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Preparing Academic Libraries for Artificial Intelligence-Enhanced Research Consultation Services: Insights from Stakeholder Perspectives

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Abstract

Artificial intelligence has rapidly transformed research practices in higher education and created new opportunities for academic libraries to strengthen research consultation services. Despite its potential, many academic libraries have not been adequately prepared to integrate artificial intelligence into research support services due to organizational, technological, and human resource challenges. This study aimed to explore how academic libraries could prepare for artificial intelligence-enhanced research consultation services by examining stakeholder perspectives at the Library of Universitas Sebelas Maret, Indonesia. A qualitative case study approach was employed, and data were collected through focus group discussions, semi-structured interviews, observations, and document analysis involving librarians, lecturers, students, researchers, and information technology personnel. The data were analyzed using thematic analysis to identify stakeholder expectations, opportunities, implementation challenges, and strategic priorities for artificial intelligence adoption. The findings revealed that stakeholders viewed artificial intelligence as a valuable tool for supporting literature searching, reference management, scholarly writing, research consultation, and research dissemination. However, concerns regarding digital competencies, ethical use, institutional policies, data privacy, and system integration remained significant barriers to implementation. Based on these findings, this study proposed a strategic readiness framework emphasizing organizational commitment, digital infrastructure, librarian capacity development, stakeholder collaboration, and responsible artificial intelligence governance. The study concluded that successful implementation of artificial intelligence-enhanced research consultation services required balanced preparation across technological, organizational, and human dimensions to ensure sustainable, ethical, and user-centered research support in academic libraries.

Keywords: *Academic Libraries, Artificial Intelligence, Research Consultation, Stakeholder Perspectives, Technology Readiness*

INTRODUCTION

Academic libraries are increasingly shifting from their traditional role as providers of information resources toward becoming active partners in supporting research activities [1], [2]. The development of digital scholarship, electronic resources, research data, bibliometric tools, and artificial intelligence (AI) has created new opportunities for libraries to provide more specialized research support [3]. Research consultation may include literature searching, reference management, bibliometric assistance, scholarly communication, publication support, and guidance throughout the research process [4]. These developments position academic libraries as important actors in supporting researchers beyond conventional information access [4].

Artificial intelligence has further expanded the possibilities for research

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consultation[5]. AI-based tools can assist users in discovering literature, developing search strategies, organizing information, managing references, supporting academic writing, and exploring research topics [6]. However, the adoption of AI in academic libraries is not simply a matter of providing access to AI tools [7]. Effective implementation requires organizational preparedness, appropriate digital infrastructure, librarian competencies, user readiness, and clear ethical and governance mechanisms [8]. Without these supporting conditions, AI adoption may create problems related to information accuracy, data privacy, research integrity, professional competencies, and inappropriate dependence on automated outputs [9].

In this study, AI readiness refers to an academic library's overall capacity to adopt, integrate, and sustain AI-enabled services responsibly. It is broader than technological preparedness and comprises organizational, technological, human, user, and governance conditions. Organizational readiness concerns institutional commitment, leadership, resources, policy, and planning; technology readiness concerns the capability to adopt and manage AI technologies; and digital infrastructure refers to the underlying systems, connectivity, authentication, data management, and interoperability that enable AI implementation. Thus, organizational readiness and digital infrastructure are treated as interrelated components of the broader AI-readiness construct, together with librarian competencies, user readiness, and governance and ethical readiness.

The issue is particularly relevant to the Library of Universitas Sebelas Maret (UNS), where research consultation is part of the broader effort to strengthen academic research support. The UNS Library provides research-oriented support through reference services, electronic resources, literature searching, reference management, bibliometric assistance, and scholarly communication and publication guidance. These services are primarily delivered through librarian-mediated consultation and existing digital platforms. AI use in research support is still emerging, particularly through individual use of generative AI and AI-assisted research tools, rather than a fully integrated institutional AI consultation service.

At the library level, a dedicated policy framework specifically governing AI integration into research consultation has not yet been identified. This emerging situation highlights the need to consider institutional direction, professional responsibility, data protection, research integrity, and service standards as part of AI readiness.

The UNS Library was selected because it has an established research-support role and serves diverse stakeholders, including students, lecturers, researchers, librarians, and information technology personnel. The coexistence of established research consultation and emerging AI use makes it a relevant case for examining conditions that should be prepared before systematic AI integration.

Previous research conducted in Indonesian academic libraries has identified challenges in developing research support services, including limited resources, organizational coordination, communication, management support, and monitoring and evaluation [10]. These findings indicate that research support transformation requires organizational and service changes rather than simply the introduction of new technologies. Recent developments in AI have created an additional dimension to this transformation. Existing studies demonstrate that academic library research support has expanded into areas such as research data management, bibliometrics, citation management, electronic information resources, and scholarly communication [11].

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Meanwhile, professional guidance on AI in academic libraries increasingly emphasizes AI knowledge, critical evaluation, ethical considerations, privacy, transparency, and responsible application. These developments suggest that AI readiness should be understood as a combination of technological, organizational, professional, user, and governance capabilities [12].

Although existing AI-readiness frameworks provide foundations for understanding institutional preparedness, the framework proposed here focuses specifically on academic library research consultation and connects readiness with the perspectives of stakeholders who use, deliver, and support the service. It brings together organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness as interrelated components, emphasizing that AI adoption requires more than technological availability.

Despite the growing discussion of AI in academic libraries, relatively limited attention has been given to how different stakeholders perceive the conditions required before AI can be integrated into research consultation services [13]. More specifically, limited attention has been given to how stakeholder perspectives can identify and connect these dimensions within an academic library research-support context. Students, lecturers, researchers, librarians, and information technology personnel may have different expectations and concerns. Students may emphasize accessibility and immediate assistance, while lecturers and researchers may expect more advanced research support. Librarians may be more concerned with professional competencies, information quality, and ethical responsibilities, whereas information technology personnel may focus on infrastructure, integration, security, and technical sustainability [9]. Understanding these differences is important because AI-enhanced research consultation is ultimately a socio-technical service involving people, technology, organizational processes, and professional values.

This study therefore addresses the gap by examining stakeholder perspectives on the preparation required for AI-enhanced research consultation services at the Library of Universitas Sebelas Maret. Rather than evaluating a particular AI application, the study focuses on the broader conditions that need to be established before AI can be integrated into research consultation. The study adopts a qualitative case study approach to explore stakeholder expectations, perceived benefits, implementation challenges, competency requirements, infrastructure needs, and ethical and governance concerns.

The novelty of this study lies in the development of an AI readiness perspective specifically for academic library research consultation services. The study connects stakeholder perspectives with five interrelated dimensions of readiness: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. This perspective provides a framework for understanding AI adoption not merely as technology implementation but as an institutional service transformation.

The study therefore conceptualizes AI readiness as a higher-level construct comprising five interrelated dimensions: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. This configuration distinguishes AI readiness from technology readiness alone and emphasizes alignment among institutional, technological, professional, user, and governance conditions.

Based on this conceptualization, the study asks: (RQ1) How do stakeholders perceive the opportunities and challenges of AI-enhanced research consultation at the UNS

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Library? (RQ2) What conditions do stakeholders identify as necessary for AI readiness? (RQ3) How can these perspectives be synthesized into a strategic AI-readiness framework for responsible and user-centered implementation?

Accordingly, this study aims to explore stakeholder perspectives concerning the readiness of academic libraries to implement AI-enhanced research consultation services and to formulate a strategic readiness framework based on the identified organizational, technological, human, and governance requirements. The findings are expected to provide both a conceptual basis for understanding AI readiness in academic library research support and a practical reference for institutions planning responsible and user-centered AI implementation.

METHOD

This qualitative case study was conducted at the Library of Universitas Sebelas Maret (UNS), Indonesia. Purposive sampling was used to recruit stakeholders with direct experience of or involvement in research support. Data comprised one FGD with 23 participants and seven individual semi-structured interviews involving two lecturers actively involved in scholarly publication, one student, one information technology staff member, and three librarians. The FGD was held on 12 June 2026 in Ruang Nakula, UNS Library; all 23 invited participants attended. The FGD was used to generate collective views and stakeholder interaction, while individual interviews explored experiences and concerns that might not emerge in a group setting.

The FGD and interview guides addressed research needs, access to consultation, consultation experiences, digital services, follow-up, and service improvement. Interviews were conducted flexibly with probing questions. Observations examined the existing research consultation environment and service process, while documentary evidence concerning research-support services was reviewed to provide contextual information. Observation and document findings were recorded using the respective observation and document-analysis guides and used for triangulation.

Data were analyzed inductively using thematic analysis. The research team repeatedly reviewed the FGD and interview data, coded relevant statements, and grouped related codes into categories. Recurring patterns concerning research needs, service gaps, accessibility, communication, support, documentation, integration, and follow-up were compared across stakeholder groups. The categories were synthesized into the Stakeholder Research Consultation User Journey and subsequently interpreted to identify requirements across five AI-readiness dimensions: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. Data sufficiency was assessed through the recurrence and consistency of themes across stakeholder groups and data sources. Triangulation of FGD, interviews, observations, and documents strengthened the credibility of the synthesis.

The researchers were familiar with the UNS Library and its research-support environment, providing contextual understanding and access to the research setting. This insider positionality was addressed by distinguishing prior institutional knowledge from participants' accounts during coding and interpretation and by comparing findings across stakeholder groups and data sources.

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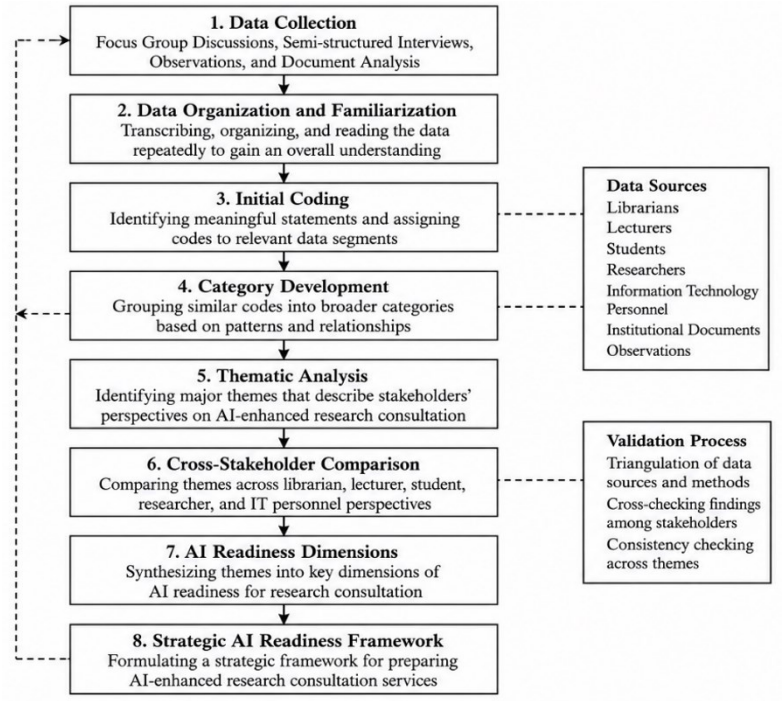


Figure 1. Research Data Analysis Procedure
(Source: Authors Analysis, 2026)

RESULTS AND DISCUSSION

Stakeholder Perspectives on Artificial Intelligence in Research Consultation

Thematic analysis of the FGD, semi-structured interviews, observations, and documents identified five interrelated dimensions of AI readiness: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. These dimensions were not predetermined before data collection. Initial coding focused on stakeholder needs, experiences, expectations, and perceived service problems. Related codes were subsequently grouped into categories and synthesized into broader dimensions of AI readiness.

The findings indicate that stakeholders perceived the development of an integrated digital support system as an opportunity to improve research consultation. A librarian explained that the implementation of the proposed concept could provide several benefits for the library, including greater service-time efficiency, wider access to services, improved service quality, and stronger research collaboration. This perspective indicates that AI-enhanced research consultation was viewed not only as a technological innovation but also as a mechanism for improving service performance and extending the library's role in supporting research.

Students emphasized a different aspect, particularly the need for an accessible medium that could connect them with relevant information and support. One student stated that a medium was needed to bring together the information students require, including research support information and technical information related to the university. This finding indicates that user readiness involves not only the ability to use

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AI but also the availability of an accessible entry point through which users can obtain appropriate information and assistance.

Lecturers similarly emphasized the need for a communication mechanism connecting users with research-support expertise. One lecturer noted that the various applications and support services provided by the university are not always known comprehensively by users, creating a need for a support system that can function as a direct communication medium connecting lecturers and librarians. This finding suggests that the challenge is partly one of service visibility and communication rather than simply the availability of digital resources.

Another librarian highlighted the institutional value of the proposed application, explaining that such an application could become a distinctive research-support service and contribute to the rebranding of the university, particularly Universitas Sebelas Maret. This perspective extends the discussion from operational efficiency to institutional positioning. A digital research-support service may therefore contribute not only to user assistance but also to the library's visibility and the university's research-support identity.

The four stakeholder perspectives show both convergence and differences. The librarian perspective emphasized service efficiency, quality, access, and research collaboration; students emphasized the need to bring together research and university information; lecturers focused on service visibility and direct communication with librarians; while another librarian emphasized institutional distinctiveness and rebranding. Despite these differences, all perspectives point to the need for a more integrated, visible, and accessible research-support environment.

Table 1. Stakeholder Perspectives on AI-Enhanced Research Consultation

Stakeholder	Main Expectations	Main Concerns	Implication for Readiness
Students	Accessible assistance with literature searching, academic writing, and reference management	Accuracy of AI responses and uncertainty about appropriate use	User AI literacy and guided access
Lecturers and researchers	Advanced literature discovery, bibliometric assistance, publication support, and research efficiency	Reliability, research integrity, privacy, and quality of outputs	Specialized AI-supported research services
Librarians	Integration of AI into research consultation while maintaining professional judgment	Competencies, ethics, privacy, verification, and changing professional roles	Librarian AI competencies and service redesign
Information technology personnel	Reliable infrastructure, system integration, security, and sustainable implementation	Data security, interoperability, system capacity, and maintenance	Digital infrastructure and technical governance

(Source: Authors Analysis, 2026)

The differences presented in Table 1 suggest that AI adoption should not begin with the selection of an AI application. Instead, the process should begin by identifying the

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research-support problems that AI is expected to address and determining whether the organization has the capacity to manage the resulting technological and professional changes. This interpretation is consistent with the current ACRL AI Competencies for Academic Library Workers, which emphasizes that academic library workers require competencies in ethical considerations, AI knowledge and understanding, analysis and evaluation, and use and application.

The finding therefore supports a human-centered approach to AI adoption. UNESCO similarly emphasizes that the development of generative AI should be accompanied by human capacity development, ethical safeguards, data privacy protection, and coherent institutional policies rather than being treated as a purely technological solution.

Organizational and Digital Readiness

The findings showed that organizational readiness constituted an important foundation for AI-enhanced research consultation. Stakeholders recognized that the introduction of AI would affect existing service processes, staff responsibilities, user interaction, and institutional policies. Consequently, AI adoption required management support, clear institutional direction, resource allocation, coordination among relevant units, and a shared understanding of the intended role of AI in research support.

The organizational dimension was particularly important because research consultation does not operate as an isolated library activity. It is connected with research management, information technology, academic departments, scholarly communication, and institutional research policies. The integration of AI therefore requires collaboration between the library and other university units rather than an implementation process conducted solely by library staff.

The findings also identified digital infrastructure as a critical condition. AI-enhanced research consultation requires reliable connectivity, appropriate hardware and software environments, secure authentication, access to relevant scholarly resources, and integration with existing digital library systems. Without adequate infrastructure, the potential advantages of AI may not translate into meaningful improvements in research consultation.

However, the findings suggest that infrastructure should not be interpreted simply as the availability of computers or internet connectivity. The more important issue concerns the integration of AI into the existing research-support ecosystem. An isolated AI tool may provide useful responses but may not be connected to the library's discovery systems, institutional repositories, research databases, reference-management environments, or consultation records. Integration is therefore necessary if AI is expected to function as part of a sustainable research-support service.

This finding extends the concept of technology readiness. A technologically ready academic library is not merely one that possesses digital tools but one that can connect those tools with organizational processes and professional services. In this context, digital infrastructure should serve as an enabling layer rather than becoming the primary objective of transformation.

Librarian Competencies and User Readiness

Another major finding concerned the human dimension of AI readiness. Stakeholders recognized that the successful use of AI in research consultation depended heavily on the competencies of librarians and users. Librarians were expected not only to know how to operate AI tools but also to understand their limitations, evaluate the reliability of

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generated information, recognize potential bias, formulate appropriate prompts, and explain responsible AI use to users.

This finding is strongly aligned with theACRL AI Competencies for Academic Library Workers approved in 2025 [14]. The framework explicitly identifies analysis and evaluation as core competencies and emphasizes that librarians should assess the accuracy, relevance, robustness, bias, fairness, transparency, and appropriateness of AI tools in relation to specific library tasks.

The implication is important for the future role of academic librarians. AI may automate some routine aspects of information retrieval, but this does not eliminate the need for librarians. Instead, the professional role may shift toward AI-mediated research guidance, in which librarians help users formulate research questions, select appropriate information sources, evaluate AI-generated outputs, verify references, and understand the limitations of automated systems.

The findings also demonstrated that user readiness must accompany librarian readiness. Students, lecturers, and researchers may already use generative AI independently, but independent use does not necessarily indicate adequate AI literacy. Users need to understand that AI-generated responses may contain inaccuracies, fabricated references, biased representations, or incomplete information. Consequently, the library's future research consultation role may include educating users about responsible AI-supported research practices.

This interpretation reinforces the relationship between AI literacy and information literacy [7]. ACRL's framework explicitly connects AI literacy with longstanding information-literacy concerns regarding authority, credibility, bias, and ethical information practices. Thus, AI readiness provides an opportunity for academic libraries to extend their established educational role rather than abandon it.

Governance and Ethical Readiness

The analysis identified governance and ethical issues as another major dimension of AI readiness. Stakeholders expressed concerns regarding data privacy, reliability of AI-generated information, intellectual property, research integrity, transparency, and the appropriate boundaries of AI use. These concerns were particularly relevant because research consultation may involve unpublished research ideas, manuscript drafts, research data, personal information, and other potentially sensitive materials.

The findings indicate that AI adoption without clear institutional guidelines could create uncertainty for both librarians and users. Librarians need to know which AI tools may be recommended, what types of research information can be entered into external AI systems, how AI-generated information should be verified, and how AI use should be disclosed in research activities. Users similarly require clear guidance concerning appropriate and inappropriate applications of AI.

This finding is consistent with UNESCO's human-centered guidance, which identifies privacy protection, ethical validation, institutional policy, and human capacity as essential elements in the responsible use of generative AI in education and research. ACRL likewise emphasizes privacy, intellectual property, accountability, transparency, accuracy, and reliability within its AI competencies for academic library workers.

Therefore, governance should not be positioned as a final administrative step after the technology has been implemented. Governance needs to be incorporated from the beginning of the service-development process. The findings suggest that responsible AI

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governance should cover tool selection, data protection, user guidance, output verification, accountability, ethical use, and continuous evaluation.

AI Readiness Framework for Research Consultation Services

The integration of the findings resulted in five interrelated dimensions of AI readiness: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. These dimensions should be understood as interconnected rather than independent components. Organizational readiness provides institutional direction and support, while digital infrastructure provides the technical foundation. Librarian competencies enable professional application of AI, user readiness supports responsible engagement with AI-enhanced services, and governance and ethical readiness establishes boundaries for safe and accountable implementation.

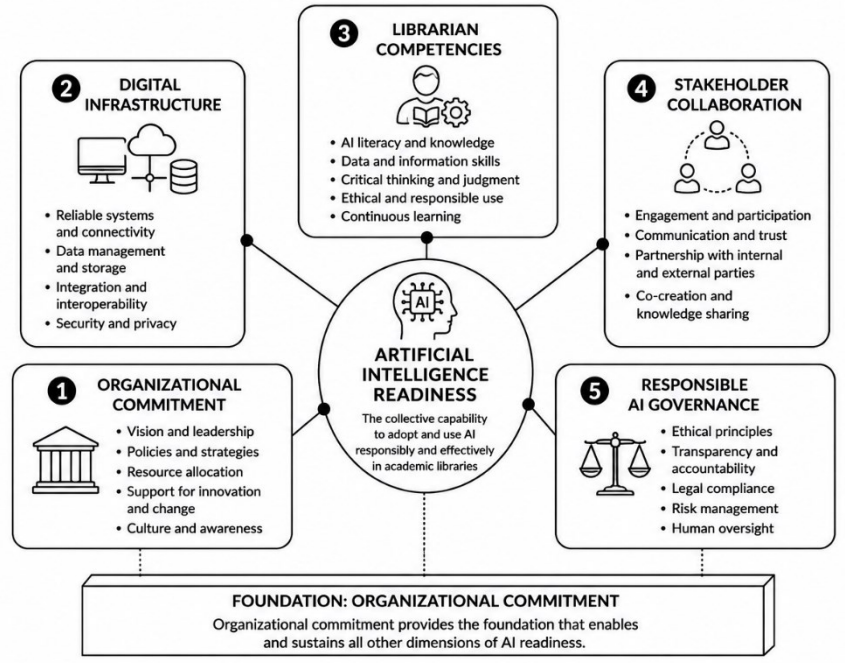


Figure 2. Dimensions of Artificial Intelligence Readiness
(Source: Authors Analysis, 2026)

The framework suggests that organizational readiness functions as a foundational dimension. Institutional commitment determines whether AI adoption is supported through policy, resources, leadership, collaboration, and service planning. Without organizational support, investment in infrastructure or staff training may remain fragmented and difficult to sustain.

Digital infrastructure represents the enabling dimension. The library requires adequate systems, connectivity, authentication, data management, and interoperability to incorporate AI into research consultation. However, the findings indicate that infrastructure should be developed according to identified service needs rather than technology availability alone.

Librarian competencies constitute the professional dimension. Librarians need sufficient knowledge to understand AI, evaluate its outputs, identify risks, apply appropriate tools, and guide users. This dimension is particularly important because the

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value of AI in research consultation depends not only on what the system can generate but also on how professional expertise is used to interpret and validate its outputs.

User readiness represents the demand-side dimension of the framework. AI-enhanced research consultation will be effective only when users understand how to engage with AI appropriately. User readiness therefore includes AI literacy, critical evaluation, awareness of limitations, and understanding of responsible research practices.

Finally, governance and ethical readiness provides the accountability dimension. It establishes the principles and institutional mechanisms necessary to protect privacy, maintain research integrity, address bias, clarify accountability, and ensure that AI remains aligned with institutional and professional values.

Thus, the five dimensions were empirically derived rather than imposed on the data at the outset. Collectively, these dimensions indicate that AI readiness is a multidimensional organizational capability rather than a technology adoption decision. The analytical contribution of this study lies in connecting professional AI competencies with the broader institutional conditions required for AI-enhanced research consultation. While the ACRL framework provides detailed competencies for academic library workers, the present framework situates these competencies within a broader service ecosystem encompassing organizational, technological, user, and governance conditions. The ACRL framework provides detailed competencies for academic library workers, whereas the present framework connects those competencies with organizational, technological, user, and governance conditions [15].

Theoretical and Practical Implications

The analytical contribution of this study lies in connecting AI competencies with the broader institutional conditions required for AI-enhanced research consultation. Rather than proposing a new organizational or technology-readiness theory, the framework provides a context-specific synthesis of five interrelated dimensions: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. While the ACRL framework provides detailed competencies for academic library workers, the present framework situates these competencies within a broader research-support service ecosystem.

The findings also provide a broader interpretation of AI literacy in academic libraries. AI literacy should not be limited to operating generative AI tools but should include evaluating AI-generated information, recognizing limitations and bias, protecting sensitive information, verifying scholarly sources, and making informed decisions about appropriate AI use. This interpretation is consistent with the ACRL framework's emphasis on ethical considerations, knowledge and understanding, analysis and evaluation, and responsible application [15].

Practically, the framework provides a basis for the Library of Universitas Sebelas Maret to plan AI-enhanced research consultation progressively. Priority should be given to organizational direction and governance, followed by assessment of digital infrastructure and librarian competencies. User AI literacy can be strengthened through consultation, training, and information-literacy activities. AI applications should then be selected according to specific research-support needs and evaluated continuously.

The findings further indicate that AI should augment rather than replace professional research consultation. AI may assist routine activities such as information discovery and preliminary guidance, while complex research problems continue to require contextual understanding, critical judgment, source evaluation, and professional accountability. This

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human-AI relationship is important because the credibility and responsible use of scholarly information remain central to academic library services.
The framework may also serve as an assessment and planning tool for other academic libraries. However, it should not be treated as a fixed implementation formula because institutional infrastructure, research environments, librarian competencies, user needs, and governance maturity may differ. Further expert review and testing across different academic library contexts are therefore required.

Overall, AI readiness should be understood not simply as the availability of AI technology but as the capacity of an academic library to integrate AI responsibly into its services, people, organizational processes, and governance. The proposed framework provides a context-specific structure for assessing these conditions within research consultation services.

CONCLUSION

This study addressed the question of how stakeholders perceive the readiness required for implementing AI-enhanced research consultation services at the Library of Universitas Sebelas Maret. The findings show that stakeholders perceive AI as a complementary technology that can improve access to research support, service efficiency, communication, and research collaboration, but its implementation requires more than the availability of AI applications. Students primarily require accessible and integrated support, lecturers emphasize direct communication and service visibility, while librarians emphasize service quality, professional competencies, and responsible implementation. These perspectives indicate that AI readiness is shaped by both shared needs and stakeholder-specific priorities.

The second question concerned the conditions required for AI-enhanced research consultation. The study identified five interrelated dimensions derived inductively from the empirical data: organizational readiness, digital infrastructure, librarian competencies, user readiness, and governance and ethical readiness. Organizational readiness provides the institutional foundation, digital infrastructure enables service integration, librarian competencies support professional application, user readiness enables responsible engagement, and governance and ethical readiness provides accountability. These dimensions were synthesized into a context-specific AI-readiness framework for research consultation services.

The study therefore answers the research problem by demonstrating that readiness for AI-enhanced research consultation should be understood as a multidimensional service capability involving organizational, technological, professional, user, and governance conditions, rather than as a technology adoption decision alone. The framework provides an initial basis for assessing readiness and planning AI integration at the UNS Library and potentially other academic libraries. However, it has not yet undergone formal expert validation or implementation testing. Further research should validate and refine the framework through expert review and application in different academic library contexts.

DECLARATION OF GENERATIVE AI

During the preparation of this work, the authors used ChatGPT (OpenAI) to assist with language refinement, manuscript organization, and the development of the written

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presentation. After using this tool, the authors reviewed, verified, and edited the content as necessary and take full responsibility for the accuracy, originality, interpretation, and final content of the publication.

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