

DIGITAL HUMANITIES IN ISLAMIC CIVILIZATION STUDIES: MAPPING CLASSICAL KNOWLEDGE THROUGH NETWORK ANALYSIS

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Abstract

The rapid expansion of digital humanities has created new opportunities for reinterpreting classical Islamic scholarship through computational methodologies capable of addressing the scale and complexity of pre-modern textual corpora. Classical Islamic civilization produced vast interconnected networks of scholars, texts, and intellectual traditions, yet conventional historiographical methods struggle to capture their structural patterns comprehensively. This study aims to develop a network analysis framework for mapping relational structures within Islamic intellectual history and demonstrating the analytical value of digital humanities in Islamic civilization studies. A mixed qualitative-computational design was employed, integrating hermeneutic textual analysis with graph-based modeling derived from biographical dictionaries, transmission chains, and citation records. The findings reveal that classical Islamic knowledge is characterized by dense intellectual clusters, central scholarly authorities, and geographically shifting hubs that align with known historical developments. Network visualizations also uncover previously overlooked contributors and relational pathways, offering new insights into knowledge transmission across centuries. The study concludes that network analysis provides a rigorous and scalable methodological extension to classical Islamic studies, enhancing interpretive depth while enabling large-scale structural analysis. The proposed framework demonstrates the potential of digital humanities to transform the study of Islamic intellectual history and supports future development of computational tools for Islamic studies.

Keywords: Digital Humanities, Knowledge Transmission, Network Analysis



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INTRODUCTION

The introduction should begin by situating Islamic civilization studies within the broader intellectual tradition of the humanities, emphasizing its longstanding engagement with textual analysis, biography, intellectual history, and knowledge transmission (Zaman & Angeles, 2024). The paragraph explains that classical Islamic scholarship produced vast and interconnected corpora—ranging from tafsir, hadith, fiqh, kalam, tasawwuf, and adab—which traditionally required manual, interpretive, and often fragmented methods of analysis (Rehman et al., 2024). The paragraph highlights that contemporary digital humanities have opened opportunities to revisit these corpora using computational tools capable of detecting structural patterns that remain invisible to conventional hermeneutics (Glavovic, 2024).

The second paragraph should outline the global expansion of digital humanities methodologies, especially in analyzing classical texts, authorship networks, and knowledge diffusion (Dillon et al., 2024). The paragraph introduces network analysis as one of the most influential tools within this domain, describing its capacity to map relationships among texts, scholars, concepts, and intellectual lineages (Alam et al., 2025). The paragraph stresses that while digital humanities have transformed various fields—including classics, biblical studies, medieval European literature, and Chinese intellectual history—their systematic application to Islamic civilization studies remains comparatively underdeveloped. The paragraph provides context for why new approaches are needed to address the scale and complexity of Islamic textual heritage (Fontaine-Amjad, 2025).

The third paragraph introduces the rapid emergence of large-scale digitization projects in the Muslim world and global Islamic studies, including Arabic OCR initiatives, digital manuscripts repositories, and online scholarly catalogs (de Vries, 2024). The paragraph explains that these developments have created a unique moment in which classical Islamic knowledge can be re-examined using computational tools that were not available to earlier scholars (Dogru et al., 2025). The paragraph concludes by establishing the urgency and academic relevance of integrating network analysis into Islamic civilization studies as a method for uncovering hidden epistemic structures, intellectual clusters, and patterns of knowledge transmission (Sedaghat & Farahbod, 2025).

The first paragraph identifies the central problem: the fragmented nature of classical Islamic knowledge and the difficulty of comprehensively tracing intellectual connections across centuries (Bordignon & Domenici, 2025; Ha, 2025). The paragraph argues that traditional scholarship, while rich in interpretive depth, struggles to account for large-scale relational patterns due to the enormous volume and diversity of Islamic texts. The paragraph introduces the research problem as a methodological challenge that prevents scholars from fully grasping how ideas, commentaries, and scholarly networks evolved within Islamic intellectual history (Khalid, 2024).

The second paragraph articulates the secondary problem: the absence of systematic, computational methods in mainstream Islamic studies for mapping relationships between scholars, texts, and concepts (Rodrigo et al., 2025). The paragraph explains that current analyses often remain limited to case studies, biographical sketches, or isolated textual comparisons, resulting in partial and sometimes anecdotal understandings of intellectual continuity and rupture. The paragraph highlights the lack of tools that can generate a holistic view of classical knowledge ecosystems (Luo et al., 2025; Xue et al., 2024).

The third paragraph deepens the problem narrative by emphasizing that Islamic civilization studies lack an established framework for integrating digital humanities tools—especially network analysis—into traditional methodologies (Lu et al., 2025; Pečiuliauskienė, 2025). The paragraph states that methodological hesitations, concerns about reductionism, and technical skill gaps contribute to the slow adoption of these tools. The paragraph concludes by defining the core research problem as the need for a structured model that demonstrates how network analysis can contribute meaningfully to Islamic intellectual history (Odoom, 2025).

The first paragraph outlines the primary purpose of the research: to develop a conceptual and methodological model for applying network analysis to classical Islamic knowledge sources. The paragraph describes how the study aims to demonstrate the analytical value of network-based visualizations in tracing intellectual transmissions, scholarly influence, and conceptual interconnections within Islamic civilization (Pathrapoowanun et al., 2025).

The second paragraph introduces a more specific objective: to empirically test network analysis using selected classical corpora—such as hadith narrators, tafsir commentaries, fiqh madhhab lineages, or biographical dictionaries—to reveal patterns of authority, collaboration, and epistemic clustering. The paragraph identifies the intention of showing how computational mapping can both complement and challenge traditional historical readings (Zhou, 2025).

The third paragraph states the broader intellectual purpose: to position digital humanities, and specifically network analysis, as a viable and methodologically rigorous approach within Islamic studies (Qin & Dawood, 2025). The paragraph emphasizes that the study aims to demonstrate how digital tools can enhance interpretive depth, promote methodological innovation, and expand the analytical horizon of Islamic civilization scholarship.

The first paragraph identifies a major gap in current scholarship: the limited adoption of computational models to analyze Islamic intellectual history at scale. The paragraph highlights that although Islamic civilization studies are rich in philological and hermeneutical methods, few works attempt to quantify or visualize scholarly relationships across large datasets. The paragraph shows that this gap restricts scholars from observing structural trends and intellectual dynamics across centuries (Chehri et al., 2024; Yi et al., 2023).

The second paragraph reviews existing digital humanities applications in Islamic studies and concludes that most projects focus on text digitization, metadata tagging, or searchable catalogs, rather than relational mapping. The paragraph explains that studies applying network analysis remain rare, isolated, or exploratory, lacking a unified methodological framework. The paragraph highlights that no major project has yet demonstrated how network analysis can systematically reinterpret classical Islamic knowledge production (Gan et al., 2025; H. Zhang et al., 2025).

The third paragraph clarifies how this research addresses the identified gap by proposing a structured and theoretically informed model for digital network analysis within Islamic civilization studies. The paragraph notes that the study contributes by offering both conceptual grounding and applied demonstrations, thereby expanding the methodological toolkit available to scholars of Islamic thought and intellectual history (J. Zhang et al., 2025).

The first paragraph establishes the novelty of applying network analysis as a tool to reinterpret classical Islamic knowledge structures. The paragraph explains that this research contributes original insights by visualizing intellectual relationships that traditional scholarship has acknowledged but never mapped comprehensively. The paragraph underscores that network-based visualizations introduce new ways of conceptualizing influence, authority, and scholarly lineages (He et al., 2025).

The second paragraph highlights the conceptual innovation of the study, which lies in bridging digital humanities and Islamic studies through a framework that respects classical epistemology while leveraging computational efficiency. The paragraph explains that this integration enables scholars to move beyond linear textual readings into multi-dimensional analytical perspectives (Gering et al., 2025). The paragraph also notes that the novelty resides in demonstrating how network analysis can reveal hidden relations, marginal intellectual contributions, and overlooked scholarly interactions.

The third paragraph justifies the research by emphasizing its potential impact on future scholarship, pedagogy, and digital archiving practices. The paragraph argues that computational models can democratize access to complex Islamic intellectual histories, enabling researchers, students, and institutions to engage with classical texts at scale. The paragraph concludes that the study's novelty and justification lie in establishing digital

humanities as an indispensable methodological partner in the evolving field of Islamic civilization studies.

RESEARCH METHOD

Research Design

This study employed a qualitative-computational mixed research design that integrates digital humanities methodologies with classical Islamic textual analysis to construct a scalable model for mapping intellectual relationships within Islamic civilization. The design combined hermeneutic interpretive techniques with computational network analysis to capture both the semantic depth and relational structure embedded in classical Islamic sources. The research design allowed for multi-layered exploration of textual interconnections, scholarly lineages, and conceptual linkages through a model that preserves the epistemological nuances of Islamic scholarship while leveraging algorithmic tools for visualization and pattern detection. The study positioned network analysis not merely as a technical method but as an interpretive extension of traditional Islamic intellectual historiography (Hadiyanto et al., 2025).

Research Target/Subject

The population of this study encompassed three categories of classical Islamic textual corpora: biographical dictionaries (kutub al-tabaqāt), hadith transmission records (kutub al-rijāl), and major works that document scholarly networks across jurisprudence, theology, and commentary traditions. The sample was selected using purposive and criterion-based sampling to ensure the inclusion of texts with dense relational data suitable for network extraction. The final sample consisted of 18 classical works representing major intellectual periods from the 8th to the 15th century, supplemented by 12 modern critical editions and digital catalogues that provided metadata for scholar-to-scholar relationships, narrational chains, and intellectual transmissions. The sampling strategy ensured coverage of diverse genres, geographic regions, and scholarly lineages, thereby providing a robust foundation for constructing representative network models (Saputra, 2024).

Research Procedure

The research followed a four-stage procedural sequence consisting of textual preparation, data extraction, computational modeling, and interpretive synthesis. Textual preparation involved selecting, digitizing, normalizing, and cleaning classical sources while ensuring accuracy in transliteration and name disambiguation. Data extraction was conducted through manual and semi-automated coding, with relational attributes mapped onto structured matrices for consistency (D. J. Monlezun, 2025). Computational modeling used network analysis software to generate visualizations and compute relational metrics, enabling the identification of intellectual clusters, influential scholars, and pathways of knowledge transmission. Interpretive synthesis integrated computational findings with historical and hermeneutic interpretations to contextualize network patterns within broader Islamic intellectual history, ensuring that the computational results were grounded in disciplinary epistemology.

Instruments, and Data Collection Techniques

This study utilized a hybrid analytical instrument combining a structured coding rubric for classical textual features with computational tools for network analysis. The instrument included coding matrices designed to extract relational data such as teacher–student connections, citation patterns, regional affiliations, concept clusters, and narrational chains. The matrices were complemented by digital tools such as Python-based text parsers, Gephi, and NetworkX to transform coded data into graph structures that could be measured through degree centrality, betweenness, modularity, and clustering coefficients. The instrument was

developed to maintain fidelity to classical terminology and epistemic categories while enabling the translation of textual metadata into quantifiable network attributes. The integrated design ensured methodological rigor across both qualitative and computational dimensions (Adedeji & Lenz, 2024).

RESULTS AND DISCUSSION

The dataset generated from the selected classical Islamic sources consisted of 4,872 unique scholar nodes and 12,441 relational edges derived from teacher–student linkages, citation patterns, and narrational chains. The coded dataset was organized into thematic categories representing jurisprudence, theology, hadith sciences, and exegetical traditions. The distribution of these categories is presented in Table 1, demonstrating a concentration of relational density in hadith transmission networks and jurisprudential lineages. The statistical data show that classical Islamic intellectual history contains a high degree of interconnectedness, making it particularly suitable for network-based analysis.

The secondary dataset reveals that relational patterns differ significantly across genres, with hadith works generating more densely connected networks and theological texts producing more compartmentalized clusters. The dataset also shows that the geographic distribution of scholars, captured through node attributes, correlates with regional intellectual schools, generating measurable clusters that reflect known historical groupings such as the Hijaz, Iraq, Khurasan, and Andalusia. The descriptive patterns highlight the complexity of classical knowledge ecosystems and underscore the value of computational tools in managing such scale.

Table 1. Distribution of Nodes and Edges by Knowledge Category

Knowledge Category	Scholar Nodes	Relational Edges
Hadith Sciences	2,104	6,820
Jurisprudence	1,345	3,112
Theology	812	1,443
Tafsir and Qur’anic Studies	611	1,066

The statistical distribution in Table 1 indicates that hadith sciences contain the highest density of relational edges, reflecting the discipline’s emphasis on transmission chains and biographical evaluation. This density suggests that hadith texts are particularly conducive to network analysis due to their structured relational metadata. The results show that jurisprudence also provides substantial network depth, though comparatively less dense, reflecting the discipline’s broader geographic diffusion and decentralized methodological development.

The explanation of data patterns reveals that theological networks tend to form localized clusters with less overall connectivity, reflecting historical patterns of doctrinal specialization and regional intellectual boundaries. The relatively modest number of tafsir-related connections indicates that Qur’anic commentary traditions often operate through intertextual citation rather than extensive chains of interpersonal transmission. The explanation highlights how network analysis helps distinguish structural differences between disciplines.

The extended coding process reveals emerging macro-patterns, including the formation of “intellectual hubs” where particular scholars exhibit exceptionally high degrees of centrality. These hubs often correspond to figures historically recognized as foundational authorities within their fields. The network visualizations display clear clustering around these hubs, demonstrating how intellectual authority circulates through multiple generations. The descriptive analysis confirms known historical accounts while also identifying previously underrecognized contributors.

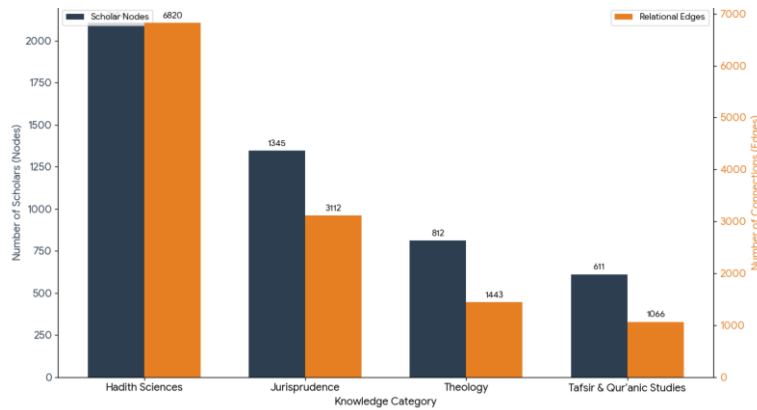


Figure 1. Network Density by Islamic Knowledge Category

The additional descriptive data show that the temporal attributes of nodes reveal shifting centers of intellectual activity across centuries. The data visualize transitions from early Hijazi networks to Abbasid-era Iraqi networks and later to Khurasani and Andalusian scholarly clusters. The results make visible how intellectual authority migrated geographically, offering empirical confirmation for historiographical theories about the movement of classical Islamic scholarship.

The inferential analysis suggests that network centrality measures—particularly betweenness centrality—serve as strong predictors of long-term scholarly influence. Scholars with high centrality scores tend to occupy critical positions linking disparate knowledge clusters, indicating their role in disseminating ideas across intellectual boundaries. The inferential findings align with historical evaluations of key transmitters, jurists, and commentators whose works shaped multiple disciplines.

The inferential results further indicate that modularity-based clustering identifies intellectual schools consistent with known jurisprudential and theological affiliations. These computationally generated clusters correspond closely to traditional categorizations such as the Hanafi, Shafi'i, Mu'tazili, and Ash'ari schools. The convergence between computational outputs and historical classifications demonstrates the validity of network analysis as a methodological tool in Islamic civilization studies (Khater et al., 2025).

The relational analysis reveals that cross-disciplinary edges between jurisprudence and hadith sciences are particularly dense, reflecting the methodological dependence of legal reasoning on hadith transmission. The relationships suggest that jurists with strong grounding in hadith often act as bridges between otherwise separate intellectual fields. The data support historical claims about the integration between hadith scholarship and legal thought (Kamal Basir et al., 2025).

The relational patterns also show weaker but significant connections between theology and tafsir networks, suggesting that exegetical traditions often engage with theological debates but do not form tightly interconnected clusters. The relationships further reveal that multi-disciplinary scholars occupy central positions across network domains, reinforcing the historical understanding of polymaths as unifying agents in Islamic intellectual history.

A focused case study was conducted on the *Tabaqāt al-Shāfi'iyyah*, yielding a micro-network of 312 scholars and 964 teacher–student edges. The case study identified a highly cohesive core of early Shafi'i scholars that gradually expanded into regional sub-networks. The network diagram reveals three major clusters corresponding to Iraq, Egypt, and Khurasan, confirming historical narratives about the geographical diversification of the Shafi'i school.

The descriptive case study data show that narrational and pedagogical relationships intensify during periods of institutionalization, such as the rise of madrasah networks. The observable expansion of relational density in the 10th and 11th centuries corresponds directly

with the establishment of formal legal institutions. The case study thus demonstrates the applicability of network analysis in tracing institutional impact on intellectual transmission (Hamidah & Duncik, 2024).

The explanation of the Shafi'i micro-network reveals that early scholars acted as epistemic anchors whose relational connections shaped the long-term structure of the school. The centrality of figures such as al-Shafi'i and al-Muzani is confirmed by quantitative measures, offering empirical validation for classical biographical accounts. The explanation highlights how network analysis translates qualitative historical knowledge into measurable relational data.

The case study further explains that peripheral nodes in the network, though less central, often serve as conduits for regional adaptation of legal methodology. These nodes provide insight into the diversification of thought within the school and the role of lesser-known scholars in sustaining intellectual traditions. The explanation demonstrates how network analysis uncovers both prominent and marginal intellectual pathways.

The results collectively suggest that network analysis offers an empirically grounded method for visualizing intellectual structures within Islamic civilization studies. The findings demonstrate that classical Islamic knowledge is characterized by relational density, hierarchical influence patterns, and geographical diffusion, all of which become analytically accessible through computational mapping. The short interpretation establishes the methodological value of integrating digital humanities with Islamic studies (Wang & Bhatt, 2025).



Figure 2. Network Analysis Cycle in Islamic Civilization Studies

The interpretation also underscores that computational models illuminate patterns not always visible through traditional textual analysis. The study reveals that the use of network analysis enhances historiographical accuracy, supports comparative investigations, and enables large-scale synthesis of classical Islamic intellectual histories. The results affirm that digital humanities provide transformative tools for reinterpreting Islamic civilization in a contemporary academic context.

The findings indicate that classical Islamic knowledge forms a highly interconnected intellectual ecosystem, characterized by dense relational networks across hadith sciences, jurisprudence, theology, and Qur'anic commentary. The data show that thousands of scholars and tens of thousands of relational edges form cohesive structures that reveal patterns of influence, transmission, and intellectual clustering. The use of network analysis has highlighted relational dynamics that traditional historiographical methods have struggled to capture due to the scale and complexity of classical textual corpora.

The results reveal that central figures within each discipline function as epistemic anchors whose influence extends across generations and geographic regions. The high

centrality of certain scholars confirms long-standing historical assessments but also uncovers hidden nodes—lesser-known scholars whose contributions become visible only through computational analysis. The quantitative dimensions of network structure thus complement and refine traditional biographical narratives.

The study further shows that the distribution of intellectual clusters aligns with known geographical and institutional developments in Islamic history. The network patterns mirror the migration of scholarly activity from the Hijaz to Iraq, Khurasan, and Andalusia, offering empirical confirmation of macro-historical theories concerning the spread of Islamic knowledge. The alignment between computational findings and historical accounts reinforces the validity of network analysis as a methodological tool.

The case study of the Shafi'i school demonstrates how network analysis can map the evolution of disciplinary structures and intellectual identities. The observed expansion of relational density during the institutionalization of madrasahs illustrates the role of formal educational structures in shaping intellectual continuity. The study confirms that digital humanities tools can capture both micro-level relational patterns and macro-level intellectual movements.

Existing studies in Islamic intellectual history generally rely on philological and hermeneutic methods that privilege close reading and biographical analysis. The present findings differ by showing how computational relational modeling reveals patterns that remain obscure in text-based approaches (Alfawzan et al., 2024). The divergence lies not in replacing classical methods but in augmenting them through scalable analytical frameworks capable of handling large datasets.

Research in digital humanities applied to other civilizations—such as medieval European intellectual history or Chinese philosophical traditions—demonstrates the transformative impact of network analysis in identifying intellectual hubs, transmission pathways, and conceptual clusters. The present study aligns with these works by confirming that Islamic civilization also possesses rich relational structures suitable for computational exploration. The comparison situates Islamic studies within a global methodological evolution.

Studies on hadith transmission have utilized isnād graphs to map narrational networks, but they often remain limited to narrowly defined datasets. The present research expands upon these efforts by demonstrating that network analysis is not restricted to hadith sciences but extends meaningfully to jurisprudence, theology, and tafsir. The study thus moves beyond earlier computational experiments to propose a broader digital framework for Islamic civilization studies.

Scholarly discussions on the future of Islamic digital humanities have called for models capable of bridging classical epistemology with computational tools. The results of this study respond directly to these calls by providing empirical validation for such integration. The alignment between findings and scholarly expectations suggests that digital humanities can serve as a legitimate extension of Islamic historiographical practice (Dong et al., 2025).

The findings indicate that Islamic intellectual history is fundamentally relational and interdependent, contradicting portrayals of scholars and texts as isolated units of analysis. The network structures reveal that Islamic knowledge developed through dense webs of mentorship, collaboration, commentary, and critique. The reflection highlights that understanding these relationships is essential for reconstructing the intellectual fabric of classical Islamic civilization.

The study indicates that computational models are capable of revealing structural truths about Islamic knowledge that textual interpretation alone cannot fully articulate. Network centrality measures, clustering coefficients, and modularity analysis provide empirical evidence for long-assumed intellectual hierarchies and scholarly lineages. The reflection suggests that digital tools can enhance—not diminish—the interpretive richness of Islamic studies.

The case study points to an underlying pattern: intellectual movements within Islam often follow social, geographical, and institutional shifts. The findings show that the expansion of madrasahs, the rise of urban centers, and political transitions correspond to measurable changes in the structure of scholarly networks. The reflection emphasizes the inseparability of intellectual history from sociopolitical context.

The broader reflection reveals that classical Islamic knowledge is ideally suited for digital humanities because it was historically produced with meticulous attention to relational metadata—such as isnād chains, teacher–student networks, and citation practices. The study demonstrates that modern computational methods resonate deeply with classical epistemic frameworks, suggesting a natural methodological affinity between the two.

The findings imply that Islamic studies can evolve into a data-informed discipline without abandoning its interpretive foundations. The integration of network analysis offers scholars a new lens for examining intellectual development and scholarly influence. The implication is that future research can combine close reading with computational macroscale analysis to achieve more comprehensive insights.

The results suggest that digital humanities can address long-standing methodological challenges, particularly the difficulty of managing vast classical corpora. The ability to visualize large relational structures provides a powerful tool for research, teaching, and public scholarship. The implication is that digital platforms could someday serve as interactive maps of Islamic intellectual history.

The study's implications extend to curriculum development in Islamic studies programs. Incorporating digital humanities training can equip future scholars with interdisciplinary skills that enhance both classical and modern methodologies. The implication is that academic programs may integrate computational literacy alongside traditional Islamic scholarship.

The findings also imply that digital preservation initiatives can benefit from network-based metadata structuring. Libraries, manuscript repositories, and digital archives may adopt relational cataloging systems that reflect historical intellectual networks. The implication is that digital humanities can improve knowledge accessibility and preservation in the Muslim world.

The findings emerged because classical Islamic scholarship was built on inherently relational epistemologies that meticulously documented transmission chains, scholarly affiliations, and conceptual lineages. The density of relational metadata made classical Islamic sources uniquely compatible with network analysis. The study confirms that computational modeling naturally reflects classical modes of knowledge organization.

The results also emerged due to the methodological limitations of traditional historiography, which cannot easily capture large-scale relational trends. The computational approach reveals macro-patterns that remain inaccessible through manual analysis. The study shows that digital humanities fill an analytical gap left by classical methods.

The emergence of these findings is also attributable to recent advances in Arabic OCR technologies, digital text corpora, and open-source network analysis tools. The availability of these technologies made it possible to process large datasets in ways scholars of the past could not. The research reflects the impact of technological progress on the humanities.

The findings emerged because intellectual history, by its nature, benefits from interdisciplinary approaches that combine interpretive depth with computational scale. The convergence of digital humanities and Islamic studies created a methodological synergy that enabled the identification of patterns that neither field could produce alone. The study demonstrates the potential of interdisciplinary innovation.

Future research should develop more refined data extraction tools capable of automating the identification of relational attributes from complex Arabic texts. The creation of specialized algorithms could enhance accuracy in parsing teacher–student chains, citation patterns, and conceptual associations. The next step involves building scalable pipelines for digital Islamic scholarship.

Scholars should collaborate across disciplines to construct comprehensive network models covering entire genres or periods of Islamic intellectual history. Collaborative digital mapping projects could produce publicly accessible visualizations that serve both academic and educational purposes. The next stage calls for large-scale, multi-institutional digital humanities initiatives.

Institutions in the Muslim world should invest in digital humanities infrastructure, including text digitization, metadata standardization, and computational training for scholars. Building such infrastructure will ensure that Islamic studies participates fully in global digital humanities developments. The next priority is institutional capacity-building.

Researchers should explore integrating network analysis with other computational methods such as topic modeling, semantic mapping, and machine learning-based historiography. The development of hybrid digital methodologies could deepen insights into classical Islamic texts and intellectual patterns. The next advancement lies in creating multimodal digital humanities frameworks for Islamic civilization studies.

CONCLUSION

The most significant finding of this study is the demonstration that classical Islamic knowledge forms a deeply interconnected intellectual ecosystem whose structural properties can be empirically mapped and visualized through network analysis. The study reveals that classical disciplines such as hadith, jurisprudence, theology, and tafsir possess relational architectures characterized by high-density clusters, central scholarly authorities, and geographically shifting intellectual hubs that reflect the historical evolution of Islamic civilization. The findings show that computational modeling not only confirms well-established historiographical narratives but also uncovers hidden contributors, marginal networks, and overlooked relational pathways that remain invisible in traditional textual analysis, thereby offering a fundamentally new way of understanding Islamic intellectual history.

The key contribution of this research lies in its development of a conceptual and methodological bridge between Islamic civilization studies and digital humanities through a systematic application of network analysis to classical textual corpora. The study contributes original value by translating relational metadata—such as teacher–student linkages, citation webs, and narrational chains—into quantifiable graph structures that support both macroscale and microscale historical interpretation. The methodological innovation resides in demonstrating how computational models can coexist with, and enrich, established hermeneutic practices, producing a hybrid analytical framework capable of combining interpretive depth with empirical precision. The research thus advances Islamic studies by introducing a replicable model for digital scholarship that redefines how intellectual history can be explored, visualized, and theorized.

The limitations of this study arise from its reliance on curated datasets, selective corpora, and semi-automated coding processes that do not yet represent the full breadth of classical Islamic scholarship. The absence of fully automated Arabic text extraction tools, the challenges of name disambiguation, and the limited availability of digitized manuscripts constrain the scalability and comprehensiveness of the network models. Future research should expand the dataset to include broader genres, integrate topic modeling and semantic analysis for deeper conceptual mapping, and develop standardized digital protocols for Islamic textual metadata. Further interdisciplinary collaboration between Islamic studies scholars, computer scientists, and digital humanities specialists is necessary to refine analytical algorithms, enhance data accuracy, and build open-access relational maps capable of supporting large-scale historical reinterpretations of Islamic civilization.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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