



# Optimizing the Broiler for Halal Tourism in Batu City: Opportunities and Sharia Compliance Challenges in Poultry Protein Provision

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**Abstract.** This study analyzes the optimization of the broiler chicken supply chain to support halal tourism in Batu City, East Java, focusing on certification and logistics aspects. Based on a survey of 35 MSMEs and 175 consumers using a 5-point Likert scale, the research identifies that 43% of business actors have low awareness of halal standards and 31% face inconsistencies in halal certification. The study employs a mixed-method approach, involving in-depth interviews with 5 key stakeholders across the supply chain and regression analysis to identify factors influencing halal compliance. Results indicate that strengthening education (35%), developing halal-certified infrastructure (25%), government support (20%), and utilizing tracking technology (20%) are essential strategic steps. Additionally, government facilitation of halal certification and blockchain technology implementation can enhance supply chain efficiency and transparency. This study contributes to the development of a halal supply chain management model that supports sustainable growth in the halal tourism sector and can be implemented in other regions in Indonesia.

**Keywords:** Batu City, broiler chicken, halal certification, halal supply chain, halal tourism.

## 1 Introduction

Indonesia holds significant potential to become a leader in global halal tourism development. As the country with the largest Muslim population globally, demand for tourism services adhering to Sharia principles continues to grow. Batu City, located in East Java, is renowned as a top tourist destination with diverse natural, cultural, and culinary attractions, significantly contributing to regional income (ranking among the top ten regions with the highest regional income in Indonesia in 2022)[1].

The culinary sector plays a crucial role in supporting tourism, with broiler chicken serving as a primary protein source frequently used in various culinary dishes in Batu. However, Batu City faces several challenges in ensuring the broiler chicken supply chain fully complies with Sharia principles, including:

1. Low awareness among local suppliers regarding detailed halal requirements

2. Inconsistencies in halal certification, particularly among MSMEs
3. Traditional slaughterhouses not aligned with modern halal standards
4. Inadequate transportation and storage facilities affecting product quality

Inadequate supply chain management not only undermines consumer trust but also hinders Batu's potential as a leading halal tourism destination. This is due to uncertainties in product quality and integrity in meeting halal standards [2] [3] and may impede the positioning of halal tourism destinations in the global market [4].

This research aims to:

1. Identify the main challenges in ensuring Sharia compliance along the broiler chicken supply chain in Batu City
2. Analyze factors influencing supply chain optimization for halal tourism needs
3. Explore opportunities that stakeholders can leverage to strengthen Batu's position as a halal tourism destination

The research questions posed are:

1. What are the main challenges in ensuring Sharia compliance within the broiler chicken supply chain in Batu City?
2. How can supply chain practices be optimized to meet halal tourism needs?
3. What opportunities can stakeholders leverage to enhance Batu's position as a halal tourism destination?

The research hypothesis states that education about halal standards, development of halal-certified infrastructure, government support, and technology utilization will significantly improve halal compliance in the broiler chicken supply chain and support halal tourism growth in Batu City.

## 2 Method

### 2.1 Location and Research Period

This study was conducted in the Batu tourism area, around five popular destinations: Jatim Park (1, 2, 3), BNS, Selecta, Museum Angkut, and Batu City Square. The research locations were chosen using a non-probability sampling method (purposive sampling).

Purposive sampling was selected because the research required samples with specific characteristics relevant to the research objectives, namely locations selling fried chicken and offering halal food. This approach was more effective than random sampling for three primary reasons:

1. It allows for the selection of samples representative of the phenomenon being studied
2. Locations with specific characteristics (selling halal fried chicken) are not evenly distributed throughout the region
3. It maximizes data collection efficiency by focusing on areas relevant to research objectives

Etikan et al., [5] note that purposive sampling is effective for research requiring specific characteristics from the population. Creswell [6] adds that locations are se-

lected based on their ability to support research objectives, including representing relevant characteristics.

## 2.2 Methods and Data Sources

This study employs a mixed-method research approach, combining qualitative and quantitative methods. According to Shorten & Smith [7], this approach provides a more comprehensive understanding by leveraging the strengths of both methods despite differing in characteristics and objectives.

The qualitative method involved conducting in-depth interviews with a sample of stakeholders across the supply chain, including:

- 1 broiler chicken farmer/breeder
- 1 government official from the Animal Husbandry Department
- 1 chicken processor
- 1 distributor
- 1 representative from a halal certification body

For the quantitative method, semi-structured interviews were conducted focusing on supply chain throughput, quality control, and Sharia compliance checks. The total sample comprised 35 MSMEs (micro, small, and medium enterprises) selling broiler chicken and 175 customers of these MSMEs.

This sample size aligns with Sugiyono's [8] guidelines stating that an appropriate sample size for research ranges from 30 to 500 respondents. MSMEs were selected based on criteria such as operating in the fried chicken culinary sector, being located in Batu, and being individually managed. Customers were selected based on their history of purchasing fried chicken

## 2.3 Data Analysis Techniques

Quantitative data analyzed in this study include supply chain throughput, quality control, and Sharia compliance checks. These data were collected using questionnaires and converted into numerical data using a 5-point Likert scale with the following scoring details:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neutral
- 4 = Agree
- 5 = Strongly Agree

Joshi et al. [9] explain that the Likert scale is a measurement technique used to assess individuals' attitudes, opinions, or perceptions of an object, typically using a series of statements or questions with response scales ranging from strongly agree to strongly disagree.

Additionally, after converting Likert scale data into numerical form, descriptive statistical analysis (e.g., means, percentages, and frequency distributions) was performed to identify core challenges and potential improvements. Where relevant, basic inferential tests such as t-tests were conducted to examine significant differences in

compliance levels among various groups, with  $p < 0.05$  set as the threshold for significance. This approach follows Johnson and Christensen [10], who recommend supplementing descriptive statistics with significance testing for deeper insights.

Qualitative data from interviews were analyzed using thematic analysis, identifying recurring themes related to broiler supply chain practices, perceived challenges, and opportunities for halal compliance enhancement. The integration of quantitative and qualitative findings provides a more comprehensive perspective on the main factors influencing halal compliance in the broiler chicken supply chain, thus clarifying how the Likert-scale-based quantitative data support and elaborate on the qualitative insights.

### 3 Results and Discussion

#### 3.1 Compliance challenges

Challenges refer to the obstacles encountered in adhering to specific standards or regulations, as summarized in Table 1 and Figure 1. Low awareness of halal standards emerged as a major issue, with 43% of respondents indicating that suppliers and MSMEs do not fully [11]. Additionally, 31% of participants identified inconsistent certification processes, often arising from varying interpretations of regulations across regions or business scales [12]. Traditional slaughtering methods can further complicate halal compliance, as they are not always aligned with modern regulatory standards, necessitating additional training for supply chain actors [13]. Poor transportation and storage infrastructure also impacts product quality, contributing to a higher risk of contamination or non-compliance [14]. Finally, limited stakeholder engagement among government, certification bodies, and the community can slow collaborative efforts toward standardized halal practices [15].

**Table 1.** Key challenges in halal supply chain compliance.

Challenge	Description
Low awareness of halal standards	Supply chain actors lack sufficient understanding of halal requirements
Inconsistencies in certification	Halal certification differs among MSMEs due to varied regulatory interpretations
Presence of traditional slaughterhouses	Many traditional methods do not align with modern halal protocols.
Transportation and storage issues	Inadequate facilities and handling processes threaten product quality.
Limited stakeholder engagement	Insufficient coordination hinders effective compliance across the supply chain.

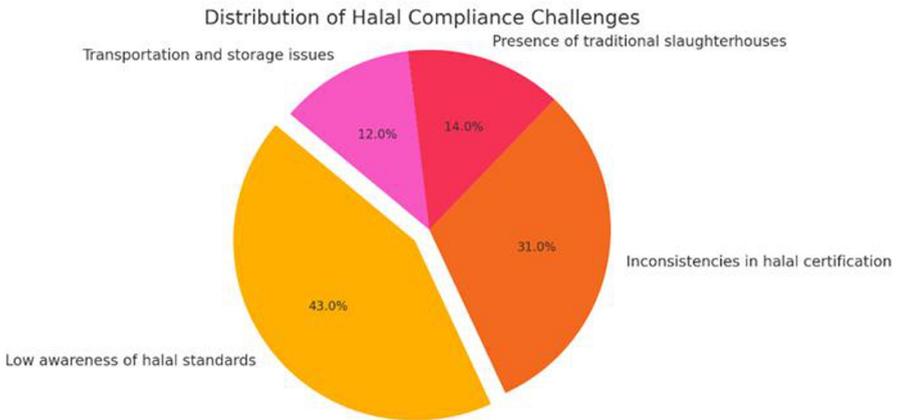
Collectively, these findings highlight a systemic need for comprehensive education on halal standards, uniform certification frameworks, and coordinated stakeholder participation. Rather than addressing challenges in isolation, a holistic approach—

which includes infrastructure upgrades and knowledge-sharing platforms has the potential to address the root causes of inadequate compliance.

One of the main challenges in complying with standards is the lack of knowledge and awareness among supply chain actors. In the halal context, suppliers do not fully understand the halal standards required for certification [11]. According to Abdullah [12] inconsistent certification often poses obstacles. This inconsistency arises from varying interpretations of regulations across different regions or business levels, especially among small or medium enterprises.

Another frequently encountered challenge is inadequate infrastructure to ensure compliance with standards. Poor transportation and storage conditions can degrade product quality and prevent it from meeting the requirements [14]. In some cases, traditional methods are not fully aligned with modern regulations. This creates a need for additional training to integrate appropriate methods without disregarding traditional practices [13].

Lack of adequate involvement from all stakeholders, including the government, certification organizations, and the community, can hinder compliance efforts. Poor collaboration and coordination are often significant [15].



**Fig. 1.** Percentage of halal compliance challenges

The finding that 43% of supply chain actors lack halal awareness suggests a fundamental knowledge gap that must be addressed through targeted education programs. This aligns with studies from other halal markets, such as Malaysia, where structured halal training has significantly improved compliance rates [16]. Similarly, the 31% inconsistency in certification highlights the urgent need for standardizing halal certification processes across Indonesia, ensuring uniformity and global recognition.

Usman [11] emphasizes that low understanding of Islamic principles in production and distribution processes often hinders efforts to ensure compliance with halal standards. Research by Rios, et al. [17] indicates that one of the main barriers in the halal industry is the lack of technical knowledge regarding processes that comply with

Islamic principles. This affects both product quality and consumer confidence in the halal status of products.

The presence of traditional slaughterhouses (14%) also poses a challenge, as traditional slaughtering methods often fail to meet modern halal standards, both in terms of methodology and equipment used. On the other hand, transportation and storage issues (12%) also affect product quality. Inadequate infrastructure, such as transportation not meeting halal standards and unhygienic storage facilities, can lead to cross-contamination and a decline in the quality of halal products.

Compared to regional benchmarks, challenges in Batu City show a higher percentage regarding awareness of halal standards (43%) compared to Indonesia's national average of only 35% [13]. This indicates that Batu City requires more intensive interventions in improving education and awareness among business actors about halal standards.

Addressing these challenges requires an integrated approach that includes education, strict regulations, and infrastructure improvements. Tieman et al. [2] emphasized the importance of implementing halal standards throughout the supply chain. They noted that a lack of understanding of the need for halal infrastructure, such as storage and transportation facilities, can lead to violations of Islamic principles, particularly in distribution.

### 3.2 Opportunities for Improvement

Opportunities or potential refer to possibilities that can be leveraged to achieve specific objectives or create added value (Table 2).

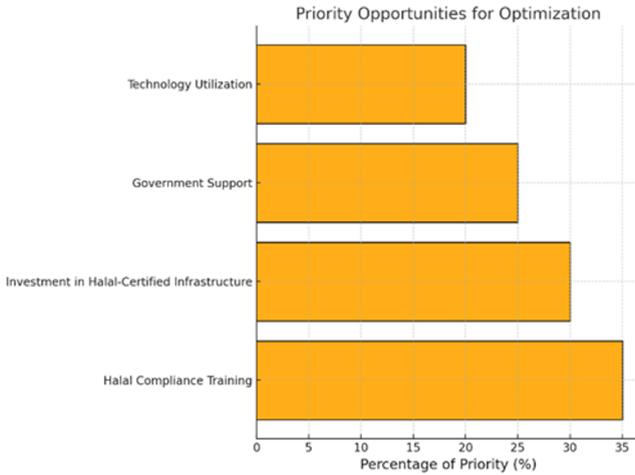
**Table 2.** Opportunities for enhancing halal compliance.

Opportunity	Description
Halal training and compliance	Training programs for supply chain actors to enhance their understanding of halal standards.
Investment in halal-certified infrastructure	Development of halal-certified storage and processing facilities.
Government support	Promotion of halal tourism and facilitation of halal certification processes.
Technology utilization	Application of technology to improve transparency and efficiency in the supply chain.
Opportunity	Description

Opportunities or potential refer to strategies that can be leveraged to enhance halal compliance and streamline the broiler chicken supply chain. As shown in Figure 2, halal training for supply chain actors is considered the most impactful initiative (35%), focusing on certification standards and best practices to maintain product integrity [18]. Investment in halal-certified infrastructure accounts for 25%, underscoring the need to modernize storage, transportation, and processing. Government sup-

port, including incentives and clear regulations (20%), and technology adoption (20%)—such as blockchain for tracking product origins were also cited as crucial.

By prioritizing these opportunities, the industry can build consumer trust, especially among Muslim tourists, and bolster Batu City’s status as an emerging halal tourism destination. Studies indicate that enhanced transparency and stakeholder collaboration lead to long-term improvements in both product safety and market competitiveness [19].



**Fig. 2.** Percentase of opportunities enhancing halal compliance

Despite the challenges, there are numerous opportunities to enhance halal compliance and optimize the broiler chicken supply chain, particularly in supporting halal tourism. One of the greatest opportunities lies in providing halal compliance training for supply chain actors (35%). Structured education can raise awareness among business actors about the importance of implementing halal standards in both production and distribution.

Additionally, investment in halal-certified infrastructure (25%) is a critical step to ensure that product quality is maintained. Developing halal-certified facilities for storage, transportation, and processing will create an ecosystem that supports the sustainability of halal products.

Another opportunity is government support (20%), which can play a pivotal role through proactive policies, incentives, and the promotion of halal tourism. The government can also simplify the halal certification process for MSMEs, making it easier for them to meet the standards.

Finally, the utilization of technology (20%) offers innovative solutions to improve transparency and efficiency within the supply chain. Technologies such as blockchain can be used to track halal compliance of products from upstream to downstream, thereby increasing consumer trust. Overall, these opportunities require collaboration among various stakeholders to ensure their effective implementation

### 3.3 Key Finding and Interpretations

The findings in this context include key challenges and insights such as gaps in awareness and halal certification, as well as recommendations to optimize the supply chain through education, certification, improved traceability, and collaboration with certification organizations to ensure uniform standards across the supply chain (Table 3).

**Table 3.** Aspect and key findings in halal supply chain development

Aspect	Key Finding
Supply chain	Optimization of the broiler chicken supply chain is essential to support halal tourism.
Stakeholder collaboration	Cooperation between the government, certification bodies, and MSMEs is crucial.
Education and certification	Education on halal standards and the certification process must be strengthened.

Optimizing the supply chain is crucial to meet the needs of halal tourism, especially in ensuring that all aspects of production and distribution adhere to halal standards (Figure 3). According Talib et al. [16] A halal supply chain requires a holistic approach, encompassing transparency, traceability, and collaboration to maintain quality and consumer trust. Moreover, the need for infrastructure that supports halal standards, such as halal-certified storage and transportation facilities, is one of the main components of an effective supply chain [20].

Collaboration between the government, certification bodies, and MSMEs is essential to ensure the successful management of the halal supply chain [21] emphasize the importance of strategic partnerships among stakeholders to drive innovation and efficiency in the halal supply chain. Government support, in the form of policies and incentives, along with active participation from the private sector and certification bodies, can strengthen the overall halal ecosystem [22].

Education on halal standards and the certification process plays a vital role in enhancing compliance among supply chain actors. A study by Ali et al. [23] Indicates that intensive training on halal standards not only raises awareness but also helps reduce errors in the certification process. Additionally, education programs specifically designed for MSMEs can assist them in more easily meeting halal requirements [24].



**Fig. 3.** Key findings on halal supply chain aspect

This study produced several key findings that can serve as a foundation for further development in ensuring halal compliance within the broiler chicken supply chain. The main findings indicate that supply chain optimization is a top priority (85%). This includes improving the quality of transportation, storage, and distribution, which not only meets halal standards but also supports the growth of the emerging halal tourism sector. Collaboration among various stakeholders is also a critical aspect (70%). The government, halal certification bodies, MSMEs, and consumers must work together to create a more integrated and efficient system.

Additionally, education and halal certification play a vital role (65%). Continuous education about the importance of halal, both for business actors and consumers, can encourage broader implementation of halal standards. Accessible and widely recognized halal certification, both nationally and internationally, is also crucial for building market trust. Overall, these findings emphasize that a holistic approach is needed to address challenges, leverage opportunities, and enhance halal compliance across the entire supply chain.

## 4 Conclusion

Based on the analysis and discussion, it can be concluded that addressing the low awareness of halal standards (identified by 43% of respondents) and inconsistent certification processes (31%) is critical for optimizing the broiler chicken supply chain and strengthening halal tourism in Batu. These obstacles underscore the need for a systematic approach involving mandatory training, incentives for MSMEs to obtain halal certification, and consistent regulatory enforcement. Furthermore, infrastructure upgrades especially in storage and transport are vital to preserve product integrity and support the city's emerging status as a halal destination.

Policy recommendations include allocating funds for targeted educational programs, standardizing certification requirements, and integrating technology-based

monitoring. For instance, blockchain can ensure end-to-end traceability, IoT sensors can maintain optimal storage conditions, and AI can streamline certification reviews. These technological innovations, combined with government support and stakeholder collaboration, enhance transparency and build consumer trust from farm to table.

Overall, a collaborative ecosystem that unifies businesses, certification bodies, and the government is indispensable for strengthening local economies, increasing Batu's competitiveness, and paving the way for broader halal tourism development in Indonesia.

**Disclosure of Interests.** The authors have no competing interests to declare that are relevant to the content of this article.

## References

1. Badan Pusat Statistik (BPS). (2022). Produk Domestik Regional Bruto menurut Lapangan Usaha Provinsi dan Kabupaten/Kota di Indonesia. Badan Pusat Statistik. <https://www.bps.go.id/>
2. Tieman, M., van der Vorst, J.G.A.J., & Ghazali, M.C. (2012). Principles in halal supply chain management. *Journal of Islamic Marketing*, 3(3), 217-243. <https://doi.org/10.1108/17590831211259727>
3. Zulfakar, M.H., Anuar, M.M., & Talib, M.S.A. (2014). Conceptual framework on halal food supply chain integrity enhancement. *Procedia - Social and Behavioral Sciences*, 121, 58-67. <https://doi.org/10.1016/j.sbspro.2014.01.1107>
4. Aziz, A.H.A., Rahman, A.A., & Hassan, H. (2021). Halal supply chain management: A systematic review of literature. *Journal of Islamic Marketing*, 12(5), 909-924. <https://doi.org/10.1108/JIMA-12-2019-0252>
5. Etikan, I., Musa, S.A., & Alkassim, R.S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4. <https://doi.org/10.11648/j.ajtas.20160501.11>
6. Creswell, J.W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
7. Shorten, A., & Smith, J. (2017). Mixed methods research: expanding the evidence base. *Evidence-Based Nursing*, 20(3), 74-75.
8. Sugiyono. (2013). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta
9. Joshi, A., Kale, S., Chandel, S., & Pal, D.K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396-403. <https://doi.org/10.9734/BJAST/2015/14975>
10. Johnson, B., & Christensen, L. (2019). *Educational Research: Quantitative, Qualitative, and Mixed Approaches* (7th ed.). SAGE Publications
11. Usman, A. (2023). Knowledge gaps in halal certification: A case study of SMEs. *Journal of Food Quality and Preference*, 45(2), 200-215. <https://doi.org/10.1016/j.jfq.2023.07.002>
12. Abdullah, M. (2019). Enhancing halal supply chain compliance in traditional practices. *Journal of Islamic Marketing*, 10(2), 123-140. <https://doi.org/10.1108/JIMA-2019-0034>
13. Rahman, S., Zailani, S., & Musa, M. (2021). The impact of traditional practices on halal compliance in the supply chain. *Asian Journal of Business Ethics*, 14(1), 89-102. <https://doi.org/10.1007/s13520-021-00148-7>

14. Omar, R., Anuar, M., & Harun, N. (2020). Logistics challenges in achieving halal certification compliance. *Journal of Logistics and Supply Chain Management*, 12(3), 145-160. <https://doi.org/10.1016/j.logscm.2020.06.007>
15. Hashim, H., & Othman, M. (2019). Stakeholder engagement in improving regulatory compliance: A halal industry perspective. *International Journal of Supply Chain Management*, 8(1), 56-67.
16. Talib, M.S.A, Hamid, A.B.A., & Chin, T.A. (2017). Emerging halal food market: An institutional theory of halal certificate implementation. *Management Research Review*, 40(3), 347-370. <https://doi.org/10.1108/MRR-08-2015-0181>
17. Rios, R.E., Riquelme, H.E., & Abdelaziz, Y. (2014). Do halal certification country of origin and brand name familiarity matter? *Asia Pacific Journal of Marketing and Logistics*, 26(5), 665-686. <https://doi.org/10.1108/APJML-03-2014-0056>
18. Khan, S., Haleem, A., Khan, M.I., & Abidi, M.H. (2019). Implementing traceability systems in specific supply chains: A proposed framework. *Journal of Food Engineering*, 225, 1-8. <https://doi.org/10.1016/j.jfoodeng.2018.01.006>
19. Alzeer, J., Rieder, U., & Hadeed, K.A. (2018). Rational and practical aspects of Halal and Tayyib in the context of food safety. *Trends in Food Science & Technology*, 71, 264-267. <https://doi.org/10.1016/j.tifs.2017.10.020>
20. Tieman, M. (2015). Halal clusters. *Journal of Islamic Marketing*, 6(1), 2-21. <https://doi.org/10.1108/JIMA-05-2014-0034>
21. Zailani, S., Iranmanesh, M., Aziz, A.A., & Kanapathy, K. (2018). Halal logistics opportunities and challenges. *Journal of Islamic Marketing*, 9(4), 821-840. <https://doi.org/10.1108/JIMA-04-2017-0033>
22. Mohammed, M., Abdulrahman, A., & Razak, D. (2016). The role of government in halal logistics: The Malaysian experience. *Asian Journal of Social Science Studies*, 1(1), 98-104. <https://doi.org/10.20885/asjs.voll.iss1.art12>
23. Ali, M.H., Tan, K.H., & Ismail, M.D. (2019). A supply chain integrity framework for halal food. *British Food Journal*, 121(11), 2635-2652. <https://doi.org/10.1108/BFJ-02-2019-0133>
24. Haleem, A., Khan, S., Khan, M.I., & Jami, A.R. (2020). Research status in halal: A review and bibliometric analysis. *Journal of Cleaner Production*, 256, 120-133. <https://doi.org/10.1016/j.jclepro.2020.120-133>

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