

HALAL-DIGITAL SUPPLY CHAIN INTEGRATION MODEL IN HALAL TOURISM ECOSYSTEM: A COMMUNITY EMPOWERMENT-BASED FRAMEWORK

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Abstract : The development of halal tourism requires effective integration between halal assurance practices, digital transformation, and community participation. However, existing studies have largely focused on halal certification, tourism marketing, or technology adoption separately, while limited attention has been given to how digital practices and community governance interact within halal tourism supply chain ecosystems. This study aims to explore the mechanisms through which halal supply chain practices, digital capabilities, and community-based governance are integrated in supporting sustainable halal tourism development. This study employed a qualitative multiple-case study design involving selected halal tourism ecosystems in Indonesia. Data were collected through semi-structured interviews, observations, and document analysis involving key stakeholders, including tourism operators, local businesses, community organizations, and supporting institutions. Data were analyzed using reflexive thematic analysis to identify patterns related to halal supply chain coordination, digital integration, and community empowerment. The findings indicate that halal-digital supply chain integration is shaped by three interconnected dimensions: digital capability, halal supply chain coordination, and community-based governance. Digital practices support information sharing, documentation, and traceability processes; however, their effectiveness depends on stakeholder readiness, collaborative arrangements, and community capacity. The study further demonstrates that community empowerment functions as a governance mechanism that connects technological practices with local tourism operations. Based on these findings, the study proposes a community-based halal-digital supply chain integration framework that emphasizes

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the interaction between technology, supply chain coordination, and local participation. This study contributes to halal tourism and supply chain literature by extending technology-centered perspectives toward a socio-technical understanding of digital transformation. The findings provide practical implications for tourism stakeholders and policymakers in designing context-sensitive digital strategies that strengthen halal assurance and community involvement.

Introduction

The global halal economy has experienced significant growth, expanding beyond halal food products into broader sectors, including finance, logistics, lifestyle, and tourism. Within this development, halal tourism has emerged as an important sector that combines religious values, tourism services, and local economic development. The increasing mobility of Muslim travelers has encouraged destinations to provide tourism experiences that consider halal assurance, including food services, accommodation, worship facilities, and transparent information regarding halal compliance (Battour & Ismail, 2016; Jabeen et al., 2025). Consequently, halal tourism ecosystems require not only service innovation but also effective coordination among multiple actors involved in the tourism value chain.

Unlike conventional tourism supply chains, halal tourism involves additional requirements related to religious compliance, trust, and verification. Halal integrity depends on the ability of actors to maintain information continuity across supply chain processes, including sourcing, production, service delivery, and consumer communication. However, many halal tourism ecosystems, particularly those involving micro, small, and community-based enterprises, still face challenges in establishing integrated information systems, maintaining traceability, and coordinating halal assurance practices among stakeholders (Harsanto et al., 2024; Chantalima, 2025).

Digital transformation has been increasingly discussed as a potential mechanism to strengthen halal supply chain management. Technologies such as blockchain, QR-based traceability, Internet of Things (IoT), and digital platforms have been proposed to improve transparency, documentation, and information exchange among supply chain actors (Al-Hazmi et al., 2024; Hendayani & Fernando, 2023). Nevertheless, digital transformation in halal tourism cannot be understood merely as

technology adoption. Tourism ecosystems are characterized by fragmented actors, diverse organizational capacities, and strong dependence on local social structures. Therefore, digital integration requires alignment between technological infrastructure, organizational readiness, and collaborative governance.

Previous studies indicate that digitalization in halal supply chains has largely focused on manufacturing and product-based contexts, particularly halal food production and logistics. Research on blockchain-based halal traceability, for example, has demonstrated the potential of digital technologies to strengthen certification processes and supply chain transparency (Hendayani & Fernando, 2023; Khan et al., 2025). However, these approaches are not directly transferable to halal tourism because tourism services involve dynamic interactions between producers, service providers, communities, certification institutions, and visitors. The operational mechanisms through which digital supply chain integration occurs across tourism actors remain insufficiently explored.

Furthermore, existing halal tourism research has frequently emphasized destination marketing, Muslim-friendly services, and visitor experience, while the integration of supply chain processes and digital governance has received comparatively limited attention (Rahman et al., 2024; Nurhayati et al., 2025). Digitalization initiatives in tourism often remain concentrated at the promotional level, such as online marketing and digital information dissemination, rather than developing shared systems for managing halal evidence, operational coordination, and accountability among ecosystem actors.

Community empowerment represents an important dimension in addressing this challenge. In community-based tourism ecosystems, local actors are not only recipients of tourism development but also participants who manage resources, provide services, and influence decision-making processes. Community empowerment involves dimensions of economic participation, social collaboration, capacity development, and ownership of local resources (Akyeampong et al., 2024; Manyara et al., 2024). Within halal tourism, community involvement becomes particularly relevant because halal assurance requires collective responsibility among multiple actors rather than relying solely on formal certification institutions.

Although studies have examined halal supply chains, digital transformation, and community-based tourism separately, limited

empirical research explains how these three domains interact within halal tourism ecosystems. Specifically, insufficient attention has been given to how community actors participate in digital traceability processes, how responsibilities for halal information management are distributed among stakeholders, and how low-cost digital practices can support halal assurance in community-based tourism settings. This gap indicates the need for an empirically grounded framework explaining the relationship between halal supply chain integration, digital practices, and community empowerment.

This study addresses this gap by examining the integration of halal supply chains and digital technologies within halal tourism ecosystems from a community empowerment perspective. Rather than proposing a universally applicable technological model, this study develops an empirically grounded framework that explains how actors negotiate halal assurance, information sharing, digital adoption, and community participation within specific tourism contexts. The study contributes to halal supply chain literature by extending discussions beyond technological solutions toward socio-technical integration involving governance, local capability, and collaborative value creation.

Based on this research focus, the study aims to analyze: (1) the current practices of halal supply chain management within tourism ecosystems; (2) the role of digital technologies in supporting traceability and information exchange; (3) the forms of community empowerment that influence halal-digital integration; and (4) the development of an empirically grounded framework for integrating halal supply chains and digital transformation in community-based halal tourism.

Method

This study employed a qualitative multiple-case study design to examine the integration of halal supply chain practices and digital transformation within community-based halal tourism ecosystems. A qualitative approach was selected because the study aimed to understand the experiences, interactions, and governance mechanisms among multiple stakeholders involved in halal tourism development (Creswell & Poth, 2023).

The research was conducted in selected halal tourism destinations in Indonesia, which were purposively chosen based on the involvement of local communities, halal-related business activities, and the use of digital

technologies in tourism operations. The unit of analysis was the halal tourism ecosystem, with embedded units consisting of halal food MSMEs, accommodation providers, tourism operators, community organizations, and supporting institutions.

Data were collected through semi-structured interviews, non-participant observations, and document analysis. Interviews were conducted with stakeholders directly involved in halal tourism activities to explore halal assurance practices, digital adoption, coordination mechanisms, and community participation. Observations focused on operational processes related to halal services and information management, while document analysis examined relevant materials such as halal certificates, operational documents, and digital records.

Data were analyzed using Reflexive Thematic Analysis following Braun and Clarke's (2021) framework. The analysis involved data familiarization, coding, theme development, theme review, interpretation, and cross-case comparison. The analysis process aimed to identify patterns related to halal supply chain integration, digital traceability, stakeholder governance, and community empowerment.

The credibility of the findings was ensured through triangulation of data sources and techniques, including comparisons between interview data, observations, and documents. Member checking and reflexive documentation were also applied to strengthen the trustworthiness of the findings. Ethical considerations included informed consent, confidentiality protection, and responsible management of participant information.

Results And Discussion

Current State of Halal Tourism Ecosystem: Fragmented Practices toward Integrated Halal Assurance

The findings indicate that halal tourism ecosystems operate through a combination of formal halal assurance practices, local community initiatives, and emerging digital information practices. Across the studied cases, halal management was not implemented as a fully integrated supply chain system but rather as a set of operational activities distributed among different actors. These activities involved halal food preparation, supplier selection, service delivery, certification management, and communication of halal-related information to visitors.

The analysis shows that halal assurance within tourism destinations is strongly influenced by coordination among ecosystem actors. Halal food MSMEs, accommodation providers, tourism operators, community organizations, and supporting institutions play different roles in

maintaining halal-related practices. However, differences in organizational capacity, documentation practices, and access to digital tools create variations in how halal information is managed across actors.

This finding suggests that the main challenge of halal tourism development is not only the availability of halal standards but also the continuity of information flows between stakeholders. In a tourism ecosystem, halal integrity depends on multiple service interactions, from suppliers and producers to final consumers. Therefore, maintaining halal assurance requires mechanisms that connect operational evidence across different points of the tourism value chain.

The finding extends previous halal supply chain studies that emphasize the importance of traceability and information transparency. Previous research has demonstrated that digital technologies such as blockchain, QR codes, and data management systems can strengthen halal supply chain performance by improving verification and information accessibility (Hendayani & Fernando, 2023; Harsanto et al., 2024). However, this study indicates that technology adoption should be understood within the broader context of organizational readiness and stakeholder collaboration.

In the tourism context, halal supply chain integration is more complex than product-based halal supply chains because services involve intangible experiences and direct interactions between providers and visitors. Consequently, halal assurance cannot rely only on certification documents but requires continuous coordination among actors who participate in producing halal tourism experiences.

The findings also highlight that community involvement represents an important foundation for halal tourism governance. Local actors are not merely service providers but also contribute to maintaining destination standards, sharing information, and coordinating tourism activities. This aligns with community-based tourism perspectives, which emphasize local participation, ownership, and collective responsibility in sustainable destination development (Akyeampong et al., 2024; Manyara et al., 2024).

Nevertheless, community participation alone does not automatically create an integrated halal tourism ecosystem. The effectiveness of community involvement depends on the availability of clear roles, communication mechanisms, and shared procedures among stakeholders. Therefore, halal tourism development requires a socio-technical approach that combines halal compliance, digital information management, and community governance.

Overall, this section demonstrates that the current condition of halal tourism ecosystems is characterized by distributed halal practices rather than fully integrated systems. The emerging need is not simply the adoption of advanced technologies but the development of appropriate integration mechanisms that connect halal evidence, stakeholder coordination, and community participation.

Digital Integration of Halal Supply Chain: From Basic Traceability to Collaborative Information Management

The findings indicate that digital integration within halal tourism ecosystems develops gradually according to the capacity and readiness of local actors. Rather than representing an immediate transition toward advanced technologies, digital transformation appears as a progressive process that begins with basic information management practices and gradually moves toward more structured traceability and coordination mechanisms.

At the operational level, digital practices within halal tourism ecosystems are primarily related to improving information availability, communication efficiency, and documentation processes among stakeholders. Digital tools are utilized to support activities such as sharing product information, managing tourism services, communicating certification status, and maintaining records related to halal assurance. However, the level of digital adoption varies depending on organizational capacity, technological literacy, and the complexity of relationships among supply chain actors.

This finding suggests that digital transformation in halal tourism should not be understood merely as technology implementation, but as a process of reorganizing information flows across interconnected actors. In halal supply chains, transparency depends on the availability of reliable information regarding products, processes, and compliance practices. Therefore, digital integration becomes meaningful when technologies support the movement of information across supply chain nodes rather than functioning as isolated tools.

The findings are consistent with previous studies highlighting that digital technologies can strengthen halal supply chain performance through improved traceability, data accessibility, and verification mechanisms (Harsanto et al., 2024; Hendayani & Fernando, 2023). However, unlike manufacturing-oriented halal supply chains, tourism ecosystems involve service interactions that are dynamic and dependent on human participation. Consequently, digital integration requires

adaptation to local contexts rather than direct adoption of complex technological systems.

One important issue identified in the integration process is the fragmentation of information management among stakeholders. Different actors may maintain their own records, communication channels, or documentation systems, resulting in limited interoperability. For example, information related to halal certification, supplier relationships, product availability, and service procedures may exist separately across different actors. This condition creates challenges in establishing a shared understanding of halal assurance throughout the tourism experience.

From a supply chain perspective, this situation demonstrates that the main challenge is not only the availability of digital technology but also the establishment of shared governance mechanisms. Digital platforms require agreement regarding what information should be collected, who is responsible for maintaining the data, and how information can be accessed by relevant stakeholders. Without such governance arrangements, digitalization risks becoming an additional administrative burden rather than an instrument for improving coordination.

The findings also indicate that simple digital solutions may provide an initial pathway for strengthening halal supply chain integration, particularly among community-based tourism actors with limited resources. Rather than immediately adopting sophisticated technologies such as blockchain or artificial intelligence, gradual digitalization through accessible tools may be more compatible with the operational realities of small businesses and local organizations.

This perspective supports the argument that digital maturity should be viewed as a continuum. Early-stage digital practices may focus on basic documentation, communication, and information sharing, while more advanced stages may involve integrated databases, automated verification systems, or intelligent analytics. The transition between stages depends not only on technological availability but also on human capacity, institutional support, and collaborative commitment among ecosystem actors.

Furthermore, digital integration has implications for halal trust formation. In halal tourism, visitors require confidence that services provided are consistent with halal principles. Digital information systems may support this process by increasing transparency and allowing stakeholders to communicate evidence of halal practices more effectively.

Nevertheless, digital information should complement rather than replace formal halal certification mechanisms and institutional oversight.

Therefore, the findings suggest that successful halal-digital supply chain integration requires three interconnected elements: (1) appropriate digital tools that match stakeholder capacity, (2) shared information governance among supply chain actors, and (3) community capability to manage and utilize digital systems. Digital transformation in halal tourism is consequently not only a technological agenda but also a collaborative process involving organizational learning, trust building, and collective responsibility.

Community Empowerment as the Governance Mechanism of Halal-Digital Supply Chain Integration

The findings demonstrate that community empowerment represents an essential governance mechanism in connecting halal supply chain practices with digital transformation initiatives. Within community-based halal tourism ecosystems, local communities are not merely beneficiaries of tourism development but active actors who contribute to service provision, resource management, information exchange, and the maintenance of halal-related practices.

The analysis indicates that the effectiveness of halal-digital supply chain integration depends not only on technological availability but also on the capacity of community actors to participate in and manage the transformation process. Digital systems require human involvement to generate, maintain, interpret, and utilize information. Therefore, community empowerment becomes a critical condition that determines whether digital practices can be embedded into everyday tourism operations.

Community empowerment in this context consists of several interconnected dimensions: participation, capability development, ownership, and collaborative decision-making. Participation refers to the involvement of local actors in tourism planning and operational processes. Capability development concerns the improvement of knowledge and skills required to manage halal standards and digital tools. Ownership reflects the extent to which communities perceive tourism development and digital initiatives as collective assets rather than external interventions.

These findings extend previous discussions on community-based tourism, which emphasize that sustainable tourism development requires meaningful local involvement and the distribution of benefits among

community members (Akyeampong et al., 2024; Manyara et al., 2024). In halal tourism contexts, community participation has additional significance because halal assurance involves collective responsibility across different actors. The implementation of halal principles cannot depend solely on formal certification institutions but requires daily practices by businesses, workers, and communities involved in tourism services.

The findings further suggest that community empowerment influences how digital technologies are adopted and utilized. Communities with stronger organizational capacity are more likely to engage in information-sharing practices, maintain operational records, and participate in collaborative initiatives. Conversely, limited digital literacy, insufficient training, and weak coordination structures may restrict the effectiveness of digital integration.

This observation highlights that digital transformation in halal tourism is fundamentally a socio-technical process. Technology provides tools for improving transparency and coordination, but communities determine how these tools are interpreted and incorporated into local practices. Therefore, digital transformation strategies that overlook community readiness may create technological systems that are disconnected from operational realities.

Furthermore, empowerment contributes to the development of trust among ecosystem actors. Trust is particularly important in halal tourism because visitors depend on credible information regarding halal compliance and service quality. When communities participate in maintaining standards, documenting practices, and communicating information, they contribute to strengthening collective accountability within the tourism ecosystem.

However, the findings also indicate that community empowerment requires institutional support. Local actors may possess strong social networks and practical knowledge, but they may require assistance in areas such as digital skills development, halal awareness, certification processes, and business management. Therefore, collaboration between communities, government institutions, educational organizations, and tourism stakeholders becomes necessary to create an enabling environment for halal-digital integration.

From this perspective, community empowerment functions not only as a social objective but also as a governance mechanism that connects technological innovation with local capability. The integration of halal supply chains and digital practices becomes more sustainable when

communities are positioned as co-creators of the tourism ecosystem rather than passive recipients of digital solutions.

Overall, this study suggests that halal-digital supply chain integration requires alignment between three dimensions: technological infrastructure, supply chain coordination, and community empowerment. While digital tools support transparency and information exchange, community capacity determines how these tools are adopted and sustained within local tourism ecosystems.

Toward a Community-Based Halal-Digital Supply Chain Integration Framework

The findings from the three analytical dimensions—halal supply chain practices, digital integration, and community empowerment—indicate that halal tourism ecosystem development requires an integrated approach that connects technological capability, supply chain coordination, and community governance. Rather than viewing digital transformation as an independent technological intervention, this study conceptualizes halal-digital supply chain integration as a socio-technical process in which digital practices, stakeholder collaboration, and community capacity interact to support halal assurance.

The framework developed from the findings consists of four interconnected dimensions: (1) digital capability development, (2) halal supply chain coordination, (3) community-based governance, and (4) sustainable halal tourism value creation.

The first dimension, digital capability development, refers to the ability of tourism actors to adopt and utilize digital tools for managing information, communication, and traceability processes. The findings suggest that digital readiness is not determined solely by technological availability but also by the knowledge, skills, and organizational capacity of stakeholders. Therefore, digital transformation requires gradual capability building rather than immediate implementation of complex technological systems.

The second dimension, halal supply chain coordination, emphasizes the importance of information continuity among actors involved in halal tourism activities. Halal assurance requires coordination from upstream suppliers to tourism service providers and visitors. In this context, digital tools function as supporting mechanisms that facilitate information sharing, documentation, and transparency. However, the effectiveness of these tools depends on the existence of shared procedures and stakeholder commitment to maintaining reliable information.

The third dimension, community-based governance, represents the central mechanism that connects digital practices with local tourism operations. Community empowerment enables local actors to participate in decision-making, maintain halal practices, and manage digital transformation according to local needs. This finding reinforces community-based tourism perspectives, which argue that sustainable tourism development depends on local ownership, participation, and collaborative governance (Akyeampong et al., 2024; Manyara et al., 2024).

The fourth dimension, sustainable halal tourism value creation, represents the broader outcome of integrating halal supply chains, digital practices, and community participation. In this framework, value creation does not refer only to economic benefits but also includes trust formation, service quality improvement, cultural sustainability, and stronger relationships among tourism stakeholders.

The proposed framework contributes to halal tourism literature by shifting the discussion from technology-centered digitalization toward a more holistic understanding of ecosystem integration. Previous studies have highlighted the role of blockchain, digital platforms, and traceability systems in improving halal supply chain transparency (Hendayani & Fernando, 2023; Harsanto et al., 2024). However, this study emphasizes that technological solutions require social and institutional foundations to become effective within community-based tourism contexts.

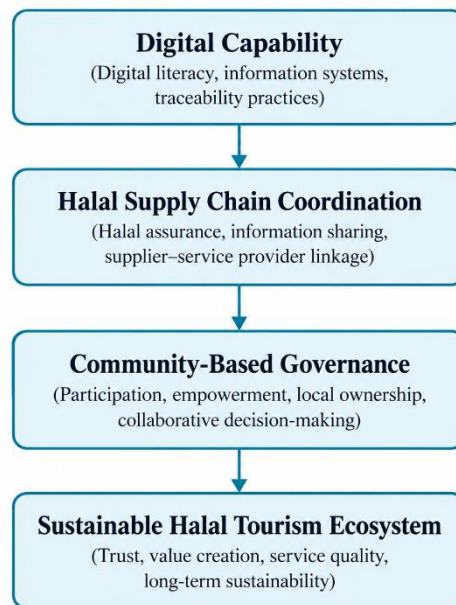
Furthermore, the framework extends existing halal tourism studies by explaining the relationship between digital transformation and community empowerment. Digitalization is positioned not as a replacement for human involvement but as an enabling mechanism that strengthens coordination among actors. Communities remain central because they provide the operational knowledge, social trust, and local commitment required to sustain halal tourism practices.

The framework also highlights several contextual conditions that influence implementation. These include stakeholder collaboration, digital literacy, institutional support, and alignment between halal standards and local tourism practices. Therefore, the application of halal-digital supply chain integration should be adapted to the characteristics of each destination rather than implemented through a standardized technological approach.

Overall, this framework proposes that effective halal tourism ecosystem development emerges from the interaction between technology, supply chain management, and community governance. Digital tools provide opportunities for improving transparency and coordination, but

their sustainability depends on the capacity of local actors to participate, collaborate, and manage shared responsibilities.

Figure 1. Proposed Community-Based Halal-Digital Supply Chain Integration Framework



CONCLUSION

This study examined the integration of halal supply chain practices and digital transformation within community-based halal tourism ecosystems. The findings demonstrate that halal-digital supply chain integration is not solely determined by technological adoption but emerges through the interaction between digital capability, supply chain coordination, and community-based governance.

The study highlights three main conclusions. First, halal tourism ecosystems require stronger coordination mechanisms among stakeholders to maintain the continuity of halal assurance across tourism activities. Halal practices involve multiple actors, including local businesses, tourism operators, communities, and supporting institutions; therefore, effective integration depends on information sharing and collaborative arrangements among these actors.

Second, digital transformation contributes to improving information management, transparency, and traceability within halal tourism ecosystems. However, digitalization should not be understood merely as the implementation of advanced technologies. The effectiveness of digital practices depends on stakeholder readiness, digital literacy,

organizational capacity, and the existence of shared governance mechanisms.

Third, community empowerment functions as a critical governance mechanism that connects halal supply chain practices with digital transformation. Local communities contribute not only as tourism service providers but also as active actors who maintain halal practices, participate in decision-making, and support the sustainability of tourism ecosystems. Therefore, sustainable halal tourism development requires a balance between technological capability, institutional coordination, and community participation.

Theoretically, this study contributes to halal tourism and supply chain literature by proposing a community-based halal-digital supply chain integration framework. The framework extends previous discussions that often emphasize technological solutions by highlighting the socio-technical relationship between digital capability, halal supply chain coordination, and community governance. This perspective provides a broader understanding of how digital transformation can be embedded within local tourism ecosystems.

Practically, the findings suggest that tourism stakeholders, policymakers, and community organizations should prioritize capacity building, collaborative governance, and context-appropriate digital adoption. Rather than implementing technology-driven solutions independently, halal tourism development strategies should consider local capabilities, stakeholder relationships, and community ownership.

This study has several limitations. First, the qualitative multiple-case design provides contextual understanding but does not allow statistical generalization across all halal tourism destinations. Second, the study focuses primarily on stakeholder perspectives within selected tourism ecosystems, while visitor perceptions and broader market responses require further investigation. Future research may employ comparative studies across different regions, incorporate quantitative approaches to examine framework relationships, or investigate the effectiveness of specific digital technologies in strengthening halal supply chain performance.

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