

ELUCIDATION OF SUPPLY CHAIN INTEGRATION IN HALAL FOOD INDUSTRY

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ABSTRACT

Much has been written about the importance of supply chain integration in determining firm performance. Moreover, for halal food production that is depending upon the wholesomeness in the supply chain, the external integration is crucial. However, there are scarce literature and managerial guide that focus on supply chain integration in the halal food industry. The aim of this research is to provide empirical evidence in explaining supply chain integration in the context of the halal food industry through a survey from 275 firms. The results provide strong empirical evidence on integrative activities and supply chain integration practices of halal food firms in Malaysian. In addition, the paper offers propositions on how supply chain integration may play their role in contributing to performance enhancement in the complex halal food industry.

Key words: Supply chain integration, halal food

INTRODUCTION

Halal food production should encompass wholesomeness and integrity (Baharuddin *et al.*, 2015). The halal dietary law has clearly indicated that any firm that is intended to produce halal food must adhere to the restriction not only within the company walls but also along the supply chain. Despite of the successfulness of certification in driving the halal industry, depending onto standards alone cannot guarantee the functionality within a particular firm or supply chain (Sroufe & Curkovic, 2008; Ali, Zhan, *et al.*, 2017), especially when the standard focuses on the production methods rather than the products (Polo-Redondo & Cambra-Fierro, 2008). Additionally, their applicability towards the complete food supply chain can be argued, as a

specific standard is only ideal for a certain part of the supply chain (Trienekens & Zuurbier, 2008). Empirical evidence in previous research shows the relationship between the standards in ensuring performance (quality) is weak (Prajogo, 2011). Similarly, Martinez-Costa *et al.* (2009) revisited the effects of multiple standards on performance and pointed out that the validity of the changes to performance is questionable.

Today's businesses require firms to be more interrelated than ever before, and competitive advantages do not solely depend on single firms (Frohlich and Westbrook, 2001; Jin, 2004); the food industry is of no exemption. Food supply chain literature suggests more extensive integration is required in enabling tools application in addressing issues in the supply chain (i.e., traceability, visibility, Radio Frequency Identification Device (RFID) (Storoy *et al.*, 2013) and standards and

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regulations relating to the food industry (Powell *et al.*, 2013). Frohlich and Westbrook (2001) have mentioned in their work on the manufacturing industry, that in order for the firm to be successful, linking the internal processes externally is important, after tailoring supply chain management to the specific type of demand. Succeeding that, a considerable amount of literature suggests that venturing into more extensive supply chain integration (SCI) may increase performance at the tactical and operational level (Tan *et al.*, 2017; Wong *et al.*, 2011). Integrating business processes is one of the best practices in supply chain management that involves coordinating decisions across multiple facilities and tiers (Meixell & Gargeya, 2005). An integrated, well-coordinated global supply chain is difficult to duplicate and, therefore, plays an important role in competitive strategy.

The contention of positivity impact of SCI impact on performance encourages the research to investigate perception and practices in the halal manufacturing firms in Malaysia. SCI is a multi-dimensional context that is conceptualized as supplier and customer integration in previous literature (e.g. Wong *et al.*, 2011). Due to its multidimensionality, it is important to highlight the perception and practices of both contexts in the supply chain. Understanding the perception and practice of SCI in the halal food industry is interesting because it may contribute to both bodies of knowledge. Firstly, SCI is a relatively new area of research in halal food. A growing body of research suggests that manufacturers should gear up for more extensive SCI (Stevens, 1989; Frohlich & Westbrook, 2001), mainly because competition has shifted from intra-company to intra-supply chain (Tan, 2001). For a young industry like halal, incorporating SCI research is a revelation of self-assessment. Despite there some research that attempts to unravel SCI in the halal research (i.e. Tan *et al.*, 2017; Ali *et al.*, 2018), the study only focuses on the relationship as a construct measure. There is a paucity of empirical research that unravels the perception and practices of SCI, thus leaving a significant void in the body of knowledge.

MATERIALS AND METHODS

Sampling

This survey was administrated in halal food manufacturers in Malaysia. In total, data were collected through a survey of Malaysia halal manufacturing firms within a period of nine months. A total of 275 out of 620 survey questionnaires sent were received, yielding a response rate of 44.3%.

Questionnaire design

The questionnaire measurement items were developed based on previous literature. Part I of the measurement consist of the integrative activity from the context of supplier and customer by adopting the work of Frohlich and Westbrook (2001). The integrative activity that consists of 16 measurement items were asked from the view with suppliers and customer relationship. In Part 2, integration activities. The respondents with a background of managers and above were selected to answer the instrument so as to increase the data reliability. This is due to the complexity of the supply chain context involving both supplier and customer relationship. Each item was responded on a 3-points Likert scale: always, sometimes, and never. Part II of the instruments asked about the perception of managers on SCI practices that may affect operational performance among halal food manufacturers. The questions on supplier and customer integration were adapted from Narasimhan and Kim, (2002), Swink *et al.* (2007), Flynn *et al.*, (2010), Wong *et al.* (2011), and Zhao *et al.* (2011). Each item was responded on a 3-points Likert scale: agree, disagree and neutral.

Prior to administrating the questionnaires, three processes were involved in enhancing the reliability and validity of the instruments. First, the initial questionnaire items that derived from English literature translated into Malay language using techniques used by Flynn *et al.* (2010) and Tan *et al.* (2017). Second, the questionnaire's quality pretested by submitting it to academicians and practitioners for their review.

Statistical analysis

All statistical analyses were conducted using SPSS for Windows (version 11.0, 2001, Chicago, IL). Frequencies were computed for all variables.

RESULTS

Table 1 summarizes the demographic characteristics of the respondents. The questionnaire was sent to 1,000 Malaysian firms involved in halal food production and yielded 255 responses.

The result of the perception of SCI practices is depicted in Table 2. The results in general shows that respondents are neutral on the positive impact of both supplier and customer integration. Quality information sharing recorded the highest value of 123 respondents agree of its importance towards the performance. Whilst, the industry does not see any importance of involving supplier in the quality assurance committee that is representing 50 respondents do not agree with the practice. For

Table 1. Demographic characteristic summary

	n	(%)
Position of respondents		
Owner	31	11
Director	48	18
Manager	94	34
Halal Executive	102	37
Number of employees		
>200 employees	51	18
<200 employees	224	81
Revenue (USD)		
<1M	165	60
1M to 3M	48	18
3M to 5M	30	11
>5M	31	11

Table 2. Statements relating to SCI practices that are perceived to impact halal food operational performance ($n=275$)

	Agree $n(\%)$	Disagree $n(\%)$	Neutral $n(\%)$
Supplier integration			
Sharing quality information with our suppliers	123(.45)	30(0.11)	122(.44)
Involving suppliers in quality assurance committee	83(.30)	50(.18)	142(.52)
Involving our suppliers at the early stage of food design	91(.33)	49(.18)	135(.49)
Having a high degree of a strategic partnership with our suppliers	90(.33)	36(.13)	149(.54)
Having a high degree of joint planning	100(.36)	43(0.16)	132(.48)
Sharing our suppliers our real-time production schedule information	107(.39)	30(0.11)	138(.50)
Customer Integration			
Sharing result of the customer satisfaction survey	93(0.34)	20(.07)	162(0.59)
Maintain close contact with consumers	145(.53)	7(0.03)	123(.45)
Organizing a "customer satisfaction" program	97(.14)	38(0.14)	140(.51)
Sharing market information	103(.11)	31(0.11)	141(.51)
Sharing information through IT	163(0.59)	20(.07)	92(.33)
Facilitating employee-customer interaction	104(.38)	18(.07)	153(.56)
Joint planning with major customers	106(.39)	16(.06)	153(0.56)

other practices, the results show that almost similar scores indicating supplier integration may posit both positive and negative impacts. For customer integration, the result shows that very little firms see connecting with consumers will not bring positive impact to the firm. Sharing information through IT recorded the highest reading, followed by maintaining close customer contact (163 and 145 respondents respectively). Even though the results show the high agreement on the positive benefits of customer integration, there are still many firms are unsure with the idea. Out of seven practices, five practices are scored more than 50% of respondents hesitant to agree with the benefits of customer integration.

Table 3 depicts the integrative activities that are implemented in Malaysia halal food industry. With supplier, the assess to process planning system was

the activity that only 26% of food manufacturers always implemented. In addition, 25% reported involving supplier with production plans. The common use of logistics recorded the highest (34%) activities coordinated with the supplier. Whilst, halal food manufacturing integrating the activities with the customer the context of packaging (45%), delivery (46%), and common use of logistics (45%).

DISCUSSION

Today, many food product recalls were caused by the supply chain actors that are outside of the firms manufacturing walls; whereas, the upstream of their supply chains (Maruchek *et al.*, 2011; Tse & Tan, 2011; Ali & Suleiman, 2018). Despite that, the responsibility and liability towards what happens in

Table 3. Integrative activities performed by the halal industry

Integration Activities	Please indicate if the Following is/are Part of Integration Practices (n=275)					
	Supplier (%)			Customer (%)		
	Always	Never	Sometimes	Always	Never	Sometimes
Assess to process planning system	.26	.15	.59	.32	.12	.56
Provision of production plans	.25	.16	.59	.32	.12	.56
Joint Electronic Data Interface	.18	.31	.51	.52	.10	.38
Knowledge of inventory mix	.27	.21	.52	.31	.15	.54
Packaging customization	.35	.10	.55	.45	.07	.48
Delivery frequencies	.32	.11	.58	.46	.07	.47
Common use of logistics	.34	.12	.53	.45	.08	.47
Common use of third-party logistics	.26	.20	.54	.36	.14	.50

the supply chain remain with the manufacturer. A myriad of literature highlighted in order for the firms to have better control of its supply chain and compete in today business, SCI should be taken seriously as part of their strategies. In halal food context, SCI has been given a serious focus in the literature (e.g. Ali *et al.*, 2017; Tan *et al.*, 2017).

Supplier integration activities is argued as the strategy that may help reducing food incidents through enabling better transparency, visibility, and traceability in the supply chain (Zailani *et al.*, 2010; Tse & Tan, 2011; Trienekens *et al.*, 2012; Ali *et al.*, 2017; Tan *et al.*, 2017). Coordination with the supplier is even more needed when the Manzini and Accorsi (2013) highlighted that knowledge on the status of quality of food supply often stops at the gates of the producer. In halal context, the status and quality are determined by audit certification mechanism. However, the mechanism has been argued of its sustainability and efficiency in the literature (Powell *et al.*, 2013; Roth *et al.*, 2008). Interestingly, it is evidenced that halal food manufacturers in Malaysia remain neutral on positive impact promised by the halal supply chain activities. In addition, the results show an inclination of managers to see the advantages of SCI. The perceived advantages of the supplier are also translated into the integration activities as shown in Table 2.

The integrative activities with the supplier are more focused on the packaging customization and common use of logistics compared to the other integration activities. This research argues that this type of integrative activities as the relationship of the suppliers meeting the manufacturers demand. For example, suppliers should supply the raw materials in accordance with the standards, i.e., packaging and delivery frequencies that have been set by the manufacturers. Similar to the common use of logistics, the relationship of supplier and manufacturers is sourcing the cheapest options, or

in the halal industry context, halal transportation. For other integration activities with the supplier, the percentage is relatively low where near to 25% of the manufacturers do not see the need for integrating with the supplier. In this case, we argue that these type of integrative activities is difficult and expensive, especially when it involves the traceability of food to its supply origins (Regattieri *et al.*, 2007; Manzini & Accorsi, 2013; Aung & Chang, 2014). Furthermore, the leakage of competitive advantages to the suppliers, which in the food industry it is not difficult to imitate.

In the food industry, consumer integration is crucial especially when the business is prone to speculation (Ali *et al.*, 2017). The food scandals have increased the involvement of consumers into demanding more information about what they eat. Therefore, the importance of customer integration cannot be disregarded where it has an effect on firm performance (Flynn *et al.*, 2010; Wong *et al.*, 2011). Despite the managers still reserved about the benefits of SCI, the data has shown that customer integration is perceived to have a more positive impact on the firms in relative to supplier integration. Facilitated by the internet of things (IOT) and Big Data, the consumers' impact on the business strategy. The data shows that the managers believe that information sharing with the consumers through the internet is high that also enabling the firm to maintain close contact with the consumers. Moreover, information sharing here may also mean the marketing efforts of the firms. Based on the data on the integration activities, the data validates the perception where the joint electric data interface recorded the highest integration activities with the consumers. In fact, the trend that can be seen is that halal manufacturing firms in Malaysia are more focus on customer integration by recording a higher value in 'always', and lesser value in 'never' in all components of integration activities.

RESEARCH IMPLICATION

This research forward important theoretical findings to the halal food industry on the context of SCI. The perception of the managers on both supplier and customer integration is still neutral in the industry. In addition, the benefits of customer integration recorded higher acceptance in the industry compared to supplier integration. One may argue of the need for SCI in the controlled environment like the halal industry. In fact, there are some activities have been noted to be practiced in the industry, that is almost similar to the demographic characteristics of the survey. In the nutshell, it can be argued that a similar percentage of supplier integration mirroring the company's revenue and status. This argument may be debatable; thus, it is something need to be further investigated. Moreover, firms nowadays competing for intra-supply chain rather than between companies, it is a prime time for the managers to seriously consider the SCI as the strategy of going forward. The halal food industry is relatively new compared to other industry such as manufacturing, electrical, etc. The trends have shown how SCI may play an important role for the firm in improving performance. Therefore, this research provides important insights towards the managers, which the supply chain strategy is underexplored and may posit benefits for the market leaders. Moreover, managers should take note that previous literature (i.e. Frohlich) has highlighted that the firm who has more extensive SCI yield better performance.

CONCLUSION

In conclusion, SCI is at the embryonic stage and yet to be accepted and practiced among halal food manufacturers in Malaysia. The mixed results indicate the potential of SCI as a competitive weapon for the firms in the halal industry that competing between supply chain. This study suffers from some limitation. First, there is no relationship in showing how SCI strategy may impact the firm performance. This the conclusion draws are not in-depth for SCI body of knowledge. So, this research suggests that future research recommended investigating the relationship in the context of the halal food industry. Second, the study does not take into account the new wave of revolution such as Industrial Revolution 4.0 into the study, thus future research should incorporate this perspective into their research.

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