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DEVELOPING A FRAMEWORK FOR AI-ISLAMIC KNOWLEDGE MAPPING AT MALAYSIAN ISLAMIC-BASED SPECIAL LIBRARY: A PRELIMINARY STUDY

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Abstract: *This conceptual paper proposes a preliminary framework for AI-enabled Islamic knowledge mapping tailored to Malaysian Islamic-based special libraries. Traditional cataloguing systems such as Dewey Decimal Classification (DDC) and Library Congress Classification (LCC) usually not be able to capture the semantic depth, interdisciplinary nature, and epistemological principles inherent in Islamic knowledge. By integrating Artificial Intelligence (AI) tools, particularly natural language processing (NLP), machine learning, and ontology development with Islamic epistemological foundations like maqasid al-shariah and tawhid, the study addresses the limitations of existing systems. Utilizing Jabareen's eight-phase methodology, the framework offers a structured model for enhancing semantic search, multilingual access, and thematic classification. The outcome supports Malaysia's digital transformation agenda while preserving the authenticity of Islamic intellectual traditions. This framework provides a theoretical foundation for future empirical validation for ontology and system development in the context of Islamic knowledge management.*

Keywords: *Artificial Intelligence, Islamic Knowledge, Knowledge Mapping, Special Libraries, Malaysia, Ontology, Natural Language Processing*

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Introduction

Islamic-based special libraries are a subset of special libraries that focus specifically on the acquisition, preservation, and dissemination of Islamic knowledge. Islamic-based special libraries are specialized institutions that focus on the collection, preservation, and dissemination of knowledge rooted in Islamic teachings, culture, and civilization. Islam-based libraries require specialized knowledge structures to reflect religious epistemology (Wan Ainol Mursyida & Saidatul Akmal Ismail, 2022). These libraries differ from general academic or public libraries in their core collections and services are tailored to support Islamic scholarship, for example, like resources in Qur'anic studies, Hadith, Fiqh Usul al-Fiqh, such as principles of Islamic jurisprudence, Islamic philosophy, Arabic linguistics, and the socio-cultural dimensions of the Muslim world (Idrees, 2012). Globally, these libraries serve as the intellectual hubs for researchers, scholars, and students of that organization, and mostly their research is dedicated to Islamic studies and research.

The notable examples of Islamic special libraries worldwide illustrate the global commitment to preserving and promoting Islamic knowledge. The King Faisal Centre for Research and Islamic Studies (KFCRIS) in Riyadh, Saudi Arabia, is renowned for its extensive manuscript collections and advanced digitization initiatives (KFCRIS, 2023). In Egypt, the Al-Azhar Library in Cairo stands as one of the oldest and most prestigious repositories of Islamic knowledge, closely associated with Al-Azhar University. The Islamic Research Institute Library (IRI) in Islamabad, Pakistan, affiliated with the International Islamic University, plays a crucial role in supporting modern Islamic thought and scholarly research (International Islamic University Islamabad, 2022). In Yemen, Dar al-Makhtutat (House of Manuscripts) in Sana'a safeguards a significant collection of rare Islamic manuscripts, many of which date back to the early centuries of Islam (Al-Jallad, 2019). Meanwhile, in the Western academic context, the Islamic Heritage Project by the Harvard University Library in the United States represents a major effort to digitize and provide global access to Islamic manuscripts, historical maps, and classical texts (Harvard University Library, 2023). These libraries, though diverse in location and affiliation, share a unified purpose in preserving the intellectual legacy of the Islamic world.

In the Malaysian context, Islamic-based special libraries such as the library at the International Islamic University Malaysia (IIUM) and the Library of the Institute of Islamic Understanding Malaysia (IKIM) exemplify localized efforts to curate Islamic knowledge resources relevant to the Southeast Asian region. These libraries serve as intellectual hubs that support academic research, policy development, and the dissemination of Islamic thought through multilingual collections and specialized databases (IKIM, 2022; IIUM Library, 2023). Their efforts reflect Malaysia's broader aim of becoming a regional center for Islamic scholarship and thought leadership, particularly in the context of the Malay-Muslim world (Perdana Leadership Foundation, 2019).

These institutions play a vital role not only in information management but also in preserving cultural identity and supporting the development of Islamic epistemology in the modern era. However, in Malaysia and beyond, these libraries often utilize traditional cataloguing systems such as the Dewey Decimal Classification (DDC) or Library of Congress Classification (LCC) (Antonio et al., 2021). While functional, these systems are primarily developed from a Western epistemological framework and may lack the semantic depth and conceptual structure to accommodate the interconnected, thematic, and multilingual nature of Islamic knowledge (Badri, 2023). Artificial Intelligence (AI) has emerged as a transformative technology across various sectors, including education, healthcare, and information science. In the library context,

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AI has shown potential in automating cataloguing, enhancing metadata enrichment, developing intelligent retrieval systems, and enabling semantic search (Gujral et al., 2019). Despite these advancements, Islamic-based special libraries in Malaysia have yet to leverage AI's full potential to support knowledge discovery and classification that aligns with Islamic epistemology.

Conventional library classification systems that were developed are primarily structured for the general, discipline-based organization of knowledge. These systems often fall short in representing the complexity of Islamic knowledge, which is inherently interconnected and rooted in specific religious, linguistic, and cultural contexts. Core Islamic concepts such as *tafsir*, *fiqh*, and *aqidah* are not only semantically rich but also interrelated across theological, legal, and historical dimensions. Furthermore, the use of multiple languages, such as Arabic, Jawi, and Malay, adds another layer of complexity to effective organization and retrieval This issue is exemplified by a case study at the Jabatan Kehakiman Syariah Malaysia Library (JKSM), which identified major cataloguing challenges including inconsistent transliteration, Arabic input limitations, and the inadequacy of standard subject headings for legal Islamic texts. Md Nor et.al. (2024) analysed Arabic cataloguing procedures at the Jabatan Kehakiman Syariah Malaysia Library and highlighted key challenges in transliteration and classification. The study underscores the importance of implementing localised systems to better capture the structure and semantics of Islamic legal materials. Consequently, users may encounter difficulties in accessing relevant materials through conventional keyword-based search systems, which lack the semantic depth to facilitate thematic or conceptual discovery.

The Fifth Industrial Revolution is initiating a significant period of technical progress and societal change, necessitating a thorough analysis of the changing function of libraries within this digital environment (Adigun et al., 2024). Despite global advances in AI for semantic search and knowledge discovery, Malaysian practice still rests largely on general-purpose Western schemes: public/state libraries fall under the National Library of Malaysia (PNM), which prescribes and extends the Dewey Decimal Classification for general collections across its national network of 14 state library systems; hence DDC remains the de facto standard in the public sector, not an Islamic-specific framework (PNM, 2017; PNM, 2019; OCLC/PNM, 2012).

In the academic sector, most large Malaysian university libraries adopt the Library of Congress Classification, while coverage is “broad,” epistemological alignment with tawhid and maqāṣid al-sharīʿah is thin: even specialist institutions report that standard schemes (DDC/LCC) remain inadequate or biased for Islamic literature (Nor et al., 2024; Idrees, 2012). AI, meanwhile, is under-utilised not only because tools are immature in library workflows but also because culturally sensitive, language-appropriate models and corpora are scarce. Empirically, librarians in Malaysia and Indonesia still characterise AI in libraries as being at an “early stage” of integration, with incomplete operational adoption (Mutia et al., 2024).

Normatively, recent studies highlight the need to align AI use with maqāṣid-guided ethics in Muslim contexts, reinforcing that “drop-in” models risk misrepresentation without domain-specific ontologies and governance (Hakim et al., 2024).Without a guiding framework that couples AI capabilities with Islamic epistemology, deployments risk simply reproducing the limitations of DDC/LCC-centric structures or, worse, distorting core Islamic concepts (Mohadi & Tarshany, 2023; Hamid & Bani-Domi, n.d.; Idrees, 2012). Building on this, the present study proposes a preliminary conceptual framework that integrates NLP and ontology-based services

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with principles of tawhid and maqāṣid to enhance knowledge mapping and access in Malaysian Islamic-based special libraries.

Research Objectives

This conceptual study seeks to address the gap in AI integration within Islamic knowledge management by proposing a framework that is both technologically innovative and epistemologically aligned with Islamic principles. Despite growing global interest in the application of artificial intelligence (AI) across digital libraries, education, and information science, there remains a lack of tailored frameworks that reflect the ontological and epistemological foundations of Islamic knowledge, such as the principles of *tawhid*, *maqasid al-shariah*, and the holistic nature of *'ilm* (Asyibli et al., 2025). Most existing AI-driven knowledge systems are designed within Western paradigms that emphasize secular, discipline-based taxonomies, which may marginalize or misrepresent the thematic interconnectivity and spiritual dimensions inherent in Islamic knowledge. Furthermore, current classification and retrieval systems often fail to accommodate the multilingual and jurisprudential complexities found in Islamic scholarship, highlighting an urgent need for culturally and theologically sensitive AI models (Elmahjub, 2023).

Accordingly, this study sets out three key objectives. First, to assess the limitations of current knowledge organization practices in Malaysian Islamic-based special libraries, particularly in representing the semantic richness and interdisciplinary nature of Islamic knowledge. Second, to identify relevant AI technologies, such as natural language processing (NLP), ontology engineering, and machine learning, that can be effectively utilized for Islamic knowledge mapping. Third, to propose a preliminary conceptual framework that integrates AI tools with Islamic epistemological principles to enhance knowledge classification, semantic search, and user access in Malaysian Islamic-based special libraries. Collectively, these objectives lay the groundwork for subsequent empirical validation and expert consultation, ensuring that the framework is both technologically robust and epistemologically sound.

Literature Review

Existing AI-driven knowledge systems are predominantly designed within Western paradigms that emphasize secular, discipline-based taxonomies, such as the Dewey Decimal Classification (DDC) and Library of Congress Classification (LCC). These systems often fragment knowledge into specialized categories, overlooking the interconnectedness and spiritual dimensions of Islamic knowledge traditions (Idrees, 2012; Elmahjub, 2023). Current literature highlights this gap, but comparative studies contrasting Western classification models with Islamic epistemological approaches remain limited, underscoring the urgent need for culturally and theologically sensitive AI models.

This literature review explores key domains that form the theoretical foundation of the proposed framework. It is structured around three main themes: First, the context of Islamic Knowledge Organization Systems, which examines traditional and indigenous approaches to classifying Islamic materials. Second, the role of Artificial Intelligence (AI) in Knowledge Mapping and Digital Libraries, focusing on how technologies such as natural language processing, machine learning, and ontologies enhance information discovery. Third, the Challenges in Representing Islamic Knowledge and the importance of Conceptual Frameworks in Library and AI Research, which highlight the limitations of existing models and the need for epistemologically grounded frameworks. These themes collectively inform the integration of AI tools with Islamic epistemology in a library context.

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Islamic Knowledge Organization Systems

The organization of Islamic knowledge has historically followed structures that reflect the epistemological and disciplinary traditions of Islam. Core Islamic disciplines such as Qur'anic exegesis (*tafsir*), Hadith studies, Islamic jurisprudence (*fiqh*), theology (*kalam*), and Sufism are deeply interwoven and often presented through non-linear, thematic, or holistic frameworks. Traditional classification systems in modern libraries, however, are typically based on Western epistemology, which tends to compartmentalize subjects. Systems such as the Dewey Decimal Classification (DDC) or the Library of Congress Classification (LCC) often fail to accommodate the semantic and thematic complexity of Islamic disciplines (Ritonga & Saputra, 2022). This misalignment can hinder meaningful access to materials and dilute the contextual richness of Islamic scholarship.

To address this challenge, scholars and library professionals have proposed indigenous knowledge organization systems (KOS) that are better suited to the Islamic intellectual tradition. These include taxonomy models and subject heading lists that are developed based on Islamic worldviews and pedagogical needs. Moslimany et al., (2024) discuss the complexities of designing holistic curricula in Islamic education, emphasizing the need to align pedagogy with Islamic epistemological values. It has been emphasized that knowledge in Islam is holistic and should be organized according to thematic connections and spiritual purposes rather than rigid academic compartments. Moreover, Rahman et al. (2022) highlight that effective knowledge management is essential for nurturing learning organizations in Islamic educational institutions. Their study underscores the importance of systematizing and contextualizing knowledge resources not only for organizational growth but also for sustaining intellectual traditions within a faith-based framework. This supports the call for indigenous Islamic KOS that align with institutional values and operational needs, making the organization of knowledge a central pillar of institutional learning and strategic development.

Despite these innovations, the implementation of indigenous KOS remains relatively limited in practical library settings, particularly in digital environments. Many Islamic libraries still rely on Western systems due to institutional requirements, legacy systems, or a lack of expertise in customizing classification tools. As a result, important Islamic texts are often misclassified, overlooked in searches, or disconnected from related subjects, especially in multilingual contexts where Arabic, Jawi, and Romanized Malay texts coexist (Roshdy, 2023). This leads to fragmented knowledge discovery and reduced user engagement.

The rise of digital libraries and online Islamic repositories has introduced new challenges and opportunities in organizing Islamic knowledge. Digital interfaces often default to keyword-based retrieval systems, which do not support deeper semantic relationships or thematic exploration. This limitation is particularly significant in the context of Islamic knowledge, which relies heavily on intertextuality and context-driven meaning. For instance, Khan et al. (2024) explored the application of semantic web and ontology technologies in digital libraries from the perspective of LIS professionals in Pakistan. It has been argued that ontology-based systems and semantic web technologies can offer more effective solutions for organizing religious content, enabling thematic searches and richer metadata annotations. In this evolving landscape, there is a critical need to revisit and modernize Islamic knowledge organization systems by leveraging Artificial Intelligence (AI) technologies such as natural language processing (NLP), automated tagging, and ontology development (Adnan, 2024). These tools can bridge the gap between traditional Islamic epistemology and contemporary digital

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information systems, enhancing accessibility, discoverability, and contextual integrity. Integrating AI into Islamic knowledge mapping represents a strategic step forward, aligning with global trends in digital transformation while preserving the authenticity and complexity of Islamic intellectual heritage. As Hemmet (2023) argues, the harmonization of AI with Islamic values is not only possible but necessary, as it ensures that technological advancements respect religious, social, and ethical dimensions unique to Muslim societies.

AI in Knowledge Mapping and Digital Libraries

The integration of Artificial Intelligence (AI) into digital libraries and knowledge mapping has gained significant traction in recent years, reflecting broader trends in digital transformation. Numerous studies have employed bibliometric and scientometric approaches to trace research developments in this area, shedding light on both the evolution and the future direction of AI in library and information science.

Nguyen and Chowdhury (2013) provided one of the earliest comprehensive knowledge maps of digital library research spanning two decades (1990–2010), highlighting conceptual clusters and evolving research priorities. While their analysis laid the groundwork for understanding thematic progressions in digital library development, it predated the mainstreaming of AI technologies and therefore did not fully address the current technological landscape. In contrast, more recent studies have zeroed in on the role of AI specifically. For example, Park and Kim (2024) used bibliographic mapping to identify major IT and AI trends in libraries, revealing a shift toward personalization, intelligent search, and user behavior analytics as core areas of development.

Complementing this, Hussain and Ahmad (2024) conducted a bibliometric review that mapped AI-focused research in academic libraries. Their findings showed an exponential rise in interest post-2020, with keywords such as "semantic search," "AI-driven recommendation systems," and "automated metadata generation" dominating scholarly discourse. Similarly, Borgohain et al. (2024) analyzed the application of AI in libraries (AAIL) using scientometric tools, arguing that while AI integration is growing, most implementations remain surface-level, lacking deeper semantic structuring aligned with domain-specific knowledge frameworks.

This critique is particularly relevant in the context of Islamic knowledge systems. El Ganadi et al. (2023) investigated the feasibility of using AI models like ChatGPT for categorizing Islamic knowledge in digital libraries. Their findings underscore a critical limitation: generic AI tools often lack epistemological alignment with Islamic traditions, raising concerns about misclassification and loss of contextual integrity. This echoes broader arguments in the literature that AI tools must be customized to accommodate the thematic interconnectivity and religious significance embedded in Islamic scholarship.

Moreover, Muslim (2024) examined the impact of digital transformation on access, user experience, and knowledge management in academic libraries. He noted that while digital interfaces powered by AI enhance discoverability and automation, they can inadvertently diminish the depth and contextual richness of knowledge when not paired with culturally and epistemologically appropriate classification systems.

Taken together, these studies highlight both the opportunities and limitations of AI in digital libraries. On one hand, AI enables advanced knowledge discovery, semantic indexing, and adaptive user interfaces. On the other hand, its utility in religiously grounded or

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epistemologically complex domains like Islamic knowledge mapping remains constrained unless coupled with frameworks sensitive to religious, linguistic, and cultural intricacies. Therefore, future implementations of AI in Islamic digital libraries must move beyond technological adoption toward contextual alignment and semantic fidelity, ensuring that the tools enhance, not obscure, the authenticity of the intellectual heritage they aim to preserve.

Challenges in Representing Islamic Knowledge

Representing Islamic knowledge within digital and library systems presents unique challenges rooted in its semantic complexity, linguistic diversity, and epistemological foundations. Unlike conventional academic disciplines, Islamic knowledge is deeply embedded in theological and philosophical traditions that often defy linear or rigid categorization. Despite the growing adoption of artificial intelligence (AI) in various sectors, its application within the domain of Islamic knowledge presents several epistemological, ethical, and practical challenges. Scholars have critically examined these limitations, highlighting issues such as semantic misrepresentation, incompatibility with Islamic legal reasoning, loss of spiritual depth, and algorithmic bias. Malik (2023) argues that the foundational principles of AI, that rooted in logic, pattern recognition, and probabilistic inference, often conflict with the metaphysical underpinnings of Islamic thought, which emphasize divine revelation, ethical intentionality, and spiritual interpretation. Similarly, Anoraga (2024) explores how AI technologies risk reducing Islamic teachings to decontextualized data points, overlooking their holistic and spiritual nature. These concerns are echoed by Al Momani (2025), who cautions that the use of AI in Islamic jurisprudence (*fiqh*) may oversimplify complex ethical rulings, thereby distorting religious authenticity and scholarly interpretation.

Kausar et al. (2024) delve into the compatibility between AI systems and Islamic law, identifying critical gaps in reasoning models, especially when AI attempts to mimic human ijtihad (independent reasoning). They emphasize that AI lacks the moral consciousness and contextual sensitivity essential for Islamic legal interpretation. Supporting this concern, Salim and Aditya (n.d.) outline that while AI can assist in administrative and pedagogical aspects of Islamic education, it faces challenges when tasked with representing dynamic theological discourse.

In a unique angle, Sukkar et al. (2024a) address the difficulties in using AI to represent Islamic architecture, noting that current models like Midjourney struggle to reflect culturally accurate aesthetics and spiritual symbolism. Their subsequent work (Sukkar et al., 2024b) further reveals the limitations of AI-generated representations in capturing the layered symbolism of Islamic heritage, illustrating that these gaps are not limited to textual knowledge but extend to visual and spatial knowledge as well.

Ahmi (2024) highlights how AI can empower Islamic studies scholars through bibliometric tools and trend analysis. However, he also points out limitations in how AI systems interpret Islamic sources, often prioritizing keyword frequency over interpretive depth. This is reinforced by Mehmood et al. (2024), who identify structural challenges in aligning AI outputs with the nuanced interpretive traditions of Islamic scholarship, particularly in areas like *tafsir* and *hadith* studies.

Herwinsyah et al. (2025) and Muslim (2024) emphasize the institutional and pedagogical limitations of AI integration in Islamic education. While AI enhances personalization and access, it also risks dehumanizing the teacher-student relationship, which is central to Islamic

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pedagogy. Moreover, disparities in digital infrastructure and the digital divide across the Muslim world further hinder effective implementation.

Despite these challenges, the literature also reflects a cautious optimism. El Ganadi et al. (2023), for instance, experimented with ChatGPT in organizing Islamic digital libraries and concluded that while current models fall short epistemologically, future ontological models hold promise if grounded in Islamic worldview principles. This calls for a shift from generic AI adoption to the co-creation of Islamically informed AI systems that respect the complexity of sacred knowledge traditions.

The literature consistently underscores that the primary challenge of AI in representing Islamic knowledge lies not in technological limitations per se, but in the epistemological and cultural misalignment between secular algorithmic logic and Islamic modes of knowing. Addressing this requires interdisciplinary collaboration, development of ontologically grounded Islamic knowledge frameworks, and ethical AI design that upholds spiritual integrity. As such, integrating AI into Islamic knowledge systems should be seen as a long-term, iterative process, guided by both scholarly tradition and technological innovation.

Conceptual Frameworks in Library and AI Research

Conceptual frameworks serve as interpretative tools that bridge theoretical constructs with real-world applications, especially in interdisciplinary fields such as library science and artificial intelligence (AI). They provide researchers with a structured approach to explore phenomena such as digital transformation, knowledge representation, user interaction, and system design. Within Library and Information Science (LIS), frameworks are essential for navigating the convergence of technology, organizational dynamics, and epistemic cultures (Roknuzzaman et al., 2009).

The need for robust conceptual models is even more critical when addressing emerging domains like AI implementation in libraries. In such contexts, empirical data may be limited or fragmented, requiring exploratory models to guide both inquiry and practice. Jabareen (2009) provides a widely adopted eight-phase method for constructing conceptual frameworks. This approach promotes the synthesis of interrelated concepts from various fields to generate a unified theoretical model. It is particularly relevant for interdisciplinary studies where technical, organizational, and philosophical domains—such as Islamic epistemology—must intersect meaningfully.

Building on Jabareen's methodology, several scholars have developed frameworks tailored to AI adoption in information environments. Shonhe (2025), for example, proposed a framework to evaluate AI technology readiness and adoption intention in records and information management (RIM). His model emphasizes the influence of perceived usefulness, system complexity, and organizational support, highlighting factors that are also critical for library settings attempting to implement AI for cataloging, retrieval, or knowledge discovery. Shonhe's model leans toward intention and behavioral aspects.

Ethical concerns also feature prominently in conceptual work on AI. Chowdhury and Oredo (2023) advanced a normative conceptual framework that accounts for ethical bias in AI systems. Their model incorporates social norms, policy vacuums, and cultural sensitivities—elements highly relevant in Islamic knowledge systems where ethical demarcations rooted in religious law and values are paramount. This parallels Abbas' (2020) framework, which incorporated

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ethics into AI integration within information systems, advocating for culturally aware design—an argument particularly compelling in Muslim-majority societies or Islamic digital libraries.

Semantic technologies and intelligent systems further expand the conceptual space in digital library research. Ravish and Nagaraja Naik (n.d.) focus on content retrieval using semantic web services, proposing a user-driven knowledge model that enhances discoverability through ontologies that emphasize semantic enrichment for user-cantered information systems. These models align well with the needs of Islamic digital libraries, which require retrieval systems that can semantically interpret theological terms, contextual relationships, and multilingual nuances.

The integration of knowledge management (KM) processes into digital library systems is another critical domain. Roknuzzaman et al. (2009) proposed a theoretical model for embedding KM functions, such as knowledge creation, storage, sharing, and application, into digital library infrastructures. This framework is particularly applicable to AI-driven Islamic knowledge repositories, where managing tacit and explicit forms of religious knowledge is essential for preserving epistemological integrity and accessibility.

Taken together, these studies reveal that conceptual frameworks in library and AI research serve multiple roles: they assess readiness (Shonhe, 2025), guide ethical integration (Chowdhury & Oredo, 2023), improve retrieval (Ravish & Naik), and support knowledge lifecycle management (Roknuzzaman et al., 2009). However, most existing models are either general-purpose or tailored for secular environments. There is still a gap in frameworks that explicitly integrate Islamic epistemological structures, such as *maqasid al-shariah* and *tawhidic* principles, into the architecture of AI systems for digital libraries.

Thus, for studies focused on Malaysian Islamic-based special libraries, a conceptual framework becomes indispensable for aligning AI technologies (e.g., NLP, ontologies, semantic search) with religious knowledge paradigms. Using Jabareen's approach, this study proposes a multi-dimensional framework that combines AI tools, KM processes, ethical design, and Islamic knowledge structures to guide the development of AI-enabled knowledge mapping systems. This framework not only facilitates meaningful information retrieval but also safeguards the spiritual and intellectual values embedded in Islamic heritage.

Table 1 below provides an overview of key scholarly works that inform the development of the AI-Islamic knowledge mapping framework. It summarizes each study's authorship, publication year, research focus, methodological approach, and core findings relevant to the integration of AI in knowledge organization and Islamic epistemology.

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Table 1: Summary of Related Literature on AI, Islamic Knowledge, and Library Systems

Authors	Year	Title	Method	Key Findings
Gujral, G., Shivarama, J., & Choukimath, P. A.	2019	Perceptions and prospects of artificial intelligence technologies for academic libraries: An overview of global trends	Review paper	Highlighted AI applications in libraries and identified challenges and opportunities globally
Wan Ainol Mursyida A.T., & Saidatul Akmal Ismail	2022	Islamic-Based Libraries: A Proposal	Conceptual paper	Proposed foundational structure for Islamic-based libraries
Hemmet, A.	2023	Harmonizing Artificial Intelligence with Islamic Values	Conceptual analysis	Discussed alignment of AI advancements with Islamic religious and socio-economic principles
Roshdy, R.	2023	Translating Islamic Law: the postcolonial quest for minority representation	Doctoral dissertation	Examined postcolonial and interpretive challenges in translating Islamic legal concepts
El Ganadi, A., et al.	2023	Bridging Islamic knowledge and AI: Inquiring ChatGPT on possible categorizations for an Islamic digital library	Exploratory study	Explored use of ChatGPT for Islamic knowledge categorization
Achruh, A., Rapi, M., Rusdi, M., & Idris, R.	2023	Challenges and opportunities of artificial intelligence adoption in Islamic education in Indonesian higher education institutions	Qualitative interviews	Highlighted pedagogical and infrastructural challenges in adopting AI in Islamic education
Mohadi, M., & Tarshany, Y.	2023	Maqasid Al-Shariâ€™ah and the Ethics of Artificial Intelligence: Contemporary Challenges	Conceptual /analytical	Analyzed ethical considerations of AI within maqasid al-shariah framework
Badri, K. N. B. Z.	2023	Comparative analysis of the library classification system between Al-Almawi and Dewey	Comparative study	Compared traditional Islamic classification with Dewey, highlighting conceptual misalignments

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Hamid, A., & Bani-Domi, E. S.	2023	Ethical dilemmas and moral frameworks: Navigating the integration of artificial intelligence in Islamic societies	Conceptual paper	Explored moral and ethical AI frameworks suitable for Islamic societies
Moslimany, R., Otaibi, A., & Shaikh, F.	2024	Designing a holistic curriculum: Challenges and opportunities in Islamic education	Literature review	Emphasized integration of moral, spiritual, and intellectual goals in Islamic curricula
Adnan, B.	2024	Leveraging Artificial Intelligence Technologies in the Service of the Holy Quran and Its Sciences	Review paper	Explored AI tools to enhance Quranic studies and exegesis
Md Nor, N. S., Muhammad Noor Choliq, A., & Mohd Saleh, N. H.	2024	Services at Jabatan Kehakiman Syariah Malaysia Library: An Analysis of Arabic Cataloguing Procedures	Qualitative case study	Identified challenges in Arabic cataloguing, transliteration, and subject access
Park, Y., & Kim, S.	2024	Research Trends on Information Technology and Artificial Intelligence for Libraries Using Bibliographic Mapping	Bibliographic mapping	Identified trends in IT and AI applications in libraries
Hussain, A., & Ahmad, S.	2024	Mapping the literature on artificial intelligence in academic libraries	Bibliometric analysis	Traced publication trends and focus areas of AI in academic libraries
Borgohain, D. J., Bhardwaj, R. K., & Verma, M. K.	2024	Mapping the literature on the application of artificial intelligence in libraries	Scientometric analysis	Analyzed keyword clusters and thematic research in AI applications in libraries
Muslim, S. A.	2024	Assessing the Impact of Digital Transformation on Access, User Experience, and Knowledge Management in Academic Libraries	Survey research	Highlighted digital gaps and potential improvements in user experience

Source: The Authors

Methodology

The methodology flowchart in this study is adapted from Jabareen's (2009) eight-phase model of conceptual framework development. It offers a systematic and structured approach for synthesizing interdisciplinary concepts into a coherent theoretical model. This is particularly important in the context of AI-Islamic knowledge mapping, which intersects domains such as artificial intelligence, Islamic epistemology, and library science. By following a conceptual research design, the methodology emphasizes theory-building through interpretive and iterative

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processes, which is especially valuable when empirical data is limited, or exploratory inquiry is undertaken.

The first three phases, which are Mapping the Selected Data, Reviewing the Data, and Identifying Key Concepts that involve gathering and examining literature from relevant fields to identify foundational concepts. This includes reviewing studies on AI tools such as natural language processing (NLP), ontology development, and machine learning, as well as literature on Islamic knowledge organization systems and epistemological frameworks like *maqasid al-shariah* and *tawhid*. During this stage, recurring themes and terminologies are extracted to form the conceptual base of the framework.

In the next two phases, Deconstructing Concepts and Categorizing Concepts, the identified terms are analysed in greater detail and grouped into meaningful thematic clusters. For example, technical tools like semantic search and intelligent indexing are categorized under "AI capabilities," while concepts such as the spiritual objectives of knowledge and ethical classification fall under "Islamic epistemology." This categorization helps to reveal patterns and establish a logical structure for the emerging framework. The subsequent phases, which are the Integrating Concepts and Synthesizing and Refining, are critical for establishing interrelationships between these conceptual categories. At this point, the framework begins to take shape through the logical linking of concepts, ensuring theoretical coherence and contextual relevance. For example, the relationship between multilingual NLP tools and the representation of Arabic or Jawi texts in Islamic libraries can be articulated clearly. The synthesis is refined through academic feedback and aligned with the objectives of AI-supported, ethically grounded knowledge discovery.

Finally, the phase of Constructing the Preliminary Framework involves the assembly of these integrated ideas into a comprehensive visual and theoretical model. This initial framework serves as a conceptual guide for implementing AI technologies in Islamic-based special libraries. It not only proposes how AI can enhance knowledge access and classification but also ensures that the system remains faithful to Islamic epistemological principles. The result is a foundation for future empirical testing, including case studies, system development, and policy evaluation in the Malaysian context.

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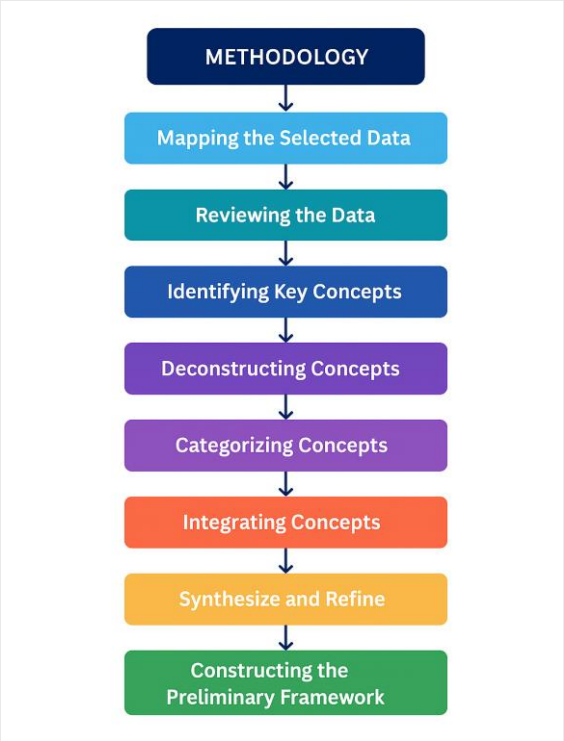

Figure 1: Phases of Conceptual Framework Development

Source: Development (Adapted from Jabareen, 2009)

Descriptive Analysis

This conceptual research resulted in the development of a preliminary framework for AI-enabled Islamic knowledge mapping tailored to the needs of Malaysian Islamic-based special libraries. The study employed Jabareen's (2009) eight-phase methodology of conceptual framework analysis, which is particularly suited for interdisciplinary domains because it allows the researcher to systematically synthesize concepts from diverse fields and construct a coherent theoretical model. Unlike linear or single-discipline frameworks, Jabareen's approach emphasizes iteration, reflexivity, and integration of heterogeneous bodies of knowledge, making it highly appropriate for bridging AI technologies with Islamic epistemology (Jabareen, 2009; Lester, 2015). In interdisciplinary studies, conceptual framework analysis has been widely applied to integrate knowledge across fields such as health, sustainability, and information science, demonstrating its robustness in contexts where multiple epistemologies must be reconciled (Jabareen, 2009; Imenda, 2014).

Given the complexity of aligning AI with Islamic epistemological principles such as *tawhid* and *maqasid al-shari'ah*, the preliminary framework developed here will undergo expert validation. To ensure both technical and epistemological soundness, the study proposes the use of the Delphi method with panels of AI specialists, Islamic scholars, and librarians. The Delphi technique has been recognized as a rigorous method for achieving consensus in areas with limited prior research and where expert judgment is essential (Hsu & Sandford, 2007; Okoli & Pawlowski, 2004). Its iterative, anonymous feedback cycles help minimize bias and ensure balanced contributions, making it a suitable strategy for validating frameworks at the intersection of AI, ethics, and Islamic knowledge organization.

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The first major outcome of this study is the identification of three core conceptual domains essential to AI-Islamic knowledge mapping: (1) Islamic Knowledge Sources, (2) AI Technologies, and (3) Islamic Epistemological Principles. Under Islamic Knowledge Sources, materials such as the Qur'an, Hadith, Fiqh literature, classical treatises, and contemporary works in Jawi and Malay were classified as foundational. AI Technologies included natural language processing (NLP), machine learning, and ontology engineering—tools known to enhance semantic search, content clustering, and intelligent indexing. Islamic Epistemological Principles, such as maqasid al-shariah and tawhid, were identified as critical ethical and conceptual anchors to ensure that knowledge mapping remains aligned with Islamic worldviews.

A second key result was the conceptual grouping and integration of these domains into a functional framework. This involved mapping relationships between AI tools and the requirements of Islamic knowledge systems. For instance, NLP techniques were conceptually linked to tasks such as multilingual text processing, automatic keyword extraction, and contextual search for Qur'anic or jurisprudential terms. Ontology-based modeling was proposed to facilitate the representation of thematic relationships between Islamic disciplines—e.g., connecting usul al-fiqh (principles of jurisprudence) with fiqh (legal rulings) and tafsir (exegesis) through semantic layers.

The third result is the visualization of the conceptual framework as a modular, adaptable model. The framework comprises four major layers: (i) Input Layer (Islamic knowledge sources), (ii) AI Processing Layer (tools and algorithms), (iii) Epistemological Layer (conceptual values and classification logic), and (iv) Output Layer (user interface, semantic search, and recommendation tools). This structure allows for future adaptation to various Islamic-based libraries while maintaining consistency in ethical and intellectual rigor.

Finally, the study outlines the potential applications of the framework, such as its integration with Integrated Library Management Systems (ILMS), enhancement of subject access through AI-driven taxonomy generation, and facilitation of user engagement through contextual and personalized search tools. These results establish a theoretical foundation for future empirical research and prototype development in the Malaysian context and beyond.

Discussion

The integration of Artificial Intelligence (AI) in knowledge organization within Islamic-based special libraries remains underdeveloped, particularly in Malaysia. This study sought to examine the limitations of current practices, identify applicable AI tools, and propose a conceptual framework that aligns with Islamic epistemological principles. The findings from the reviewed literature affirm the significance and urgency of addressing these objectives through interdisciplinary collaboration and system innovation.

In line with the first objective, the literature reveals persistent challenges in representing the semantic richness, multilingual scope, and interdisciplinary nature of Islamic knowledge using conventional library classification systems such as the Dewey Decimal Classification (DDC) and Library of Congress Classification (LCC). Studies by Badri (2023) and Md Nor et al. (2024) demonstrate that these systems inadequately reflect Islamic conceptual structures, often leading to misclassification and fragmented access to core religious disciplines like *tafsir*, *fiqh*, and *aqidah*. Similarly, Wan Ainol Mursyida and Saidatul Akmal Ismail (2022) emphasize the need for contextually relevant cataloguing and subject representation frameworks tailored to Islamic

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libraries. These findings underscore that existing systems fail to account for non-linear, thematic relationships and spiritual dimensions embedded in Islamic scholarship, thereby justifying the development of a new, epistemologically grounded framework.

Addressing the second objective, multiple sources highlight the potential of AI technologies, including natural language processing (NLP), machine learning, semantic web technologies, and ontology development, to address the classification and retrieval challenges in Islamic knowledge systems. Gujral et al. (2019), Park and Kim (2024), and Hussain and Ahmad (2024) emphasize AI's capabilities in automating metadata enrichment, enabling semantic search, and improving information discovery in library environments. However, the application of these tools in Islamic contexts remains limited and often misaligned with religious epistemology. Studies like El Ganadi et al. (2023) and Mehmood et al. (2024) demonstrate experimental attempts using tools like ChatGPT and AI-driven classification for Islamic content but also caution that these models lack the contextual and ethical sensitivity required for accurate representation. This gap presents a critical opportunity to develop Islamically informed AI applications that respect and preserve religious and philosophical nuances.

The third research objective is addressed through the synthesis of conceptual frameworks discussed in the literature. Jabareen's (2009) eight-phase model provides a methodological foundation for constructing a framework that is both flexible and theoretically grounded. Building on this, Shonhe (2025) and Chowdhury and Oredo (2023) offer insights into AI-readiness and ethical design, which are crucial for operationalizing AI in sensitive religious domains. Furthermore, the integration of maqasid al-shariah and tawhidic principles as emphasized by Mohadi and Tarshany (2023), and Hakim and Shamsuddin (2024) can ensure that AI tools are aligned with Islamic values. The convergence of these perspectives informs the development of a preliminary conceptual framework that bridges AI capabilities with Islamic knowledge traditions. This framework aims to support semantic classification, intelligent retrieval, and user interaction while maintaining spiritual and cultural integrity.

Conclusion and Future Recommendations

This conceptual study has addressed the critical gap in the integration of Artificial Intelligence (AI) within Islamic knowledge management, specifically in the context of Malaysian Islamic-based special libraries. By examining the limitations of current classification systems, identifying the potential of AI tools, and proposing a preliminary framework grounded in Islamic epistemological principles, the study offers both theoretical and practical contributions to the field. The research confirms that existing knowledge organization systems, primarily based on Western epistemologies, struggle to represent the semantic richness, interdisciplinary depth, and spiritual dimensions of Islamic scholarship. Misclassification, lack of multilingual support, and disconnected thematic relationships are common shortcomings, as demonstrated by the literature.

AI technologies such as Natural Language Processing (NLP), machine learning, and ontology engineering offer promising avenues for advancing knowledge discovery and user experience in digital Islamic libraries. However, without proper contextual and theological grounding, these technologies risk reinforcing epistemological distortions rather than solving them.

The proposed conceptual framework synthesizes AI capabilities with Islamic knowledge sources and epistemological anchors like *maqasid al-shariah* and *tawhid*. This multi-layered model provides a foundation for developing intelligent, ethical, and spiritually coherent information systems in Islamic-based special libraries. Through a structured, theory-driven

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methodology inspired by Jabareen's (2009) conceptual framework model, the study presents a novel approach to AI-Islamic knowledge mapping that is both adaptive and principled.

To further develop and operationalize the insights of this study, several strategic recommendations are proposed. Firstly, future research should focus on empirical validation of the proposed conceptual framework through pilot implementations in selected Malaysian Islamic-based special libraries. Conducting real-world case studies will help assess the framework's effectiveness in improving semantic search, multilingual access, and user experience. These practical insights will be invaluable in refining the framework's design and confirming its relevance across different institutional settings.

Secondly, the development of a prototype system is crucial for testing the theoretical framework in a technological environment. This should involve collaboration between AI developers and Islamic scholars to ensure that tools such as Natural Language Processing (NLP), ontology-based classification, and ethical filtering are aligned with Islamic principles. Integrating the framework into existing Integrated Library Management Systems (ILMS) through custom modules or plugins can facilitate practical adoption while maintaining interoperability with current library infrastructures.

Thirdly, interdisciplinary collaboration is essential for ensuring the success and cultural relevance of AI applications in Islamic knowledge management. Partnerships among librarians, Islamic studies scholars, computer scientists, and linguists can support the co-design of contextually appropriate classification schemes, ontologies, and metadata standards. Concurrently, training and capacity-building initiatives for library professionals are recommended to promote AI literacy, digital ethics awareness, and proficiency in Islamic knowledge representation, ensuring long-term sustainability and responsible usage of AI technologies.

Finally, further research should prioritize the development of a standardized, open-source ontology that models Islamic concepts, enabling semantic interoperability across digital repositories. In tandem, policy frameworks and ethical guidelines must be developed in consultation with religious authorities and academic institutions. These guidelines will ensure that AI implementations are guided by Islamic ethical principles, preventing misuse or misrepresentation of sacred knowledge. By advancing these recommendations, the study contributes not only to the future of Islamic librarianship but also to the global discourse on ethically aligned, culturally grounded AI innovation.

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