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Halal risk mitigation in the Australian–Indonesian red meat supply chain

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Abstract

Purpose – This study aims to identify *halal* risk events, *halal* risk agents, measure *halal* risk level and formulate the *halal* risk control model (mitigation) in all stages in the beef supply chain from Australia to Indonesia.

Design/methodology/approach – This research combines qualitative and quantitative method. It elaborates nine variables as the Halal Control Point: *halal* animal, animal welfare, stunning, knife, slaughter person, slaughter method, invocation, packaging, labeling and *halal* meat. This study uses house of risk, a model for proactive supply chain risk.

Findings – The main mitigation strategies to guarantee the *halal* beef status in the abattoir is the obligation of vendor or the factory to issue a written manual of stunning tool. The priority of *halal* risk mitigation strategies for the retailing to avoid the meat contamination is the need of a *halal* policy for transporter's companies and supermarkets.

Research limitations/implications – Every actor must be strongly committed to the application of *halal* risk mitigation strategies and every chain must be implemented in the *halal* assurance system.

Originality/value – This model will be a good reference for *halal* meat auditing and reference for *halal* meat import procurement policy.

Keywords Mitigation, *Halal* risk agent, *Halal* risk event, *Halal* risk level

Paper type Research paper

Introduction

World population in 2015 reached 7 billion people. More than a quarter or 2.04 billion people are Muslim population in the various continents. The largest Muslim populations are in Asia, namely, 1.39 billion people (69 per cent of the Muslim population of the world). Furthermore, in a row, there are 582 million of Africa, 56 million of Europeans, 10.1 million of America, and 1.77 million of Oceania (Muslim Population, 2015). In country, Indonesia is the largest Muslim country in the world, as many as 219 million people or 10 per cent of world Muslim population are Indonesian Muslims. The trend of Muslim population is increasing including in the West. The UK Muslim has been growing 10 times faster than the

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non-Muslim population. The same phenomenon also occurred in French city of Marseilles; approximately one-third of its inhabitants are Muslim, and it's predicted that it will soon become the Muslim Majority city in Europe (Wilson, 2014).

Derived by religion which affects Muslim consumer behavior according to religious affiliation, commitment, orientation, and also by shift of *halal* awareness and perception which lied in someone as being Muslim (Wilson and Liu, 2011; Journal of Islamic Marketing, 2012), the amount of the Muslim population, especially in Indonesia, requires the availability of *halal* products. The need of *halal* is not only for Indonesia and Muslim-majority countries but also for non-Muslim countries, such as China, India, France, UK, USA and Australia which have Muslim inhabitants. The fast food restaurants such as McDonald's, KFC, Domino's and Subway in Europe have provided *halal* food in their restaurant chain (Wilson and Liu, 2010).

The 2013 Thomson Reuter and Dinar Standard "*State of Islamic Economy*" report estimated that the global *halal* industry is valued currently at US$2.3 trillion (Wilson, 2014). For more detail, Thomson Reuters (2014) described that global Muslim spending on food and beverages has increased by 10.8 per cent to reach $1,292 billion in 2013. This took inflating *halal* food market potential to be 17.7 per cent of the global expenditure in 2013 compared to 16.6 per cent at the year before. This expenditure is expected to grow to $2,537 billion market by 2019 and will account for 21.2 per cent of the global expenditure. A 2013 special report focusing on *halal* food logistics proved that the costs for the global *halal* food market was $151 billion. Malaysia, United Arab Emirates and Australia introduced *halal* food indicator that focuses on the health of the *halal* food ecosystem. Meanwhile, top countries with the biggest Muslim consumer of *halal* food are Indonesia ($190 billion), Turkey ($168 billion), Pakistan ($108 billion) and Iran ($97 billion).

One of the core sectors of Indonesian food industry affected by *halal* processes is meat and live animal sector. The Indonesian *halal* meat consumption comes from the various types of livestock permitted by Islam, namely, cattle, buffaloes, goats, sheep, chickens and ducks. In 2014, according to the Ministry of Agriculture (2015), the level of meat consumption of Indonesian society is by 8 kg/capita/year, with in details of the beef consumption is 2.3 kg/capita/year, chicken meat consumption is 4.8 kg/capita/year and other meat consumption is 0.9 kg/capita/year. In 2013, the total consumption of Indonesian *halal* meat was estimated to reach 2.2 million tons with a market value of US $10 billion.

The supply of *halal* meat in Indonesia generally comes from local farmers both poultry and ruminants. The production of *halal* meat from poultry reached 1.67 million tons and 0.5 million tons of ruminants. The supply of beef in Indonesia is still deficit of 184 thousand tons, or 40 per cent of national beef demand. This deficiency is met through imported beef from Australia who inhabited Muslim minority. Beef supply requirement, both from domestic and imported from Australia, has been related to meat production process in Islamic law, especially in animal's slaughtering stage. This requirement extends to ingredients that are part of various processed food products as well. There is a technology supporting the process of *halal* meat, while food supply chain is also increasingly looking for *halal* integrity in its transportation step. Relevant with this, all meat processes from farmers to end consumers need a *halal* assurance system process in the *halal* supply chain risk management approach.

Literature review

Conceptually, a supply chain is a series of physical and decision-making activities connected by material and information flows and associated flows of money and property rights that

cross-organizational boundaries; and supply chain management is a business process in which it can be seen as a structured, measured set of activities designed to produce a specified output for a particular customer or market (Vorst *et al.*, 2007). Generally, there are four echelons in supply chain management (Narahari and Biswas, 2007). First, procurement includes supplier selection, direct delivery from suppliers, vendor-managed inventories, optimal procurement inventories and optimal procurement policy. Second, processing includes processing location, capacity planning, capacity allocation, inventory decisions, optimal processing strategy, input control, production scheduling and constrained supply. Third, distribution includes configuration of distribution facilities, location, retailer or costumer allocation, facility configuration and optimal distribution strategy. Finally, logistics includes logistics mode selection, selection of port, direct delivery and optimal transportation strategy. According to Sporleder and Boland (2011), one of seven specific economic characteristics of agri-food supply chains is a risk emanating from the biological nature of agri-food supply chains.

Halal supply chain is a concept of product flow ranging from farmers to consumers which pay attention on the *halal* and *toyyib* condition along the products supply chain (Omar *et al.*, 2012). In contrast to conventional supply chain, every level of *halal* supply chain process should compliance with the rules of Islamic law (Bahrudin *et al.*, 2011). The typical characteristic of the *halal* supply chain process is not lawful to tolerate contamination and contact with *haram* elements (Tieman, 2011). Referring to Wilson and Liu (2011), what is *halal* at its apex is that which is pure, praiseworthy and of benefit. For Muslim, it should be given and present in all consumed commodity. In the case of doubt of the probable contamination, according to Wilson and Liu (2010), Muslim tends to take the position of avoidance because of the risk of spiritual or physical punishment within hereafter.

Halal is going through an evolution covering four phases: Muslim company, *halal* product, *halal* supply chain and *halal* value chain. In the Muslim company, the *halal* assurance system is purely based on trust. The sentiment of trust is being divine privilege and, therefore, worthy of serious consideration when they are engaged in something which is deemed *halal* (Wilson and Liu, 2010). In the *halal* product, the *halal* assurance system is based on a product certification by independent *halal* certification body. In the *halal* supply chain, *halal* assurance is extended upstream (addressing transportation and storage requirements of purchased ingredients) and downstream (addressing transportation and storage and value-adding requirements of the supply chain). In the *halal* value chain, the company is applying Islamic values to their entire business value chain. Among others, this covers the adoption of Islamic financing and *takaful* (Islamic assurance), use of Islamic branding and marketing concepts in the position of the products and creating value of the community and the earth, for example, minimization of waste (Tieman, 2015). According to Rahman *et al.* (2013), the important drivers of implementing green supply chain practice in the *halal* food companies are performance and quality improvement and waste and cost reduction.

Halal food supply chain involved the process of managing *halal* food products from different points of suppliers to different points of buyers/consumers, which involved various different parties, who are located at different places, which may be, at the same time, involved with managing non-*halal* food products, with the purpose of satisfying the needs and requirements of both (*halal* and non-*halal*) customers (Zulfakar *et al.*, 2012). Today, *halal* supply chain is complex for various reasons. First, there are different *halal* market requirements, which are based on Islamic school of thought, local *fatwa* (religious rulings) and local custom. There are different interpretations on slaughtering requirements (regarding stunning and machine slaughter, which cannot be found anymore in the final

ingredient and need for ritual cleansing. Second, as supply chain partners are based on different *halal* environments dealing with a single supply chain (Muslim and non-Muslim country). Third, there is a poor understanding of *halal* and *halal* logistics requirement in particular non-Muslim countries, requiring a lot of educational efforts in their supply chains (Tieman, 2015).

Refer to Tieman *et al.* (2012), the product characteristics (bulk versus unitized, ambient versus cool chain) and market requirements (Muslim or non-Muslim country) determine the supply chain vulnerability to *halal* contamination, for which *halal* control activities and assurance activities are put in place to reduce supply chain vulnerability. Tieman and Ghzali (2013) developed a *halal* procurement maturity model which consists of the following three stages: viewing *halal* compliance as opportunity, making *halal* supply chains and *halal* value chains. Slaughtering has been mentioned as an essential requirement of *halal* meat from land animals (Qureshi *et al.*, 2012). The study of Omar and Jaafar (2011) found that *halal* animal feed, proper slaughtering and proper segregation are the three pertinent areas that need focus on the *halal* food supply chain.

The uncertainty and the impact of an event in the supply chain is a risk (Sinha *et al.*, 2004). The supply chain risk consists of 17 types of risk, namely, the risk of standardization complaints including *halal* standards, product quality, production cost, competition, demand, supply fulfillment, storage, shipping timeliness, accuracy of budget delivery, delivery fulfillment, order fulfillment, partner error, distance, suppliers, supplier management, engineering and innovation, transport, disaster and foreign products (Schoenher *et al.*, 2008). Analysis of supply chain risk is a part of supply chain management that must be done to avoid or to reduce business failure under the conditions of uncertainty (Mariminand Maghfiroh, 2011). According to Norrman and Jansson (2004), the focus of supply chain risk management is to understand, and try to avoid, the devastating effects that disasters or even minor business disruptions can have in a supply chain. The aim of supply chain risk management is to reduce the probability of risk events occurring and to increase resilience, that is, the capability to recover from a disruption. Sheffi and Rice (2005) suggest that the supply chain resilience can be improved by either creating redundancy or improving flexibility. Ritchie and Brindley (2007) suggested that classic supply chain risk management such as maintaining buffer stocks and slack lead times are becoming less viable nowadays. However, as suggested by Pujawan and Geraldin (2009), supply chain risk analysis can use a house of risk (HOR) which is an innovative model for proactive supply chain risk management.

The framework of *halal* critical point in the Australian–Indonesian *halal* red meat supply chain

The *halal* critical analysis framework of red meat, especially beef, should be acquired by supply chain approach. Referring to Jie (2008), there are three stages of beef supply chain from breeding to the end consumer. The First stage in Jie's terminology is the "turning grass into meat". This stage consists of many activities such as cattle breeding, feedlot and livestock selling. The second stage, which is mainly beef processing, includes holding yard, slaughtering, meat processing and packaging as the final stage of meat processing. The meat processing comprises hide removal, removing internal organs, trimming, weighing, chilling and boning. The boning process is a meat cutting into small pieces, while the trimming is the process to remove the excess fat or bruising. The third stage is as the final process to deliver the meat to end consumer. The process is called the wholesaling or

retailing. In the Australian condition, the wholesaling is divided into two parts, the domestic and international market.

In the *halal* perspective, each stage of the beef supply chain should comply with the *halal* requirements. Riaz and Chaudry (2004) formulated the halal control point (HCP) as if a stone corner to put step to see the *halal* fulfillment from early breeding, feedlot, slaughtering process as well as the retailing. For more detail, in pre-slaughtering process, at least there are two HCPs. In the slaughtering process, there are five HCPs, and in the post-slaughtering, there are two HCPs. The slaughtering process gets more *halal* risk. The first of two HCPs are *halal* animal and animal welfare in breeding and feedlot. The five HCPs are stunning, slaughter person, slaughter methods, knife and invocation in abattoir process. While, the last two HCPs are in post-slaying (HCP-8) which includes *halal* carcass, deboning and boning, hide and other parts and meat cuts and, finally, packaging and labeling as the HCP-9. The basic *halal* principle in the post-slaughtering is to prevent the meat from non-*halal* meat or filth material, although it comes from the animal itself.

In the flow of cattle herds from Australia to Indonesia, as illustrated in Figure 1, the focus of *halal* analysis should be placed mainly in Indonesian beef supply chain. The major HCPs

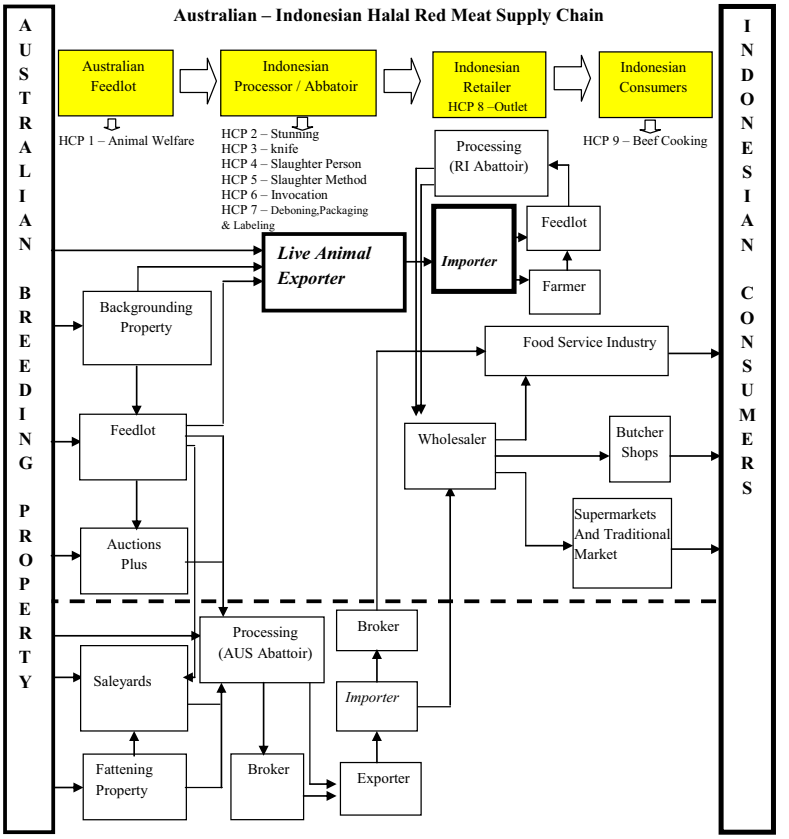


Figure 1.
The halal control points in the Australian – Indonesian *halal* beef supply chain

Source: Adopted form Jie (2008), Riaz and Chaudry (2004)

are in slaughtering process in abattoir. The Assessment Institute for Food, Drug and Cosmetics – The Indonesian Council of Ulama (LPPOM-MUI) especially compiles The *Halal* Assurance System-23103 (HAS 23103) for abattoir which indicates that the major risk of *halal* meat mostly occur in abattoir process. Referring to Jie (2008), the most Middle East Countries as well as the South East Asian counties prefer to import the live cattle than processed beef so the countries can manufacture the cattle in accordance to the religious belief. In Indonesia, according to Ministry of Agricultural Republic of Indonesia (2015), more than 65 per cent of beef import from Australia is in the form of live cattle.

Absolutely, the HCP of the *halal* animal and the animal welfare take the point to analysis in the flow of red meat supply chain. It is suspected to the existence of cross-breeding practices between cattle and pig in which it emerges the consequence of unlawful status of cattle. But, Jie (2008) presented four common methods of breeding in Australian beef community, which are as follows:

(1) the straight breeding which is usually adopted in Queensland between one species of cattle;

(2) cross-breeding method in which two or more straight breeding are combined; for example, Brahman and Hereford are crossed and then selected within the crossbred population to form some breeds;

(3) heterocyst methods in which a mixture vigor or heterocyst is the difference between the performance of the progeny and the average performance of the parental breeds to achieve maximum productivity in a commercial herd; and

(4) selection of superior parental animals which can accomplish the maximum number of desirable genes.

Jie's in-depth study indicates the rarity of cross-breeding between pig and cattle. The fact has answered the strong point of HCP-1.

About the animal welfare, based on direct observation on the cattle farm in Melbourne area, it is well practiced. Furthermore, the LPPOM-MUI (2012) does not require the cattle feed clean from the filth to get *halal* status of meat. There is no restriction if grass of animal feed is touched or contaminated by the cow manure, for example. Actually, it is the legal and formal law of *halal* status of meat. But, the teaching of Islam – as all Muslims agrees – orders people to consume the *thoyyib* of food. The word of *halal* in the Qur'an has not been separated from *thoyyib*, which indicated the demand for mankind to consume the clean and healthy food. Based on the demand, Riaz and Chaudry (2004) place the animal welfare in pre-slaughtering stage as one of HCPs as the requirement to get *thoyyib* status of meat.

By realizing the facts, the paper focuses on the analysis of *halal* risk in the flow of beep supply chain in Indonesia from feedlot to meat retailing, supermarket as well as the traditional market. The paper also traces agent of *halal* risk, mapping the agent, and finally come to planned and proposed mitigation strategy. The area of the study is the beef processing in Indonesia as part of the beef supply chain from Australia to Indonesia.

Research methodology

There are at least two variables presented in this paper, namely, *halal* risk and *halal* risk agent. The *halal* risk is an allegation of the existence of unlawful animal, or the lawful animal contaminated – or at least touched – by the non-*halal* animal, or the *halal* meat contaminated by the filth material, although it come from the cow itself. While the risk agent is the fact or the condition that probably emerge the *halal* risk, such as the less awareness of

halal requirement to separate completely the fulfilled meat of *halal* requirement with the part of meat which does not meet the *halal* criteria.

The *halal* risk is measured by the severity level of the risk. The severity in the *halal* risk is not the size of impact to the emergence and the spread of risk, but the difficulty to avoid. The more difficult to avoid, the *halal* risk has more probability to happen. Therefore, the keyword used to measure the risk is "difficulty" which is elaborated into three levels of Likert scale to be difficult, neutral and easy followed by the sequence of score 5, 4 and 3 (Pujawan and Geraldin, 2009). This is because the size or volume of the contaminant material, referring to LPPOM-MUI (2012), has not been considered in the case of *halal*. The *halal* meat, for example, directly becomes unlawful just because it is contaminated by a very small size – or even by the touching – of unlawful meat. The measure of *halal* risk agents are by the level of occurrence of the agent, in which the keyword used is the common, neutral and uncommon in the Likert scale followed by the score of 5, 3 and 2.

The instrument to measure the probable *halal* risks event and the *halal* risk agent are compiled by referring to HAS 23103 of LPPOM-MUI (2012) as the recognized *halal* standard in Indonesia. In addition, the instrument is also designed by focus group discussion (FGD) with the *halal* auditors of LPPOM-MUI as well as by in-depth interviews with the *halal* expert who has the high experience of *halal* research. The data collection using the compiled instrument are also conducted by in-depth interview, direct observation, guided interview and also by FGD with various parties involved in beef supply chain process, such as beef feedlot practitioner, abattoir clerk and manager, transporter and also retailers.

Data analysis is processed by using the HOR. It is a model for proactive supply chain risk management, which was developed by Pujawan and Geraldin (2009). The HOR is divided into two parts, the HOR-1 and the HOR-2. The HOR-1 in this analysis produces the sequences of aggregate risk potential. In this paper, while it focuses on *halal* risk, the HOR should also produce the AHRP, which easily lead to proposed and planned mitigation strategy. While the HOR-2 leads to yield the sequences of *halal* risk mitigation strategy. The HOR analysis is of course based on the severity level of *halal* risk event, the occurrence level of *halal* risk agent, and also the impact or correlation of the *halal* risk agent to the *halal* risk event.

Result and discussion

The paper presented the *halal* risk event, *halal* risk agent and the *halal* risk mitigation in the flow of beef supply chain from to feedlot to beef processing and retailing.

Halal risk events and halal risk agents in the feedlot

The two *Halal* Control Points (HCPs) in the feedlot are animal welfare and *halal* animal. In the light of HAS 23103 of LPPOM-MUI, the research identified at least eight probability of *halal* risk in the feedlot process. The eight mentioned *halal* risks are difficult to:

(1) get information about calf process production;

(2) gain protein supplement of animal feeding with the *halal* logo;

(3) gain supplement of animal drug with the *halal* logo;

(4) make a 5 km minimum distance between cattle farm and piggeries;

(5) form a habit that animal drinking water supply should be regularly scheduled;

(6) form a habit that animal feeding should be regularly scheduled;

(7) form a habit that animal health check should be regularly scheduled; and

(8) form a *halal* and *thoyyib* awareness related to animal welfare.

By the keyword of "difficulty" elaborated in Likert scale, the identified probability of *halal* risk is classified into three categories. The first is the irrelevant statement because the matter is not existed, such as the statement about "Make a 5 km minimum distance between cattle farm and piggeries." The second of identified *halal* risk probability is "the most easy to handle" because it is part of farmer's culture and habit. In this case, there is no *halal* risk, and of course, it does need to mitigate. The third is actually *halal* risk.

By the process, the rest of *halal* risk in the feedlot is presented in Table I. The risks are difficult to:

- get information about calf process production;
- gain protein supplement of animal feeding with the *halal* logo; and
- gain supplement of animal drug with the *halal* logo.

The three difficulties are faced by the Indonesian feedlot as well as the Australian feedlot; and it needs to mitigate. The difficulties emerge the question of why it gets hard. To answer the question, the research explored the nine probable causes related to the *halal* risk agents. But, based on the FGD with the feedlot practitioners, depth interview and direct observation, the research came into three *halal* risk agents presented in Table II.

Considering the data presented in Table II, what is the appropriate mitigation to solve the *halal* risk agent? The question led us to map and rank the *halal* risk agent.

Halal risk level in the feedlot

Relating to *halal* risk agents, the question is how many per cent of each HRA contributes to the emergence of HRE? Also, which HRA actually need to mitigate? The questions oblige us to map the *halal* risk agent in the form of AHRP, which elaborated from the Aggregate of Risk Potential. Referring to Pujawan and Geraldin (2009), the ARP is a result of occurrence of HRA, the severity of HRE, and the impact of HRA to HRE. The formula is elaborated by entering the data into the HOR-1 to prove the *halal* risk level as presented in Figure 2.

Based on the process, the *halal* risk agent is the calf suppliers do not explain its production process (A1) contributes more than sixty presents to the emergence of *halal* risk events. Of course, this agent should get a priority to mitigate. The next priority of *halal* risk agent which requires to control is the rare of the animal feed protein supplement products with a *halal* logo as presented in Figure 1 in the code of A2. This agent contributes 12

Table I.
Halal risk events in the feedlot

Code	*Halal* risk event in the feedlot
E1	Difficult to get information about calf process production
E2	Difficult to gain protein supplement of animal feeding with the *halal* logo
E3	Difficult to gain supplement of animal drug with the *halal* logo

Table II.
Halal risk agents in the feedlot

Code	*Halal* risk agent in the feedlot
A1	Calf suppliers do not explain its production process
A2	It is still rare the animal feed protein supplement products with a *halal* logo
A3	It is still rare medicinal supplement livestock products with a *halal* logo

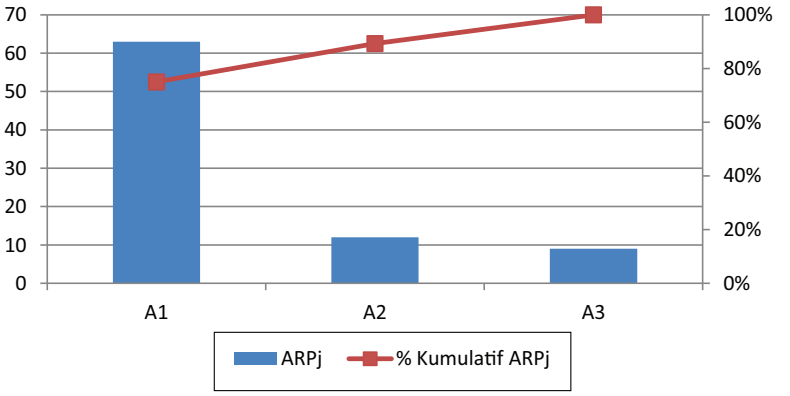


Figure 2.
Halal risk level in the feedlot

present to probability of *halal* risk severity; while next agent is still rare of medicinal supplement livestock products with a *halal* logo.

Risk mitigation in the feedlot

Based on the HAS 23103, the research proposed mitigation strategy that might be implemented in the feedlot. The research compiled ten proposed mitigations. But, based on the correlation between the proposed HRM to the HRA, and the total effectiveness to difficulty ratio, the possible mitigation strategy is presented by rank of priority in Figure 2 (Figure 3).

In the light of analysis, the main priority of the mitigation strategy in the feedlot is the practitioners should try to get more calf suppliers. The second and the third priority are

COR Area	Halal Risk Mitigation / Halal Risk Agents	Seeking more than one supplier of calf	Tracing materials and the manufacturing process of cattle protein supplements	Tracing materials and the manufacturing process of cattle drug	Disseminating the urgency halal policy for stakeholder companies	AHRPJi
		M-1	M-2	M-3	M-4	
Feedlot Process	Calf suppliers do not explain its production process	9				63
	It is still rare the animal feed protein supplement products with a halal logo		9		3	12
	It is still rare medicinal supplement livestock products with a halal logo		9	9	3	9
Total effectiveness to difficulty ratio		567	189	81	63	
Rank of Priority		1	2	3	4	

Figure 3.
The house of risk to mitigate the *halal* risk agent

tracing materials and the manufacturing process of cattle protein supplements and cattle drug. The last priority is disseminating the urgency of *halal* policy for company stakeholder. In Indonesia, many farm cattle practitioners composes the feed supplement by themselves, and of course uses the *halal* material; and by this process, it is not only to get a clear status of ingredient material, but also get the good quality of animal feed. About the supplement of drug medicine, many Indonesian feedlots take the prominent and famous name of company. The famous and big company, in their perspective, will have a good responsibility.

Halal risk events and halal risk agents in the abattoir

The coming of unlawful meat, beside by the non-*halal* animal, it might be happen also by the unsuitable process with the Islamic teaching. That is why the main HCP should be placed in abattoir, which includes stunning, slaughter person, knife, slaughter methods, and invocation. Related to the stunning process, at least there are three probabilities of higher *halal* risks, which includes difficulty to validate the effect of stunning to the animal pain; difficulty to record and to store a record of stunning impact for every slaughtered cattle; and also the stunning human error that might be happen which causes the lack of *halal* requirement because of the less skill of stunning's clerk. The rest of *halal* risks in stunning practice and slaughter person are related to the butcher individually. By the fact, the research shows the difficulties to get obedient butcher religiously. Also it is not easy to meet a *halal* requirement that a slaughter should own a *halal* certificate and identity from Islamic Institution as a *halal* slaughterer. The butcher also should have a medical record for their healthy to prevent the slaughter human error, but it is not easy to get, as presented in Table III.

The probability of *halal* risk might be happen in the slaughter methods, knife, and invocation. The main *halal* risk in the slaughter method and knife is difficult to prove by naked eye that slaughtering has been successful to cut three channel (vascular, respiratory, and the food channel). It is also difficult to avoid a slaughtering human error that causes a non-*halal* meat. The other difficulty is to form a *halal* awareness that a butcher knife should not be lifted before it cuts three channels. Our in depth interview with official government owned abattoir indicated, a human error that might be happen in slaughtering method and knife is the wrong choice of place in the neck of slaughtered cattle which causes the butcher fails to cut three channels.

Indeed, the *halal* status is a yield of a human awareness. However, it was not easy to encourage the *halal* awareness. As presented in the Table IV, the slaughter process in abattoir still face the difficulty to form an *halal* awareness that a butcher knife should not be lifted before it cut three channels; to form an *halal* awareness that the slaughter must be performed quickly and precisely without lifting the knife; and to form an *halal* awareness that the slaughterer should not be too tired to avoid human error.

Discussing about *halal* risk event, the question is what agent encourages the emergence of the risk. Referring to LPPOM-MUI (2012), at least there has been twenty six *halal* risk agents (HRAs) encourage probably the emergence of *halal* risk. However, in the light of a depth as well as guided interview, and direct observation to abattoirs performed stunning practice, the research found eight agents of *halal* risk related to the stunning and slaughter person; and nine agents probably occur in slaughter methods, knife, and invocation. In the field of stunning, there are probability of damage of stunning tool, the less skill of stunning clerk, the lack of manual to maintain the stunning tool, and inadequate archive facility to store the stunning record. For slaughter person, there are two HRAs related to butcher personally. The scarcity of Muslim obedient of slaughterer clerk is the first agent; the second is the butchers have not customized to record their health regularly.

CODE	*Halal* risk events in the abattoir
E1	Difficult to validate that stunning does not cause an animal death
E2	Difficult to validate that stunning does not cause a broken skull
E3	Difficult to validate that Stunning does not cause animal pain
E4	Difficult to store a record of stunning result of each cattle
E5	Difficult to avoid a stunning human error causes a lack of *halal* requirement of cattle
E6	Difficult to meet a *halal* requirement that butcher should be an Islamic religiosity obedient
E7	Difficult to meet an *halal* requirement that a slaughter should own a *halal* certificate and identity from Islamic institution
E8	Difficult to meet the *halal* requirement that a slaughter should own regular medical record
E9	Difficult to prove by naked eye that slaughtering has succeed to cut three channel (vascular, respiratory and the food channel)
E10	Difficult to avoid a slaughtering human error that causes a non-*halal* meat
E11	Difficult to form an *halal* awareness that a butcher knife should not be lifted before it cut three channels (vascular, respiratory and the food channel)
E12	Difficult to form an *halal* awareness that slaughtering should start from front of the neck
A13	Difficult to form an *halal* awareness that the slaughter must be performed quickly and precisely without lifting the knife
E14	Difficult to form an *halal* awareness that the slaughter must be carried out before the animal conscious
E15	Difficult to form a *halal* awareness that the distance between stunning and knifing is maximum of 30 seconds
E16	Difficult to form an *halal* awareness that saying *basmalah* is a *halal* requirement
E17	Difficult to form an *halal* awareness that the slaughterer should not be too tired to avoid human error
E18	Difficult to form a *halal* awareness that slaughter should not in the conditions of dizziness and angry to avoid human error
E19	Difficult to prove by naked eye that slaughtering has succeed to cut three channel (vascular, respiratory and the food channel)
E20	Difficult to avoid a slaughtering human error that causes a non-*halal* meat
E21	Difficult to form an *halal* awareness that a butcher knife should not be lifted before it cut three channels (vascular, respiratory and the food channel)

Table III.
Halal risk events in the abattoir (beef processing)

In the field of slaughter methods, invocation and knife, the research shows nine *halal* risk agents. The first two agents are the clerk of *halal* supervisor is not effective yet; and the less number of slaughterers which make them too tired. The other agents related to *halal* corporate culture and *halal* awareness building, in which *halal* awareness has not yet become a culture of organization; the *halal* training has not been done regularly; and the rest of assumptions that *halal* slaughtering requirements are too difficult. Finally, it is still remained the company's stakeholders who think that the *halal* requirement is merely formality.

Halal risk level in the abattoir

The presentation of *halal* risk agents puts an enigma of each *halal* risk agent contribution to emerge *halal* risk event. The question is also which *halal* risk agent actually needs to mitigate? The question leads to map the HRA in the form of AHRP. Referring to Pujawan and Geraldin (2009), AHRP is a result of occurrence level of *halal* risk agent, the severity of *halal* risk event, and the correlation of *halal* risk agent to the *halal* risk event. The formula is elaborated by entering the data into the Level 1 House of Risk (HOR-1). The data processing revealed twelve HRAs have accumulated 80 per cent for the coming of *halal* risk (Figure 4).

CODE	*Halal* risk agent in the abattoir
A1	The training of *halal* does not yet yield significant results
A2	The stunning instrument is not routinely calibrated
A3	There is a damage of stunning tool
A4	The stunning clerk is still less skilled
A5	There is not a manual yet to maintain the stunning tool
A6	The facilities of archives storage is still inadequate
A7	The scarcity Moslems slaughterer clerk
A8	The butchers have not checked their health regularly
A9	The clerk of *halal* supervisor have not been effective
A10	The slaughterers are too tired
A11	The *halal* awareness has not become a corporate culture
A12	The *halal* policy has not been effectively socialized
A13	*Halal* training has not been done on a regular basis
A14	Many company stakeholder have not been interested in understanding the *halal* importance
A15	There are many assumptions that the *halal* requirements of slaughtering is too difficult
A16	There are many company stakeholders have not felt interested in *halal* status
A17	There are still many company's stakeholders who think that the *halal* requirement is merely a formality
A18	There are still many company stakeholder who think that the *halal* policy is merely to obtain market
A19	*Halal* policy has not been socialized in the deboning officer
A20	*Halal* policy has not become a corporate culture (for officers of deboning)
A21	*Halal* training has not given yet a significant result
A22	*Halal* training for deboning clerk has not been done on a regular basis
A23	There is no *halal* reference for officers of deboning
A24	Stakeholders of the company are not interested in *halal* policies
A25	Deboning facility (to separate *halal* and non-*halal* beef) is inadequate
A26	There are many stakeholders of company who think that the *halal* requirements in deboning process is too complicated

Table IV.
Halal risk agents in the abattoir

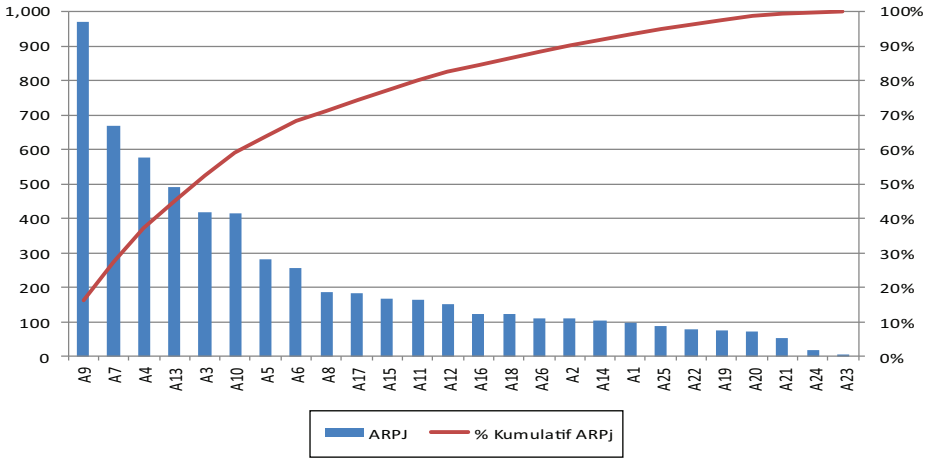


Figure 4.
Halal risk level in the abattoir

For more detail, the condition of clerk of *halal* supervisor that has not been effective is the major problem that contributes more than 16 per cent to the probability of the emergence of HRE. The next main problem is related to the slaughter person that is the scarcity of actual Muslim obedience to be a *halal* butcher. The last fact contributes about 11 per cent to severity of *halal* risk event. Other main agents are the less skill of stunning clerk; *halal* training which has not been done in a regular schedule; and the damage of stunning tool. For the last three agents, it contributes to the probability of emergence of *halal* risk in sequencing of 9, 63 per cent, 8, 22 per cent, and 7,012 per cent.

By the process, the research revealed five *halal* risk agents that should be a priority to mitigate. The agents, by the sequencing from the highest to the lowest contribution to *halal* risk event, are as follows:

(1) The clerk of *halal* supervisor has not yet been effective.
(2) The scarcity of Muslims obedience as a slaughterer clerk.
(3) The stunning clerk is still less skilled.
(4) *Halal* training has not been done on a regular schedule.
(5) The slaughterers are too tired.

Halal risk mitigation in the abattoir

The discussion finally comes to a fundamental question about how to mitigate the *halal* risk agents in abattoir. By considering the rank of $AHRP_{Ji}$, degree of difficulty to perform the action, and effectiveness to difficulty ratio, the HOR-2 process has yielded 17 proposed mitigation (M) strategies, which is ranked by the total effectiveness of the action, from M1 to M17, and categorized into three groups. The first five M are the most urgent; the second of five are the more urgent; and the rest of seven are the rather urgent mitigation (Figure 5).

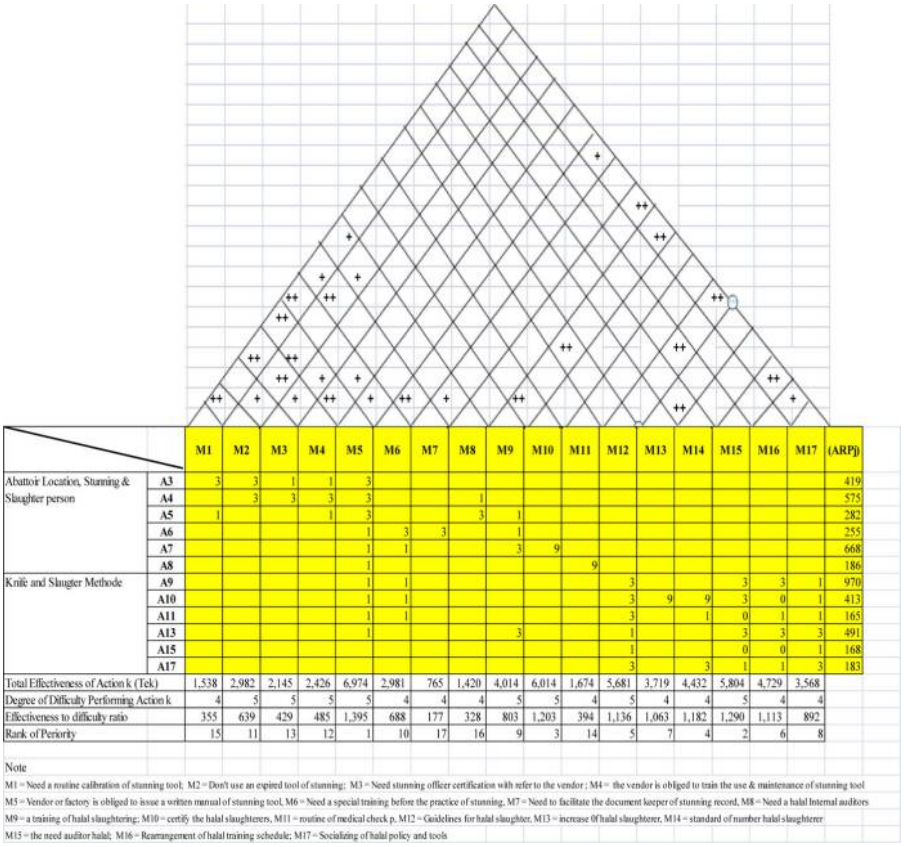
The first five M consist of the following:

(1) The obligation of vendor to issue a written manual of stunning tool; and the need;
(2) of *halal* auditor;
(3) to certify the *halal* butcher;
(4) of standard number of *halal* butcher; and
(5) of *halal* guideline for *halal* slaughter.

The second group of more urgent proposed M consist the need to/of the following:

- the rearrangement of the *halal* training schedule;
- increase the *halal* slaughterer;
- socialization of *halal* policy;
- training of *halal* slaughter; and
- special training before the stunning practice.

The second group of proposed mitigation strategies is very important. However, the research places it as the second group because many abattoirs have performed it as internal of annual program and many of them have been executed. Here, the rest of the seven proposed mitigation, which include the following:



		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	(ARP)j
Abattoir Location, Stunning & Slaughter person	A3	3	3	1	1	3													419
	A4		3	3	3	3			1										575
	A5	1			1	3			3	1									282
	A6					1	3	3		1									255
	A7					1	1			3	9								668
	A8					1						9							186
Knife and Slaugter Methode	A9					1	1						3			3	3	1	970
	A10					1	1						3	9	9	3	0	1	413
	A11					1	1						3		1	0	1	1	165
	A13					1				3			1			3	3	3	491
	A15												1			0	0	1	168
	A17												3		3	1	1	3	183
Total Effectiveness of Action k (Tek)		1,538	2,982	2,145	2,426	6,974	2,981	765	1,420	4,014	6,014	1,674	5,681	3,719	4,432	5,804	4,729	3,568	
Degree of Difficulty Performing Action k		4	5	5	5	5	4	4	4	5	5	4	5	4	4	5	4	4	
Effectiveness to difficulty ratio		355	639	429	485	1,395	688	177	328	803	1,203	394	1,136	1,063	1,182	1,290	1,113	892	
Rank of Periority		15	11	13	12	1	10	17	16	9	3	14	5	7	4	2	6	8	

Note

M1 = Need a routine calibration of stunning tool; M2 = Don't use an expired tool of stunning; M3 = Need stunning officer certification with refer to the vendor ; M4 = the vendor is obliged to train the use & maintenance of stunning tool
M5 = Vendor or factory is obliged to issue a written manual of stunning tool, M6 = Need a special training before the practice of stunning, M7 = Need to facilitate the document keeper of stunning record, M8 = Need a halal Internal auditors
M9 = a training of halal slaughtering; M10 = certify the halal slaughterers, M11 = routine of medical check p, M12 = Guidelines for halal slaughter, M13 = increase 0f halal slaughterer, M14 = standard of number halal slaughterer
M15 = the need auditor halal; M16 = Rearrangement of halal training schedule; M17 = Socializing of halal policy and tools

Figure 5.
House of risk

(1) The propose to avoid the use of expired stunning tool;

(2) the obligation of the vendor to train the use and maintenance of the stunning tool; and the need of/to:

(3) stunning officer certification with refer to the vendor;

(4) routine medical check-up for the *halal* butcher;

(5) a routine calibration of stunning tool;

(6) internal *halal* auditor; and

(7) facilitate a document keeper of stunning record.

For the last seven proposed M, many abattoirs feel it less important, or at least they have it done in their routine program. But, indeed, many proposed M is very important. For example, the existence of internal *halal* auditor is one of the *halal* certification required by LPPOM-MUI (2012). Fortunately, the *halal* certified abattoir has had the internal *halal* auditor. The condition leads them to assume that the proposed M is not important. About the stunning requirement, many Indonesian abattoirs which performed the stunning practice have got the training before practice, and also has got manual book of stunning

practices. About the routine medical check-up for *halal* butcher, many of abattoirs have done a close cooperation with local health center.

Halal risk events and halal risk agents in the retailing

Retailing is one of the important stages in the beef processing from feedlot to end consumer. The basic principle of retailing is to avoid the probability of meat contamination by the filth material which is coming from the unlawful animal or other filth which causes the *halal* meat to become non-*halal*, or at least, it is suspected to be non-*halal* just because of the unclear place from *najs* (filth), altered the place for pig and beef, or altered knife to cut the beef and pig. By the fact, the more important factors for the Muslim consumers are the authenticity of the meat being *halal*. Although it is based on UK experience (Wilson and Liu, 2010), but the tendency is the same with the Indonesian Muslim based on the assumption that the driver for *halal* lies in someone being Muslim (Wilson and Liu, 2010). Therefore, the process of retailing should have to be separated completely between the *halal* beef and unlawful meat. In this context, Riaz and Chaudry (2004) placed the retailing as one of the HCP which assumed the unlawful meat could probably happen in the process of retailing.

Referring to LPPOM-MUI (2012), the research collected at least seven *halal* risk events that probably happen in retailing process and transporting. The identification of *halal* risk event is also based on the result of in-depth interview, direct observation and FGD. The sources of information are transporter, supermarket manager, and also the traditional market which provides the meat for consumer. The observation is focused in Indonesia because the retailers of Australian beef are mainly in Indonesia. But to complete the data of retailer, the research also collected data from the Australian retailer in Brisbane and Melbourne. The object of the observation in Australia included the big supermarket and the middle market.

The instrument to collect the probability of *halal* risk event is using the word "difficulty" in the form of Likert scale. But, for many supermarkets and traditional markets, in the Indonesian context, they actually do not get a significant difficulty to handle the action contained in the questioners. The degree of difficulties commonly varies between neutral and easy, which indicated that there are not the significant difficulties. In consequence, the risk of *halal* in retailing process is not significant. For the Australian context, they differentiate completely between the *halal* and non-*halal* butcher. For the *halal* butcher, the meat packaging in the outlet and the place are entirely separated from the non-*halal* meat (Table V).

About the degree of difficulties, if the retailer and transporter actually get difficulty, it means the company got a high risk of *halal*. But, fortunately, there are not significant difficulties faced by the retailing practitioners. For the common condition, they do not get

Table V.
Halal risk events in the retailing

Code	The *Halal* risk event in the retailing
E37	Difficult to provide the special container to deliver the *halal* meat
E38	Difficult to provide the special carriage to avoid meat contamination of filth
E39	Difficult to provide special warehouse in the port for *halal* meat before shipping
E40	Difficult to form *halal* awareness for management and employees related to the transportation and storage
E41	Difficult to provide special warehouse in supermarket for *halal* meat
E42	Difficult to separate *halal* meat outlet in supermarket with the pig outlet
E43	Difficult to form a *halal* culture for supermarket management and employee
E44	Difficult to gain a *halal* certificate for meat product

difficulty to provide the special container to deliver the *halal* meat. They also do not get difficulties to provide a special warehouse and special outlet. But, to form the *halal* awareness perfectly, the supermarket and the traditional market get problem. Although their practice to handle the meat apparently complies with *halal* requirements, it still arouses a critical question whether their practice is based on the *halal* consciousness or only based on the common practice of company. Indeed, the *halal* matter is yielded of awareness. Without *halal* consciousness, it gets high risk to fall into risk of *halal*. In the light of the facts, it needs to form a *halal* consciousness completely.

The *halal* risk agent as a result of research browsing by the literature study with reference to LPPOM-MUI (2012), as well as direct observation, and in-depth interview with the practitioner of market is presented in Table VI. There are nine HRA that have a high probability to arouse the risk of *halal*. For more details, the agents of *halal* risk are related to the absence of *halal* policy, *halal* interest, *halal* knowledge, *halal* training, *halal* guideline and *halal* facilities. But, which of the *halal* risk agent contributes mainly to the *halal* risk? The *halal* risk level as a result of HOR-1 analysis, in which it considers the occurrence level of the agent and the correlation of the *halal* risk agent to the *halal* risk event.

Halal risk level in the retailing

The *halal* risk level is very important to reach a final goal of the research, to control the agent of *halal* risk. By controlling the agent of the risk, it will come to guarantee the status of *halal* meat. In this case, the research did not control the event of *halal* risk, but proposes to mitigate the potential agent of *halal* risk. By controlling the agent, it will avoid a risk completely.

The HOR model analysis indicated the limited place to separate the *halal* meat and unlawful meat is the main problem of to arouse the *halal* risk. It contributes about 20 per cent to the emergence of *halal* risk. The next agent is the absence of *halal* guideline which contributes about 18 per cent to the emergence of *halal* risk. The next agent in sequence is the lack of *halal* interest of the management, assumption that the *halal* requirement is too complicated, assumption that *halal* certificate is not important, and the thought that it is not important to separate the *halal* and the unlawful meat. The six agents accumulated more than 80 per cent of the probability of the emergence of *halal* risk. Additionally, of course, the six agents become the priority to mitigate. For more details on the six agents of *halal* risk contribution to the emergence of *halal* risk event is presented in Pareto Diagram in Figure 6. Finally, by this fact of the agent of *halal* risk, the question is how to mitigate the agent of *halal* risk.

Code	*Halal* risk agent in the retailing
A47	There has not been a *halal* policy for the company
A48	The management and employees assume no interest for the policy
A49	*Halal* requirements are too complicated for the company
A50	There have not been written *halal* guidelines for all stakeholders of the company
A51	There has been no *halal* training for management and employees
A52	Warehouse facilities are still limited
A53	Place of the meat product outlet is still limited
A54	Many consumers consider it does not need to separate *halal* and non-*halal* meat product
A55	The stakeholders of company still consider unnecessary of *halal* certification

Table VI.
Halal risk agents in the retailing

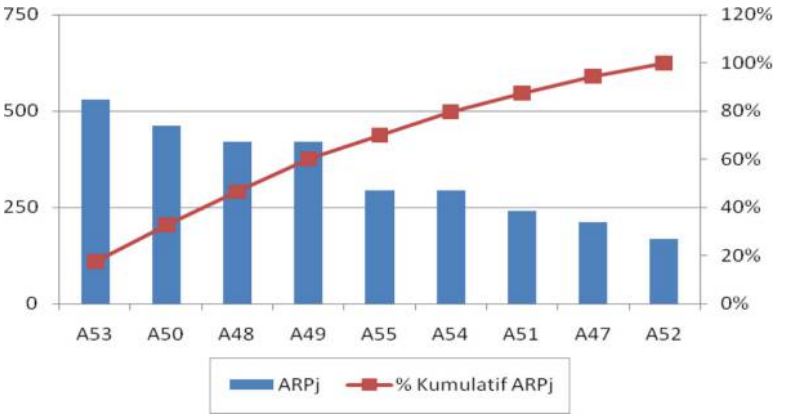


Figure 6.
Halal risk level in the retailing

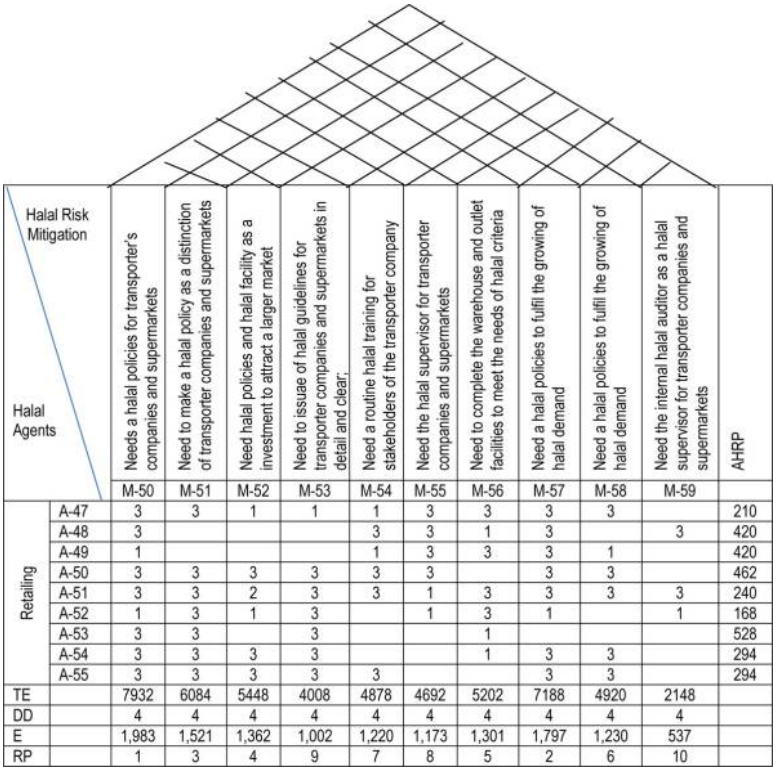
Halal risk mitigation in the retailing

Which of the agent risk mitigation should be a priority? The HOR-2 presented the rank of priority by considering the AHRP, the correlation of *halal* risk mitigation to the *halal* risk agent, total effectiveness the action, degree of difficulty to perform the action, effectiveness to difficulty ratio. By such consideration, the HOR-2 came to rank of priority to mitigate the *halal* risk agent. The *halal* policy and providing the facility to prevent the *halal* status took the appearance of the big five priorities (Figure 7). For more details, the first priority is the need of a *halal* policy for transporter's companies and supermarkets. The second is the need of *halal* policies to fulfill the growing of *halal* demand. The third is the need to make a *halal* policy as a distinction of transporter companies and supermarkets. The fourth is the need of *halal* policies and *halal* facility as an investment to attract a larger market; and the fifth is the need to complete the warehouse and outlet facilities to meet the needs of *halal* criteria.

Conclusion

In the light of description, explanation and argument based on the literature review, in-depth interview, guided interview, direct observation, as well as data processing using the described methods; finally, the paper comes to a conclusion, as following:

- The priority of mitigation strategy in the feedlot to get a *halal* and *thoyyib* meat is the feedlot practitioners should try to get more calf suppliers; tracing materials and manufacturing process of cattle protein supplements and cattle drug; and disseminating the urgency of *halal* policy for company stakeholder.
- The main mitigation strategies to guarantee the *halal* meat status in the abattoir is the obligation of vendor or the factory to issue a written manual of stunning tool; the need of *halal* auditor; the important of *halal* butcher certification; the urgency to standardize the number of *halal* butcher; and the need of *halal* guideline for the *halal* butcher.
- The priority of *halal* risk mitigation for the retailing to avoid the meat contamination is the need of a *halal* policy for transporter's companies and supermarkets; the need of *halal* policies to fulfill the growing of *halal* demand; the need of *halal* policies and *halal* facility as an investment to attract a larger market; and finally the need to complete the warehouse and outlet facilities to meet the needs of *halal* criteria.



Halal Agents		Halal Risk Mitigation: Needs a halal policies for transporter's companies and supermarkets (M-50)	Need to make a halal policy as a distinction of transporter companies and supermarkets (M-51)	Need halal policies and halal facility as a investment to attract a larger market (M-52)	Need to issuae of halal guidelines for transporter companies and supermarkets in detail and clear; (M-53)	Need a routine halal training for stakeholders of the transporter company (M-54)	Need the halal supervisor for transporter companies and supermarkets (M-55)	Need to complete the warehouse and outlet facilities to meet the needs of halal criteria (M-56)	Need a halal policies to fulfil the growing of halal demand (M-57)	Need a halal policies to fulfil the growing of halal demand (M-58)	Need the internal halal auditor as a halal supervisor for transporter companies and supermarkets (M-59)	AHRP
Retailing	A-47	3	3	1	1	1	3	3	3	3		210
	A-48	3				3	3	1	3		3	420
	A-49	1				1	3	3	3	1		420
	A-50	3	3	3	3	3	3		3	3		462
	A-51	3	3	2	3	3	1	3	3	3	3	240
	A-52	1	3	1	3		1	3	1		1	168
	A-53	3	3		3			1				528
	A-54	3	3	3	3			1	3	3		294
	A-55	3	3	3	3	3			3	3		294
TE		7932	6084	5448	4008	4878	4692	5202	7188	4920	2148	
DD		4	4	4	4	4	4	4	4	4	4	
E		1,983	1,521	1,362	1,002	1,220	1,173	1,301	1,797	1,230	537	
RP		1	3	4	9	7	8	5	2	6	10	

Figure 7.
Halal risk mitigation in the retailing

References

Bahrudin, S.S.M., Illyas, M.I. and Desa, M.I. (2011), "Tracking and tracing technology for halal product integrity over the supply chain", *International Conference on Electrical Engineering and Informatics (ICEEI), 2011, IEEE*, pp. 1-7.

Jie, F. (2008), Supply Chain Analysis of the Australian Beef Industry, PhD dissertation, The University of Sydney, Sydney.

Journal of Islamic Marketing (2012), "Executive interview: charting the rise of the halal market – tales from the field and looking forward", *Journal of Islamic Marketing*, Vol. 3 No. 3, pp. 288-294.

Mariminand Maghfiroh, N. (2011), *The Application of Decision Making Technique in Supply Chain Management*, IPB Press, Bogor.

Ministry of Agricultural Republic ff Indonesia (2015), *Statistic of Indonesia*, Ministry of Agricultural Republic of Indonesia, Jakarta.

Muslim Population (2015), "Muslim population in the world", available at: www.muslimpopulation.com/World/ (accessed 23 May 2015).

Narahari, Y. and Biswas, S. (2007), "Performance measures and performance models for supply chain decision making", available at: www.ozzymeatexporters.com.au/ (accessed 20 December 2007).

Norrman, A. and Jansson, U. (2004), "Ericsson's proactive supply chain risk management approach after a serious Sub-supplier accident", *International Journal of Physical Distribution & Logistics Management*, Vol. 34 No. 5, pp. 434-456.

Omar, E.N. and Jaafar, H.S. (2011), "Halal supply chain in the food industry – a conceptual model", *IEEE Symposium on Business, Enginering and Industria Applications (ISBEIA)*, *Langkawi*, pp. 384-389.

Omar, E.N., Jaafar, H.S. and Osman, M.R. (2012), "Assessing halalan-toyyiban food supply chain in the poultry industry", *International Halal Conference 2012 (INHAC)*, pp. 4-5.

Pujawan, I.N. and Geraldin, H.G. (2009), "House of risk: a model for proactive supply chain risk management", *Business Process Management Journal*, Vol. 15 No. 6, pp. 953-967.

Qureshi, S.S., Jamal, M., Qureshi, M.S., Rauf, M., Syed, B.H., Zulfikar, M. and Chand, N. (2012), "A review of halal food with special reference to meat and its trade potential", *The Journal of Animal and Plant Science*, Vol. 22 No. 2, pp. 79-83.

Rahman, M.N.A., Manzouri, M. and Zain, C.R.C.M. (2013), "Environmental concern in managing halal food supply chain", *American Journal of Environmental Science*, Vol. 9 No. 3, pp. 240-246.

Riaz, M.N. and Chaudry, M.M. (2004), *Halal Food Production*, CRC Press, Boca Raton, LA.

Ritchie, B. and Brindley, C. (2007), "An emergent framework for supply chain risk management and performance measurement", *Journal of the Operational Research Society*, Vol. 58 No. 11, pp. 1398-1411.

Schoenher, T., Rao, T.V.M. and Harrison, T.H. (2008), "Assessing supply chain risks with the analytic hierarchy process; providing decision support for offshoring decision by a US manufacturing company", *Journal of Purchasing and Supply Chain Management*, Vol. 14 No. 2, pp. 100-111, doi: 10.1016/j-pursup. 2008.01.008.

Sheffi, Y. and Rice, J.B. Jr (2005), "A supply chain view of the resilient enterprise", *MIT Sloan Management Review*, Vol. 47 No. 1, pp. 41-48.

Sinha, P.R., Whitman, L.E. and Malzahn, D. (2004), "Methodology to mitigate supplier risk in an aerospace supply chain", *Supply Chain Management: An International Journal*, Vol. 9 No. 2, pp. 154-168.

Sporleder, T.R. and Boland, M.A. (2011), "The evaluation of Brazilian beef in Europe: consumers, importers and exportes perspective", *International Food and Agribusiness Management Review*, Vol. 14 No. 5, pp. 27-52.

The Assessment Institute for Food, Drug, and Cosmetics, The Indonesian Council of Ulama (LPPOM-MUI) (2012), *The Guideline to Meet the Criteria of Halal Assurance System in Abattoir*, LPPOM-MUI, Bogor, West Java.

Thomson Reuters (2014), *State of the Global Islamic Economy 2014 – 2015 Report*, Thomson Reuters, New York, NY.

Tieman, M. and Ghzali, M.C. (2013), "Principles in halal purchasing", *Journal of Islamic Marketing*, Vol. 4 No. 3, pp. 282-293.

Tieman, M. (2011), "The application of halal in supply chain management: in-depth interviews", *Journal of Islamic Marketing*, Vol. 2 No. 1, pp. 186-195, doi: 10.1108/17590831111139893.

Tieman, M. (2015), "Halal supply chain strategies", *Asia Food Journal*, available at: www.asiafoodjournal.com/2015/02/halalfoodsupplychainstrategy (accessed 2 February 2015).

Tieman, M., Vorst, J.G.A.J. and Ghzali, M.C. (2012), "Principles in halal supply chain management", *Journal of Islamic Marketing*, Vol. 3 No. 3, pp. 217-243.

Vorst, J.G.A.J., Silva, C.A. and Trienekens, J.H. (2007), *Agro-Industry Supply Chain Management: Concepts and Application*, Food and Agriculture Organisation, United Nation, Rome.

Wilson, J.A.J. (2014), "The halal phenomenon: an extension or a new paradigm?", *Social Business*, Vol. 4 No. 3, pp. 255-271.

Wilson, J.A.J. and Liu, J. (2010), "Shaping the halal into a Brand?", *Journal of Islamic Marketing*, Vol. 1 No. 2, pp. 107-123.

Wilson, J.A.J. and Liu, J. (2011), "The challenge of Islamic branding: navigating emotions and halal", *Journal of Islamic Marketing*, Vol. 2 No. 1, pp. 28-42.

Zulfakar, M.H., Anuar, M.M. and Talib, M.S.A. (2012), "conceptual framework on halal food supply chain integrity enhancement", *International Halal Conference, Putra World Trade Centre, Kuala Lumpur*, 4-5 September 2012.

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