

# **Application of Balanced Scorecard Method in Measuring Halal Frozen Food Supply Chain Performance**

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## **Abstract**

As one of the countries with the largest Muslim population in the world, Indonesia is a very attractive market for the halal food industry. According to The Global Islamic Economy Indicator in the State of the Global Islamic Economy (SGIE) Report in 2022, Indonesia is ranked fourth in the number of halal food consumption. The halal status of the product must be guaranteed from the source of raw materials until the product received by consumers. This research was conducted at a small business that produces halal frozen food which has been measuring its performance only based on financial aspects. This study aims to determine the value of business performance using 4 aspects with the

balanced scorecard method, namely financial aspects, customer aspects, internal business aspects and learning & growth aspects using halal indicators. This study uses 19 Key Performance Indicators (KPI) in measuring performance. Based on the calculation results, it is known that the business performance value is 73.653 which is included in the good performance category. Based on the analysis with the Traffic Light System method, there are 6 KPIs that require improvement and 2 of them are halal indicators. Proposed improvements that can be given to improve business performance, namely the owner can use Islamic banks in saving capital and business income and also organize training and education on the Halal Assurance System (SJH) to employees, especially employees who work in the production department.

## **Keywords**

Performance Measurement, Supply Chain, Key Performance Indicator, Balanced Scorecard, AHP.

## **1. Introduction**

Supply Chain Management (SCM) is the process of integrating, coordinating, and controlling the movement of raw materials into finished products from suppliers to deliver to consumers to help increase the efficiency and effectiveness of the entire business supply chain (Harwati, 2019). The main goal of the supply chain is to meet customer needs, and in the process also generate profits for all parties involved in the supply chain (Chopra & Meindl, 2013). Halal Supply Chain Management (HSCM) is a new perspective that has arisen because many companies want to meet the demands of Muslim consumers in ensuring product halal assurance. In HSCM, the entire upstream to downstream process from source of raw materials to delivering the final product to customers must comply with Sharia law. The concept of halal supply chain maintains and ensures the integrity of halal food. The halal supply chain also avoids direct contact with illicit goods, manages cross-contamination between halal and haram goods, pays attention to special facilities for halal products, and ensures supply chain management is in line with the perceptions of Muslim consumers (Wahyuni, 2020).

Indonesia is a very attractive market for halal food because Indonesia is one of the countries with the largest Muslim population in the world. According to The Global Islamic Economy Indicator in the State of the Global Islamic Economy (SGIE) Report in 2022, Indonesia is the fourth country in the GIE Index in the halal food ranking which shows that Indonesia is the fourth country with the largest amount of halal food consumption. Fulfilling halal requirements is something that must be considered in running a business that produces halal products, because halal is a consideration for Muslim communities in consuming food and drinks (Fauziyah, 2020). And every Muslim is obliged to consume halal food and drink (Qurtubi et al., 2022). The rapid development of the halal food industry cannot be separated from the Government's support by establishing the Halal Product Guarantee Agency (Badan Penyelenggara Jaminan Produk Halal/BPJPH) to provide security and convenience to Muslim consumers (Fathoni & Syahputri, 2020). Some examples of BPJPH's authorities are formulating and establishing Halal Assurance System (HAS) policies; determining HAS norms, standards, procedures and criteria; issuing and revoking halal certificates on foreign products, and registering halal certificates on foreign products, registering halal auditors, supervise HAS.

The food industry, which is currently growing rapidly, is the cake industry, both ready-to-eat cakes and frozen food. This can be seen from the increasing number of cake shops in residential areas and shopping centers in Indonesia, especially in big cities. The rapid development of the cake industry is due to the increasing public demand for cake consumption (Prasastono et al., 2022). As one of the countries with the largest Muslim population in the world, the government and producers must provide guarantees for halal products for the community, because the concept of halal does not only concern religion, but also cleanliness and quality so that the halal food consumed must be guaranteed (Suhardi et al., 2019). In the frozen food business which is the object of research, performance measurement is only carried out from a financial perspective.

To be able to survive in highly dynamic conditions, a business must be able to measure, maintain and improve its performance (Qurtubi et al., 2022). Business performance is the output of a business in a certain period based on predetermined standards. Performance measurement is an assessment of how the company's capabilities are based on certain standards. Performance measurement is a part of HSCM where SCM performance measurement with indicators of Islamic values is important in achieving HSCM balance (Harwati, 2019). Performance measurement can help determine the level of success of a business running a predetermined program (Martunis et al., 2019). To measure business performance, the Balanced Scorecard (BSC) method can be used. According to Martunis et al., (2019), the BSC method is appropriate for measuring performance because it does not only consider financial aspects. To be able

to assess effective performance, it is necessary to translate the mission, vision, and strategy of the organization into operational objectives and performance parameters, both financial and non-financial. The BSC provides a strategic perspective by considering indicators from other perspectives such as the customer perspective, internal business perspective, and learning & growth perspective, as described in the Balanced Scorecard method (Setiowati & Syukri, 2021).

This research was conducted in a business that produces frozen food. There are 5 job divisions in the frozen food business, namely admin, sales, production, courier, and public relations. So far, the frozen food business has only measured its business performance from a financial aspect. Because other aspects also need to be assessed in performance measurement, this research was conducted to measure frozen food business performance by involving customer aspects, internal business aspects, and learning & growth aspects and paying attention to halal indicators to find out how halal supply chain management is implemented in the frozen food business.

## **2. Literature Review**

Supply chain is defined as all activities, materials, tools, and processes to make products from raw materials to semi-finished products or final products. In addition, supply chain supply chain means the process from upstream to downstream. The supply chain also means the entire process starting from purchasing, sourcing, production, and distribution with the flow of materials and information that covers starting from the procurement of raw materials, suppliers, distribution of raw materials, purchasing, production processes, production targets, to distribution. According to its definition and implementation, supply chain management (SCM) is an important process for companies to be able to increase production levels in order to distribute products to customers by managing and also controlling all activities. Therefore, supply chain management is a critical activity that needs to be carried out by a company because it is an activity that includes managing the entire flow of goods and business processes of a company from upstream to downstream (Kusrini et al., 2019).

Performance measurement is the process of measuring and monitoring performance, increasing motivation, and diagnosing problems, as well as identifying successes and potential business management strategies (Firdaus et al., 2020). According to Sofyan Tsauri (2014), performance measurement can be carried out using a relevant assessment system. The performance appraisal system must also be easy to implement and in accordance with what will be measured and reflect the things that really determine performance. Indicators that become tools in performance measurement must be designed in such a way because the indicators assessed must be related to what the performance appraiser is doing.

Halal Supply Chain Management (HSCM) 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 (Dini Wahyuni et al., 2022). One thing of the HSCM model is performance measurement, measuring Supply Chain Management performance with Islamic indicators that are important to achieve balance in HSCM (Harwati, 2019).

The Balanced Scorecard is a method used to measure company performance from all aspects, both financial and non-financial. The Balanced Scorecard itself is a collection of integrated performance measures, implemented from the company's strategy to support the overall company's strategy. The balanced scorecard is a very popular method and is widely used by practitioners in measuring business performance (Rahim & Radjab, 2017). So it is necessary to measure using the Balanced Scorecard, where the measuring instrument used covers all aspects. The aspects covered in the Balanced Scorecard are grouped into four main perspectives, namely financial perspective, customer perspective, internal business perspective, and learning & growth perspective (Fitria et al., 2021). All BSC perspectives are related to each other which are summarized in a "cause and effect relationship" (Rahim & Radjab, 2017).

In assisting decision-making, tools can be used, namely the Analytical Hierarchy Process (AHP) method. The AHP method is used to provide weighted scores for each indicator in performance measurement (Qurtubi et al., 2022) and helps determine the degree of interest in decision-making (Hooshmand et al., 2018) so as to facilitate decision-making.

From the AHP weighting, it is known that the performance values and conditions of the company's performance are described in Table 1.

Table 1. Company's Performance Value

<b>Score</b>	<b>Explanation</b>
< 40	<i>Poor</i>
40-50	<i>Marginal</i>
50-70	<i>Average</i>
70-90	<i>Good</i>
> 90	<i>Excellent</i>

By using the BSC and AHP methods, performance measurements can be carried out to assist decision-making (Hooshmand et al., 2018).

Each indicator has a different weight with a different size scale. Therefore, it is necessary to process parameter equalization through normalization called Snorm De Boer Normalization (Dini Wahyuni et al., 2022). In normalization, the indicator will be converted in the interval between 0-100. The Snorm De Boer normalization formula is:

$$\text{Larger is Better, Snorm} = \frac{Si - S_{\min}}{S_{\max} - S_{\min}} \times 100\%$$

$$\text{Lower is Better, Snorm} = \frac{S_{\max} - Si}{S_{\max} - S_{\min}} \times 100\%$$

Explanation :

$S_i$  = The actual indicator value that was successfully achieved

$S_{\min}$  = The worst achievement value of performance indicators

$S_{\max}$  = The best achievement value of work indicators

According to (Qurtubi et al., 2022), a traffic light system is a system that helps show business performance conditions based on 3 color categories, namely:

- The red color indicates unsatisfactory performance and the actual performance is below the company's target. Included in the red color is  $KPI \leq 60$
- The Yellow color indicates marginal performance. Included in the yellow color is  $60 \leq KPI \leq 80$
- The green color indicates satisfactory business performance and the actual performance is above the target set. Included in the green color are  $KPIs \geq 80$

### 3. Methods

The variable used in this research is Key Performance Indicator (KPI) which are designed based on literature that relevant to performance measurement and readjusted to conditions at the research's object. From 19 KPIs, there are 6 KPIs are halal indicators. The stages of data collection in this research are:

- Observations to find out all supply chain activities in the frozen food business
- Conducting interviews to validate the observation results
- Distribution of AHP questionnaire. The respondents are 7 person who understand it's supply chain, include the business owner

The stages of data processing in this research are:

- Determination of Key Performance Indicator (KPI)
- Normalization of Snorm De Boer
- Weighting with the Analytical Hierarchy Process (AHP) Method
- Calculation of the Overall Business Performance Final Value
- Analysis of each indicator on the KPI using the Traffic Light System method

### 4. Results

#### 4.1. Determination of Key Performance Indicators (KPIs)

KPIs determination is obtained by searching various literature related to performance measurement. After reviewing 6 journal articles, 106 KPIs were collected. Several KPIs were eliminated because they have same meaning, bringing

the total to 92 KPIs. As many as 73 KPIs could not be used in this research because there are confidential data (could not be published), the indicators were not concern for business owner, there were difficulties in measuring, and the objects were not in accordance with this research. The 19 KPIs determination based on 4 aspects according to the Balanced Scorecard method can be seen in Table 2.

Table 2. KPIs Determination Based on The BSC Method

No.	Criteria	KPI	Literature Sources
1.	Financial Perspective	Operating Revenues	Kodrat et,al (2019) dan Moradi (2018)
2.		Halal Certification Fee	Advice from Business Owner
3.		Sales Growth	Nima Moradi (2018)
4.		Percentage of Sharia Banking	Advice from Business Owner
5.		Accuracy of Employee Salary Payment	Harwati & Pettalolo (2019)
6.	Customer Perspective	Order Compliance	Harwati (2019)
7.		Expired Labels	Harwati (2019)
8.		Number of Complaints	Harwati (2019)
9.		Quality Improvement	Kodrat et,al (2019)
10.		New Consumers	Pratiwi (2018)
11.	Internal Business Perspective	Halal Certification	Qurtubi (2022), Harwati & Pettalolo (2019), dan Fauziyah (2020)
12.		Halal Raw Materials	Qurtubi (2022), Harwati & Pettalolo (2019), dan Fauziyah (2020)
13.		Adequacy of Supplies	Qurtubi (2022)
14.		Number of Defective Products	Kodrat et,al (2019)
15.	Learning & Growth Perspective	Post Sales Service	Kodrat et,al (2019)
16.		Employee Training and Development	Kodrat et,al (2019) dan Moradi (2018)
17.		Training and Education About Halal Assurance System	Advice from Business Owner
18.		Employee Retention	Pratiwi (2018)
19.		Product advertising	Moradi (2018)

#### 4.2. Normalization with Snorm De Boer

Example of the results of the calculation of Snorm De Boer :

1. Halal Certification Fee

This frozen food business obtains a free halal certificate. In addition, the renewal of halal certification is also obtained free of charge, so this indicator has a score of 100.

2. Sales Growth

In 2020, there are 66,406 packs of products were sold, in 2021 there are 88,722 packs were sold, and in 2022 there are 73,183 packs were sold. This indicator is categorized as larger is better because it will get better if the value is bigger.

$$Snorm = \frac{Si - Smin}{Smax - Smin} \times 100$$

$$Snorm = \frac{76.104 - 66.406}{88.722 - 66.406} \times 100 = 43$$

The recapitulation of the normalization calculation of Snorm De Boer can be seen in Table 3.

Table 3. Recapitulation of Snorm De Boer Normalization Calculations

No.	Criteria	KPI	SNORM Score
1.		Operating Revenues	47

2.	Financial Perspective	Halal Certification Fee	100
3.		Sales Growth	43
4.		Percentage of Sharia Banking	20
5.		Accuracy of Employee Salary Payment	100
6.	Customer Perspective	Order Compliance	95
7.		Expired Labels	100
8.		Number of Complaints	50
9.		Quality Improvement	100
10.		New Consumers	60
11.	Internal Business Perspective	Halal Certification	100
12.		Halal Raw Materials	100
13.		Adequacy of Supplies	100
14.		Number of Defective Products	75
15.	Learning & Growth Perspective	Post Sales Service	100
16.		Employee Training and Development	100
17.		Training and Education About Halal Assurance System	50
18.		Employee Retention	100
19.		Product advertising	100

### 4.3. Weighting with Analytical Hierarchy Process (AHP) Method

Weighting with the AHP method is carried out at the criterion level according to the 4 perspectives of the Balanced Scorecard and on each KPI. The stages of weighting with the AHP method are as follows:

1. Compilation of Pairwise Comparison Matrix Between Criteria
2. Calculation of the geometric mean on the paired matrices
3. Normalization of Comparison Matrix
4. Calculation of Consistency Ratio (CR)

There are several calculation stages to find out the CR value, namely:

- a. Total Weight Matrix  
The Total Weight Matrix can be calculated by adding up each matrix cell per row of all criteria.
- b. Eigen vector  
 $\text{Eigen vector} = \text{Total Weight Matrix} / \text{order matrix}$
- c. Weighted Sum Vector
- d. Consistency Vector (CV)  
 $\text{CV} = \text{Weighted Sum Vector} / \text{Eigen vector}$

Recapitulation of CV calculations between criteria can be seen in Table 4.

Table 4. Consistency Vector Value Recapitulation

No.	Criteria	Total Weight Matrix	Eigen Vector	Weighted Sum Vector	Consistency Vector
1.	Financial	2.297	0.574	2.529	4.404
2.	Customer	0.812	0.203	0.836	4.116
3.	Internal Business	0.398	0.100	0.404	4.053
4.	Learning & Growth	0.492	0.123	0.500	4.065
<b>Total</b>		<b>4.000</b>	<b>1.000</b>	<b>Average</b>	<b>4.160</b>

The performance value of each criterion is obtained based on the value of the Eigen Vector can be seen in Table 4.

e. Consistency Index (CI)

$$CI = \frac{CV - n}{n - 1}, n = \text{order matrix}$$

$$CI = \frac{4.160 - 4}{4 - 1} \times 100\% = 5.32\%$$

f. Consistency Ratio (CR)

$$CR = \frac{CI}{RI}, RI \text{ is the Random Index}$$

Based on the Random Index table, if  $n = 4$ , then the value of  $RI = 0.90$

$$CR = \frac{5.32\%}{0.90} = 5.91\% \text{ (if } CR \leq 10\% \text{, then the data is declared consistent and the calculation results are declared correct)}$$

All stages of weighting with the AHP method are continued at the sub-criteria (indicator) level until the weight of each indicator can be known. The final weight of each KPI is obtained by multiplying criteria weight with sub-criteria weight.

#### 4.4. Frozen Food Supply Chain Performance Calculation

After weighting with the AHP method, the performance value of each criterion is obtained based on the value of the Eigen Vector. Final score is obtained by multiplying final weight with the Snorm De Boer values. Meanwhile, business performance value is obtained by adding up the final scores of all KPIs. Recapitulation of the calculation of the final value of business performance can be seen in Table 5.

Table 5. Recapitulation of Business Performance Final Value

No.	BSC Perspective	Criteria Weight	KPI	Sub Criteria Weight	Final Weight	Snorm De Boer values	Final score	Business Performance Value
1.	Financial Perspective	0.574	Operating Revenues	0.301	0.173	47	8.083	73.653
2.			Halal Certification Fee	0.121	0.069	100	6.926	
3.			Sales Growth	0.338	0.194	43	8.438	
4.			Percentage of Sharia Banking	0.066	0.038	20	0.759	
5			Accuracy of Employee Salary Payment	0.066	0.038	100	3.793	
6	Customer Perspective	0.203	Order Compliance	0.321	0.065	95	6.201	
7			Expired Labels	0.259	0.053	100	5.256	
8			Number of Complaints	0.092	0.019	50	0.938	
9			Quality Improvement	0.133	0.027	100	2.711	
10			New Consumers	0.194	0.039	60	2.364	

11	Internal Business Perspective	0.100	Halal Certification	0.472	0.047	100	4.699
12			Halal Raw Materials	0.308	0.031	100	3.064
13			Adequacy of Supplies	0.131	0.013	100	1.308
14			Number of Defective Products	0.089	0.009	60	0.534
15	Learning & Growth Perspective	0.203	Post Sales Service	0.157	0.032	100	3.179
16			Employee Training and Development	0.175	0.035	100	3.545
17			Training and Education About Halal Assurance System	0.164	0.033	50	1.664
18			Employee Retention	0.140	0.028	100	2.847
19			Product advertising	0.365	0.074	100	7.411

Based on Table 5, the business supply chain performance value is 73.653 which is included in the good performance category (if the business performance value is between 70-90 then the business is classified having good performance) (Fauziyah, 2020)

#### 4.5. KPI analysis uses the Traffic Light System method

The grouping of SNORM normalized scores against Key Performance Indicators (KPI) using the Traffic Light System method can be seen in Table 6.

Table 6. Grouping of KPI scores using the Traffic Light System

No.	Criteria	KPI	SNORM Score
1.	Financial Perspective	Operating Revenues	47
2.		Halal Certification Fee	100
3.		Sales Growth	43
4.		Percentage of Sharia Banking	20
5.		Accuracy of Employee Salary Payment	100
6.	Customer Perspective	Order Compliance	95
7.		Expired Labels	100
8.		Number of Complaints	50
9.		Quality Improvement	100
10.		New Consumers	60
11.	Internal Business Perspective	Halal Certification	100
12.		Halal Raw Materials	100
13.		Adequacy of Supplies	100
14.		Number of Defective Products	75
15.		Post Sales Service	100



16.	Learning & Growth Perspective	Employee Training and Development	100
17.		Training and Education About Halal Assurance System	50
18.		Employee Retention	100
19.		Product advertising	100

In the table above, there are 6 indicators colored red, namely business income, sales growth, percentage of sharia banking, number of complaints, new customers, and training and education about SJH. The indicator is colored red because it has a KPI value of  $\leq 60$

#### 4.6. Conclusions

The conclusions obtained from the results of this study are:

1. Based on the results of performance calculations using the Balanced Scorecard and AHP methods, the frozen food business performance value is 73.653 which is categorized as having good performance.
2. Based on the Key Performance Indicator (KPI) grouping using the Traffic Light System, there are 6 KPIs that are categorized as red, namely business income, sales growth, percentage of sharia banking, number of complaints, new customers, and training and education about SJH. KPIs that are categorized as red mean that they require improvement because they have poor performance.
3. Proposed improvements that can be given to improve performance indicators in the frozen food business are:
  - a. Participate in training in order to increase sales growth
  - b. Be more sensitive and understand the desires of customers
  - c. Maximize digital marketing more because 90% of products are sold thanks to marketing through digital marketing
  - d. Owners can use Islamic banks to avoid usury.
  - e. During the packing process, employees must be more careful when checking and separating defective products from good products.
  - f. Provide internal training and education regarding the Halal Assurance System (SJH)
  - g. Make promotions and provide rewards to maintain consumer loyalty.
  - h. Employees in the production section must be more careful and not rush during the product production process to avoid things that cause product defects.

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## **Acknowledgments**

The author would like to thank the University of Sumatera Utara and the frozen food business for the cooperation and the opportunity so this research can be done.

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