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Mapping smart tourism technologies in halal tourism: bibliometric evidence and thematic research gaps

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ABSTRACT

This study maps the intellectual structure and thematic development of smart tourism technologies in halal tourism, a field in which digital innovation increasingly intersects with Sharia-compliant service requirements but remains weakly synthesized. Using Scopus as the data source, publications from 2015 to 2024 were retrieved through a structured TITLE-ABS-KEY search string and screened using PRISMA procedures, resulting in 38 eligible publications from an initial 156 records. Bibliometric analysis was conducted using Bibliometrix/Biblioshiny and VOSviewer through performance analysis, source analysis, keyword co-occurrence, citation analysis, and network visualization. A systematic thematic synthesis was also conducted to identify dominant technologies, implementation issues, and research gaps. The findings show an annual publication growth rate of 34.59%, with Indonesia, China, and Malaysia appearing as the most visible contributors within the analyzed Scopus corpus. Keyword and thematic analyses indicate that Muslim tourist perceptions, sustainable tourism, IoT, halal tourism management, AI, and machine learning form the main research clusters. This study contributes by clarifying how smart tourism scholarship can be adapted to halal tourism contexts through digital halal verification, Muslim-friendly destination services, culturally sensitive technology adoption, and future research agendas on Sharia-compliant smart tourism ecosystems.

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Introduction

Smart tourism technologies and halal tourism have developed as two influential research streams in contemporary tourism. Smart tourism scholarship explains how artificial intelligence, Internet of Things (IoT), big data, mobile applications, and platform-based services reshape destination management and tourist experience (Buhalis & Amaranggana, 2015; Gretzel et al., 2015; Suanpang & Pothipassa, 2024). Halal tourism research, meanwhile, emphasizes Muslim tourists' needs for halal food, prayer facilities, modest services, religiously appropriate information, and destination environments consistent with Islamic values (Battour & Ismail, 2016; Mohsin et al., 2016; Samori et al., 2016). The growing overlap between these two streams raises a specific question that is not fully answered in either field: how can digital tourism systems become not only efficient and personalized, but also trustworthy, culturally sensitive, and Sharia-compliant?. Existing smart tourism literature often treats technology adoption as a general mechanism for improving convenience, personalization, and operational efficiency. This assumption is useful, but it is insufficient for halal tourism because Muslim travelers evaluate technology through additional criteria, including halal assurance, religious

service availability, privacy, gender-sensitive information, and confidence in the credibility of digital claims. For example, a mobile application that recommends restaurants or hotels may be perceived as valuable only when its halal information is transparent, updated, and verifiable. Similarly, AI-based recommendation systems and IoT-enabled hotel services need to address prayer time, Qibla direction, halal meal ordering, and culturally appropriate interaction rather than merely providing generic smart hospitality functions (Al-Ansi et al., 2019; Çeltek, 2023).

The market relevance of this issue is clear. Global halal tourism continues to expand, and Muslim travelers increasingly use mobile and platform-based services during trip planning, booking, navigation, and on-site decision-making (Mastercard & CrescentRating, 2024; GMTI, 2024). However, market growth alone does not explain the intellectual development of the field. A more critical academic issue is whether the literature has moved beyond fragmented discussions of technology, sustainability, and Muslim-friendly services toward an integrated understanding of smart halal tourism. The current body of research remains scattered across tourism management, information systems, Islamic marketing, sustainability, and hospitality studies. This fragmentation creates a theoretical gap. Technology Acceptance Model, UTAUT, and value-based adoption perspectives are frequently used to explain digital service adoption, but they do not fully capture the religious, cultural, and trust-based dimensions that shape technology use in halal tourism. Conversely, halal tourism studies often discuss destination image, service quality, religiosity, satisfaction, and loyalty, but pay less attention to the technological infrastructure through which halal experiences are increasingly mediated. As a result, the intersection between smart tourism technologies and halal tourism requires systematic mapping to identify the dominant knowledge structures, methodological patterns, and unresolved theoretical issues.

A methodological gap also remains. Previous reviews have examined smart tourism or halal tourism as separate domains, while fewer studies have systematically mapped their convergence. In particular, the post-pandemic acceleration of contactless services, mobile-first travel behavior, AI-driven personalization, blockchain-based verification, and IoT-enabled hospitality has intensified the need to review how technology is being conceptualized and implemented in Muslim-friendly destinations. Without bibliometric mapping and thematic synthesis, it is difficult to determine whether the field is maturing, which themes dominate, and where future empirical and theoretical work should be directed. Against this background, the present study examines Scopus-indexed research on smart tourism technologies in halal tourism from 2015 to 2024. Rather than claiming to represent all global publications, the study focuses on the available Scopus corpus that met predefined search, screening, and relevance criteria. Bibliometric analysis is used to identify publication trends, source distribution, influential documents, country patterns, and keyword networks. Systematic thematic synthesis is then used to interpret the technological applications, implementation concerns, and future research gaps that cannot be captured by publication counts alone. The study contributes in three ways. First, it clarifies the intellectual structure of smart tourism technologies in halal tourism by mapping dominant themes, sources, and collaboration patterns. Second, it links bibliometric patterns with substantive issues such as digital halal verification, Muslim-friendly mobile services, IoT-supported hospitality, AI-based personalization, and privacy-sensitive service design. Third, it proposes a more focused research agenda for developing Sharia-compliant and culturally responsive smart tourism ecosystems.

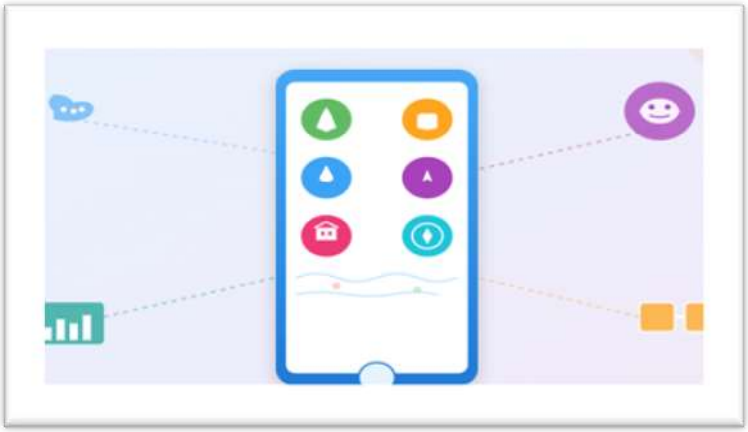

Figure 1. Smart Tourism Technologies

Research Questions and Objectives

This study aims to map the intellectual structure, thematic development, and research gaps of smart tourism technologies in halal tourism. The bibliometric component addresses publication growth, citation patterns, source distribution, keyword networks, and country-level visibility, while the systematic review component

interprets the substantive meanings of these patterns for Muslim-friendly digital tourism services. The study is guided by the following research questions:

RQ1: What is the current state of research on smart tourism technologies in halal tourism?
Rationale and Approach: This question examines the evolution and current landscape of academic research at the intersection of smart tourism technologies and halal tourism. Through bibliometric analysis, we investigate publication trends over time (2015-2024), growth patterns, geographical distribution of research contributions, and identification of key contributors including leading countries, institutions, and prolific authors. Understanding the current state is essential for contextualizing existing knowledge, identifying established research leaders, and recognizing emerging contributors. This RQ is addressed through descriptive bibliometric analysis including publication trends, geographical distribution, citation analysis, and collaboration networks presented in the Results section.

RQ2: What smart tourism technologies are most utilized by halal tourists?
Rationale and Approach: This question explores the specific technological applications, platforms, and innovations that have been adopted and valued by Muslim travelers. Through systematic content analysis, we identify the most frequently mentioned and implemented technologies including mobile applications (halal restaurant locators, prayer time calculators, Qibla finders), Internet of Things (IoT) devices (smart hotel rooms, automated prayer facilities), artificial intelligence systems (AI-powered recommendation engines), and emerging technologies (blockchain, augmented reality). This RQ is addressed through thematic synthesis of technology mentions across all 38 articles in the systematic literature review.

RQ3: How significant is the role of technology in enhancing halal tourist experiences?
Rationale and Approach: This question investigates the measurable impacts and significance of smart tourism technologies on the quality, satisfaction, and overall experience of Muslim travelers. We synthesize findings from quantitative and qualitative studies to assess both the magnitude and mechanisms through which technology influences tourist outcomes, including information accessibility, convenience, personalization, trust in halal compliance, satisfaction, and loyalty. This RQ is answered through meta-synthesis of empirical findings from studies that measured technology impact on tourist experiences.

RQ4: How are smart technologies adopted and implemented in halal tourism destinations?
Rationale and Approach: This question examines the practical processes, strategies, challenges, and success factors associated with implementing smart tourism technologies in Muslim-friendly destination contexts. Through case study analysis, we identify adoption patterns across different destination types, implementation frameworks, technological infrastructure requirements, and barriers including financial constraints, technical limitations, and cultural sensitivity concerns. This RQ is addressed through synthesis of implementation case studies and adoption pattern analysis across different geographical contexts.

RQ5: What are the future research directions in this domain?
Rationale and Approach: This question identifies existing research gaps, underexplored themes, and emerging topics warranting scholarly attention.

Table 1. Research Question Alignment with Methodology and Analysis

Research Question	Primary Methodology	Specific Analytical Techniques	Results Section
RQ1 - Current state	Bibliometric Analysis	Publication trend analysis, Geographical distribution, Co-authorship networks, Citation analysis	Descriptive Bibliometric Analysis
RQ2 - Technologies utilized	Systematic Literature Review	Thematic content analysis, Technology categorization, Frequency analysis	Keyword Analysis + Thematic Synthesis
RQ3 - Technology significance	Systematic Literature Review	Meta-synthesis of empirical findings, Impact measurement compilation	Most Cited Papers + Content Analysis
RQ4 - Implementation	Systematic Literature Review	Case study analysis, Implementation framework mapping, Barrier identification	Network Analysis + Discussion
RQ5 - Future directions	Combined Bibliometric + SLR	Research gap analysis, Keyword evolution tracking, Emerging theme identification	Discussion + Conclusion

By analyzing research theme evolution through keyword co-occurrence, examining methodological approaches, and synthesizing reported limitations, we develop a comprehensive research agenda. This RQ is addressed in the Discussion and Conclusion sections through research gap analysis and future directions.

Research Contributions

By integrating bibliometric mapping with thematic synthesis, this study offers theoretical, practical, and methodological contributions that respond directly to the fragmented nature of the literature.

Theoretically, the study positions smart halal tourism as more than a simple extension of smart tourism. It shows that technology adoption in Muslim-friendly tourism must be understood through service trust, halal assurance, religious service accessibility, cultural sensitivity, privacy, and value alignment. This perspective helps extend technology adoption and smart destination theories into contexts where religious compliance is part of the service evaluation process.

Practically, the study provides destination managers, hotel operators, technology developers, and policymakers with a clearer map of technology priorities in halal tourism. The findings highlight the need to design digital services that support halal food verification, mosque and prayer facility information, Qibla direction, prayer time notification, Muslim-friendly booking, privacy-sensitive personalization, and transparent destination communication.

Methodologically, the study demonstrates how bibliometric indicators can be combined with systematic content synthesis. Bibliometric mapping identifies visible structures in the literature, while thematic synthesis explains why those patterns matter for halal tourism practice and future theory development.

The integration of smart tourism technologies into halal tourism development should therefore be interpreted carefully. The issue is not simply whether destinations adopt AI, IoT, mobile applications, or blockchain, but whether these technologies can strengthen trust, reduce uncertainty, and support religiously appropriate experiences. Industry reports indicate that Muslim-friendly destinations increasingly invest in digital infrastructure, but scholarly work is still needed to examine how these investments affect tourist confidence, destination competitiveness, and sustainable service delivery (CrescentRating & Mastercard, 2024; GMTI, 2024).

This study therefore contributes to academic and applied debates by identifying which themes are most visible, which technologies are most frequently discussed, and which questions remain weakly developed. The synthesis of 38 Scopus-indexed publications does not exhaust the entire field, but it provides a structured evidence base for understanding how smart tourism technologies are being framed in relation to halal tourism and where future research should move.

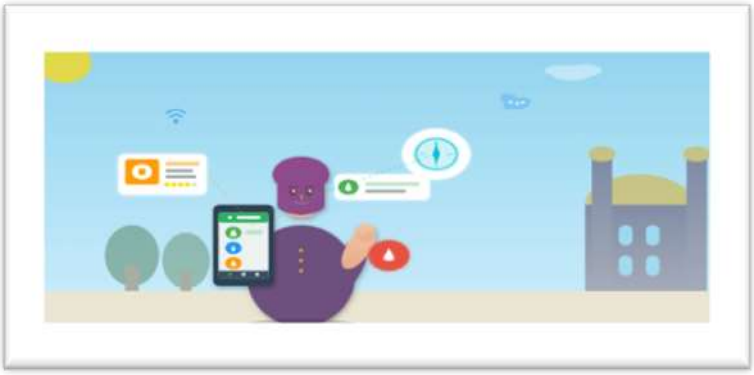

Figure 2. Smart Tourism Technologies in Halal

Method

Research Design and Data Source

This study uses a two-stage review design that combines bibliometric analysis and systematic literature review. The bibliometric stage maps the visible intellectual structure of the field through publication growth, source productivity, citation patterns, country-level visibility, author keywords, and network visualization. The systematic review stage interprets the content of the selected publications to identify dominant technologies, adoption contexts, implementation barriers, and future research gaps. This combination is appropriate because the research problem is not limited to counting publications; it also requires explaining how smart tourism technologies are conceptually connected to halal tourism requirements.

Data were retrieved from Scopus because it provides structured bibliographic metadata required for bibliometric analysis, including titles, abstracts, keywords, authorship, affiliations, citations, sources, and document types (Baas et al., 2020). The search covered publications from 2015 to 2024 to capture the period in which smart tourism research matured and digital transformation in tourism accelerated. The search string was developed through a pilot search and combined technology-related terms with halal or Muslim-friendly tourism terms: TITLE-ABS-KEY("smart tourism" OR "digital tourism" OR "tourism technology" OR "mobile tourism" OR "artificial intelligence tourism" OR "AI tourism" OR "IoT tourism" OR "big data tourism") AND ("halal tourism" OR "Islamic tourism" OR "Muslim friendly" OR "Muslim traveler" OR "halal destination" OR "Islamic hospitality").

The screening process followed PRISMA-S recommendations for transparent reporting of literature searches (Rethlefsen et al., 2021). Two reviewers independently screened titles, abstracts, and full texts. Disagreements were resolved through discussion until consensus was reached. Inclusion was limited to English-language articles, reviews, and conference papers that directly discussed the implementation, adoption, impact, management, or conceptual development of technology in halal, Islamic, or Muslim-friendly tourism contexts. Documents were excluded when they discussed tourism technology without a halal/Muslim-friendly context, halal issues without a technological component, non-scholarly materials, inaccessible full texts, duplicates, or records with incomplete bibliographic metadata that could not support analysis.

Quality control was conducted at two levels. First, bibliographic quality was checked by verifying document type, year, source title, DOI availability, author keywords, and citation metadata. Second, thematic relevance was checked by coding whether each document addressed at least one of the following themes: smart destination systems, mobile applications, IoT-enabled hospitality, AI or machine learning, blockchain or digital verification, information systems, or digital Muslim-friendly services. Because this review does not estimate intervention effects, formal risk-of-bias scoring was not applied; instead, methodological transparency, relevance, and metadata completeness were prioritized.

Table 2. Operational Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Database	Scopus-indexed records with usable bibliographic metadata	Records outside Scopus or records with insufficient metadata for bibliometric analysis
Publication period	2015-2024	Before 2015 or after 2024
Language	English	Non-English documents
Document type	Article, review, and conference paper	Editorial, note, erratum, book review, and non-scholarly material
Topical relevance	Studies connecting tourism technology with halal, Islamic, Muslim-friendly, or Muslim traveler contexts	Studies on general tourism technology without halal/Muslim context, or halal tourism without a technology component
Full-text access	Full text available for thematic screening	Full text not available for relevance and content assessment

PRISMA Selection Process

The PRISMA screening process began with 156 records identified from Scopus. Title and abstract screening reduced the corpus to 89 records judged potentially relevant. Subject-area filtering retained 52 records from business, management and accounting, social sciences, computer science, engineering, arts and humanities, and related interdisciplinary areas. Additional screening based on document type, English language, full-text accessibility, duplication, and direct relevance to technology in halal or Muslim-friendly tourism produced a final corpus of 38 documents. Thus, the final dataset should be interpreted as the eligible Scopus-indexed corpus based on the stated search protocol, not as a complete representation of all publications worldwide.

Search Strategy: Scopus TITLE-ABS-KEY("smart tourism" OR "digital tourism" OR "tourism technology" OR "mobile tourism" OR "artificial intelligence tourism" OR "AI tourism" OR "IoT tourism" OR "big data tourism") AND ("halal tourism" OR "Islamic tourism" OR "Muslim friendly" OR "Muslim traveler" OR "halal destination" OR "Islamic hospitality"). The analysis used Bibliometrix/Biblioshiny for performance analysis and descriptive mapping, and VOSviewer for keyword co-occurrence and network visualization. Keywords with at least three occurrences were examined in the co-occurrence analysis, while lower-frequency but conceptually relevant terms were retained for the thematic synthesis.

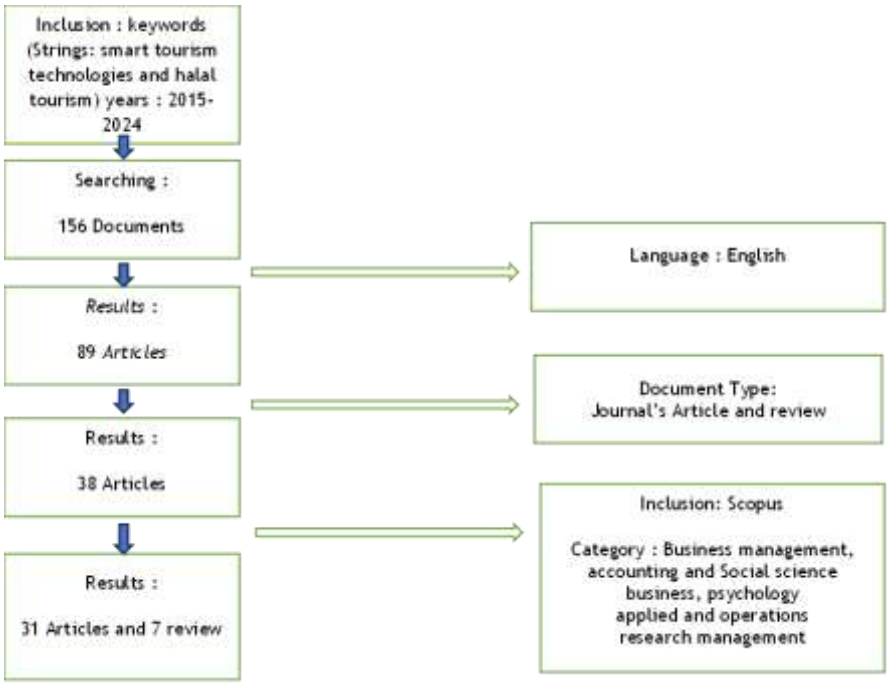

Figure 3. PRISMA Setting

Results and Discussions

Results

The initial Scopus search identified 156 records and the PRISMA-based screening process retained 38 eligible documents. The results are organized to answer the five research questions rather than to present isolated descriptive counts. First, the bibliometric profile explains the current state of the field. Second, source, keyword, citation, country, and network analyses clarify the dominant structures of the literature. Third, the thematic interpretation of these patterns identifies the technologies most frequently discussed, their role in halal tourist experience, and the remaining research gaps.

The final corpus indicates that smart tourism technologies in halal tourism remain an early-stage but growing research area. The dominant topics are not limited to technological efficiency; they also include Muslim tourist perception, sustainability, IoT-enabled services, halal tourism management, and digital information systems. This pattern suggests that the field is developing at the intersection of technology adoption, religiously appropriate service design, destination competitiveness, and sustainable tourism.

The keyword analysis reveals a diversity of research subtopics, including artificial intelligence in halal tourism, mobile applications for Muslim travelers, IoT implementation in halal hospitality, digital platforms for halal certification, and blockchain technology for the halal supply chain. The dataset involves a substantial number of authors from various countries and disciplinary backgrounds, with the average number of authors per document indicating a high level of interdisciplinary collaboration in this emerging research area. The percentage of international co-authorship reflects significant global collaboration, particularly between Muslim-majority countries such as Malaysia, Indonesia, and the UAE, and technologically advanced nations such as South Korea, Japan, and several European countries. Interestingly, a few documents were authored by single researchers, indicating pioneering independent contributions in this relatively new and underexplored field. Of the 38 documents in the dataset, 31 are journal articles and 7 are review articles, suggesting that research in this area has reached a reasonable level of academic maturity but still requires more empirical studies. This bibliometric review provides insights into the current state of research on smart tourism technologies in halal tourism, highlighting trends in technological adoption, research collaboration patterns, and emerging themes. The consistent growth in publications since 2018 and the increasing citation patterns underscore the rising relevance and influence of this interdisciplinary research area within the global academic community, as well as its potential to generate significant innovation in the halal tourism industry.

Descriptive Bibliometric Analysis

The bibliometric profile comprises 38 Scopus-indexed publications on smart tourism technologies in halal tourism, published across 25 sources between 2015 and 2024. The annual growth rate of 34.59% indicates increasing scholarly attention to this topic within the analyzed corpus. However, this figure should be interpreted cautiously because the field is represented by a relatively small number of publications. The dataset involves 287 contributing authors, with

an average of 9.74 authors per document and no single-authored publications. This pattern suggests that research on smart tourism technologies in halal tourism is generally conducted through collaborative and interdisciplinary scholarly work.

Figure 4. Main Information of the Bibliometric Dataset

International co-authorship accounts for 21.05% of the corpus, indicating the presence of cross-country collaboration, although its intensity remains moderate. The dataset also contains 281 unique author keywords, reflecting considerable topical dispersion across technology, tourism, sustainability, and halal-related research themes. In addition, several exported records showed incomplete reference metadata; therefore, this issue was treated as a data-cleaning limitation rather than substantive evidence about the intellectual structure of the field. The average document age is 2.05 years, while the average citation rate reaches 9.737 citations per document. These indicators suggest that the topic has gained recent visibility, but it has not yet reached the stability and consolidation typically associated with a mature research stream.

Source Journals

The source analysis shows that the literature is dispersed across interdisciplinary outlets rather than concentrated in a single specialized journal. Sustainability (Switzerland) contributes the largest number of papers, indicating that smart halal tourism is frequently linked with sustainability, destination management, and responsible tourism. Tourism Review follows with two articles, while other journals and proceedings contribute one article each. This distribution suggests that the field is still institutionally fragmented and is being developed across tourism, sustainability, information systems, Islamic studies, and computational domains.

Table 3. Journal Sources

Sources	Articles
Sustainability (Switzerland)	5
Tourism Review	2
Al-'Adalah	1
Asia Pacific Journal Of Information Systems	1
Ceur Workshop Proceedings	1
Computational Intelligence And Neuroscience	1
European Journal Of Tourism Research	1
Geojournal Of Tourism And Geosites	1
Humanities And Social Sciences Communications	1

The implication is that smart tourism technologies in halal tourism have not yet formed a stable disciplinary home. This fragmentation is not necessarily a weakness; it shows that the topic requires knowledge from multiple domains. However, it also means that future studies need stronger conceptual integration so that technological, religious, managerial, and sustainability perspectives are not discussed as separate themes.

Author Keywords

Author keyword analysis identifies the main conceptual anchors of the field. “Tourism” appears most frequently (11 occurrences), followed by “smart tourism” (9 occurrences), while “sustainability” (5 occurrences) and “sustainable tourism,” “ecotourism,” “tourism development,” and “bibliometric analysis” (4 occurrences each) indicate a strong link between technology-enabled tourism and sustainability-oriented destination development. “Halal tourism” and “internet of things” appear with 3 occurrences each, suggesting that the halal-specific and technology-specific substreams are visible but still less consolidated than the broader tourism and sustainability vocabulary.

The keyword pattern suggests that research at the intersection of smart tourism and halal tourism is still exploratory. The field has not yet developed a dominant theoretical vocabulary around Sharia-compliant smart services, halal digital trust, Muslim-friendly personalization, or privacy-sensitive tourism technologies. This

absence is important because it reveals where future theoretical work can add value beyond general smart tourism frameworks.

Table 4. Author Keywords

Words	Occurrences
tourism	11
smart tourism	9
sustainability	5
bibliometric analysis	4
ecotourism	4
sustainable tourism	4
tourism development	4
'current	3
halal tourism	3
internet of things	3

Most Cited Papers Analysis

Citation analysis shows which documents have become relatively visible within the corpus. The paper listed first in Table 5 records 53 citations and a normalized citation score of 3.35, while the second paper records the highest citation rate per year at 16.33. These figures indicate that sustainability-oriented and technology-implementation studies have gained the strongest attention.

Table 5. Most Cited Papers Analysis

Country	Frequency of author-country occurrences	Total Citations	TC per Year	Normalized TC
(Yang & Zhang, 2022)	10.1108/TR-02-2022-0060	53	13.25	3.35
(Alsabafi et al., 2023)	10.3390/su15054166	49	16.33	3.38
(Cuesta-Valiño et al., 2020)	10.3390/su12051778	41	6.83	1.76
(El Archi et al., 2023)	10.3390/su15129717	32	10.67	2.21
(Naramtić, 2020)	10.3390/su12219287	28	4.67	1.20
(Jiang & Phoong, 2023)	10.1057/s41599-023-02150-7	27	9.00	1.86
(Xu & Au, 2023)	10.1108/TR-10-2022-0494	23	7.67	1.59
(Talukder & Mukhida, 2024)	10.4018/979-8-3693-2137-9.ch009	16	8.00	3.20
(Sabbioni et al., 2022)	10.3390/s22041619	14	3.50	0.89
(Ercan, 2023)	10.54055/pjtr.v3i4.2788	12	4.00	0.83
(Zaifić et al., 2023)	10.3390/mti7070064	11	3.67	0.76
(Alam et al., 2024)	10.31893/multirev.2024061	9	4.50	1.80
(Abdelfattah et al., 2023)	10.1080/19407963.2023.2294789	8	2.67	0.55
(Ding & Xu, 2021)	10.1155/2021/8123014	7	1.40	1.00
(Fu et al., 2023)	10.21511/ppm.21(4).2023.33	6	2.00	0.41
(Elda Hicerra et al., 2022)	10.1109/ICISSS5894.2022.9915164	6	1.50	0.38
(Master Student, Global Graduate Hospitality Management and Tourism, Kyung Hee University, Korea et al., 2018)	10.14329/apjis.2018.28.2.93	4	0.50	1.00
(Noviantić et al., 2024)	10.24042/adalah.v21i1.21220	3	1.50	0.60
(Subartanto et al., 2024)	10.1108/JIABR-02-2024-0056	3	1.50	0.60

However, because citation accumulation is affected by publication year, journal visibility, and database coverage, citation counts are interpreted here as indicators of influence within the Scopus corpus rather than as definitive measures of scholarly quality.

The most cited papers cover themes such as sustainable smart tourism implementation, IoT applications in hospitality, digital platforms for Muslim travelers, and technology-enabled Islamic tourism practices. These

themes reinforce the finding that the literature is shaped by two overlapping concerns: how technology improves destination and hospitality services, and how those services can be aligned with Muslim travelers' religious and cultural expectations. The normalized citation values, ranging from 0.25 to 3.38, show uneven influence across the corpus. Recent papers from 2023 and 2024 show competitive citation rates despite shorter exposure time, which may reflect growing academic attention after the acceleration of digital tourism services. This pattern should be framed as early growth rather than as evidence of a fully established research paradigm.

Word Cloud Analysis

The word cloud reinforces the keyword analysis by showing "smart tourism" and "tourism" as central terms, with "sustainability," "sustainable tourism," "halal tourism," and "ecotourism" forming the supporting vocabulary. This indicates that the field is not only technology-focused but also connected to broader debates on sustainable and responsible destination development.

Figure 5. Word Cloud of Author Keywords in Smart Tourism Technologies and Halal Tourism Research

Technology-related terms such as "Internet of Things," "machine learning," "smart technologies," "information systems," and "digital tourism" show the main technological directions discussed in the literature. Geographical terms such as "Malaysia" and "Indonesia" reflect the visibility of Muslim-majority destinations in the corpus. Terms such as "COVID-19," "innovation," and "technological development" suggest that the pandemic and post-pandemic digital acceleration have influenced the framing of smart tourism services. Overall, the word cloud should be read as an exploratory visualization rather than a stand-alone result. It helps identify recurring vocabulary, but the substantive meaning of these terms requires interpretation through the keyword network, citation structure, and systematic thematic synthesis.

Countries' Scientific Production Analysis

The country analysis should be interpreted as author-affiliation or country occurrence visibility within the Scopus dataset, not as a direct count of full publications. Indonesia records the highest occurrence count (43), followed by China (8), Malaysia (7), Oman (7), the USA (6), Morocco (6), India (5), Kazakhstan (5), Romania (4), and Saudi Arabia (4). Indonesia's visibility may reflect its large Muslim population, policy interest in halal tourism, and active tourism research community. However, it may also be influenced by the structure of the dataset, co-authorship patterns, and Scopus indexing coverage.

Table 6. Country Occurrence Analysis

Country	Freq
Indonesia	43
China	8
Malaysia	7
Oman	7
Morocco	6
Usa	6
India	5
Kazakhstan	5
Romania	4
Saudi Arabia	4

This pattern suggests that Muslim-majority countries play an important role in shaping the topic, while technology-advanced countries contribute to the innovation and digital-service dimension. Nevertheless, the results should not be overstated as proof of global leadership. They indicate visibility within the analyzed corpus and point to the need for broader cross-database validation and stronger collaboration between countries with halal tourism expertise and countries with advanced digital tourism infrastructure.

Network Visualization Analysis

The network visualization shows that "smart tourism" and "tourism" operate as central nodes, while "halal tourism" and "sustainability" function as important connecting concepts. Terms such as "technology," "Internet of Things," "machine learning," and "information systems" are linked to smart tourism, whereas "halal tourism" is connected to "sustainable tourism," "ecotourism," and "tourism development." This structure indicates that the field is organized around three concerns: digital infrastructure, Muslim-friendly service requirements, and sustainable destination development.

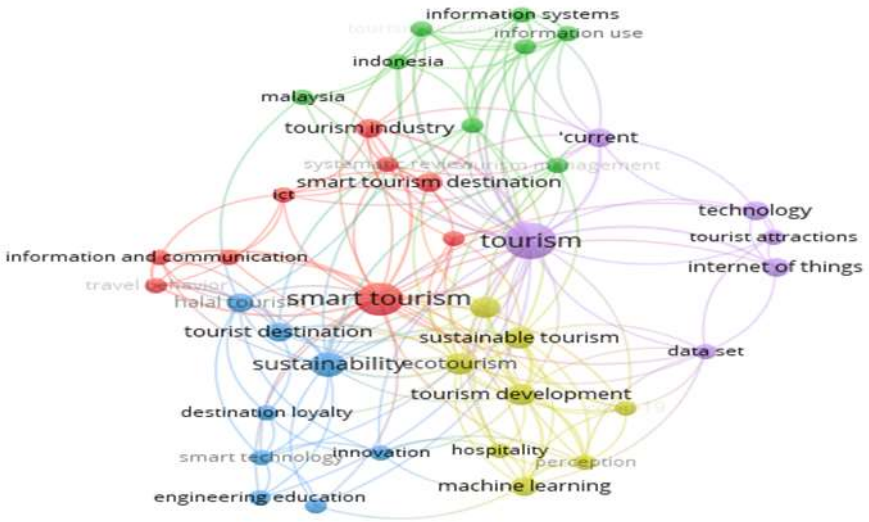

Figure 6. Keyword Co-occurrence Network of Smart Tourism Technologies and Halal Tourism Research

The connection between IoT, information systems, and smart tourism shows that technological infrastructure is central to the field. At the same time, the links between Indonesia, Malaysia, and halal tourism suggest that Muslim-majority contexts are important empirical and conceptual sites. The presence of "engineering education" and "machine learning" also indicates that technical and educational perspectives are beginning to enter discussions of smart tourism applications.

Four thematic clusters can be interpreted from the network. Cluster 1 is a technology cluster, covering IoT, machine learning, information systems, and smart technologies. Cluster 2 is a sustainability cluster, covering sustainable tourism, ecotourism, and tourism development. Cluster 3 is a halal tourism cluster, centered on Muslim-friendly services, religious compliance, and halal destination management. Cluster 4 is an academic and methodological cluster, represented by bibliometric analysis, engineering education, and knowledge-mapping terms. These clusters show that the field is interdisciplinary, but they also reveal the need for stronger theory that explains how digital systems can be designed for halal assurance and Muslim tourist trust.

Discussion

The findings indicate that smart tourism technologies in halal tourism are developing as an emerging research area, but the evidence should be interpreted with caution. Publication growth and keyword diversity suggest rising interest, yet the small corpus and fragmented source distribution show that the field is not yet mature. Therefore, the main contribution of this review is not to claim a complete global map, but to identify the current structure of Scopus-indexed research and the conceptual gaps that require further investigation.

One important insight is that smart halal tourism cannot be reduced to generic technology adoption. In mainstream smart tourism, digital tools are often evaluated through efficiency, personalization, convenience, and destination competitiveness. In halal tourism, those criteria remain relevant, but they are mediated by halal trust, religious service availability, cultural appropriateness, privacy, and perceived credibility of digital information. This means that future models should integrate constructs from technology adoption theory with halal tourism constructs such as Sharia compliance, Islamic service quality, halal assurance, and Muslim tourist trust.

The geographical pattern also requires a cautious interpretation. Indonesia's high visibility in the corpus may reflect genuine research interest and policy relevance, but it may also be shaped by affiliation-counting methods, co-authorship structures, and database coverage. Rather than treating country occurrence as evidence of definitive leadership, future studies should compare Scopus with Web of Science, Dimensions, and regional databases to test whether the same pattern appears across sources.

The technology themes identified in the review point to several practical implications. Mobile applications can reduce uncertainty by providing halal restaurant information, mosque locations, prayer times, and Muslim-friendly destination guidance. IoT-enabled hospitality can support room-level personalization, Qibla direction, halal meal requests, and energy-efficient service delivery. AI and machine learning can improve recommendations, but they also raise concerns about algorithmic bias, privacy, and the credibility of halal claims. Blockchain and digital certification systems may strengthen transparency in halal food and service verification, but empirical studies are still needed to evaluate their usability, cost, and acceptance among tourists and providers.

Conclusion

This study examined 38 Scopus-indexed publications on smart tourism technologies in halal tourism from 2015 to 2024 using bibliometric analysis and systematic thematic synthesis. The findings show that this research field is growing but remains fragmented. Publication growth, source diversity, keyword dispersion, and network visualization indicate that the literature is organized around smart tourism, sustainability, halal tourism, IoT, information systems, and Muslim-friendly service concerns. Within the analyzed corpus, Indonesia, China, and Malaysia appear as the most visible country contributors, while Sustainability (Switzerland) and Tourism Review are among the most visible publication outlets. The dominant thematic areas include sustainability-oriented smart tourism, IoT-enabled hospitality, AI-supported personalization, mobile Muslim-friendly services, and digital systems for halal information and verification. These findings suggest an early transition from general smart tourism applications toward more context-sensitive Muslim-friendly digital services. The study contributes by offering a structured map of the eligible Scopus-indexed literature and by clarifying how smart tourism technologies are increasingly connected to halal tourism concerns. It also identifies three main gaps: the absence of a strong theoretical framework that integrates technology adoption with halal assurance, Muslim tourist trust, privacy, and religious service quality; the limited empirical validation of AI, blockchain, IoT, and mobile applications in real Muslim-friendly destination settings; and the moderate level of international collaboration between countries with halal tourism expertise and those with advanced smart tourism infrastructure. These findings are useful for researchers seeking to build stronger theory and for practitioners developing Muslim-friendly smart destination services. However, the study is limited by its reliance on a single database, English-language documents, and a relatively small corpus; therefore, the results should be read as a focused mapping of the selected Scopus dataset rather than as a definitive global assessment. Future research should develop technology adoption models that include Sharia compliance, halal digital trust, privacy concerns, and Muslim-friendly service quality; test the effects of AI-based recommendation, mobile halal applications, IoT hotel systems, and digital halal verification on trust, satisfaction, perceived value, and destination loyalty; compare Muslim-majority and Muslim-minority destinations; evaluate blockchain-based halal supply chain transparency; and examine governance models for responsible, inclusive, and culturally sensitive smart halal tourism ecosystems.

References

Amundsen, P. A., Evans, D. W., Rajendran, D., Bright, P., Bjørkli, T., & Eldridge, S. (2018). Inclusion And Exclusion Criteria Used In Non-Specific Low Back Pain Trials: A Review Of Randomised Controlled Trials Published Between 2006 And 2012. Bmc Musculoskeletal Disorders, 19(1), Article 113. Https://Doi.Org/10.1186/S12891-018-2034-6

Anaç, M., Gumusburun Ayalp, G., & Erdayandi, K. (2023). Prefabricated Construction Risks: A Holistic Exploration Through Advanced Bibliometric Tool And Content Analysis. Sustainability, 15(15), Article 11916. Https://Doi.Org/10.3390/Su151511916

Azam, A., Fathallah, A., Bensaid, B., & Alshammari, F. (2024). Intersection Between Modern Technologies And Halal Tourism. Journal Of Muamalat And Islamic Finance Research, 21(1), 1–19. Https://Doi.Org/10.33102/Jmifr.V21i1.00300

Baas, J., Schotten, M., Plume, A., Côté, G., & Karimi, R. (2020). Scopus As A Curated, High-Quality Bibliometric Data Source For Academic Research In Quantitative Science Studies. Quantitative Science Studies, 1(1), 377–386. Https://Doi.Org/10.1162/Qss_A_00019

Battour, M., Hakimian, F., Ismail, M., & Boğan, E. (2018). The Perception Of Non-Muslim Tourists Towards Halal Tourism: Evidence From Turkey And Malaysia. Journal Of Islamic Marketing, 9(4), 823–840. Https://Doi.Org/10.1108/Jima-07-2017-0072

Battour, M., Ismail, M. N., Battor, M., & Awais, M. (2017). Islamic Tourism: An Empirical Examination Of Travel Motivation And Satisfaction In Malaysia. Current Issues In Tourism, 20(1), 50-67. Https://Doi.Org/10.1080/13683500.2014.965665

Buhalis, D., & Amaranggana, A. (2015). Smart Tourism Destinations Enhancing Tourism Experience Through Personalisation Of Services. In I. Tussyadiah & A. Inversini (Eds.), Information And Communication Technologies In Tourism 2015 (Pp. 377-389). Springer. Https://Doi.Org/10.1007/978-3-319-14343-9_28

Butowski, L. (2018). Smart Tourism And Muslim Travel Behaviour. In Tourism, Culture And Heritage In A Smart Economy. Intech.

Çeltek, E. (2023). Analysis Of Smart Technologies Used In Smart Hotels. Journal Of Business Research – Turk, 15, 1–22. Https://Doi.Org/10.20491/Isarder.2023.1754

Crescentrating & Mastercard. (2024). Rida Framework (Responsible, Immersive, Digital, And Assured) For Muslim-Friendly Travel Experiences. In Global Muslim Travel Index 2024. Crescentrating.

Cuesta-Valiño, P., Bolifa, F., & Núñez-Barriopedro, E. (2020). Sustainable, Smart And Muslim-Friendly Tourist Destinations. Sustainability, 12(5), Article 1778. Https://Doi.Org/10.3390/Su12051778

Data.Ai. (2024). State Of Mobile 2024: Travel App Downloads And Usage Trends. Data.Ai Intelligence.

Eid, R., & El-Gohary, H. (2015). The Role Of Islamic Religiosity On The Relationship Between Perceived Value And Tourist Satisfaction. Tourism Management, 46, 477–488. Https://Doi.Org/10.1016/J.Tourman.2014.08.003

Eskerod, P., Hollensen, S., Morales-Contreras, M. F., & Arteaga-Ortiz, J. (2019). Drivers For Pursuing Sustainability Through Iot Technology Within High-End Hotels—An Exploratory Study. Sustainability, 11(19), Article 5372. Https://Doi.Org/10.3390/Su11195372

Evolve Business Intelligence. (2025a). Halal Tourism Market Analysis 2024–2032.

Evolve Business Intelligence. (2025b). Smart Tourism Market Size, Share, And Trends 2023–2034.

For Insights Consultancy. (2024). Travel App Platforms Market Report 2023–2030.

Gmti. (2024). Global Muslim Travel Index 2024: Muslim Travel Market Insights. Crescentrating.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart Tourism: Foundations And Developments. Electronic Markets, 25(3), 179–188. Https://Doi.Org/10.1007/S12525-015-0196-8

Guleria, D., & Kaur, P. (2021). Bibliometric Analysis Of Big Data And Tourism: Past Trends And Future Directions. Library Hi Tech, 39(3), 764–784. Https://Doi.Org/10.1108/Lht-09-2020-0239

Mastercard & Crescentrating. (2024). Global Muslim Travel Index 2024. Crescentrating & Mastercard.

Mbarushimana, S. (2024). The Impact Of Smart Room Technology On Guest Satisfaction And Operational Efficiency. Journal Of Modern Hospitality, 3(2), 1–13. Https://Doi.Org/10.47941/Jmh.1956

Mohsin, A., Ramli, N., & Alkhulayfi, B. A. (2016). Halal Tourism: Emerging Opportunities. Tourism Management Perspectives, 19, 137–143. Https://Doi.Org/10.1016/J.Tmp.2015.12.010

Priori Data. (2025). Global Mobile Travel App Usage Statistics 2025. Priori Data Intelligence.

Rethlefsen, M. L., Kirtley, S., Waffenschmidt, S., Ayala, A. P., Moher, D., Page, M. J., Et Al. (2021). Prisma-S: An Extension To The Prisma Statement For Reporting Literature Searches In Systematic Reviews. Systematic Reviews, 10(1), Article 39. Https://Doi.Org/10.1186/S13643-020-01542-Z

Samori, Z., Md Salleh, N. Z., & Khalid, M. M. (2016). Current Trends On Halal Tourism: Cases On Selected Asian Countries. Tourism Management Perspectives, 19, 131–136. Https://Doi.Org/10.1016/J.Tmp.2015.12.011

Suanpang, P., & Pothipassa, P. (2024). Integrating Generative Ai And Iot For Sustainable Smart Tourism Destinations. Sustainability, 16(17), Article 7435. Https://Doi.Org/10.3390/Su16177435

Travelport Digital. (2019). Global Digital Travel Research Report.

Vargas-Sánchez, A., & Moral-Moral, M. (2019). Halal Tourism: State Of The Art. Tourism Review, 74(3), 385–399. Https://Doi.Org/10.1108/Tr-01-2018-0015

Ye, B. H., Ye, H., & Law, R. (2020). Systematic Review Of Smart Tourism Research. Sustainability, 12(8), Article 3401. Https://Doi.Org/10.3390/Su12083401