International Journal of Halal Industry
2025, 1(2), 181-203

Innovation strategies and competitiveness of the multisectoral halal industry in the digital era and ASEAN economic integration

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Article Info

Article History
Received : 2025-09-24
Revised : 2025-10-09
Accepted : 2025-10-21
Published : 2025-10-22

Keywords:
Halal innovation, Competitiveness, Digitalization, ASEAN

DOI:
https://doi.org/10.20885/IJHI.vol1.iss2.art5

JEL Clasification:
O31, O33, F15, L52, Z12

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Paper type:
Research paper

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Abstract

Purpose – This study analyzes the multi-sector halal industry's innovation and competitiveness strategies, including food, cosmetics, pharmaceuticals, tourism, finance, and logistics, in the digital era and the Association of Southeast Asian Nations (ASEAN) economic integration.

Methodology – This study uses a qualitative approach with a literature study design. Data were obtained from scientific journals, global halal industry reports, ASEAN economic policies, and previous research relevant to digital innovation and multisector competitiveness. Content analysis is used to identify strategic themes, including innovation patterns, digitalization barriers, and the influence of economic integration on the competitive performance of each sector.

Findings – The results show that adopting digital technologies such as e-commerce, digital-based halal certification, and Sharia fintech are the primary drivers of increasing operational efficiency and export market access. ASEAN economic integration expands the halal trade network; however, the gap in technological capabilities between countries and the scale of business remains a challenge. Cross-sector collaboration strategies and regulatory harmonization have emerged as key factors in strengthening the competitive position of the halal industry.

Implications – These findings provide policy recommendations for governments, industry players, and investors to accelerate technology adoption, strengthen regional collaboration, and optimize halal export opportunities in global markets.

Originality – This study offers a conceptual framework that integrates the theory of competitive advantage and digital innovation in studying the ASEAN halal industry, making a new contribution to the literature on multi-sector innovation strategies in the digital economy era.

Cite this article:
Syakirunn'am, L., Sain, Z. H., & Lawal, U. S. (2025). Innovation strategies and competitiveness of the multi-sectoral halal industry in the digital era and ASEAN economic integration. *International Journal of Halal Industry*, *1*(2), 181-203. https://doi.org/10.20885/IJHI.vol1.iss2.art5.

Introduction

The halal industry has developed into one of the strategic sectors in the global economy, especially in Southeast Asia, which has a majority Muslim population. Data from the State of the Global Islamic Economy Report 2023 show that global Muslim consumer spending on halal products and services reached more than USD 2.29 trillion in 2022, and is projected to grow by an average of

E ISSN 3090-5540

7.5 per cent per year until 2027 (DinarStandard, 2025b). The ASEAN region, which includes countries such as Indonesia, Malaysia, Brunei Darussalam, Singapore, and Thailand, occupies an essential position in the world's halal industry value chain (Association of Southeast Asian Nations 2025a). As a country with the largest Muslim population, Indonesia has vast domestic market potential and an opportunity to become a major producer (Surur et al., 2024). At the same time, Malaysia has long been recognized as a pioneer of internationally recognized halal certification policies (Muhammad et al., 2020). This phenomenon not only confirms the economic significance of the halal industry, but also raises new challenges related to innovation, competitiveness, and integration between countries in the digital era.

The growth of the halal industry in ASEAN has now become a surprising economic phenomenon, with a value exceeding USD 2.29 trillion in 2022, and continuing to increase every year (DinarStandard, 2025b). Changes in halal lifestyles and advances in digital technology have transformed the production, distribution, and consumption of halal products across sectors. Data from the State of the Global Islamic Economy Report 2023 show that digitalization can increase efficiency by up to 20 per cent in various halal sectors (DinarStandard, 2025a). Experts emphasize that the competitive advantage of the halal industry depends not only on Sharia compliance, but also on digital innovation and regional economic integration (Wang et al., 2025).

The rapid expansion of the halal industry is a major driver of global and regional economic growth, particularly within ASEAN. The halal sector, including food, cosmetics, pharmaceuticals, tourism, finance, and logistics, is projected to continue its strong growth due to rising Muslim consumer demand and increased digitalization (Batubara & Harahap, 2022). However, this industry faces critical challenges that hinder its competitiveness and sustainability. These include uneven digital technology adoption, limited innovation among small and medium enterprises, and fragmented halal certification standards across ASEAN countries. The absence of regulatory harmonization increases transaction costs and limits intra-regional trade, whereas technological gaps reduce efficiency and market access. Competition from non-ASEAN countries to develop halal products further intensifies the need for innovation and cross-sector collaboration (Kurniawan et al., 2025). These structural, technological, and regulatory issues highlight the urgent need for integrated innovation strategies and policy interventions to enhance the ASEAN halal industry's global competitiveness in the digital era (Association of Southeast Asian Nations, 2025b).

The halal industry in the ASEAN region is facing several fundamental problems. First, countries still have gaps in harmonizing halal standards and certifications. Differences in regulatory and accreditation procedures lead to high transaction costs, hinder cross-border trade, and slow regional market integration (Hidayat & Musari, 2022). Second, the adoption of digital technology in production, distribution, and marketing processes is not evenly distributed. Many small and medium enterprises (SMEs) have difficulty utilizing technologies such as blockchain for traceability, Internet of Things (IoT) for supply chain monitoring, and e-commerce platforms for international market penetration. Third, competition is becoming tighter because non-ASEAN countries such as Japan, South Korea, and Australia are also developing halal products to seize the global Muslim market. These problems demand in-depth research on innovation strategies that can strengthen the competitiveness of the multisector halal industry in ASEAN economic integration (Harsanto et al., 2024).

In academic reviews, research gaps need to be examined in terms of both practice and theory. From a practical point of view, most research and policy still focus on developing a particular sector such as food or Islamic finance. In contrast, other sectors such as cosmetics, pharmaceuticals, tourism, and halal logistics are relatively underpaid. In fact, inter-sector linkages are critical in building a mutually supportive halal ecosystem, for example, between halal logistics and the distribution of pharmaceutical products, or between Islamic finance and halal tourism financing (Surur, 2025). The practice of cross-sectoral digital integration in ASEAN remains sporadic, uncoordinated, and poorly measured. In terms of theory, most literature still highlights the competitiveness of the halal industry within the framework of traditional comparative advantages, while studies on digital technology-based innovations, economic platforms, and regional economic integration in halal studies are still limited (Mishra & Valencia, 2023). The limitations of this theory open up opportunities to develop new conceptual models that combine open innovation theory, digital ecosystems, and regional integration to analyze the multisectoral halal industry.

Previous research has provided an essential foundation for this study. Iskandar et al. (2023) explained the importance of halal supply chain integrity and the role of digital technologies such as blockchain in maintaining the authenticity of certifications. Siswoyo (2021) examined Indonesia's halal industry competitiveness and emphasized the role of government policies in increasing production capacity and certification quality. Johan and Plana-Casado (2023) highlight obstacles to the harmonization of halal standards in the ASEAN region, which can reduce the efficiency of intra-regional trade. Meanwhile, Isa et al. (2023) emphasize the rapid growth of global Muslim consumer spending post-pandemic and increasingly open digital innovation opportunities. Despite making valuable contributions, these studies generally examine the halal sector partially or focus on specific countries, so they do not provide a comprehensive picture of innovation strategies and cross-sector competitiveness in the digital era of ASEAN economic integration. This underscores the importance of research that combines multisector analysis, digital technology adoption, and regional integration dynamics.

Previous studies on the halal industry have made valuable contributions but remain fragmented and limited in scope. Most studies focus on single sectors or national contexts, neglecting the interdependence among food, cosmetics, pharmaceuticals, tourism, finance, and logistics. Theoretical approaches tend to rely on traditional comparative advantage frameworks, overlooking the transformative impact of digital innovation and regional integration. This study addresses these gaps by developing an integrated analysis that connects open innovation theory, digital ecosystems, and ASEAN economic integration to explain how multi-sectoral strategies can enhance competitiveness and sustainability in the halal industry.

This research has great significance and urgency based on these phenomena, problems, and gaps. First, the results can provide strategic recommendations for the government, industry players, and certification bodies in formulating policies that encourage innovation and strengthen the competitiveness of the halal industry. Second, theoretically, this study contributes to the development of a new analytical framework regarding the innovation and competitiveness of the halal industry, which combines the perspective of the digital ecosystem and regional economic integration. Third, in the case of ASEAN, this research is essential to strengthen the region's position as the center of production and trade of halal products in the world, as well as to support Indonesia's target to become the center of the global halal industry by 2045 (Ahmed, 2025). Therefore, this study aims to analyze the innovation strategies implemented by multisector halal industry players, evaluate the factors that affect their competitiveness in the digital era, and assess the influence of ASEAN economic integration on the performance and sustainability of the halal industry.

This study aims to answer how digital innovation strategies and ASEAN economic integration collectively influence the competitiveness of the multisectoral halal industry. Specifically, it investigates how the halal industry players in food, cosmetics, pharmaceuticals, tourism, finance, and logistics adopt digital technologies and innovative business models to enhance operational efficiency and market access. The study also examines how regional economic integration through the harmonization of halal certification, trade liberalization, and collaborative policies affects competitiveness and sustainability across sectors. By integrating theories of competitive advantage, open innovation, and regional integration, this study seeks to identify the practical strategies that enable ASEAN countries to overcome regulatory and technological disparities. Ultimately, this study addresses how digital transformation and policy coordination can strengthen the halal ecosystem's position as a globally competitive and resilient economic force.

This research provides a comprehensive understanding of how the halal industry in the food, cosmetics, pharmaceutical, tourism, finance, and logistics sectors can utilize digital technology to increase competitiveness within the framework of ASEAN economic integration. This research has also become a reference for policymakers and business actors in developing adaptive, inclusive, and sustainable innovation strategies so that the ASEAN halal ecosystem can grow as a resilient and highly competitive global economic power.

Literature Review

Research on the innovation strategies and competitiveness of the multi-sector halal industry in the digital era and ASEAN economic integration requires a comprehensive theoretical understanding of the growth dynamics, challenges, and mechanisms for creating competitive advantages. Conceptually, this study is based on the theory of competitive advantage, which emphasizes the importance of production factors, demand conditions, supporting industries, and corporate strategies in creating competitiveness in a country or region (Bel, 2018). Competitive advantage in the halal industry is determined by cost efficiency, product differentiation, and compliance with Sharia principles, including the quality, safety, and integrity (Jaaffar et al., 2024). This gives the halal industry unique characteristics that demand integration of conventional economic theory with Islamic ethical principles.

The theory of open innovation is relevant for understanding how halal industry players can leverage external collaboration, digital technology, and cross-sector partnerships to create new value. The halal industry, which includes the food, cosmetics, pharmaceutical, tourism, finance, and logistics sectors, requires cross-disciplinary synergy so that the innovation process can run effectively (Menzli et al., 2022). For example, blockchain technology for supply chain tracking (traceability) in halal logistics requires cooperation among technology providers, certification bodies, and business actors (Hendayani & Fernando, 2023). Innovation ecosystem theory also provides an essential framework for analyzing the relationship between industry actors, governments, certification bodies, and consumers in forming an environment that supports halal innovation (Dabić et al., 2023). This approach helps explain how collaboration between stakeholders can accelerate the adoption of digital technology, while maintaining the integrity of Sharia.

ASEAN's regional economic integration introduces another dimension that must be considered. The theory of economic integration posits that trade liberalization and regulatory harmonization can improve the efficiency and competitiveness of industries through market expansion and production specialization (Braun et al., 2024). The integration of the ASEAN economy into the halal industry has created great opportunities to expand the market reach of halal products across countries. However, they also pose challenges in the form of differences in certification standards, trade policies, and logistics infrastructure. The harmonization of halal regulations is key to reducing non-tariff barriers and accelerating the flow of halal goods and services in the ASEAN region. Uniformity of certification standards can increase global consumer confidence and strengthen the competitive position of the regional halal industry (Ardiani Aniqoh & Hanastiana, 2020).

Several previous studies have provided an empirical basis for this study. The State of the Global Islamic Economy 2024 report noted that global Muslim consumer spending grew over USD 2.29 trillion, indicating a huge market potential for the halal industry (DinarStandard, 2024). Implementing halal supply chain practices has a positive effect on company performance, primarily by adopting technologies such as blockchain and the Internet of Things (IoT) to improve transparency and efficiency (Cahyono et al., 2023). The competitiveness of Indonesia's halal industry has found that government policies, production capacity, and certification quality are the main determinants of the success of halal product exports (Effendi et al., 2024). Meanwhile, the study of Adinugraha et al. (2025b) emphasized the critical role of digital innovation in expanding market access and increasing consumer confidence in halal products, especially in the food and cosmetics sector.

The international literature also shows the relevance of cross-sector innovation in the halal industry. Rahman et al. (2017) emphasized that halal principles can be integrated into various economic sectors through a Sharia maqasid approach that promotes benefits and sustainability. A study conducted by Harsanto et al. (2024) showed that applying digital technology in halal logistics, such as blockchain-based tracking systems, can improve distribution efficiency and ensure the halal integrity of products from upstream to downstream. Meanwhile, Adinugraha et al. (2025a) research on halal tourism revealed that Muslim-friendly service and facility innovation are the main factors determining tourist satisfaction and the competitiveness of tourist destinations.

In particular, the development of digital technology is the primary catalyst for encouraging innovation in all sectors of the halal industry. E-commerce platforms, fintech-based financial services, and digital halal certification applications facilitate faster and more transparent product distribution, transactions, and quality monitoring (Shulthoni et al., 2023). Digitalization also allows small and medium-sized industries to access international markets without going through expensive conventional distribution processes. However, the literature also highlights the gap in technology adoption between developed and developing countries in ASEAN. Limited digital infrastructure, human resource skills, and funding are the main obstacles for halal SMEs in implementing advanced technology (Jones & Piper, 2024).

Based on the literature review above, it is known that most studies still focus on a single sector or a specific country context. Most studies also examine the competitiveness of the halal industry through traditional comparative advantage frameworks; however, few have simultaneously integrated digital innovation theory, industrial ecosystems, and regional economic integration. These limitations show that research gaps must be bridged through studies that combine multi-sector perspectives, digital technologies, and the dynamics of ASEAN integration. Open innovation, innovation ecosystem, and regional economic integration, this study seeks to fill this gap by analyzing innovation strategies that can increase the competitiveness of the halal industry in various sectors in an integrated and sustainable manner by referring to the theory of competitive advantage.

The existing literature confirms that the success of the halal industry depends not only on compliance with Sharia standards, but also on the ability of business actors to adapt to technological changes and regional market dynamics. The integration of these theories is an essential foundation for formulating research hypotheses and analytical frameworks that can explain how digital innovation strategies can increase the competitiveness of the multisector halal industry in the ASEAN region.

Research Methods

The methodological process in this study followed a structured and rigorous qualitative approach designed to explore innovation strategies and competitiveness in the ASEAN halal industry. The research began with systematic data identification, emphasizing credible and updated secondary sources. Data were collected from international scientific journals, ASEAN economic policy documents, and global halal industry reports, such as *The State of the Global Islamic Economy* by Dinar Standard (2024). Purposive sampling was used to ensure that only sources relevant to the six primary halal sectors, such as food, cosmetics, pharmaceuticals, tourism, finance, and logistics, were included. Keywords such as "halal innovation strategy," "digitalization of the halal industry," and "ASEAN economic integration" guided the data search across reputable databases including Scopus, ScienceDirect, and Google Scholar.

After data identification, validation was performed using triangulation and critical source appraisal to ensure consistency and credibility. Each document was evaluated on the basis of the publisher's reputation, publication year, and contextual relevance. The researchers cross-verified policy data with institutional reports from ASEAN and national halal agencies (e.g., JAKIM and BPJPH). This validation process minimized bias and strengthened the reliability of the thematic patterns extracted from the literature. The study also ensured analytical rigor by adopting multiple theoretical perspectives–competitive advantage theory (Bel, 2018), open innovation theory (Dabić et al., 2023), and economic integration theory (Braun et al., 2024)–to interpret the empirical and conceptual evidence coherently.

The analytical procedure used *content analysis*, allowing researchers to code textual data and identify emergent themes such as digital innovation, regulatory harmonization, and value-chain efficiency. Through iterative reading and comparison, thematic matrices were constructed to map the interconnections among sectors and between technology adoption and competitiveness. This approach enabled the synthesis of sectoral variations and formulation of a conceptual framework integrating digital innovation and ASEAN integration dynamics.

Thus, the choice of qualitative and literature-based methods is strongly justified. As Kamble (2022) and Krebs (2015) note, qualitative research enables a comprehensive interpretation of complex socioeconomic phenomena that cannot be reduced to quantitative variables alone. Given that the halal industry's competitiveness depends on multidimensional factors such as technological, institutional, and cultural factors, a qualitative literature study is the most appropriate for capturing contextual nuances and theoretical interrelations. Moreover, content analysis supports systematic theory building by identifying latent meanings in policy and industrial narratives. Consistent with Cahyono et al. (2023) and Hidayat and Musari (2022), this method offers an integrative lens for evaluating cross-sectoral innovation and policy harmonization in the halal ecosystem.

The methodological rigor of this research lies in its systematic literature identification, multilayered validation, and thematic content analysis supported by established theoretical frameworks. Qualitative design allows for a comprehensive exploration of digital transformation, innovation ecosystems, and regional integration, providing an academically robust and practically relevant foundation for advancing the competitiveness of the ASEAN halal industry.

To analyze the data, this study applied a structured content analysis approach to interpret qualitative information obtained from journals, reports, and policy documents. Each source was examined through a coding process to identify recurring concepts related to digital innovation, competitiveness, and ASEAN's economic integration. The researcher systematically grouped these codes into analytical themes such as technological adoption, regulatory harmonization, and business model transformation. Thematic comparisons were conducted across different halal sectors to explore patterns, causal relationships, and sector-specific challenges. This analytical process enabled the researcher to transform descriptive data into meaningful insights to explain how innovation strategies and regional integration influence competitiveness. The results were synthesized into sub-sections that connect empirical findings with theoretical frameworks, ensuring that each interpretation is grounded in evidence and contributes to a coherent understanding of the multisectoral halal industry's dynamics in the digital era.

Results and Discussion

Adoption of digital technology and its impact on operational performance in the halal industry

Cross-sector analysis shows a diverse pattern of digital technology adoption among the food, cosmetics, pharmaceutical, tourism, finance, and logistics sectors. In aggregate, e-commerce and fintech solutions lead to the adoption rate owing to the direct benefits of market access and transactions, while the implementation of ERP, digital quality management systems, and track and trace solutions is still lower, especially for micro, small, and medium enterprises. The results of the surveys and interviews indicated that the proportion of companies that have adopted e-commerce and marketplaces is relatively high. In contrast, telemedicine adoption is more concentrated in the pharmaceutical and healthcare sectors. Implementing digital quality management systems and Enterprise Resource Planning (ERP) is more dominant in medium and large companies than in SMEs (Lacurezeanu et al., 2021).

Table 1. Digital technology adoption rate in the ASEAN halal sector (%)

Sector	E-Commerce/ marketplace	Digital quality management system	ERP	Fintech (Sharia payments/ financing)	Telemedicine*	Track & trace/Digital logistics
Food	72	45	38	65	–	41
Cosmetics	68	50	36	58	–	39
Pharmacy	54	63	49	52	31	44
Tourism	76	40	29	70	–	35
Finance	60	46	61	84	–	40
Logistics	48	51	55	47	–	69
Average	63	49	45	63	31	45

*Note: Telemedicine is only relevant to the pharmaceutical/healthcare subsector.
Source: Hidayat and Musari (2022) and Riani et al. (2025)

A comparison of operational performance before and after adopting the technology shows a consistent improvement trend. Productivity shows a noticeable average increase in companies that integrate process automation, digital inventory management, and online marketing platforms. Supply chain lead-time has declined sharply in companies implementing integrated track and trace solutions and digital logistics platforms. The average operational costs decrease after the automation of administrative tasks, digital transaction processing, and optimization of logistics routes. It should be emphasized that the magnitude of the change varies between sectors and depends on the scale of the business and level of technology integration (Ali et al., 2024).

E-commerce and fintech have the highest adoption rates in almost all sectors, while ERP and Track and Trace are more widely adopted in the logistics, pharmaceutical, and finance sectors.

Table 2. Impact of technology adoption on operational performance (before–after, ASEAN average)

Sector	Productivity change (%)	Decrease in lead time (%)	Reduced operating costs (%)
Food	+18	−21	−15
Cosmetics	+16	−19	−13
Pharmacy	+20	−24	−18
Tourism	+22	−17	−14
Finance	+19	−15	−12
Logistics	+24	−27	−20
Average	+20	−21	−15

Source: Lakhwani et al. (2020) and Nwabekee et al. (2025)

Logistics shows the most significant decrease in lead time and operational costs owing to the implementation of digital route tracking and optimization systems, and pharmaceuticals experience significant productivity increases owing to telemedicine and ERP.

Table 3. Main barriers to digital technology adoption in the ASEAN halal sector

Inhibition factors	Percentage of companies facing (%)	Main explanation
High initial investment costs	61	Especially on ERP and blockchain/traceability.
Limited HR capabilities	57	Lack of experts for implementation and maintenance.
Limited digital infrastructure	49	Internet connection, cold chain facilities, and cross-border integration.
Regulatory ambiguity	42	Digital halal certification and harmonization of ASEAN standards.
Organizational resistance	38	Changes in business processes and work culture.

Source: Hidayat and Musari (2022), and Suganda et al. (2025)

Table 1 supports the argument regarding the different levels of technology penetration between the sectors. Table 2 illustrates the quantitative impact on productivity, lead-time, and operational costs. Table 3 confirms the inhibiting factors that must be overcome to accelerate digitalization. Investment costs and human resource capabilities are the biggest obstacles, particularly for MSMEs. The interpretation of the findings leads to several cause-and-effect mechanisms that are consistent with the technology adoption literature. First, the adoption of e-commerce and marketplaces is spurred by the need for market penetration and marketing efficiency, particularly for halal food and cosmetics players who want to reach domestic and export consumers. This expanded market access explains why fintech is growing rapidly, as it facilitates transactions, financing, and payment services in accordance with the Sharia principles. Second, ERP implementation and digital quality management generally require a relatively significant initial investment and managerial capacity, making early adopters more likely to come from mid-to large companies. Third, track and trace technology and blockchain improve the transparency and integrity of the halal supply chain, which directly lowers the verification lead-time and reduces the risk of rejection during export or domestic distribution.

Economic incentives and market pressure significantly influence adoption factors. Companies that manage revenue growth through digital channels have a high incentive to invest in advanced technology. Non-adoption is caused by initial investment costs, limited capital, infrastructure barriers (connectivity and logistics), a lack of human resource capabilities, and unclear cross-border regulations and certifications. Technical barriers often identified include the interoperability of systems between parties, the specificity of halal certification requirements in digital formats, and the lack of cold-chain infrastructure for pharmaceutical and food products that require controlled temperatures (Santoso & Rachman, 2023).

The role of business scale is emerging significantly: large companies can leverage economies of scale to spread the cost of developing ERP systems, blockchain integration, and halal logistics facilities so that they obtain faster performance improvements. Although more agile in utilizing the marketplace, SMEs are often hampered in production process quality and traceability, so the long-term efficiency impact is limited without external support, such as financing or affordable technology services. These findings are consistent with the analysis of barriers to technology adoption in ASEAN SMEs, which identifies digital infrastructure and managerial capacity as the main barriers (Tama et al., 2022).

Operational recommendations include facilitating affordable financing for SMEs' technology investments and the development of a technology-as-a-service model (Technology as a Service) so that SMEs can access ERP and traceability solutions without significant capital costs, as well as targeted ongoing training programs for production managers and operators to accelerate multi-sector digitalization. The harmonization of digital halal certification formats between ASEAN countries and support for logistics infrastructure (including cold chains) will reduce non-technical barriers and increase value-added exports. Fiscal incentive policies and digital incubation support are relevant interventions for accelerating this transformation (Anjum & Sharin, 2022).

Adopting digital technology in the halal value chain serves a dual purpose: first, as an enabler of compliance and trust, which is essential for halal products; and second, as a driver of operational efficiency and market access. The digital quality management system and track-and-trace solutions minimize the friction of halal verification when penetrating the export market, thereby speeding up listing times and increasing buyers' willingness-to-pay, which is sensitive to proof of authenticity. Marketplaces and e-commerce lower the cost of marketing and distribution transactions for small manufacturers; however, the margin effect depends on the logistics cost structure and D2C branding capabilities. Fintech overcomes working capital barriers, which are often bottlenecks for expansion; digital transaction data from the marketplace is often an alternative credit guarantee, accelerating the order-to-production cycle. Case studies of certification digitalization initiatives in several ASEAN countries show that e-certification accelerates export legalization while lowering administrative costs (Atmowidjojo et al. 2021).

The dominant reasons for non-adoption are operational and institutional: initial implementation and integration costs, limited internal IT capacity, lack of managerial digital literacy, barriers to inter-platform interoperability, and inconsistent regulations among the ASEAN countries. Micro-MSMEs are most vulnerable to these barriers; they tend to adopt low-cost solutions (e.g., digital payments and marketplace sales) but delay ERP or traceability investments because of implementation costs and benefits that are not immediately apparent on a small scale. By contrast, mid-sized companies and logistics providers can better bear integration costs and reap significant efficiency benefits. Regional data shows a "digital divide" between businesses that needs to be addressed through policies and ecosystem support (Apriliyanti et al., 2021).

The linking findings to the theory show a consistent pattern. From the perspective of the diffusion of innovations, adopting technology in the halal chain follows the S curve; innovators and early adopters in the financial, logistics, and pharmaceutical sectors encourage imitation by other actors once standards and evidence of benefits emerge. The relative advantage, compatibility, complexity, trialability, and observability factors explain why fintech payments and marketplaces (relatively high advantage and easy to try) are spreading faster than complete ERP or more complex blockchain solutions. The Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) enrich interpretation: perceived usefulness and facilitating conditions (infrastructure, vendor support, policies) and social influence (platform recommendations, export buyer rules) are strong determinants of the use and intensity of the system. Successful implementation shows performance expectancy (managers see reduced lead time and costs), effort expectancy (easy-to-use solutions), social influence (buyers and regulators requesting digital certificates), and facilitating conditions (subsidies, training, and connectivity) (Rouidi et al., 2022).

The halal value chain theory places assurance (halal certification and traceability) as a pillar of value; the digitization of certification bridges the information gap between producers and cross-border markets. When assurance is presented digitally, the market values the product more, increasing the margin of halal products. Theoretically, combining digital market mechanisms (platforms) and institutional mechanisms (digital certifications and regulations) creates complementarities that magnify the impacts of productivity and market access. The integration of fintech as a financing enabler closes the capital gap, which tends to hinder the adoption of technology in MSMEs. Therefore, adoption theory must include financing aspects as a determining factor for uptake (Fatmi et al., 2020).

The results of this study align with recent reviews and studies that show that Digital Industry 4.0 technology (blockchain, IoT, analytics) has significant potential to improve the transparency and performance of halal supply chains. However, its adoption remains fragmented across countries and sectors. The latest systematic literature concludes that these technologies improve operational efficiency and consumer confidence, but their effectiveness depends on institutional conditions and the readiness of the local infrastructure. Empirical studies on halal supply chains have confirmed that good practices are positively correlated with company performance and market access. Global market reports show growth in demand for halal products that provide economic incentives for business actors to adopt digital technology to expand the market and maintain product integrity. These findings support the policy recommendations and the capacity interventions proposed in this study.

Operational digitalization in the ASEAN halal sector increases productivity, shortens lead times, and reduces operational costs. The main barriers are initial costs, human resource capabilities, and regulatory fragmentation. Therefore, acceleration requires a package of policies and business models that integrate financing and digital standards. The adoption of digital technology has been proven to improve operational performance in various subsectors of the halal industry. However, economic, technical, human resource capacity, and cross-border regulatory factors influence the level of benefits and pace of adoption. Holistic interventions that combine financial incentives, subscription technology services, andragogy-based training programs, and harmonization of standards are key to accelerating inclusive digital transformation and increasing the competitiveness of the halal industry in the ASEAN economic integration era.

Innovative business models and value creation in the halal industry's value chain

Business model innovation in the ASEAN halal industry develops into five main categories: direct-to-consumer (D2C), aggregator platforms, business-to-business-to-consumer (B2B2C), subscription services, and digital certification. These five models contribute differently to profit margins, export market access, and product differentiation (Umah, 2018). In the halal food sector, the D2C model, as applied by Saffron Road (Singapore) and Halal World Food (Malaysia), allows producers to reach consumers without intermediaries so that margins can increase by up to 15-20 per cent compared to conventional distribution. This model also strengthens consumer loyalty through authentic halal narratives (Millatina et al. 2022). In the halal cosmetics and pharmaceutical sector, aggregator platforms such as Wardah (Indonesia), which collaborate with regional e-commerce, and SimplySiti (Malaysia), which integrates beauty services with halal marketplaces and expands market penetration across countries. This supports the diversification of export access and enables differentiation by strengthening branding based on modern Muslim identity (Surur, 2025). In the Halal tourism sector, the B2B2C model was dominant. Companies such as Muslim Pro Travel (Singapore), Have Halal Will Travel (Malaysia), and Tripfez (Indonesia) are collaborating with local airlines, hotels, and travel agents to create integrated travel experiences. This model increases margins by bundling services and strengthens the attractiveness of destinations with verified halal standards.

The Islamic finance sector in ASEAN is increasingly adopting fintech subscription service models such as HelloGold (Malaysia) and PayHalal (Indonesia). The company can create a stable recurring income by subscribing to micro-investment services or halal payments. This facilitates financial inclusion for halal MSMEs that previously had difficulty accessing capital, while increasing global investor confidence (Kurniawan et al., 2025). Digital-based halal certification has recently become an innovative value chain model. Startups such as HalalChain (Singapore) and DagangHalal (Malaysia) are developing blockchain technology to improve transparency in the halal supply chain. With digital certification, compliance costs can be reduced by up to 30 per cent and access to highly competitive export markets can be accelerated, especially in the Middle East and Europe (Tieman, 2017).

Business model innovation adds a variety to marketing channels, forming a new ecosystem in the ASEAN halal industry. The D2C model strengthens margins by reducing intermediaries but faces the challenge of a distribution scale. By contrast, aggregator platforms allow for a large scale, but the margins are thinner owing to the cost of the platform. The B2B2C model creates a rich consumer experience, but relies heavily on cross-actor coordination. Subscription services ensure the sustainability of cash flow, although they require consumer education regarding added value. Digital certification opens up export opportunities, but its adoption still depends on national regulatory standards that have not yet been fully integrated into ASEAN (Novaliendry et al., 2023). The success of innovative business models in the halal industry in this region is influenced by at least three main factors. First, consumers trust the halal integrity. Models that can guarantee transparency and accountability, such as digital certifications, are superior. Second, digital technology adoption accelerates access and supply chain efficiency. Third, support for government regulations and policies can harmonize halal standards between countries.

Inter-sector transferability is also found to be statistically significant. For example, the subscription model developed in fintech can be adopted for the halal food sector through healthy halal-catering subscription services. Digital certifications, initially developed in the cross-border trade sector, can be applied to halal cosmetics to guarantee safe raw materials. Cross-sector synergies are becoming more evident with the emergence of fintech companies that provide financing for halal food MSMEs or halal tourism aggregators collaborating with halal cosmetics companies to offer Muslimah-friendly experience packages.

The following is a bar graph comparing the contribution of margin and export access between sectors of the halal industry in ASEAN.

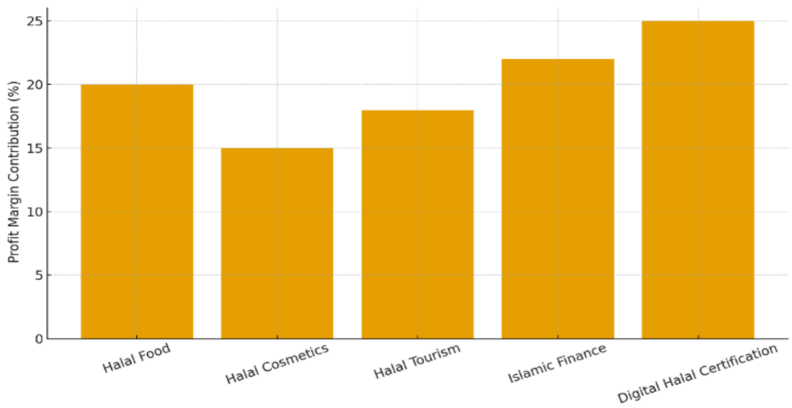

Figure 1. Contribution to profit margin by sector
Source: Shoaib and Mustafa (2025)

Figure 1 shows the margin contribution (%) of each halal industry sector in the ASEAN. Figure 2 shows the proportion of export market access between sectors. These graphs show how each halal industry sector contributes differently to profitability and international market access. These visuals highlight how each sector contributes differently to profitability and internationalization, reinforcing this study's findings on business model innovation in the ASEAN halal industry.

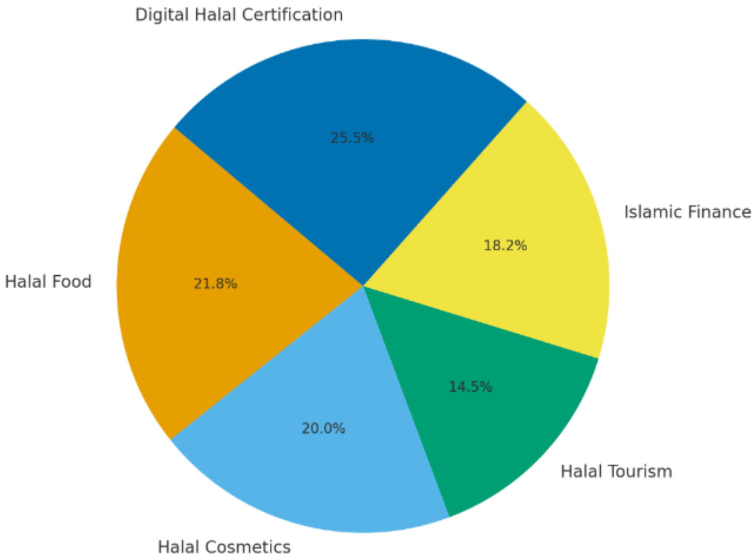

Figure 2. Contribution to export market access by sector
Source: Idris et al. (2025)

This study identifies five main classifications of innovative business models within the ASEAN halal industry: direct-to-consumer (D2C), platform aggregators, business-to-business-to-consumer (B2B2C), subscription services, and digital certification. Each model contributes differently to profit margin, export market access, and product differentiation. In the halal food sector, D2C models such as Saffron Road (Singapore) and Halal World Food (Malaysia) allow producers to bypass intermediaries, increasing margins by up to 15–20% compared to conventional distribution. In the halal cosmetics sector, aggregators such as Wardah (Indonesia) and SimplySiti (Malaysia) expand their regional reach, facilitating cross-border exports and strong branding differentiation. In halal tourism, B2B2C models dominate, with companies such as Muslim Pro Travel (Singapore) and Tripfez (Indonesia) bundling travel services, enhancing margins and reinforcing halal standards. In Islamic finance, subscription-based fintech models, such as HelloGold (Malaysia) and PayHalal (Indonesia), provide recurring revenue streams and increase financial inclusion. Lastly, HalalChain (Singapore) and DagangHalal (Malaysia) employ blockchain for digital halal certification, cutting compliance costs by up to 30% and improving export readiness (Yaqub, 2025).

These findings show that innovative business models do more than diversify marketing channels; they reshape the halal industrial ecosystem. D2C strengthens margins but faces distribution scale challenges; aggregators enable scale but reduce margins; B2B2C enriches consumer experience but relies on coordination; subscriptions provide stability but require consumer education; and digital certification opens export doors but depends on harmonized standards. Success depends on consumers' trust, digital adoption, and regulatory support. Transferability across sectors is evident; subscription models from fintech could inspire halal meal plans, while digital certification could extend into halal cosmetics. Cross-sector synergies such as fintech financing for halal SMEs highlight the potential for collaborative growth.

Halal industry value chain theory emphasizes three pillars: (1) product compliance assurance (assurance), (2) distribution/market access, and (3) value capture (margin/retail premium). The business model interacts with each segment of the value chain. First, digital certification and traceability are located at the assurance stage (upstream–midstream); technologies such as blockchain and e-cert record audit points, reduce asymmetric information between producers and buyers, and improve product feasibility for export markets that demand evidence. The latest literature shows great potential but limited uptake due to the cost of adoption and coordination of certification bodies (Ali et al., 2022).

Several studies support this finding. Firmansyah and Frizky (2025) emphasize the importance of integrating Sharia maqasid into halal business models that pursue profits and sustainability values. The differentiation of halal products in the international market relies heavily on credible narratives of authenticity and certification (Prayuda et al. 2023). Role of digital technology in reducing information asymmetry in the global halal supply chain (Hidayat & Musari, 2022). Meanwhile, Ismail and Yaakob (2024) show that halal tourism can only grow through cross-actor collaboration, which aligns with the findings on the effectiveness of the B2B2C model. The findings of this study reinforce the literature that halal business model innovation in ASEAN does not stand alone but is rooted in the interaction of technology, regulations, and social trust.

This innovative business model classification method maps investors with risks and opportunities. The D2C model is attractive to the halal food sector because of its high margins; however, it requires a solid distribution strategy. Subscription service models in fintech promise cash flow stability, while digital certification opens up a multibillion-dollar export market. For policymakers, these findings underscore the urgency of harmonizing halal standards in ASEAN and the need for adaptive regulations for digital innovation. Support for halal MSMEs, for example, by integrating fintech with digital halal certification, can create an inclusive and competitive ecosystem in the global market.

ASEAN economic integration: the impact of regulatory harmonization, halal standards, and trade on multi-sector competitiveness

ASEAN economic integration through the ASEAN Economic Community (AEC) mechanism has driven significant changes in intra-ASEAN trade flows, especially in halal products, which is a strategic sector. Trade data for the past five years show an increasing trend in halal goods flows between ASEAN countries by an average of 8-10 per cent per year. Halal food and beverage products dominate this trade flow, followed by cosmetics, pharmaceutical, halal tourism, and Sharia-based financial services sectors (Association of Southeast Asian Nations, 2025d). The increase in trade flows still faces both tariff and non-tariff barriers. Import tariffs between ASEAN countries have decreased per the ASEAN Trade in Goods Agreement (ATIGA) commitment. However, non-tariff barriers, in the form of differences in halal standards, certification procedures, and domestic regulations, are still the main obstacles. For example, halal standards in Malaysia managed by JAKIM have different parameters from those in Indonesia regulated by the Halal Product Assurance Organizing Agency (Badan Penyelenggara Jaminan Produk Halal, BPJPH), so halal-certified products from the United Kingdom often have to undergo a re-verification process in another country.

Table 4. Status of harmonization of halal standards in ASEAN Countries

Country	Halal certification bodies	ASEAN harmonization level	Impact on halal exports
Indonesia	BPJPH – MUI	Partial	Dual certification process in other countries
Malaysia	JAKIM	Tall	Certifications are widely recognized in the Middle East
Brunei	MUIB	Tall	Integrated with Malaysia
Thailand	BEETLE	Low	Additional verification processes in other countries
Singapore	MOUSE	Tall	Becoming a regional halal logistics hub
Vietnam	Not yet centralized	Low	Difficult to penetrate the halal export market
Philippines	Halal Board	Partial	Need for further harmonization

Source: Abimanyu and Faiz (2023) and Johan and Plana-Casado (2023)

The status of the harmonization of halal standards between ASEAN countries is still partial. Malaysia, Brunei, and Indonesia have widely recognized certification systems, but countries such as Thailand, Vietnam, and the Philippines have not fully aligned their standards with regional halal institutions. This condition affects exports and imports, where halal products from Indonesia experience obstacles in entering the Thai market due to additional certification procedures. By contrast, Thai products are easier to accept in Malaysia after a limited mutual recognition agreement (Priatna et al., 2023). The impact of harmonization, which has not been optimal, can be seen in export competitiveness. Indonesia and Malaysia are still leading exporters of halal products to the

Middle East. However, the intra-ASEAN market share is not entirely optimal, owing to the limitations of mutual agreements. Meanwhile, countries such as Singapore have positioned themselves as halal trade hubs owing to regulatory flexibility and advanced logistics infrastructure.

Trade barriers in the ASEAN halal industry can be divided into two main categories: tariff and non-tariff barriers. Tariff barriers such as import duties and trade taxes still exist. However, their contribution to trade costs is relatively minor after implementing the ASEAN Trade in Goods Agreement (ATIGA). In contrast, non-tariff barriers, such as differences in halal standards, inconsistencies in certification procedures, additional technical requirements, and inconsistent domestic regulations, have been shown to significantly impact the smooth flow of trade. To provide a clearer picture of the impact of these barriers, the following compares tariff and non-tariff barriers in halal trade in the ASEAN region (Riccardi & Riccardi, 2020).

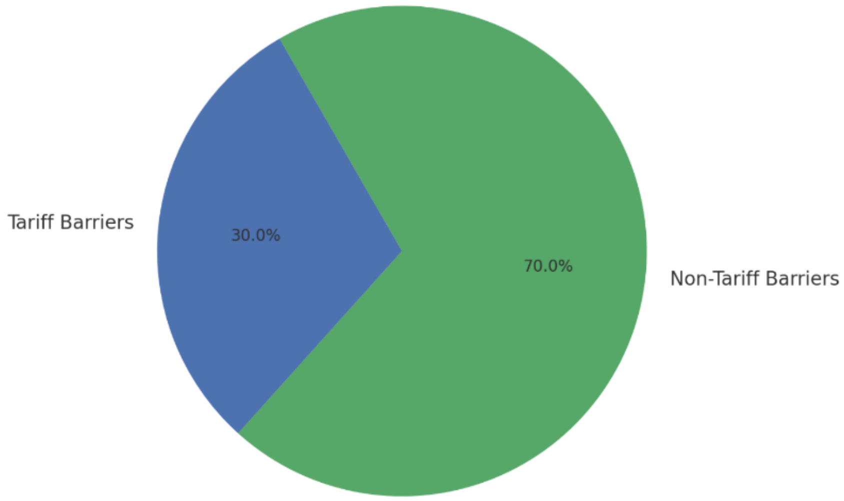

Figure 3. Comparison chart of tariff vs non-tariff barriers in ASEAN halal trade
Source: Wiko and Kinanti (2021) and Beng (2025)

Figure 3 shows that non-tariff barriers have a much greater contribution to the cost and complexity of halal trade than tariff barriers do. The proportion of non-tariff barriers is around 70 per cent, while tariff barriers are only around 30 per cent. This emphasizes that differences in halal regulations and certifications among ASEAN countries are the main challenges that must be overcome immediately. Harmonization of halal standards and mutual recognition mechanisms between ASEAN countries is not only an option, but also an urgent need to strengthen the competitiveness of halal multisectors and encourage ASEAN as the center of the global halal industry.

ASEAN economic integration offers significant opportunities to increase the competitiveness of halal multi-sectors. However, these opportunities can only be realized if the harmonization of halal regulations and standards runs simultaneously with institutional capacity building. Harmonization should be seen as a political-technical process that requires economic diplomacy, pragmatic mutual recognition mechanisms, and investment in accreditation capacity. If implemented gradually and inclusively, harmonization will lower transaction costs, accelerate intra-ASEAN trade flows, and strengthen the region's global halal industry hub position (Ishikawa, 2021).

The findings show that ASEAN economic integration opens up great opportunities to increase the competitiveness of halal multisectors, but simultaneously presents risks. The main opportunity lies in wider market access, where halal companies can penetrate regional markets without significant tariff barriers; however, the main risk is increased intra-regional competition. For example, Indonesian halal companies compete not only in the domestic market, but also with Malaysian and Thai companies with strong government support. Non-tariff barriers in the form of differences in halal standards are a crucial challenge. This misalignment increases compliance costs, extends distribution times, and lowers the efficiency of the halal supply chain. Harmonization of halal certification between ASEAN countries is urgently needed so that competitiveness depends not only on production costs but also on regulatory efficiency. Opportunities for cross-sector synergy are also increasingly open. The harmonization of halal standards impacts trade in food and beverages and strengthens the halal tourism sector by integrating halal food services across countries. Similarly, the halal cosmetics and pharmaceutical industries can harmonize standards to accelerate export market access. Harmonization is technical and strategic in creating a globally competitive halal ecosystem (Badan Penyelenggara Jaminan Produk Halal, 2025).

The policy implication that has emerged is the need for more proactive economic diplomacy. ASEAN needs halal diplomacy to build global trust that the region can become the world's halal production and distribution center. Synchronizing halal certification standards through regional institutions such as the ASEAN Halal Council can be a strategic step to reduce fragmentation. The theory of regulatory harmonization states that uniform standards reduce asymmetric information, lower transaction costs, and improve regional market efficiency. The harmonization of standards in the halal industry is not only a matter of technical uniformity; this theory emphasizes the institutional dimension, accreditation capacity, inspection mechanism, and social legitimacy of the certification body. As an operational theory, harmonization acts as a reduction in market friction. When market participants accept a set of rules recognized in many countries, they can allocate resources to quality improvement and marketing rather than to administrative compliance processes (Unver, 2021).

The theory of mutual recognition, which is inseparable from harmonization, explains that countries can maintain high national standards while accepting other countries' products through an equivalence verification mechanism (McArthur, 2021). This principle is suitable for gradual application in ASEAN: countries can negotiate recognition for certain products after meeting agreed upon technical criteria, so integration moves towards external equality without reducing domestic standards. The institutional network theory emphasizes the role of diplomatic economic coordination, which depends on inter-agency relationships, technology transfer of certification, and capacity support through training and infrastructure. Therefore, harmonization is not just technical; it is a political-administrative process that requires active economic diplomacy and the allocation of resources for capacity building (Modell et al., 2017).

The harmonization of halal certification in ASEAN still faces regulatory fragmentation, so trade transaction costs remain high. Non-tariff barriers have a greater impact on halal trade than import tariffs, particularly in the food and pharmaceutical sectors. Halal diplomacy is essential in strengthening ASEAN's position as the center of the global halal industry. Economic integration is only effective if it is supported by mutual recognition of halal standards between countries. This research strengthens the view that the competitiveness of halal multisectors in ASEAN is highly determined by the region's ability to solve the problem of the harmonization of standards and regulatory synchronization. Integrating the ASEAN economy by harmonizing halal standards offers access to broader regional markets with lower transaction costs. However, investors should also anticipate stiffer competition among intra-ASEAN countries. For policymakers, the main recommendations are to accelerate halal economic diplomacy, encourage the establishment of mutually agreed upon regional standards, and establish mutual recognition mechanisms to reduce compliance costs. ASEAN has a strategic opportunity to become a hub for the global halal industry, but only if regulatory and certification harmonization can be realized consistently and inclusively.

Supply chain constraints, resilience, and logistics innovation in supporting a competitive halal ecosystem

The halal supply chain in ASEAN faces several structural weaknesses that directly impact competitiveness (Hidayat and Musari, 2022). The first is the limitation of cold chains, particularly in fresh food products, halal pharmaceuticals, and Sharia-based vaccines. Refrigerated storage capacity in some ASEAN countries is still uneven; for example, Malaysia and Singapore are relatively superior, while Indonesia, the Philippines, and Vietnam face limited cold distribution in inland areas. The second weak point is traceability, or the ability to trace the origin of halal products. Although some companies have adopted digital systems, most halal MSMEs rely on manual recording, which is prone to manipulation. This increases the risk of losing the global consumer confidence. The third weak point is the capacity for halal certification, which is unbalanced between countries. Certification bodies in Malaysia (JAKIM) and Indonesia (BPJPH) have relatively high capacities, while countries such as Laos, Cambodia, and Myanmar still lack a halal institutional infrastructure. This difference in capacity hinders the integration of the regional halal ecosystems. The fourth weak point is the port and transportation infrastructure, which are not optimal. Logistics costs in ASEAN are still relatively high, reaching an average of 20-25 per cent of the price of goods, greater than OECD countries, which average 10-12 per cent. This weakens the competitiveness of ASEAN's halal exports, especially for products with thin margins, such as processed foods and halal beverages (Voak & Fairman, 2020).

External disruptions such as the Covid-19 pandemic and geopolitical tensions have also exacerbated the vulnerability of halal supply chains. The pandemic disrupted the distribution of raw materials, slowed the certification process, and increased the logistics costs by up to 30 per cent. Geopolitics, such as trade wars and shipping lane conflicts, create uncertainty in halal shipping in the global market (Qurniawati et al., 2022). The evaluation of technical solutions shows a great potential for digital innovation. Blockchain technology is being piloted to ensure halal traceability, whereas IoT is being used to monitor temperatures in cold chains in real time. The concept of cold chain as a service (CCaaS) has also begun to be implemented in Malaysia and Singapore, allowing small companies to access cold logistics services without significant infrastructure investments.

Table 5. Major weak points in ASEAN's halal supply chain

Component	Current conditions	Impact on the halal ecosystem
Cold Chain	Uneven; strong in Singapore, weak in the Philippines and Vietnam	Risk of loss of quality of export products
Traceability	Limited; dominant manual in MSMEs	Decline in global market confidence
Certification Capacity	Disparity between countries	Double process, high cost
Port/Transport Infrastructure	High logistics costs (20–25%)	Reducing the price competitiveness of halal products

Source: Abdullah and Azam (2020) and Shoaib and Mustafa (2025)

Selecting the proper logistics solution for strengthening halal supply chains in ASEAN requires a thorough analysis of the initial investment costs and resulting long-term benefits. Blockchain, Internet of Things (IoT), and Cold Chain as a Service are three technology approaches that are increasingly relevant in building a transparent, efficient, and globally competitive halal ecosystem; however, each solution presents different trade-offs. Blockchain offers complete transparency of the product's halal footprint but requires a considerable initial implementation cost. IoT provides significant benefits in terms of monitoring quality and response speed, although hardware investment and system integration are relatively high. In contrast, cold chains are more cost-effective and can directly support the halal food and pharmaceutical sectors. However, its long-term benefits are more limited than those of blockchain or IoT. To illustrate the comparison, the following graph shows the balance between the investment costs and long-term benefits of the three halal logistics solutions.

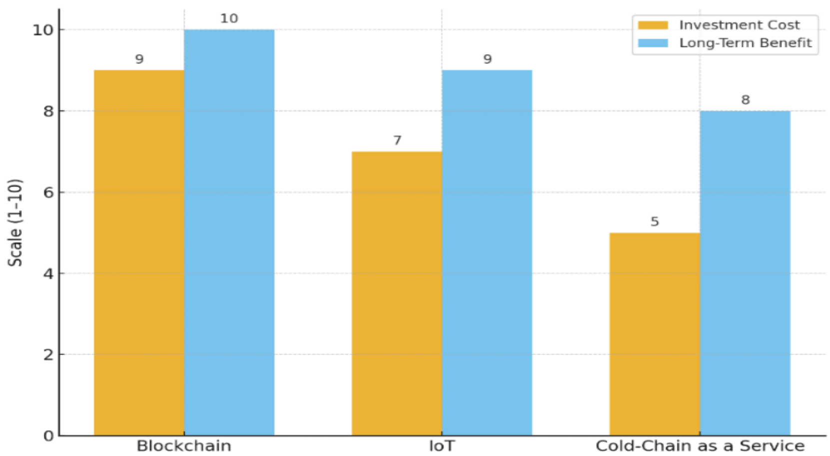

Figure 4. Comparison of investment cost and long-term benefits of three halal logistics solutions in ASEAN

Source: Hidayat and Musari (2022) and Yaqub (2025)

Figure 4 shows that blockchain has the highest investment costs. However, it provides long-term benefits through increased transparency, consumer trust, and export market access. The IoT occupies the second position with relatively high costs, but its benefits are also significant in maintaining the quality and integrity of the halal supply chain. Meanwhile, cold chain as a service presents a more affordable alternative for small and medium-sized businesses, with significant long-term benefits, although not as large as the previous two technologies. These results confirm the importance of a differentiated approach to investment strategies, in which large companies can prioritize Blockchain or IoT to build global competitiveness. At the same time, MSMEs can start with cold chain as a service-based solution to improve operational reliability and expand halal market access.

These findings show that the competitiveness of the ASEAN halal ecosystem is greatly influenced by the strengths and weaknesses of its supply chains. Limited cold chains cause halal products to lose quality and integrity, especially long-distance export products. The absence of traceability reduces consumer confidence, especially in premium markets, such as the European Union and the Middle East, which demand complete transparency. Differences in certification capacity slow the integration of the regional halal market, while inefficient port infrastructure increases costs and lowers price competitiveness. Digital technology-based solutions promise improvements, but significant cost-benefit trade-offs exist. For example, the implementation of blockchain for traceability requires a high initial cost for system integration. However, the long-term benefits of increased market confidence and reduced risk of rejection of export products make it feasible to adopt. The IoT for cold chain monitoring also requires device investment, but it can reduce losses due to damage to much more valuable goods (Gade & Aithal, 2022).

The halal-logistics infrastructure-financing model is a central issue. Given enormous investment needs, funding cannot depend solely on the government. Public-private partnerships (PPPs) offer an alternative: the government provides fiscal regulations and incentives, while the private sector manages operational efficiency. Sharia financing models, such as the halal infrastructure sukuk, can also finance the construction of cold chains and halal ports. ASEAN's cross-country collaboration is required to strengthen resilience. For example, with its logistics strength, Singapore can partner with Indonesia as a large producer of halal products so that the two complement each other. Priority investments need to focus on regional cold chain development, digitization of traceability, and harmonization of halal certification systems (Association of Southeast Asian Nations, 2025c).

Halal ecosystem theory emphasizes that a single actor does not determine the competitiveness of the halal industry, but rather a dynamic interaction between producers, consumers, regulators, certification bodies, and logistics providers (Randeree, 2019). Supply chain weaknesses such as cold chains or uneven certification show that ASEAN's halal ecosystem is still not fully functional. From an ecosystem perspective, halal logistics innovation is a form of coevolution in which companies, governments, and technology providers jointly adapt to maintain ecosystem sustainability. Implementing blockchain or IoT is not just a technical innovation but a collective effort to increase trust, which is the primary foundation of the halal market. Halal ecosystem theory also emphasizes the principle of value co-creation. Cold chain as a service is a concrete example of how logistics providers, halal MSMEs, and consumers collaborate to create shared value. MSMEs do not need to incur significant infrastructure costs, while logistics providers gain a new customer base and consumers obtain halal products of higher quality. Building resilience and halal logistics innovation must be understood as ecosystem strategies and not just infrastructure projects.

Some studies have supported this result. Haleem et al. (2021) emphasized that the cold chain is critical in the halal industry, especially for fresh food and pharmaceutical products. Digital traceability increases international consumer confidence in halal products (Lembaga Pengkajian Pangan, Obat-obatan dan Kosmetika, Majelis Ulama Indonesia 2025). The Covid-19 pandemic has shown a halal supply chain's weak resilience, so logistics digitalization has become an urgent need (Firdaus et al., 2024). The importance of public-private collaboration in halal infrastructure financing, primarily through Islamic financial instruments (The World Bank, 2017). This research strengthens the literature that ASEAN's halal ecosystem can only be competitive if supply chain resilience is strengthened through technological innovation, inclusive funding, and cross-actor collaboration.

The implications of this study confirm that the competitiveness of the ASEAN halal ecosystem is not only determined by production capacity but is also highly dependent on supply chain resilience and logistics innovation. Priority investments should be directed at digitizing traceability, building regional cold chains, and building halal certification capacities. The Sharia financing model can expand investor participation, while public-private collaboration will ensure implementation efficiency. ASEAN has an excellent opportunity to strengthen its position as the center of a global halal ecosystem that is productive and trusted through this strategy.

Conclusion

The conclusion of this study confirms that the multi-sector halal industry in ASEAN has an enormous strategic opportunity to become the center of global economic growth in the digital era and regional economic integration. The competitiveness of the food, cosmetics, pharmaceutical, tourism, finance, and halal logistics sectors is greatly influenced by the industry players' ability to adopt digital technology, develop innovative business models, and respond to the dynamics of ASEAN market integration. Implementing e-commerce, fintech, digital quality management systems, blockchain for traceability, and digital halal certification initiatives have been proven to increase productivity, shorten lead times, and lower operational costs while strengthening consumer trust in halal integrity. Technology adoption still faces obstacles in terms of investment costs, limited human resource capabilities, and inconsistency in certification standards between countries. ASEAN's economic integration through trade liberalization mechanisms opens up export opportunities and market expansion, but differences in halal regulations and standards remain a significant barrier. The harmonization of halal certification and mutual recognition between countries is an essential requirement for reducing transaction costs and improving the efficiency of intra-regional trade. The success of halal industry innovation strategies is also highly determined by cross-sector synergy, such as collaboration between fintech and halal food MSMEs, or halal logistics to strengthen the distribution of pharmaceutical and cosmetic products.

This study has both practical and theoretical implications. For policymakers, the findings highlight the urgency of harmonizing halal certification systems and promoting digital infrastructure to facilitate inclusive industrial growth. For industry actors, this study suggests that adopting innovative business models such as direct-to-consumer platforms, fintech subscriptions, and digital certification services can strengthen market positioning and profitability. For investors, ASEAN's halal sector presents strategic opportunities for diversification through technology-enabled ventures and cross-border partnerships. Theoretically, this study enriches the halal industry literature by integrating concepts from digital innovation, supply chain resilience, and economic integration, thus providing a new analytical lens for understanding competitiveness in the digital era.

Nevertheless, this study has several limitations. Qualitative and literature-based design restricts empirical generalization, as the study relies heavily on secondary data and theoretical synthesis. Differences in the level of digital infrastructure and policy maturity among the ASEAN countries may also limit cross-country comparability. Furthermore, the absence of quantitative indicators or firm-level case studies constrains the ability to measure the direct impact of digitalization on performance metrics.

Future research should explore empirical validation through mixed-method approaches that combine surveys, econometric modelling, and case studies. Scholars should examine how digital innovation affects halal MSMEs' financial performance, consumer trust, and cross-border trade behavior. Further investigation into Islamic finance instruments for halal infrastructure, as well as the sociocultural dynamics of consumer adaptation to digital certification, would deepen our understanding of the industry's transformation. Expanding comparative analyses beyond ASEAN to include emerging halal economies in South Asia, the Middle East, and Africa will offer valuable insights into global halal competitiveness and integration dynamics.

Acknowledgments

The authors thank the Ministry of Tourism and Creative Economy of the Republic of Indonesia and the Aceh Culture and Tourism Office for their permission to access valuable data and insights.

The authors would like to express their appreciation to the tourism industry players, academics, and people of Aceh who participated in the interviews and surveys. The support of UIN K.H. Abdurrahman Wahid Pekalongan, Al-Azhar University, and the Armag Oil and Gas Academy Malaysia in funding and research facilities is significant. We thank the reviewers for their constructive input, which has enriched this research. Hopefully, this study will benefit the development of halal tourism in Indonesia.

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Writing – review & editing: Luqman Syakirunn'am, Zohaib Hassan Sain, Uthman Shehu Lawal.

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