

Green Halal Supply Chain in Malaysian Halal Food Companies: A Conceptual Framework

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Abstract— The aim of becoming a global Halal hub has been outlined in the Third Industrial Master Plan 2006–2020 (IMP3) and Malaysia now is on target to attain the status by 2020. However, the progression needs to be geared with a holistic ecosystem that enable closing compliance loop within Halal supply chain. Thus, calling for sustainable development to strengthen the Halal definition. Despite the urge, the degree of readiness to employ green practices in Halal food industry is still vague and the issues are still new and developing. Food industry is one of the major contributors to environmental problems, large amount of waste is generated from food industry, by promoting sustainability in producing Halal food can reduce their environmental footprint and will benefit Malaysia where other countries can recognize Malaysian Halal standards not only for hygiene and safety but also as a symbol of eco-friendly practices. Therefore, green Halal supply chain is now seen to be central towards global Halal hub. Responding to these needs, this study is expected; (1) to identify what are the green practices implemented in collaboration with supplier and customer in managing Halal food supply chain (2) to assess what is sustainable performance achieved from green practices implemented (3) to determine if supplier-customer collaboration moderates the impact of green practices on sustainable performance. This study will employ mixed methods of qualitative and quantitative to answer the study's objectives. Overall, this study is expected to present a model that provides a comprehensive view on Green Halal supply chain concerning supplier-customer collaboration in green practices. The model can help the industry and policy maker to identify what green practices are feasible to collaborate with and what are the related benefits and barriers. Engaging Green Halal Supply Chain can further improve Malaysian reputation as the world's leading Halal hub.

Keywords— *Green Practices, Sustainable Performance, Halal Food, Supply Chain Management, Supplier Collaboration and Customer Collaboration.*

1. Introduction

Sustainability is a growing concern in the food industry. A study in “New Scientist” showed the food industry lagging in environmental performance compared to other industries [1]. This is partly because the food industry plays a significant role in environmental impact. For instance, the food supply is responsible for about 20-30 percent of total greenhouse gas emissions and more than 40 percent of total liquid and solid wastes every year [2]. As a result, there remains a substantial challenge ahead for the food industry to become more sustainable. To tackle this challenge, food manufacturers need to implement sustainability initiatives within their companies as well as upstream and downstream of the companies. Therefore, by integrating green practices in supply chain management is found to be most effective [1].

The supply chain of Halal food products includes agriculture, manufacturing, packaging, distribution, use and disposal. Agricultural production generally is the largest contributor to the life cycle impact of food, typically greater than 50 percent of the environmental footprint [3]. In general, food processing is the next most significant contributor to impact in the supply chain. Packaging impacts tend to be very limited compared to other components of the supply chain but can be up to 20 percent due to energy needed to produce the package [4]. Consumer transport to purchase food can also be a significant impact, and consumer use of the food can contribute to the life cycle impact [5].

Halal food is not only to fulfil religious responsibilities for Muslims, but Halal food itself is the highest standards of safety, hygiene and quality assurance. By presenting green and sustainable food practices, it will enhance requirement to the industrial food performance in global market.

Formalization and standardization of the Halal standard will provide identity and credibility for the whole Halal industry, as well as gaining international recognition [6]. In global market, green and sustainable food development has been discussed intensely, especially in Europe as much research has shown the impact to the environment. [7] claimed that European Union has ever since been the leader of the environmental policy, which partly involved the development of climate change and the promotion themes such as sustainable developments in international fields. The involvement of Europe country in these issues, has invited many non-governments organizations (NGOs), especially in develop and developing countries to participate to preserve this matter [7]. Although green and sustainability development is still at initial stages in Halal food industry, the efforts in greening the industry will surely benefit Malaysia where other countries will also be recognizing Halal Malaysia standards as a good environmental practice.

Given the case of Halal food supply chain in Malaysia, this industry is known as the strongest Halal sector as compared to other countries and have a good recognition of its Halal logo [8]. However, due to economy downturn, the country has witnessed a moderate investment coming into the industry [9]. Thus, this might signal the stakeholders to take some proactive actions towards the realization of Malaysian Halal Global Hub. Responding to this, making improvement and adding value in our Halal legislations and standards seems obligatory rather than optional.

As the Malaysian government is focusing on increased food production as well as making Malaysia an international hub, food processing companies leverage on Malaysia's strength in Halal certification and the government's promotional efforts to capture the Halal market abroad [10]. According to the Minister of International Trade and Industry, Datuk Seri Mustapa Mohamed, Malaysia is now on track to achieve global Halal hub status by 2020, backed by a holistic ecosystem [11]. To achieve a holistic ecosystem, efforts towards sustainable development in Halal industries must be taken seriously.

Practicing green practices has proven many benefits, The World Business Council for Sustainable Development has found businesses that incorporate sustainable or green practices have had greater financial success with lower production

costs, improved product function and quality, increased market share, improved environmental performance, better relationships with stakeholders, and lower risks [12]. Further, consumer interest in sustainability is growing. Consumer interest in sustainable products grew from around 50 percent in 2007 to 70 percent in 2010 and is expected to grow higher in future [13]. As a result, a green supply chain approach to sustainability may be the best way to protect a company's value as well as the future generation's Halal food supply.

However, to achieve environmental excellence is a challenging task, because all the related activities in the supply chain require some degree of collaboration between supply chain members [14]. As contended by [15], supplier and customer represent an important aspect of supply chain management and have been proven to effectively improve company's performance. Similarly, [16] indicated that to strengthen core competencies for sustainable development, firms need to collaborate with supply chain members into environmental practices. Therefore, to fill the gaps, this study aims to develop a comprehensive research framework that can modelling how green practices of supplier and customer in Halal Food Supply Chain affects sustainable performance. The findings and results of this research is assumed to be a fundamental by providing empirical evidence for Halal Food industry to enhance their sustainable performance and be responsive to sustainability issues to stay competitive as world class Halal Hub.

2. Sustainability and Halal Food Industry

The Halal Food industry, besides being economically and socially important, current systems of food production, distribution, and consumption have significant impact on environmental degradation, causing depletion of natural resources, deterioration of ecosystems, social health and livelihoods [17]. Food supply chains are responsible for a large share of household-related environmental impacts, e.g. 29% of GHG emissions, 58% of eutrophication, 30% of acidification and 32% of ecotoxicity [18]. In addition, stakeholders increasingly expect companies to manage and disclose environmental and social impacts as evidence of effective corporate governance, therefore investors will be showing interest in how the food sector is

responding to sustainability challenges. Responding to these, it is necessary to close the loop within the Halal supply chain by reducing the industry's environmental footprint. By doing so, this can strengthen the global definition of Halal standard. According to the Minister of International Trade and Industry, Datuk Seri Mustapa Mohamed, the realization of Malaysian global Halal hub status by 2020 should be backed by a holistic ecosystem as to ensure that our future generation can be safeguard [8].

According to the Department of Environment (DOE) report published in 2017, the main environmental problems in Malaysia were found to be water pollution and the disposal of solid waste. Large quantities of both liquid and solid wastes are produced annually by the food processing industry. These waste materials contain principally biodegradable organic matter and disposal of them creates serious environmental problems. While water pollution in the country is typically caused by the discharge of the industries and the activities of farming [19]. However, the current water and air catastrophe has indicated that these natural resources have to be managed for their sustainability. The indication has posed a new challenge for the country to come up with strategies to secure, manage and govern the conservation of water resources and the quality of air [20]. Aside from this, the next major issue is the solid and hazardous waste. According to [21], around 17,000 tons of waste is generated on a daily basis, the food waste constitutes the largest portion of the total waste and this is predicted to increase to over 30,000 tons daily by 2020 owing to the population growth. Regardless of the significant level of waste, the recycled portion was only reported to be 5% [21]. Due to lack of awareness and some technical constraints, Malaysia and many other developing countries are still employing conventional approach of end-of-life products, which entail land filling or incineration of waste.

For this reason, the Malaysian government focuses on environmental aspects in its Tenth Malaysia Plan called "Building an environment that enhances quality of life". The 10th Malaysia Plan details measures to be taken to achieve this goal. The desired quality of life can only be achieved within a stable and well-preserved environment. According to the plan, the Malaysian government will introduce new legislation and incentives to ensure that all industries and consumers comply

with the measures necessary to take on the country's environmental problems. This plan has enhanced awareness and understanding on green practices that are in place and are crucial for a sustainable future. The challenge now is to get local industry players including the Halal food industry to play a role in Malaysia's green agenda of sustainable development. Findings in previous studies indicated the adoption of green practices in Malaysia is still at the level of unfavorable [22] and still relatively far to reach the level necessary to the apprehension of Malaysian green agenda [23]. Therefore, any relevant studies are crucial for the understanding of green practices and to identify how green practices can be successfully implemented thus spur the Malaysian green agenda and the sustainability development especially in the Malaysian Halal Food Industry to be recognized as reputable global Halal Hub.

Responding to sustainability issues, Halal and sustainability are now both seen as opportunities. It is no longer enough for producers to focus solely on what type of food is produced – how food is produced is just as important. As well as product ingredients, consumers everywhere are increasingly concerned about farm animal welfare, transport, packaging and waste management, and many are demanding nutritious and quality food options that allow them to lead a healthier lifestyle. By incorporating green practices in Halal supply chain provides an opportunity, if better understood, to improve the many aspects of Halal production, thus contributing towards a more sustainable and secure food future [24]. Halal is no longer simply an expression of contested forms of production and consumption. It is part of a rapidly expanding, globalized market that is starting to bring the concerns of Muslim and non-Muslim consumers closer together.

However, improving sustainability in the food industry requires engagement of stakeholders, to cope with the challenges of consumer expectations, limited resources, international policies and regulations [2]. As a result, the implementation of green practices in food industry has spread and studies have analyzed their impact on performance i.e., quality, efficiency, flexibility and responsiveness [5]. Yet, there is scarce identification of green practices applied in collaboration, across different supply chain members of supplier and customer particularly issues pertaining Halal food supply chain [25].

Previous studies have suggested that supply chain collaboration can make a difference in the application of certain practices as well as their respective performance outcomes [22].

However, the collaboration between partners in supply chain management proposed, merely focuses only on core operational issues rather than matters pertaining sustainable issues. Indeed, sustainable consciousness has become intertwined with daily life and sound business practices [29]. The sustainability concept has increasingly become important in any business operations including Halal businesses. Research shows that price is no longer the only guide for competition but ecological, health and welfare benefits are involved collectively [30]. In addition, the ongoing pressure from increased globalization and increased competition, the higher demands for safety and security, environmental protection, lack of scarce resources, social and ethical issues have induced immense pressure on business organizations [31]. Consequently, business organizations such as Halal business organizations have not only needed to deliver quality products right on time, but they now also have to comply with environmental, economic, ethical and the social pressures placed on their business activities. These compliances cannot be achieved without systematic collaboration in both upstream and downstream of supply chain [32].

With respect of sustainability development, an effective assessment of a sustainability passes through the simultaneous evaluation of economic, environmental and social performance. Therefore, the adoption and implementation of sustainable initiatives such as green practices should seek to address all the pillars of sustainable [33]. However, the previous study on sustainable performance has studied this performance from the point of isolation rather to evaluate the collective performances of sustainable which embraces the economic, environmental and social performance [34]. This provides greater clarity and supports for this study to investigate how implementing green practices in Halal food supply chain can contribute to sustainable performance.

Thus, to the best of our knowledge, few studies have analyzed sustainable performance outcomes expected from collaborative green practices in different supply chain stages of supply and demand of Halal food. Therefore, this study intends to fill this gap by analyzing the type of collaboration for green practices implemented in Halal food supply

chain in order to develop an integrated green Halal supply chain model towards global Halal hub, and explore the performances aimed at when setting up collaborative green practices among supply chain members. Overall, the main problem of the research can be stated as follows: To what extent is green practices being implemented by Halal food companies in Malaysia? To what extent is supplier collaboration in green practices being implemented by Halal food companies in Malaysia? To what extent is customer collaboration in green practices being implemented by Halal food companies in Malaysia? What is the impact of green practices in Halal food companies on sustainable performance? Does supplier and customer collaboration in green practices moderate the impact of green practices on sustainable performance?

3. Collaboration for Sustainability in Halal Food Supply Chain

The Malaysia Standards Halalan-Toyyiban Assurance Pipeline (MS2400: 2010) described Halal in supply chain perspective, are the things or actions which are permitted or lawful in Islam, and that the standard of operation is acceptable and in accordance with Shariah requirements. Fundamentally, Halal reflects that every action is follow the Islamic rules, and that it must be clean and must not, in anyway, inflict harm on the consumer. Therefore, combining the description of supply chain management and the principles of Halal, the Halal supply chain management can be defined as the business processes of improving a firm's performance and fulfilling customers' demand by supplying products, services and information that are in accordance with Shariah of Islam. [41] provides a more detailed and elaborate definition of the Halal supply chain as: *"The process of managing the procurement, movement, storage and handling of materials, parts, livestock, semi-finished or finished inventory both food and non-food, and related information and documentation flows through the organization and the supply chain in compliance with the general principles of Shariah"*

In addition, [11] described the Halal supply chain to be like the conventional supply chain, which comprises planning, implementing and controlling the distribution and storage, but it only caters for Halal-certified products, from the origin to the

consumption point. In short, the Halal supply chain must include the elements of Halal (faith, trust, clean, safe and free from non-Halal), be practiced by all supply chain members, and that it must be presentable and embedded within the activities along the supply chain (logistics, purchasing, information management, value adding, etc.). Based on the given definitions, supplier and customer represents as an important aspect of supply chain and key to successful reap the potential benefits from the supply chain.

In response to sustainability issues, previous studies have suggested the need for collaboration between supply chain actors as a component of success [42]. The growing demand for improved service levels and rising costs for offering better quality products recognize collaboration in the supply chain as a key driver to increase business performance and sustainability [43]. Supply chain collaboration refers to companies and/or organizations working together to solve problems and/or achieving common goals [30] (Suansawat, 2013). However, supply chain collaboration is difficult to manage because of challenges regarding the decisions surrounding with whom and when to collaborate, for what reasons and how to implement collaboration [16].

Therefore, it is necessary to understand the context and the type of collaborative relationship between partners to achieve the most suitable results. Collaboration in the supply chain can be of different types. [16] identified two main typologies: vertical (i.e., with customers, with suppliers) and horizontal (i.e., with competitors and other organizations). For a collaboration initiative to be successful, cultural and strategic elements need to be considered e.g., trust, corporate focus, intra-organizational support, communication [43]. In this context, [16] also highlights the importance of focusing 'on the small number of close relationships rather than trying to collaborate with everyone', because collaboration implies high resources investment. In the case of sustainable development such as green practice, vertical collaboration in the supply chain is more favoured. Whereby, the efforts greening the business activities along the supply chain should first seek the cooperation between the key members of supplier and customer before extending it to other parties.

Table 1 presents the green practices category that will be adopted in this study. The green practices

listed are classified in seven dimensions that were derived from numerous of literature review [46] [47], the practices proposed are specifically for food industry considering factors relevant in the Halal food supply chain.

Table 1. Green Practices in Food Industry

Sustainability Dimension	Green Practices	
Environment	Natural Resources conservation (NRC)	Animal Welfare: Elimination of cruelty; safe handling, housing, slaughter and transport. Soil conservation: Conservation forest, species; prevent soil erosion and pollution, prevent loss of arable land and biodiversity, responsible farming methods (reducing fertilizer and pesticides), elimination of contaminant and pollutant agents. Water conservation: reducing water consumption, efficient water use, waste water re-use and recovery.
	Green processing, packaging and transportation (GPPT)	Design, materials and packaging: effective design for reuse and recycling, use of design for disassembly and reuse, material reuse and recycle, reducing packaging, using reusable/recyclable packaging Waste: reduce waste and hazardous materials, composting organic waste, producing renewable energy or animal feed with waste, lower disposal costs, damage compensation, recycling Processing and transportation: reducing energy use, conservation of energy, reducing CO2 emissions and GHGs, reduce pollution, reduction of fuel consumption.
Social	Health and Safety (H&S)	Improved product quality, food safety, food security, traceability and transparency. Promotion of healthy life styles and local food sources. Safer warehousing and

	Work and Human Rights (W&HR)	transportation. Better working conditions that result in higher levels of motivation and productivity and less absenteeism. Training, education, advancement. Regular employment, elimination of illegal and child labor, respect of worker rights, gender equality, freedom of association, safe working conditions.
	Community	Donation, collaboration with NGOs, philanthropy, support to the economic development in local communities, educational practices, health care, job training, volunteering, childcare.
Economic	Green purchasing (GP)	Increasing supplier diversity, confidentiality, eliminating deception and impropriety, transparency, proper purchasing processes (reciprocity, fairness, no power abuse or special treatment), supplier's labor programs, local sourcing that result in shorter lead-times. Environmental and social considerations when selecting, monitoring and controlling suppliers.
	Support supply chain partners	Profit sharing with actors in the upstream supply chain, premium price payment, support and monitoring for obtaining environmental certification (i.e.ISO 14001 standards). Facilitate partners' access to markets, knowledge and technology transfer, fostering financing opportunities, information and expertise sharing.

The research framework depicted in Figure 1 shows the relationship under investigation, that is to identify the green practices applied in Malaysian Halal Food Companies. Then, the attention is in observing the impact of these green practices on sustainable performance, specifically economic,

environmental and social performance, predicting the moderating effect of supplier and customer collaboration in the Halal food supply chain.

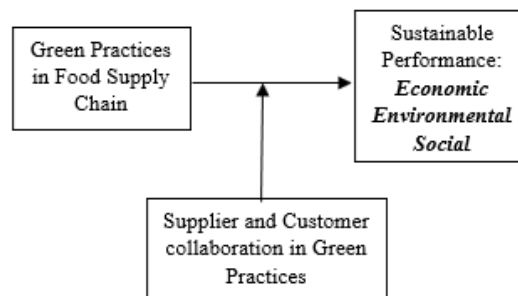


Figure 1. Research Framework

4. Methodology

Industry insights will first be sought from the managerial level of Halal food companies in Malaysia. The targeted Halal food companies in this study are those companies that are operating in Malaysia. This will be done by a series of personal interview with these organization's general managers particularly in addressing the gravity of green practices towards their sustainable performance consequences in Halal Food industry. The insights gained will be crafted into a conceptual framework consists of recognized constructs regarded as important and significant to the study. A questionnaire will be developed henceforth. The questionnaire will be improved through a series of pilot testing involving a convenient sample size of the Halal food companies' general managers. The finalized draft will be distributed to 285 halal food companies operating in the country, the sample size of 285 for this study is based on the sample table by [35]. The sample size is deemed as representative enough for these companies operating in the country [35], so that the findings can be generalized to Halal industries in Malaysia.

A set of questionnaires will be used to gather data to identify and to examine the relationship between green practices in Halal food supply chain and sustainable performance of the companies. The present research strategy is exploratory in the sense that it has the purpose to investigate and describe the correlation between the variables. The population of this study will be the Malaysian halal food companies that are certified by JAKIM, according to JAKIM database in 2017, there were about 1126 food companies in Malaysia that are

certified in Halal [10]. The reason why these halal food companies are selected because they represent the largest sector in Halal industry in terms of sales, employment and contribution to the economy. This study will be used a proportionate stratified random sampling technique by selecting equally the number of companies from every state in Malaysia and clustering it according to the area sampling design which focused on Halal food companies that are certified in Halal by JAKIM. With simple random sampling, there would an equal chance (probability) that each of the 1126 companies could be selected for inclusion in our sample. The sample size of 285 companies for this study is based on the sample table by [35].

The research method for this study is a mixed method study that sought to explore the extent of sustainable Halal management practice in Halal food industry in Malaysia. It gives greater flexibility and holistic in investigative techniques and the opportunity to combine macro and micro levels of the study. However, the main purpose of this method is for triangulation that seek convergence and corroboration of findings from different methods that study the same phenomenon. In this design, the quantitative and qualitative data will be collected sequentially or in two phases, where the first phase is collecting in-depth interviews with experts in Halal food companies and case study of few companies. The purpose of these interviews and case study is to collect information and opinions from both industry and academia. Then, follow by larger scale survey distribution to Halal food companies throughout Malaysia. Based on the findings obtained from qualitative and quantitative studies, a framework for the development of Green Halal Supply Chain Model for Halal food industry will be developed and proposed.

5. Conclusion

In sum, it can be concluded that the global Halal food demand will grow higher and pressure the Halal food supply chain. The increasing relevance of processing, storage, and logistic activities within the food supply chain mandate a new systemic perspective for addressing sustainability. While these processes are typically tailored to reduce costs, their environmental and social sustainability are not accounted for. Therefore, reconciling economic growth of food supply chain ecosystems with environmental and social sustainability is

mandatory for the future generation of politician, planners, entrepreneurs and consumers. As Malaysian now is a step forward towards its global Halal hub, thus by getting green practices enclosed in Halal food supply chain would provide greater reputation to Malaysian Halal practices and standard. As stated by [2] “global food production must increase by 60% by 2050 in order to meet the demands of the growing world population” in order to reduce world hunger, while there is a need to observe resource capacity and to reduce food waste at the same time. Therefore, this study intends to fill this gap by investigating the type of green practices implemented for sustainability in Halal food supply chain, to analyze whether supply chain collaboration among supplier and customer will impact the effectiveness of green practices towards sustainable performance of Halal food companies and explore the performances aimed at when setting up these green practices in Halal food supply chain. The findings of the study will be sought to set the indicators and the critical success factors that will be used to develop a ‘Green Halal Supply Chain Model’. It is hoped that the model of green Halal supply chain will attract researchers and the policy makers that are having an interest in identifying strategies in developing sustainability in Halal supply chain. The model developed can be applicable to improve the standard of Halal as a symbol of good practice, safe and healthy not only to human beings but also to economy, environment and social welfare.

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