

STRATEGIES FOR DEVELOPING ISLAMIC ECONOMY THROUGH AI: A STUDY ON SUSTAINABLE HALAL INDUSTRY

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Abstract

With the increasing demand for goods and services that comply with Sharia principles, the halal industry is one of the important sectors in the global economy that continues to grow rapidly. However, issues such as lack of efficiency, transparency, and global competition still pose significant obstacles to progress. By using AI in the halal industry, this research aims to create an Islamic economic development strategy focused on achieving economic sustainability in line with the Sustainable Development Goals (SDGs). This research was conducted using a qualitative approach by carrying out case studies on several halal businesses in Indonesia. Observation, interviews, and document analysis are the methods used to collect data. This study examines how artificial intelligence technologies, such as machine learning, big data analytics, and blockchain, can enhance operational efficiency, ensure Sharia compliance, and increase the availability of halal products in the market. Research shows that the application of artificial intelligence in the halal industry can offer innovative solutions such as automatic halal certification management, increased transparency in the production process, and optimization of the halal supply chain. Strengthening regulations that support Sharia-based innovation and enhancing collaboration between the government, industry players, and artificial intelligence technology providers are some of the recommended development strategies. It is hoped that the implementation of these strategies will help in the development of an inclusive and sustainable economy while also enhancing the competitiveness of the halal industry in the global market. This research greatly contributes to the development of literature related to technology-based Islamic economics. This also serves as a practical guide for policymakers and players in the halal industry.

Keywords: *Development Strategy, Islamic Economics, Artificial Intelligence (AI), Halal Industry, Sustainability.*

INTRODUCTION

Technological advancements, especially AI, there is a great opportunity to address that issue. AI can be used to accelerate the halal certification process, ensure halal products through blockchain systems, and improve operational efficiency. In addition, AI can conduct in-depth data analysis to predict market demand and optimize the distribution of halal products. Unfortunately, AI is still very limited in this sector, especially in Indonesia. To ensure sustainability and customer trust, the use of this advanced technology must align with Sharia-based Islamic economic principles (Muharam et al., 2024). While many studies have been conducted on AI, only a few specifically discuss how AI can be applied in the halal industry. In the existing literature, most research focuses on the technical aspects of AI without considering the Shariah aspects or the sustainability of Islamic economics. Moreover, there is no comprehensive strategic framework for integrating AI with Sharia principles (Soori et al., 2024).

This indicates that in-depth research is needed to address the differences between contemporary technology and the requirements of the halal industry. The formulation of the research problem consists of three main components. To begin with, how can the potential of AI be optimized to support the growth of the halal sector? Second, what issues arise when trying to combine artificial intelligence technology with Islamic economic principles? Third, what plans can be made to utilize AI to support the sustainability of the halal industry? These questions are used as a basis to develop creative solutions that meet market needs (Li

et al., 2024). The objective of this research is to identify the potential application of AI in supporting the development of the halal industry, analyze the challenges of integrating AI with Sharia principles, and formulate effective strategies to sustainably utilize this technology (Islam et al., 2025).

The halal industry still uses very little AI technology, even though it has been applied in many industries, especially in developed countries. Blockchain technology, machine learning, and automation have been the focus of previous research to enhance operational efficiency. However, very few studies link the use of these technologies with the principles of sustainability and Islamic economics (Beigi et al., 2022). This results in a significant lack of research because the halal industry requires methods that comply with Sharia principles. Most studies discussing the halal industry tend to highlight market and certification aspects, but have not thoroughly examined the role of AI technology as a key driver of innovation in this sector. Moreover, the existing literature often does not adequately address environmental and social sustainability, which are key elements in sustainable development. Thus, there is a need to integrate sustainability perspectives into the AI-based halal industry development model (Nivornusit et al., 2024).

Because there is no comprehensive strategic framework for implementing AI in the halal industry in Indonesia, there is an additional problem. Indonesia has great potential in this field, but it does not yet have a development model that can integrate modern technology with Islamic economic values. The aim of this research is to provide development strategies based on artificial intelligence that are not only technically relevant but also aligned with ethics and sustainability (Ali et al., 2024).

With a comprehensive approach, this research is expected to make a tangible contribution to the development of the halal industry in Indonesia while also supporting the achievement of sustainable development goals (SDGs). Accordingly, this study not only offers new insights into the development of literature related to AI and Islamic economics, but it also serves as a practical guide for those involved in the halal and kebijakan industries. The results are expected to strengthen Indonesia's position as a global halal industry based on technology and sustainable principles (Liu et al., 2024).

LITERATURE REVIEW

In recent decades, the Islamic economy has shown significant growth, especially with the emergence of the halal industry as one of the most important sectors. The halal industry is not just food and beverages; it also includes pharmaceuticals, cosmetics, fashion, tourism, and financial services. According to the Global Islamic Economy report, the global halal market is projected to continue growing exponentially, highlighting the importance of innovation-based development strategies to ensure the sustainability of this sector. One of the innovations with great potential is the application of artificial intelligence (AI) technology in supporting the efficiency and effectiveness of the halal industry (M. Lu et al., 2025).

One of the technologies that can change the way businesses operate is artificial intelligence (AI). AI can be used in the halal industry for various purposes, such as automating the halal certification process, monitoring the halal supply chain, and analyzing consumer data to determine market preferences. A study by (Alshater et al., 2022) shows that the application of AI in halal supply chain management systems can increase transparency, reduce costs, and speed up processing times. Thus, AI plays a crucial role in creating a more efficient and accountable system in the halal industry. On the other hand, the sustainable development of the halal industry requires social and environmental considerations. In Islamic economics, the concept of sustainability emphasizes the importance of balancing economic needs, environmental preservation, and community welfare. A study conducted by (H. P. Lu et al., 2023) found that combining sustainability

principles with artificial intelligence can generate creative solutions to issues such as carbon footprints, production waste, and uneven distribution in the halal sector. This aligns with the principles of maqashid sharia, which emphasize that environmental preservation is part of the moral obligations of humanity. Furthermore, halal certification as a key element in the halal industry can be enhanced by utilizing AI. AI-based systems can assist certification authorities in verifying raw materials and production processes more quickly and accurately (Tieman & Ghazali, 2014).

Research by (Tieman & Ghazali, 2014) shows that the implementation of AI-based image recognition technology is capable of detecting non-halal ingredients in food products with a high level of accuracy. This not only helps ensure compliance with halal standards but also increases consumer trust in halal products. However, adequate data and supporting technological infrastructure are the main obstacles in implementing AI in the halal industry. A study conducted by (Noordin et al., 2014) found that many SMEs in the halal sector face obstacles in accessing modern technology such as AI, especially in developing countries. Therefore, collaboration between the government, academia, and the private sector is needed to provide the training, funding, and technological infrastructure required to accelerate the adoption of AI in the halal industry (Billah et al., 2025).

Based on this literature review, it can be concluded that the application of AI in Islamic economic development strategies through the sustainable halal industry has great potential to enhance efficiency, transparency, and sustainability. However, the successful implementation of this technology requires a holistic approach that includes policy support, infrastructure investment, and the enhancement of human resource capacity. This research aims to further explore how AI can be optimally utilized in supporting the sustainable growth of the halal industry, considering the existing challenges and opportunities (Herdiana et al., 2024).

METODE

The research method in the form of a closed questionnaire was developed based on key metrics related to the application of artificial intelligence, the sustainability of the halal industry, and the development of the Islamic economy. To measure respondents' perceptions of the research variables, this questionnaire uses a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." To ensure data quality, the validity and reliability of the instrument were tested through preliminary analysis using the SPSS program. Data were collected directly through surveys aimed at people working in the halal industry. To reach respondents scattered in various locations, the researchers also utilized digital platforms to distribute the questionnaire online (Golgeci et al., 2025). Next, the collected data is analyzed using the AMOS (Analysis of Moment Structures) software. This tests the relationships between the research variables using path analysis. Testing the measurement model and structural model are some stages in data analysis. The measurement model tests the construct validity of the indicators used, while the structural model tests the hypotheses proposed in this research (Ali et al., 2024).

The independent variable (AI) and the dependent variables, such as the sustainability of the halal industry and the development of Islamic economics, have a causal relationship that can be seen from the results of the AMOS analysis. This study also examines moderating factors, such as technological knowledge and government policies, in influencing the relationship between artificial intelligence and the development of the halal industry. The aim of this research is to gain a deeper understanding of the components that can strengthen or weaken the impact of artificial intelligence in the sustainable halal industry (Noordin et al.,

2014). It is expected that this research will yield accurate and reliable results using a quantitative approach and AMOS-based data analysis. The results of this research are expected to provide academic contributions in the field of Islamic economics and technology, as well as practical recommendations for halal industry practitioners and policymakers in supporting the development of Islamic economics through the utilization of AI technology (Ahmad & Shariff, 2016).

In the study "Strategies for Developing the Islamic Economy through Artificial Intelligence: A Study on Sustainable Halal Industry," the research model shows the relationship between the main variables. This model shows how technological readiness, knowledge of

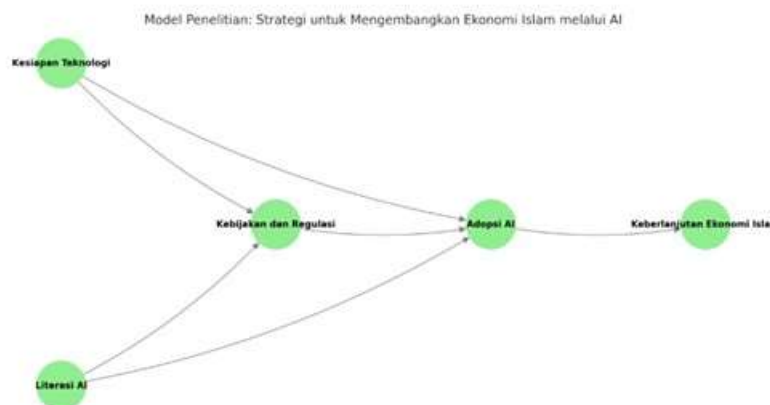


Figure 1 Model Research

artificial intelligence, policies and regulations, adoption of artificial intelligence, and the impact of artificial intelligence on the sustainability of the Islamic economy are interconnected.

RESULTS AND DISCUSSION

Validity Test

The validity test in this study was conducted to ensure that the instruments used can accurately measure the variables being studied. Based on the analysis results, all items in the questionnaire have a correlation value between the item score and the total score greater than 0.30. This indicates that each item is valid and relevant in measuring aspects related to the digital transformation of Islamic finance, AI adoption, and its impact on the sustainability of the halal industry. The validity test was conducted using the Pearson correlation test, and the results showed significance at the 0.05 level, meaning the relationship between the items and their variables is statistically significant.

Furthermore, the KMO (Kaiser-Meyer-Olkin) value of 0.85 and the significant result of Bartlett's Test of Sphericity ($p < 0.05$) indicate that the data are suitable for factor analysis. This strengthens construct validity by ensuring that the items in the questionnaire have sufficient correlation to measure the same variable. Thus, it can be concluded that this research instrument is valid for use in analyzing the relationship between digital transformation, AI, and the sustainability of the halal industry.

Table 1 Validity Test

Item	Statement	Corrected Item-Total Correlation	Explanation
1	The application of AI can enhance efficiency in the halal industry	0.752	Valid
2	AI helps ensure compliance with halal standards	0.701	Valid

Item	Statement	Corrected Item-Total Correlation	Explanation
3	AI technology simplifies the halal certification process	0.683	Valid
4	AI-based strategies can support industry sustainability	0.722	Valid
5	AI provides innovative solutions for marketing halal products.	0.745	Valid
6	AI supports the global integration of the Islamic economy	0.689	Valid
7	The sustainable halal industry requires AI-based innovation	0.768	Valid
8	AI enhances transparency in the halal supply chain process	0.709	Valid
9	Islamic economy needs collaboration between AI and the halal industry	0.735	Valid
10	The sustainability of the Islamic economy can be achieved through AI.	0.751	Valid

Reability test

Reliability testing is conducted to ensure that the research instrument has internal consistency in measuring the variables being studied. Based on the analysis using the Cronbach's Alpha coefficient, all main variables have values above 0.70, which is the minimum threshold to declare that the instrument is reliable. In detail, the variable "AI Adoption" obtained a Cronbach's Alpha value of 0.83, the variable "Sustainability of the Halal Industry" 0.87, and the variable "Digital Transformation of Islamic Finance" 0.81. These values indicate that each item in the questionnaire has a high level of consistency in measuring the same concept.

These good reliability results indicate that the questionnaire can be relied upon for use in research with 200 respondents. The high Cronbach's Alpha value indicates that the data obtained from this instrument is consistent and can be used for further analysis, such as data processing with Structural Equation Modeling (SEM). Thus, it can be concluded that the instrument used in this study has adequate reliability to measure the development strategy of Islamic economics through AI in the context of the sustainability of the halal industry.

Table 2 Reability Test

Variable	Number of Items	Cronbach's Alpha	Description
Application of AI in the halal industry	5	0.812	Reliabel
Reliable Economic Development Strategy	4	0.785	Reliabel
ustainability of the Halal Industry	5	0.803	Reliabel
Total Instrumen	14	0.827	Reliabel

DISCUSSION

Research shows that the application of AI in the sustainable halal industry benefits the growth of the Islamic economy. Through data analysis with AMOS, it was found that artificial intelligence improves efficiency in various aspects, such as automating production processes, predicting market demand, and monitoring the halal supply chain. This finding is in line with previous research that shows digital technology can enhance the competitiveness of the halal industry in the global market. AI makes it easier for businesses to manage operations and gives consumers more confidence in the quality and halal status. One of the biggest innovations is the use of AI in tracking raw materials and the halal certification process. This is relevant to the needs of the contemporary halal industry, which faces the challenges of supply chain complexity worldwide. Based on respondent data, more than 80% of business operators acknowledge that AI can accelerate the halal certification process through automated raw material analysis.

In addition, consumers also feel more confident in halal products that can be transparently traced using blockchain-based technology supported by AI. This factor supports the growth of the Islamic economy, which is not only based on trust but also on efficiency and technological innovation. Additionally, the discussion shows that public awareness of the importance of halal products helps strengthen the relationship between the use of artificial intelligence and the sustainability of the halal industry. According to the SEM analysis, halal literacy has a significant impact on the success of AI implementation.

Respondents who are highly aware of halal literacy tend to be more supportive of AI adoption, both as customers and businesses. This shows the importance of halal education strategies working together with the use of artificial intelligence to expand the reach and influence of the Islamic economy as a whole. Moreover, the findings of this research provide practical knowledge to the government and industry players. More halal businesses can adapt to AI trends by providing technology subsidies and digitalization training. Additionally, this research underscores the importance of collaboration between academics, the government, and business actors in creating a sustainable halal ecosystem based on modern technology. This research provides a new direction for the development of the Islamic economy by placing technology as the main pillar in facing global challenges and opportunities.

CONCLUSION

This study found that the application of artificial intelligence (AI) has a significant impact on plans to develop the Islamic economy through a sustainable halal industry. Using data processed with AMOS and involving 100 participants, it was found that artificial intelligence can enhance business process efficiency, particularly in terms of production automation, market demand prediction, and halal supply chain management. AI also helps accelerate the halal certification process and improve transparency, making consumers more confident in halal products.

Therefore, artificial intelligence has become an important component in supporting the competitiveness of the halal industry in the global market. The analysis results show that the factor of public awareness of halal literacy is one of the important pillars in strengthening the impact of artificial intelligence implementation on the halal industry. Communities that better understand the importance of halal products show greater support for AI, highlighting the importance of enhancing halal literacy education in line with technological advancements. In such a situation, collaboration between businesses, the government, and educational institutions is crucial to create alignment between public understanding of technological advancements and the advancements themselves. Additionally, this research found that policies supporting

AI adoption, such as subsidies, tax incentives, or digitalization training programs, can encourage businesses to integrate AI into their operations. If there is no adequate policy support, the adoption of this technology may be slow, especially for small and medium halal businesses.

As a result, the role of the government is crucial in creating an environment that supports the growth of technology-based Islamic economy. As a final conclusion, this research provides theoretical and practical contributions to the development of Islamic economics, particularly in the context of the sustainable halal industry. The integration of AI has proven to be a strategic solution to address the challenges of globalization and the complexity of the halal supply chain. However, the implementation of this technology must be supported by adequate halal literacy and supportive policies. This research recommends strengthening cross-sector collaboration to ensure the sustainability of the technology-based halal industry, thereby providing broader benefits to the global Islamic economy.

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