Risk Analysis in Halal Fast Food Supply Chain Restaurant using Risk Map Method

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Halal food has increasing demand in recent years. Many countries are promoting its tourism and culinary by providing halal status. In order to implement Halal system which is used to obtain Halal status, the culinary or restaurant company should accomplish several requirements that covers from many stakeholders in their supply chain management such as supplier, logistics, and production process. Hence, there are some risks obtained in conducting Halal supply chain system. The risks found at this research are from its business process which is procurement, raw material delivery, inventory, production, and consumer. From those processes, the risks discovered are listed and assigned with their severity and probability, ended up in Risk Priority Index. The risks then ranked and mapped in the risk map in order to know which risks that has high impacts. Some responses are proposed to overcome the critical risks, such as sanitary checking before delivered to the customer, make some chambers, and make SOP related to hygiene of the kitchen.

Keywords: Halal Supply Chain, Risk Assessment, Halal Restaurant

1. INTRODUCTION

Almost all people in the world ever eat in a fast food restaurant, since the consumption of fast food is increasing in the past years [1]. The main consumer of it is the young generations [2]. A restaurant company will do anything to make their products well-sold, because the main business process in restaurant is purchasing and selling [3].

In order to increase the sales, the restaurant should be able to follow the today's trend and recently, halal tourism is very popular [4]. As the tourism sector escalates, the order for halal products and services also raises [5]. As halal is a characteristics and law that Muslim people should obey [6], many non-Muslim countries are starting to develop halal tourism and services as a strategy to increase their revenue [7,8]. With the advancement of it, the economic value will be increased because the world is more to be religion-inclusive [6]. One of the halal tourism aspects is culinary, which is an important and promising market because food is the basic need among people [9]. Halal food is not only for Muslim, but it can be bought by non-Muslim since it is known healthier than other food [8]. As one of the top 10 in global Islamic economy [10], Indonesia should implement the halal food in a strict and in line with Syariah law.

Halal status is very important and complex, because it influences people to buy the products offered [11]. Hence, it also generates many risks in order to do it [12] as in conducting the business, supply chain is critical and the relationship between their supplier and business partner are important [13,14]. Risks are generated from the supply chain, so the people that in charge in the processes should be aware of those risks [15]. In order to reduce the risk that may be occurred, risk assessment may be used as it is able to increase the effectiveness in the decision making to conduct and implement risk reduction actions [16]. Risk assessment is a part of risk management, which is the important thing to be completed in a project [17]. This research will be focused on the halal risk assessment and mitigation as a part of risk management in a fast food restaurant company in Indonesia.

A previous research has been worked out by de Araújo [18] about the production process of halal meat and poultry. The case study was in Brazil, non-Muslim majority country that has provided halal status to its meat and poultry products. The research brings the process of how halal system implemented. It is found that the production of halal meat is consists of several stakeholders that should also implement halal system and the practical things in doing the halal meat and poultry business, such as certification, process transformation,

and mobilization. Halal control points in poultry were clearly explained by Shahdan et al. [19], by identifying the guidelines and the current position of implementation. The researchers then proposed several control points in poultry system from the on farm, transportation and slaughtering process.

Marzuki et al. [20] brought up the research about halal certification in restaurant. It found out the customers of the restaurant by conducting demographic, factor, reliability, and cluster analysis. The result of this research is to prove that in conducting hospitality industry, halal certification leads to the commercial perspectives. Another research in halal tourism industry was conducted by Henderson [21] that focused on the halal food as a tourism market attraction in Malaysia and Singapore. It discovered that halal food attracts more market since many non-Muslim also having high acceptance of halal food.

In term of supply chain management, Hijrah et al. [22] discovered several issues in the customer consideration towards Halal food. The issues are: the role of attention and perception, reliability of supply chain, the consistency and law about the Halal status, and about the uniting of halal food with the non-halal one. The case study of halal risk analysis by Wahyuni et al. [23] was about the slaughterhouse and the methods used are SCOR and HOR. In the slaughterhouse, as in the paper, there are five risk agents that should be taken into account: the cleanliness of workplace, the blood waste management, the machine management, and request management. By several studies that has been carried out, this paper will conduct research about the halal risk management at fast food restaurant using risk map method.

2. RESEARCH METHODS

This research carried out risk management process in an Indonesian fast food restaurant company. As in [24], the supply chain of the restaurant is procurement, distribution, inventory or storage, production, and selling or handing to customers. The steps in conducting this research are:

- Analyse the halal control points in every business process.
- List and mark each risk and calculate risk priority index (RPI).
- Draw Risk Heat Map based on the analysed risks and RPI.
- Propose some suggestions to prevent future risks.

$$RPI = Si \times Pi \quad (1)$$

Where:

Si = Severity Index and Pi = Probability Index

3. RESULT AND DISCUSSION

3.1 Halal control point of restaurant supply chain

Identify the halal control point should be related to its supply chain flow from the beginning to the end consumer. There are five activities of restaurant supply chain that should compliance with the halal requirement. Therefore, by determining the halal control point (HCP) it can shows the halal point to meet its requirement. For more detail, in the first activity such as procurement has 3 HCPs, while the raw material delivery, inventory, production, and consumer have 1 HCP for each activity. In the procurement activity has more halal critical point and also gets more halal risk activity that will happen. Figure 1 shows the supply chain flow with each halal critical point.

Figure 1: Supply chain flow of fast food restaurant

3.2. Supply chain Risk identification

Risk identification is carried out to determine the risks that occur in the company's activities that can potentially happen and affect the company's supply chain activities (Table 1). The risks are identified based on the business process activity where done by the company. Risk identification should be done by the company in early of the project. Because the sooner the risk is identified, the sooner manager or stakeholder will get the way to solve to mitigate them, so the risk will not exposure to be greater. There are 11 risk events that were identified by the researcher. Following is a table identifying risk events that occurred at fast food restaurant supply chain.

Table 1: Risk event of halal product

Risk Event	Code
Procurement	
The slaughtering process is not in line with Syariah	E1
Unclear halal status of the raw material	E2
The raw material exceeds the expiration date	E3
Delivery	
Unclean containers and transportation	E4
Inventory	
Raw material is contaminated by non-halal substance	E5
Power failure that leads to bacterial growth in the raw materials	E6
Production	
Deficient manner in cooking	E7
Not thorough in cleaning food ingredients	E8
The cooking utensil is not hygiene	E9
Unclear production environment	E10
Consumer	
Packaging contaminated with non-halal substance	E11

3.3. Priority index determination

The RPI value is the multiplication result of the probability value and the severity value of each risk event. The level of probability is describing how many times the risk occurs in a month. The level rating starts from 1, which never occurs or maximum only 1-5 times in a month, which always occurs maximum 20 times. The severity level describes the impact of the risk to the halal status of the product with rating level starts from 1 that will not give any impact to the halal status of the product to 5, which the impact will lose the product's halal status. The value of the RPI illustrates how substantial the risk is to the sustainability of the project. Table 2 shows RPI values for each risk event.

Table 2: Risk priority index of halal product

Risk Event	Code	Severity	Probability
The slaughtering process is not in line with Syariah	E1	3	4
Unclear halal status of the raw material	E2	2	3
The raw material exceeds the expiration date	E3	5	4
Unclean containers and transportation	E4	2	2
Raw material is contaminated by non-halal substance	E5	5	3
Power failure that leads to bacterial growth in the raw materials	E6	1	2
Deficient manner in cooking	E7	2	3
Not thorough in cleaning food ingredients	E8	2	3
Not thorough in cleaning food ingredients	E8	2	3

The cooking utensil is not hygiene	E9	3	3
Unclear production environment	E10	2	3
Packaging contaminated with non-halal substance	E11	2	2

3.4. Risk map matrix

Risk map are made from the risk priority index value between the probability of a risk event and the risk event's impact. This matrix is divided into three risk categories, namely high risk, moderate risk, low risk. The identified risks are categorized into three risk categories in different colours. The orange colour shows that the risk is in the high-risk category, yellow colour shows medium, and the green colour show the low-risk level (Figure 2).

Figure 2: Risk map matrix

Based on the risk map matrix result before, most of the risk is at low levels. Those who categorized in low levels are unclear statements of halal status of the material, unclear transportation of containers, power failure, deficient cooking manner, not thorough cleaning the ingredients, unclear production environment, and packaging that contaminated with the non-halal substance. Risks that fall into the category of low risk have a low probability they will occur, and the impact that appears does not make the product losing its halal status. Therefore, the risk categories to be handled are only risks that are at medium and high levels. Table 3 shows risks that will be controlled and mitigated.

Table 3: Critical risk event of halal product

Risk Event	Code	Status
The slaughtering process is not in line with Syariah	E1	Medium
The raw material exceeds the expiration date	E3	High
Raw material is contaminated by non-halal substance	E5	High
The cooking utensil is not hygiene	E9	Medium

3.5. Risk response and mitigation

Risk mitigation is a way to manage risks and reduce the consequences of risks and prioritize risk management follow-up with the highest total effectiveness and cost-efficient. The most significant risks identified in the procurement process are risk event coded E1, the slaughtering process is not in line with Syariah, the raw

material exceeds the expiration date by code E3. In addition, in the inventory and production process also has significant risk that had been identified such as raw material is contaminated by non-halal substance and cooking utensil is not hygiene with risk code E5 and E9. The risk was chosen because the resulting impact can affect a product's halal status and are not included in the low-risk category. The researchers compiled some proposed mitigations through the risk that is identified (Table 4).

Table 4: Risk mitigation of halal product

Code	Risk Event	Risk Response/Mitigation
E1	The slaughtering process is not in line with Syariah	a. Choose supplier that already have halal certificate and trusted.
E3	The raw material exceeds the expiration date	b. Double checking while still at the supplier which have not been delivered and also after being delivered.
E5	Raw material is contaminated by non-halal substance	c. Make two chamber or separate inventories
E9	The cooking utensil is not hygiene	d. Make separation equipment between halal and non halal
E1	The slaughtering process is not in line with Syariah	e. make SOP related hygiene and guideline to employee

4. CONCLUSION

Halal risk management should be considered in halal requirement. To fulfill those requirements this paper shows five halal critical points in fast food restaurant supply chain from the first procurement to the end consumer. The researcher was identified 11 risk event that occur with different probability and severity value. This paper using risk map method to measure the critical risk with calculating Risk Priority Index (RPI). The risk map result show there 4 significant risk that categorized medium and high risk such as the slaughtering process is not in line with Syariah, the raw material exceeds the expiration date by code E3. In addition, in the inventory and production process also has significant risk that had been identified such as raw material is contaminated by non-halal substance and cooking utensil is not hygiene with risk code E5 and E9. The risk was chosen because the resulting impact can affect a product's halal status and are not included in the low-risk category. The researchers compiled some proposed mitigations through the risk event before such as choose supplier that already have halal certificate and trusted, double checking while still at the supplier which have not been delivered and also after being delivered, make two chamber or separate inventories, make separation equipment between halal and non halal, and make SOP related hygiene and guideline to employee.

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