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THE IMPACT OF SUSTAINABLE SOURCING ON HALAL CERTIFICATION: A LITERATURE REVIEW ON ETHICAL AND ENVIRONMENTAL CONCERNS

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ABSTRACT

Objective: This research analyzes the relationship between halal certification, sustainability, and global ethics in building a resilient and transparent halal supply chain. The focus includes the role of blockchain technology and ESG (Environmental, Social, and Governance) integration to improve traceability, consumer trust, and compliance with sharia and sustainability standards.

Research Design & Methods: This research uses a systematic literature review to analyze studies on halal certification, sustainability, and technology in the halal supply chain. Data were obtained from Scopus, Web of Science, and Google Scholar databases. Qualitative analysis was conducted to identify key patterns and practices in sustainable halal supply chain management.

Findings: The results show that integrating blockchain with ESG principles strengthens transparency and traceability at every stage of the halal supply chain, crucial in maintaining consumer confidence and compliance with halal standards. Top management commitment and dedicated halal infrastructure also play an important role in ensuring product quality and integrity. In addition, it was found that mandatory halal certification for MSMEs in Indonesia can strengthen the spiritual rights of Muslim consumers. However, its impact on improving MSME performance has not been significant without the support of more effective management strategies.

Implications & Recommendations: This study's findings indicate the need for additional strategies, such as subsidizing halal certification, training, and policy support, to strengthen the performance and competitiveness of MSMEs in the international market. In addition, the halal industry is advised to adopt blockchain technology and ESG principles widely as solutions to enhance trust and social responsibility.

Contribution & Value Added: This research offers a framework that integrates blockchain, ESG, and halal certification to build a sustainable supply chain. The added value is that it provides insights into the importance of sustainability integration and transparency in the halal industry, strengthens the position of MSMEs in the global market, and supports sustainable development goals.

Keywords: Halal certification, Global ethics, Halal supply chain, Sustainability,

JEL codes: Q01, Q56

Article type: research paper

INTRODUCTION

Sustainable procurement has become a highly relevant issue in various industry sectors worldwide, including the rapidly growing halal food industry. As global awareness of the

importance of more environmentally friendly, ethical, and socially responsible business practices increases, sustainable procurement in the context of halal certification has gained significant attention (Rejeb, Rejeb, & Zailani, 2021). Halal certification, which initially focused only on compliance with Sharia law and ensuring that products meet hygiene standards and that raw materials conform to Islamic principles, is now evolving to cover broader aspects of sustainability (Al-Shami & Abdullah, 2023). These aspects include responsible use of natural resources, reduced carbon footprint, better waste management, social justice, and animal welfare. These changes reflect the changing expectations of global consumers who not only want technically halal products but also products that are produced in a way that respects environmental and social ethics. Consumers increasingly demand transparency in halal food production, including ensuring that the raw materials used are sustainably sourced and free from environmentally damaging or unethical practices (Rahman et al., 2024). In addition, many companies also realize that adopting sustainable procurement practices can enhance their reputation in the global marketplace, give consumers more confidence, and open up new business opportunities (Pereira et al., 2023). This trend is triggered by changing consumption patterns where consumers are increasingly aware of the social and environmental impacts of the products they buy and encouragement from governments and international organizations that encourage adopting more environmentally responsible business practices (Yener et al., 2023). Ab Talib & Zulfakar (2023) In the halal food sector, sustainable procurement is also faced with the challenge of ensuring that these practices comply with Sharia principles, thus creating a halal certification system that ensures religious compliance and supports global sustainability goals. This shows the importance of integration between Sharia principles and sustainability practices in halal certification, which is now not only a religious issue but also one of the key elements in achieving global sustainable development goals (Tayob, 2021).

In the context of halal certification, sustainable sourcing includes selecting, procuring, and producing raw materials and end products, considering three fundamental aspects: environmental, social, and economic factors (Mustapha et al., 2024). This process includes efficiently utilizing resources, reducing waste, and establishing strict ethical standards throughout the supply chain (Fernando et al., 2024). Applying this concept in the halal industry can strengthen the integrity of halal certification by ensuring that the entire process is not only shariah-compliant but also supports sustainability. Yet, adopting sustainable procurement in the halal certification process is still limited, mainly due to the lack of research exploring the relationship between sustainable procurement and halal certification. Existing literature mainly focuses on halal certification's legal and technical aspects, often ignoring or addressing sustainability issues separately (Bux et al., 2022). This oversight requires a shift in manufacturers' strategies to incorporate sustainable practices, such as renewable resource utilization and environmental impact mitigation, in their halal supply chains. For consumers, sustainable sourcing fosters trust in halal products by ensuring that products are produced with social and environmental responsibility in addition to meeting sharia standards. In addition, climate change and environmental degradation have encouraged governments and international organizations to advocate for implementing sustainable business practices in various sectors, including the halal industry (Sri Meylinda & Rabiatal Adawiyah Matondang, 2023). Implementing sustainable procurement in halal certification helps meet global regulatory demands and creates added value for halal products in the international market. The integration of sustainable practices into halal certification provides an opportunity for manufacturers to meet the expectations of modern consumers who are not only looking for halal products, but also products that are produced in an ethical and environmentally friendly manner (Sri Meylinda & Rabiatal Adawiyah Matondang, 2023).

While the potential benefits of sustainable sourcing in the halal industry are huge, there are some significant challenges to overcome (Haleem et al., 2021). One of the biggest challenges is the lack of internationally agreed certification standards that integrate sustainability principles in halal certification (Haleem et al., 2020). In many countries, halal certification focuses only on the hygiene and safety aspects of food without considering the environmental or social impacts of the production process (M. R. Hasan & Abd Latif, 2024). In addition, many industry players do not fully understand or apply the concept of sustainable procurement in their operations (Allenbacher & Berg, 2023). This is due to a lack of awareness, limited funds, and regulations that do not fully

support the implementation of sustainable practices in the halal industry (Al-Mahmood & Fraser, 2023). From an ethical standpoint, sustainable halal industry procurement also presents challenges. Halal certification must ensure compliance with Sharia law and consider the social impact of business decisions, such as worker welfare, animal welfare, and social justice (Yama et al., 2019). Many studies have shown that current halal certification is still vulnerable to ethical criticism, especially when applied in the context of global trade, which can marginalize certain Muslim communities or violate principles of social justice (Tayob, 2021). For example, in many developing countries, small producers often do not have access to the technology or resources necessary to comply with strict halal standards, ultimately affecting their businesses' sustainability. On the other hand, from an environmental perspective, sustainable sourcing in the halal industry is also important to reduce negative impacts on nature (Ab Talib & Zulfakar, 2023). The food industry, particularly livestock and agriculture, often contributes heavily to pollution and deforestation. Therefore, implementing more environmentally friendly practices in halal food production can help reduce these impacts. One proposed solution is using blockchain technology to increase transparency in the halal supply chain. With blockchain, consumers and regulators can easily trace the origin of halal products and ensure that every stage in the supply chain meets established sustainability standards (Bux et al., 2022).

This study underscores the considerable promise of sustainable procurement in optimizing the efficiency and reputation of the halal certification process. Nevertheless, challenges persist, including conflicts between sustainability practices and halal standards and tracing difficulties in global supply chains. The findings underscore the necessity of integrating sustainability into halal certification while maintaining strict compliance with syariah principles. Future research should prioritize the formulation of pragmatic strategies that facilitate the harmonization of sustainability and halal requirements, with a particular focus on resolving traceability concerns and enhancing global supply chain management.

LITERATURE REVIEW

Sustainable Procurement in the Halal Industry

Sustainable procurement in the halal industry is a concept that focuses on implementing environmentally, socially, and economically responsible business practices at every stage of the supply chain. Sustainable procurement aims to ensure that the entire process, from the procurement of raw materials to the distribution of the final product, is carried out with sustainability principles in mind (Singh & Chan, 2022). In the context of the halal industry, this concept is increasingly important given the increasing global demand for halal products that meet Sharia standards and support environmental conservation efforts and social responsibility (Krisna & Yusuf, 2023). Implementing sustainable procurement in the halal industry includes various strategic measures such as efficient use of resources, reduction of environmental impact through better waste management, and improvement of social welfare through fair and ethical corporate policies (Sari et al., 2024). Sustainable procurement is an important cornerstone of the halal industry, as it can help ensure that every product produced complies with Sharia standards while keeping the welfare of the environment and society in mind.

However, sustainable procurement in the halal food sector still faces a number of considerable challenges (Ali & Suleiman, 2016). One of the main obstacles is the lack of global agreement on halal certification standards that include sustainability aspects (Handayati et al., 2024). Currently, most halal certification standards focus more on fulfilling Sharia law related to hygiene and raw materials without incorporating sustainability dimensions such as carbon emissions management, waste reduction, or renewable energy use (Sakti, 2023). This creates a significant gap in the sustainability standards applicable in different countries and makes adopting sustainable practices difficult to implement across the board in the halal industry. Integration of Shariah principles with sustainability must be done to build a comprehensive framework for halal certification (Bachtiar et al., 2024). This move will meet the demands of consumers increasingly concerned about environmental issues and increase consumer confidence in halal products.

Other research shows that adopting sustainable procurement in the halal industry can provide significant long-term benefits (Khan, 2024). Besides enhancing a company's reputation in the eyes of global consumers increasingly concerned with sustainability, sustainable procurement can also help companies improve operational efficiency. Energy savings, reduced resource use, and better waste management can reduce operational costs. Thus, halal companies that adopt sustainable practices have the opportunity to improve their competitiveness in the international market. Adopting sustainable sourcing strategies can also expand access to global markets, as the products produced comply with Sharia standards and reflect a commitment to environmental and social responsibility. This provides a competitive advantage that can support the long-term growth of the halal industry in an era that increasingly emphasizes global sustainability (Cooper, 2024).

Halal Certification and Ethical Aspects

Halal certification ensures that products or services comply with Sharia rules and principles. The basic principles in halal certification include cleanliness, fairness, and compliance with food safety standards. Initially, halal certification only focused on technical aspects of raw materials allowed in Islam. Still, in recent decades, it has begun to cover broader issues, such as business and trade ethics (Yanti, 2024). These ethical values are increasingly relevant in a global market emphasizing corporate social responsibility, including in the halal industry (Shovkhalov, 2024). For example, the ideal halal certification should not only ensure that the product is technically halal but should also reflect concern for animal welfare, social justice, and the economic well-being of the community, especially for groups involved in the supply chain of the halal product (Tayob, 2021). This means that halal standards must meet Sharia law and global sustainability and business ethics standards.

However, in practice, several ethical issues often arise in the context of halal certification, especially in relation to trade and production that directly impact Muslim communities in developing countries (Mustapha et al., 2024). Several studies have shown that poorly managed halal certification processes can exacerbate the marginalization of certain groups and affect the viability of small producers. For example, in the halal meat industry, smallholder farmers in many countries often face huge challenges to meet stringent certification standards, which sometimes do not match their capacity and resources. This creates inequities that can affect their economic well-being and drive inequality in access to the global halal market. Therefore, it is important to balance Sharia compliance and the implementation of fair and sustainable business practices so that all parties involved, including small producers, are not disadvantaged in the certification process (Ghalih et al., 2024).

The ethical aspects of halal certification are also closely related to how companies run their overall business operations (Mustapha et al., 2024). Responsible halal certification should not only focus on raw material sourcing and production processes but should also consider each stage's environmental and social impacts in the supply chain (Khan, 2024). For example, animal slaughter practices should comply with animal welfare standards, and efforts to ensure that workers in the supply chain receive fair wages and work in decent conditions should be a priority. In addition, companies should also avoid practices that could lead to environmental damage, such as deforestation or water pollution, due to their industrial activities (Kadirova, 2024). Sustainable procurement plays an important role in ensuring that halal products not only meet religious standards but also meet global ethical standards that international consumers increasingly recognize. This will not only enhance the company's reputation in the eyes of consumers but also make a positive contribution to the sustainability of the halal industry as a whole (Tayob, 2021).

Sustainable Procurement and Environmental Impact on Halal Certification

Environmental issues are an important element of sustainable procurement, especially in the context of halal certification (Abderahman et al., 2021). Halal food production, especially in the livestock and agriculture sectors, has a major environmental impact, including deforestation, carbon emissions, and excessive water use (Jameel, 2023). Therefore, it is important to integrate the principles of environmental sustainability into halal certification to ensure that halal products are

safe and Sharia-compliant and produced in an environmentally friendly manner (Muazu & Sjahrir, 2023). Research shows that adopting green practices in the halal supply chain can help reduce negative impacts on nature and improve resource efficiency (Bux et al., 2022).

Technologies such as blockchain have increased transparency and efficiency in the halal supply chain (Hendayani & Fernando, 2023). Blockchain enables better tracking of the origin of raw materials, ensuring that every step in the halal production process adheres to strict environmental standards (Ali et al., 2021). In addition, this technology can also be used to verify that the ingredients used are from socially and environmentally responsible sources. Although this technology is still in the early stages of adoption in the halal industry, its potential to improve sustainability and transparency is immense (Bux et al., 2022). In addition to technology, adopting more efficient resource management practices is also important to reduce the environmental footprint of halal products (Abderahman et al., 2021). Practices such as reduced water use, energy, and better waste management can help halal companies reduce the environmental impact of their operations (Thamagasorn & Pharino, 2019). In many countries, stricter regulations on sustainability also encourage companies to implement more environmentally friendly practices in their production (Dangelico & Pujari, 2010). Therefore, halal certification incorporating environmental sustainability principles can be a powerful tool to drive positive change in the global halal industry (Salindal, 2019).

Sustainable Supply Chain and Halal Certification

A sustainable supply chain plays a crucial role in supporting the sustainability of halal certification, as it involves the entire production process, from the procurement of raw materials to the distribution of halal products to end consumers (Abderahman et al., 2021). In the halal industry, every stage of the supply chain must comply with Sharia principles, where raw materials and production processes must meet halal requirements (Z. Hasan, 2021). It is also important to ensure the process is environmentally friendly and ethical, in line with the growing consumer demand for transparency and social responsibility (R et al., 2024). Halal supply chain integration, both internally and externally, can not only improve the integrity of halal products but also contribute to improving the quality performance of halal food products (Nugroho et al., 2024). This research confirms the importance of sustainable practices that include transparency in all production and distribution stages to meet the expectations of consumers who are increasingly aware of the importance of halal products that meet religious standards and environmental ethics.

Furthermore, a study conducted (Mohd Daud et al., 2023) in Malaysia revealed that adopting halal certification could effectively improve the overall halal supply chain performance. The certification process, complemented by clear halal labeling, provides greater confidence to consumers regarding the halal status of the products they consume, especially in a competitive global market (Jailani, 2024). A trusted halal label, in addition to providing a guarantee of halalness in terms of sharia, also increases product safety and quality (Zainudin et al., 2024). In this case, halal certification plays an important role as an instrument that supports compliance with religious principles and promotes increased integrity and efficiency in the supply chain (Sadiyah & Erawati, 2024). The adoption of trusted halal standards creates a positive domino effect on the supply chain as a whole, as every party in the chain, from manufacturers to distributors, is bound to the same standards to ensure safe, quality, and halal products (Almelaih Alfzari & Omain, 2022).

Sustainability in the halal supply chain also includes interrelated environmental, economic, and social aspects. Implementing environmentally friendly practices, such as using clean energy, better waste management, and reducing carbon emissions, is becoming increasingly important in reducing negative impacts on the environment. A “green supply chain” in the halal industry supports environmental sustainability and strengthens halal products' position in the global market. Using renewable energy and effective waste management throughout the halal supply chain creates products that are not only Shariah-compliant but also environmentally ethical (Khan, 2024). The main challenge is to ensure that all parties involved in the supply chain, from farmers to distributors, comply with the sustainability standards that have been set. The involvement of all supply chain

elements is important to maintain halal integrity so that the final product is not only Sharia-compliant but also contributes to social and environmental sustainability ([Mustapha et al., 2024](#)).

METHODS

This study uses a systematic literature review design to explore the ethical and environmental issues associated with sustainable procurement in the context of halal certification. The research method used was a comprehensive search through relevant databases, such as Scopus, Web of Science, and Google Scholar, to systematically identify related literature. The literature review focuses on exploring the ethical and environmental issues that arise in implementing sustainable sourcing in the halal supply chain. The inclusion criteria for this study included articles that explicitly examined the relationship between sustainable sourcing and halal certification, especially those that addressed ethical and environmental challenges and opportunities. Meanwhile, exclusion criteria were applied to studies irrelevant to the topic, such as those that only focused on technical or economic aspects without examining ethical and sustainability dimensions. The data collected through this literature search was systematically analyzed by identifying the main patterns and themes in the various articles. In this case, no statistical analysis was conducted, as the research focused on qualitative analysis of the existing literature. We found articles from scopus. This analysis aims to develop a comprehensive picture of the challenges in realizing sustainable procurement in the halal industry and its impact on social and environmental sustainability. As this research involves only secondary literature analysis, no specific ethics approval is required, and informed consent is not relevant in the context of a literature review. This research is expected to make a significant contribution to the literature related to halal certification and sustainable procurement by highlighting the ethical and environmental challenges faced by the industry.

RESULT AND DISCUSSION

This research highlights that halal certification, sustainability, and global ethics are interconnected in building a strong, trusted, and responsible halal supply chain. The proposed framework identifies the relationship between global ethics, green purchasing, sustainable packaging, moral responsibility, and halal supply chain management as key elements in improving sustainable halal supply chain performance. In globalization, halal supply chains face increasingly complex challenges, especially related to product integrity, consumer trust, and moral responsibility that must be met by every organization ([Mustapha et al., 2024](#)). By applying the principles of global moral and ethical responsibility and integrated halal supply chain management practices, the industry can improve the quality of halal products while ensuring the hygiene and health of the products provided ([Ghalih et al., 2024](#)). The pressure of competition in the global market makes companies develop unique halal certification strategies to build consumer confidence and face fierce competition. This is in line with the findings of Raman et al. (2023), which state that the availability of Shariah-compliant resources is important for halal supply chain management (HSCM) due to the wide variability of resources in the market. On the other hand, green purchasing and sustainable packaging also support achieving sustainable halal supply chain performance ([Abderahman et al., 2021](#)). This aligns with research that shows the importance of adopting green practices in the halal supply chain, as practiced in Malaysia, to make Muslim countries the global halal hub ([Ghalih et al., 2024](#)). These sustainable practices have a positive impact on the environment and the economy and society, where green halal supply chains help maintain a low carbon footprint, reduce waste, and increase the social value of halal products in the eyes of consumers.

Furthermore, as described by [Tieman \(2011\)](#), halal products require specialized infrastructure to prevent contact with non-halal products. This makes the availability of halal resources a critical factor in HSC management. In addition, management commitment and support are another important factor, as the complexity of HSC requires a high level of commitment from top management in terms of leadership and resource allocation ([Paulraj et al., 2017](#)). Using technologies such as blockchain and ESG (Environmental, Social, and Governance) integration in the

halal supply chain adds a crucial dimension of transparency and trust in the halal certification system. Blockchain technology, in particular, enables better traceability and enhances product integrity so consumers can trust that the halal products they consume comply with Sharia principles and high sustainability standards (Bai & Sarkis, 2020). On the other hand, mandatory halal certification of MSMEs plays a major role in providing legal protection and consumer confidence through strengthening the spiritual rights of Muslim consumers. However, its impact on the overall performance of MSMEs is still not statistically significant, so additional strategies that support sustainability and more effective business management need to be integrated to ensure long-term success (Wibowo et al., 2024).

The Relationship between Halal Certification, Sustainability, and Global Ethics

This research highlights that the relationship between halal certification, sustainability, and global ethics is the foundation for building a strong, trusted, and responsible halal supply chain. Halal certification is about Sharia compliance and global ethical principles, which involve moral responsibility and commitment to the environment. By upholding global ethics, the halal supply chain protects consumer interests and increases product transparency and credibility. In addition, sustainability in halal certification includes social, environmental, and economic aspects so that this supply chain answers religious demands and the expectations of a global society increasingly concerned with environmentally friendly and ethical products (Tayob, 2021). In globalization, the integration of halal certification, sustainability, and global ethics is important for companies that want to maintain competitiveness in international markets. Muslim and non-Muslim consumers are increasingly interested in products that combine religious values with environmental and social sustainability. Research shows that consumers informed about halal values and global ethics are more likely to believe in product quality, strengthening their loyalty. On the other hand, adopting these ethical and sustainability standards helps halal companies enhance their reputation, expand their market reach, and meet the expectations of consumers who crave socially and ecologically responsible products (Bux et al., 2022).

Thus, implementing halal certification standards that consider sustainability and global ethics not only strengthens the value of halal products but also supports business development in an increasingly complex market. The combination of halal certification, sustainability, and global ethics enables halal companies to meet high-quality standards while maintaining sharia values, increasing consumer confidence, and contributing to sustainable development goals (SDGs). In the long run, this integration will provide a solid foundation for the growth of a halal industry capable of meeting global challenges while strengthening the link between religious values and the demands of the modern market (Tayob, 2021).

Complexities and Challenges in the Global Halal Supply Chain

In an increasingly integrated global market, halal supply chains face complex challenges, including Sharia compliance, product traceability, and consumer trust. With the increasing demand for halal products from Muslim and non-Muslim consumers who care about ethics and sustainability, the halal industry must maintain product integrity at every stage of the supply chain, from raw material sourcing to distribution. Various factors, including the high variability of halal raw materials in the global market trigger this complexity. In Muslim-majority countries, the availability of sharia-compliant raw materials may be easily accessible. However, in non-Muslim countries, challenges can arise in limited resources, high production costs, or difficulty obtaining internationally recognized halal certification (Mujanah, 2024). To maintain the integrity of halal products, many companies have implemented specialized supply chain infrastructure designed to avoid cross-contamination between halal and non-halal products. This includes using storage, transportation, and processing facilities that meet halal standards. This challenge not only requires operational adjustments at the production level but also requires cross-border collaboration with partners who can provide halal-compliant raw materials. However, such collaboration is often difficult due to different regulations and certification standards between countries. This leads to the need to build a flexible certification strategy that is compliant with Sharia standards and meets local requirements in the different countries where the products are marketed (Rizki et al., 2023).

In the face of these challenges, digital technologies such as blockchain are becoming increasingly essential tools to ensure traceability and transparency throughout the supply chain. This technology allows every transaction and product movement to be digitally recorded, making it easier for consumers to verify the halal status of the products they buy. Blockchain increases transparency and reduces the risk of fraud or contamination, which are often major concerns in long and complex supply chains. Implementing this technology also opens up new opportunities to ease halal certification in countries with different standards. However, implementing blockchain technology requires substantial investment and sufficient technical skills, which remains a challenge, especially for MSMEs in the halal sector. In addition, competitive pressures in the global market mean that companies must find ways to ensure halal products comply with sharia and consider sustainability aspects. This includes using ethically sourced raw materials, selecting environmentally friendly packaging, and effective waste management. Growing consumer awareness about the environmental impact of their products is driving halal companies to adopt sustainable practices along the supply chain. In some countries, halal companies have widely adopted these green practices, particularly in Malaysia, which is striving to become a global halal hub. Adopting these practices not only reduces carbon footprint and waste but also strengthens consumer confidence in ethical and environmentally friendly halal products, increasing the social value of halal products in the global market (Kadir et al., 2016).

The Role of Sustainable Practices in Improving Halal Supply Chain Performance

Sustainable practices in the halal supply chain are becoming increasingly important, especially in globalization, pushing companies to meet higher environmental and social demands. Among the important aspects of this endeavor are green purchasing and sustainable packaging, which not only support sustainability but also increase product value in the eyes of consumers. Green purchasing ensures that ingredients in the halal supply chain come from sources that meet sustainability criteria in terms of ethics and environmental impact. In this case, green practices reduce the consumption of natural resources and lower the risk of pollution and waste that may occur during the production process. On the other hand, sustainable packaging focuses on selecting materials that are easily recyclable or have a lower environmental impact. These initiatives directly impact the carbon footprint of the halal products being marketed, thus contributing to the reduction of emissions and supporting long-term sustainability targets (Rejeb, Rejeb, Zailani, et al., 2021).

In Malaysia, implementing green supply chain practices in the halal industry has shown positive results in strengthening the country's position as a global halal hub. Other Muslim countries are beginning to see the benefits of adopting similar strategies, which include collaboration with suppliers and customers to maximize the benefits of sustainability practices in the halal supply chain. These practices not only support the environment but also increase the product's overall value, with greener halal products gaining a positive perception in international markets that are increasingly focused on sustainability. By focusing on green practices, companies also respond to market trends that demand greater transparency and social responsibility. Adopting green practices helps companies improve their competitiveness by offering products that meet sustainability standards, reducing dependence on raw materials that negatively impact the environment, and opening up new opportunities in the growing international halal market (Abdullah et al., 2018).

In addition to environmental and economic benefits, a sustainable halal supply chain has significant social effects. Today's global consumers want halal products and demand products that are produced responsibly and transparently. The social impacts of sustainability practices in the halal supply chain include increased consumer confidence and high-added value for halal products. Using sustainable practices toward reducing waste and carbon footprints encourages the creation of a responsible and environmentally friendly supply chain ecosystem. With green initiatives in place, companies in the halal industry can strengthen their reputation, increase consumer confidence, and create long-term social value. Overall, implementing sustainable practices provides various benefits to halal companies, both from an operational perspective and consumer perception. It is an important strategic element in facing competition in a global market increasingly focused on sustainability (Rahman, 2013).

Specialized Infrastructure Development and Management Commitment in the Halal Supply Chain

Research shows that halal supply chains require specialized infrastructure to ensure halal integrity throughout the distribution process. Based on the findings by [Tieman \(2011\)](#), This infrastructure is essential to avoid the risk of cross-contamination with non-halal products, whether in processing, storage, or shipping. This is a major concern in non-Muslim majority countries, where dedicated halal facilities are often limited. Studies show that managing contamination risk in the halal supply chain, especially in the transportation and warehouse sectors, is a major challenge that must be managed with specific systems and procedures to ensure sharia standards are maintained ([Tieman, 2011](#)).

In addition to infrastructure needs, commitment from top management is very important in the halal supply chain. In a study by [Pournader et al. \(2020\)](#), this commitment includes leadership support and resource allocation to carry out halal procedures strictly and consistently. Management commitment is needed to ensure budget allocation and training for the workforce to properly manage halal procedures. This study found that without strong management support, the risk of violating halal standards is higher, reducing consumer confidence and disrupting the company's reputation in the international market.

Table 1 Infrastructure and Risk of Contamination in the Halal Supply Chain

Infrastructure Factors	Description	Risk If Unavailable
Specialized Storage	Separate storage facilities for halal and non-halal products.	Cross-contamination with non-halal products.
Halal Transportation	Specialized vehicles that ensure no contamination during delivery.	Risk of contamination during cross-border transportation.
Halal Certification for Suppliers	Certification system that ensures all suppliers meet the standards.	Product safety is not guaranteed from source to product.
Tracking and Traceability System	Technology to monitor product movement in the supply chain.	Decreased consumer confidence if not transparent.
Management Support and Commitment	Management commitment to supporting the sustainability of halal practices.	Compliance with halal standards is reduced without support.

Source: ([Tieman, 2011](#)), ([Paulraj et al., 2017](#)), ([Bux et al., 2022](#)).

With adequate infrastructure and strong management commitment, halal supply chains can maintain compliance with Sharia standards while meeting modern expectations for sustainability and ethical responsibility. A well-managed infrastructure includes dedicated facilities to avoid contamination, appropriate transportation procedures, and sophisticated tracking systems to monitor the product's journey from raw materials to the end consumer. In an increasingly globally connected world, halal standards are no longer just about fulfilling Sharia law but also a symbol of food safety and quality. This is driven by consumers who are increasingly aware of the origin and production process of the products they consume, making supply chain transparency an important factor in increasing consumer confidence in halal products.

Having the right infrastructure in place and support from management also helps the company carry out sustainable business practices, which is now one of the important criteria in the international market. Infrastructure such as halal warehouses, dedicated transportation, and layered certification help reduce the risk of contamination, reducing the risk of product withdrawal from the market due to non-conformance. Moreover, with blockchain-based tracking systems, consumers can ascertain the halalness of products from the information provided through the supply chain. This transparency creates a competitive advantage for companies in the halal sector,

allowing them to compete in an increasingly tight international market. The combination of reliable infrastructure and management commitment in the halal supply chain creates a stronger reputation, increases consumer confidence, and supports achieving global sustainability goals in line with Islamic business ethics (R et al., 2024).

Blockchain Technology and ESG Integration in Halal Supply Chain

With the use of blockchain technology and the implementation of ESG principles, halal companies can maintain integrity and transparency along the supply chain, increasing consumer confidence and attracting investors who value sustainable and ethical business practices. With its ability to provide transparent and immutable records, blockchain technology allows consumers and other stakeholders to trace halal products from raw materials to final distribution. This not only ensures that the product complies with Sharia standards but also demonstrates the company's commitment to responsible business practices, which is an added attraction in an international market that is increasingly concerned with global sustainability and ethical aspects (Saber et al., 2019).

ESG principles in the halal supply chain amplify the positive impact of blockchain technology, taking into account environmental, social, and corporate governance aspects. For example, the application of ESG in the supply chain allows companies to demonstrate commitment to ethical business practices, such as responsible use of resources, adherence to environmental standards, and fair and equitable labor engagement. This combination of blockchain and ESG strengthens the market competitiveness of halal companies, as consumers today are not only looking for products that are Sharia-compliant but also products that are produced with respect for global ethics and sustainability (Sunny et al., 2020).

Table 2 Impact of Blockchain and ESG Implementation in Halal Supply Chain

Aspect	Impact of Blockchain Implementation	ESG integration Impact	Reference
Transparency	Creates comprehensive traceability and raw materials for distribution	Increased transparency regarding sustainable practices	Sunny et al. (2020)
Traceability	Enables tracking of every stage of the production process	Increase consumer confidence through high traceability	Bai & Sarkis (2020)
Consumer Trust	Increases trust with irreversible proof	Provide assurance of ethical and environmentally friendly business practices.	Saber et al., (2019)
Operational Efficiency	Reduces inefficiencies through process digitization	Improve efficiency through sustainable governance	Chandan et al (2023)
Market Competitiveness	Strengthens competitiveness by creating added value to products	Enhance competitiveness through positive market perception	Pournader et al., (2020)

The integration of blockchain technology with ESG (Environmental, Social, and Governance) principles forms a new foundation for a more resilient, transparent, and socially and environmentally responsible halal supply chain. Blockchain technology allows every stage of the supply chain process to be monitored in real time and recorded in an immutable system, providing consumers with proof of traceability from raw materials to finished products. This is crucial in maintaining consumer confidence in the integrity of halal products that meet strict Sharia standards. On the other hand, the implementation of ESG principles strengthens the company's reputation by ensuring ethical and sustainable business practices. ESG, through environmental, social, and governance aspects, helps companies minimize environmental impacts, respect workers' rights, and manage supply chains with high transparency, adding more value to halal products for consumers who care about sustainability and social responsibility. Overall, the combination of blockchain and ESG introduces new standards in the halal industry, allowing companies to improve traceability, strengthen reputation, and comply with sustainability practices that are increasingly in

demand in the global market. This integration also serves as a positive signal to investors interested in environmentally-friendly and socially responsible sectors, potentially increasing investment interest in the halal industry.

CONCLUSION

The conclusion of this study shows that the integration of halal certification, sustainability, and global ethics plays a crucial role in building a resilient, transparent, and responsible halal supply chain. Blockchain technology, when combined with ESG (Environmental, Social, and Governance) principles, provides a strong foundation to improve traceability, transparency, and competitiveness of halal products in the global market (Ghalih et al., 2024). Mandatory halal certification in Muslim countries, especially for MSMEs, strengthens the legal protection of Muslim consumers and builds public trust (Wibowo et al., 2024). However, to ensure a sustainable positive impact, additional strategies such as policy support, training, and more efficient management practices are needed so that MSMEs can continue to compete and thrive in the international market. This study also found that the mere implementation of halal certification is not enough to improve MSME performance without a sustainable business management approach and support from the government. Therefore, the success of a sustainable halal supply chain requires a combination of technology, good governance, and high management commitment. With these measures, halal products not only meet Sharia standards but also appeal to global consumers who are increasingly concerned about sustainability and social responsibility. Overall, implementing halal certification supported by technology and sustainability principles greatly benefits both consumers and the halal industry. This combination opens up opportunities for Indonesian MSMEs to participate more competitively in the global market, meet the expectations of modern consumers, and contribute to sustainable economic development.

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