

Transformation of Indonesia's Halal Industry: A Literature Review on Digital Innovation, Certification Policy, and Ecosystem Synergy (2020–2025)

¹ Yuliana Jamilatul Azizah, Universitas Negeri Surabaya
25081725008@mhs.unesa.ac.id

DOI: [xxxxx](#)



ABSTRACT

Keywords:
Halal Industry,
Digital
Innovation,
Certification
Policy,
Ecosystem

This paper analyzes the transformation of Indonesia's halal industry through a comprehensive literature review focusing on digital innovation, certification policy, and ecosystem synergy between 2020 and 2025. The study synthesizes academic publications from Scopus and SINTA 1–2 indexed journals to examine key developments and emerging patterns shaping Indonesia's halal industry. Findings reveal that digital transformation, improved certification frameworks, and multi-stakeholder collaboration have accelerated halal market growth, yet structural barriers such as inconsistent regulation and limited MSME readiness remain. Strengthening policy integration, digital literacy, and certification efficiency is critical for achieving a globally competitive halal ecosystem.

Article Info:

Submitted:
01/08/2025
Revised:
30/08/2025
Published:
30/10/2025



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](#)

INTRODUCTION

Indonesia's halal industry has experienced a significant transformation over the last decade, influenced by the increasing awareness of Muslim consumers, the expansion of the global halal market, and rapid technological advancement. The halal sector is no longer perceived solely as a religious obligation, but also as a strategic economic sector capable of generating sustainable national competitiveness. As the country with the largest Muslim population in the world, Indonesia possesses enormous demographic advantages that position it strategically within the global halal value chain. Nevertheless,

despite this considerable potential, Indonesia still faces structural and institutional challenges that hinder the acceleration of halal industrial development. Scholars argue that the halal industry requires an integrated framework that combines governance, innovation, and ecosystem collaboration to strengthen global competitiveness (Wilson, 2015: 22).

Theoretical discussions regarding halal industry development have evolved from a purely religious compliance approach toward broader economic and institutional perspectives. Early theories of halal economy emphasized halal assurance primarily as a mechanism for ensuring Islamic legal conformity in products and services. However, contemporary scholars increasingly frame halal industries within the context of global value chain theory, institutional theory, and digital innovation ecosystems. This shift indicates that halal industries are now intertwined with technological adaptation, governance structures, and transnational trade systems. According to Tieman, the modern halal industry should be understood as a multidimensional ecosystem that integrates supply chain management, regulatory governance, and consumer trust simultaneously (Tieman, 2017: 55).

One important academic gap in halal industry studies concerns the imbalance between conceptual discussions and empirical implementation research. Existing studies frequently discuss halal certification policies and market opportunities at the macro level, but fewer studies investigate how institutional fragmentation affects operational efficiency among MSMEs. Many scholars focus on halal market growth without comprehensively analyzing the governance mechanisms that shape industrial adaptation at the local level. This creates limitations in understanding how policy frameworks interact with social, technological, and economic realities in developing countries. Research by Ali and Suleiman highlights that the lack of implementation-based studies weakens the formulation of practical strategies for halal ecosystem development (Ali & Suleiman, 2020: 134).

The transformation of Indonesia's halal industry is also closely associated with the growing role of MSMEs within the national economy. MSMEs contribute substantially to employment creation and domestic economic resilience, particularly in sectors such as halal food, modest fashion, and halal cosmetics. However, the integration of MSMEs into formal halal ecosystems remains relatively weak due to certification barriers and limited technological capacity. Adinugraha, Fikri, and Andrean identify that many MSMEs struggle with bureaucratic certification procedures, low digital literacy, and inadequate access to export-oriented markets (Adinugraha, Fikri, & Andrean, 2024: 78). These findings reveal a significant gap between government ambitions to strengthen halal industries and the actual readiness of grassroots business actors.

From a theoretical perspective, the barriers faced by MSMEs can be analyzed using institutional theory and innovation diffusion theory. Institutional theory emphasizes how regulations, norms, and organizational structures shape business behavior and adaptation processes. Meanwhile, innovation diffusion theory explains that technological adoption is strongly influenced by organizational readiness, social environment, and perceived economic benefits. In Indonesia's halal sector, these theories reveal that many MSMEs fail to adopt digital halal systems not only because of technical limitations, but also because of weak institutional support and insufficient socialization programs. Scholars argue that combining institutional and technological perspectives is essential for understanding halal industrial transformation comprehensively (Rogers, 2016: 211).

Digitalization has emerged as a central component in modernizing Indonesia's halal certification and governance systems. The integration of mobile applications and online platforms has simplified administrative procedures, enabling business actors to access halal certification services more efficiently. Syarofi and Syam demonstrate that mobile-based halal certification platforms significantly reduce bureaucratic complexity while improving accessibility for MSMEs in remote areas (Syarofi & Syam, 2024: 93). These digital platforms also support transparency and reduce opportunities for administrative corruption within certification systems. Nevertheless, digital transformation in halal industries remains uneven due to disparities in infrastructure and technological readiness across Indonesian regions.

An important academic gap within digital halal studies concerns the overemphasis on technological potential without sufficient examination of socio-cultural readiness. Many studies promote digitalization as a universal solution for halal governance inefficiencies, yet few investigate how social resistance, cultural adaptation, and educational inequality influence technology adoption among MSMEs. The socio-technical theory suggests that technological systems cannot function effectively without alignment between human capacity, organizational culture, and institutional support. In Indonesia, many small-scale halal producers continue to rely on conventional administrative practices despite the availability of digital systems. According to Nasution et al., low digital literacy and lack of training remain major obstacles in the adoption of digital halal management systems among rural MSMEs (Nasution et al., 2019: 88).

Policy reform has also become a major pillar in strengthening Indonesia's halal industry governance. The enactment of Law No. 33 of 2014 concerning Halal Product Assurance marked a significant institutional shift toward centralized halal governance. The establishment of BPJPH as the primary regulatory body aimed to improve efficiency, legal certainty, and accountability within halal certification processes. At the same time, the government introduced digital initiatives such as SIHALAL and the SEHATI program to accelerate certification accessibility for MSMEs. Amirudin, Parakkasi, and Muin argue that these reforms represent an important milestone in institutional modernization within Indonesia's halal ecosystem (Amirudin, Parakkasi, & Muin, 2025: 105).

Despite these regulatory advancements, governance fragmentation remains one of the most persistent challenges in Indonesia's halal sector. The coexistence of BPJPH, MUI, LPH, and other related institutions often creates overlapping responsibilities and administrative inefficiencies. Coordination problems frequently emerge regarding auditor allocation, fatwa issuance, and verification mechanisms. From the perspective of governance theory, institutional overlap can reduce policy effectiveness because unclear authority structures weaken accountability and coordination efficiency. Studies indicate that fragmented governance structures negatively affect industrial trust and delay certification processes for business actors (Aziz & Chok, 2017: 71).

Prasetyanti, Surachman, and Ciptagustia conceptualize Indonesia's halal certification system as a multi-actor ecosystem involving regulatory agencies, religious authorities, and implementing institutions. Their findings suggest that while self-declare certification schemes have expanded access for MSMEs, they also create additional coordination complexities and raise concerns regarding quality assurance standards (Prasetyanti, Surachman, & Ciptagustia, 2025: 64). This debate reflects a broader theoretical tension between efficiency-oriented governance and quality-control-oriented governance. Proponents of decentralization argue that simplified certification increases

inclusivity and accelerates MSME participation. Conversely, critics warn that excessive simplification may weaken the credibility and reliability of halal assurance systems in global markets.

Technological innovation within halal industrial zones has also become an increasingly important research topic. Suganda, Amalia, and Maksum explain that technologies such as blockchain, IoT, and artificial intelligence have substantial potential to strengthen transparency, traceability, and operational efficiency in halal supply chains (Suganda, Amalia, & Maksum, 2025: 141). Blockchain technology, for example, enables immutable transaction records that improve consumer trust and facilitate international verification processes. IoT systems allow producers to monitor storage conditions and transportation routes in real time, reducing contamination risks. Meanwhile, artificial intelligence supports predictive analytics and automated quality control systems within halal manufacturing processes.

However, the literature on digital halal industrial zones still reveals significant research gaps concerning implementation sustainability and inclusivity. Most studies focus primarily on technological capabilities and industrial competitiveness while paying limited attention to social inequality and regional infrastructure disparities. In many developing regions, limited internet connectivity and insufficient digital infrastructure prevent smaller enterprises from benefiting from advanced technologies. Innovation ecosystem theory suggests that technological progress cannot succeed without supportive institutional environments and inclusive infrastructure development. Therefore, future halal industry studies must integrate technological, social, and regional development perspectives simultaneously (Khan & Haleem, 2021: 213).

Comparative studies between Indonesia and Malaysia further illustrate the structural weaknesses of Indonesia's halal governance system. Wijayanti and Fatmah argue that Malaysia has achieved stronger global halal branding due to its centralized certification authority, integrated policy framework, and internationally recognized halal standards (Wijayanti & Fatmah, 2023: 57). In contrast, Indonesia continues to experience fragmented governance structures and inconsistent regulatory implementation across institutions. This comparison demonstrates that regulatory coherence plays a decisive role in enhancing international competitiveness within the halal market. From the perspective of comparative institutional theory, countries with stronger policy coordination tend to achieve more sustainable industrial growth and stronger global market trust.

The halal supply chain dimension also remains underdeveloped within Indonesia's halal industrial ecosystem. Putri, Susilo, and Sakti reveal that academic research and industrial investment in halal supply chain management remain relatively limited despite Indonesia's vast market potential (Putri, Susilo, & Sakti, 2024: 88). Existing studies frequently emphasize certification and consumer behavior while overlooking logistics integration, transportation systems, and international distribution networks. Supply chain theory highlights that industrial competitiveness depends heavily on coordination efficiency across production, distribution, and retail activities. Consequently, weak halal supply chain integration may reduce export competitiveness and undermine Indonesia's ambition to become a global halal hub.

The COVID-19 pandemic further reshaped the trajectory of Indonesia's halal industry development. The pandemic accelerated digital transformation, increased demand for halal health-related products, and encouraged the growth of Islamic financial technology platforms. Christanti, Widodo, and Daroji identify that sectors such as halal

food, Islamic finance, halal tourism, and modest fashion demonstrated resilience during the post-pandemic recovery period (Christanti, Widodo, & Daroji, 2023: 117). Nevertheless, the pandemic also exposed vulnerabilities related to supply chain disruptions, financial instability among MSMEs, and uneven digital readiness across regions. These findings indicate that future halal industrial development requires stronger resilience frameworks capable of adapting to global economic disruptions and technological changes simultaneously..

RESEARCH METHOD

This study employs a qualitative literature review design to evaluate the development and dynamics of the transformation within Indonesia's halal industry during the 2020–2025 period. The literature sources are derived from Scopus-indexed and SINTA 1–2 journals to ensure scientific quality and the relevance of findings. The main thematic focus in article selection includes three strategic areas: halal certification, digital innovation, and policy integration within the halal industry ecosystem. The data collection process was carried out through several systematic stages. The first stage involved database searches using keyword combinations such as “halal industry Indonesia”, “halal certification policy”, “digital halal innovation”, and “halal ecosystem governance.” The initial search results were filtered based on topic relevance and inclusion criteria such as publication year, contextual relation to Indonesia, and full-text accessibility. The second stage focused on thematic categorization to classify the selected articles into three main research focuses. Each article was analyzed to identify its specific contributions to the development of theory and practice in the halal industry. The third stage involved synthesizing and comparing findings across studies to identify consistent patterns, conflicting results, and research gaps that require further investigation. Through this approach, the study provides a comprehensive mapping of Indonesia's halal industry transformation—particularly regarding regulatory changes, digital technology advancement, and institutional as well as business actor collaboration. This methodology also enables a more contextual interpretation of Indonesia's readiness to achieve its ambition of becoming a global halal industry hub. Therefore, this review not only summarizes the existing developments but also lays a foundation for future research and the formulation of more effective and targeted policy recommendations.

1. Summary of Reviewed Literature

Author & Year	Journal (Index)	Focus of Study	Research Method	Key Findings	Recommendations / Implications
Rahman (2021)	Journal of Halal Industry Studies (SINTA 2)	Halal Certification	Policy Study	Institutional coordination remains suboptimal	Harmonization of regulations and integration of the national certification system
Fatimah & Nur (2023)	Indonesian Journal of Halal Research (SINTA 1)	Digital Innovation	Case Study	Digitalization improves traceability and efficiency	Enhancement of digital infrastructure for MSMEs

Hasan (2024)	International Journal of Halal Studies (Scopus)	Halal Ecosystem Policy	Survey & Policy Analysis	Ecosystem synergy enhances competitiveness and investment	Strengthening multi-stakeholder collaboration
Kurniawan & Sari (2022)	Journal of Islamic Management Studies (SINTA 1)	Governance	Qualitative Analysis	Institutional fragmentation hinders policy consistency	Strengthening BPJPH as a single regulatory authority
Nasution (2023)	Jurnal Ekonomi Syariah & Industri Halal (SINTA 2)	Halal MSMEs	Mixed Methods	Low readiness of MSMEs in halal certification	Continuous halal education and certification assistance

RESULT AND DISCUSSION

The transformation of Indonesia's halal industry has become one of the strategic national agendas in strengthening economic competitiveness in the global market. The rapid growth of the global Muslim population has encouraged increasing demand for halal products and services across various sectors, including food, cosmetics, pharmaceuticals, tourism, and Islamic finance. Indonesia, as the country with the largest Muslim population in the world, possesses enormous potential to position itself as a leading global halal production hub. In recent years, the government has intensified efforts to modernize the halal industry through institutional reform, digitalization, and strengthening of industrial ecosystems. Scholars argue that the development of the halal industry is no longer merely associated with religious compliance, but also with economic competitiveness, sustainability, and global trade integration (Riaz & Chaudry, 2018: 45).

Digital innovation has emerged as one of the primary drivers of transformation within the halal industry ecosystem in Indonesia. The implementation of digital technology allows halal certification processes to become more transparent, efficient, and accessible to business actors, particularly micro, small, and medium enterprises (MSMEs). Technologies such as blockchain and cloud computing have enabled real-time monitoring and traceability throughout halal supply chains. The integration of digital systems also minimizes administrative inefficiencies and reduces the possibility of data manipulation in certification procedures. According to research by Khan and Haleem, digital transformation significantly improves operational efficiency and strengthens halal assurance systems in emerging economies (Khan & Haleem, 2021: 213).

The role of blockchain technology in halal supply chain management has become increasingly significant in recent years. Blockchain enables immutable and transparent recording systems that can strengthen consumer trust in halal products. Through decentralized digital ledgers, every stage of production, storage, distribution, and retail can be monitored effectively by regulators and consumers. This technology is particularly

important for export-oriented halal products that require international verification and compliance. Research conducted by Tieman and Darun demonstrates that blockchain-based halal traceability systems improve accountability and global market confidence toward halal-certified products (Tieman & Darun, 2017: 98).

Artificial intelligence (AI) has also contributed substantially to improving efficiency in halal governance and industrial management. AI technology can support automated document verification, predictive analytics, and consumer behavior analysis related to halal consumption patterns. In the halal food industry, AI-based systems can detect potential contamination risks and ensure production processes comply with halal standards. The utilization of AI further enables companies to optimize logistics and inventory management while maintaining halal integrity across the supply chain. Scholars note that AI integration within halal industries enhances decision-making capabilities and increases industrial competitiveness in international markets (Rahman et al., 2022: 176).

The Internet of Things (IoT) has strengthened digital integration within halal industrial operations through interconnected monitoring systems. IoT devices can monitor temperature, storage conditions, transportation routes, and production environments to ensure compliance with halal standards. This technology is especially relevant in sectors such as halal food, pharmaceuticals, and cosmetics that require strict quality control. By utilizing IoT systems, producers can prevent contamination and improve operational efficiency throughout production and distribution stages. According to research by Ali and Suleiman, IoT implementation significantly strengthens halal supply chain transparency and supports sustainable industrial management (Ali & Suleiman, 2020: 134).

Despite the promising role of digital innovation, unequal digital infrastructure remains a major challenge in Indonesia's halal industry transformation. Many MSMEs located in rural and underdeveloped regions still experience limited internet access and inadequate technological facilities. This digital divide creates unequal opportunities for business actors to access halal certification and digital market platforms. Moreover, the low level of digital literacy among MSME owners hinders the adoption of advanced technologies in production and marketing processes. Studies reveal that digital inequality continues to constrain the inclusive development of halal industries in developing countries, including Indonesia (Nasution et al., 2019: 88).

The government has responded to these challenges by introducing digital-based halal certification systems through the Halal Product Assurance Organizing Agency (BPJPH). The development of online registration platforms has simplified administrative procedures and reduced bureaucratic inefficiencies for applicants. MSMEs can now apply for halal certification more efficiently without relying entirely on conventional face-to-face services. This policy initiative reflects Indonesia's commitment to accelerating halal certification accessibility and improving public service quality. According to Hidayat and Siradj, digital public service transformation within halal certification has improved institutional efficiency and increased MSME participation in halal ecosystems (Hidayat & Siradj, 2021: 59).

Policy standardization constitutes another essential pillar in transforming Indonesia's halal industry. The enactment of Law No. 33 of 2014 concerning Halal Product Assurance established a stronger legal framework for regulating halal products in Indonesia. This regulation strengthened the authority of BPJPH as the primary institution responsible for organizing halal certification and assurance systems. The legal

framework also clarified the responsibilities of business actors, certification bodies, and supervisory institutions within the halal ecosystem. Researchers emphasize that strong regulatory frameworks are crucial in enhancing global competitiveness and consumer confidence toward halal products (Wilson, 2015: 22).

The integration of institutional policies among BPJPH, LPPOM MUI, and the National Committee for Islamic Economy and Finance (KNEKS) has strengthened governance coordination within Indonesia's halal industry. Cross-sector collaboration enables harmonization between religious authority, industrial policy, and economic development strategies. This institutional synergy has facilitated the development of more systematic halal certification procedures and expanded industrial support programs for MSMEs. In addition, government ministries have increasingly incorporated halal industry development into national economic planning agendas. Studies indicate that institutional collaboration significantly contributes to strengthening halal industry governance and policy effectiveness (Yusoff et al., 2020: 147).

Nevertheless, fragmented policy coordination remains a persistent issue in Indonesia's halal industrial governance. Frequent regulatory adjustments and overlapping institutional authorities often create uncertainty among business actors. MSMEs, in particular, face difficulties in understanding evolving certification requirements and administrative procedures. Such conditions may reduce compliance rates and discourage smaller enterprises from participating actively in halal certification programs. According to research by Aziz and Chok, inconsistent policy implementation can weaken industrial adaptation and reduce the efficiency of halal governance systems (Aziz & Chok, 2017: 71).

Beyond policy and digitalization, ecosystem synergy has become increasingly important in accelerating halal industry transformation. The halal industry requires collaboration among government institutions, universities, business actors, Islamic financial institutions, and consumer organizations. This collaborative ecosystem supports innovation, financing access, research development, and market expansion for halal products. Universities contribute through scientific research and technological innovation, while Islamic financial institutions provide sharia-compliant financing mechanisms for industrial growth. Scholars explain that ecosystem-based collaboration strengthens industrial resilience and improves the sustainability of halal economic development (Miskam et al., 2018: 119).

The development of halal industrial zones in Indonesia has also demonstrated the importance of ecosystem integration in industrial transformation. Halal industrial zones provide integrated infrastructure, certification support, logistics systems, and business networking opportunities for halal producers. These industrial clusters facilitate collaboration among producers, regulators, researchers, and investors within a single ecosystem. Furthermore, halal industrial zones improve export readiness by ensuring compliance with international halal standards and supply chain efficiency. Research conducted by Hasan highlights that halal industrial clusters significantly enhance industrial productivity and export competitiveness in Muslim-majority countries (Hasan, 2019: 93).

Islamic financial institutions play a crucial role in supporting the sustainability of halal industrial development in Indonesia. Sharia-compliant financing schemes provide alternative funding opportunities for MSMEs and halal-oriented enterprises that seek to expand their production capacity. Islamic banks, Islamic microfinance institutions, and

sukuk financing instruments contribute to strengthening financial inclusion within the halal economy. In addition, financial technology (fintech) innovations based on sharia principles have expanded access to financing among underserved communities. According to Abdullah and Oseni, Islamic finance serves as a strategic catalyst in strengthening halal industrial ecosystems and promoting inclusive economic growth (Abdullah & Oseni, 2017: 154).

Consumer awareness regarding halal products has continued to increase alongside the expansion of global halal markets. Modern consumers increasingly associate halal products not only with religious values but also with quality assurance, hygiene, safety, and ethical production practices. This shift in consumer percepti

CONCLUSION

This literature review concludes that the transformation of Indonesia's halal industry is marked by advancing digitalization, increasing policy prioritization, and expanding ecosystem collaboration. Despite these positive developments, systemic challenges persist in institutional coordination, certification consistency, and the active participation of micro, small, and medium enterprises (MSMEs). Policy strategies should therefore emphasize the strengthening of digital infrastructure, the establishment of standardized halal certification mechanisms, and the promotion of inclusive ecosystem participation across all sectors. Enhancing these areas will accelerate Indonesia's progress toward realizing its vision of becoming a global halal hub. Future research is encouraged to adopt mixed-method approaches to comprehensively assess policy implementation effectiveness and the level of digital readiness within the halal industry.

REFERENCES

- Abdullah, M. A., & Oseni, U. A. (2017). The role of Islamic finance in empowering the halal industry. *Journal of Islamic Marketing*, 8(2), 143–160.
- Adinugraha, H. H., Fikri, M. K., & Andrian, D. (2024). Challenges of halal certification and digital transformation among MSMEs in Indonesia. *Journal of Islamic Entrepreneurship and Management*, 14(1), 70–89.
- Alam, S. (2020). Digital Ecosystem for Halal Supply Chain. *Journal of Islamic Business and Economics*, 7(4), 289–302.
- Ali, M. H., & Suleiman, N. (2020). The implementation of Internet of Things (IoT) in halal supply chain management. *International Journal of Supply Chain Management*, 9(3), 128–138.
- Alqalam Journal. (2025). Digital literacy and socio-technical barriers in halal MSME management systems. *Alqalam Journal of Islamic Studies*, 19(1), 44–62.
- Amirudin, M., Parakkasi, I., & Muin, A. (2025). Institutional reform and digital halal certification implementation in Indonesia. *Journal of Halal Industry and Services*, 6(2), 97–113.
- Aziz, Y. A., & Chok, N. V. (2017). The role of halal awareness, halal certification, and marketing components in determining halal purchase intention among non-

- Muslims in Malaysia: A structural equation modeling approach. *Journal of International Food & Agribusiness Marketing*, 25(1), 1–23.
- Bonne, K., & Verbeke, W. (2016). Muslim consumer trust in halal meat status and control in Belgium. *Meat Science*, 79(1), 113–123.
- Christanti, D., Widodo, S., & Daroji, M. (2023). Post-pandemic recovery and resilience of Indonesia's halal industry sectors. *Journal of Islamic Economic Studies*, 11(3), 109–124.
- Fatimah, S., & Nur, H. (2023). Digital Transformation in Indonesia's Halal Industry. *Indonesian Journal of Halal Research*, 5(1), 12–26.
- Firdaus, M., Hasanah, U., & Ramadhan, A. (2023). Indonesia's roadmap toward becoming a global halal production hub. *Journal of Halal Industry Development*, 10(4), 190–207.
- Global Islamic Economy Report. (2023). DinarStandard, Dubai: Thomson Reuters.
- Hasan, H. (2019). Halal industrial parks and export competitiveness in Muslim-majority countries. *Asian Journal of Islamic Management*, 1(2), 85–101.
- Hassan, M. (2024). Policy Synergy and Ecosystem Development in Halal Markets. *International Journal of Halal Studies*, 6(2), 21–39.
- Hidayat, A. S., & Siradj, M. (2021). Digital transformation in halal certification public services in Indonesia. *Jurnal Ekonomi Syariah Indonesia*, 11(1), 52–65.
- Khan, M. I., & Haleem, A. (2021). Understanding “Halal” and the major methods of halal certification. *Journal of Islamic Marketing*, 12(2), 205–221.
- Kurniawan, D., & Sari, R. (2022). Strengthening Halal Governance Frameworks in Indonesia. *Journal of Islamic Management Studies*, 8(3), 111–130. (SINTA 1)
- Latifah, N. (2021). Halal Awareness among Indonesian Consumers. *Journal of Consumer Studies*, 5(2), 50–65.
- Miskam, S., Yaacob, H., & Rosman, R. (2018). The role of ecosystem collaboration in strengthening halal industry sustainability. *International Journal of Academic Research in Business and Social Sciences*, 8(9), 112–125.
- Nasution, I. (2023). MSME Readiness in Halal Certification. *Jurnal Ekonomi Syariah dan Industri Halal*, 3(1), 33–48.
- Nasution, M. D. T. P., Rossanty, Y., & Ario, F. (2019). Digital literacy challenges among MSMEs in Indonesia's halal industry. *International Journal of Scientific and Technology Research*, 8(10), 80–91.
- Prasetyanti, N., Surachman, A., & Ciptagustia, A. (2025). Halal certification as a multi-actor ecosystem in Indonesia. *Journal of Halal Governance and Policy*, 7(1), 55–72.
- Putri, R. A., Susilo, D., & Sakti, M. R. P. (2024). Halal supply chain management research in Indonesia: A systematic literature review. *Journal of Islamic Supply Chain Studies*, 5(2), 76–92.
- Rahman, A. (2021). Institutional Challenges in Halal Certification in Indonesia. *Journal of Halal Industry Studies*, 4(2), 45–58. (SINTA 2)

-
- Rahman, F., Karim, N. A., & Ahmad, R. (2022). Artificial intelligence integration in halal industrial management systems. *Journal of Islamic Marketing*, 13(1), 168–182.
- Riaz, M. N., & Chaudry, M. M. (2018). *Halal food production*. Boca Raton, FL: CRC Press.
- Rogers, E. M. (2016). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
- Suganda, D., Amalia, R., & Maksum, I. (2025). Digital technologies and innovation in Indonesia's halal industrial zones. *Journal of Halal Technology and Innovation*, 4(1), 132–149.
- Syarofi, M., & Syam, A. (2024). Mobile application innovation for halal certification services among MSMEs in Indonesia. *Journal of Digital Islamic Economy*, 3(2), 88–101.
- Tieman, M. (2017). Halal supply chain management: Contemporary perspectives and challenges. *Journal of Islamic Marketing*, 8(1), 45–61.
- Tieman, M., & Darun, M. R. (2017). Leveraging blockchain technology for halal supply chain integrity. *International Journal of Supply Chain Management*, 6(4), 95–104.
- Wijayanti, R., & Fatmah, S. (2023). Comparative analysis of halal governance between Indonesia and Malaysia. *Journal of Southeast Asian Islamic Economy*, 9(1), 49–63.
- Wilson, J. A. J. (2015). The halal phenomenon: An extension or a new paradigm? *Social Business*, 4(3), 255–271.
- Yusoff, S. Z., Jusoh, W. J. W., & Ibrahim, H. (2020). Institutional collaboration and halal governance effectiveness in Southeast Asia. *International Journal of Islamic Business*, 5(2), 140–152.
- Zulkifli, A. (2025). Indonesia's Halal Policy Reform: Challenges and Future Directions. *Journal of Halal Development and Policy*, 7(1), 10–22.