

## Investigating halal food Supply chain management, halal certification and traceability on SMEs performance

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### ABSTRACT

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This study aims to provide implications for the application of the halal logistics traceability model to food commodities in Indonesia and to be able to recommend alternative policy scenarios for the government. The system dynamic approach is used to model the traceability of halal logistics for food commodities in Indonesia. The urgency of this research is that it will contribute to improving the quality of halal logistics which has implications for the halal industry in Indonesia. This research also has implications for food quality and safety which helps food security in Indonesia, the relationship between Halal Certification and Traceability on SMEs Performance, analyzing the relationship between Halal food supply chain management and Halal Certification and Traceability. This research method is a quantitative survey, research data obtained by distributing online questionnaires to 390 food SME owners who have implemented the Halal Assurance Management System. Data analysis used a structural equation model (SEM) with SmartPLS 3.0 software. The stages of data analysis are validity, reliability and significance tests. The sampling technique used is non-probability sampling. The questionnaire used in this study uses a Google form which will be distributed to respondents. This questionnaire measurement method uses a Likert scale of 5, namely Strongly Disagree (STS), (2) Disagree Answers (TS), (3) Neutral Answers (N), (4) Agree Answers (S), Strongly Agree (SS). The independent variable used in this research is halal supply chain management. The dependent variables used in this study are halal certification and traceability and SMEs Performance. The results of this study indicate that Halal food supply chain management has a positive and significant effect on the performance of SMEs, Halal Certification and Traceability have a positive and significant effect on SMEs Performance, Halal Certification and Traceability have a positive and significant effect on Halal food supply chain management.

## 1. Introduction

Indonesia is a country with the largest Muslim population in the world and around 87.2% or the equivalent of 209 million people are Muslims. This makes Indonesia to become a country with the largest halal industry in the world. According to the State of the Global Islamic Economy report for 2022, Indonesia ranks first in the world as a consumer of halal products (Abderahman et al., 2021). However, this broad market potential has not been maximized by the Indonesian government to make Indonesia the first halal food producer in the world where Indonesia has not yet been included in the 10 categories of

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halal food producers in the world. One that plays a role in the economic growth of developing countries like Indonesia is the existence of Micro, Small and Medium Enterprises (MSMEs). Every year, the growth of MSMEs in Indonesia has increased very rapidly, in fact more than 90% of the total workforce in Indonesia is able to be absorbed by MSMEs dominated by young people and women. Halal MSMEs contribute to helping the country pursue its economic growth targets, through a workforce that is absorbed in various business sectors. In addition, halal MSMEs are a sector that has proven resilient in dealing with various crises. The demand for halal products is increasing in direct proportion to the increase in the total Muslim population in the world. The population of Muslims in Indonesia is the largest in the world, which is the reason why Indonesia is a potential country to market halal products (Purwanto, 2021).

Halal is the main requirement for Muslim consumers in consuming food products (Adinugraha et al., 2021). The halal food product is determined from the suitability of the process, raw materials to transportation from the upstream to the downstream stage of the product to the hands of consumers. The Research Institute for Food, Drugs and Cosmetics of the Indonesian Ulama Council (LPPOM MUI) has issued a Halal Assurance System (SJH) as outlined in the HAS 23000 rule. Thus, the existence of halal guarantees is a basic need for consumers for the products consumed which include the halalness of each stage and constituent components. Halal products can be guaranteed to be halal if they have a halal certificate. Halal certificates are obtained if MSMEs apply for halal certification and meet predetermined requirements. Halal certification is a process that must be passed to obtain a halal certificate. According to Abderahman et al. (2021), there is no significant difference in the profit of MSMEs before and after having a halal certificate, so it is necessary to analyze how to optimize the application of halal certification to increase MSME profits. This research will analyze halal supply chain management to formulate how to optimize the application of halal certification to increase MSME profits. Every company or business engaged in the food and beverage sector will not be separated from halal certificates, namely the goal is to be able to provide certainty about the halal status of a product in the inner peace of consumers who enjoy it, therefore halal certificates are very influential for consumers who enjoy food and drinks in these companies.

Halal logistics, as part of the halal supply chain, plays an important role in the process of storing, transporting, and distributing halal products to consumers. According to Ali et al. (2021), Halal logistics is the process of managing the procurement, movement, storage, and handling of material, livestock, and semi-finished goods supplies both food and non-food along with related information and documentation flows through company organizations and supply chains that comply with general principles sharia In Indonesia. The development of halal products is still at the stage of certification and halal labeling of halal products. Although it shows an increase there is no blueprint for the development of halal logistics as a master plan for the development of halal logistics in Indonesia (Kadir et al., 2016; Handayani et al., 2023). Halal logistics requires guarantees of product halalness from the beginning to the hands of the producers. This process can be maintained up to the distributor company, but the process has not been monitored from the supplier to the retailer level. In Indonesia, there is no standard halal product guarantee system, a clear Standard Operating Procedure/SOP to regulate the distribution of halal products. To identify errors in the supply chain, a traceability system is needed to uncover problems that occur along the chain. The flow of information from upstream to downstream in a well-recorded and documented supply chain can provide transparency about halal products. A halal traceability system is needed to provide transparent information about food processes. By having a halal traceability system, the critical point of halal control can be fully monitored if the product is suspected of being contaminated with non-halal elements and further action can be taken (Bux et al., 2022; Fujiwara, 2017).

## **2. Literature Review and Hypothesis Development**

### *2.1 Halal Supply Chain Management*

Halal SCM is a management process for the supply, distribution, storage and management of materials, livestock products, as well as semi-finished supplies for both food and non-food with related information and documentation flows through organizations that are in accordance with the Shari'a to ensure halal products reach the hands of consumers. According to Annabi and Ibadapo-Obe (2017), halal SCM is a halal network management with the aim of extending halal guarantees from resources to buyers so that halal products are guaranteed. According to Sunarsi et al. (2020) and Aziz and Chok (2013), halal SCM indicates that the processes that occur throughout the entire supply chain must be halal. Halal SCM is the process of handling halal food products from suppliers to buyers, which involves different parties, places, and, at the same time, also involves the handling of non-halal products with the aim of satisfying the needs of both consumers of halal and non-halal products (Zulfakar et al., 2014). Halal SCM is the integration of business processes and activities that covers the areas of warehousing, sourcing processes, transportation, product management, inventory management, and other management ranging from raw materials to products consumed based on Islamic law known as (Bux et al., 2022). The halal supply chain is a series of processes starting from the source of supply to the consumer that must be guaranteed halal, the supply chain for halal chicken meat will start from farms and slaughterhouses, and then the chicken meat will be transported and stored before it reaches the customer. This is to ensure that halal is not only applied to products or food but also to all activities in the supply chain which includes product handling and management (inventory management and material handling). All components in the supply chain, from upstream to downstream, must have individual and integrated responsibilities to protect halal food products from being cross-contaminated, either intentionally or unintentionally.

**H<sub>1</sub>:** *Halal food supply chain management has a positive and significant effect on the performance of SMEs.*

**H<sub>3</sub>:** *Halal food supply chain management has a positive and significant effect on Halal Certification and Traceability.*

## 2.2 Halal Certification

According to Jasman and Ariffin (2021), halal certification is a security for a Muslim consumer to be able to choose products that are in accordance with Islamic religious rules. Products that have halal certification are products that are in the process of processing and manufacturing standards in terms of safety and cleanliness. Halal certification guarantees that a product can be consumed or used by Muslims without fear of its safety and cleanliness. Mohamed et al. (2020) defined halal as all things that are permissible, do not contain transactions that are prohibited by Shari'a, and have been legitimized by Shari'a to carry out these cases. Halal products are products that have been declared halal according to Islamic law (Junejo et al., 2021). Halal certification is a factor that can influence consumer buying interest. Halal certification is interpreted as a document that is issued by an Islamic institution that explains whether the products listed in it comply with Islamic standards (Azizah, 2022).

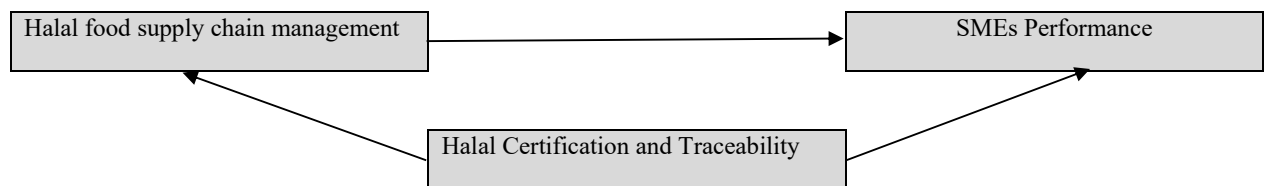
**H<sub>2</sub>:** *Halal Certification and Traceability have a positive and significant effect on SMEs Performance*

## 2.3 SME performance

Performance is the result or level of success of a person during a certain period in carrying out the tasks compared to various possibilities, such as work standards, targets or goals or criteria that have been determined in advance and have been mutually agreed upon. Performance, among others, can be seen from the following indicators: compliance with all rules that have been set in the company, being able to carry out their duties without error (with the lowest error rate), in carrying out their duties. There are several obstacles faced by MSMEs that make it difficult to develop, such as limited capital and difficulty accessing capital, quality human resources and managerial abilities that still lack limited infrastructure such as technological tools, limited access to production factors, an unsupportive business climate and high competition. This can be overcome if MSMEs and the government know the actual performance position of MSMEs so that the strategies taken can be right on target. For this reason, a comprehensive performance assessment using the Balanced Scorecard approach with four perspectives must be applied by MSMEs. The Financial Perspective can measure the extent to which MSMEs are able to manage existing capital and assets to generate profits. The Customer Perspective can measure the extent to which customer satisfaction with products and services from MSMEs and measure how much profit is derived from sales.

## 3. Method

This research method is a quantitative survey, research data obtained by distributing online questionnaires to 390 SME food owners who have implemented the Halal Assurance Management System. Data analysis used a structural equation model (SEM) with SmartPLS 3.0 software. The stages of data analysis are validity, reliability, and significance tests. The sampling technique used is non-probability sampling. The questionnaire used in this study uses a Google form which will be distributed to respondents. This questionnaire measurement method uses a Likert scale of 5, namely Strongly Disagree (STS), (2) Disagree Answers (TS), (3) Neutral Answers (N), (4) Agree Answers (S), Strongly Agree (SS). The independent variable used in this research is halal supply chain management. The dependent variables used in this study are halal certification and traceability and SMEs Performance. Fig. 1 shows the structure of the proposed study.



**Fig. 1.** Research Model

## 4. Result and Discussion

### 4.1 Respondent Profile

Research data obtained by distributing online questionnaires to 390 SMEs food owners who have implemented the Halal Assurance Management System. Based on Table 1 it was concluded that most respondents were male, namely 54%.

**Table 1**  
Respondent Profile

	Criteria	Total	%
Gender	Male	210	54%
	Female	180	46%
Education	Senior High School	168	36%
	Diploma	120	34%
	Bachelor Degree	45	22%
	Master	32	5%
	Doctor	25	3%
Work Experiences	< 5 Years	129	27%
	6 - 10 Years	134	36%
	11-15 Years	56	19%
	> 16Years	71	18%

*Reliability and Average Variance Extracted (AVE)*

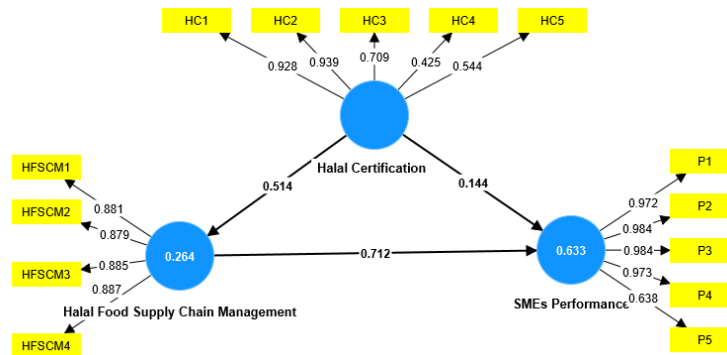
Reliability of each variable shows the high coefficient in terms of Cronbach’s Alpha and Composite Reliability (more than 0.700) and also Average Variance Extracted (AVE – measured the convergent validity) of each variable has met the criteria of validity (more than 0.500) as described in the table below.

**Table 2**  
Reliability and AVE Testing

No	Variables	Cronbach’s Alpha	Composite Reliability	AVE
1	Halal food supply chain management	0.813	0.901	0.655
2	Halal Certification and Traceability	0.812	0.934	0.734
3	Performance	0.891	0.923	0.643

*Path Coefficients*

Path Coefficients on Research Framework of Achievement Motivation can be described in figure below.



**Fig. 2.** Validity Testing

*Inner model test*

The inner model test contains an explanation of the R-Square, while the R-square value in this study is as follows:

**Table 3**  
The results of R Square and adjusted R-Square

Variable	R-Square	Adjusted R-Square
SME Performance	0.633	0.623

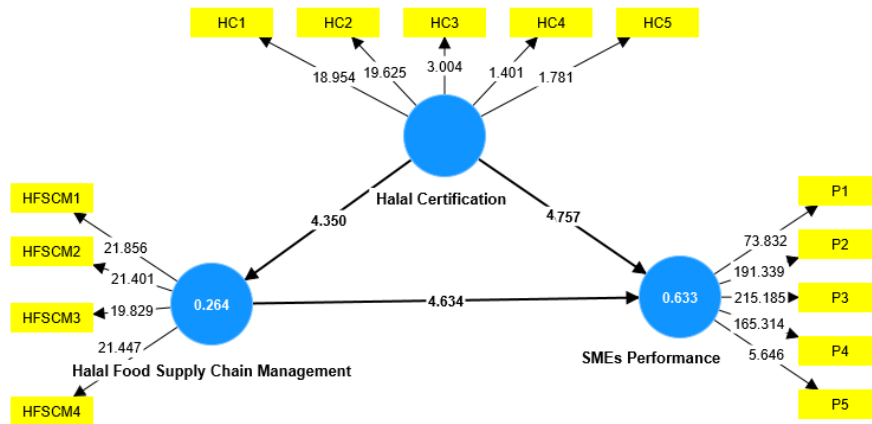
From the R-Square table, it can be concluded that 62.3 % of SMEs Performance is influenced by halal food supply chain management and halal certification while the remaining 37.7% is influenced by other variables outside the study.

*Research Hypotheses Tested*

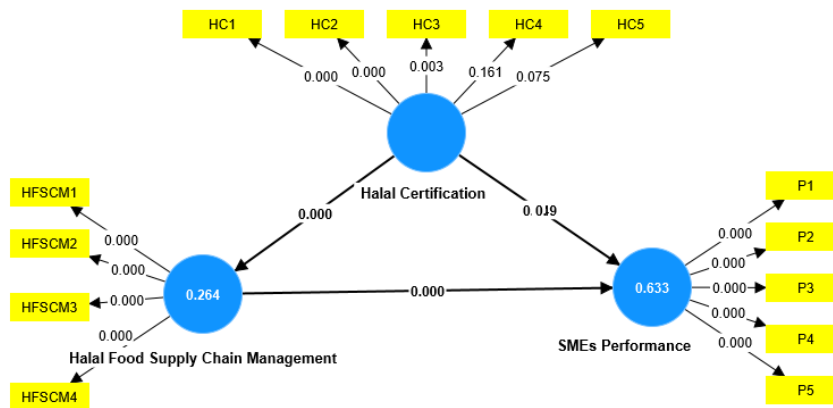
Based on the path coefficients mentioned above it can be found that all research hypotheses were tested as described on the Table 4 below.

**Table 4**  
Hypotheses Testing

No	Hypotheses	Path Coefficients	Significant Level	Results
1	Halal food supply chain management and performance of SMEs	0.712	p<0.050	Accept the Hypothesis
2	Halal Certification and Traceability and SMEs Performance	0.144	p<0.050	Accept the Hypothesis
3	Halal Certification and Traceability and Halal food supply chain management	0.514	P<0.050	Accept the Hypothesis



**Fig. 3.** Hypotheses Testing (t Value)



**Fig. 4.** Hypotheses Testing (p Value)

*f<sup>2</sup> Effect Sizes Evaluation*

Hair et al. (2019) explain that the guidelines for assessing **f<sup>2</sup>** are 0.02 (= small), 0.15 (= moderate), and 0.35 (= large), respectively.

**Table 5**  
The results of **f<sup>2</sup>** Effect Sizes Evaluation

	Performance
Halal food supply chain management	0.52
Halal Certification and Traceability	0.39

For the Halal food supply chain management variable, the **f<sup>2</sup>** value of 0.52 represents a big effect, for the Halal Certification and Traceability, the **f<sup>2</sup>** value of 0.39 represents a large effect.

*Q<sup>2</sup> Evaluation*

Q<sup>2</sup> value is greater than 0 indicates that the model has predictive relevance for certain endogenous constructs.

**Table 6***Q<sup>2</sup> Evaluation*

Construct	Q <sup>2</sup>
Performance	0.577

The value of Q<sup>2</sup> for the performance variable is 0.577 > 0.000, meaning that this variable has predictive relevance. Based on the results of the study, the direct influence test and the hypothesis, the research aims to answer whether the proposed hypothesis can be accepted or rejected. The results of testing the direct effect hypothesis can be explained as follows:

*Halal food supply chain management and SMEs performance*

Based on the results of data analysis, a T value > 1.96 was obtained and a p value < 0.50, so it was concluded that Halal food supply chain management had a positive and significant effect on the performance of SMEs. According to Rejeb et al. (2021) and Samsi et al. (2012), halal food supply chain management has a positive and significant effect on performance. This result is also confirmed by Thomas et al. (2017), Wahyuni et al. (2019), Zainuddin et al. (2019), Zulfakar et al. (2014) that halal food supply chain management has a positive and significant effect on performance.

*Halal Certification and Traceability and SMEs Performance*

Based on the results of data analysis, it was obtained a T value > 1.96 and a p value < 0.50 so it was concluded that halal certification and traceability had a positive and significant effect on SMEs Performance. According to Jasman et al. (2021), Haudi et al. (2022) and Khan and Haleem (2016), halal certification and traceability have a positive and significant effect on SMEs Performance, the result is also in line with Ma'aram and bin Nording (2021), Mohamed et al. (2020); Mutmainah (2018).

*Halal Certification and Traceability and Halal food supply chain management*

Based on the results of data analysis, it was obtained T value > 1.96 and p value < 0.50 so it was concluded that halal certification and traceability had a positive and significant effect on halal food supply chain management. According to Rejeb et al. (2021), halal certification and traceability had a positive and significant effect on halal food supply chain management. The result is in line with Samsi et al. (2012), Thomas et al. (2017), Wahyuni et al. (2019) and Zainuddin et al. (2019).

The logistics industry now needs to be prepared to offer halal logistics solutions for the halal industry. Halal logistics and supply chain management is an important discipline for the halal industry in expanding integrity Halal from the source to the consumer's point of purchase. The halal supply chain covers everything from the procurement and preparation of halal ingredients to the manufacture and delivery of the final product to the customer. Supply chain for halal food products needs to be developed in a systematic way in responding to consumer needs and requests with the ability to coordinate each business unit from supply chain actors. From all over the supply chain, logistics service providers play a very important role in ensuring that raw materials, raw materials, packaging, storage, and transportation of halal products are carried out correctly so that it is not contaminated with non-halal materials or products. In addition, halal food producers are required to apply the concept of good and healthy, which includes quality, nutrition, hygiene and ethically delivered products to consumers since not all halal food is good for consumers. Halal food supply chain is becoming famous because of the increasing demand for halal products (Annabi & Ibidapo-Obe, 2017).

Based on this research, the traceability system in halal logistics guarantees product quality in the supply chain, besides that traceability can authenticate and identify products to protect consumers. Halal traceability will help increase consumer confidence in food safety. In addition, implementing halal traceability can reduce the cost of removing products from the market. Blockchain technology that can solve problems in halal logistics, namely ensuring transparency and consensus. The novelty of this research is to recommend a halal logistics traceability model for food commodities in Indonesia based on blockchain technology that has never been studied before in Indonesia. This research is in line with the Indonesian government's efforts to make Indonesia a producer of the halal industry and can become a world leader in the halal industry.

Halal SCM as part of the halal supply chain, plays an important role in the process of storing, transporting and distributing halal products to consumers. Halal is the process of managing the procurement, movement, storage and handling of the supply of materials, livestock and semi-finished goods both food and non-food along with the flow of information and related documentation through corporate organizations and supply chains that comply with general principles of sharia. In Indonesia, the development of halal products is still in the stage of certification and halal labeling of halal products. Even though it shows an increase, there is no blueprint for the development of halal logistics as a master plan for the development of halal logistics

in Indonesia. Halal logistics requires guarantees of halal products from the initial process to the hands of producers. This process can be maintained up to the distributor company, but this process has not been monitored from the supplier to the retailer level. In Indonesia, there is no standard halal product guarantee system, especially clear Standard Operational Procedures/SOPs to regulate the distribution of halal products. To identify errors in the supply chain, a traceability system is needed that can uncover problems that occur along the chain. The flow of information from upstream to downstream in a well-recorded and documented supply chain can provide transparency about halal products. A halal traceability system is needed to provide transparent information about food processes and enable customers to track it. By having a halal traceability system, the critical point of halal control can be fully monitored if the product is suspected to be contaminated with non-halal elements and further action can be taken.

## 5. Conclusion

The results of this study indicate that halal food supply chain management has a positive and significant effect on the performance of SMEs, Halal Certification and Traceability has a positive and significant effect on SMEs Performance, Halal food supply chain management has a positive and significant effect on Halal Certification and Traceability. Every company or business engaged in the food and beverage sector will not be separated from halal certificates, namely the goal is to be able to provide certainty about the halal status of a product in the inner peace of consumers who enjoy it, therefore halal certificates are very influential for consumers who enjoy food and drinks in these companies. Based on this research, the traceability system in halal logistics guarantees product quality in the supply chain, besides that traceability can authenticate and identify products to protect consumers. Halal traceability will help increase consumer confidence in food safety. In addition, implementing halal traceability can reduce the cost of removing products from the market. Blockchain technology that can solve problems in halal logistics, namely ensuring transparency and consensus. The novelty of this research is to recommend a halal logistics traceability model for food commodities in Indonesia based on blockchain technology that has never been studied before in Indonesia. This research is in line with the Indonesian Government's efforts to make Indonesia a producer of the halal industry and can become a world leader in the halal industry.

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