

Challenges and Strategic Responses in Halal Supply Chain Integration: A Multi-Dimensional Literature Review

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ABSTRACT

This study aims to provide a comprehensive understanding of the dynamics of halal supply chain (HSC) integration through a systematic literature review (SLR) approach. Using the PRISMA guidelines, the study analyzed 67 peer-reviewed journal articles from the Scopus database published between 2015 and 2024. The primary focus is to identify contemporary issues, major challenges, and proposed strategies in the integration of halal supply chains and halal logistics. The findings reveal that HSC integration extends beyond logistical operations, encompassing multidisciplinary dimensions such as regulatory clarity, stakeholder competencies, operational risks, supplier relationship complexity, and sociocultural challenges in multicultural environments. The strategies proposed in the literature include the adoption of emerging technologies such as blockchain and traceability systems, the enhancement of halal certification frameworks, human capital development, and collaboration among governments, industries, and academic institutions. This study offers a significant contribution by formulating an evidence-based integrative framework to support the development of effective, efficient, and sustainable halal supply chains at the global level. The findings provide strategic implications for policymakers, industry practitioners, and researchers in building a trustworthy and internationally competitive halal ecosystem.

Keywords: *halal logistic, halal supply chain, supply chain integration, systematic literature review*

1. INTRODUCTION

Halal Supply Chain Management (HSCM) is a critical component of the halal industry, aiming to ensure the halal integrity of products from upstream to downstream processes. The integration of HSCM has become increasingly vital in response to the growing global demand for halal products, driven by the rising Muslim population and increasing consumer awareness regarding halal

assurance (Ali *et al.*, 2021; Handayani *et al.*, 2021). A halal supply chain not only involves the sourcing of halal-certified raw materials but also requires that the processes of production, distribution, and storage comply with halal standards to prevent cross-contamination with non-halal products (Jannah & Al-Banna, 2021; Sentia *et al.*, 2022).

One of the main challenges in HSCM integration lies in traceability and supply chain transparency (Çemberci *et al.*, 2024). Technologies such as blockchain have been proposed to enhance consumer trust by enabling real-time tracking of a product's halal status (Ardiantono *et al.*, 2024; Hew *et al.*, 2020). However, despite its promising potential to improve both efficiency and consumer confidence, the adoption of such technologies remains limited due to barriers including a lack of technical knowledge and skills among industry players (Hasnan & Kohda, 2023). Moreover, the sustainability of halal supply chains is highly dependent on compliance with halal regulations, which vary across countries, thus requiring stronger coordination among stakeholders (Kristanto & Kurniawati, 2023; Masudin *et al.*, 2023).

Several studies have been conducted in this domain, particularly through literature reviews; however, most remain limited in scope. For instance, Masudin *et al.* (2018) conducted a literature review on halal logistics but focused solely on the logistics aspect without addressing the full integration of the halal supply chain. Ab Talib *et al.* (2015) explored the key success factors in supply chain management but did not specifically examine HSCM integration. Similarly, Mustun (2021) emphasized halal certification and business competitiveness but did not delve into the operational and strategic challenges of halal supply chains.

A more recent study by Kurniawati and Cakravastia (2023) attempted to address sustainability and operational issues within HSCM but did not cover emerging challenges or strategies needed for comprehensive integration. In addition, Hasnan *et al.* (2024) applied a bibliometric approach to map the HSCM landscape, yet their findings lacked in-depth analysis of integration challenges and strategies. These gaps highlight the need for a more comprehensive exploration of HSCM integration, especially

regarding current issues, primary challenges, and practical strategies to enhance halal supply chain compliance.

This study aims to address these gaps by conducting a systematic literature review of publications on HSCM integration from the past decade using the Scopus database. The review identifies recent issues, key challenges, and proposed strategies in previous research, offering a more comprehensive understanding of HSCM development. The novelty of this study lies in its systematic approach to identifying the challenges and integration strategies of HSCM, providing evidence-based recommendations to enhance the effectiveness of halal supply chains.

Therefore, the findings of this study offer valuable insights and practical implications for both academic development and field implementation of halal supply chain integration. Specifically, this research contributes significantly by comprehensively synthesizing existing studies on HSCM integration, whereas contemporary reviews tend to narrow their focus to specific aspects. By using the Scopus database to curate a repository of high-quality publications, this study not only illuminates the field but also explores emerging insights and offers a holistic perspective on halal supply chain discourse. These insights can help the halal industry improve operational efficiency and foster consumer trust in halal products on a global scale.

2. LITERATURE REVIEW

The concept of the value chain, introduced by Porter (1985), has served as a foundational framework for understanding how a product or service passes through a sequence of business activities to create added value. From inbound logistics, production processes, outbound logistics, marketing, to after-sales service, each stage in the value chain contributes to enhancing the final value of the product. Within the context of the halal industry, this concept becomes more complex due to the need to incorporate *Shariah*-compliant principles into each activity, which forms the basis for what is now known as the Halal Supply Chain.

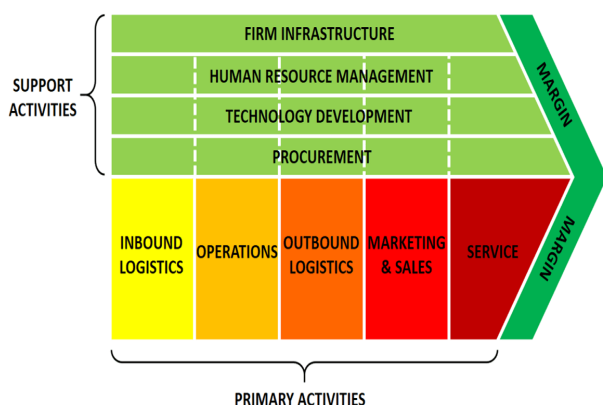


Figure 1 The generic value chain (Porter, 1985).

The Halal Supply Chain refers to a supply chain management system that ensures all logistical and production activities are conducted in accordance with halal principles. This concept extends beyond mere compliance in sourcing halal-certified raw materials; it also includes the entire processes of handling, storage, packaging, distribution, and marketing (Perdana, 2020; Usman, 2020).

Therefore, Halal Supply Chain Integration (HSCI) is essential to align all stages and stakeholders in the supply chain to work synergistically in preserving the halal integrity of products from upstream to downstream.

A key component of HSCI is Halal Logistics, which encompasses transportation, warehousing, handling, and distribution operations performed with strict separation between halal and non-halal products to avoid contamination (Kristanto & Kurniawati, 2023; Kurniawati & Rochman, 2023). Halal logistics practices involve designing dedicated transportation systems, using specialized containers, establishing halal-certified warehouses, and maintaining cold chain monitoring for sensitive products.

Halal certification by authorized institutions serves as a critical indicator of successful supply chain integration. This certification not only evaluates the production process but also verifies the logistics and distribution systems (Badriyah *et al.*, 2021; Kubota *et al.*, 2017). In this context, integration among companies, certifying bodies, logistics partners, and suppliers is crucial to ensure full compliance with halal standards.

Marketing is another vital aspect of the halal value chain that must be carefully managed. Halal information presented on packaging, labeling, and promotional materials must reflect transparency and authenticity (Abdul-Talib & Abd-Razak, 2013; Ashraf & Farooqui, 2017). Achieving this requires coordination among marketing, production, and logistics teams to ensure that messages delivered to consumers are aligned with actual processes.

Beyond technical aspects, management integrity and adherence to *Shariah* values form the ethical foundation of HSCI (Rizki *et al.*, 2023; Yunan *et al.*, 2020). Without commitment from all parties involved in the supply chain, the halal system can be easily compromised. Therefore, establishing a strong halal culture within organizations is essential to maintaining consistency and the long-term sustainability of an integrated system.

Industry players are becoming increasingly aware of the importance of integration in halal supply chains and logistics. Subianto (2018) observed that an increasing number of companies are obtaining halal certification in response to rising Muslim consumer demand and government regulations. This certification also demonstrates that their supply chain systems are integrated with halal principles, both in terms of processes and logistics (Marzuki *et al.*, 2012; Viverita & Kusumastuti, 2017).

Technology plays a supportive role in strengthening HSCI, particularly in ensuring traceability and transparency. Blockchain technology, for example, has been adopted to record the entire journey of a product from the source of raw materials to the end consumer in a real-time and tamper-proof manner (Alamsyah *et al.*, 2022; Katuk, 2019). Furthermore, training and capacity building for logistics and supply chain personnel are essential to maintaining sustainable halal system integration (Ambali & Bakar, 2014; Aziz & Chok, 2013). Therefore, Halal Supply Chain Integration is inseparable from the vital role of halal logistics. Their integration not only guarantees compliance with *Shariah* principles but also fosters efficiency, transparency, and consumer trust in halal products within the global market.

3. METHODOLOGY

This study adopts the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to conduct a systematic literature review. The PRISMA framework consists of four key stages: identification, screening, eligibility, and inclusion (Mengist *et al.*, 2020). The initial step involved identifying relevant literature aligned with the research topic (Sahab & Oulfarsi, 2024) namely Halal Supply Chain Integration. In the early phase of analysis, specific variables commonly associated with Halal Supply Chain Integration such as halal supply chain and halal logistics were used as the main focus for data retrieval. Articles that did not directly address these themes were excluded to minimize potential research bias. The literature search was conducted using the Scopus database, which was selected due to its high relevance and comprehensive indexing of high-quality, peer-reviewed publications.

To retrieve appropriate articles, the authors performed a title-based search using Boolean operators, specifically "OR", to include articles containing either of the following keywords: "halal supply chain" OR "halal logistics". The publication period was restricted to studies published between 2015 and 2024 to ensure the inclusion of recent and relevant contributions.

Further screening was conducted by excluding irrelevant publication types such as conference papers, book chapters, reviews, books, and erratum. Additionally, to enhance the quality and focus of the analysis, only articles categorized under the subject area of Business, Management, and Accounting were retained. This selection ensured that the dataset reflected the managerial and strategic dimensions of Halal Supply Chain Integration.

The PRISMA flow diagram illustrating the data screening and selection process is presented in Figure 2.

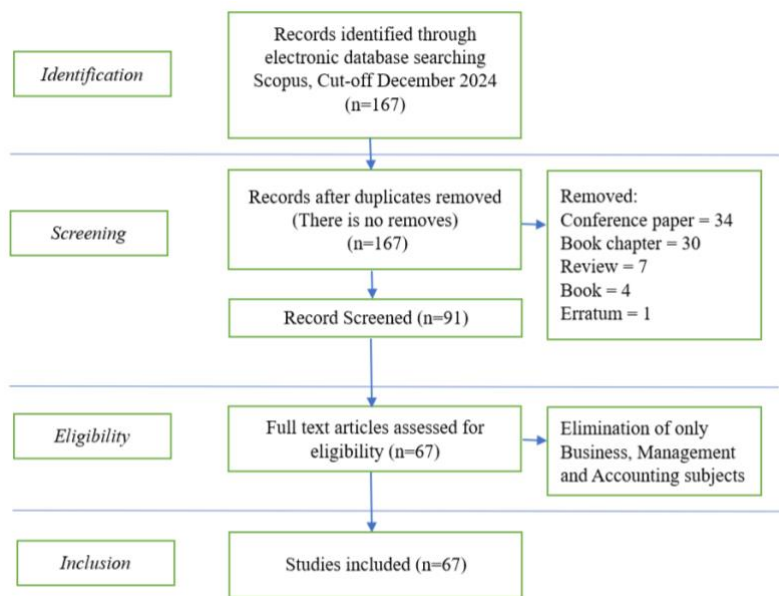


Figure 2 PRISMA flow diagram of data search process.

As depicted in Figure 2, the initial search yielded a total of 167 documents, including 91 journal articles, 34 conference papers, 30 book chapters, 7 reviews, 4 books, and 1 erratum. Given the broad subject areas in the initial dataset, the scope was narrowed to include only those within the Business, Management, and Accounting subject area, resulting in 67 journal articles deemed relevant for further analysis. Following the selection process, Microsoft Excel was used to manage and analyze the extracted data, enabling systematic evaluation of publication trends, key themes, and research gaps in the field of Halal Supply Chain Integration.

4. RESULT AND DISCUSSION

4.1 Publication Trends

Based on the results of the article search and selection from the Scopus database between 2015 and 2024, there has been a significant increase in the number of publications addressing the topic of Halal Supply Chain Integration. In 2015, only 2 articles were published on this subject. This number gradually increased over the following years, with 4 articles in 2016 and 5 in 2017.

A more consistent upward trend began to emerge in 2018, with the number of publications ranging between 7 and 8 articles per year through 2022. The peak was reached in 2023, with 11 articles published, indicating growing scholarly interest in halal supply chain integration. Although there was a slight decline to 8 articles in 2024, the overall trend demonstrates a positive and sustained growth in academic attention toward this topic over the last decade.



Figure 3 Publication trends.

This trend reflects an increasing recognition of Halal Supply Chain Integration as a critical area of interest among scholars and practitioners alike encompassing both halal supply chain and halal logistics in line with the rising demand for transparency, Shariah compliance, and efficiency in the management of halal product supply chains.

4.2 Source of References

A wide range of sources has supported the development of research on Halal Supply Chain Integration, particularly

through the emergence of new findings and innovative concepts commonly published in academic journals. These journals play a vital role in disseminating knowledge on best practices, innovations, and advancements in halal supply chain integration to both the academic community and industry practitioners. By adhering to rigorous scientific standards in the publication process (Ellaway, 2022), scholarly articles contribute to driving innovation and improving systems within the halal supply chain ecosystem.

Table 1 Source journals of reviewed articles.

Journal Names	Amount	
Journal Of Islamic Marketing	21	31.34%
International Journal Of Supply Chain Management	14	20.90%
British Food Journal	3	4.48%
Arab Gulf Journal Of Scientific Research	2	2.99%
Pertanika Journal Of Social Sciences And Humanities	2	2.99%
Supply Chain Forum	2	2.99%
Acta Logistica	1	1.49%
Asian Journal Of Business Research	1	1.49%
Business Process Management Journal	1	1.49%
Cleaner Logistics And Supply Chain	1	1.49%
Information Resources Management Journal	1	1.49%
Institutions And Economies	1	1.49%
International Business Management	1	1.49%
International Journal Of Asian Business And Information Management	1	1.49%
International Journal Of Computing And Digital Systems	1	1.49%
International Journal Of Logistics Research And Applications	1	1.49%
International Journal Of Logistics Systems And Management	1	1.49%
International Journal Of Productivity And Performance Management	1	1.49%
International Journal Of Public Sector Performance Management	1	1.49%
International Journal Of Technology	1	1.49%
International Review Of Management And Marketing	1	1.49%
Journal For Global Business Advancement	1	1.49%
Journal Of Global Operations And Strategic Sourcing	1	1.49%
Journal Of Korea Trade	1	1.49%
Journal Of Modelling In Management	1	1.49%
Logistics	1	1.49%
Operations And Supply Chain Management	1	1.49%
Paper Asia	1	1.49%
Uncertain Supply Chain Management	1	1.49%

The availability of academic publications encourages researchers and practitioners to develop methods and technologies that are not only more efficient but also aligned with Shariah principles. In addition, these journal articles serve as valuable resources for industry players in making strategic business decisions (Koziol-Nadolna & Beyer, 2021; Olalekan *et al.*, 2021). The insights derived from academic literature assist companies in understanding market trends, consumer needs, and best practices in managing an integrated halal supply chain.

An analysis of the 67 selected articles from the Scopus database reveals that publications on halal supply chain

integration are distributed across a variety of scholarly journals, covering topics related to logistics as well as supply chain management. A total of 29 journals were found to contribute to this topic between 2015 and 2024. The most dominant journal in this field is the Journal of Islamic Marketing, which accounts for 21 articles, representing approximately 31.34% of the total publications. This affirms the journal’s position as a primary outlet for research that integrates Islamic principles into supply chain management, particularly in the context of halal supply chains. The second most prominent is the International Journal of Supply Chain Management, contributing 14 articles (20.09%), highlighting

the logistics academic community's growing interest in halal-related issues within the context of global supply chains.

Other journals that have published articles on this topic, albeit in smaller numbers, include the British Food Journal (3 articles), Arab Gulf Journal of Scientific Research (2 articles), Pertanika Journal of Social Sciences and Humanities (2 articles), and Supply Chain Forum (2 articles). Additionally, 23 other journals contributed one article each, further enriching the scholarly discourse on this topic.

The diversity of journals indicates that research on halal supply chain integration is inherently multidisciplinary, with strong relevance to Islamic economics, logistics efficiency, organizational performance, and global market dynamics. This reflects the growing importance of halal supply chain integration, not only from the perspective of Shariah

compliance but also in terms of operational effectiveness and global competitiveness.

4.3 Articles, Authors, and Countries with the Highest Contributions

Individual articles play a crucial role in advancing knowledge on halal supply chain integration. Articles serve as key platforms for sharing findings, methodologies, and theoretical insights that underpin the development of this field. Through academic publications, researchers contribute to the scholarly conversation, inspire further investigations, and deepen the collective understanding of the halal industry.

The table 2 presents the top 20 most cited articles, reflecting those that have made the most significant academic contributions based on citation count count in recent scholarly literature.

Table 2 Top 20 articles with the highest citations.

No.	Author(s)	Year	Title	TC
1	Ab Talib M.S.; Hamid A.B.A.; Zulfakar M.H.	2015	Halal supply chain critical success factors: A literature review	127
2	Zailani S.; Iranmanesh M.; Aziz A.A.; Kanapathy K.	2017	Halal logistics opportunities and challenges	107
3	Khan M.I.; Haleem A.; Khan S.	2018	Defining Halal Supply Chain Management	80
4	Fathi E.; Zailani S.; Iranmanesh M.; Kanapathy K.	2016	Drivers of consumers' willingness to pay for halal logistics	78
5	Khan S.; Haleem A.; Khan M.I.	2021	Risk management in Halal supply chain: an integrated fuzzy Delphi and DEMATEL approach	72
6	Zailani S.; Jafarzadeh S.; Iranmanesh M.; Nikbin D.; Selim N.I.I.	2018	Halal logistics service quality: conceptual model and empirical evidence	60
7	Khan S.; Haleem A.; Khan M.I.	2020	Assessment of risk in the management of Halal supply chain using fuzzy BWM method	51
8	Haleem A.; Khan M.I.; Khan S.	2021	Conceptualising a framework linking halal supply chain management with sustainability: an India centric study	47
9	Khan M.I.; Khan S.; Haleem A.	2022	Analysing barriers towards management of Halal supply chain: a BWM approach	44
10	Selim N.I.I.B.; Zailani S.; Aziz A.A.; Rahman M.K.	2022	Halal logistic services, trust and satisfaction amongst Malaysian 3PL service providers	42
11	Mohamed Y.H.; Abdul Rahim A.R.; Ma'aram A.	2020	The effect of halal supply chain management on halal integrity assurance for the food industry in Malaysia	38
12	Talib M.S.A.; Hamid A.B.A.; Zulfakar M.H.; Chin T.A.	2015	Barriers to Halal logistics operation: Views from Malaysian logistics experts	35
13	Khan M.I.; Haleem A.; Khan S.	2022	Examining the link between Halal supply chain management and sustainability	29
14	Sumarliah E.; Li T.; Wang B.; Moosa A.; Sackey I.	2021	The impact of customer halal supply chain knowledge on customer halal fashion purchase intention	29
15	Karia N.	2022	Halal logistics: practices, integration and performance of logistics service providers	28
16	Fernando Y.; Wahyuni-TD I.S.; Zainul Abideen A.; Mergeresa F.	2023	Traceability technology, halal logistics brand and logistics performance: religious beliefs and beyond	28
17	Masudin I.; Fernanda F.W.; Widayat	2018	Halal logistics performance and customer loyalty: From the literature review to a conceptual framework	22
18	Hendayani R.; Fernando Y.	2023	Adoption of blockchain technology to improve Halal supply chain performance and competitiveness	22
19	Abdullah R.; Sabar R.; Mustafar M.	2018	Green Halal supply chain in Malaysian halal food companies: A conceptual framework	21
20	Noorliza K.	2020	Resource-capability of halal logistics services, its extent and impact on performance	20

An analysis of the 20 most cited articles in the field of halal supply chain integration reveals that the development of the halal supply chain (HSC) and halal logistics concepts has been significantly shaped by early conceptual literature reviews. The most cited article between 2015 and 2024 is by Ab Talib *et al.* (2015), which has garnered 127 citations. This study employs a systematic literature review approach to identify and synthesize critical success factors (CSFs) in the implementation of halal supply chains. By examining various prior studies, the article identifies key factors such as managerial commitment, Shariah compliance, government regulation, and consumer involvement. Its contribution is pivotal in providing a conceptual foundation for developing structured halal supply chain integration models, and it serves as a key reference linking the managerial, regulatory, and logistical aspects of halal systems.

In addition to Ab Talib *et al.* (2015), other influential works have contributed to the discourse by adopting more empirical and application-oriented approaches. For example, Zailani *et al.* (2017), with 107 citations, explicitly addresses the challenges and opportunities in halal logistics, including fragmented distribution systems, lack of infrastructure, and discrepancies in halal standards across countries. Fathi *et al.* (2016), cited 78 times, complements this perspective by exploring consumer motivation in paying a premium for halal logistics services highlighting the role of consumer perception and trust in creating added value within the halal supply chain integration process.

Furthermore, the trajectory of recent literature shows a growing interest in the development of integrative frameworks that connect halal supply chains, halal logistics, and sustainability. Studies by several researchers (Haleem *et al.*, 2021b; S. Khan *et al.*, 2020, 2021) utilize quantitative methods such as fuzzy Best-Worst Method (BWM) to identify risks and design decision-making-based integration frameworks. These studies illustrate that logistics is no longer perceived as a standalone component but rather a strategic enabler that ensures halal assurance throughout the supply chain.

Taken together, the collective insights derived from the most frequently cited articles in the domain of halal supply chain integration have established a robust and indispensable intellectual foundation that not only anchors the conceptual evolution of the field but also informs the practical implementation of halal logistics and supply chain systems. These seminal works, by interlinking theoretical constructs with empirical evidence, have played a transformative role in shaping scholarly discourse and operational strategies, thereby offering a comprehensive roadmap for future investigations. In doing so, they facilitate the design and development of halal supply chain frameworks that are increasingly resilient to disruption, rigorously compliant with Shariah principles, and deeply attuned to the evolving expectations of ethically conscious consumers in both domestic and international markets.

Based on author productivity in publications related to halal supply chain integration (see Table 3), the three most prolific authors Haleem, A., Khan, M.I., and Khan, S. each contributed 10 publications, representing approximately 6.25% of the total articles analyzed. These authors are prominently involved in studies focusing on managerial aspects, risk management, and sustainability within halal

supply chains and halal logistics. Their dominance reflects strong collaboration and a consistent research agenda aimed at developing integrative frameworks for halal supply chain systems, particularly from a technical and decision-making perspective, as evidenced by their frequent use of methodologies such as fuzzy logic, DEMATEL, and the Best-Worst Method (BWM).

Other authors who have made significant contributions, albeit with fewer publications, include Susanty, A. and Zailani, S., each with 4 articles (2.50%). Zailani, S. is especially recognized as an early pioneer in halal logistics research, notably in the Malaysian context, with a focus on operational issues and implementation challenges in halal logistics. Susanty, A., on the other hand, is active within the Indonesian research context, frequently addressing halal supply chain integration in relation to SMEs and the food industry. Their involvement indicates a broader geographical and thematic diversity in the literature, ranging from conceptual explorations to context-specific applications.

Table 3 Top 20 most productive authors.

No.	Author Name	Qty	Percentage
1	Haleem, A.	10	6.25%
2	Khan, M.I.	10	6.25%
3	Khan, S.	10	6.25%
4	Susanty, A.	4	2.50%
5	Zailani, S.	4	2.50%
6	Ab Talib, M.S.	3	1.88%
7	Iranmanesh, M.	3	1.88%
8	Jati, S.	3	1.88%
9	Mahidin, N.	3	1.88%
10	Puspitasari, N.B.	3	1.88%
11	Abdullah, R.	2	1.25%
12	Aziz, A.A.	2	1.25%
13	Deraman, N.	2	1.25%
14	Elias, E.M.	2	1.25%
15	Fernando, Y.	2	1.25%
16	Hamid, A.B.A.	2	1.25%
17	Jaafar, H.S.	2	1.25%
18	Kamarulzaman, N.H.	2	1.25%
19	Kanapathy, K.	2	1.25%
20	Kurniawati, D.A.	2	1.25%

In addition to these leading figures, several other authors including Ab Talib, M.S., Iranmanesh, M., and Fernando, Y. have contributed 2 to 3 articles each. Their works have played a pivotal role in establishing the theoretical foundations and bridging halal supply chain concepts with contemporary issues such as sustainability, consumer trust, and technological adoption. This pattern suggests that although a few authors dominate in terms of publication volume, the development of the halal supply chain integration literature is also enriched by a wide range of contributors who bring diverse perspectives and help expand the field's multidimensional scope.

Table 4 presents the contributions of different countries to the literature on halal supply chain integration. Malaysia emerged as the dominant contributor, accounting for approximately 44.30% of the total publications, followed by Indonesia (26.58%) and India (12.66%). This dominance

aligns with the productivity of key authors such as Haleem, A., Khan, M.I., and Zailani, S. from Malaysia, as well as Susanty, A. from Indonesia, all of whom have actively contributed to the development of research on halal supply chain and logistics integration.

Table 4 Country contribution to the development of Halal value chain publications.

Countries	Qty	Percentage
Malaysia	35	44.30%
Indonesia	21	26.58%
India	10	12.66%
Australia	3	3.80%
Brunei Darussalam	2	2.53%
Thailand	2	2.53%
China	1	1.27%
Germany	1	1.27%
Hungary	1	1.27%
Japan	1	1.27%
Oman	1	1.27%
South Korea	1	1.27%

Malaysia stands out for its contributions to strategic and conceptual research, often focusing on high-level

frameworks and policy implications within the halal ecosystem. In contrast, Indonesia's contributions are more contextual, emphasizing industry-specific applications and challenges, particularly in sectors such as SMEs and halal food production. India has made significant strides through a technical and analytical approach, reinforcing the importance of decision-making methodologies in enhancing halal systems.

Although contributions from other countries remain limited, they highlight a growing interest and potential for global collaboration, which could broaden the development and implementation of halal supply chain integration in the international market. This emerging diversity suggests a promising trajectory for more inclusive and cross-border research in the halal supply chain domain

4.4 Issues, Challenges, and Development Strategies

To gain a comprehensive understanding of the analyzed documents, Table 5 presents a summary that includes the authors, year of publication, source, topic, as well as the challenges and strategies identified in each study. Several articles do not explicitly mention challenges or strategies; therefore, these fields are left unchecked or unmarked.

Table 5 Topics, challenges, and strategies in the implementation of halal supply chain integration.

No.	Authors	Source title	Topic		chall	strat
			HSC	HL		
1	(Hanifasari <i>et al.</i> , 2024)	Journal of Islamic Marketing	√		√	
2	(Ardiantono <i>et al.</i> , 2024)	Journal of Islamic Marketing	√		√	√
3	(Kurniawan <i>et al.</i> , 2024)	International Journal of Computing and Digital Systems	√		√	√
4	(Hasnan <i>et al.</i> , 2024)	Paper Asia	√		√	√
5	(Harwati <i>et al.</i> , 2024)	Journal of Islamic Marketing	√		√	√
6	(Khan <i>et al.</i> , 2024)	Arab Gulf Journal of Scientific Research	√		√	√
7	(Nazaruddin <i>et al.</i> , 2024)	Journal of Islamic Marketing	√		√	√
8	(Rajendran <i>et al.</i> , 2024)	Journal of Islamic Marketing	√			√
9	(Fernando <i>et al.</i> , 2023)	Journal of Islamic Marketing		√	√	√
10	(Hendayani & Fernando, 2023)	Journal of Islamic Marketing	√			√
11	(Rusydiana <i>et al.</i> , 2023)	Journal of Islamic Marketing	√			√
12	(Suseno <i>et al.</i> , 2023)	Uncertain Supply Chain Management	√		√	
13	(Kurniawati & Cakravastia, 2023)	Cleaner Logistics and Supply Chain	√		√	√
14	(Kristanto & Kurniawati, 2023)	Journal of Islamic Marketing	√		√	√
15	(Rahman <i>et al.</i> , 2023)	International Journal of Logistics Research and Applications		√	√	√
16	(Susanty <i>et al.</i> , 2023)	Journal of Islamic Marketing		√	√	√
17	(Khan <i>et al.</i> , 2023a)	Arab Gulf Journal of Scientific Research	√			
18	(Khan <i>et al.</i> , 2023)	Journal of Global Operations and Strategic Sourcing		√	√	√
19	(Lestari <i>et al.</i> , 2023)	International Journal of Public Sector Performance Management	√		√	√
20	(Khan <i>et al.</i> , 2022)	Journal of Islamic Marketing	√		√	√
21	(Selim <i>et al.</i> , 2022)	Journal of Islamic Marketing		√	√	√
22	(Khan, 2022a)	International Journal of Productivity and Performance Management	√		√	√
23	(Karia, 2022)	Journal of Islamic Marketing		√	√	√
24	(Susanty <i>et al.</i> , 2022)	Journal of Islamic Marketing		√	√	√
25	(Hidayat & Musari, 2022)	International Journal of Asian Business and Information Management		√	√	√
26	(Ziegler <i>et al.</i> , 2022)	Business Process Management Journal		√	√	√

Table 5 Topics, challenges, and strategies in the implementation of halal supply chain integration. (cont'd)

No.	Authors	Source title	Topic		chall	strat
			HSC	HL		
27	(Ruangsriroj & Suvittawat, 2022)	Asian Journal of Business Research		√		√
28	(Khan <i>et al.</i> , 2021)	Journal of Modelling in Management	√			
29	(Haleem <i>et al.</i> , 2021a)	Journal of Islamic Marketing	√			√
30	(Sumarliah <i>et al.</i> , 2021)	Information Resources Management Journal	√		√	√
31	(Ag Majid <i>et al.</i> , 2021)	British Food Journal		√	√	√
32	(Haleem <i>et al.</i> , 2021b)	Logistics		√	√	√
33	(Ab Talib <i>et al.</i> , 2021)	Operations and Supply Chain Management		√	√	
34	(Ruangsriroj & Suvittawat, 2021)	Acta Logistica		√		
35	(Khan <i>et al.</i> , 2020)	Supply Chain Forum	√		√	√
36	(Mohamed <i>et al.</i> , 2020)	Journal of Islamic Marketing	√		√	√
37	(Noorliza, 2020)	Journal of Islamic Marketing		√		
38	(Susanty <i>et al.</i> , 2022)	Journal of Islamic Marketing		√	√	√
39	(Ab Talib, 2020)	Journal of Islamic Marketing		√	√	√
40	(Zainuddin <i>et al.</i> , 2020)	International Journal of Supply Chain Management	√		√	√
41	(Yunan <i>et al.</i> , 2020)	Institutions and Economics		√	√	√
42	(Sutawidjaya & Nawangsari, 2020)	International Journal of Supply Chain Management	√		√	√
43	(Zainuddin <i>et al.</i> , 2019)	International Journal of Supply Chain Management	√		√	√
44	(Supian <i>et al.</i> , 2019)	International Journal of Supply Chain Management	√			√
45	(M. E. Elias <i>et al.</i> , 2019)	International Journal of Supply Chain Management		√	√	√
46	(Mahidin <i>et al.</i> , 2019a)	International Journal of Supply Chain Management		√	√	√
47	(Omar <i>et al.</i> , 2019)	International Journal of Supply Chain Management	√		√	√
48	(Lee <i>et al.</i> , 2019)	Journal of Korea Trade	√		√	√
49	(Razimi <i>et al.</i> , 2019)	International Journal of Supply Chain Management	√		√	√
50	(Khan <i>et al.</i> , 2018)	Supply Chain Forum	√		√	√
51	(Zailani <i>et al.</i> , 2018)	British Food Journal		√	√	
52	(Masudin & Fernanda, 2018)	International Journal of Technology		√	√	√
53	(Abdullah <i>et al.</i> , 2018)	International Journal of Supply Chain Management	√		√	√
54	(Faradina <i>et al.</i> , 2018)	International Journal of Supply Chain Management		√	√	√
55	(Lestari <i>et al.</i> , 2018)	Journal for Global Business Advancement		√		
56	(Lestari <i>et al.</i> , 2018)	International Journal of Supply Chain Management		√	√	√
57	(Zailani <i>et al.</i> , 2017)	Journal of Islamic Marketing		√	√	√
58	(Elias <i>et al.</i> , 2017)	International Journal of Supply Chain Management	√		√	√
59	(Husny <i>et al.</i> , 2017)	International Journal of Supply Chain Management		√	√	√
60	(Hanifah <i>et al.</i> , 2017)	Pertanika Journal of Social Sciences and Humanities		√	√	√
61	(Sirajuddin <i>et al.</i> , 2017)	Pertanika Journal of Social Sciences and Humanities	√		√	
62	(Fathi <i>et al.</i> , 2016)	British Food Journal		√	√	√
63	(Aigbogun <i>et al.</i> , 2016)	International Review of Management and Marketing	√		√	√
64	(Roslan <i>et al.</i> , 2016)	International Journal of Supply Chain Management		√	√	√
65	(Saleh <i>et al.</i> , 2016)	International Business Management	√		√	√

Table 5 Topics, challenges, and strategies in the implementation of halal supply chain integration. (cont'd)

No.	Authors	Source title	Topic		chall	strat
			HSC	HL		
60	(Hanifah <i>et al.</i> , 2017)	Pertanika Journal of Social Sciences and Humanities		√	√	√
61	(Sirajuddin <i>et al.</i> , 2017)	Pertanika Journal of Social Sciences and Humanities	√		√	
62	(Fathi <i>et al.</i> , 2016)	British Food Journal		√	√	√
63	(Aigbogun <i>et al.</i> , 2016)	International Review of Management and Marketing	√		√	√
64	(Roslan <i>et al.</i> , 2016)	International Journal of Supply Chain Management		√	√	√
65	(Saleh <i>et al.</i> , 2016)	International Business Management	√		√	√
66	(Ab Talib <i>et al.</i> , 2015)	Journal of Islamic Marketing	√		√	√
67	(Talib <i>et al.</i> , 2015)	International Journal of Logistics Systems and Management		√	√	√

Where: HSC=halal supply chain, HL=halal logistic, chall=challenge, strat=strategy

4.5. Dynamics of Issues in Halal Supply Chain Integration (HSCI)

The progression and transformation of scholarly discussions related to HSCI over time can be systematically classified into three distinct yet interrelated phases, with each phase representing a significant shift in thematic emphasis, research priorities, and methodological approaches within the broader academic discourse, thereby illustrating the dynamic and evolving nature of HSCI as a multidisciplinary field of inquiry.

Phase 1 (2015–2017): Foundational Understanding and Early Challenges. Early studies centered on conceptual clarity and the initial implementation barriers of halal supply chain management (HSCM). Ab Talib *et al.* (2015) emphasized the need to strengthen HSCM practices within the catering industry, while Elias *et al.* (2017) illustrated challenges in halal assurance in the agricultural sector using apples as a case example. Other key contributions during this period highlighted the importance of halal integrity (Mohd Sirajuddin *et al.*, 2017) and performance measurement of halal supply chains (Husny *et al.*, 2017), laying the groundwork for future development of HSCI frameworks.

Phase 2 (2018–2020): Risk, Consumer Behavior, and Technological Adoption. From 2018 onwards, studies began to explore risk management within halal supply chains (Faradina *et al.*, 2018; Yunan *et al.*, 2020) and shifts in consumer behavior, especially during the COVID-19 pandemic (Masudin *et al.*, 2018). Halal integrity continued to be a prominent theme (Khan *et al.*, 2020; Supian *et al.*, 2019), along with the growing importance of halal logistics implementation in countries like Indonesia (Susanty *et al.*, 2020). Technology emerged as a key enabler, seen in the development of halal logistics performance systems (Zainuddin *et al.*, 2020) and insights into global halal logistics challenges (Sutawidjaya & Nawangsari, 2020).

Phase 3 (2021–2024): Sustainability, Innovation, and Sector Expansion. Recent years (2021–2024) have witnessed heightened attention on technological innovation and sustainability. Ruangsriroj & Suvittawat (2021) emphasized the role of halal awareness among millennials in driving HSCI adoption. Emerging technologies such as blockchain (Khan *et al.*, 2023), halal traceability systems (Rahman *et al.*, 2023), and green halal supply chain models (Lestari *et al.*, 2023) are gaining traction in the literature. The scope of HSCI research has expanded into non-food sectors including halal fashion (Kristanto & Kurniawati, 2023) and halal

tourism (Selim *et al.*, 2022), reflecting diversification beyond traditional domains such as food and pharmaceuticals.

Recent studies such as Hanifasari *et al.* (2024) explored critical success factors (CSFs) for successful integration, while Nazaruddin *et al.* (2024) and Harwati *et al.* (2024) revisited risk management, now seen as increasingly complex due to globalization and cross-border regulatory pressures. Rajendran *et al.* (2024) mapped out the scope of HSCM, highlighting the need for harmonization in terminology and practices at the international level. Furthermore, Ardiantono *et al.* (2024) pointed to the low adoption rate of halal logistics in certain regions, reinforcing findings from Suseno *et al.* (2023) on institutional, cultural, and regulatory barriers that continue to hinder full HSCI implementation. These findings affirm that halal supply chain integration should not be perceived merely as a logistical process. Rather, it is a multi-dimensional system encompassing cultural, religious, economic, and technological aspects. An interdisciplinary approach is imperative to support the effective and holistic implementation of HSCI.

4.6. Challenges and Strategies in Implementing the Halal Supply Chain (HSC)

Through an extensive review of academic literature focusing on the dynamics of HSC practices within the observed period, it has been identified that the implementation of HSC is encumbered by a spectrum of challenges encompassing structural inefficiencies, technical constraints, and cultural complexities, all of which are further exacerbated by disjointed coordination among stakeholders and inadequate infrastructural support. Nonetheless, scholarly contributions have proposed a variety of strategic responses designed to mitigate these impediments, ranging from fostering institutional synergy and enhancing human capital capabilities, to embracing technological innovation aimed at safeguarding the integrity and efficiency of halal supply chain systems

- Ambiguity of Halal Standards and Regulations
A key challenge in HSC implementation lies in the lack of clarity and consistency in international halal standards. Ardiantono *et al.* (2024) noted that the ambiguity of halal guidelines, minimal inter-agency collaboration (e.g., JAKIM, HDC, and LSP), and the absence of a unified global halal certification scheme hinder global supply chain alignment. The suggested

strategy involves establishing effective collaboration among halal authorities to develop globally recognized standards that ensure product integrity.

- Lack of Understanding and Competency Among Supply Chain Actors

Several studies have highlighted the insufficient understanding of HSC concepts among supply chain stakeholders. Hasnan *et al.* (2024) emphasized the importance of educating both consumers and business actors on halal logistics values. Khan *et al.* (2022) revealed that many firms underestimate the critical role of human resource competencies in maintaining product halalness. Proposed solutions include training programs, human capital development, and organizational adjustments aligned with halal principles (K. Khan *et al.*, 2022; Suseno *et al.*, 2023).

- Operational Risks and Management Complexity

Risk dimensions within HSC management are another area of concern (Beigi *et al.*, 2024). Harwati *et al.*, (2024) and (Haleem *et al.*, 2021a) identified critical risks stemming from production planning, IT systems, and distribution networks. To mitigate these risks, companies are encouraged to implement halal traceability systems and develop proactive risk management models.

- Supply Chain Misalignment and Supplier Relationships

Sumarlia *et al.* (2021) underscored limited oversight and misalignment between suppliers and manufacturers as key impediments to halal integration. Addressing this issue requires the adoption of effective halal logistics (HL) practices and enhanced information integration across supply chain actors.

- Vulnerability of Halal Integrity

Studies have consistently shown that halal integrity is prone to disruption due to operational complexity and raw material adulteration (Supian *et al.*, 2019; Zainuddin *et al.*, 2019). Recommended strategies include strengthening verification systems, utilizing halal cold chains, and intensifying R&D efforts to preserve product authenticity.

- Supply Disparities and Dependence on Non-Muslim Countries

Razimi *et al.* (2019) reported that a large share of the global halal food market is supplied by non-Muslim countries, raising concerns about halal assurance. To address this, increasing awareness and understanding of HSC principles among both consumers and industry players is crucial.

- Cost Barriers and Limited Government Support

High implementation costs and insufficient government backing are recurring challenges (Omar *et al.*, 2019; Saleh *et al.*, 2016). Strengthening vertical and horizontal collaboration within the supply chain, along with supportive public policy, are among the proposed strategies to build a resilient halal ecosystem.

- Lack of Innovation and Technology Adoption

Khan *et al.* (2018) and Sutawidjaya & Nawangsari (2020) highlighted the low levels of innovation in halal logistics services. Digital transformation, including the use of halal tracking systems, should be embraced to enhance HSC efficiency and integrity.

4.7. Challenges and Strategies in Halal Logistics

In a parallel development to the broader halal supply chain discourse, the implementation of halal logistics has also been found to face a diverse range of obstacles that span regulatory, operational, infrastructural, and socio-cultural dimensions. These multifaceted challenges, as revealed through a synthesis of current scholarly findings, can be systematically categorized into several thematic clusters to facilitate a more structured understanding of the issues involved and to highlight the corresponding strategic responses that have been proposed in the literature, as detailed in the following sections:

- Infrastructure, Standards, and Certification Gaps

One of the primary challenges in halal logistics implementation is the lack of adequate infrastructure and harmonized international standards (Hidayat & Musari, 2022; Lestari *et al.* 2018). Many countries also lack halal certification bodies and skilled professionals in this domain (Fathi *et al.*, 2016; Mahidin *et al.*, 2019b). Recommended solutions include strengthening national and international certification frameworks, developing human capacity through halal logistics training, and creating sector-wide technical guidelines. Lestari *et al.* (2018) also emphasized measuring halal logistics performance using indicators such as Halal Supply Chain Responsiveness (HSCRES) to improve accountability and effectiveness.

- Operational Complexity and Contamination Risks

Contamination risks between halal and non-halal products are a significant concern, particularly during storage, packaging, and distribution (Roslan *et al.*, 2016; Yunan *et al.*, 2020). This risk is heightened for sensitive products like meat and beverages requiring specialized handling (M. E. Elias *et al.*, 2019; A. Khan *et al.*, 2023). Strategies include rigorous certification oversight, applying the Islamic principle of *maslahah* to prevent contamination, and developing logistics systems tailored to specific product characteristics. A combination of technical and normative approaches is seen as critical to maintaining halal integrity end-to-end.

- Low Market Demand and Consumer Awareness

Limited consumer awareness especially among SMEs regarding halal logistics remains a barrier to adoption. Many businesses still perceive Halal Logistics Service Providers (HLSPs) as cost burdens rather than value-adding entities (Ab Talib, 2020; Mahidin *et al.*, 2019b). Solutions include consumer education, promoting halal logistics as a driver of product safety and quality, and enhancing the global market competitiveness of HLSPs. Expanding halal export markets can also incentivize businesses to adopt halal logistics principles (Haleem *et al.*, 2021a; Rahman *et al.*, 2023).

- Implementation Costs and Operational Efficiency

Halal logistics is often associated with high costs and operational inefficiencies due to the need for segregation and extensive documentation (Ab Talib, 2020; M. E. Elias *et al.*, 2019). This is compounded by limited managerial understanding of long-term benefits. To address this, strategies such as adopting blockchain technology for cost efficiency and transparency, cross-sector collaboration to share

infrastructure, and streamlining halal logistics processes from upstream to downstream have been proposed (Susanty *et al.*, 2022).

- Regulatory Limitations and Government Involvement
The absence of comprehensive regulations for halal logistics leads to implementation confusion and slow industry adoption (Ruangsriroj & Suvittawat, 2022; Selim *et al.*, 2022). Active government intervention is required through supportive national policies, human resource training, and regulatory harmonization to facilitate cross-border halal trade. Moreover, synergy between government bodies, industry players, and academia is essential to build a sustainable halal logistics ecosystem.
- Technological Gaps and Information Systems
The adoption of advanced technologies such as traceability systems, RFID, and blockchain in halal logistics remains limited due to cost concerns and low digital literacy (M. E. Elias *et al.*, 2019; Rahman *et al.*, 2023). Strategies include developing affordable halal digital systems, leveraging performance indicators like specific assets, quality assurance, and trusted commitment (Ab Talib *et al.*, 2016), and establishing halal logistics innovation hubs to drive localized technological solutions.
- Socio-Cultural Dimensions in Multicultural Societies
In multicultural settings, halal values are not always prioritized, creating cultural resistance and varying interpretations (Fernando *et al.*, 2023; Haleem *et al.*, 2021a). Adaptive approaches to cultural diversity are essential, including inclusive marketing strategies that emphasize quality, safety, and sustainability. In addition, systematic methods such as the Best Worst Method (BWM) can help identify context-specific barriers and support the development of socially relevant policies.

5 CONCLUSION, IMPLICATION, RECOMMENDATION, AND FUTURE RESEARCH

5.1 Conclusion

This study reveals that the implementation of halal supply chain integration faces a variety of complex challenges, ranging from conceptual, technical, and operational to cultural dimensions. At the general level of the halal supply chain, the main challenges include weak collaboration among supply chain actors, lack of integrated information systems, limited regulatory support, and internal resistance to halal transformation. Meanwhile, in halal logistics operations, the primary barriers involve insufficient infrastructure and halal standards, contamination risks, low market demand, high implementation costs, and technological limitations.

Nonetheless, various strategies have been identified to address these challenges. These include strengthening cross-stakeholder coordination, developing halal assessment frameworks, adopting modern technologies (such as blockchain and traceability systems), and integrating sharia values into logistics practices. The findings underscore the importance of a holistic and collaborative approach in

realizing an effective, efficient, and sustainable halal supply chain integration.

5.2 Implications

Theoretically, this study contributes to the development of halal supply chain integration models by emphasizing the alignment between strategic elements, operational processes, and sharia-based values. The multi-dimensional approach used to analyze the challenges and strategies offers new insights to enrich the literature in the field of Islamic supply chain management, particularly in the context of developing countries and multicultural societies.

From a managerial perspective, the findings encourage firms not only to comply with halal standards administratively but also to internalize halal principles in decision-making processes, risk management, human resource development, and technology utilization. Halal logistics should be viewed not as a cost burden, but as a differentiation strategy and a value proposition for both Muslim and non-Muslim consumers who are increasingly concerned with product quality and ethical standards.

5.3 Recommendations

Based on the findings and discussion, it is recommended that industry players, government institutions, and halal certification bodies enhance collaboration in designing policies, infrastructure, and halal logistics systems that are integrated and responsive to technological advancements and global market dynamics. Strengthening human capital through specialized training, improving halal literacy, and establishing halal logistics competency certifications should be prioritized to overcome implementation barriers. Additionally, investment in tracking technologies and supply chain transparency is essential to ensure halal integrity from upstream to downstream. A value-driven managerial approach based on sharia principles must also be consistently embedded in all supply chain activities to increase consumer trust and enhance the global competitiveness of the halal industry.

5.4 Future Research

Future research is encouraged to explore halal supply chain integration using quantitative and longitudinal approaches to assess the effectiveness of the strategies identified in overcoming implementation challenges at both operational and strategic levels. Expanding the geographical and industrial scope such as non-food industries and services can provide a more comprehensive understanding of halal logistics dynamics across different regions and business cultures. Furthermore, consumer involvement in the halal supply chain remains underexplored; hence, future studies should integrate consumer perspectives to design more responsive, sustainable, and market-oriented halal logistics systems.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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