norms, and institutions are no longer rigid but constantly shifting, requiring individuals and organizations to adapt continuously. In this context, the IAIN Curup Library operates within a regulatory landscape that is fluid rather than fixed. The absence of AI-specific regulations is not merely a gap but a symptom of broader liquid conditions where technological innovations outpace institutional capacities to regulate them.

The library's open-access policy further reflects the ambivalence of liquid modernity: openness provides flexibility, visibility, and academic democratization, but simultaneously increases vulnerability, especially when regulatory frameworks remain underdeveloped. The institution is thus navigating a space where stability is provisional, and policies must remain adaptable to ongoing changes in technology, global standards, and user expectations (Newbould & Williams, 2024). This underscores the need for strategic foresight and collaborative governance to develop AI policies that are both responsive and resilient within this liquid regulatory environment.

3.4.4 Digital Engagement

> *Sejauh ini pemustaka sangat senang menggunakan perpustakaan digital yang kita punya seperti e-theses dan e-repository. Namun ada beberapa aplikasi seperti kubuku dan ejournal yang mahasiswa jarang akses. Mungkin karena kurang promosinya. Para dosen terbantu sekali selain itu membantu naik jabatan fungsional, perpustakaan digital juga membantu kegiatan bimbingan skripsi dan tesis mahasiswa.*
>
> *Adopsi terkait teknologi baru-baru ini seperti AI masih perlu kami pikir ulang. Saya sadar memang banyak manfaat dari AI untuk akademik. namun yang menjadi masalah adalah apakha infrastruktur kami siap dalam menerapkan AI di kegiatan perpustakaan. Karena pustakawan kami juga belum pernah ikut workshop atau mempelajari AI secara mendalam untuk kegiatan perpustsakaan.*

translation of the interview transcript.

> So far, users are very happy with the digital library we have, such as e-theses and e-repositories. However, some applications like Kubuku and e-journals are rarely accessed by students, probably due to a lack of promotion. Faculty members are very much helped by this, as it also helps them in advancing their functional positions. Additionally, the digital library supports the thesis and dissertation guidance process for students.
>
> Adoption of newer technologies like AI still requires more consideration. I understand there are many benefits of AI for academics, but the issue is whether our infrastructure is ready to implement AI in library activities. Our librarians have never attended workshops or studied AI in depth for library operations.

The library has successfully fostered positive digital engagement, especially with its e-theses and e-repository platforms, which are well-received by users, including students and faculty. These platforms facilitate research activities and support thesis and dissertation supervision, contributing to the academic advancement of students (Hussain & Ahmad, 2024). However, there is a noticeable gap in engagement with other digital tools, such as the Kubuku app and e-journals, which students seldom access. This could be attributed to insufficient promotion of these platforms, as the library head noted. Increasing the visibility and usability of such tools is crucial, as it can enhance the overall effectiveness of the digital library and increase user adoption (Hussain & Khan, 2025). The head of the library's admission that AI adoption requires further consideration underscores the challenges faced by the library in embracing newer technologies. While the potential benefits of AI are acknowledged, the library recognizes that its current infrastructure may not yet be fully prepared to support AI applications effectively, highlighting a need for further investment and training in this area (Ajani et al., 2022).

IAIN Curup Library has made significant strides in adopting digital technologies and supporting its human resources, there are still gaps, particularly in the areas of AI readiness and regulatory frameworks for emerging technologies. The ongoing development of both infrastructure and staff competencies will be crucial in ensuring the library can keep pace with the evolving technological landscape in higher education.

4. Conclusion

IAIN Curup Library has made significant progress in adopting digital technologiessuch as digital repositories and automated systemsthat enhance access to academic resources and support research activities for both students and faculty. However, the library continues to face challenges in integrating emerging technologies like artificial intelligence (AI), due to gaps in infrastructure, the absence of formal AI policies, and the need for more advanced training for staff. Although ongoing professional development and participation in digital library conferences demonstrate a commitment to technological advancement, the lack of strategic regulatory frameworks limits the library's readiness for AI adoption. These conditions reflect Bauman's notion of liquid modernity, where rapid technological change outpaces institutional preparedness, creating a structural lag between existing capacities and future demands. To remain relevant in this fluid digital environment, academic libraries must invest more deeply in both technological infrastructure and human resource competencies to ensure their continued role in supporting higher education and research.

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