



Blockchain For Halal Certification Integrity and Consumer Trust: A Systematic Literature Review

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Received: April 28, 2026; **Accepted:** July 23, 2026; **Published:** July 29, 2026

Abstract: This study synthesizes current developments concerning the application of blockchain technology to reinforce halal certification integrity and strengthen consumer trust. A systematic literature review (SLR) was carried out following the PRISMA protocol, using Scopus and Web of Science databases covering 2019- 2025. From an initial 108 records, 48 studies met the eligibility criteria and were analyzed thematically. The review reveals four interconnected domains traceability and transparency, governance and regulatory structures, organizational readiness, and technological orchestration which jointly determine blockchain readiness within halal ecosystems. The findings demonstrate that blockchain, particularly when combined with IoT, AI, and smart contracts, facilitates secure verification, improves data integrity, and enhances auditability. A conceptual framework is proposed to illustrate how institutional capacity, technological integration, and regulatory harmonization collectively shape consumer trust.

Keywords: Blockchain, Consumer Trust, Halal Certification, Halal Supply Chain, PRISMA, Traceability, Distributed Ledger Technology

1. Introduction

Due to Muslim consumers growing awareness of product safety, authenticity, and integrity, the demand for halal products has increased dramatically in the age of globalization [1], [2]. However the intricacy of contemporary halal supply chains has brought about a number of difficulties, such as the dangers of counterfeiting halal certificates, data manipulation, and a lack of information



DOI: 10.52362/ijiems.v5i2.2569

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transparency [3], [4]. Numerous halal certification fraud incidents in different countries have undermined consumer confidence by revealing weaknesses in conventional systems that still primarily rely on paper records or fragmented databases [5]. Information technology developments have been acknowledged as providing fresh approaches to these problems. As a type of Distributed Ledger Technology (DLT), blockchain has been distinguished by its capacity to securely, transparently, and unchangeably record transactions [6], [7]. Through this technology, end-to-end traceability of halal products can be established, real-time verification of certificates can be performed, and information can be integrated across stakeholders within the halal supply chain. When combined with the Internet of Things (IoT) and smart contracts, blockchain has been reported to accelerate certification processes, minimize human errors, and strengthen consumer confidence [8], [9]. While studies have looked at the advantage and difficulties of Blockchain at the advantages adoption in the halal sector, the majority have mostly concentrated on behavioral intentions to adopt and perceived advantages numerous studies have examined the benefits and challenges of blockchain adoption in the halal industry, most have primarily focused on behavioral intentions to adopt and perceived benefits [10], [11]. Limited systematic evidence has been provided regarding the interrelationships among organizational readiness, governance mechanisms, technological orchestration, and their implications for consumer trust [1], [12]. This research gap highlights the need to synthesize the most recent empirical evidence through a systematic literature review (SLR) guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. Accordingly, this study is designed to (i) identify and categorize the key factors influencing blockchain implementation in halal supply chains, (ii) map the relationships among traceability, governance, organizational readiness, and technological orchestration in relation to consumer trust, and (iii) propose an evidence-based conceptual framework that may serve as a strategic guide for certification bodies and industry practitioners. It is contributed by this study that the existing body of work has been brought together, a thematic map that can support policy making processes has been developed, and several directions for future inquiry that may help advance a more standardized and scalable halal ecosystem supported through the use of blockchain technology have been outlined.

2. Literature Review

Blockchain is known as a form of Distributed Ledger Technology (DLT) that records transactions permanently, transparently, and securely [2], [7], [9]. In the halal supply chain setting, the technology has been adopted to ensure that certification information is securely maintained



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and that full product traceability can be achieved. At each phase of production and distribution, a durable and tamper-proof record is produced, thereby limiting opportunities for data alteration and reinforcing consumer confidence [6], [13], [14]. It has been proven in various studies that challenges related to transparency and operational efficiency in the halal sector can be mitigated through the implementation of blockchain technology [1], [12], [15]. Blockchain integration has been proven to accelerate halal certificate verification, reduce the risk of counterfeiting, and simplify the audit process.. Moreover, the integration of blockchain with the Internet of Things (IoT) and smart contracts facilitates enhanced precision and automation in data capture throughout the supply chain [9], [13]. This integration decreases manual involvement and lowers the likelihood of human error. Within the Indonesian context, notable obstacles have been identified, including inadequate digital infrastructure, insufficient technology proficiency among small and medium-sized halal firms (SMEs), and disjointed certification requirements. [4]. These constraints are in line with the findings of [16], which emphasizes that organizational readiness including top management support, human resource competency, and cultural alignment serve as important determinants of blockchain adoption success. The regulatory aspect has also been acknowledged as playing a significant role.. Certification authorities such as JAKIM in Malaysia and MUI in Indonesia have been identified as strategic actors in promoting data standardization and interoperability across blockchain platforms [17]–[19]. Nevertheless, the literature has indicated that cross-institutional and cross-national coordination remains weak, thereby constraining the potential for large-scale international adoption [16], [20], [21] [16], [20], [22]. Although the potential of blockchain in halal ecosystems has been widely discussed, most studies have predominantly focused on intention to adopt and perceived benefits [1], [10], [16] rather than on a comprehensive mapping of readiness factors and their direct relationship with consumer trust [12], [23]. Therefore, the PRISMA-based systematic literature review (SLR) conducted in this study has been designed to fill this research gap by providing a thematic map and an evidence-driven conceptual framework that integrates the dimensions of traceability, governance, organizational readiness, and technological orchestration [1], [6], [7].

3. Methodology

In order to guarantee openness, consistency, and reproducibility throughout the review process, this study used a systematic literature review (SLR) approach that was guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol [23], [24]. This approach was choose because it makes it easier to identify new research trends regarding



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blockchain implementation in halal supply chains and permits the structured synthesis of empirical evident [1], [7], [12].

Three primary steps comprised the PRISMA protocol used in this study: (i) Literature Search Strategy; (ii) Inclusion and Exclusion Criteria; and (iii) Article Selection Process. (i) Literature Search Strategy: Because both Scopus and Web of Science (WoS) offer multidisciplinary coverage and index high-quality publications, the literature search was carried out across two respectable academic databases. As recommended by, the search strategy used a combination of halal and blockchain-related keywords, such as “halal AND “blockchain” AND (“traceability” OR “certification” OR “halal supply chain”) [4]. The search was limited to English language publications issued between 2019 and 2025 to ensure alignment with recent technological developments. [10], [16]. (ii) Inclusion and exclusion criteria The inclusion criteria included: (a) peer reviewed journal articles or conference proceedings indexed in Scopus or Word Search, discussing the use of blockchains in a halal context. (b) empirical or conceptual studies containing information on halal traceability, certification or management[25], [26]. (c) Articles on factors relating to organisational preparedness or consumer confidence [1], [16]. The exclusion criteria included: non-academic or non-indexed publications, non-full-text articles and studies that discuss the subject of blockchains in a general context without specific reference to halal systems [21]. (iii) Selection procedure The selection procedure for PRISMA was carried out in three successive stages: identification, screening and selection.

All pertinent studies were gathered from the first search results during the identification phase. Duplicate records were eliminated during screening, and abstracts and titles were examined to make sure they met the inclusion and exclusion criteria. A full-text review was carried out during the eligibility stage to verify each article's applicability to the study's goals. 48 studies out of the 108 publications that were found satisfied the final inclusion requirements and were added to the bibliometric and thematic analyses. The PRISMA flow diagram below shows the specific selection procedure:



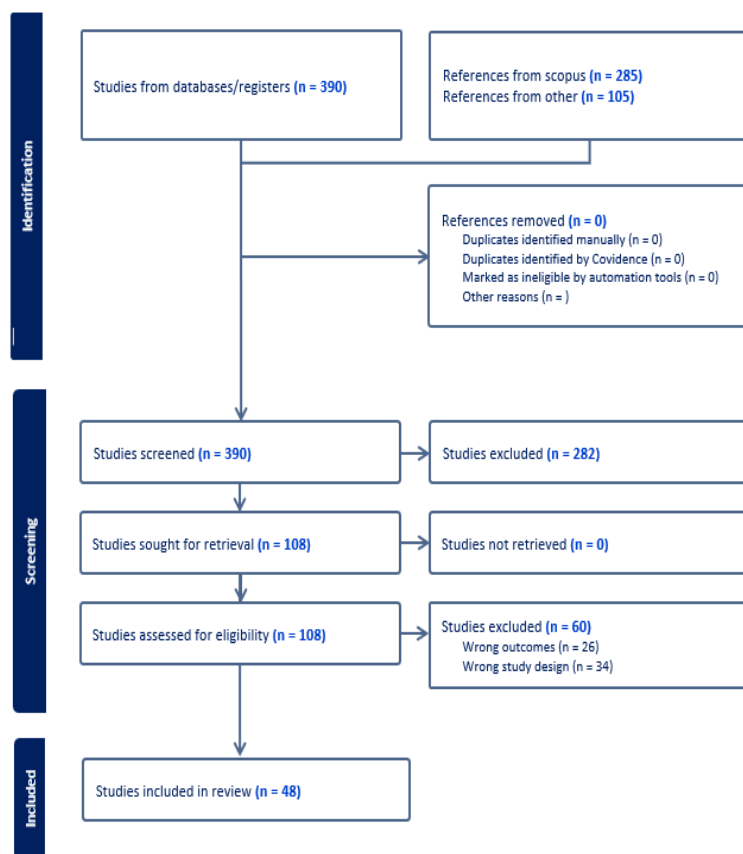


Figure 1. PRISMA Model for Blockchain in Halal Systems

3.1. Data Analysis Technique

The findings were divided into four major clusters using thematic synthesis based on the reviewed literature: (i) traceability and transparency; (ii) governance and regulation; (iii) organizational readiness; and (iv) technological orchestration.

Table 1. Thematic Cluster

Thematic Cluster	Main Focus of Finding	Reference
Traceability and Transparency	Blockchain has been utilized to provide an immutable ledger for end-to-end	(Sunmola et al., 2025), (Adhiwibowo et al., 2025), (Susanty et al., 2024),



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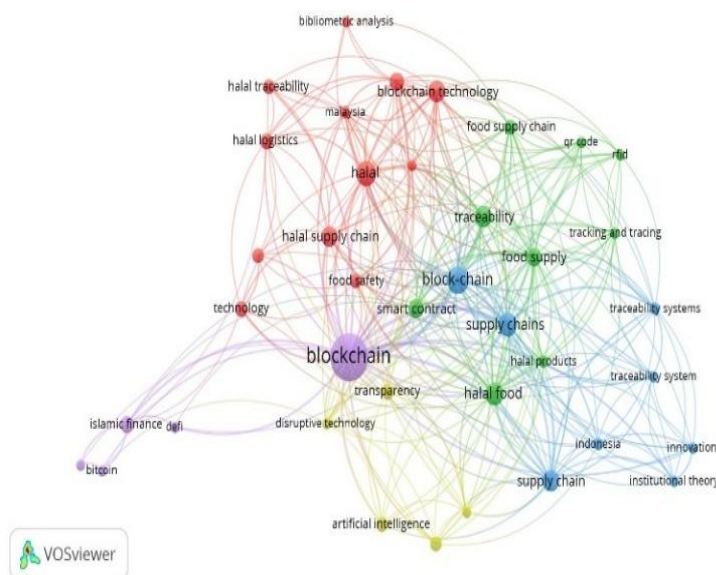
	tracking of halal products, reducing certificate manipulation, improving audit efficiency, and enabling real-time verification. IoT integration enables automatic data recording (e.g., temperature, location, storage status minimizing human error.	(Nashirudin & Ulfah, 2024), (Munawar & Mugiono, 2024), (Sumarliah et al., 2023), (J. Hidayati et al., 2023), (Hendayani & Fernando, 2023), (Sidarto & Hamka, 2021), (Mardiyah et al., 2021), (Ali et al., 2021a), (Abidin & Perdana, 2020)
Governance & Regulation	According to research, blockchain based halal certification's credibility and interoperability standards are greatly influenced by the role of certification authorities (e.g., JAKIM, MUI). Challenges include regulatory discrepancies and inadequate cross border coordination. A framework for regional or international governance is required to harmonize policies.	(Fernando et al., 2025), (Changalima, 2025), (Mehmood et al., 2024), (Mohamad Karudin et al., 2024), (Karyani et al., 2024), (Ali et al., 2024), (Rahman, Mahroof, et al., 2023), (Maidin et al., 2022), (Waspodo & Rakhmawati, 2021), (Azizah, 2021) (Ab Talib et al., 2020)
Organizational Readiness	It has been stated that internal readiness includes digital infrastructure, technological literacy, top management support, and cultural alignment. Due to their limited resources, halal SMEs realize that training, technical support, and incentive programs are needed to strengthen blockchain adoption.	(Vanany et al., 2024), (Ali et al., 2024), (Sumarliah et al., 2023), (Hendayani & Fernando, 2023), (Heikal et al., 2023), (Rejeb et al., 2023), (Noorliza, 2022), (Masudin et al., 2022), (Thing et al., 2021)



Technological Orchestration	It has been reported that the synergy between blockchain, IoT, AI, and smart contracts enhances halal certification efficiency and fosters service innovation (e.g., automated verification and real-time notifications). However, there are still technical issues, particularly with regard to data scalability and high bandwidth requirements.	(Harsanto et al., 2024), (Agung et al., 2024), (Purusottama et al., 2023), (Arkeman et al., 2023a), (Masudin et al., 2022), (Alamsyah et al., 2022), (Ali et al., 2021a)
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3.2. Bibliometric Mapping

Additionally, bibliometric mapping was carried out using VOSviewer software in order to see how key words relate to one another and to spot research trends. (Changalima, 2025; Rejeb et al., 2023). In order to support blockchain implementation strategies within the halal supply chain, this method allowed for a thorough integration of study findings and the creation of an evidence-based conceptual framework. (Fernando et al., 2025; Sunmola et al., 2025) The VOSviewer visualization is presented in the following figure:



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Figure 2. Bibliometric Mapping of Blockchain in Halal Systems

The figure.2 presents a co-occurrence map of keywords derived from the bibliometric analysis of 48 articles related to blockchain within the halal supply chain. Each color represents a major thematic cluster: (1) halal supply chain and certification (red), (2) product traceability and tracking (green), (3) supply chain management and theoretical approaches (blue), and (4) the integration of supporting technologies such as AI and smart contracts (yellow). The keyword blockchain has been positioned centrally and has been acknowledged as a key element in linking the clusters, thereby emphasizing the multidisciplinary character of research within this field.

4. Result And Discussion

4.1. Conceptual Framework

Four interrelated thematic clusters supporting the preparedness of the halal supply chain for blockchain implementation have been identified through the analysis of the 48 selected studies. These clusters illustrate how organizational, technological, and regulatory elements are collectively aligned to reinforce consumer trust (Fernando et al., 2025; Sumarliah et al., 2023; Sunmola et al., 2025). This relationship is presented in the figure below:

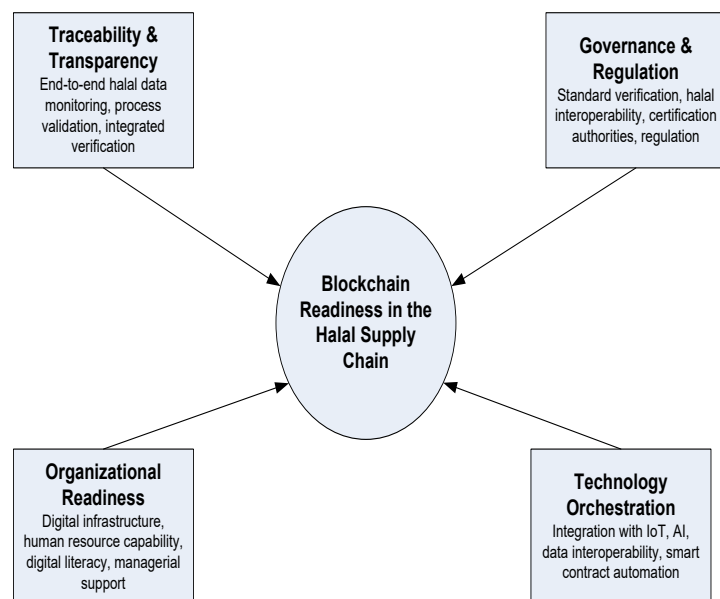


Figure 3 Thematic Cluster

1. Traceability and Transparency



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Most studies have indicated that the use of blockchain has contributed substantially to improving the traceability of halal products across all stages of the supply chain (Adhiwibowo et al., 2025; Munawar & Mugiono, 2024). The activities involved from sourcing and processing to distribution and certification can be recorded in a permanent and tamper resistant ledger, allowing verification to be carried out by relevant parties at any time. When blockchain is combined with Internet of Things (IoT) devices, information such as temperature, location, and storage conditions is captured automatically, which enhances data precision and reduces the likelihood of human error (Arkeman et al., 2023b; Purusottama et al., 2023). These observations are consistent with earlier findings that reported faster audit verification and a reduced risk of halal certificate misuse. (Karyani et al., 2024; Sidarto & Hamka, 2021).

2. Governance and Regulation

The effective utilization of blockchain in the halal sector is reported to be highly dependent on the existence of a clear and well-structured governance system. Standard-setting activities have been carried out by certification bodies such as JAKIM in Malaysia and MUI in Indonesia, both of which have been recognized for promoting data interoperability and supporting the harmonization of certification practices across regions (bin Khairuddin & Rahman, 2023; Maidin et al., 2022), (Ali et al., 2024; Mardiyah et al., 2021). Despite these efforts, several studies have noted that uneven regulatory provisions and limited coordination between countries remain major barriers to wider international adoption [23], [25]. In response to these concerns, the literature has suggested that regional or global governance arrangements be developed to strengthen the credibility and uniformity of blockchain-based halal certification systems (Abidin & Perdana, 2020; Katuk, 2019).

3. Organizational Readiness

Organizational readiness has been recognized as a major determinant of successful blockchain adoption, as it is reflected in the availability of digital infrastructure, the level of technological literacy, the commitment of top management, and the degree of cultural alignment within an institution (Ali et al., 2024; Fernando et al., 2023). It has also been noted that firms possessing a well defined digital strategy, adequate financial resources, and competent personnel are more capable of implementing blockchain systems effectively (Sumarlia et al., 2023; Vanany et al., 2020). Limited digital capacity among halal SMEs in Indonesia has been identified as a significant issue that calls for focused interventions like government incentives, technical support, and training programs (Nashirudin & Ulfah, 2024; Wasposito & Rakhmawati, 2021).

4. Technological Orchestration

It has been shown that the benefits offered by blockchain systems can be broadened when the technology is combined with complementary digital solutions such as the Internet of Things (IoT),





artificial intelligence (AI), and smart contracts (Munawar & Mugiono, 2024). Through this form of technological integration, improvements in certification efficiency have been reported, along with the emergence of new service capabilities, including automated halal verification and real-time notifications for consumers (Arkeman et al., 2023a; Masudin et al., 2022). Despite these advancements, several studies have noted that scalability remains a concern, particularly in relation to bandwidth demands and limitations in data storage capacity (Ali et al., 2024; Handayani et al., 2022).

4.2 Synthesis of Findings

Taken together, the four thematic clusters have been used to form a conceptual framework that illustrates how the successful application of blockchain in the halal supply chain relies on an integrated approach involving data transparency, credible regulatory structures, organizational readiness, and the incorporation of complementary technologies (Sunmola et al., 2025). Through this combination, consumer confidence in halal products is reinforced, and a foundation is established for developing implementation strategies that are measurable, standardized, and capable of being scaled effectively (Ali et al., 2024; Sumarlia et al., 2023).

4.3. Conceptual Framework and Research Implications

The conceptual framework generated from this systematic review has been assembled by incorporating the four thematic clusters traceability and transparency, governance and regulation, organizational readiness, and technological orchestration which have been recognized as essential components in shaping blockchain readiness within the halal supply chain. In this framework, traceability and transparency are regarded as the foundational elements that make it possible for each phase of the halal certification process to be verified from end to end, beginning with the acquisition of raw materials and concluding with the delivery of finished products to consumers.

Governance and regulation are understood to serve as the mechanisms through which credibility within the system is maintained, particularly by promoting standardization and enabling data interoperability across different regions, thereby helping to minimize regulatory discrepancies between countries. The extent to which an organization is prepared has been viewed as determining its capacity to adapt to new technologies, including the readiness of its human resources, the strength of its digital infrastructure, and the level of support provided by top management. In addition, technological orchestration has been regarded as essential for ensuring that blockchain functions effectively, as this depends on its integration with complementary technologies such as IoT, AI, and smart contracts.

The framework has practical value because it can guide the way policies and implementation plans are developed, particularly when technical requirements, institutional arrangements, and organizational capabilities need to be considered together. The insights produced by this review may also be used by halal certification bodies to strengthen their digital systems and design training





initiatives that address specific competency gaps. For industry practitioners, the framework offers a reference point for planning technology-related investments that remain aligned with broader international practices. In the academic domain, the framework opens several directions for further study. These include examining how the identified clusters interact across different countries, assessing how effectively various technologies can be integrated within halal operations, and exploring the economic implications of implementing blockchain solutions in this sector.

5. Conclusion

A review conducted using the PRISMA approach and drawing on 48 selected studies has provided a consolidated overview of how blockchain has been applied to support the integrity of halal certification and to reinforce consumer confidence during the period 2019–2025. From this body of literature, four principal themes were identified, namely: (i) transparency and traceability, (ii) governance and regulatory structures, (iii) organizational preparedness, and (iv) the coordination of supporting technologies. It has been discovered that these clusters work well together to create a conceptual framework that can be used as a tactical manual to gauge and improve the halal supply chain's preparedness for blockchain adoption. The results showed that blockchain can offer end-to-end traceability, boost regulatory credibility, and increase consumer trust especially when combined with IoT, AI, and smart contracts. However, it has been demonstrated that institutional support, digital literacy, and technical preparedness are essential for implementation success.

Acknowledgements

The authors are grateful for the helpful criticism and encouragement they received from reviewers and colleagues. The authors were entirely self-supported and did not receive any outside funding for this study.

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DOI: 10.52362/ijiems.v5i2.2569

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DOI: 10.52362/ijiems.v5i2.2569

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