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The Moderating Effect of Halal Assurance System on the Relationship between Halal Food Supply Chain Management and Halal Integrity Assurance

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Abstract

Purpose: The main purpose of this study is to empirically investigate the effect of halal food supply chain (HFSC) management on halal integrity assurance (HIA) with moderating variable of halal assurance system (HAS).

Design/ methodology/ approach: This study employed a quantitative research approach, in which survey questionnaires were distributed to 475 Malaysian halal food and beverages producers. A multiple hierarchical regression technique was applied to examine the moderating effect of the hypotheses.

Findings: The results revealed that halal assurance system (HAS) was found to moderate the halal food supply chain (HFSC) management and halal integrity assurance. HAS had also been found to significantly moderate the supply chain resources (SCR) and halal integrity assurance (HIA) relationships.

Research Limitations/ Implication: This study focuses on the halal industry in Malaysia specifically for food and beverages producers, its findings cannot be generalized to other business categories. Issues of applicability of this study to other countries also need to be considered.

Practical Implication: This study addresses the assurance of halal integrity as a crucial element in managing halal food supply chain in halal food industry. It has empirically identified the moderating role of halal assurance system (HAS) to strengthen the halal food supply chain integrity assurance in halal food industry.

Social Implications: The study has successfully filled the gap in literature by empirically establishing the moderating role of halal assurance system (HAS) on halal food supply chain integrity assurance. This result has presented a better understanding of the halal integrity assurance concept application in society.

Originality/Value: This study is one of very few studies which have empirically link halal assurance system, halal integrity assurance and halal supply chain management in the halal food industry. The paper's primary contribution is the finding support to the integration of halal context as an important determinant in present halal food supply chain model in accordance with Islamic requirements.

Keywords: Halal assurance system, Halal food supply chain integrity, Halal food supply chain management, Halal product, Halal food and beverages industry

1. Introduction

Food quality and its safety are among the major concerns to many consumers around the world.

Consumers are more concerned about such issues than anything else because of their beliefs, values and eating habits (Muhammad *et al.*, 2009; Zailani *et al.*, 2010a). *Halalan-toyyiban* product means any product which are not harmful and safe to be consumed as underlined by *Shariah* law, and thus is allowable and permissible (Omar *et al.*, 2013). The beliefs in *halalan-toyyiban* concept made Muslim consumers become aware on the status of halal food products they consume. Among them are the issues related to halal integrity assurance whereby the halal food producers must comply with all the regulations set by Malaysian halal authorities (Arif and Sidek, 2015; Zailani *et al.*, 2010a).

The country was once shocked by the finding of two popular brands of Cadbury chocolate products found containing pig DNA (porcine) following random testing made by the Ministry of Health (MoH) on the product taken from the shelves (Lai and Nawawi,

2014). In a similar case, Muslim consumers were stunned when freshwater catfish, raised in an aquaculture farm were fed with pig carcasses and other cross-contaminated food sources (Mok, 2019). The issue get triggered when it started to viral off in the newspaper and the social media. Even a butter manufacturer was also faced with cross-contamination issue where pig DNA (porcine) was found in their products. It was then traced back to the repackaging plant in Malaysia where the cross-contamination occurred during the packaging process (Ling, 2011).

These events have led some consumers questioning the integrity of halal food produced in Malaysia. Investigations into the production process revealed weaknesses in sustaining halal food integrity. As a response, the Department of Islamic Development Malaysia (JAKIM) proposed the need for critical monitoring of every halal food product as well as random inspections to ensure halal compliance. With the increasingly available brands and varieties of food in the market, the authenticity of halal food products also has elevated the concerns among Muslim consumers around the world (Fadzlillah *et al.*, 2011). The status of halal food products has also become suspicious with the growing numbers of non-Muslim producers and foreign multinationals dominating the halal food industry. It seems that the suppliers and producers do not understand the special requirements in handling of halal food products (Arif and Sidek, 2015).

Food products are produced and came from all parts of the world. The food products travel a greater distance and involve a lot of handlings along the supply chain before they reach the consumers; thus the integrity of halal food products must therefore be controlled and monitored to satisfy consumers with the authentic halal products. Muslims consumers are aware that the *halalan-toyyiban* concept is not only restricted to the sources of food ingredients, but also includes processing, food handling, packaging, storing and delivering (Alam and Sayuti, 2011). It could not be considered as halal in the event that the food product was not handled or stored correctly.

In order to develop a clean, reliable and untainted halal food supply chain, there is a need for every party of the supply chain i.e. supplier, manufacturer, logistics service provider and end-user to be monitored, so that consumers can satisfy with the authenticity of the halal food products (Bahrudin *et al.*, 2011). Therefore, the adoption of halal assurance system as a halal control and assurance mechanism along a supply chain is highly sought both from the side of producers and consumers as the key component towards safeguarding the halal integrity of the supply chain in accordance with *Shariah* compliance. According to Tarmizi *et al.* (2014), the assurance system is capable of revealing information and status of halal products throughout the supply chain, thus the details of the ingredients, production process and logistics activities can be easily accessible to enhance the halal integrity.

Although numerous studies have been conducted on halal integrity assurance, halal food supply chain management and halal assurance system, there is no empirical study so far that has examined the moderating role of halal assurance system (HAS) on the relationship between halal food supply chain (HFSC) management and halal integrity assurance (HIA). Thus, in order to help bridge the literature gap, this study attempts to evaluate the important role that halal assurance system (HAS) plays in halal food supply chain integrity assurance.

2. Halal Integrity Assurance (HIA)

One of the main and unique attributes of halal products is the aspect of halal-ness or a term called halal integrity. Halal integrity means that the product remains halal from the upstream to the downstream supply chain, free from any activity and process that might breach the halal status; intentionally or unintentionally (Zulfakar *et al.*, 2012). The halal integrity clearly presents the details of the halal status of a product and assures that the requirements for halal as stated are met (Mohamed *et al.*, 2016; Soon *et al.*, 2017). Tieman (2011), Khan (2009), Lodhi (2009) agree that halal integrity assurance is the key factors in developing a well trusted halal food supply chain in the current complex and competitive environment. Alserhan (2015) pointed out that halal integrity ensuring the entire supply chain should be perfect that brings the assurance of the manufactured product are truly halal according to *Shariah* law.

Halal products, when compared to other products, are produced according to the concept of *halalan-toyyiban* (according to the principles of Islamic laws and health quality). The concept requires the product to meet the essential element of *halal* and *toyyib* that is good, hygienic, clean, high quality and safe for human consumption. This is a holistic approach that not only focuses on the product's physical attributes but also stresses on the role of moral behavior throughout the halal food supply chain management (Mohamad and Hassan, 2011). The word *toyyiban* is translated as good, pure, wholesomeness, healthy and nutritious, meaning pure both in the physical and moral aspects. This study is to intended to empirically investigate the impact on halal integrity assurance (HIA) due to halal food supply chain (HFSC) management with moderating role of halal assurance system (HAS).

3. Halal Food Supply Chain (HFSC) Management

The primary indicator of a successful halal industry is the assurance of halal integrity. The halal integrity offers assurance, thus create more demand for authentic and genuine halal food products. There are a number of supply chain processes that determine halal integrity assurance. This is why importance is placed on sustaining halal integrity along a supply chain from production to consumption. The processes along the supply chain include sourcing of ingredients, procurement, manufacturing, and handling of product, storage, transportation, delivery, and distribution which must follow the *Shariah* principles. For the supply chain to be deemed satisfactory for halal food, it must follow all the Islamic dietary laws from production to consumption stages. Intentionally,

including forbidden ingredients or substance in any amount is prohibited and all stages of the supply chain must be strictly regulated to guarantee halal product integrity (Lodhi, 2009).

Pahim *et al.* (2012) stated that consumer consumption trends have widened their focus of halal food products to include the supply chain for the purpose of ensuring halal product integrity, hence the recognition of the halal food supply chain management. Studies also have showed that Muslim consumers are more conscious about their food and demand more from the halal food supply chain to extend the integrity of halal products (Talib and Razak, 2013). In addition, Shafie and Othman (2006) pointed out due to several cases that questioned the status and integrity of halal products made it imperative for halal food supply chain management to be taken seriously. This study expects HFSC management to have a significant influence on HIA. Thus, the relationship between halal food supply chain management and halal integrity assurance needs to be further explored.

H1: HFSC management has a significant effect on HIA.

Following an extensive literature review and discussions on the existing supply chain management models, the halal food supply chain (HFSC) management comprises of the following dimensions.

3.1 Supply Chain Objectives (SCO)

Halal integrity is determined by various manufacturing processes along a supply chain. These processes play a huge role in safeguarding the halal integrity from production to consumption (Tieman, 2011). According to Alserhan (2010), the halal food supply chain approach should first ensure the right intention through a halal policy that serves as the basis for the organization's commitment to protect halal integrity along the supply chain. Tarmizi *et al.* (2014) added that the objective of the *halalan-toyyiban* food supply chain is upholding halal integrity to make certain that Muslim consumers receive high-quality halal food products. Therefore, this study expected SCO to have a significant effect on HIA.

H1a: SCO has a significant effect on HIA.

3.2 Supply Chain Logistics Control (SCLC)

Logistics control is essential to preserve the integrity of halal food products along a supply chain, especially at the delivery and distribution stages. Segregation of physical products is carried out at various storage spaces, be it warehouses, distribution centres, transit areas, or transportation units. Gubbins (2003) mentioned that dedicated halal assets which referred to a dedicated warehouse, transit place and transportation fleet as the important factors in the halal food supply chain. The use of a transportation vehicles dedicated to halal goods enables seamless trade between different parties without compromising halal integrity and avoiding cross contamination. This makes possible for worldwide marketing and delivery of local halal food products.

According to Talib *et al.* (2013), assets exclusively dedicated to halal food products are important to the supply chain to ensure full segregation thus improving the halal integrity assurance. In view of this, logistics forwarding service companies capable of ensuring halal integrity are vital for halal industry to be successful (Tan *et al.*, 2012). Mixing halal and non-halal products together during transportation activities means that the halal status will prevail in a non-halal manner. The concept of halal logistics companies is that halal integrity assurance in the supply chain is restricted to storage containers and transportation vehicles (Tieman, 2013). Therefore, this study expects SCLC to have a significant effect on HIA.

H1b: SCLC has a significant effect on HIA.

3.3 Supply Chain Resources (SCR)

The presence of competent human resources, knowledge of halal and halal logistics operation during halal food processing are crucial to the overall halal food supply chain management. This is to protect consumers from unintentionally consuming non-halal products, consequently it will enhance the halal product integrity. Foster *et al.* (2011) proposed that Human Resource Management (HRM) be used as a tool among supply chain and operation managers to preserve the supply chain quality. Tieman (2007a) proposed that third-party logistics (3PL) service providers be provided with proper training to make them aware of the correct way to handle halal products and services, thus reducing the cross-contamination. Moreover, producers of halal foods are to ensure every employee is knowledgeable on the halal concept to protect halal product integrity throughout the supply chain down to consumption. Therefore, this study expects a positive influence of SCR on HIA.

H1c: SCR has a significant effect on HIA

3.4 Supply Chain Business Process (SCBP)

The assurance of halal integrity is dependent on various processes along a supply chain from source to the point of consumer purchase. The operations at each stage of the supply chain inclusive of logistics operation are important to determine the integrity assurance of halal products. Other business factors that are crucial to the halal food supply chain are the procurement process, management of manufacturing flow, and fulfilment of customer order. These factors extend the integrity of halal food products from production to the point of consumption. To guide companies in halal logistics operation for business purposes, warehouses, transportation, and product handling require halal control and assurance activities. Nakyinsige *et al.* (2012) highlighted with halal

certification, halal food producers can guarantee quality assurance to consumers by proving their compliance to the halal manufacturing process. Therefore, this study expects a positive influence of SCBP on HIA.

H1d: SCBP has a significant effect on HIA

3.5 Supply Chain Network Structure (SCNS)

Barratt (2004) identified trust, mutuality, openness, exchange of information and communication as the success factors for the assurance of halal integrity. For example, trust between partners in the halal food supply chain is essential because halal integrity and halal status are guaranteed as long as it is under the control of the halal logistics service provider, but when the halal logistics service provider changes hands, cross-contamination may occur when the receiving party does not engage in halal practices. To be effective in the halal food supply chain management, supply chain partners will have to trust each other by exchanging information, transparent or honest, with clear communication that will benefit each other mutually (Marzuki *et al.*, 2012). As pointed by Jaafar *et al.* (2011), the success of the halal food supply chain is the result of the collaboration and joint efforts among halal stakeholders. Therefore, this study expects SCNS to have a positive effect on HIA.

H1e: SCNS has a significant effect on HIA

4. Halal Assurance System (HAS)

The foundation of a successful halal industry, regardless of the types of halal products, is halal integrity. Halal product integrity is the result of various activities along a supply chain. This implies that every activity along the supply chain is important for halal integrity to be preserved from the point of origin to the point of consumption (Tieman, 2011). However, various parties involved in the supply chain face the challenge of sustaining halal product integrity (Zulfakar *et al.*, 2014). This is due to the likelihood of cross-contamination or the high tendency of halal and non-halal products getting mixed together during handlings.

Ali *et al.* (2014) viewed that the production stage of halal food supply chain is the most important for halal product integrity because it involved multiple processes. These stages consists of incoming ingredients and raw materials, mixing, processing, packaging, labelling, and storing of finished products. If minor changes are observed in the incoming ingredients, the halal integrity of products that were previously certified halal will be called into question. Halal product integrity can also be compromised by the equipment used for production. Therefore, producers of halal food must be transparent on the production process, and ensure employees are trained on how to preserve the halal integrity along the food supply chain.

Tieman (2007b) mentioned that quality control in the halal supply chain is highly sought both from the side of the producers and consumers as the key component towards safeguarding the halal integrity of the halal food supply chain management. The activities that make up halal controls and assurance are important to attain an expansive halal food supply chain that poses low risk of cross-contamination (Vlajic *et al.*, 2012). A condition from JAKIM and Department of Standards Malaysia (DSM) is for an assurance system capable of revealing information and status of halal products through the food supply chain (Tarmizi *et al.*, 2014). This is to make details of the ingredients, production process and logistics activities to be easily accessible. Alserhan (2010) stated that a supply chain approach should spell out the right intention in a halal policy to protect halal integrity along the supply chain. This includes consumer or customer assurance and the mechanism of control and assurance (Tieman *et al.*, 2012).

Halal logistics companies require HAS as a guideline to certify that halal product integrity is properly safeguarded all through the supply chain (Tarmizi *et al.*, 2014). Implementation of HAS by logistics service providers, effective control measures can be put in place to curtail the risk of halal products becoming compromised. This will portray confidence in the safety and integrity of halal products, and thus guarantee trustworthiness and stability of the halal industry (Tieman, 2007a). It is necessary for every halal production company to have HAS in their operations so the trained human resource team is prepared to handle halal operations and adapt to the changes that come with it; thereby raising the integrity of halal practices (Tarmizi *et al.*, 2014).

HAS was employed for the purpose of providing trust and confidence for companies committed to enhance halal integrity assurance in their operations. It is essential for various parties that collaborate in the halal food supply chain management to build trust for halal integrity to be assured (Spears *et al.*, 2013). For an extensive halal food supply chain with minimal exposure to contamination, every stage of the supply chain from the supply, production, and logistics must be monitored so consumers can be satisfied with the authenticity of the halal food products. Therefore, this study expects a significant moderating effect of HAS on the relationship between HFSC (SCO, SCLC, SCR, SCBP, and SCNS) management and HIA. Accordingly, the following hypotheses were developed.

H2: HAS moderates the effect of HFSC on HIA relationship

H2a: HAS moderates the effect of SCO on HIA relationship

H2b: HAS moderates the effect of SCLC on HIA relationship

H2c: HAS moderates the effect of SCR on HIA relationship

H2d: HAS moderates the effect of SCBP on HIA relationship

H2e: HAS moderates the effect of SCNS on HIA relationship

5. Research Methodology

5.1 Sample and Data Collection

The population for this study consists of halal food and beverages (F&B) companies in Malaysia. The list of the industries involved in this study was obtained from *Malaysia Halal Industry Directory 2017*. The unit of analysis of this study is the organizational level consists of halal food producers that have been certified halal by JAKIM. The survey questionnaires were distributed to the respondents of various food and beverages companies in Johor, Kuala Lumpur, Selangor, Melaka and Penang in Peninsular Malaysia. A total of 475 survey questionnaires were distributed to the respondents via mail and by-hand from June to December 2017. Most of the respondents are general manager or owner of the company, halal executives, halal officers, quality assurance managers, and operations personnel.

A total of 126 of the survey questionnaires were collected, but only 121 of them can be used for data analysis. The overall response rate is 26.5%. The other returned questionnaires are unusable because of poor quality and partially completed. Only respondents with good knowledge of the company and have halal certified product is qualified to complete the survey questionnaires. The respondents representing various companies for the survey questionnaire were presumed to hold specific knowledge in halal food industry. The key respondents for this study will be ideally the top and middle management.

5.2 Regression Models

This study applied the standard procedure by Baron and Kenny (1986) to analyse the moderating effect of HAS on the relationship between HFSC management and HIA. The following three steps (Model 1 to Model 3) were used to assess the moderating effect of HAS by implementing a hierarchical multiple regression (Baron and Kenny, 1986; Frazier *et al.*, 2004).

Step 1: The effect of the predictor variables on dependent variable (Model 1):

$$HIA_i = \alpha_0 + \beta_1 OBJ_{\mathrm{i}} + \beta_2 LC_{\mathrm{i}} + \beta_3 RSC_{\mathrm{i}} + \beta_4 BPR_{\mathrm{i}} + \beta_5 NWS_{\mathrm{i}} + \varepsilon_i$$

Step 2: The effect of the moderator variable on dependent variable (Model 2):

$$HIA_i = \alpha_0 + \beta_1 OBJ_{\mathrm{i}} + \beta_2 LC_{\mathrm{i}} + \beta_3 RSC_{\mathrm{i}} + \beta_4 BPR_{\mathrm{i}} + \beta_5 NWS_{\mathrm{i}} + \beta_5 HA_{\mathrm{i}} + \varepsilon_i$$

Where *HA = halal assurance system*

Step 3: The effect of the interaction among the predictor variables and the moderator on dependent variable (Model 3):

$$\begin{aligned} HIA_i = \alpha_0 + \beta_1 OBJ_{\mathrm{i}} + \beta_2 LC_{\mathrm{i}} + \beta_3 RSC_{\mathrm{i}} + \beta_4 BPR_{\mathrm{i}} + \beta_5 NWS_{\mathrm{i}} \\ + \beta_5 HA_{\mathrm{i}} + \beta_6 OBJHA_{\mathrm{i}} + \beta_7 LCHA_{\mathrm{i}} + \beta_8 RSCHA_{\mathrm{i}} + \beta_9 BPRHA_{\mathrm{i}} \\ + \beta_{10} NWSHA_{\mathrm{i}} + \varepsilon_i \end{aligned}$$

The moderated hierarchical regression analysis was adopted to determine the effect of moderating variables in the relationship between predictor and dependent variables. The analysis was employed to determine the moderating effects of these variables and to identify which variables react as expected.

6. Data Analysis

Table 2 presents the results of hierarchical multiple regressions related to Model 1, 2 and 3 using least square regression with robust standard errors respectively. Model 1 includes the HFSC (*SCO, SCLC, SCR, SCBP, and SCNS*) as the independent variables (first step). Model 2 includes moderator variable (second step). Model 3 includes the interaction terms (final step).

Table 2: Result of the Least Square Regression with Robust Standard Errors to examine the effect of interaction of HA and SCO, SCLC, SCR, SCBP and SCNS on HIA

Variables	Model 1 (Coefficient)	Model 2 (Coefficient)	Model 3 (Coefficient)
SCO	0.0006643	0.0075860	0.0692332
SCLC	-0.1000089	-0.1161370	-0.8710984
SCR	0.0349477	-0.0424645	-0.5888057
SCBP	0.2928137*	0.2756273*	0.2142375
SCNS	0.3129703***	0.2780224***	0.9403249
HA		0.1810120**	-0.6402758
SCOHA			0.0290762
SCLCHA			0.2433565
SCRHA			0.1472707*
SCBPHA			-0.0308130
SCNSHA			-0.1919132
R^2	0.4221	0.4482	0.5479
Change in R^2	-	-	0.1000
P-value	0.0000	0.0000	0.0000
***significant at $p<0.01$, **significant at $p<0.05$, *significant at $p<0.1$			

According to the results, the *F* statistic in Model 1 is significant (Sig. $F = 0.000$) and R^2 of 0.4221, indicating that the selected HFSC (*SCO, SCLC, SCR, SCBP* and *SCNS*) can explain 42.2% of variation in HIA. Model 1 reveals that both *SCBP* and *SCNS* (*p*-value<.05, Coefficient = 0.2928137 and 0.3129703) significantly affect *HIA*. Therefore, it can be reasonably concluded that hypotheses H_1, H_{1d} and H_{1e} are accepted.

Model 2 shows that *F* statistic is significant (Sig. $F = 0.000$) and the impact of *HA* on *HIA* is also significant (*p*-value < .05).

Model 3 which presents the impact of interaction terms (*SCOHA, SCLCHA, SCRHA, SCBPHA, and SCNSHA*) is significant and has stronger explanatory power of 0.5479. Model 3 shows 0.100 change in R^2 compared to Model 2, which means that hypothesis H_2 is accepted. Regarding the interaction terms (*SCOHA, SCLCHA, SCRHA, SCBPHA, and SCNSHA*), the impact of *SCOHA, SCLCHA, SCBPHA and SCNSHA* is not significant (*p*-value > 0.1, Coefficient = 0.0290762, 0.2433565, -0.0308130, -0.1919132), but the impact of *SCRHA* is significant (*p*-value < 0.1). Therefore, based on the results of Model 3, hypotheses H_2 and H_{2c} are accepted, but hypotheses H_{2a}, H_{2b}, H_{2d} and H_{2e} are rejected.

The results of the data analysis show that HFSC (*SCO, SCLC, SCR, SCBP* and *SCNS*) management is positively associated with HIA. It was also found that both dimensions of *SCBP* and *SCNS* to have significant effect on HIA. To further strengthen the halal food supply chain, the moderating variable of HAS was adopted to increase the effect on HIA. The significant moderating effect of HAS is explained by the fact that companies which adopt HAS will enable the whole food supply chain to respond to the end-customers' requirements, which means they are producing products with higher integrity assurance to satisfy the customers' needs. The finding is consistent with previous study done by Tarmizi *et al.* (2014), Abdul *et al.* (2009) and Vlajic *et al.* (2012) where they claimed that the halal assurance system is able to trace information and status of halal products along a supply chain and consequently enhance halal integrity assurance.

Further, HAS as a moderator is empirically found to influence the relationship between *SCR* and HIA. The significant moderating effect of HAS on the relationship between *SCR* and HIA could be explained by companies having a dedicated human resource team to manage the activities of halal food supply chain. Previous surveys done by Shou and Wang (2017), Samsi *et al.* (2012) and Shafii and Khadijah (2012) have been successful in highlighting the need for well-trained supply chain resources during halal product preparation at the origin of the resource materials until delivery and distribution to assure the integrity of halal products.

Thus, the significant moderating effect of HAS is due to the halal control activities throughout the supply chain on top of companies having their halal certification. This will increase the consumers' confidence in the integrity assurance of halal food products due to the system ability to minimize cross-contamination and consequently optimize the existing halal food supply chain management. HAS strengthens the halal food supply chain management toward a sustainable and robust food supply chain that strives for a lower vulnerability of halal contamination.

7. Discussion and Conclusion

This study has examined halal integrity assurance (HIA) from the perspective of halal food industry in Malaysia. It has also examined the effect of halal food supply chain (HFSC) management on HIA and has empirically proven the significant effect of HFSC (*SCO*, *SCLC*, *SCR*, *SCBP* and *SCNS*) management on the enhancement of HIA. Based on the results, both *SCBP* and *SCNS* had also been found to have significant effect on HIA.

A model which conceptualized the link between HFSC management and HIA has been analyzed in the context of halal food industry. The model was able to explain variations in HIA under study as a result of various activities along the food supply chain. The findings show that HFSC management, emphasized by the halal food producers influenced on HIA could be enhanced if appropriate approaches were employed. Based on the results, the halal assurance system (HAS) was found to have a significant moderating effect on the relationship between HFSC management and HIA. Specifically, HAS had also been found to significantly moderate the relationship between *SCR* and HIA.

The practical contribution of this study is to demonstrate the effect of HFSC management in enhancing HIA where no empirical study so far has reported such effects. It can be concluded that HFSC management is a crucial resource for achieving better HIA. The study has proven that halal food producers need to observe HFSC management to ascertain the impact on HIA. The results show that organizations should focus on both *SCBP* and *SCNS*.

In general, this study offered an overview, perhaps for the first time, an empirical analysis on the moderating role of HAS on the relationship between HFSC management and HIA. Thus, by understanding the importance of HAS adoption in enhancing the integrity assurance of the halal food supply chain management, the finding may provide guidance and better perception for developing effective strategies and modifications to improve halal food supply chain integrity assurance.

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