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Safeguarding Halal Integrity Through Halal Logistics Adoption: A Case of Food Manufacturers

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Abstract: *Safeguarding the halal integrity of products has become a part of ethical business practice in the halal supply chain. The concept of wholesomeness in the halal supply chain should cover the entire supply chain – from farm to fork. Therefore, all players in the supply chain should adopt halal logistics. Due to scarce research on halal integrity in the context of logistics, this exploratory study investigates the relationship between halal logistics and relative advantage, ease of use, and compatibility in lieu of safeguarding halal integrity. The result shows that a relative advantage resulting from halal logistics adoption was the most significant motivational factor in maintaining halal integrity. Surprisingly, ease of use and compatibility did not play a significant role in influencing the manufacturers' efforts to safeguard halal integrity. This study contributes new knowledge of halal logistics adoption and the maintenance of halal integrity. Moreover, this research also provides fresh and insightful practical implications based on the results of the study.*

Keywords: halal logistic adoption; halal integrity; relative advantage; ease of use; compatibility; DOI; TAM
JEL Classification:

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1. Introduction

The rising frequency of food scandals globally suggests a missing link in the food industry. For example, a candy food scandal in Spain (Muñoz-Colmenero, Martínez, Roca, & Garcia-Vazquez, 2016); chicken sausage contaminated with pork Italy (Di Pinto et al., 2015; Tse & Tan, 2011); the horsemeat-beef burger industry in the United Kingdom (Premanandh, 2013),

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and Sanlu's milk in China (Marucheck, Greis, Mena, & Cai, 2011). These scandals have alerted the consumers and made them wary of the food products they consume. Moreover, the scandals have created a trust issue among consumers on the label, especially concerning whether it is reflecting accurate information of the product being offered. Food is a fusion product and could not be modulated during its production process. Therefore, all players in the supply chain should assume the role of safeguarding the food integrity. For the halal context, once there is doubt in the product, the consumers, certification body, and government will ensure that the affected product will be removed from the marketplace as soon as possible (Tan, Ali, Makhbul, and Ismail, 2017; Ali and Suleiman, 2018; and Said, 2017). The scandals that occurred indicate the firm's incapability to safeguard the resulting in questions pertaining to halal integrity and prompting strong reactions in the past such as boycotts, which have impacted the sustainability of halal firms (Jaques, 2015; Nor et al. 2017).

Halal firms must adopt best practices along with strict measures to safeguard the halal integrity of their product. Elliot (2014) noted that safeguarding food integrity covers not only issues beyond food safety and quality, but also the way the food product has been sourced, procured, and distributed—as well as the honest and accurate provision of information about these elements to consumers. Meanwhile, Ali et al. (2017) observed the halal supply chain integrity as an extension to the view held by Elliot (2014), i.e. that it should fulfil the halal dietary requirement. In a nutshell, efforts to maintain halal integrity should be taken throughout the entire chain—from farm to fork. Ali et al. (2017) coined four important dimensions of halal food supply chain integrity: (1) raw material integrity (i.e. safety, purity, origin, and quality), (2) production integrity (i.e. manufacturing strategy and internal system), (3) service integrity (i.e. franchising, food-service, and outsourcing), and (4) information integrity (i.e. labelling). They also noted halal logistics as equally important for each of these dimensions. Halal logistics is an innovation in logistics operations that fulfils the halal requirement in the halal industrial ecosystem (Jaafar et al., 2011; Karia et al., 2015; Ali et al. 2019). Halal logistics has been defined as the process of all logistical matters from the source of production until the product reaches the hand of the customer, all of which must be sharia-compliant (Omar and Jaafar, 2011; Omar et al., 2011; Tieman, 2013). In other words, without the use of halal logistics, efforts to maintain halal integrity will not be successful. That is, halal integrity and halal logistics are two things that cannot be separated in the halal ecosystem. Hence, to maintain halal integrity, it is mandatory to adopt halal logistics as well.

There is a lack of studies on logistics in the halal industry, and the meagre findings are inconclusive. Although the Government of Malaysia regards halal logistics as one of the important pillars in maintaining halal integrity,

halal logistics services face a tough situation and have not received the right attention from halal industry players (Hamid, Talib, & Mohamad, 2014; Ngah, Zainuddin, & Ramayah, 2014). The less demand for halal logistics is a strong indicator of the poor intention to maintain halal integrity among halal goods manufacturers. Therefore, this research aims to extend the work of Haleem and Khan (2017) and Zailani et al. (2015) who argued that maintaining halal integrity was a critical success factor in halal orientation strategies including halal logistics adoption. However, the previous studies did not explore the reason behind the intention to maintain halal integrity, which could otherwise serve as the motivational factors for halal logistics adoption. Therefore, this study will contribute to the body of knowledge by introducing the motivational factors for halal food manufacturers to maintain the halal integrity of their products. This research explores the influential factors behind maintaining halal integrity intention. Borrowing the Diffusion of Innovation Theory (DOI) perspective by Rogers (1995) and the Technology Acceptance Model (TAM) by Davis, Bagozzi, and Warshaw (1989), this study investigates the relationship between relative advantage, ease of use, compatibility, and intention to maintain halal integrity in Malaysia's halal food industry.

The remainder of this paper is organised as follows: Section 2 explains the definition of key concepts and hypothesis development, while Section 3 discusses the methodology used to test the hypotheses. Section 4 presents the empirical results, and Section 5 presents the discussion of the results. The last section provides the conclusion and practical and theoretical implications of the research.

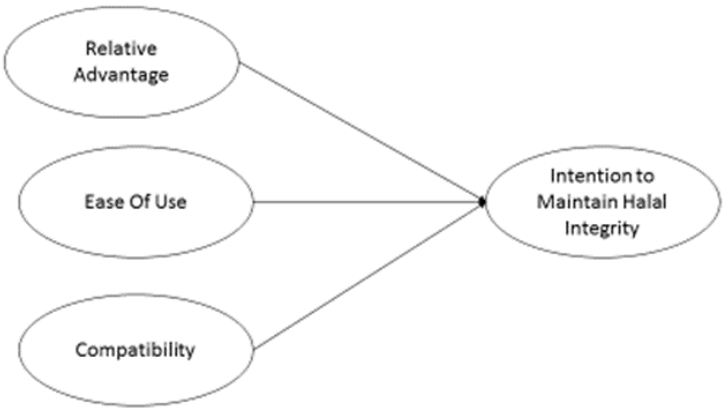
2. The Research Model: Definition of Key Concepts and Hypotheses

Based on the theory of DOI and TAM, the three influential factors that may best explain the intention to maintain halal integrity in Malaysia's halal industry are relative advantage, ease of use, and compatibility (Rogers, 1995b; Davis et al. 1989). Rogers (1995c) stated that relative advantage and compatibility could be the factors that push companies to adopt innovation. In other words, the intention to maintain halal integrity via halal logistics adoption can be considered a relatively new idea in logistics that can be explained by DOI. On the other hand, relative advantage and compatibility have been recognised as the most influential factor in adoption decisions (Tornatzky & Klein, 1982). Meanwhile, Davis et al. (1989) introduced TAM, which proposed ease of use as a factor behind innovation adoption decisions. From the TAM perspective, innovation would more likely be adopted if it were easy to use. Therefore, in this study, relative advantage and compatibility were utilised under the DOI lens while ease of use was investigated as part of the TAM perspective. Innovation adoption studies

strongly recommended using a combination of more than one theoretical perspective or approach, which this study applied (Hemlata, Hema, & R, 2015; Oliveira & Martins, 2010).

Meanwhile, the decision to maintain halal integrity beyond the factory wall should be one of the strategic movements that should be adopted by halal goods manufacturers. Any strategic decision should be based on the following compelling reasons: first, any efforts taken by the firms need to provide benefits. Second, the initiative should be easy to implement or use. Third, compatibility is important in ensuring the sustainability of the efforts. Accordingly, the framework of this study was developed and presented in Figure 1.

Figure 1: The Research Model Illustrating the Relationship Between Relative Advantage, Ease of Use, Compatibility, And Intention to Maintain Halal Integrity



2.1 Intention to Maintain Halal Integrity

Halal integrity can be defined as the assurance of the halal status of a product (Soon et al. 2017). Meanwhile, Tieman (2017) stated that halal integrity refers to the unquestionably halal condition of a product. From these two definitions, it can be surmised that halal integrity refers to the status or halal value of a product that cannot be argued that is also protected from being affected by any haram element via the maintenance of halal integrity efforts. On the other hand, maintaining halal integrity can be described as the effort taken by halal goods manufacturer to maintain halal integrity and halal practices from farm to fork (Karia & Assari, 2014). Therefore, the action taken by halal goods manufacturer to safeguard halal integrity is defined as the effort to maintain the halal status of a product. The effort to maintain

halal integrity is driven by the intention of halal food producers to secure the halal value of the product from production up to consumption by the consumers. Meanwhile, Ngah, Zainuddin, & Ramayah (2015) claimed that halal food manufacturers are still reluctant to use halal logistics in their business operations. This situation does not bode well for efforts to maintain halal integrity from farm to fork. There is less intention to maintain halal integrity along with the supply chain activities, which gives a strong signal that further investigation is needed to explore the issues of safeguarding the halal value of a product.

On the other hand, there is also a dilemma in maintaining halal integrity, which does not happen at the production stage. With the strict procedures and standards of operation based on MS1500:2009: Halal Food - Production, Preparation, Handling and Storage - General Guidelines (Second Revision), all aspects of production are designed to secure the halal value of products. However, the use of the halal logo on product packaging makes the majority of halal manufactures, and the Muslim consumers, assume that they have fulfilled the halal requirement practice (Ngah et al., 2015). The halal logo seems to have become the main guide for Muslim consumers to find halal food that is fit to consume (Tieman & Nistelrooy, 2014). This shows that Muslim consumers trust that the halal food manufacturers have chosen the best practices in their business operations that will maintain halal integrity.

Meanwhile, halal goods manufacturers typically appoint a halal personnel under company's internal halal committee to oversee halal integrity. When the issues regarding halal integrity emerge, the halal personnel will be the person responsible for managing and advising the management of the precaution to mitigate the issues. Since logistics are commonly outsourced to third parties, the span of control of the halal personnel is limited. Furthermore, there is a lack of regulation that specifically outline the compulsory use of halal logistic (Ngah et al., 2014), which, in turn, acts as a barrier to halal logistics adoption. The lack of regulation can stem from the local law not prohibiting halal goods from being transported and stored using conventional logistics practice. The rules simply mention that halal goods need to be handled based on sharia-compliant practices. In other words, the halal logistics providers lose their competitive advantage to conventional logistics providers because of the nature of these regulations. Therefore, from the perspective of the manufacturers of the halal goods, halal integrity is not threatened even if halal logistics is not implemented.

Meanwhile, from some interviews conducted, Ngah et al. (2014) found that halal goods manufacturers only showed interest in adopting halal logistics if they recognised the advantages of using it for their product image and consumer perception. Therefore, in this empirical study, the role of relative advantage was investigated in light of the intention to maintain halal

integrity. Additionally, the ease to which halal integrity is maintained as a new approach was also investigated. Nevertheless, halal goods manufacturers have put in an excellent effort to safeguard halal integrity at the production stage. It will, therefore, be interesting to investigate whether this new approach of adopting halal logistics to maintain halal integrity is compatible with existing business operations.

2.2 Relative Advantage

Relative advantage is referred to as the belief that an action or plan has benefits and has an impact relative to the existing practice (Chong, 2006). Similarly, relative advantage is considered similar to the term 'usefulness' (Alam et al., 2011; Wang et al. 2007; Agarwal & Prasad, 1997) and perceived benefits (Ahmad, Bakar, Faziharudean, & Zaki, 2014), as well as performance expectancy (Rahi, Ghani, Alnaser, & Ngah, 2018).

For example, much of the literature suggests relative advantage as an important factor behind the strategic movement adopted by many industries, such as the retail industry (Karayanni, 2013); the health industry (Ahmadi, Nilashi, & Ibrahim, 2015; Hung, Hung, Tsai, & Jiang, 2010); the mobile phone industry (Cheng, 2015; Zhang, 2017), public organisations (Damanpour & Schneider, 2009); the Information Technology industry (A. Lin & Chen, 2012); the banking industry (Rahi et al., 2018); the watch industry (Kuo-Lun, 2017); the agriculture industry (Abdollahzadeh, Damalas, & Sharifzadeh, 2017); and the hotel industry (Yi-Shun, Hsien-Ta, Ci-Rong, & Ding-Zhong, 2016). Moreover, Chiu and Fogel (2017) and Sin et al. (2016) identified relative advantage as an influencing factor in organisational decision-making. In terms of the intention to safeguard halal integrity, the benefits associated with the adoption of halal logistics can be argued as one of the important factors for consumers. As halal integrity is one of the determinants of the recurring purchase of consumers, one may argue that it would be a relative advantage over a firm's competitors. Otherwise, the issues to safeguard halal integrity will not be treated as a priority in the strategic planning of halal goods manufacturers. Therefore, this study hypothesises that:

H1: Relative advantage has a positive relationship with the intention to maintain halal integrity.

2.3 Ease of Use

The term 'ease of use' was introduced by Davis (1989) and is the opposite of complexity (Alam et al., 2011a; Wang et al., 2007b). Ease of use is defined as the perception that any new practice, system, or technology can

be used with minimum effort (Davis, 1989; Salman & Aziz, 2015). Therefore, to convince halal goods manufacturers to maintain halal integrity, any practice, system, or technology related to efforts such as implementing halal logistics should be easy to use. Hence, any obstacle that increases the effort to maintain halal integrity should be avoided.

Ease of use has been widely discussed in the literature based on the Technology Acceptance Model (TAM) proposed by Davis (1989). Previous research has studied ease of use across different organisational levels such as small medium enterprises (SMEs) (Alam, Ali, et al., 2011) multinational companies (Chiu & Fogel, 2017; Ramayah, Ahmad, & Hong, 2012) and big firms (Assimakopoulos & Wu, 2010). Furthermore, ease of use has been determined as a factor that influences the organisational decision-making process (Sanjit et al., 2018; Shang-Yu & Chung-Cheng, 2016).
Ease of use also provides a different connotation in the literature of innovation adoption. For example, ease of use (Lin, 2011); ease of understanding (Chang & Tung, 2008); ease of training personnel members (Tojib, Sugianto, & Sendjaya, 2008), and low expense (Yudi, Hooi, & Walters, 2015) have been investigated in many research contexts. For halal integrity, the system or technology used to maintain halal integrity should be easy to understand (Ali and Suleiman, 2018). It is apparent that to foster the intention to maintain halal integrity among halal goods manufacturers, many factors pertaining to planning and action need to be considered and implemented. Therefore, this study hypothesises that:

H2: Relative advantage has a positive relationship with the intention to maintain halal integrity.

2.4 Compatibility

Compatibility has been defined as the degree to which a new practice is perceived to be consistent with existing values, past experience, and needs of potential users (Rogers, 1995b). Similarly, Ax and Greve (2017) highlighted the close relationship between compatibility and organisational culture, value, and belief in terms of implementing a new practice. Compatibility factors are closely related to the corporate culture of halal goods manufacturers, especially in terms of maintaining halal integrity. If the corporate culture of halal goods manufacturers has no strong intention to maintain halal integrity, more effort will be needed to foster this intention.

Furthermore, efforts to maintain halal integrity are determined by the compatibility between intention and value and belief. The key to maintaining halal integrity planning is to make it compatible with the idea of corporate culture among halal goods manufacturers. Meanwhile, Ortega, Martínez, and De Hoyos (2010) pointed out that greater compatibility will lead to better

implementation of a new practice. Considering this argument, it can be concluded that the more compatible the efforts to maintain halal integrity with the value and belief of halal goods manufacturers, the higher the chance that the effort will receive support from the management of halal goods manufacturers.

Meanwhile, the important role of compatibility as a factor influencing new practice implementation has been determined in many types of industries such as the mobile industry (Cheng, 2015); the e-Commerce industry (Ghobakhloo, Arias-Aranda, & Benitez-Amado, 2011; Karayanni, 2013); the cloud computing industry (Alshamaila, Papagiannidis, & Feng, 2013; Zhaoujun, Jun, Yali, & Ying, 2015); the service industry (Law, Ennew, & Mitussis, 2013), and the Information Technology industry (Alam, Omar, & Hashim, 2011). Complementary to this, Chiu and Fogel (2017) and Yu-Min et al. (2010) reported that compatibility could be a driver of the decision process in business organisations. Therefore, this study hypothesises that:

H3: Compatibility has a positive relationship with the intention to maintain halal integrity.

3. Research Methodology

3.1 Sample and Data Collection

The population of this study consists of Malaysian halal food manufacturers. A list of halal food producers was developed from a directory provided by Jabatan Kemajuan Islam, JAKIM (Islamic Development Department of Malaysia). There is a total of 2,623 halal goods producers in Malaysia (Ngah et al., 2017). For this study, purposive random sampling was used. By using purposive random sampling, only management-level personnel involved directly in the halal practice of their organisation were chosen as the respondents for this study.

3.2 Measure and Questionnaire Design

The independent variable was measured using a seven-point Likert scale while the dependent variable was measured using a five-point Likert scale to avoid any problems with common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Table 1 shows all measures of the key constructs used in this study, as adopted from past studies.

Table 1: Reflective construct measure, a result of reliability and convergent validity

Reflective construct source/indicator		**Loading**	**CR**	**AVE**
Relative advantage (Ngah, 2016; Syed, Md., & Mohd, 2011b)				
RA1	Increases my firm's image	0.896	0.968	0.834
RA2	Increases my firm's profit	0.942		
RA3	Increases my firm's competitive advantage	0.929		
RA4	Maintains the purity of my products	0.836		
RA5	Helps to maintain my firm's market	0.954		
RA6	Increases customers satisfaction	0.916		
Ease of Use (Jiunn-Woei, Yen, & Yen-Ting, 2014; Ngah, 2016)				
EOU1	Easy to use	0.881	0.931	0.732
EOU2	Easy to integrate	0.896		
EOU3	Easy to understand	0.904		
EOU4	It does not require my firm's employees to have specific skills	0.869		
EOU5	Developing our own halal logistics system is easy	0.714		
Compatibility (Alam et al., 2011)				
COMP1	Compatible with my firm's existing logistics operation	0.917	0.969	0.863
COMP2	Compatible with my firm's existing logistics infrastructure	0.924		
COMP3	Compatible with my firm's corporate culture	0.939		
COMP4	Compatible with my firm's product manufacturing practices	0.942		
COMP5	Compatible with my firm's customer business practices	0.922		
Maintaining Halal Integrity (Zailani et al., 2015)				
MHI1	Avoids complaints on halal practices	0.931	0.962	0.836
MHI2	Fulfils halal audit requirement	0.868		

Reflective construct source/indicator		Loading	CR	AVE
Relative advantage (Ngah, 2016; Syed, Md., & Mohd, 2011b)				
MHI3	Maintains the value of halal for my firm's product	0.904		
MHI4	Facilitates a corrective action plan related to halal practice	0.922		
MHI5	Maintains the halal requirement in every aspect of the production of goods	0.944		
Notes: CR = composite reliability, AVE = average variance extraction				

Several processes were undertaken to prepare the questionnaire for this study. Firstly, relevant and suitable measurement items were identified from previous related studies and then adapted to suit the objective of this study, as shown in Table 1. Since the questionnaire was derived from English literature, Tan et al. (2017) suggested employing a three-step refinement of the item measurement: (1) Translate from the English language (existing literature) to Malay with the help of a professional Malay translator; (2) Back-translate the Malay translation to English in order to check its validity with the help of another professional English translator; (3) Re-check version (1) with version (2) to identify any inconsistencies.

After issues in wording and language have been resolved, the next step is to determine content validity, as suggested by Hair Jr. et al. (2007) and Lee et al. (2018). The item measurement was reviewed by two academicians with experience and expertise in management studies. In this study, a pre-test was done with the cooperation of 15 management personnel from firms in the halal industry. Along with this pre-test activity, any valuable feedback given by the respondent was used to prepare the final version of the questionnaire.

3.3 Data Collection

This research developed a questionnaire to collect the data for this study. This questionnaire was distributed to the management personnel of halal goods manufacturers during a halal professional training session held from January 2018 to March 2018 conducted by JAKIM and the Halal Industry Development Corporation (HDC). A cover letter was attached with the questionnaire, stating that respondent's answers would be treated as confidential and would only be used for academic purposes. The respondents

consisted of 99 management personnel from halal food manufacturers. The reason for choosing management personnel is that they have full knowledge of halal organisation operations since they are the backbone of the internal halal committee that determines the direction of halal practice in their organisation. The literature also stated that only executive-level personnel and above should be chosen as the respondents for organisational-level studies (Ngah et al., 2015; Othman, Shaarani, & Bahron, 2016; K. W. K. Soon, Lee, & Boursier, 2016; Tan et al., 2017). In total, 130 sets of questionnaires were distributed, but only 115 were returned. After the cleaning up process, only 99 sets of questionnaires could be used for further data analysis. Meanwhile, 16 sets of questionnaires could not be used due to poor data quality.

3.4 Sample Profile

Table 2 presents the respondents' profile according to their position, size of their firm, and operation level. The data shows that 68.6% of the respondents were executives in their firms. Meanwhile, 35.4% of respondents came from big firms with more than 200 employees. Complementary to this, 51.5% of respondents came from good halal manufacturers that sell their products in the domestic and international markets.

Table 2: Respondent Profile

Respondent Profile	**Number of respondents**	**% of the sample**
Position of Respondent		
Owner	1	1.0
CEO	1	1.0
Director	6	6.0
Manager	23	23.2
Executive	68	68.6
Firm Size		
Micro	8	8.1
Small	33	33.3
Medium	23	23.2
Big	35	35.4
Firm Operation Level		
Domestic	32	32.3
International	16	16.2
Both	51	51.5

3.5 Data Analysis

The Structural Equation Model (SEM) tool, Smart PLS software version 3.0, was used to test the hypotheses of this study. Since the purpose of this study is to explore the relationship between two variables, Smart PLS was found suited for the purpose (Sarsted et al., 2011; Hair et al., 2017b; Ringle et al., 2018). Also, PLS-SEM has been proven as more suitable for exploratory research (Hair et al., 2017b; Tan et al., 2017). In comparison, covariance-based SEM (CB-SEM) is more suitable as a means of confirmation or rejection of theories (Hair et al., 2017b). Finally, since the sample of size of this study was 99, it falls under the small rather than big sample. Hair et al. (2017b) claimed that 250 denotes a significant sample size. Therefore, PLS-SEM was used since it is also suitable for a small sample size, such as that used in this study

3.6 Measurement Model

In this study, a measurement model analysis was performed. Hair et al. (2017a) suggested using internal consistency reliability, indicator reliability, and convergent validity to evaluate the reflective measurement model. For this reason, composite reliability was used to evaluate internal consistency reliability (Hair et al., 2013) and to evaluate the validity of the measurement construct in this study (Sarstedt & Ringle, 2009; Wang et al., 2016). Meanwhile, to evaluate convergent validity, indicator reliability and average variance extracted (AVE) were used (Hair et al., 2017a). The value of the outer loading was determined to test the reliability of the indicator (Hair et al., 2013; Ramayah et al., 2018). The value of the outer loading will serve to explain the most consistent indicator to use (Ramayah et al., 2018). Furthermore, AVE was used to evaluate the degree of indicators that reflect a construct. The result of the convergent validity and the discriminant validity of the measurement model is shown in Table 1. According to Hair et al. (2017), if the outer loading is greater than 0.708, and if all AVE is greater than 0.5, the construct meets convergent validity. Meanwhile, Hair et al. (2010) suggested that if all composite reliability is greater than 0.7, the measurement construct can be accepted. The findings of this study showed that the measurement model achieved both reliability and convergent validity. In the meantime, as suggested by Hair et al. (2017a) and Ramayah et al. (2018), the Heterotrait-Monotrait of correlation (HTMT) should be used to evaluate discriminant validity. The results of discriminant validity using the HTMT approach is shown in Table 3:

Table 3: Result of Discriminant Validity using HTMT Value

	COMP	**EOU**	**HLIA**	**RA**
COMP				
EOU	0.807			
MHI	0.416	0.523		
RA	0.580	0.676	0.585	

Table 3 shows that the value of HTMT was below 0.90. According to Hair et al. (2017a), if the HTMT value is less than 0.90, there is no problem of discriminant validity. As a whole, the measurement model demonstrated adequate convergent validity and discriminant validity.

3.7 Structural Model Test

The structural model test involved hypothesis testing by implementing the bootstrapping procedure, as suggested by Hair et al. (2017a) and Ramayah et al. (2018), with 99 samples, 5000 subsamples and no sign change, to determine the significance level of the path coefficients. The significance level was set to 0.05. The R2 for the main model was 0.35; indicating that 35% of the variance in maintaining halal integrity intention was explained by all three constructs—relative advantage, ease of use, and compatibility. The result on f2 of relative advantage (0.161), ease of use (0.029), and compatibility (0.000) explained that relative advantage had a medium effect R2 correlation with halal logistics adoption intention. Meanwhile, the value of f2 for ease of use and compatibility indicated that there was no effect in its R2 correlation with halal logistics adoption intention (Hair et al., 2017b). The result of the structural model is shown in Table 5.

Table 5: Path Coefficient and Hypothesis Testing

	Path Coefficient	***t* Values**	***p* Values**	**Significance (p<0.05)**	**Hypothesis Result**
RA -> MHI	0.425	3.291	0.001	Yes	Accepted
EOU -> MHI	0.228	1.414	0.079	No	Rejected
COMP -> MHI	-0.007	0.048	0.481	No	Rejected

The results indicate that only H1 is supported and is significant at $p < 0.05$, with a t value > 1.645 (one-tailed) (Hair et al., 2017b) where H1 was 3.291, H2 was 1.414, and H3 was 0.048. Meanwhile, H2 and H3 are not supported.

4. Findings and Discussion

Surprisingly, of all the characteristics based on the TAM and DOI theories, only relative advantage was found to relate to the intention to maintain halal integrity positively. Meanwhile, the other two—ease of use and compatibility—had an insignificant effect on the intention to maintain halal integrity, and therefore require further explanation.

The significance of relative advantage and not compatibility or ease of use shows that halal food producers benefitted as one of the major drivers for safeguarding halal integrity. This can be argued in two ways. First, relative advantage is evidenced for food manufacturers when they use halal logistics. This result conforms to the literature, which suggested that the adoption of halal logistics might increase a firm's corporate image or would help it extend it share in the market (Ali et al. 2017). Second, the benefits to the firms and the intention to maintain halal integrity overlap. Parallel impacts can be expected from maintaining halal integrity and the perceived benefits of the action. In comparison to other findings, relative advantage plays the most significant role despite the difficulties and non-compatibility of halal logistics with the firms. Therefore, this research argues that maintaining halal integrity is strongly associated with relative advantages, where food manufacturers should see maintaining halal integrity as their uppermost objective in the supply chain. This finding agrees with previous literature that highlighted the equal importance of maintaining halal integrity to that of the effort to maintain the status of halal and the trust of consumers (Tan et al. 2017).

The result of this study shows that ease of use and compatibility were not significantly related to the intention to maintain halal integrity. Government support in establishing halal logistics should result in the easy adoption of halal logistics for food manufacturers. It is perplexing, however, that the findings show that the effort to maintain halal integrity via halal logistic implementations is not easy. This study argued keeping halal status-quo is not easy in the complex supply chain. Similarly, Ngah et al. (2015) mentioned that the characteristics of halal logistics service are multifaceted and difficult for food manufacturers' perspective. The complexity of maintaining halal integrity hinders the manufacturers' effort to maintain beyond its factory wall. Additionally, ease of use also relates to the difficulty to implement or obtain halal logistics. As mentioned by Ngah et al. (2015), the availability of halal logistics is low and, in turn, becomes a barrier to halal logistics adoption.

For the relationship between compatibility and intention to maintain halal integrity, the direction of the relationship shows that halal logistics fits with the halal food manufacturers' operations and supply chain but gives a

negative effect. The result shows that there is no significant gap or difference in the design of the systems, the practice, or the philosophy between the desired halal logistics service and the existing logistics practice. There is a need, therefore, to highlight that, as long as existing logistics practice used by halal goods manufacturers fulfil sharia requirements, then, compatibility will not be a significant issue. The difference between halal logistics and existing logistics practices is that the latter is sharia-compliant while the former has the relevant training and certification provided by Jabatan Kemajuan Islam (JAKIM).

In contrast, existing logistics practices are not certified by JAKIM but are self-declared as sharia-compliant. In other words, halal goods manufacturers perceive halal practice and existing logistics practice to be similar, so there is no reason to change it. This argument explains the reason for the findings on compatibility, which has a negative but significant relationship with intention to maintain halal integrity. Furthermore, the requirements to adopt halal logistics remain voluntary. Without a better understanding of the differences between halal logistics and existing logistics practices, any effort to maintain the value of halal products along the supply chain via halal logistics adoption will face a formidable barrier. Therefore, all stakeholders in the halal food industry should sit together and align their goals to solve issues of compatibility.

5. Conclusion, Implications, and Limitations

The advantages gained from the efforts to maintain halal integrity have become an important issue among halal food producers. The results of this study provide empirical data suggesting that halal logistics practice is not easy to use and is also not compatible with existing conventional logistics practice. This study concludes that the probability of business organisations applying ethical business practice, such as maintaining halal integrity is dependent on how this ethical business practice could provide an advantage to the business organisation.

Therefore, this study contributes to the body of knowledge of business ethics practice. It is clear that maintaining halal integrity is only driven by the motivation of the relative advantage it will afford to the organisation. However, the same does not hold true for ease of use and compatibility. It is hoped that the advantages of halal logistics service implementation, even if still at the embryonic stage, will become a major driver for food manufacturers to maintain halal integrity. It is hoped that this issue will have a snowball effect in maintaining halal integrity from the context of halal logistics adoption, similar to the sand cone model introduced by Ferdows (1990) in Walczak (2014) that highlighted quality as the prerequisite along with other manufacturing strategies. Practically, halal manufacturers do not

perceive halal logistics as easily adoptable or compatible. The results of the study show that halal food manufacturers are still keen to use other types of logistics providers. Unless the regulations make it compulsory for firms to adopt halal logistics, the halal logistics provider will continue to be at a disadvantage. Thus, it is important now for the government and the industry to position halal logistics more aggressively as one of the important features of the halal supply chain.

This research is not free from limitations. Further research should take into consideration the following insights into their research. First, the DOI and TAM used in this research could be enhanced by integrating the TOE perspective, which may provide a better explanation of the adoption of halal logistics. Second, this research only focused on halal food manufacturers, making the study incomplete and not representative of other segments of the halal industry, such as cosmetics and healthcare. Third, both sides of the supply chain should be investigated, that is, the halal logistics provider and adopters, to find similarity and cohesiveness in the findings. Fourth, even though the findings of this research are sufficient for generalising the phenomenon, future research may engage with a qualitative method that enables an in-depth explanation of maintaining halal integrity through logistic adoption.

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