



The Integration of Artificial Intelligence in Hadith Scholarship: A Bibliometric Perspective on Emerging Research Directions

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Abstract

This study aims to map the research landscape on the role of artificial intelligence (AI) in hadith studies, identifying key academic trends, publication growth patterns, frequently explored topics, institutional and individual contributions, emerging research directions, and underexplored areas. The analysis applies a bibliometric method using data from the Scopus database between 2013 and 2024. The findings reveal a significant rise in the number of publications, totaling 103 works, highlighting the growing academic recognition of AI's relevance in hadith studies. Among the most prolific contributors is Sayoud, H., while the most cited work is "Hadith Data Mining and Classification: A Comparative Analysis" (Saloot M.A. et al., 2021), underscoring AI's multidisciplinary role in hadith classification. The Journal of Theoretical and Applied Information Technology, Lecture Notes in Computer Science, and Procedia Computer Science dominate as publication platforms. Universiti Kebangsaan Malaysia emerges as the most active institution, with Malaysia leading overall with 30 publications. Frequently examined topics include hadith, authenticity, narrator, Qur'an, model, approach, technique, and classifier. Meanwhile, emerging themes such as authenticity, narrator, reliability, isnad, matn, and deep learning point to a growing focus on hadith authentication and chain of transmission through AI technologies. Conversely, topics related to complexity, challenge, meaning, phase, order, Muslim, and legislation remain underrepresented, suggesting opportunities for future exploration. This study highlights the growing integration of AI in hadith studies, urging institutions to adopt digital approaches, expand research collaborations, and utilize diverse methods and data. Such efforts will advance both theoretical and practical dimensions of Islamic studies.

Keywords: *artificial intelligence; hadith; hadith studies; bibliometric*

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1. INTRODUCTION

Artificial Intelligence (AI) represents the advancement of digital technology that increasingly permeates various aspects of human life, including academia and scientific fields ¹. One area that has recently begun to attract attention in the integration of AI is Islamic studies, which encompasses various disciplines such as tafsir, fiqh, usul al-din, and particularly the study of hadith ². AI is no longer merely a technical tool; it has become an intellectual partner in helping to resolve scholarly issues that previously required significant time and resources. With machine learning capabilities, AI systems are able to "learn" from data, recognize patterns, and make decisions based on the available information ³. Deep learning, a more complex branch of machine learning, is capable of processing complex data structures such as natural language, images, and sounds with high accuracy ⁴. Meanwhile, Natural Language Processing (NLP) enables computers to understand, interpret, and generate human language, including classical Arabic texts ⁵, which are the primary sources in Islamic studies.

In the field of hadith studies, the development of AI opens new opportunities to enhance the effectiveness and objectivity in understanding and researching hadith ⁶. Traditionally, hadith studies demand exceptional precision in analyzing the sanad (chain of narrators) and matn (content of the text). This process requires a deep understanding of the narrators' history, comparison of textual variants, and the validity and authenticity of each narration ⁷. Furthermore, within the context of hadith studies, the presence of artificial intelligence (AI) also presents a great opportunity to strengthen and simplify various aspects of analysis that have traditionally been performed manually and require high precision. One such application is in the identification and verification of the sanad. AI can trace and map sanad networks automatically by processing large datasets containing the names of narrators from various hadith sources ⁸. Through specially designed algorithms,

¹ Yongjun Xu et al., "Artificial Intelligence: A Powerful Paradigm for Scientific Research," *The Innovation* 2, no. 4 (November 2021): 100179, doi:10.1016/j.xinn.2021.100179.

² Yuli Andriansyah, "The Current Rise of Artificial Intelligence and Religious Studies: Some Reflections Based on ChatGPT," *Millah: Journal of Religious Studies*, February 28, 2023, ix–xviii, doi:10.20885/millah.vol22.iss1.editorial.

³ Iqbal H. Sarker, "Machine Learning: Algorithms, Real-World Applications and Research Directions," *SN Computer Science* 2, no. 3 (May 22, 2021): 160, doi:10.1007/s42979-021-00592-x.

⁴ Christian Janiesch, Patrick Zschech, and Kai Heinrich, "Machine Learning and Deep Learning," *Electronic Markets* 31, no. 3 (September 8, 2021): 685–95, doi:10.1007/s12525-021-00475-2.

⁵ Ali Farghaly and Khaled Shaalan, "Arabic Natural Language Processing," *ACM Transactions on Asian Language Information Processing* 8, no. 4 (December 2009): 1–22, doi:10.1145/1644879.1644881.

⁶ Fatichatus Sadiyah, "Scientific Hadiths and Its Implementation in The Emergence of Artificial Intelligence (AI)," *Dirosatuna: Journal of Islamic Studies* 7, no. 1 (February 29, 2024): 1–15, doi:10.31538/dirosatuna.v6i2.4590.

⁷ Muhammad Barnaba Ridho Ilahi et al., "Hadith Critics Categories in The Selection of Hadith Narrators: A Comparative Analysis," *Jurnal Ilmiah Al-Mu'ashirah* 20, no. 2 (July 31, 2023): 266, doi:10.22373/jim.v20i2.16787.

⁸ Saqib Hakak et al., "Digital Hadith Authentication: Recent Advances, Open Challenges, and Future

the system can recognize the relationships between narrators, calculate the frequency of their appearance in various sanads, and assess their validity and credibility based on the principles of the science of *rijāl al-ḥadīth* ⁹.

Additionally, AI, through NLP capabilities, plays a significant role in the classification and analysis of hadith matn ¹⁰. The system can identify similarities or subtle differences that may occur among various versions of the matn. AI can even categorize hadith thematically — such as those related to worship (*‘ibādah*), transactions (*mu’āmalāt*), or ethics (*akhlāq*) — or qualitatively, such as their level of authenticity (*ṣaḥīḥ*, *ḥasan*, or *ḍa‘īf*), using labeled datasets previously compiled by scholars. Equally important, AI can also be used to create interactive visualizations of the sanad network and the interconnections of the matn. With informative graphical displays, users can view maps of relationships between narrators and understand the transmission flow of hadith more intuitively ¹¹. These visualizations not only facilitate scholarly analysis but also open new avenues for more engaging and structured hadith learning, both in academic settings and in Islamic boarding schools (*pesantren*). With all these capabilities, AI not only accelerates scholarly work in the field of hadith but also opens new horizons for the development of technology-based Islamic studies that remain grounded in classical scientific methodology ¹².

Research by Sadiyah¹³ highlights the potential of AI in managing and analyzing hadith data more systematically, while underscoring the need for its application to be guided by the ethical and spiritual values rooted in Islam. Sadiyah emphasizes that although AI can speed up the research process, human oversight by hadith scholars is still essential to ensure accuracy and maintain the integrity of the findings. In this view, AI is not merely a technical tool, but a means to deepen the understanding and development of hadith knowledge in the modern era. Similarly, Muhammad A. A. Taghian¹⁴ analyzes the ability of AI tools to translate short, two-word hadiths, focusing on translation accuracy and contextual precision. By comparing AI-generated results with those of linguists and scholars, he finds that while AI can produce reasonably accurate translations, it often struggles to capture the semantic depth and cultural context embedded within the hadith. This suggests a critical area where AI needs further enhancement, especially for complex religious texts that demand nuanced linguistic and exegetical understanding. Mesbahul Hoque et al.¹⁵ also point out that although AI improves efficiency in big data analysis, its

Directions,” *Transactions on Emerging Telecommunications Technologies* 33, no. 6 (June 14, 2022), doi:10.1002/ett.3977.

⁹ Aqil M. Azmi, Abdulaziz O. Al-Qabbany, and Amir Hussain, “Computational and Natural Language Processing Based Studies of Hadith Literature: A Survey,” *Artificial Intelligence Review* 52, no. 2 (August 18, 2019): 1369–1414, doi:10.1007/s10462-019-09692-w.

¹⁰ Ibid.

¹¹ Mohammad Arshi Saloot et al., “Hadith Data Mining and Classification: A Comparative Analysis,” *Artificial Intelligence Review* 46, no. 1 (June 8, 2016): 113–28, doi:10.1007/s10462-016-9458-x.

¹² Farhana Haque, Anika Hossain Orthly, and Shahnewaz Siddique, “Hadith Authenticity Prediction Using Sentiment Analysis and Machine Learning,” in *2020 IEEE 14th International Conference on Application of Information and Communication Technologies (AICT)* (IEEE, 2020), 1–6, doi:10.1109/AICT50176.2020.9368569.

¹³ Sadiyah, “Scientific Hadiths and Its Implementation in The Emergence of Artificial Intelligence (AI).”

¹⁴ Muhammad A. A. Taghian, “Assessing the Accuracy Criteria of AI Tools-Aided Translation: A Case Study of Two-Word Prophetic Hadiths,” *CDELT Occasional Papers in the Development of English Education* 87, no. 1 (July 1, 2024): 217–62, doi:10.21608/opde.2024.384369.

¹⁵ Mesbahul Hoque, A Irwan Santeri Doll Kawaid, and Shumsudin Yabi, “Ethical Guidelines for the

use must be complemented by traditional scholarly methods and guided by sound religious principles. They argue that AI should serve as a supportive tool, not a replacement for established hadith methodologies, reinforcing the scientific and ethical foundations of the field. These studies collectively highlight both the promise and the limitations of AI in hadith studies. Yet, despite advances, significant gaps remain in addressing its ability to preserve the precision, context, and spiritual depth required in hadith research — a gap this paper aims to explore and address.

Several studies have demonstrated a growing interest in applying artificial intelligence (AI) to Islamic studies, especially in the context of hadith science. However, AI's contribution in this area is still limited and has not yet fully addressed all relevant aspects. Although existing literature highlights AI's potential in hadith research, most studies remain fragmented, focusing only on one or two technological aspects and falling short of capturing the broader research ecosystem. As a result, there is a pressing need for a bibliometric mapping that can shed light on the overall trends and developments in this field over time.

Bibliometric mapping provides a comprehensive view of the research landscape in AI and hadith studies¹⁶. By employing tools such as VOSviewer and Biblioshiny, it becomes possible to visually trace connections between topics, authors, and publications, making it easier to understand the evolution of this research area¹⁷. Such an approach allows scholars to move beyond isolated studies, gaining a holistic perspective that captures the breadth and depth of AI applications in hadith studies. It also reveals shifts in the main topics and key actors across disciplines, including computer science, linguistics, and Islamic studies. Ultimately, this study aims to illuminate underexplored areas and foster closer collaboration among researchers and institutions, providing a roadmap for future inquiry and guiding advances in the intersection of AI and hadith scholarship¹⁸.

Therefore, this research aims to provide a clearer and deeper understanding of the development of AI research in the field of hadith science, using a bibliometric approach that enables a systematic analysis of the scholarly literature. With this approach, this study hopes to provide more comprehensive information about the trends and dynamics of research in this field. Specifically, this study has four main objectives that serve as the focus of the analysis:

1. Identifying Yearly Publication Trends. One of the main goals of this study is to understand how research related to AI in hadith science has evolved over time. By mapping the publication trends, we can identify peak periods in publications and the factors that may influence the rise or fall of research interest.
2. Mapping the Most Contributing Authors, Institutions, and Countries. In addition to understanding the topics frequently discussed, it is also important to know who is leading this research. This study aims to identify the key authors, academic institutions, and countries that have contributed most to the development of AI research in hadith

Use of AI in Hadith Studies,” in *International Prophetic Conference (SWAN) FPQS USIM*, 2024, 791–95, <https://swanfpqs.usim.edu.my/index.php/conference/article/view/252>.

¹⁶ Oğuzhan Öztürk, Rıdvan Kocaman, and Dominik K Kanbach, “How to Design Bibliometric Research: An Overview and a Framework Proposal,” *Review of Managerial Science*, 2024, 1–29, doi:10.1007/s11846-024-00738-0.

¹⁷ Nees Jan Van-Eck and Ludo Waltman, *VOSviewer Manual: Manual for VOSviewer Version 1.6.18* (Universitet Leiden & CWTS Meaningful Metrics, 2022), https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.18.pdf.

¹⁸ Naveen Donthu et al., “How to Conduct a Bibliometric Analysis: An Overview and Guidelines,” *Journal of Business Research* 133 (2021): 285–96, doi:<https://doi.org/10.1016/j.jbusres.2021.04.070>.

science. This can provide an overview of global collaboration in this research, as well as highlight regions or countries that may have distinct strengths and focuses in their research.

3. **Revealing Dominant Keywords and Main Topics Frequently Studied.** One important contribution of bibliometric analysis is to uncover the dominant keywords that frequently appear in publications related to AI and hadith science. These keywords reflect the main topics often discussed by researchers. For example, whether the frequently studied topics are related to the analysis of hadith texts, sanad verification, digitalization of classical hadith literature, or even the application of AI in teaching hadith. By understanding these keywords, we can identify the most popular topics and the relevance of research in the development of hadith science with AI technology.
4. **Identifying Open Research Gaps.** In addition to mapping what has already been extensively researched, this study also aims to identify open research gaps in the development of AI in hadith science. These gaps may relate to aspects that have not been extensively studied or topics that require further exploration.

This study is expected to provide significant benefits both academically and practically. Academically, the findings are expected to serve as an important reference for researchers and scholars interested in the development of AI studies in hadith science. With systematic mapping, this study will provide evidence-based data that can help researchers identify topics that need further investigation, as well as provide clearer directions for future research development. For instance, by understanding the trends and research gaps, academics can avoid repeating topics that have already been widely studied and focus more on emerging aspects. From a practical perspective, this research holds great potential to guide various stakeholders involved in AI technology development and religious studies. Educational institutions, for example, can use the findings of this research to design curricula that integrate AI technology into hadith studies or to engage experts in interdisciplinary collaborations between technology and Islamic studies. Developers of Islamic applications can also utilize the findings to create AI-based applications that help Muslims study hadith more efficiently, such as applications for sanad verification or text analysis. Additionally, Islamic research institutions can use these findings as a foundation to develop strategic research programs that delve into specific aspects of hadith science using AI in a more sustainable and structured manner.

This study uses a bibliometric analysis approach to map the development of research on the application of artificial intelligence (AI) in the advancement of hadith science. This method is chosen due to the ability of bibliometrics to systematically identify research trends, patterns of collaboration among researchers, and scholarly contributions based on academic publication data¹⁹. The data sources for this study are drawn from internationally reputable scientific journals indexed in Scopus, ensuring that the data used is relevant and scientifically accountable. To reflect the most recent developments, only publications published within the last 10 years are analyzed.

The analysis process is carried out in several key stages. The first stage involves the collection of publication data, including essential information such as title, abstract, keywords, author names, institutional affiliations, country of origin, and publication year. The collected data is then analyzed using bibliometric software, VOSviewer. The objective

¹⁹ Debmalaya Mukherjee et al., "Guidelines for Advancing Theory and Practice through Bibliometric Research," *Journal of Business Research* 148 (2022): 101–15, doi:<https://doi.org/10.1016/j.jbusres.2022.04.042>.

is to identify collaboration patterns among researchers, research trends, as well as countries and institutions that have made significant contributions to research related to AI and hadith science²⁰.

The data collection process for this study involved four steps:

1. **Keyword Determination.** To locate relevant studies, keywords such as “artificial intelligence,” “machine learning,” “deep learning,” “natural language processing,” “hadith,” and “hadith studies” were used, along with related terms. The final query included variations like: (TITLE-ABS-KEY (artificial AND intelligence) OR TITLE-ABS-KEY (machine AND learning) OR TITLE-ABS-KEY (deep AND learning) OR TITLE-ABS-KEY (natural AND language AND processing) AND TITLE-ABS-KEY (hadith AND studies) OR TITLE-ABS-KEY (hadith) OR TITLE-ABS-KEY (hadiths) OR TITLE-ABS-KEY (hadiths AND narration) OR TITLE-ABS-KEY (hadiths AND records) OR TITLE-ABS-KEY (hadith AND criticism)) AND PUBYEAR > 2012 AND PUBYEAR < 2025.
2. **Database Selection.** The Scopus database was selected due to its extensive coverage and focus on high-quality, peer-reviewed journals, making it ideal for capturing recent advances in AI and hadith studies.
3. **Inclusion and Exclusion Criteria.** The analysis was limited to peer-reviewed international journal articles published between 2013 and 2024. This ten-year range was chosen to capture the latest developments in AI and hadith research, reflecting advances in technology and the growing trend of digital hadith studies. Editorials and non-peer-reviewed articles were excluded from the final dataset.
4. **Data Cleaning.** The dataset was refined by removing duplicates, verifying metadata (such as titles, authors, institutions, and abstracts), and categorizing the main topics of each publication.

This structured approach allows for a more comprehensive understanding of AI’s role in hadith studies, highlighting patterns and trends that traditional literature reviews often miss.

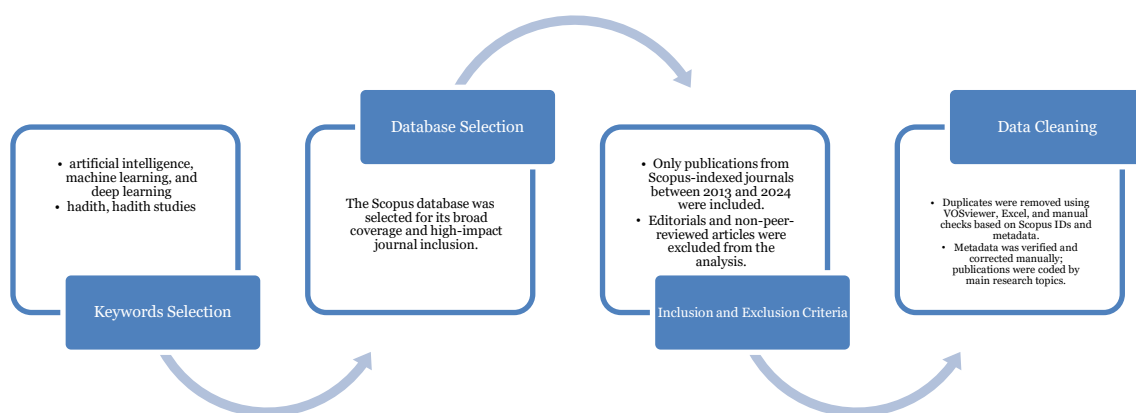


Figure 1. Data Collection Steps

Once the data is collected, bibliometric analysis is conducted using software tools such as VOSviewer to identify trends and patterns in the literature being studied. This analysis encompasses several key aspects as follows:

²⁰ Van-Eck and Waltman, *VOSviewer Manual: Manual for VOSviewer Version 1.6.18*.

1. **Publication Analysis.** This step involves determining the number of publications per year to identify trends and the development of research over time.
2. **Author Analysis.** This identifies the most productive authors and those who have made significant contributions to research related to AI and hadith studies.
3. **Institution and Country Analysis.** This step determines the academic institutions and countries that are actively involved in this research and have made substantial contributions to the development of hadith science through the use of AI.
4. **Keyword and Topic Analysis.** This examines the keywords that frequently appear in publications to understand the primary focus and direction of research related to AI and hadith science.

The results of this analysis are then visualized in the form of network maps, graphs, and tables to facilitate understanding. These visualizations aim to provide a clearer view of the relationships among researchers, institutions, countries, and the key topics emerging in AI research within the context of hadith studies. To ensure the accuracy and validity of the results, the findings from this bibliometric analysis will be validated through triangulation with other sources, including additional relevant literature reviews ²¹.

2. DISCUSSION

2.1. Development of Publications

After extracting and mapping the database of scientific publications related to AI and Hadith studies from the Scopus database, data on the Development of Publication Numbers is presented in Table 1.

Table 1. Development of Publication Numbers related to AI and Hadith Science

Year	Frequency	Percentage
2013	2	1.94
2014	4	3.88
2015	5	4.85
2016	6	5.83
2017	7	6.80
2018	10	9.71
2019	11	10.68
2020	10	9.71
2021	9	8.74
2022	12	11.65
2023	11	10.68
2024	16	15.53
Total	103	100.00

Source: Scopus.Com (Processed Data, 2025)

²¹ Nees Jan Van Eck et al., "A Comparison of Two Techniques for Bibliometric Mapping: Multidimensional Scaling and VOS," *Journal of the American Society for Information Science and Technology* 61, no. 12 (2010): 2405–16, doi:<https://doi.org/10.1002/asi.21421>.; Nees Jan Van-Eck and Ludo Waltman, "Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping," *Scientometrics* 84, no. 2 (2010): 523–38, doi:<https://doi.org/10.1007/s11192-009-0146-3>.; Van-Eck and Waltman, *VOSviewer Manual: Manual for VOSviewer Version 1.6.18*.

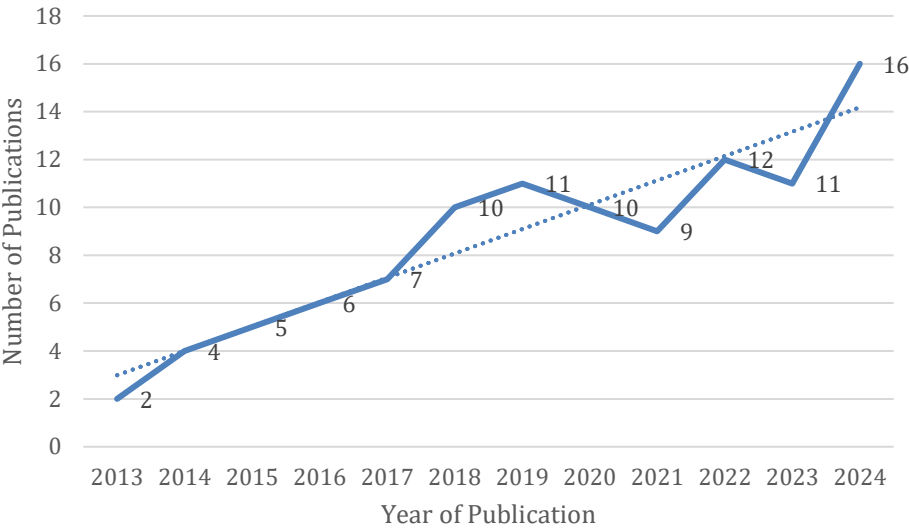


Figure 2. Publication Development Trends
Source: Scopus.Com (Processed Data, 2025)

Table 1 and Figure 2 present the development of publications discussing the intersection of artificial intelligence (AI) and hadith science from 2013 to 2024, based on data collected from Scopus. In total, there were 103 publications recorded during this period. The data reveals a rising trend in publications year by year, with a notable intensification in the last five years. At the beginning of the observation period, the number of publications was still very limited. In 2013, only 2 publications were recorded (1.94%), with gradual increases in the following years: 4 publications (3.88%) in 2014 and 5 publications (4.85%) in 2015. This period reflects the early academic interest in the integration of AI in hadith studies, which was generally exploratory and conceptual in nature.

A more consistent increase began to be evident from 2016, with publications growing each year. From 2017 to 2019, there was a steady growth with 7 publications (6.80%), 10 publications (9.71%), and 11 publications (10.68%), respectively. This marked a strengthening interest in applying AI in Islamic studies, particularly in efforts related to digitalization, codification of texts, and automation of hadith sanad search. Growth slightly slowed in 2020 and 2021, with 10 publications (9.71%) and 9 publications (8.74%), respectively, likely due to external factors such as the global pandemic, which impacted the research ecosystem in general. However, in 2022, the number of publications rebounded to its highest point at that time, with 12 publications (11.65%), followed by a still high number in 2023, with 11 publications (10.68%). The peak of growth occurred in 2024, with 16 publications recorded, representing 15.53% of the total. This indicates that more than half of the publications recorded over the past twelve years were produced in just the last five years (2020–2024), signaling a significant increase in scholarly attention toward the use of AI technology in the field of hadith studies.

Overall, the data in this table suggests that the study of AI in the context of hadith science has evolved from a marginal discourse to a more structured and increasingly popular field of research. This trend can be attributed to the growing awareness of AI's potential in the verification of hadith, digital text processing, and the development of more

adaptive hadith information systems. Although this trend shows positive growth, there is still ample room for further exploration, especially in aspects of methodology, integration of ethics, and the development of AI-based applications aligned with the principles of hadith science. Considering this trend, it can be projected that in the coming years, interdisciplinary collaboration between computer scientists and hadith scholars will increase. Future research is expected not only to expand the realm of AI applications in hadith science but also to contribute to the formation of a more inclusive and contextual digital scholarly ecosystem in Islamic studies.

Table 2. Document Types of Publications

Document Type	Frequency	Percentage
Conference Paper	46	44.66
Article	42	40.78
Conference Review	9	8.74
Review	3	2.91
Data Paper	2	1.94
Book Chapter	1	0.97
Total	103	100.00

Source: Scopus.Com (Processed Data, 2025)

Table 2 presents the distribution of document types in publications discussing the intersection of Artificial Intelligence (AI) and Hadith science based on data collected from Scopus up until 2025. A total of 103 documents were analyzed, with a variety of publication types reflecting the dynamics and patterns of knowledge dissemination in this field. The majority of publications fall under the category of conference papers, with 46 documents or 44.66% of the total. This dominance indicates that scholarly forums such as seminars, symposia, and international conferences serve as the primary venues for researchers to present preliminary studies or innovative developments related to the application of AI in Hadith science. The preliminary nature of conference papers often reflects experimental or new approaches that are not yet fully developed but are highly relevant for discussion within the academic community.

The second most common document type is articles, with 42 documents (40.78%). Scientific articles published in journals typically undergo a rigorous peer-review process, thus providing a more solid academic contribution and serving as key references in the development of theory and practice in AI within the context of Hadith studies. The high proportion of journal articles indicates that research in this field has started to reach a more mature academic stage and is being widely accepted within the academic community.

Next, there are 9 conference reviews (8.74%). These documents are typically reports or summaries of various presentations within a conference, offering an overview of the latest trends and approaches being developed. The existence of these documents reflects efforts to synthesize scattered knowledge within academic forums into more structured studies. Furthermore, publications in the form of reviews or review articles account for 3 documents (2.91%). This type of article serves to summarize and analyze various previous studies, making it highly useful for understanding the overall research landscape of AI in Hadith science. Meanwhile, data papers are recorded with 2 documents (1.94%), indicating

an initiative to provide relevant datasets to support further research.

Finally, there is 1 publication in the form of a book chapter (0.97%), which typically provides a more in-depth discussion within the broader context of an academic book. Although its number is small, the existence of book chapters suggests that this topic is beginning to enter the realm of more comprehensive literature. Overall, the distribution of document types shows that research on AI in Hadith science is still largely developing within open academic forums, but it is also beginning to find a place in more established formal academic publications. This diversification of document types highlights an active and collaborative research ecosystem, as well as significant potential for the development of interdisciplinary approaches that combine classical Islamic studies with cutting-edge technologies such as AI. Looking ahead, it is expected that more publications in the form of academic books and comprehensive reviews will emerge, enriching the literature in this field.

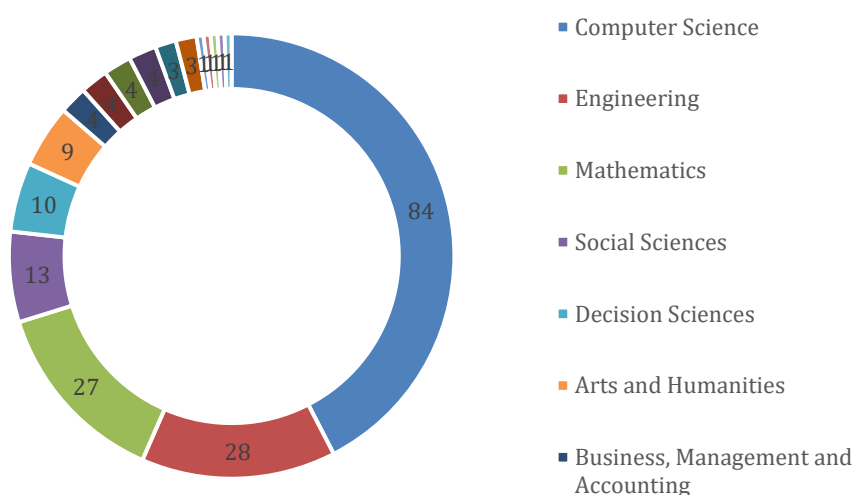


Figure 3. Research Subject Area of Publications
Source: Scopus.Com (Processed Data, 2025)

Figure 3 displays the distribution of subject areas for publications discussing the intersection of Artificial Intelligence (AI) and Hadith science based on data obtained from Scopus up to 2025. A wide range of research fields serves as the platform for the development of this study, with the total number of publications spread across various disciplines. The field of *Computer Science* dominates the number of publications, with a total of 84 documents, indicating that computational approaches, programming, as well as the development of algorithms and artificial intelligence, are the foundational elements in research connecting AI with Hadith studies. This is understandable, as AI itself is a product of the rapid advancements in computer science over the past two decades.

In second place, *Engineering* records 28 publications, signifying a significant contribution from the engineering field, especially in the application of hardware and software technologies supporting the digitization process and textual analysis of Hadiths. *Mathematics* contributes 27 publications, reflecting the important role of formal logic, statistics, and mathematical models in the development of more accurate and efficient AI systems. *Social Sciences* ranks fourth with 13 documents, demonstrating attention to the

social, cultural, and humanistic dimensions of AI’s application in Hadith science. The presence of AI not only impacts technical aspects but also brings ethical, epistemological, and sociological implications that deserve thorough examination.

Next, *Decision Sciences* contributes 10 publications, showing that data-driven decision-making and logic-based approaches are also being explored in the development of AI-based decision support systems for Islamic studies. *Arts and Humanities* (9 publications) also makes a contribution, reflecting the importance of humanities approaches in understanding the historical, linguistic, and Islamic values within Hadiths. Several other fields with smaller contributions include *Business, Management, and Accounting*, *Materials Science*, and *Medicine*, each with 4 publications, as well as *Physics and Astronomy* (4 publications), *Energy*, and *Multidisciplinary* fields, each with 3 publications. *Agricultural and Biological Sciences*, *Chemistry*, *Earth and Planetary Sciences*, *Economics*, *Econometrics and Finance*, and *Environmental Science* each have 1 publication, indicating that, although their share is small, interdisciplinary approaches continue to influence research on AI in Hadith science.

This distribution indicates that while AI studies in Hadith science are predominantly driven by scientific and technological approaches, contributions from *social sciences*, *humanities*, and *multidisciplinary* fields also play a vital role. This reflects that the development of AI in Islamic studies is not merely a technical matter, but requires cross-disciplinary collaboration to ensure its application remains relevant, ethical, and contextual within the framework of Islamic scholarship.

2.2. Authors and Citations

From the perspective of authors, there are several authors or researchers whose works dominate in terms of quantity.

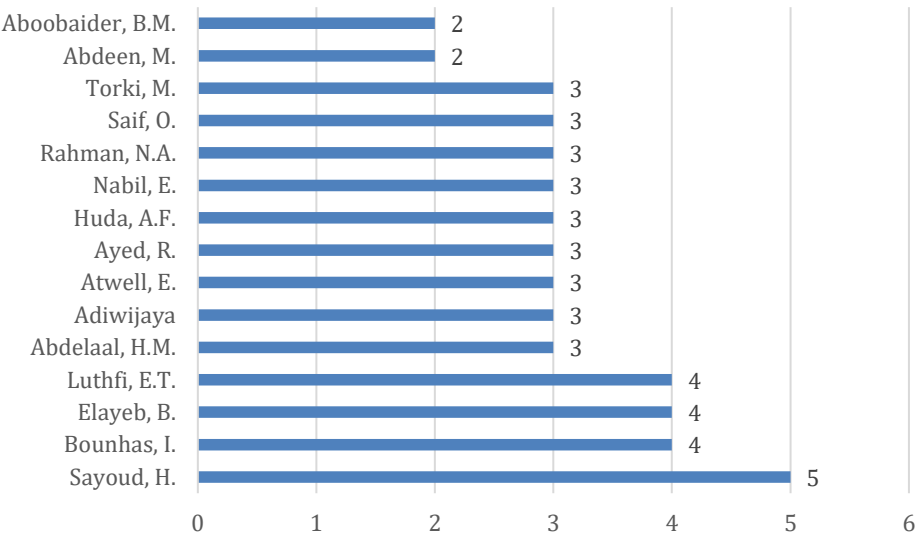


Figure 4. Top 15 Authors by Number of Published Documents
Source: Scopus.Com (Data Processed, 2025)

Figure 4 above presents the list of the top 15 authors with the highest number of publications that examine the relationship between Artificial Intelligence (AI) and Hadith science, based on data from Scopus up to 2025. This information provides an overview of the individual contributions of researchers active in this field, as well as the trends in

collaboration and the ongoing direction of research development.

The author with the highest number of publications is Sayoud, H., who has 5 documents. This position reflects Sayoud's dominant role in advancing interdisciplinary research that combines AI with Islamic studies, particularly in the fields of Arabic language processing and Hadith authentication. Following Sayoud, there are three authors who each have 4 publications: Bounhas, I., Elayeb, B., and Luthfi, E.T. This indicates their consistent and focused research in similar topics.

Next, there is a group of authors who each have 3 publications, including Abdelaal, H.M., Adiwijaya, Atwell, E., Ayed, R., Huda, A.F., Nabil, E., Rahman, N.A., Saif, O., and Torki, M. This number suggests that these authors are also significant contributors actively involved in various research projects related to the development of AI technology for Hadith studies, whether through text processing methods, semantic modeling, or the implementation of machine learning in Islamic data analysis. At the bottom, there are two authors, Abdeen, M. and Aboobaider, B.M., each with 2 publications. Although they have fewer publications compared to others, their involvement still reflects an active role in contributing to the development of relevant academic literature, with potential for further expansion through collaboration and diversification of topics.

Overall, the distribution of publications indicates that the study of AI in Hadith science is still somewhat limited but is gradually growing, with contributions from researchers across countries and institutions. The dominance of certain names suggests the existence of research excellence hubs that can serve as references for other academics wishing to delve deeper into this topic or explore opportunities for collaboration. Moving forward, an increase in the number of active researchers in this field will be an important indicator of the maturity and sustainability of this interdisciplinary study.

Table 3. Top 15 Most Cited Publications

Rank	Authors	Article Title	Year	Journal or Publication Media	Number of Citations
1	Saloot M.A.; Idris N.; Mahmud R.; Ja'afar S.; Thorleuchter D.; Gani A.	Hadith data mining and classification: a comparative analysis	2016	Artificial Intelligence Review	51
2	Azmi A.M.; Al-Qabbany A.O.; Hussain A.	Computational and natural language processing based studies of hadith literature: A survey	2019	Artificial Intelligence Review	32
3	Rostam N.A.P.; Malim N.H.A.H.	Text categorisation in Quran and Hadith: Overcoming the interrelation challenges using	2021	Journal of King Saud University - Computer and Information Sciences	29

Rank	Authors	Article Title	Year	Journal or Publication Media	Number of Citations
		machine learning and term weighting			
4	Abdi A.; Hasan S.; Arshi M.; Shamsuddin S.M.; Idris N.	A question answering system in hadith using linguistic knowledge	2020	Computer Speech and Language	25
5	Mahmood A.; Khan H.U.; Zahoor-Ur-Rehman; Khan W.	Query based information retrieval and knowledge extraction using Hadith datasets	2017	Proceedings - 2017 13th International Conference on Emerging Technologies, ICET2017	24
6	Alkhatib M.; Monem A.A.; Shaalan K.	A Rich Arabic WordNet Resource for Al-Hadith Al-Shareef	2017	Procedia Computer Science	22
7	Aldhlan K.A.; Zeki A.M.; Zeki A.M.; Alreshidi H.A.	Novel mechanism to improve hadith classifier performance	2013	Proceedings - 2012 International Conference on Advanced Computer Science Applications and Technologies, ACSAT 2012	20
8	Abdelaal H.M.; Elemery B.R.; Youness H.A.	Classification of Hadith According to Its Content Based on Supervised Learning Algorithms	2019	IEEE Access	19
9	Mahmood A.; Khan H.U.; Alarfaj F.K.; Ramzan M.; Ilyas M.	A multilingual datasets repository of the Hadith content	2018	International Journal of Advanced Computer Science and Applications	18
10	Al Faraby S.; Jasin E.R.R.; Kusumaningrum A.; Adiwijaya	Classification of hadith into positive suggestion, negative suggestion, and information	2018	Journal of Physics: Conference Series	17

Rank	Authors	Article Title	Year	Journal or Publication Media	Number of Citations
11	Ben Khiroun O.; Ayed R.; Elayeb B.; Bounhas I.; Ben Saoud N.B.; Evrard F.	Towards a new standard arabic test collection for mono- and cross-language information retrieval	2014	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	17
12	Salah R.E.; Zakaria L.Q.B.	Building the Classical Arabic Named Entity Recognition Corpus (CANERCorpus)	2018	Proceedings - 2018 4th International Conference on Information Retrieval and Knowledge Management: Diving into Data Sciences, CAMP 2018	16
13	Hasan A.M.; Zakaria L.Q.	Question classification using support vector machine and pattern matching	2016	Journal of Theoretical and Applied Information Technology	15
14	Tlemsani I.; Marir F.; Majdalawieh M.	Screening of Murabaha business process through Quran and hadith: a text mining analysis	2020	Journal of Islamic Accounting and Business Research	14
15	Soudani N.; Bounhas I.; Elayeb B.; Slimani Y.	Toward an Arabic ontology for Arabic word sense disambiguation based on normalized dictionaries	2014	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	14

Source: Scopus.Com (Data Processed, 2025)

Table 3 presents the 15 most cited articles in the field of technology-based Hadith studies, particularly those employing Artificial Intelligence (AI), Natural Language Processing (NLP), and data mining approaches. The article ranked first is by Saloot et al. (2016), titled “*Hadith Data Mining and Classification: A Comparative Analysis*”, published in *Artificial Intelligence Review*, with a total of 51 citations. This high citation

count indicates that the article has become a key reference in the development of AI-based Hadith classification techniques and has opened a new direction in the digitalization of classical Islamic sources.

Ranked second is the article by Azmi et al. (2019), titled “*Computational and Natural Language Processing-Based Studies of Hadith Literature: A Survey*”, published in the same journal, with 32 citations. This article plays an important role in summarizing the development of computational approaches to Hadith literature, making it a frequently cited starting point for new researchers in the field. In third place is the article by Rostam and Malim (2021), titled “*Text Categorisation in Quran and Hadith*”, published in the *Journal of King Saud University – Computer and Information Sciences*, which has received 29 citations. This study focuses on contextual separation and the interrelation between Qur’anic and Hadith texts using machine learning and term-weighting techniques—a particularly challenging topic in Islamic NLP studies.

Fourth place is held by Abdi et al. (2020), whose article explores a question-answering system within the Hadith context, with a total of 25 citations. The development of linguistically based question-answering systems reflects the growing trend of integrating classical Arabic language with modern technologies to facilitate access to Islamic literature. Mahmood et al. (2017) rank fifth, with 24 citations for their work on information retrieval and knowledge extraction from Hadith datasets, underscoring the importance of well-structured data in building accurate Islamic text search systems. In sixth place is the article by Alkhatib et al. (2017), which introduced Arabic WordNet for Hadith contexts and has garnered 22 citations, enriching the semantic resources of the Arabic language. Meanwhile, the article by Aldhlan et al. (2013), which developed a novel mechanism to improve the accuracy of Hadith classification, ranks seventh with 20 citations, marking an early interest in enhancing the performance of automated Hadith classification.

The article by Abdelaal et al. (2019), which applied supervised learning algorithms for Hadith content classification, ranks eighth with 19 citations. In ninth place is Mahmood et al. (2018), who made a significant contribution to the development of multilingual Hadith datasets, with 18 citations—paving the way for cross-linguistic Hadith studies. Ranks ten through fifteen reflect a variety of themes, ranging from Hadith classification based on doctrinal values (Al Faraby et al., 2018) to corpus development, Arabic ontologies, and machine learning methods for information retrieval in Islamic contexts. The citation counts range between 17 and 14, indicating that although the topics vary, each article has had a meaningful impact in shaping new directions for technology-based Hadith research.

In general, the data in Table 3 reflect a growing interest in the digitalization of classical Islamic literature, particularly Hadith, through the application of AI and NLP technologies. These articles illustrate how interdisciplinary collaboration between Islamic studies and computer science has given rise to innovative approaches in the management and analysis of Islamic texts, opening broad research opportunities for developing more adaptive, intelligent, and inclusive Islamic information systems.

2.3. Publication Media, Affiliations, and Countries

Based on an analysis of 103 publications retrieved through the Scopus database, the top 15 publication venues were identified, as illustrated in Figure 4 below.

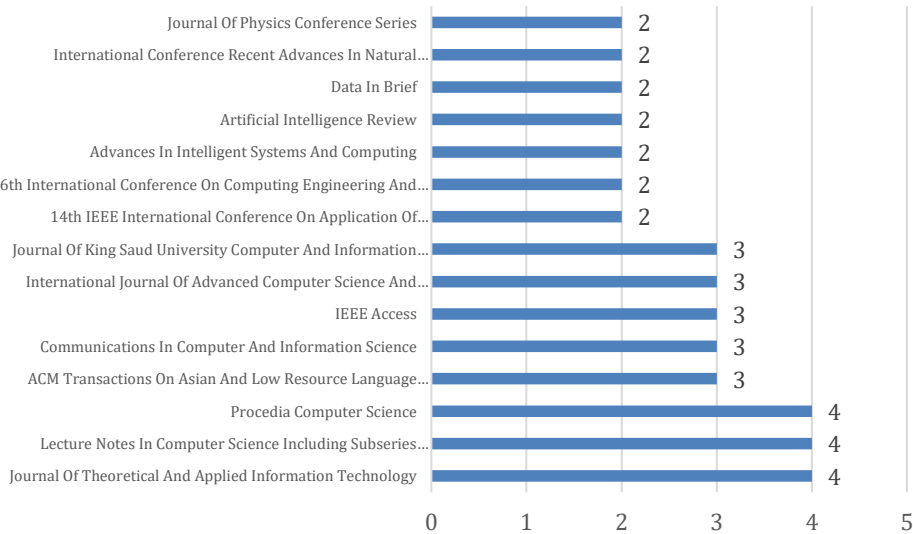


Figure 5. Top 15 Publication Venues and Number of Publications
Source: Scopus.com (Processed Data, 2025)

The figure above displays the top 15 publication venues with the highest number of publications in the field of artificial intelligence and Hadith studies, based on data retrieved from Scopus and processed in 2025. The top three venues—*Journal of Theoretical and Applied Information Technology*, *Lecture Notes in Computer Science* (including the subseries *Lecture Notes in Artificial Intelligence* and *Lecture Notes in Bioinformatics*), and *Procedia Computer Science*—each recorded four publications. This indicates that these three venues serve as strategic platforms consistently used by researchers to disseminate studies integrating information technology and artificial intelligence with Islamic studies, particularly Hadith science.

Following these are several venues that each published three articles, including *ACM Transactions on Asian and Low Resource Language Information Processing*, *Communications in Computer and Information Science*, *IEEE Access*, *International Journal of Advanced Computer Science and Applications*, and the *Journal of King Saud University – Computer and Information Sciences*. These journals reflect the diversity of interdisciplinary approaches, ranging from natural language processing and information system development to intelligent computing applications in Islamic contexts.

Other venues, such as the *14th IEEE International Conference on Application of Information and Communication Technologies (AICT 2020)*, *6th International Conference on Computing Engineering and Design (ICCED 2020)*, *Advances in Intelligent Systems and Computing*, and *Artificial Intelligence Review*, each recorded two publications. This suggests that international conferences and reputable journals continue to be essential channels for academics to share their research. Likewise, *Data in Brief*, the *International Conference on Recent Advances in Natural Language Processing (RANLP)*, and the *Journal of Physics: Conference Series* also reported two publications each, indicating that data-driven experimental studies, natural language processing, and computational physics approaches are also contributing to the advancement of AI research in Hadith studies.

Overall, the distribution of publication venues reflects the breadth of multidisciplinary approaches in examining the integration of artificial intelligence with Islamic sciences, particularly Hadith. The journals and proceedings span various academic

disciplines such as computer science, linguistics, information systems, and physics, signaling growing interest in this topic from diverse international academic communities. This data serves as a valuable reference for researchers in selecting strategic and relevant publication outlets aligned with future research directions.

Table 4. Top 15 Institutions with the Highest Number of Publications in Artificial Intelligence and Hadith Studies

No.	Affiliation	Number of Publications
1	Universiti Kebangsaan Malaysia	12
2	Telkom University	8
3	Universiti Teknologi MARA	7
4	Université des Sciences et de la Technologie Houari Boumediene	5
5	Universiti Teknikal Malaysia Melaka	5
6	UIN Sunan Gunung Djati	5
7	Universitas Amikom Yogyakarta	5
8	Universiti Malaya	4
9	Université de la Manouba	4
10	Ecole Nationale des Sciences de l'Informatique	4
11	Faculty of Engineering	3
12	Minia University	3
13	University of Leeds	3
14	International Islamic University Malaysia	3
15	Institute of Public Administration	3

Source: Scopus.com (Processed Data, 2025)

Table 4 presents the top 15 institutions with the highest number of publications in the field of artificial intelligence and Hadith studies, based on data retrieved from Scopus and processed in 2025. Universiti Kebangsaan Malaysia ranks first with a total of 12 publications, highlighting its leading role in advancing interdisciplinary research that bridges artificial intelligence and Islamic studies, particularly Hadith scholarship. In second place is Telkom University from Indonesia, with 8 publications—an achievement that underscores Indonesia's significant contribution to the global research landscape on the application of intelligent technologies in religious studies. This is followed by Universiti Teknologi MARA with 7 publications, further indicating Malaysia's strong institutional commitment to research in this field.

Several institutions recorded 5 publications each, including Université des Sciences et de la Technologie Houari Boumediene (Algeria), Universiti Teknikal Malaysia Melaka, UIN Sunan Gunung Djati (Indonesia), and Universitas Amikom Yogyakarta. The presence of two Indonesian institutions in this group suggests a robust academic foundation in integrating Islamic studies with emerging technologies. Institutions with 4 publications include Universiti Malaya, Université de la Manouba (Tunisia), and Ecole Nationale des Sciences de l'Informatique, also based in Tunisia. The inclusion of institutions from North Africa affirms that the intersection of AI and Hadith studies is gaining traction in both the

Arab world and the Francophone Islamic academic context. At the next level, several institutions recorded 3 publications each, such as a Faculty of Engineering (unspecified institution), Minia University (Egypt), University of Leeds (United Kingdom), International Islamic University Malaysia, and the Institute of Public Administration. This demonstrates a broad and balanced participation from universities and research institutions across Europe, the Middle East, and Southeast Asia.

Overall, these data reflect that research in artificial intelligence and Hadith studies has gained significant attention across institutions in Muslim-majority countries such as Malaysia, Indonesia, and those in North Africa, as well as from several institutions in Europe. This achievement highlights the growing strength of cross-national and interdisciplinary academic collaboration in the innovative and contextual integration of modern technology with classical Islamic scholarship.

Table 5. Top 15 Countries with the Highest Number of Publications in Artificial Intelligence and Hadith Studies

No.	Country Affiliation of Authors	Number of Publications
1	Malaysia	30
2	Indonesia	22
3	Saudi Arabia	16
4	Egypt	8
5	United Arab Emirates	8
6	United Kingdom	7
7	Tunisia	6
8	Algeria	5
9	Pakistan	5
10	United States	3
11	France	2
12	Germany	2
13	Bahrain	1
14	Bangladesh	1
15	Brunei Darussalam	1

Sumber: Scopus.Com (Data Diolah, 2025)

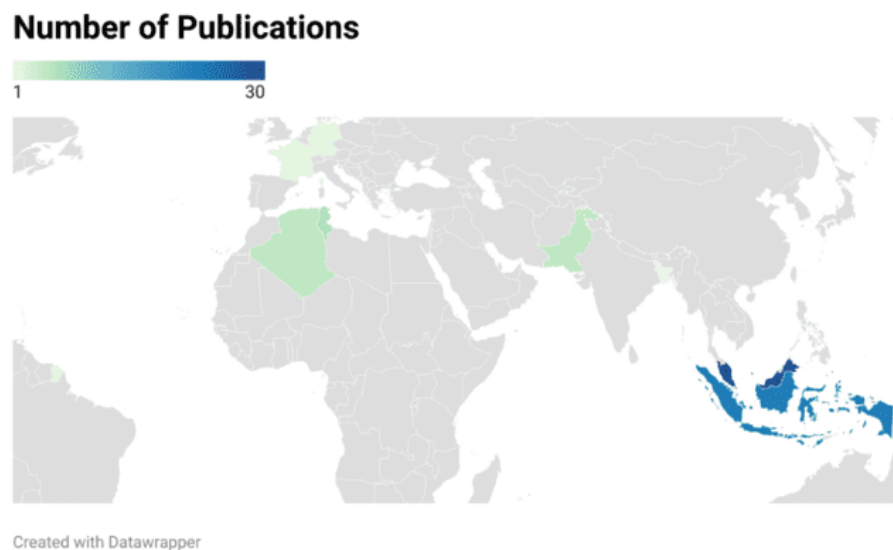


Figure 6. Geographic Distribution of Publications based on the Country Affiliation of Authors (Top 15)

Source: Scopus.com (Processed Data, 2025)

In terms of contributions by country, Table 5 and Figure 6 indicate that Malaysia ranks first with a total of 30 publications, making it the leading country in research that integrates artificial intelligence and Hadith studies. This reflects Malaysia's strong commitment to advancing interdisciplinary research, particularly in leveraging technology to support Islamic studies. Indonesia follows in second place with 22 publications, highlighting the active role of Indonesian academics and higher education institutions in engaging with the development of artificial intelligence and its application in Islamic scholarship, particularly in the field of Hadith. This achievement also signifies a growing national research capacity in harmonizing Islamic values with digital innovation.

Saudi Arabia ranks third with 16 publications, indicating the country's significant role in promoting the digitalization and modernization of Islamic studies through technological adoption. Egypt and the United Arab Emirates follow with 8 publications each, demonstrating regional leadership in advancing research that combines AI with Islamic sciences. The United Kingdom, with 7 publications, is the only Western country in the top six, signaling scholarly interest in Europe regarding the application of AI to Islamic studies.

Meanwhile, Tunisia contributed 6 publications, followed by Algeria and Pakistan with 5 publications each, further affirming the engagement of Muslim-majority countries in developing this research field. Contributions from countries such as the United States (3 publications), France, and Germany (2 publications each) suggest that while involvement from developed countries remains limited, there is growing potential for expansion through cross-regional collaboration. Additionally, countries like Bahrain, Bangladesh, and Brunei Darussalam each contributed 1 publication, illustrating that although their quantitative contributions are small, they nonetheless reflect the geographical diversity and global interest in this emerging topic.

Overall, the data suggest that research at the intersection of artificial intelligence and Hadith studies is not only progressing in developed nations but is also experiencing significant growth in Muslim-majority and Southeast Asian countries. This trend opens up

considerable opportunities for cross-national collaborations in developing innovative and contextually relevant approaches to Islamic studies in the digital era.

2.4. Mapping the Development of Research in Artificial Intelligence and Hadith Studies

A bibliometric mapping of the development of research in artificial intelligence and Hadith studies was conducted using VOSviewer, which produced a visual representation of the relationships among frequently occurring topics in the literature. In the data selection process, the researchers used the feature “Create a map based on text data”. The data source was set to “Read data from reference manager files”, with RIS file types supported by the VOSviewer application.

For the counting method, binary counting was applied, with a minimum occurrence threshold of 5, resulting in 154 selected terms from a total of 103 documents. The mapping of topics related to artificial intelligence and Hadith studies was displayed using the Network Visualization mode. The outcome of this visualization is presented in Figure 7 below.

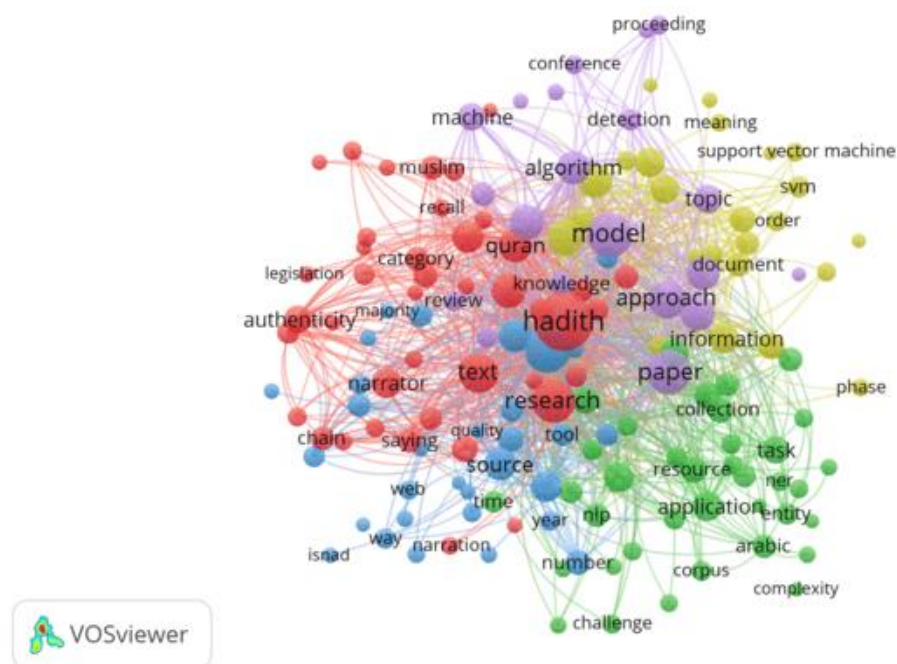


Figure 7. Topic Mapping of Artificial Intelligence and Hadith Studies Using Network Visualization Mode

Source: Data Processing Results (2025)

Figure 7 presents a network visualization that represents the mapping of recurring topics in the intersection of artificial intelligence (AI) and hadith studies, based on bibliometric analysis. Each node in the network represents a frequently used keyword in academic publications, with the size of the node indicating the frequency of that keyword's occurrence—the larger the node, the more prominent the topic in the analyzed literature. The lines connecting the nodes represent the co-occurrence or linkage of keywords within the same documents. Thicker lines denote stronger associations. The various colors signify distinct clusters of thematically related topics.

The topic mapping of AI and hadith studies reveals five main clusters, each

representing different but interconnected directions, approaches, and research foci in the integration of AI technologies with hadith scholarship. Each cluster reflects a particular dimension in the systematic and scientific exploration, processing, and verification of hadith texts through artificial intelligence.

1. Red Cluster: Hadith Authentication and Narrator Analysis

The red cluster occupies a central position in the network and is characterized by keywords such as *hadith*, *research*, *authenticity*, *narrator*, and *quran*. This indicates a primary focus on the authentication of hadith—a critical process in classical hadith studies that is now being advanced through algorithmic approaches. The keywords *authenticity* and *narrator* suggest that researchers are particularly interested in analyzing the *sanad* (chain of transmission) and the reliability of transmitters.

AI plays a significant role in modeling and assessing the validity of transmission chains through computational methods, such as narrator network analysis and credibility scoring algorithms. For instance, algorithms can evaluate the consistency of narrator data, detect anomalies in transmission chains, and compare different hadith versions across sources. The presence of the keyword *quran* indicates efforts to correlate or compare hadith content with the Qur'an, ensuring thematic coherence and alignment. This cluster thus embodies a theological-methodological orientation, where AI is utilized to uphold scholarly rigor in hadith authentication.

2. Blue Cluster: Narrative Structure and Transmission Chain Tracing

The blue cluster includes keywords such as *source*, *text*, *chain*, and *narration*, highlighting a focus on the narrative structure of hadith and the tracing of sources. This cluster is closely linked to the study of *sanad* and *matan*—the two primary components of a hadith: the chain of narrators and the textual content.

Research within this cluster aims to develop intelligent systems capable of identifying intertextual relationships and automatically tracing source origins. This includes mapping transmission chains, modeling narrative networks, and reconstructing the original sources of hadith texts. AI facilitates the visualization of relationships among narrators and hadiths, enabling the detection of potential interpolations, repetitions, or distortions during transmission. Here, AI functions as a tool for internal verification of traditional scholarly narratives.

3. Green Cluster: NLP Applications in Hadith Text Processing

The green cluster is marked by keywords such as *application*, *resource*, *NLP*, *entity*, and *corpus*, indicating a research focus on the application of Natural Language Processing (NLP) technologies to hadith texts, particularly those in Arabic. Research in this cluster tends to be technical and linguistic, employing AI to extract specific information from hadith texts, such as named entities (e.g., places, people, dates), thematic classification, Arabic morphological analysis, and automated translation.

By building large, well-annotated digital corpora of hadith texts, researchers can train AI models to more accurately comprehend the structure and context of classical Arabic. NLP functionalities also include semantic and syntactic analysis, which are crucial for interpreting the complex and layered meanings embedded in hadith. This supports automation in hadith retrieval, topic-based classification, and even the development of hadith-based question-answering systems. Thus, this cluster strengthens a more responsive and accessible automation-based approach to Islamic scholarship.

4. Yellow Cluster: Machine Learning Approaches and Text Classification

The yellow cluster is defined by keywords such as *topic*, *SVM (Support Vector Machine)*, and *document*, pointing to a focus on the development and application of machine learning models for hadith text classification and thematic detection. Models like SVM are employed to classify hadiths based on themes, legal rulings, or narrator authority. Automated topic detection facilitates content annotation and categorization, enabling the creation of more focused and relevant intelligent search systems.

This approach is particularly significant in the context of AI-based Islamic digital libraries or information systems, which demand high levels of accuracy and efficiency in document clustering. Furthermore, this cluster represents the growing acceptance of computational text mining approaches in Islamic studies, providing solutions to the limitations of manual methods in analyzing complex religious texts.

5. Purple Cluster: Methodologies and Scientific Dissemination Forums

Finally, the purple cluster, consisting of keywords such as *model*, *approach*, *algorithm*, *detection*, and *conference*, represents the methodological and dissemination-oriented dimensions of AI research in hadith studies. These keywords reflect a strong interest in developing and refining algorithms for hadith detection and classification, as well as the importance of academic forums as spaces for knowledge exchange and innovation.

Research in this cluster is not only results-oriented but also emphasizes methodologies and approaches, including model validation and algorithm performance evaluation. Academic conferences serve as key venues for sharing ideas, presenting novel models, and discussing technical and ethical challenges in applying AI to Islamic texts.

Overall, this mapping comprehensively demonstrates that the integration of AI in hadith studies is not merely a trend but signifies a profound methodological transformation. Each cluster indicates that the research is not only technically or computationally driven but also deeply rooted in the epistemological needs of Islamic scholarship—textual validity, source credibility, and contextual understanding. AI functions as a bridge between classical scholarly traditions and modern analytical demands, opening new avenues for the interpretation, verification, and dissemination of Islamic knowledge in a manner that is broader, faster, and more objective. In this context, AI is not merely a tool but an integral component of the emerging methodology in contemporary Islamic studies.

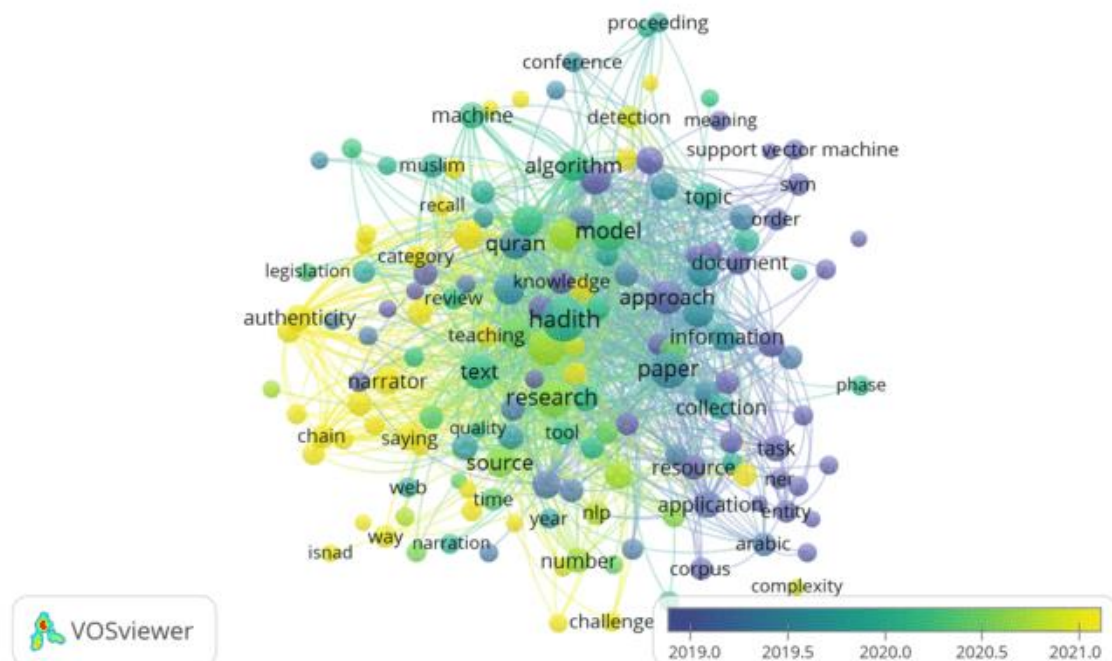


Figure 8. Topic Mapping Results of Artificial Intelligence and Hadith Studies Using Overlay Visualization Mode
Source: Processed Data (2025)

Figure 8 illustrates the results of topic mapping that links Artificial Intelligence (AI) and hadith studies using the *Overlay Visualization* mode in the VOSviewer application. This visualization provides temporal information on the emergence and development of keywords in scientific publications, represented through a color gradient—from blue (earlier years, around 2019) to yellow (more recent years, approaching 2021). Thus, the color of each keyword node reflects the average time of its appearance in the literature and can be interpreted as an indicator of research trends over time.

In general, keywords such as “hadith,” “model,” “research,” and “algorithm” appear as large nodes in central positions within the network, indicating that these terms are primary topics and most frequently associated with other themes. This suggests that hadith studies have been actively modeled and analyzed using AI-based approaches, particularly in the form of structured algorithms and computational models.

Over time, the focus of studies has gradually shifted. Green-colored keywords such as *quran*, *knowledge*, *source*, *teaching*, *tool*, and *nlp* indicate a broadening of research scope toward the integration of AI with a wider range of Islamic literature (including the Qur’an), as well as the use of Natural Language Processing (NLP) to process classical Arabic used in hadith. This marks a transition from narrative verification toward content exploration, entity annotation, and the digitalization of Islamic knowledge. Keywords such as *algorithm*, *quality*, and *recall* highlight a focus on the development of intelligent retrieval systems and performance evaluation of models, while *machine* and *review* signal the systematic adoption of machine learning approaches.

The presence of yellow-colored keywords such as *authenticity*, *narrator*, *reliability*, *way*, *deep learning*, *chain*, *isnad*, and *saying* indicates that recent research on

the integration of AI and hadith studies is increasingly focused on hadith authentication and *isnād* (chain of transmission) analysis. This aligns with the traditional approach in hadith sciences, which emphasizes the validity of sources, the credibility of narrators, and the integrity of the transmission chain from the Prophet Muhammad to the final narrator. In this context, AI is utilized to identify narrative patterns, evaluate inter-narrator relationships, and assess the authenticity and integrity of isnād chains based on biographical data, narration frequency, and isnād structure. The application of deep learning plays a significant role in this process, as it allows computers to learn from large datasets and detect complex relationships among isnād elements, even in classical Arabic texts with intricate syntactic structures. The appearance of keywords such as *legislation* and *category* around this cluster further strengthens the indication that the early orientation of research was deeply rooted in textual and normative approaches, positioning AI as a tool to classify hadiths based on legal categories, themes, or authenticity.

Also noteworthy are the keywords *conference*, *paper*, *approach*, and *proceeding*, which appear along the green-to-yellow spectrum, indicating that from 2020 onwards, the dissemination of AI research in hadith studies has increasingly taken place in academic forums. This underscores the growing importance of methodological development and knowledge exchange among researchers as key drivers of innovation in this field.

Overall, this overlay visualization demonstrates that the integrative study of AI and hadith has undergone thematic and methodological evolution. From an initial focus on isnād verification and hadith authentication, research has progressed toward text digitalization, linguistic analysis, automated classification, and semantic information extraction using machine learning approaches. The color transitions in the keyword network reflect that recent trends are more technological, applicative, and linguistic in nature, emphasizing automation and efficiency in processing Islamic data. This suggests that the field will continue to evolve—not only in scholarly aspects but also in the development of information systems and digital tools that support modern and inclusive teaching, understanding, and dissemination of hadith knowledge.

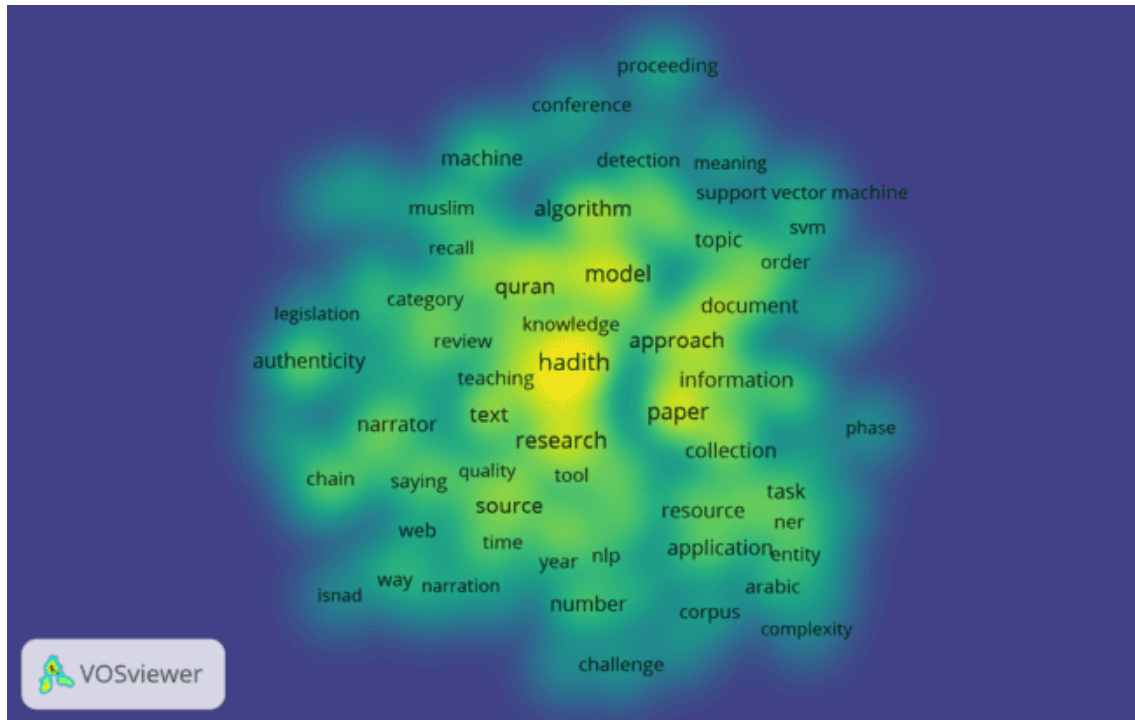


Figure 9. Mapping of Research Topics on Artificial Intelligence and Hadith Studies
Using Density Visualization Mode
Source: Data Processing Results (2025)

Figure 9 presents the results of topic mapping that connects Artificial Intelligence (AI) with Hadith studies through the Density Visualization mode in the VOSviewer application. This mode displays the intensity of keyword occurrences in the analyzed scientific literature using a color spectrum ranging from dark to bright. Bright colors (vivid yellow) indicate keywords that appear most frequently and have strong associations with the central topic, whereas green and dark blue represent lower frequency and weaker associations.

The visualization clearly places the term “*hadith*” at the center with the brightest color, indicating it is the primary focus of the analyzed publications. Surrounding it are several high-intensity keywords such as “*model*,” “*research*,” “*algorithm*,” “*paper*,” “*source*,” “*text*,” and “*approach*,” forming the core cluster of the main research theme. This suggests that computational approaches to Hadith studies have become an active and established field, particularly focusing on the development of models, algorithms, and AI-based research methodologies.

The proximity of keywords such as “*model*,” “*algorithm*,” and “*research*” to “*hadith*” indicates that data modeling and machine learning algorithms are the most frequently employed AI approaches in this field. Keywords like “*text*,” “*document*,” and “*information*” highlight that Hadith texts are central to Natural Language Processing (NLP) experiments and classification efforts. The presence of “*source*” and “*knowledge*” underscores the critical importance of source validity in Hadith content analysis. Meanwhile, keywords such as “*paper*,” “*approach*,” and “*conference*” with high density imply that this research area is actively discussed and widely published in academic forums, using diverse methodological approaches.

In areas with medium intensity (green to yellow-green hues), keywords such as “*quran*,” “*machine*,” “*nlp*,” “*review*,” “*tool*,” and “*recall*” appear, suggesting that the research focus has expanded beyond Hadith to include other Islamic texts (such as the Qur’an), along with increased utilization of NLP technologies for information extraction and semantic analysis. Topics like “*named entity recognition (NER)*,” “*support vector machine (SVM)*,” and “*task*” reflect the application of advanced machine learning methods for identifying key entities in Hadith texts and categorizing their content into thematic or legal classifications.

At the periphery of the visualization, keywords with dark green to blue hues such as “*complexity*,” “*challenge*,” “*meaning*,” “*phase*,” “*order*,” “*muslim*,” and “*legislation*” are visible. These colors indicate relatively low frequency of occurrence compared to the central terms. Although not yet the main focus of current literature, their presence suggests potential research areas that could be further explored in the future.

Some emerging research opportunities from these low-density areas include:

- Addressing the complexity of *isnād* (chain of narration) structures and classical Arabic grammar through AI approaches;
- Contextual meaning analysis of Hadith, requiring deep semantic understanding via Natural Language Processing;
- Studies on the application of AI in Islamic jurisprudence, particularly in the context of religious legislation and digital *fiqh*;
- Further exploration of technical and ethical challenges in applying AI to sacred texts that are theologically and historically sensitive.

Moreover, the emergence of keywords like “*web*,” “*year*,” and “*time*” suggests that temporal dimensions and digitalization are also becoming significant supporting elements in AI and Hadith research. This opens the possibility for examining the historical dynamics of Hadith transmission, the evolution of digital narratives, and the integration of data into real-time systems. Accordingly, these darker areas on the map represent relatively untapped research fields, which are crucial to pursue in order to broaden the contribution of AI to comprehensive Hadith studies.

Overall, Figure 3 provides a compelling visual depiction of how AI and Hadith studies intersect in academic literature. High-density centers indicate a primary research focus on modeling, algorithms, and Hadith text analysis, while medium- and low-density areas reflect expanding scope toward integration with other Islamic texts, advanced machine learning applications, and exploration of technical and conceptual challenges. As such, this mapping not only highlights dominant research trends in AI and Hadith but also reveals strategic opportunities for deeper and broader interdisciplinary scholarship in the future. Researchers can use these insights to identify research gaps, design novel approaches, and strengthen academic contributions to the integration of technology and Islamic studies.

3. CONCLUSION

Based on the findings and discussions regarding the development of historical and Islamic manuscript studies, several conclusions can be drawn.

First, the number of publications related to the role of Artificial Intelligence (AI) in Hadith studies has reached 103, with a significant upward trend in recent years. This reflects a growing interest among scholars and practitioners in utilizing AI for various aspects of Hadith knowledge management.

Second, in terms of authorship, one prominent contributor is H. Sayoud, who has

authored five documents. This underscores his leading role in advancing interdisciplinary research that integrates AI and Islamic studies, particularly in Arabic language processing and Hadith authentication. Moreover, the most frequently cited work in this domain is the article by Saloot et al. (2016), titled “*Hadith data mining and classification: a comparative analysis*”, published in *Artificial Intelligence Review*, which has garnered 51 citations. The high citation count indicates that this work has become a key reference in developing AI-based Hadith classification techniques and has paved the way for the digitalization of classical Islamic sources.

Third, in terms of publication outlets, the top three journals—*Journal of Theoretical and Applied Information Technology*, *Lecture Notes in Computer Science* (including its sub-series *Lecture Notes in Artificial Intelligence* and *Lecture Notes in Bioinformatics*), and *Procedia Computer Science*—each recorded four publications. This suggests that these venues serve as strategic and consistently utilized platforms for researchers to disseminate work at the intersection of information technology, artificial intelligence, and Islamic studies, particularly Hadith scholarship. From the perspective of institutional affiliation, Universiti Kebangsaan Malaysia ranks highest with a total of 12 publications, highlighting its leading role in fostering interdisciplinary research that merges AI with Islamic studies, especially in Hadith. Nationally, Malaysia leads with 30 publications, making it the most productive country in this field. This reflects Malaysia’s strong commitment to advancing interdisciplinary research, particularly in leveraging technology to support Islamic scholarship.

Fourth, topic mapping reveals prominent keywords in this research trend, such as *hadith*, *research*, *authenticity*, *narrator*, *quran*, *model*, *approach*, *technique*, and *classifier*, reflecting the main thematic focus of the field. Several keywords highlighted in yellow—such as *authenticity*, *narrator*, *reliability*, *way*, *deep learning*, *chain*, *isnad*, and *saying*—indicate a recent trend toward utilizing AI for Hadith authentication and sanad (chain of narration) analysis. In terms of research density, several terms—such as *complexity*, *challenge*, *meaning*, *phase*, *order*, *Muslim*, and *legislation*—are located in lower-density areas, suggesting lower frequency but high potential for further exploration.

3.1. Implications, Research Limitations, and Suggestions for Future Studies

The findings of this study carry several important implications for the advancement of Hadith sciences and the application of modern technology in Islamic studies. *First*, the increasing number of publications indicates that the integration of AI in Hadith scholarship is not merely a passing trend but has become part of the mainstream of interdisciplinary research. This presents opportunities for educational institutions and Islamic research centers to develop curricula and research programs that merge digital technologies with classical Islamic studies. *Second*, Malaysia’s dominance—particularly that of Universiti Kebangsaan Malaysia—signals the emergence of a center of excellence in this field, which can serve as a model or international collaboration partner. *Third*, the recent emphasis on Hadith authentication and sanad analysis shows that AI is being applied not only in technical aspects (such as data classification) but is also beginning to penetrate the epistemological domain of Hadith sciences. This development may stimulate new discourse in the methodology of contemporary Islamic scholarship.

Nonetheless, this study has several limitations. *First*, the data analyzed is limited to the Scopus database, meaning that publications not indexed in Scopus—such as those found in Google Scholar, DOAJ, or local databases like Garuda and Sinta—were excluded. This could introduce biases related to geographic or institutional representation. *Second*,

the bibliometric approach employed is quantitative-descriptive in nature and does not delve deeply into the content or methodological quality of each publication. As such, while general trends and directions can be mapped, the scientific depth of these studies has not been critically evaluated.

Future research is encouraged to expand the scope of databases by incorporating Scopus, Web of Science, and others to gain a more comprehensive picture. Additionally, bibliometric analysis can be complemented with qualitative approaches—such as systematic literature reviews or content analysis—to examine methodological approaches, theoretical frameworks, and key findings in greater depth. Topics with low density—such as *complexity*, *challenge*, *meaning*, *phase*, *order*, *Muslim*, and *legislation*—should also receive greater attention as underexplored areas with significant research potential. Future studies may aim to develop more specific theoretical frameworks and AI methodologies tailored for Hadith authentication, sanad validation, or even the practical integration of AI into Hadith education.

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