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DIGITAL AND TECHNOLOGICAL TRENDS IN QUR'ANIC RECITATION STUDIES: A BIBLIOMETRIC ANALYSIS

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Abstract:

The rapid advancement of digital and educational technologies has increasingly influenced the ways Qur'anic recitation is studied, taught, and disseminated, prompting growing scholarly attention across diverse academic disciplines. Despite this expansion, existing research on Qur'anic recitation remains fragmented, and a comprehensive quantitative overview of digital and technological trends in this field is still limited. Addressing this gap, the present study aims to systematically map the intellectual structure, publication patterns, and collaborative dynamics of research on digital and technological approaches to Qur'anic recitation. A bibliometric analysis was conducted using data retrieved from Elsevier's Scopus database through an advanced search strategy, yielding a final dataset of 3,362 publications. Scopus Analyzer was employed to examine descriptive statistics and publication trends, including annual output and country contributions, while OpenRefine was used to clean, standardize, and harmonize bibliographic records to ensure data accuracy. Network visualisation and relational analyses, including keyword co-occurrence and co-authorship by country, were performed using VOSviewer. The findings reveal a steady growth in publications over the past two decades, with a marked acceleration after 2016, reflecting heightened scholarly engagement driven by digital learning platforms, artificial intelligence, and speech-related technologies. The United States, Malaysia, Indonesia, and the United Kingdom emerge as leading contributors in terms of publication output and international

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collaboration. Keyword co-occurrence analysis highlights the continued dominance of classical themes such as translation, exegesis, and recitation, alongside the increasing presence of technology-oriented concepts, indicating an evolving interdisciplinary landscape. Overall, this study provides a comprehensive quantitative synthesis of digital and technological trends in Qur'anic recitation studies, offering valuable insights into research trajectories, collaborative networks, and emerging thematic directions. The findings contribute to a deeper understanding of how technological innovation is reshaping Qur'anic recitation scholarship and provide a foundation for future empirical and theory-driven research in this growing field.

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Keyword:

Artificial Intelligence, Bibliometric Analysis, Digital Technology, Islamic Education, Qur'anic Recitation

Introduction

Digital and technological innovations have profoundly transformed the landscape of Qur'anic recitation studies, marking a significant shift from exclusively traditional, teacher-led methods to technology-enhanced learning environments. The integration of advanced tools such as Artificial Intelligence (AI), speech recognition systems and cloud-based platforms has enabled new modes of recitation analysis, personalized feedback and interactive pedagogical delivery. These developments have not only expanded access to Qur'anic education for diverse and transnational communities but have also introduced real-time corrective mechanisms and adaptive learning experiences that were previously unattainable. The fusion of digital innovation with centuries-old recitation practices is fostering an environment where learners benefit from improved accessibility and engagement, while educators and scholars grapple with the challenge of maintaining religious authenticity and ethical integrity in the digital age (Shawar et al., 2024; Syahir et al., 2025; M. A. B. Yahya et al., 2025; Yusof et al., 2025).

Recent scholarship underscores the transformative potential of these technologies in enabling dynamic, inclusive, and scalable approaches to Qur'anic education. Digital platforms now leverage machine learning algorithms and audio-text synchronization techniques to assess and enhance recitation performance, while virtual communities and mobile applications facilitate transnational learning and personalized educational experiences. However, this evolution is not without its complexities: concerns regarding the preservation of sacredness, Shariah compliance, and the spiritual dimensions of Qur'anic learning remain central to ongoing debates. This review situates the current state of digital and technological trends in Qur'anic recitation studies within a broader research agenda, exploring the multifaceted impact of digitalization on traditional Islamic pedagogical methods and highlighting the need for

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balanced, ethically grounded innovation (Shawar et al., 2024; Syahir et al., 2025; M. A. B. Yahya et al., 2025; Yusof et al., 2025).

Literature Review

Scholarly attention to technological tools and digital platforms in Qur'anic recitation studies has grown markedly in recent years. Early research focused on the deployment of AI-powered speech recognition technologies such as Dynamic Time Warping (DTW) and Mel Frequency Cepstral Coefficients (MFCC) to monitor Tajweed accuracy and provide automated feedback to learners. These systems synchronize recitation audio with textual transcripts, offering immediate, actionable insights that are crucial for effective memorization and comprehension (Shafie et al., 2022; Yusof et al., 2025). The proliferation of comprehensive databases and cloud-based APIs has further facilitated multilingual transliteration and content retrieval, broadening access for non-Arabic speakers while maintaining high standards of accuracy and cultural sensitivity (Adhoni et al., 2014). Mobile applications and digital platforms, including TajweedMate and MyQuran.ai, have demonstrated empirical success in improving Qur'anic literacy by delivering personalized feedback and adaptive practice environments ("Assessing the Impact of AI-Driven Tools on Qur'anic Literacy: A Quasi-Experimental Study in Islamic Higher Education in Indonesia," 2025; Shawar et al., 2024).

The impact of digitalization on traditional pedagogical practices is evident in the emergence of hybrid learning models that blend conventional teacher led instruction with interactive digital feedback systems. AI-based applications complement traditional methods by offering personalized guidance and error correction, but scholars consistently emphasize that these tools cannot supplant the integral role of qualified teachers in preserving the spiritual and ethical dimensions of recitation (M. A. B. Yahya et al., 2025). Instead, digital tools serve as supplementary aids, enhancing learner engagement and supporting the transmission of classical knowledge. The COVID-19 pandemic accelerated the adoption of online platforms, revealing that digital learning can match face to face instruction in terms of recitation performance, while also highlighting the importance of motivation, interaction, and spiritual depth in sustaining engagement (Nkwanyana & Fagbadebo, 2025; W. B. M. H. M. Yahya et al., 2021).

Despite these advancements, significant challenges persist in ensuring that digital tools adhere to the rigorous standards of Islamic tradition and Shariah compliance. Studies have documented issues related to algorithmic bias, data privacy, and misalignment with religious values, particularly in AI-powered applications and chatbots (Fajrie et al., 2023; Kannike & Fahm, 2025). Researchers advocate for the development of robust ethical frameworks that incorporate foundational Islamic principles such as Maqāṣid al-Sharīʿah, justice, and transparency to safeguard the integrity of digital recitation tools. Interdisciplinary collaboration among technologists, Islamic scholars, and educators is seen as essential for creating applications that both innovate and respect the sacred dimensions of Qur'anic teachings (Andri Nirwana et al., 2025; Kannike & Fahm, 2025).

Emerging trends point toward the integration of real-time feedback systems and the evolution of digital platforms into more interactive, community-oriented learning environments. The accelerated adoption of digital learning during the COVID-19 pandemic has led to shifts in student engagement and institutional readiness to embrace online formats. Virtual communities have become vital, bridging geographical divides and fostering a sense of belonging among transnational learners (Fazza, 2022; Sari & Moore, 2024). However, the literature also

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highlights technological limitations such as connectivity issues, premium content restrictions, and the potential dilution of spiritual ambiance. There remains an underexplored need for standardized assessment metrics, comprehensive ethical frameworks, and multilingual Qur'anic ontologies to enhance cross-cultural knowledge dissemination and ensure the continued relevance and authenticity of Qur'anic recitation studies in the digital era (Mirarab et al., 2023; Semerikov et al., 2025; Syahir et al., 2025).

Research Question

RQ1. What are the temporal publication trends in research on digital and technological approaches to Qur'anic recitation from 2005 to 2025?
RQ2. Which publications constitute the most highly cited works in digital and technological Qur'anic recitation studies, and what thematic foci do they represent?
RQ3. Which countries are the leading contributors to scholarly output in digital and technological Qur'anic recitation studies?
RQ4. What are the dominant and emerging research themes, as reflected by keyword co-occurrence patterns, in digital and technological Qur'anic recitation studies?
RQ5. What are the patterns of international collaboration among countries in digital and technological Qur'anic recitation research, as revealed through co-authorship networks?

Methodology

Bibliometrics involves gathering, organizing, and analyzing bibliographic data from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). Beyond basic statistics, such as identifying publishing journals, publication years, and leading authors (Wu & Wu, 2017), bibliometrics includes more sophisticated techniques like document co-citation analysis. Conducting a successful literature review requires a careful, iterative process to select suitable keywords, search the literature, and perform an in-depth analysis. This approach helps to compile a comprehensive bibliography and achieve reliable results (Fahimnia et al., 2015). With this in mind, the study focused on high-impact publications, as they provide meaningful insights into the theoretical frameworks that shape the research field. To ensure data accuracy, SCOPUS served as the primary source for data collection (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017). Additionally, to maintain quality, the study only considered articles published in peer-reviewed academic journals, deliberately excluding books and lecture notes (Gu et al., 2019). Using Elsevier's Scopus, known for its broad coverage, publications were collected from 2006 through December 2025 for further analysis."

Data Search Strategy

The data retrieval strategy for this bibliometric study was designed to ensure comprehensive coverage, disciplinary relevance, and methodological rigor. Table 1 show advanced search was conducted in the Scopus database using the TITLE field with multiple standardized variants of the term Qur'anic/Quranic, including different transliterations and spellings, to capture the full spectrum of scholarly publications related to the Qur'an. Restricting the search to the title field enhanced the thematic precision of the dataset by ensuring that only publications with a clear and explicit focus on Qur'anic-related topics were included. In addition, subject area filters were applied to limit the dataset to Social Sciences (SOCI) and Arts and Humanities (ARTS), aligning the corpus with educational, pedagogical, cultural, and interpretive dimensions that are most relevant to studies on education and learning technologies. Language restrictions to

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English, Malay, and Arabic further ensured academic quality and contextual relevance, while also reflecting the dominant languages used in Qur'anic and Islamic education scholarship as show in Table 2.

To capture the longitudinal evolution of the field, publication years from 2005 to 2025 were included, allowing the analysis to trace both early developments and recent research trends over a twenty-year period. This extended temporal scope is particularly important for bibliometric studies, as it enables the identification of growth patterns, thematic shifts, and emerging research fronts. The final dataset comprised 3,362 publications, indicating a substantial and sustained body of literature within the selected scope. Such a dataset size is sufficient for robust bibliometric mapping, including trend analysis, keyword co-occurrence, and thematic clustering, while remaining focused enough to preserve conceptual coherence. Overall, the search strategy balances inclusivity and specificity, providing a reliable foundation for examining research trajectories and intellectual structures relevant to education-related studies within the Qur'anic scholarly domain.

Table 1: The Search String

Scopus	TITLE (Qur'anic OR Quranic OR "Qur'an" OR Quran OR "Al-Qur'an" OR "Al-Quran") AND (LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ARTS")) AND (LIMIT-TO (LANGUAGE , "English") OR LIMIT-TO (LANGUAGE , "Malay") OR LIMIT-TO (LANGUAGE , "Arabic")) AND (LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023) OR LIMIT-TO (PUBYEAR , 2024) OR LIMIT-TO (PUBYEAR , 2025))

Table 2: The Selection Criterion Is Searching

Criterion	Inclusion	Exclusion
Language	English, Arabic, Malay	Non-English, Arabic, Malay
Subject	Art & Humanities, Social Sciences	Others
Timeline	2006 - 2025	<2006

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Data Analysis

Vosviewer is a widely adopted bibliometric analysis software developed by nees jan van eck and ludo waltman at leiden university, the netherlands (Van eck & Waltman, 2010, 2017). The software is specifically designed to support the visualization and analysis of scientific literature through the construction of intuitive network maps, thematic clusters, and density visualizations. It enables comprehensive examination of bibliometric relationships, including co-authorship, co-citation, and keyword co-occurrence networks, thereby facilitating a structured understanding of research domains. Its interactive and user-friendly interface, together with continuous software updates, allows for efficient exploration and analysis of large-scale bibliographic datasets.

A key strength of vosviewer lies in its ability to transform complex bibliometric data into visually interpretable maps that clearly represent relationships among publications, authors, and research themes. The software excels in identifying clusters of related items, detecting patterns in keyword co-occurrence, and generating density maps that highlight areas of research concentration. Its accessibility benefits both novice and experienced researchers, enabling effective navigation of research landscapes. Moreover, vosviewer supports metric computation, visualization customization, and compatibility with multiple bibliographic data sources, reinforcing its value as a robust and versatile tool for bibliometric investigations.

For this study, bibliographic datasets containing information on publication year, article title, author names, journal source, citation counts, and keywords were extracted from the Scopus database in PlainText format, covering publications from 2004 to December 2024. The datasets were subsequently analyzed using VOSviewer software (version 1.6.19). By applying VOS-based clustering and mapping techniques, the software facilitated the generation and examination of bibliometric maps. As an alternative to the Multidimensional Scaling (MDS) approach, VOSviewer emphasizes the placement of items in a low-dimensional space such that the distance between any two items accurately reflects their degree of relatedness (van Eck & Waltman, 2010). In this regard, VOSviewer shares conceptual similarities with MDS (Appio et al., 2014). However, unlike MDS which primarily relies on similarity measures such as cosine similarity and the Jaccard index VOSviewer employs a more appropriate normalization technique for co-occurrence data, namely the association strength (AS_{ij}), calculated as follows (Van Eck & Waltman, 2007):

$$AS_{ij} = \frac{C_{ij}}{w_i w_j}$$

which is “proportional to the ratio between on the one hand the observed number of cooccurrences of i and j and on the other hand the expected number of co-occurrences of i and j under the assumption that co-occurrences of i and j are statistically independent” (Van Eck & Waltman, 2007).

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Result & Discussions

***RQ1**: What Are the Temporal Publication Trends in Research on Digital and Technological Approaches to Qur'anic Recitation From 2005 To 2025?*

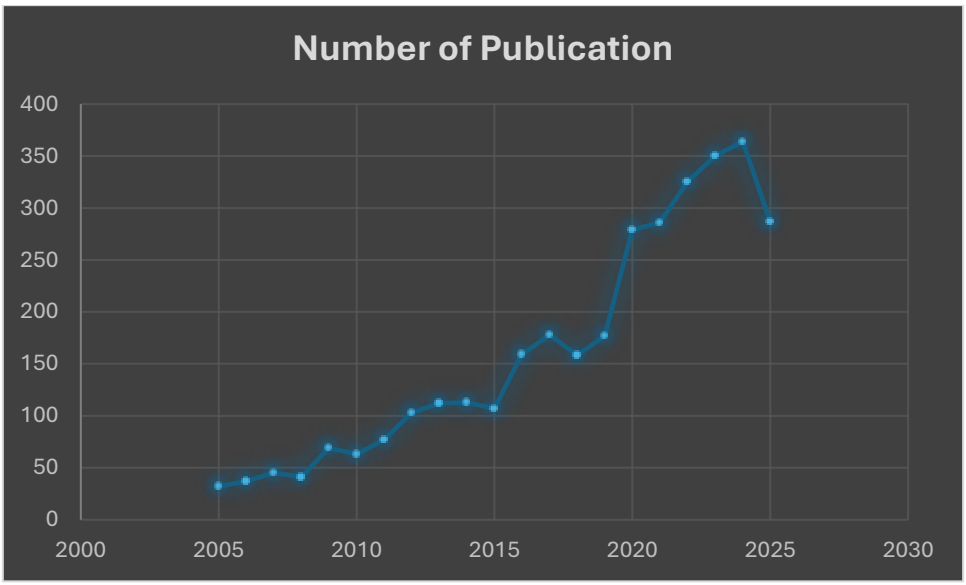

Figure 1: Trend Of Research in Online Learning by Years

The publication trend from 2005 to 2025 demonstrates a clear and sustained growth in research on digital and technological dimensions of Qur'anic recitation studies. During the initial phase (2005–2011), the number of publications remained relatively low, increasing gradually from 32 publications in 2005 to 77 in 2011. This period reflects the exploratory stage of the field, where digital technologies were still emerging and their application to Qur'anic recitation was limited. Between 2012 and 2015, a modest but consistent rise can be observed, with annual publications exceeding 100 for the first time in 2012. This growth coincides with wider adoption of e-learning platforms, mobile technologies, and early digital tools for religious and educational purposes, indicating increasing scholarly interest in integrating technology with traditional Qur'anic practices.

A more pronounced expansion is evident from 2016 onwards, marking a phase of rapid development and consolidation. Publications rose sharply from 159 in 2016 to 279 in 2020, followed by a substantial surge during the post-2020 period. The years 2021 to 2024 show particularly strong output, peaking at 364 publications in 2024, which reflects intensified research activity driven by advances in artificial intelligence, speech recognition, mobile applications, and the accelerated digitalisation of education during and after the COVID-19 pandemic. Although 2025 shows a slight decline to 287 publications, this figure remains comparatively high and may reflect incomplete indexing for the year. Overall, the trend highlights the transformation of Qur'anic recitation studies from a niche area into a dynamic and mature research domain with digital and technological approaches increasingly shaping scholarly discourse and future research directions.

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RQ2: Which Publications Constitute the Most Highly Cited Works in Digital and Technological Qur'anic Recitation Studies, And What Thematic Foci Do They Represent?

No.	Authors	Title	Year	Source Title	Cited by
1.	Al-Tarawneh,	Women in the Qur'an, Traditions, and Interpretation	2021	Women in the Qur and Traditions and Interpretation	335
2.	Sinai,	The walking Quran	2017	Walk Quran	211
3.	Ware,	The Qur'an and its biblical subtext	2014	Qur and Its Biblical	184
4.	Tlili,	Reading the qur'ān in Latin Christendom, 1140-1560	2012	Reading the Qur N in Latin Christendom	157
5.	Stowasser,	Interpreting the Qur'an: Towards a contemporary approach	2011	Interpreting the Qur an Towards A Contemporary Approach	134
6.	Rasmussen,	Animals in the Qur'an	2010	Animals in the Qur an	109
7.	Reynolds,	Women, the recited Qur'an, and Islamic music in Indonesia	2010	Women the Recited Qur an and Islamic Music in Indonesia	104
8.	Burman,	Sufi commentaries on the Qur'an in classical Islam	2009	Sufi Commentaries on the Qur and in Classical Islam	101
9.	Sands,	The Qur'an: A Historical-Critical Introduction	2006	Quran A Historical Critical Introduction the Quran	96
10.	Saeed,	The role of quran translations in radicalizing muslims in the west and misrepresenting islam	2005	Journal of Religion and Violence	93

Table 3: Most Cited Author

The analysis of the top ten most cited publications reveals that highly influential works in Qur'anic studies are largely grounded in **theological interpretation, historical inquiry, gender studies, and cultural analysis**, rather than narrowly defined technological applications. The most cited article, *Women in the Qur'an, Traditions, and Interpretation* by Al-Tarawneh (2021), with 335 citations, underscores the centrality of gender-focused Qur'anic scholarship within the broader academic discourse. Similarly, seminal works by Sinai (2017), Ware (2014), and Tlili (2012) emphasize interpretive, historical, and interreligious dimensions of the Qur'an, reflecting sustained scholarly interest in contextual and comparative approaches. These highly cited studies demonstrate that foundational theoretical and hermeneutical contributions continue to shape the intellectual structure of the field and attract long-term citation impact across disciplines such as religious studies, history, and humanities.

From the perspective of digital and technological trends in Qur'anic recitation studies, the citation profile suggests an important interpretive insight: contemporary technology-oriented research builds upon a well-established corpus of classical and thematic Qur'anic scholarship. Articles addressing recitation, performance, and musical dimensions such as Rasmussen (2010) and Reynolds (2010)serve as conceptual bridges between traditional Qur'anic practices and later digital or media-based explorations. Meanwhile, more recent works, including Saeed (2005), reflect the expansion of Qur'anic studies into modern sociopolitical and media contexts, which increasingly intersect with digital dissemination and online interpretation. Overall, the dominance of non-technological yet highly cited works indicates that technological innovation in Qur'anic recitation research is intellectually anchored in enduring interpretive frameworks, highlighting the necessity of integrating digital methodologies with robust theoretical and historical foundations to achieve meaningful and impactful scholarship.

RQ3: Which Countries Are the Leading Contributors to Scholarly Output in Digital and Technological Qur'anic Recitation Studies?

Based on the publication output presented, the **United States** emerges as the leading contributor, with **565 publications**, indicating its strong and sustained scholarly engagement in Qur'anic-related research. This leadership reflects the presence of well-established research institutions, interdisciplinary Islamic studies programs, and advanced digital research infrastructures that support high-volume academic production. Following closely are **Malaysia (399 publications)** and **Indonesia (367 publications)**, highlighting Southeast Asia as a major regional hub for Qur'anic and Islamic education research. The strong contribution from these two Muslim-majority countries underscores the active integration of traditional Qur'anic scholarship with contemporary educational and digital approaches, particularly within higher education and teacher training contexts.

The **United Kingdom (268 publications)** ranks fourth, reinforcing its historical strength in Islamic studies, humanities research, and critical Qur'anic scholarship. Contributions from **Saudi Arabia (140)**, **Germany (132)**, **Jordan (128)**, and **Iran (125)** further demonstrate the global and cross-cultural nature of research in this field, spanning both Muslim-majority and Western academic contexts. Countries such as **Turkey (87)** and **Canada (82)** also make notable contributions, reflecting growing international interest and collaborative research networks. Overall, the distribution of publication output indicates that Qur'anic recitation and related educational research are driven by a combination of strong Western academic traditions and dynamic scholarly communities within the Muslim world, contributing to a diverse and globally interconnected research landscape.

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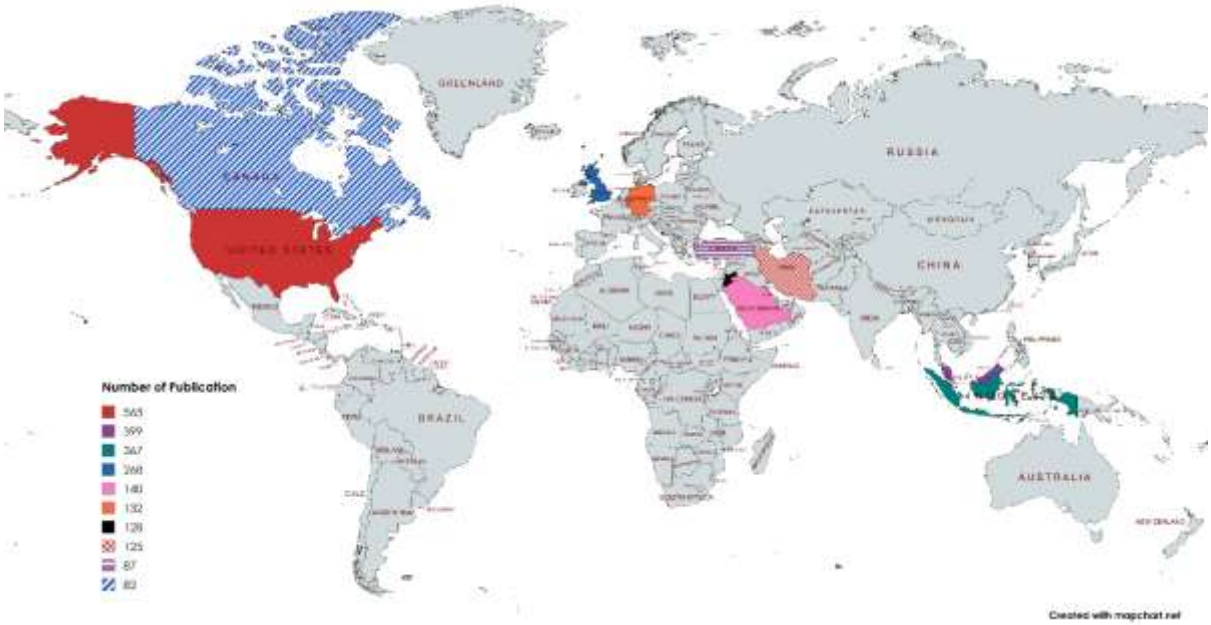

Figure 2: Country Contributions to Digital and Technological Research in Qur'anic Recitation

RQ4: What Are the Dominant and Emerging Research Themes, As Reflected by Keyword Co-Occurrence Patterns, In Digital and Technological Qur'anic Recitation Studies?

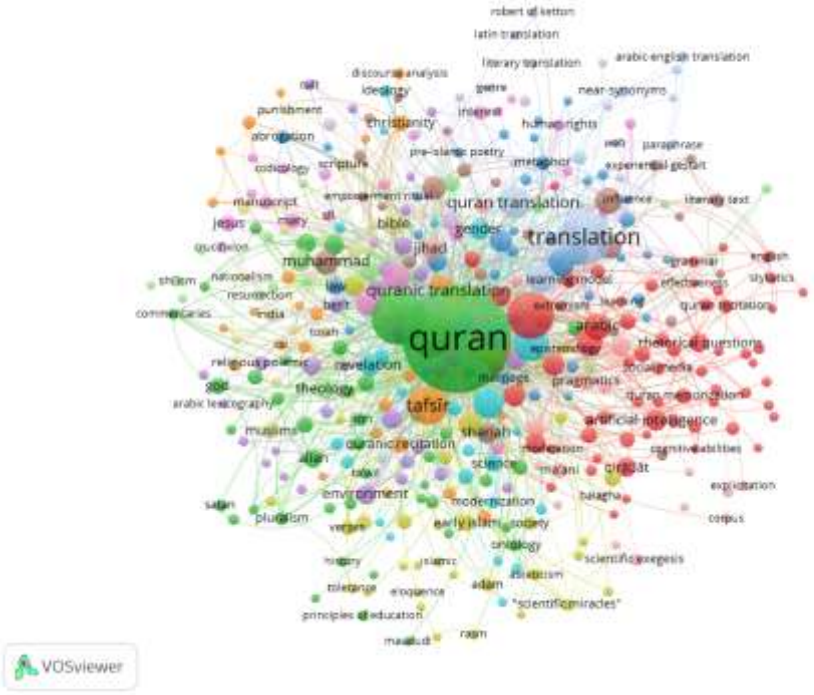

Figure 3: **Network Visualization Map of Keywords' Co-Occurrence**

Keyword co-occurrence analysis in VOSviewer refers to a bibliometric technique used to identify how frequently keywords appear together within the same publications and to map the

conceptual structure of a research field. The underlying assumption is that keywords that co-occur more often are thematically or conceptually related. By visualising these relationships as networks, VOSviewer reveals dominant research themes, emerging topics, and the intellectual connections between concepts. In the context of Qur'anic studies, this approach helps to uncover how core notions such as *Qur'an*, *Islam*, *translation*, *exegesis*, and *recitation* are interconnected, thereby offering an empirical representation of the field's knowledge structure and thematic organisation.

To construct the keyword co-occurrence network, the full counting method was applied, meaning that each occurrence of a keyword within a document was counted equally, regardless of how many keywords appeared in that document. This method is appropriate for capturing the overall prominence and visibility of concepts across the literature. A minimum threshold of five occurrences was set to exclude infrequently used or marginal keywords and to focus on more established and recurring themes. As a result, 399 keywords were selected out of a total of 4,273, ensuring a balance between analytical clarity and thematic richness. The resulting network visualisation highlights both high-frequency keywords (e.g., quran, islam, translation, tafsīr) and their link strength, which reflects the intensity of their co-occurrence relationships within the dataset.

The findings from the keyword co-occurrence analysis significantly contribute to the understanding of digital and technological trends in Qur'anic recitation studies by revealing the field's conceptual foundations and emerging directions. The dominance of traditional themes such as exegesis, interpretation, hermeneutics, and translation indicates that contemporary research remains deeply rooted in classical Qur'anic scholarship. At the same time, the presence of technology-related keywords such as *artificial intelligence*, *machine learning*, *natural language processing*, *automatic speech recognition*, *social media*, and *technology* demonstrates a growing scholarly engagement with digital tools and computational methods. This coexistence of classical and technological themes suggests a gradual paradigm shift in which digital innovation complements, rather than replaces, established interpretive frameworks. Consequently, the co-occurrence network not only maps the current intellectual landscape but also highlights interdisciplinary integration, positioning digital Qur'anic studies as an evolving field with strong theoretical grounding and expanding methodological horizons.

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RQ5: What Are the Patterns of International Collaboration Among Countries in Digital and Technological Qur'anic Recitation Research, As Revealed Through Co-Authorship Networks?

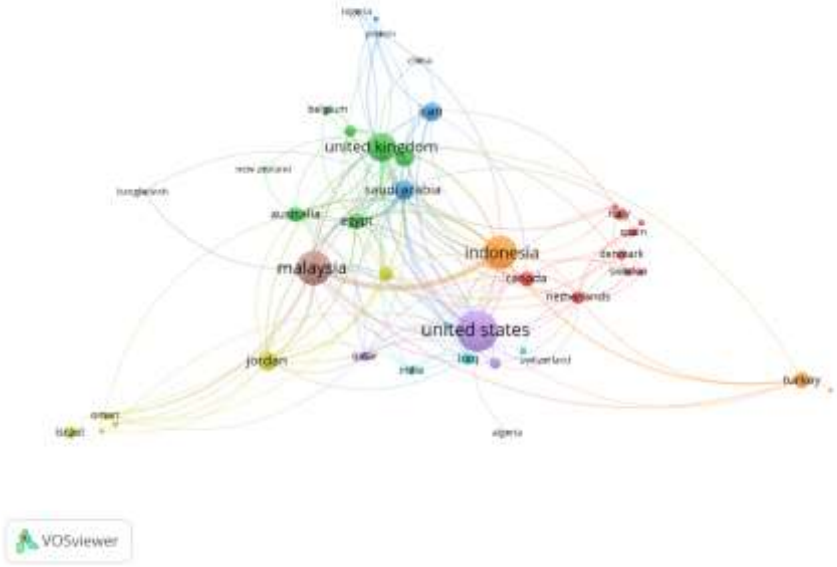

Figure 4: Density Map of Top Contributing Countries

Co-authorship analysis by countries in VOSviewer is a bibliometric approach used to examine patterns of international research collaboration based on shared authorship affiliations across publications. In this network, each node represents a country, while links between nodes indicate collaborative relationships formed when authors from different countries co-author the same document. The strength of these links, expressed as total link strength, reflects the intensity and frequency of collaboration between countries. By visualising these relationships, VOSviewer reveals the structure of global research networks, identifies central and peripheral countries, and highlights hubs of international cooperation within a specific research domain.

To generate the co-authorship network, the full counting method was employed, whereby each country listed in a multi-authored publication received equal credit for that document. This method is particularly suitable for capturing the breadth of international collaboration without weighting contributions by author position or frequency. A minimum threshold of five documents was applied to ensure that only countries with sustained research activity were included in the analysis. Consequently, 45 countries were selected from a total of 90, allowing the map to focus on meaningful and stable collaboration patterns rather than sporadic or incidental co-authorships. This threshold enhances the clarity of the visualisation and ensures analytical robustness.

The co-authorship network provides valuable insights into the global knowledge production and collaborative dynamics in digital and technological Qur'anic recitation studies. Countries such as Malaysia, Indonesia, Saudi Arabia, the United Kingdom, and the United States emerge as central nodes, indicating their dual roles as major producers of research and key connectors within international collaboration networks. Notably, Malaysia and Indonesia demonstrate strong regional leadership with high total link strength, reflecting active cross-border

partnerships within Southeast Asia and beyond. Meanwhile, Western countries such as the United States and the United Kingdom show high citation impact, suggesting their influence in shaping theoretical and methodological directions. Overall, these findings underscore the increasingly international and interconnected nature of the field, highlighting how collaborative research across diverse cultural and academic contexts enriches scholarly discourse and accelerates the development of knowledge at the intersection of Qur'anic studies and digital technology.

Conclusion

This bibliometric analysis was conducted to provide a systematic overview of the development, structure, and collaborative patterns of research on digital and technological trends in Qur'anic recitation studies. The study set out to examine temporal publication trends, identify influential publications, determine leading contributing countries, map dominant and emerging research themes, and analyse international collaboration through co-authorship networks. The analysis demonstrates a clear and sustained growth in scholarly output over the past two decades, with a notable acceleration in recent years that reflects the increasing integration of digital technologies into Qur'anic recitation research. Influential publications remain largely grounded in classical interpretive and cultural studies, while newer research increasingly engages with technological tools and interdisciplinary perspectives. At the global level, contributions are led by a combination of Western and Muslim-majority countries, indicating a diverse and internationally connected research landscape.

The findings contribute to the field by offering a consolidated quantitative picture of how digital and technological approaches are shaping Qur'anic recitation studies. The coexistence of traditional themes such as interpretation, exegesis, and recitation with emerging topics related to artificial intelligence, speech processing, and digital platforms highlights an ongoing transformation rather than a rupture with established scholarship. This synthesis provides useful insights for researchers, educators, and institutions seeking to understand the direction of current research and to position future studies within this evolving landscape. From a practical perspective, the results may inform the design of technology-enhanced learning tools, guide policy and curriculum development in Qur'anic education, and support cross-national research partnerships. At the same time, the study is limited by its reliance on a single database, language restrictions, and publication-type filtering, which may exclude relevant contributions from other sources or regions. Future research may expand data sources, incorporate qualitative assessments, and explore ethical, pedagogical, and spiritual dimensions of digital Qur'anic recitation in greater depth. Overall, this study underscores the value of bibliometric analysis as a method for revealing research trends and knowledge structures, and it highlights the growing significance of digital and technological inquiry within contemporary Qur'anic recitation studies.

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Ethics Statement:	This study did not involve any human participants, animals, or sensitive data requiring ethical approval. The authors confirm that the research was conducted in accordance with accepted academic integrity and ethical publishing standards.
Author Contribution Statement:	All authors contributed significantly to the development of this manuscript. Mohd Nizam Sahad was responsible for the conceptualization, methodology, and overall supervision of the study. Mohd Shahidan Ramli handled data collection, analysis, and interpretation of results. Khairil Fikri Mohd Din contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.

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