Impact of Halal Certification on Peanut Pie Supply Chain Performance

Dini Wahyuni
Ph.D Student at Department of Industrial Engineering
Faculty of Engineering
Universitas Sumatera Utara
Medan, Indonesia
diniwahyuni2015@gmail.com

Nazaruddin
Department of Industrial Engineering
Faculty of Engineering
Universitas Sumatera Utara
Medan, Indonesia
nazarmtd60@gmail.com

Irwan Budiman
Department of Industrial Engineering
Faculty of Technology and Computer Sciences
Universitas Prima Indonesia
Medan, Indonesia
irwanb01@gmail.com

Rahel Ulina Pangaribuan
Department of Industrial Engineering
Faculty of Engineering
Universitas Sumatera Utara
Medan, Indonesia
pangaribuanrahel29@gmail.com

Abstract

Halal food is known from the halal label listed on the packaging, and may be included if the product already has a halal certificate. This research was conducted at the Peanut pie business which has received a Halal certificate. This study aims to look at various aspects of the impact experienced by the business after obtaining a halal certificate on peanut pie products. The supply chain performance measurement is carried out under 2 conditions, namely before and after obtaining a halal certificate. Performance measurement uses the Supply Chain Operations Reference (SCOR) method based on 17 Key Performance Indicators that have been compiled based on research related to supply chain performance measurement and based on the provisions contained in the Halal Product Guarantee Act. Furthermore, the performance indicators are weighted using the Analytical Hierarchy Process (AHP) method. The results of supply chain performance calculations using the SCOR and AHP methods get the supply chain performance value before being certified halal is 68.32 which is in the Average category. Meanwhile, the supply chain performance value after halal certified is 80.47 in the Good category. There are 3 indicators that have increased after obtaining a halal certificate on the product, namely the halal certificate indicator on the material, the MUI halal label indicator, and the product manufacturing cycle time indicator. However, there are also indicators that have decreased in value after obtaining a halal certificate, namely indicators of increasing the role of the halal management team, indicators of the number of defective/failed products to meet halal criteria and indicators of complaint rates.

Keywords
Halal Certificate, SCOR, AHP, Halal Assurance System, Supply Chain Performance

1. Introduction

Eating halal food is a basic right of every Muslim. Not only related to religious beliefs, consuming halal food is also related to health, economy and security. Therefore, every business actor is expected to provide protection to consumers through the use of halal ingredients in the production process. The demand for Halal food continues to increase due to greater awareness among Muslims about their responsibility to consume only Halal food. Coincidentally, global awareness of the importance of food safety, which is associated with halal food, has emerged. With advanced technology, it is now possible to analyze the contents of food products quickly and accurately. In addition, Halal certification which guarantees quality and benefits, has an impact on increasing demand for these products.

Consumers are now increasingly aware of the importance of health, which then affects their behavior in consuming food. Consumers will look for foods that can keep them healthy and can improve their quality of life. In Islam, consuming halal food is an important aspect of religion. The role of food in cultural practices and religious beliefs is complex but has a uniform understanding among Muslim followers. Usually halal logos or labels are a way to communicate and reassure Muslim consumers that food products are produced and prepared according to Islamic requirements. On the other hand, non-Muslim consumers also understand that the food with the logo is prepared in the most hygienic and clean way for consumption. So that non-Muslims will tend to look for food with a halal logo. It is evident that non-Muslim consumers give a positive response to halal food certification (Hassan et al, 2009).

According to Berry (2008), there is a strong demand for halal products in a number of non-Muslim countries for both Muslim and non-Muslim consumers. Halal products are also increasingly popular because of the positive perception that halal products are healthier, safer and humane animal care. In addition, a recent report by the Islamic Food and Nutrition Council of America (2009) in March 2009, stated that a focus on healthy food also creates strong opportunities to market halal food as a lifestyle choice; new "organic products," especially in the United States and Europe where consumers are already paying a premium price for organic food. Many non-Muslim consumers have chosen to buy and consume halal food because of the perception that it is a healthier option. It is expected that the consumption of halal food will increase among the health conscious market segment.

Halal labels can be an effective means of communication to consumers to make it easier for consumers to sort out halal food more easily. Products that have been proven to have passed the halal test by MUI have previously gone through a series of processes and tests that prove their products do not contain najis and are allowed to be consumed. In research by Othman et.al (2006) measuring customer attitudes towards the status of halal food in Penang found that customer attitudes towards the Halal logo are generally favorable, about 40% of respondents will not buy food products that do not have the Halal logo.

Halal certificate is a measure of food safety, quality assurance and many beneficial characteristics that are enjoyed not only by Muslim consumers but also by non-Muslim consumers. Halal requirements have met many conventional quality standards, such as ISO 9000, Good Hygienic Practice (GHP), Good Manufacturing Practices (GMP), veterinary inspection, Codex Alimentarius and Hazard Analysis and Critical Control Point (HACCP). Thus, industries that apply Halal requirements will produce better quality food products than those that apply conventional standards (Ali and Jamaludin, 2008). However, the values of Halal food/products can be further popularized among non-Muslim consumers if the public can be more aware of the benefits regarding health, hygiene, safety, environment, social justice and animal welfare that come together with the halal way of doing things. .

Halal certification can also be an innovation tool for businesses to develop because it can differentiate one business from another. Halal certification is one of the key factors to meet the growing halal market. Halal certification is also closely related to improving company performance. Halal certificates are now seen as a marketing tool and provide manufacturers with a competitive advantage alongside other benefits such as consumer confidence, adherence to

Islam, and hygiene and safety requirements. Halal certificate also serves as a mechanism for government or community authorities to monitor halal food in the food industry.

As evidence of Halal certification as a tool to improve business performance, there are examples of business success in Singapore after the UAE recognized the Singapore Islamic Religious Council (MUIS), food exports from Singapore to the UAE increased by 67% in the same year as quoted on the International Enterprise website. Singapore. Halal certified pharmaceutical product manufacturers are able to expand their market to various countries, such as China, India, Turkey, Sri Lanka, Canada, United Arab Emirates, Brunei, and Indonesia (Bustamam (2010) and Machfud et al. (2011)). Exports of halal frozen food producers in Malaysia can expand the market up to 100% after obtaining a halal certificate (Liow, 2011). In addition, there is also a Malaysian company that produces Halal pharmaceutical gelatin that has obtained a Halal certificate and has successfully expanded its business geographically to China, India, Turkey, Sri Lanka, Canada, United Arab Emirates (UAE), Brunei, and Indonesia.

Halal supply chain management is the process of managing the procurement, movement, storage and handling of materials, supplies, semi-finished goods, food and non-food in accordance with Sharia principles (Aziz et al., 2021). The main basis of the halal supply chain is that the information flowing in each supply chain must be in accordance with the principles of sharia law. There are several factors that are the key to the success of the halal supply chain, namely government support, special assets, information technology, human resources, collaborative relationships, halal certification, and halal traceability. Supply Chain Management theory is used to deal with the complexity of halal integrity assurance issues in the food supply chain related to safety, security, and quality (Tieman et al., 2012). There is a framework used to integrate food in a halal supply chain environment. The framework addresses four dimensions of integrity, namely: raw materials, production, services, and information integrity. Logistics plays an important role in ensuring the integrity of halal food through proper management of transportation, handling & storage along the supply chain until it reaches its destination (Zailani et al, 2017). Halal integrity is not only related to permitted and prohibited goods, but also related to the halal status of products from raw materials to consumers (Khan et al., 2018).

In the Halal Product Guarantee Law No. 33 of 2014, article 1 states that the Halal Production Process is a series of activities to ensure product halal status, including the supply of materials, processing, storage, packaging, distribution, sales, and product presentation. Article 25 states that business actors or companies that have obtained a halal stipulation must include a halal label on the product; consistently maintain product halal status and separate locations, places and slaughter, processing equipment, storage, packaging, distribution, sales, and presentation between halal and non-halal products; renew the halal provisions if the validity period of the halal provisions expires; and report changes in the composition of Materials to BPJPH.

Halal certification can have the impact of increasing the market (Machfud (2011), Bustamam (2010), Liow (2011)), increasing consumer perceptions (Hassan (2009), Berry (2008)), as well as clarity of product halal status (Othman et.al. , 2006). The government stipulates halal product guarantee regulations that regulate halal provisions from upstream to consumers or halal guarantees along the supply chain (Aziz et. al., 2021).

This research was conducted in a Peanuts Pie business that has obtained a halal certificate. The number of requests for Peanuts Pie products has increased after obtaining a halal certificate on the product from 8 tons to 13 tons per month. After being certified halal, several updates or changes were made, namely the implementation of a halal assurance system in businesses, which included: the use of halal raw materials, the formation of a halal management team, and several other changes. This peanut pie business has never done any performance measurement, either before or after the halal certification. The supply chain performance measurement in this study was carried out using the Supply Chain Operations Reference (SCOR) method. In the SCOR method, the entire supply chain flow is summarized in 5 core processes, namely the plan, source, make, deliver, and return processes. After that, the measurement of the weighting is carried out using the Analytical Hierarchy Process (AHP) to determine the level of importance of each performance indicator so that the final performance value of the Peanuts Pie business can be known.

2. Methods

The variables used in this study consisted of supply chain performance indicators or Key Performance Indicators (KPI). Key Performance Indicators are designed based on previous research references and adapted to the conditions of the research object. There are 6 indicators taken from research conducted by Prasetya and Retnoningsih (2019) on the potato chip business. The three indicators are taken from research conducted by Misnadesi and Hartati (2019) which in their research uses the SCOR and Fuzzy AHP methods. Research conducted by Harwati and Pettalolo (2018) uses halal criteria on the SCOR model. From this research, 4 indicators of performance appraisal were taken. In addition, there are 4 Key Performance Indicators (KPI) which are halal indicators based on the Halal Product Guarantee Act, so that in total there are 17 Key Performance Indicators (KPI).

Data collection in this study was carried out by:

1. Conducting observations and interviews regarding all activities in the peanut pie supply chain and the data needed for the assessment of Key Performance Indicators (KPI) used in performance measurement.
2. The AHP questionnaire is filled out by an expert who knows the supply chain system and the state of the business under study. The results of the questionnaire are used in processing the value of the importance of each criterion.

The stages of data processing in this study are:

1. Normalize Snorm de Boer on previously designed KPIs using the SCOR method.
2. Weighing the main priorities on the SCOR model using the AHP questionnaire.
3. Calculate the final weight of the supply chain from the value of KPI weights (level 3) with performance attributes (level 2) and supply chain processes (level 1).
4. Perform supply chain performance calculations based on the multiplication of the KPI normalized value with the final weighted value.
5. Comparing the value of supply chain performance on conditions before and after obtaining a halal certificate.
6. Analyze using the Traffic Light System on all Key Performance Indicators.

3. Results and Discussion

3.1. Performance Measurement Indicators and Snorm de Boer Weighting

The measurement of the performance of the Peanuts Pie supply chain is carried out by applying the Halal indicator using the Supply Chain Operation Reference (SCOR) method which consists of 5 processes, namely: plan, source, make, deliver, and return. The Key Performance Indicators used in this study were designed based on previous research references and adapted to the conditions of the research object.

There are 6 indicators taken from research conducted by Prasetya and Retnoningsih (2019) on the potato chip business. The three indicators are taken from research conducted by Misnadesi and Hartati (2019) which in their research uses the SCOR and Fuzzy AHP methods. Research conducted by Harwati and Pettalolo (2018) uses halal

criteria on the SCOR model. In addition, there are 4 KPIs which are halal indicators and are based on the provisions contained in the Halal Product Guarantee Act, namely:

1. Increasing the role of the halal management team placed on the Plan process indicator on the Agility attribute.
2. Inspection of incoming raw materials placed on the Source process indicator in the Reliability attribute.
3. Cleanliness of production facilities placed on the Make process indicator in the Asset attribute.
4. Cleanliness of Transportation which is placed on the Source process indicator in the Asset attribute.

The design and preparation of Key Performance Indicators (KPI) in the Peanut Pie business studied can be seen in Fig. 1.

Snorm De Boer normalization is carried out to uniform the different size scales of each performance indicator. The determination of the worst performance value (Smin) and the best performance value (Smax) is carried out based on three categories, namely larger is better, lower is better. The equation used is as follows:

For the Larger Is Better category

$$\text{Snorm} = \frac{\text{SI-Smin}}{\text{Smax-Smin}} \text{ x } 100$$

For the Lower Is Better category

$$\text{Snorm} = \frac{\text{Smax-SI}}{\text{Smax-Smin}} \text{ x } 100$$

Information:
SI = Actual indicator value that has been achieved
Smin = The worst performance value of the performance indicator
Smax = The best performance value of the performance indicators

The results of the Snorm de Boer calculation from each Key Performance Indicator (KPI):

1. Number of Products Planned
   The number of products planned is the number of peanut pie products produced every month. When the business has not received a Halal certificate, it is 8 tons per month. After being certified halal, the planned

number of products is 13 tons per month. Because the amount of production or sales is fixed every month, the KPI value = 100.

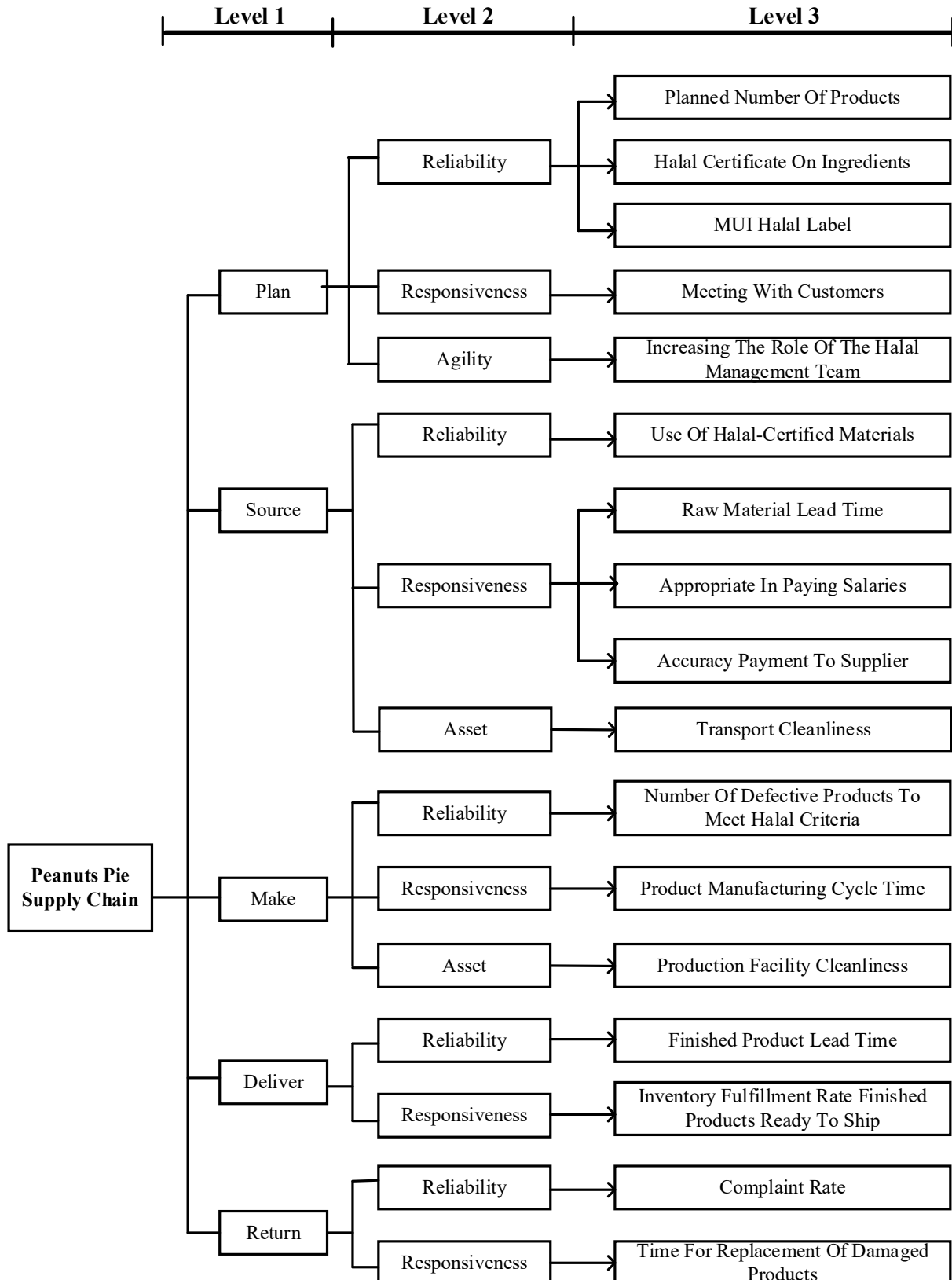| Level 1	Level 2	Level 3
Plan	Reliability	Planned Number Of Products
		Halal Certificate On Ingredients
		MUI Halal Label
	Responsiveness	Meeting With Customers
	Agility	Increasing The Role Of The Halal Management Team
Source	Reliability	Use Of Halal-Certified Materials
	Responsiveness	Raw Material Lead Time
		Appropriate In Paying Salaries
		Accuracy Payment To Supplier
	Asset	Transport Cleanliness
Make	Reliability	Number Of Defective Products To Meet Halal Criteria
	Responsiveness	Product Manufacturing Cycle Time
	Asset	Production Facility Cleanliness
Deliver	Reliability	Finished Product Lead Time
	Responsiveness	Inventory Fulfillment Rate Finished Products Ready To Ship
Return	Reliability	Complaint Rate
	Responsiveness	Time For Replacement Of Damaged Products

(Peanuts Pie Supply Chain)

Figure 1. Hierarchy of Key Performance Indicators for Peanuts Pie

2. Halal Certificate on Ingredients
   There are 5 ingredients used for the process of producing peanut pie. In conditions before being certified halal, there are 4 halal ingredients used. Then the normalization value is (larger is better category).
   Snorm $= \frac{\text{SI-Smin}}{\text{Smax-Smin}}$ x 100 $= \frac{4-0}{5-0}$ x 100 $= 80$
   In the condition after being certified halal, all materials used are halal materials used. Then the normalized value is 100.
3. MUI Halal Label
   In the condition before obtaining the halal certificate, the peanut pie product does not yet have a halal logo from the MUI on the packaging, then the KPI value is 0. In the condition after obtaining the halal certificate, the peanut pie product already has the MUI halal logo on the packaging, then the KPI value is 100.
   The recapitulation of the Snorm De Boer weighting calculation can be seen in Table 1.

Table 1. Recapitulation of Normalization Score Calculation

KPI	Attribute	Core Process	Category	Normalized Score Before Certification	Normalized Score After Certification
Planned number of products	Reliability	Plan	Larger is better	100	100
Halal certificate on ingredients			Larger is better	80	100
MUI Halal Label			Larger is better	0	100
Meeting with customers	Responsiveness		Larger is better	0	0
Increasing the role of the halal management team	Agility		Larger is better	66.7	33.3
Use of halal-certified materials	Reliability	Source	Larger is better	100	100
Raw Material Lead Time	Responsiveness		Lower is better	80	80
Appropriate In Paying Salaries			Lower is better	100	100
Accuracy Payment To Supplier			Lower is better	100	100
Transport Cleanliness	Asset		Larger is better	100	100
Number of defective Products to meet halal criteria	*Reliability*	*Make*	*Lower is better*	80	50
Product manufacturing cycle time	*Responsiveness*		*Lower is better*	30	71.4
Production facility cleanliness	*Asset*		*Larger is better*	66.7	66.7
Finished product lead time	*Responsiveness*	*Deliver*	*Lower is better*	50	50
Inventory Fulfillment Rate Finished Products Ready to Ship	*Reliability*		*Larger is better*	100	100
Complaint rate	*Reliability*	*Return*	*Lower is better*	100	50
Time for replacement of damaged products	*Responsiveness*		*Lower is better*	50	50

3.2. Key Performance Indicator (KPI) Weighting and Performance Calculation

Furthermore, the main priority is weighted on the SCOR model using the AHP questionnaire. The calculation of the final weight of the supply chain starts from the value of the KPI weight (level 3) with performance attributes (level 2) and supply chain processes (level 1). The data obtained from the questionnaire was then processed with the following steps:

1. Compilation of the pairwise comparison matrix
2. The process is weighted on the pairwise comparison matrix
3. Normalization between processes is carried out on the comparison matrix
4. Calculation of the total weight matrix of each process
5. The Eugen Vector. value is calculated
6. Calculation of max
7. Consistency Index (CI) is calculated, and
8. Consistency Ratio (CR) is calculated, where the results of CR (<= 0.10) concluded that the comparison process between the two criteria was carried out consistently (Padmowati, 2009).

The following is an example of the results of weighting AHP data starting from the weighting between Processes (Level 1). The data obtained from the questionnaire (paired comparison section between processes) were then processed and entered into the pairwise comparison matrix.

a. The pairwise comparison matrix was prepared. The results of compiling the comparison matrix can be seen in Table 2.

Table 2. Pairwise Comparison Matrix Between Process

Process	Plan	Source	Make	Deliver	Return
Plan	1	1/4	1/4	1/3	4
Source	4	1	1	4	6
Make	4	1	1	4	6
Deliver	3	1/4	1/4	1	4
Return	¼	1/6	1/6	1/4	1

b. Process weighting is carried out on the pairwise comparison matrix. The weighting results can be seen in Table 3.

Table 3. Inter-Process Weighting Results

Process	Plan	Source	Make	Deliver	Return
Plan	1.00	0.25	0.25	0.33	4.00
Source	4.00	1.00	1.00	4.00	6.00
Make	4.00	1.00	1.00	4.00	6.00
Deliver	3.00	0.25	0.25	1.00	4.00
Return	0.25	0.17	0.17	0.25	1.00
TOTAL	12.25	2.67	2.67	9.58	21.00

c. Normalization between processes is carried out on the comparison matrix. The results of normalization can be seen in Table 4. (Example: plan: plan = 1/12.25 = 0.08)

Table 4. Normalization Results Between Process

Process	Plan	Source	Make	Deliver	Return
Plan	0.08	0.09	0.09	0.03	0.19
Source	0.33	0.38	0.38	0.42	0.29
Make	0.33	0.38	0.38	0.42	0.29
Deliver	0.24	0.09	0.09	0.10	0.19
Return	0.02	0.06	0.06	0.03	0.05

TOTAL	1.00	1.00	1.00	1.00	1.00

d. The calculation of the total weight matrix of each process is carried out. The results of the calculation of the total weight matrix can be seen in Table 5. (example: for the plan process, the total weight matrix = 0.08 + 0.09 + 0.09 + 0.03 + 0.19 = 0.49)

Table 5. Calculation Results of Inter-Process Total Weight Matrix

Process	Plan	Source	Make	Deliver	Return	Total Weight Matrix
Plan	0.08	0.09	0.09	0.03	0.19	0.49
Source	0.33	0.38	0.38	0.42	0.29	1.78
Make	0.33	0.38	0.38	0.42	0.29	1.78
Deliver	0.24	0.09	0.09	0.10	0.19	0.73
Return	0.02	0.06	0.06	0.03	0.05	0.22

e. The Eugen Vector value is calculated, which can be seen in Table 6. (Example: for the plan process, the eugen vector value = 0.49/5 = 0.099)

Table 6. Eugen Vector Calculation Results Between Process

Total Weight Matrix	Eugen Vector
0.49	0.099
1.78	0.356
1.78	0.356
0.73	0.145
0.22	0.044
5.00	**1.00**

f. Performed calculations max
λ maks = ((12,25 x 0,099) + (2,67 x 0,356) + (2,67 x 0,356) + (9,58 x 0,145) + (21,00 x 0,044))
λ maks = 5,42

g. Consistency Index (CI) is calculated
$CI = \frac{(\lambda \text{ maks} - n)}{n-1}$, n = order matrix
$CI = \frac{(5,42 - 5)}{5-1} = 0,11$

h. Performed the calculation of Consistency Ratio (CR)
$CR = \frac{CI}{RI}$, RI = Random Index
Based on the Random Index table, because n = 5, then RI = 1.12
$CR = \frac{0,11}{1,12} = 0,09 = 9\%$, then CR < 10% then the data used is consistent and the calculation results are declared correct.

Furthermore, the calculation of the weighting of the AHP data at Level 2 and Level 3. Then the recapitulation of the calculation results of the final performance of the peanut pie supply chain before obtaining halal certification can be seen in Table 7.

Table 7. Table of Final Performance of the Peanut Pie Supply Chain Before Halal Certification

No	Process	Weight Level 1	Attribute	Weight Level 2	Key Performance Indicators	Weight Level 3	SNORM	Final Weight	SNORM x Weight	Final Performance
1	Plan	0,1	Reliability	0,56	Planned number of products	0,11	100	0,01	0,62	
2					Halal certificate on ingredients	0,44	80	0,02	1,99	
3					MUI Halal Label	0,44	0	0,02	0,00	
4			Responsiveness	0,32	Meeting with customers	1,00	0	0,03	0,00	
5			Agility	0,12	Increasing the role of the halal management team	1,00	66,7	0,01	0,80	
6	Source	0,36	Reliability	0,33	Use of halal-certified materials	1,00	100	0,18	14,40	
7			Reponsiveness	0,33	Raw Material Lead Time	0,46	80	0,08	6,62	
8					Appropriate In Paying Salaries	0,13	100	0,02	2,34	
9					Accuracy Payment To Supplier	0,42	100	0,08	7,56	68,32
10			Asset	0,33	Transport Cleanliness	1,00	100,00	0,12	11,88	
11	Make	0,36	Reliability	0,67	Number of defective Products to meet halal criteria	1,00	80	0,07	5,76	
12			Reponsiveness	0,33	Product manufacturing cycle time	1,00	33,3	0,22	7,20	
13			Asset	0,2	Production facility cleanliness	1,00	66,7	0,07	4,80	
14	Deliver	0,15	Reliability	0,67	Finished product lead time	1,00	50	0,10	5,03	
15			Reponsiveness	0,33	Inventory Fulfillment Rate Finished Products Ready to Ship	1,00	100	0,05	4,95	
16	Return	0,04	Reliability	0,25	Complaint rate	1,00	100	0,01	1,00	
17			Reponsiveness	0,75	Time for replacement of damaged products	1,00	50	0,03	1,50	

The results of calculating the final performance of the peanut pie supply chain before obtaining halal certification can be seen in Table 8.

Table 8. Table of Final Performance of the Peanut Pie Supply Chain After Halal Certification

No	Process	Weight Level 1	Attribute	Weight Level 2	Key Performance Indicators	Weight Level 3	SNORM	Final Weight	SNORM x Weight	Final Performance
1	Plan	0,1	Reliability	0,56	Planned number of products	0,20	100	0,01	1,12	
2					Halal certificate on ingredients	0,80	100	0,04	4,48	
3					MUI Halal Label	0,44	100	0,02	2,49	
4			Responsiveness	0,32	Meeting with customers	1,00	0	0,03	0,00	
5			Agility	0,12	Increasing the role of the halal management team	1,00	33,3	0,01	0,40	
6	Source	0,36	Reliability	0,25	Use of halal-certified materials	1,00	100	0,18	18,00	
7			Reponsiveness	0,75	Raw Material Lead Time	0,46	80	0,08	6,62	
8					Appropriate In Paying Salaries	0,13	100	0,02	2,34	
9					Accuracy Payment To Supplier	0,42	100	0,08	7,56	80,47
11			Asset	0,33	Transport Cleanliness	1,00	100,00	0,12	11,88	
12	Make	0,36	Reliability	0,67	Number of defective Products to meet halal criteria	1,00	50	0,24	12,06	
13			Reponsiveness	0,33	Product manufacturing cycle time	1,00	71,4	0,12	8,48	
14			Asset	0,2	Production facility cleanliness	1,00	66,7	0,07	4,80	
15	Deliver	0,15	Reliability	0,67	Finished product lead time	1,00	50	0,10	5,03	
16			Reponsiveness	0,33	Inventory Fulfillment Rate Finished Products Ready to Ship	1,00	100	0,05	4,95	
17	Return	0,04	Reliability	0,25	Complaint rate	1,00	50	0,01	0,50	
18			Reponsiveness	0,75	Time for replacement of damaged products	1,00	50	0,03	1,50	

Based on the calculation of supply chain performance using the SCOR and AHP methods, the supply chain performance value before being certified halal is 68.32, which is in the Average category. Meanwhile, the supply chain performance value after being certified halal is 80.47 in the Good category.

Furthermore, the KPI grouping on the Peanuts Pie business was carried out using the Traffic Light System method. The traffic light system uses three colors as indicators, namely green for satisfactory performance (performance score > 80), yellow for marginal performance (60 performance score ≤ 80) and red for poor performance (performance score < 60) (Vanany, 2005). The grouping of KPIs based on the Traffic Light System can be seen in Table 9.

Table 9. Grouping of KPIs for Peanuts Pie Business Using Traffic Light System

No	Key Performance Index	SNORM Before Certified	SNORM After Certified
1	Planned number of products	100	100
2	Halal certificate on ingredients	80	100
3	MUI halal label	0	100
4	Meeting with customers	0	0
5	Increasing the role of the halal management team	66.7	33.3
6	Halal raw material inspection	100	100
7	Raw material lead time	80	80
8	Appropriate in paying salaries	100	100
9	Accuracy payment to supplier	100	100
10	Transport cleanliness	100	100
11	Number of defective products/failure to meet halal criteria	80	50
12	Product manufacturing cycle time	30	71.4
13	Production facility cleanliness	66.7	66.7
14	Product delivery lead time	50	50
15	Inventory fulfillment rate finished products ready to ship	100	100
16	Complaint rate	100	50
17	Damaged product replacement time	50	50

3.3. Discussion

There are 6 KPIs that are still in the red category, namely (1) Meeting with customers, (2) Increasing the Role of the Halal Management Team, (3) Number of Defective Products/Failure to Meet Halal Criteria, (4) Product Delivery Lead Time, (5) Complaints Rate, and (6) Time to Replace Damaged Products. There are 3 indicators that have increased in value after obtaining a halal certificate on a product, namely (1) Halal Certificate on Materials, (2) MUI Halal Label, and (3) Product Manufacturing Cycle Time. In addition, there are also 3 indicators that experienced a decline in value after obtaining a halal certificate on the product, namely (1) Increasing the Role of the Halal Management Team, (2) Number of Defective/Failed Products to Meet Halal Criteria and (3) Complain Rate.

Based on the research that has been done, it is known that there is a positive effect of halal certification on the supply chain of Peanuts Pie, including an increase in the number of requests and a decrease in the lead time of product manufacture due to the use of production machines. The Peanuts Pie business also increases the role of its supply chain by creating processes that ensure the cleanliness of equipment, storage, processing, and the ability of workers to consistently carry out the halal production process. Through the Halal MUI logo on the packaging of Peanuts Pie which is marketed, of course, public trust in the product of Peanuts Pie has increased and gives a positive image from the public and buyers.

Judging from the criteria for the halal assurance system, the Peanuts Pie business has used products with halal-certified ingredients. In addition, the facilities used are kept clean and are not used to produce non-halal products. However, there is no banner regarding the halal product guarantee system at the peanut pie business production site as a form of socialization of halal policy. This business has also formed a halal management team that is responsible for planning, implementing and supervising the daily production process. However, there are shortcomings in the contribution of

the halal management team, namely training or seminars that are attended. In addition, the Internal Audit is still not routinely carried out by the halal management team every 6 months. Peanut pia products are also categorized as untraceable. This can be seen on the packaging of the peanut pie that does not include an expired date label.

SMEs are also increasing the role in their halal food supply chain to create processes that ensure the cleanliness of equipment, storage, processing, and the ability of workers regarding the halal production process. Through the Halal MUI logo on the packaging of Peanuts Pie which is marketed, of course, public trust in the product of Pia Peanut Atik has increased and gives a positive image from the public and buyers. Halal certification is closely related to the number of Peanuts Pie sales which increased by 62.5%. This increase in the number of sales will certainly have an impact on improving the financial performance of the business after being certified halal where this result is in line with the results of research conducted by Mohamed et al. (2014) which examines the impact of halal certification on the company's financial performance and shows that halal certificate is positively correlated with improving the company's financial performance. In addition, the implementation of halal standards can improve the company's operational performance where companies use machines in the peanut pie production process to be able to meet the increasing number of requests or sales after obtaining halal certification. This is in accordance with the results of research conducted by Giyanti and Indriastiningsih (2019) which shows that the application of halal standards can improve company performance, both operational performance and financial performance.

Due to the condition of SMEs that already have halal certificates, it is recommended for SMEs to make efforts to improve indicators related to the halal assurance system, namely: Increasing the role of the halal management team. It is hoped that workers who are responsible for the halal management team can take part in more training to be able to increase their knowledge of the halal product guarantee system and carry out all tasks related to the halal assurance system for which they are responsible.

4. Conclusion
The conclusions obtained based on the results of research on the impact of halal certification on supply chain performance of the peanut pie business are as follows: The results of supply chain performance calculations using the SCOR and AHP methods, the supply chain performance value before being certified halal is 68.32, which is in the Average category. Meanwhile, the supply chain performance value after being certified halal increased to 80.47 in the Good category.
1. There are 6 KPIs that are still in the red category, namely (1) Meeting with customers, (2) Increasing the Role of the Halal Management Team, (3) Number of Defective/Failed Products to Meet Halal Criteria, (4) Product Delivery Lead Time, (5) Complain Rate, and (6) Time to Replace Damaged Products.
2. There are 3 indicators that have increased in value after obtaining a halal certificate on a product, namely (1) Halal Certificate on Materials, (2) MUI Halal Label, and (3) Product Manufacturing Cycle Time.
3. There are 3 indicators that have decreased in value after obtaining halal certificates on products, namely (1) Increasing the Role of the Halal Management Team, (2) Number of Defective/Failed Products to Meet Halal Criteria and (3) Complain Rate.

Halal certification owned by a company can expand the market / increase sales. Currently, the government has issued regulations on guaranteeing halal products so that local governments can encourage business actors in their regions to immediately certify the products produced.

References
Ali, K. A. M., Jamaludin, K. R., Quality Assurance in Halal Food Manufacturing in Malaysia: A Preliminary Study, *Proceedings of International Conference on Mechanical and Manufacturing Engineering (ICME2008)*, Johor Bahru, Malaysia, 2008.

Aziz, F., Setyorini, R., & Hasanah, Y. N., Analisis Halal Supply Chain pada Usaha Mikro Kecil Menengah (UMKM) Makanan di Kota Bandung, Analysis of Halal Supply Chain on Food Micro, Small and Medium Enterprises (MSMEs) in Bandung City, *Jurnal Ilmiah Ekonomi Islam*, vol. 7, no. 01, pp. 293-301, 2021.

Berry, B., *Global halal food market brief*, 1st Edition, Canada: Agriculture and Agri-Food Canada, Ottawa, 2008.

Bin Nooh, M. N., et al., Halal certification: what the SME producer should know, *Proceedings of the 1st Enterpreneurship & Management International Conference*, Kuala Lumpur, October 12, pp 56-63, 2007.

Bustamam, U. S. A., Entrepreneurial growth process of Malay entrepreneurs – A Malaysian, *International Journal of Business*, vol. 1, no. 3, pp.206-217, 2010.

Firdaus, H., Midyanti, D. M., and Mutiah, N., Pengukuran kinerja supply chain Perum Bulog divisi regional Kalimantan Barat menggunakan supply chain operation reference (SCOR), Measurement of supply chain performance of Perum Bulog regional division of West Kalimantan using supply chain operation reference (SCOR), *Coding Jurnal Komputer dan Aplikasi*, vol. 8, no. 3, pp. 19-28, 2020.

Giyanti, I, and Indriastiningsih, E., Impact of halal certification on the performance of food small medium enterprises, *Jurnal Ilmiah Teknik Industri*, vol. 18, no. 2, pp. 116-123, 2019.

Harwati and Pettalolo, A. N. Y., Halal criteria in supply chain operations reference (SCOR) for performance measurement: A case study, *Proceedings of the 1st International Conference on Industrial and Manufacturing Engineering, IOP Conference Series: Materials Science and Engineering 505 (1)*, Medan City, Indonesia, October 16, pp. 1-9, 2018.

Hassan, S. H. et al, Influence of the Halal Certification Mark in Food Product Advertisement in Malaysia. Chapter 14 of *The New Culture of food. Marketing Opportunity from ethnic, religious and cultural diversity*. Gower Publishing, England, 2009.

Hidayat, A. S., and Siradj, M., Sertifikasi halal dan sertifikasi non halal pada produk pangan industri, Halal certification and non-halal certification for industrial food products, *AHKAM: Jurnal Ilmu Syariah*, vol. 15, no.2, pp. 199-210, 2015.

Islamic Food and Nutrition Council of America, IFANCA, Available: www.ifanca.org/newsletter/2009_03.htm, August 12, 2020.

Khan, M. I., Haleem, A., and Khan, S., Defining Halal Supply Chain Management, *Supply Chain Forum: An International Journal*, vol. 19, no. 2, pp. 122-131, 2018.

Liow, R. J., *Marketing Halal: Creating New Economy, New Wealth*, 1st Edition, MPH Group Pub, Selangor, 2011.

Machfud, A. K., et al., Collaboration, wealth, and value creation, SME's Halal products communities, and information systems, *International Journal on New Computer Architechture and Their Applications*, vol. 1, no. 2, pp. 510-518, 2011.

Misnadesi, and Hartati, M., Pengukuran kinerja rantai pasok UKM Kalamai Uni War menggunakan metode SCOR dan fuzzy AHP, Measurement of supply chain performance of Kalamai Uni War SMEs using SCOR method and fuzzy AHP, *Spektrum Industri*, vol. 17, no. 2, pp. 119-132, 2019.

Mohamed, R., Mahmood, C., Mansor, N., *Compliance to halal certification – Its impact on business financial performance*, in Recent Trends in Social and Behaviour Sciences, CRC Press, pp. 499-503, 2014.

Othman, R. et. al., 2006. Customers' Attitude towards Halal Food Status: A Survey on Penang Muslim Consumers. *Proceedings of 2nd National Conference on Entrepreneurship and Small Business 2006*. Faculty of Business Management, Universiti Utara Malaysia. Vistana Hotel, Penang. 9 – 10 December, pp. 1-10, 2006.

Padmowati, R. d. L. E., Pengukuran index konsistensi dalam proses pengambilan keputusan menggunakan metode AHP, Measuring the consistency index in the decision-making process using the AHP method, *Proceedings of Seminar Nasional Informatika*, Yogyakarta, Indonesia, May 23, pp. 80-84, 2009.

Prasetya, A., Retnoningsih, D., and Koestiono, D., Kinerja manajemen rantai pasok (supply chain management) keripik kentang di industri kecil Kota Batu, Supply chain performance in potato chips industries in Batu City, *Habitat*, vol. 30, no. 2, pp. 44-53, 2019.

Setyaningsih, E. D., and Marwansyah, S., The effect of halal certification and halal awareness through interest in decisions on buying halal food products, *Syi'ar Iqtishadi: Journal of Islamic Economics, Finance, and Banking*, vol. 3, no. 1, pp. 65, 2019.

Teng, P. K., Wan Jusoh, W. J., and Hoe, K. S., Awareness, recognition, and intention: Insight from a non-muslim consumer survey regarding halal labeled food products in Malaysia halal labeled food view project functional foods view project, *Proceedings of the 3rd International Conference on Management*. Penang, Malaysia, June 10-11, pp. 89-101, 2013.

Tieman, M., van der Vorst, J. G. A. J., dan Ghazali, M. C., Principles of Halal Supply Chain Management, *Journal of Islamic Marketing*, vol. 3, no. 3, pp. 217–243, 2012.

Vanany, I., Suwignjo, P., and Yulianto, D., Design of supply chain performance, *Proceedings of International Conference on Operations and Supply Chain Management*, January 18, pp. 78-86, 2005.

Yusuf, A. H., Shukor, A., and Bustamam, U. S. A., Halal certification vs business growth of food industry in Malaysia, *Journal of Economics, Business, and Management*, vol. 4, no.3, pp. 247-251, 2016.

Zailani, S., Iranmanesh, M., Aziz, A. A., and Kanapathy, K., Halal logistics opportunities and challenges. *Journal of Islamic Marketing*, vol. 8, no. 1, pp. 127-139, 2017.

Acknowledgements

Biographies

Dini Wahyuni is a lecturer at the Department of Industrial Engineering, Universitas Sumatera Utara. Undergraduate education is pursued at Industrial Engineering at the Universitas Sumatera Utara and master programme in the Industrial Engineering at the Institut Teknologi Bandung. Currently, she is a doctoral student in the industrial engineering at the Universitas Sumatera Utara. Research interests include halal supply chain, halal certification, production management and ergonomics. Dini Wahyuni has attended workshops on the Halal Assurance System and workshops on Best Practice of Halal Logistics in Malaysia, as well as workshops on Supply Chain teaching materials. She is also active in LPPOM MUI as a Halal auditor in the Province of Sumatera Utara.

Nazaruddin is a lecturer at the Department of Industrial Engineering, Universitas Sumatera Utara and past Head Department of Master and Doctor Programme at Industrial Engineering in the Universitas Sumatera Utara. Previously, Nazaruddin also served as secretary of the Master of Management Study Program at the same University. Undergraduate education was taken at the Industrial Engineering Universitas Sumatera Utara, a master program was completed at Industrial Engineering and Management, the Institut Teknologi Bandung and completed a doctor program at University Utara Malaysia (UUM). Research interests include the fields of technology management, supply chain and strategic management.

Irwan Budiman is a lecturer at the Department of Industrial Engineering, Faculty of Technology and Computer Sciences, Universitas Prima Indonesia. He earned bachelor and master degree in Industrial Engineering from Universitas Sumatera Utara. He has published journals and conference papers. Budiman has completed research project with Indonesian State Plantation Company III (PTPN III), Indonesian State Power Company (PLN), Indonesia Eximbank, Bank of Indonesia, and Local Government (Pemda). His research interests include productivity engineering, production management, ergonomics, supply chain management, and strategic management.

Rahel Ulina Pangaribuan is an alumnus of Industrial Engineering at the Universitas Sumatera Utara, with a final study on the halal supply chain. Born in the city of Medan, on July 29, 2000, currently Rahel Ulina Pangaribuan is 21 years old. is the last child of 4 siblings. He is a graduate of SMA Methodist 2 Medan. During college he was also active as an assistant to the Ergonomics and Work System Design Laboratory in Universitas Sumatera Utara from 2020 to 2021. After studying for approximately 4 years, Rahel received a Bachelor of Engineering degree in November 2021. Rahel Ulina Pangaribuan conducted research his final project which discusses the impact of halal certification on the supply chain in one of the SMEs in the city of Medan.