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# Inbound Halal Logistics Practices: A Case of Local Mosques

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**Abstract:** The involvement of multiple supply chain players across the mosque food supply chain has led to halal problems, particularly cross-contamination between halal and haram of raw materials during inbound logistics. The objective of this study is to determine factors that influence inbound halal logistics practices among local mosques. Stratified random sampling was used to select the target local mosques in Peninsular Malaysia. Responses from several mosques' management committees were obtained through self-administrated questionnaires. Descriptive, mean score, factor and logistic regression analyses were performed to analyse the data and to determine the factors that influence inbound halal logistics practices among local mosques. The findings showed that knowledge, dedicated facilities, religious responsibility, management support, financial resources, course and training, and trust were the factors that influenced inbound halal logistics practices among local mosques. This study recommends continuous courses and training on halal logistics should be held by the local mosques and specific guidelines on halal logistics should be made available to ensure inbound halal logistics practices could be performed well by the local mosques.

**Keywords:** food supply chain, halal food, inbound halal logistics, mosques

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## 1. INTRODUCTION

Food safety has become a critical issue in providing safe, clean, and quality food for consumers. Food safety scandals are commonly linked to issues such as food adulteration, substitution, and ingredients fraud, usually to increase manufacturers' profits (Ali *et al*., 2016; Grimm *et al*., 2014). The involvement of entire players in the food supply chain is important in providing safe, clean, quality as well as halal food products for consumers. The movement of halal food products along the supply chain requires an in-depth understanding of logistics, utilization of

dedicated facilities, and trust between supply chain partnerships (Abd Kadir *et al*., 2016). In the Islamic religion, clean, safe, wholesome, and halal food is compulsory for Muslims. The word halal refers to 'permissible' or 'lawful' (Azam, 2016), which is the major concern of Islamic dietary law and obligation for all Muslims (Rezai *et al.,* 2012). All food is halal except a few mentioned in the al-Quran such as pork, blood, carrion, and those animals slaughtered without the name of Allah SWT (Abd. Latif, 2011). According to Demirci *et al.* (2016), halal is referred to as food that is free from swine's flesh, blood, carrion, animals not slaughtered according to Islamic laws and alcoholic drinks. While Lau *et al*. (2016) described that halal (lawful) foods are free from any components that Muslims are prohibited from consuming as mentioned in the Islamic holy book, al-Quran, Hadith and other sources of Islamic law. Halal food must be free from all parts of swine and its derivative as mentioned in the Islamic law and regulations.

Halal food is mentioned specifically by the al-Quran and the Sunnah (Hussaini, 1993; Muhammad Nafik & Ratuasari, 2012). The halal food concept is not only confined to the ingredients in food products, but also includes that anything related to halal food and non-food products must comply with the Islamic rules. This includes the production and distribution processes along the food supply chain activities before the halal products reach consumers for their consumption. According to Ahmad Tarmizi *et al.* (2013), regardless of halal food or non-food products, logistics activities must fulfil the best halal practices as logistics is one of the important parts of the halal supply chain. Considering the importance of halal logistics activities in the local and international markets, Malaysia has established the Malaysia *Halalan Toyibban* Assurance Pipelines (MS2400:2010) as the guidelines for industry players in the logistics sector. The Malaysia *Halalan Toyibban* Assurance Pipelines (MS2400:2010) comprises of MS2400-1:2010 (Part 1) - Halal transportation, MS2400-2:2010 (Part 2) - Halal warehousing, and MS2400-3:2010 (Part 3) - Halal retailing (Department of Standards Malaysia, 2010).

The development of the halal food industry does not involve the point of resources and raw ingredients only, but also including the handling activities. In particular, the Malaysian halal standard guideline for halal food preparation (MS1500:2004) provides comprehensive guidelines covering the sources of halal food and drinks, slaughtering, product processing, handling and distribution, product storage, display and serving, hygiene, sanitation and food safety, as well as, packaging and labelling (HDC, 2012). Not only the guideline provides a reference to serving halal, clean, safe, and wholesome food to consumers, but it also prescribes the packaging, storage, and transportation that should be physically separated from any other non-halal food or any things that are decreed najs (animal or things that are not permissible such as pigs and its derivatives, blood and carrions (Halal Research Council, 2020) by Shariah law to reduce cross-contamination risk with non-halal things (Tieman & Ghazali, 2014). Hence, *halalan toyyiban* processes are indeed necessary along the food supply chain.

As part of the supply chain players, mosques have a huge responsibility to serving food that is safe, clean, quality as well as halal to the community. Mosque in many definitions given is known as a place for Muslims worship (MuslimSpeak, 2009). In modern terminology, a mosque is not only a place for prayers, but also known as community centres. It also could be a place for celebration, *da'wah*, meetings, deliberations, medical care well as a place for education (Newsroom, 2015). Mohamed *et al*. (2014) also described that mosque is not only a place of worship, but also a place to gain knowledge, communal gathering for the Islamic community, holding various religious ceremonies and rituals, and a place where religious studies take place. In the Islamic religion, mosques are viewed as political, economic, and social institutions (Collins, 2011). In Malaysia, mosques are mainly used as facilities for social events such as receptions, talks and religious events. Since many activities are held in the local mosques, there is provision for food during certain events, thus, *halalan toyibban* food will be one of the biggest concerns. Halal problems arise during preparation, handling, processing, or transportation of foods and beverages for events by the mosque management committees and other supply chain players like food suppliers and logistics service providers. This is because some food suppliers and logistics service providers are still lacking in knowledge and understanding of handling logistics activities according to halal logistics standards (Ahmad Tarmizi *et al*., 2013). It is even more worrisome if the mosque management committees who are responsible for selecting the food suppliers are also lacking in knowledge of halal logistics requirements.

Notably, there is a small number of local mosques that have their catering services, but most of local mosques in Malaysia do not prepare foods and beverages during events or ceremonies at the mosque; rather the mosque will outsource such activities to other food suppliers such as caterers and restaurants. Regularly, the local mosques will choose the food suppliers and logistics service providers to supply and deliver foods and beverages to the mosque during the event or ceremony. The food suppliers then buy the raw materials and prepare the food at their premises and have it delivered to the mosque either by logistics service providers or themselves. As this is the case, the local mosques cannot attest whether the suppliers adhere to the *halalan toyyiban* standards for inbound logistics activities such as receiving, storing, and transportation of the raw materials being used.

Generally, some raw materials are mostly imported from foreign countries, the ability to trace the origins of raw materials is limited (Ali & Suleiman, 2017), thus creating some difficulties for the local mosques to guarantee the raw materials are *Halalan toyyiban*. The involvement of multiple supply chain players across the food supply chain will lead to various halal problems. It also led to the high possibility that cross-contamination between halal and haram of raw materials, food ingredients, and processed products occurred (Ruslan *et al*., 2018). Hence, the halal status of raw materials' compliance to the halal standards during inbound halal logistics will be

questionable. Despite the raw materials, mosque management should ensure devices, utensils, and processing aids used in the processing and preparing halal food are easy to clean, complying with inbound halal logistics practices (DSM, 2010). In light of the above discussions, this study aims to determine factors that influence inbound halal logistics practices among local mosques.

## 2. Literature Review

According to Fahimnia and Molaei (2011), logistics are described as a network of organizations, people, activities, information, and resources involved in the physical flow of products from suppliers to customers. Logistics activities are also dealing with getting the right quantity and quality of materials (or services) to the right place at the right time, for the right client, and at the right price (Sadjady, 2011). Further, Jeschonowski *et al*. (2009) described logistics as a part of supply chain management that plans and implements related information between the point of origin and the point of consumption to meet customers' requirements. Since logistics is at the heartbeat of the supply chain, upgrading conventional logistics operations to halal logistics operations will be a huge advantage among logistics practitioners. Logistics activities can be divided into two flows known as inbound and outbound. According to Ingram (2018), inbound logistics is referred to as logistics activities such as transport, storage, and delivery of goods that come into a business, while outbound logistics is referred to as logistics activities that going out from a business.

Halal logistics is a new approach to avoid contamination of perishables, raw materials, and food products during distribution activities (Ahmad Tarmizi *et al.*, 2014). This new logistics innovation involved three main types of activities, namely transportation, warehousing, and retailing as classified according to the Malaysia *Halalan Toyibban* Assurance Pipelines - MS2400:2010 (DSM, 2010). Halal logistics includes the physical activities which provide a set of data for communication and management between continuous links along the food supply chain as aligned with the Shariah concept and from the aspects of policymakers, service providers, and the implication of halal logistics practices (Kamarudin *et al.*, 2012; Tieman, 2011).

According to Halal Industry Development Corporation (HDC) (2012), an institution under the Ministry of International Trade and Industry Malaysia (MITI), halal logistics is referred to as a basic principle of halal in logistics to ensure segregation of halal cargo from non-halal cargo, to avoid cross-contamination and to ensure that the halal logistics system is aligned to the expectation of Muslim consumers. Halal logistics is regarded as a new application of Shariah law to logistics activities in a way that will eventually protect halal integrity along the whole supply chain and follow requirements as stated by the Shariah law (Ahmad Tarmizi *et al.*, 2014; Jaafar *et al.*, 2011; Tieman, 2010).

Malaysia's halal authorized bodies such as the Department of Standards Malaysia (DSM) and the Department of Islamic Development Malaysia (JAKIM) have established guidelines for halal logistics to provide practical guidance for food industry practitioners and food logistics service providers. It is also to serve as a basic requirement for halal food products and food trade or business in Malaysia. *Halalan toyibban* pipeline assurance system had highlighted necessary halal links between producers of products and cargo with consumers to ensure products or cargo are delivered from one custodian to another as per halal requirements. Besides, the importance of halal guidelines is to preserve the halal integrity of the products, goods, and cargo (Abd Latif, 2011). Halal guidelines also could help industry practitioners and other stakeholders reducing the halal risks along the food industry supply chain.

Knowledge is described as a feeling or expression known by a person or a group of peoples (Che Amar *et al*., 2011). Knowledge is also referred to as expertise and skills gained by a person or a group of people through a theoretical or practical understanding of a subject and it influences intention through attitude (Abd Rahman *et al.*, 2015). Many studies revealed that knowledge has a positive influence on attitudes, but only a few have investigated the effect of knowledge on attitudes towards halal food (Aziz & Chok, 2013). Niu (2010) suggested that knowledge is the key to sustaining competitiveness in the market. In implementing proper halal logistics, industry practitioners need to understand halal logistics objectives, requirements, rules, and regulations (Tieman, 2009). Thus, knowledge of halal logistics concept is important for effective inbound halal logistics.

According to Tieman *et al*. (2012), halal logistics vulnerability can be avoided in the supply chain by having dedicated infrastructure, such as dedicated halal warehouse, and dedicated halal cold storage and transport. As one of the halal logistics objectives is to avoid cross-contamination thus, the mixing of halal and non-halal products in the same cold room is not allowed. The Department of Standards Malaysia (2005) described that dedicated equipment and facilities that are used for non-halal products cannot be used for halal products to uphold halal supply chain integrity.

Previous studies highlighted the possibility of cross-contamination with non-halal products during transportation activities due to some reasons i.e. high cost of logistics operations, different halal certification bodies, and inadequate information and halal logistics experts (Ahmad Tarmizi *et al.*, 2013; Zailani *et al.*, 2015). This can be reduced to a minimum level, if halal food producers have their own transportation and make their delivery to the end consumers (Ab Talib *et al.*, 2015; Ahmad Tarmizi *et al*., 2013). Besides, the existing dedicated management support to handle the halal food products will reduce the risk of cross-contamination, avoid any human mistake and help to protect the integrity of halal food supply chain (Jaafar *et al.*, 2011).

In the Islamic religion, there are two types of foundation concepts that should be mastered by all Muslims namely *Fardhu Ain* and *Fardhu Kifayah*. *Fardhu Kifayah* explains the maslahah of the religion and worldly matters, which are commandments in *syarak* and it has to be performed by a group of *mukallaf* (an accountable person). This is enough to fulfil the commandment of maqasid by *syarak* and enough to free others from the sin, if it is not performed. While *Fardhu Ain* is specifically for every individual, however, the commandment and obligation are for all *mukallaf* generally (Tarmizi, 2020). Thus, there is a strong interrelated of religious responsibility of halal food supply chain players to perform accountable halal practices (*Fardhu Kifayah*) as Muslim consumers are responsible to follow Islamic dietary (*Fardhu Ain*).

Bonne and Verbeke (2006) described that Muslims must follow a set of dietary laws intended to advance their well-being. As the halal industrial players or responsible parties that provide and serve halal food products to the Muslim community, ensuring all resources of raw materials and inbound activities to follow Islamic rules as one of Fardhu Ain or also can be described as main religious responsibility. Based on Adi and Adawiyah (2018), religiosity is one of the relevant values in the business ecosystem. It helps to encourage confidence in the safety of products and promotes both confidences in the halal industry and stability of the halal business. Increasing attention to the importance of religiosity in business and world economic development helps the development of the halal ecosystem. Religion responsibilities appear as a relevant reason to uphold halal logistics and strengthen the entire halal food supply chain.

Good management is to ensure employees received enough support to practice halal in their day-to-day activities. Ahmad Tarmizi *et al*. (2014) explained the management plays a role in accommodating the implementation of halal logistics process through the provision of financial, materials, human resources and shaping the organizational context to make the organization more adaptive to the new halal logistics system. Tan *et al.* (2012) suggested that management roles are important to ensure halal integrity among local halal industry players. Besides the industry players, the management should pay intention to social responsibility and support Islamic institutions such as mosques in upholding and fulfilling halal practice preparation, apart from religious responsibility.

However, according to Stirpe *et al.* (2015), the implementation of new practices will be effective, if they are well accepted by the management. Both management and employees are required to support each other to achieve the objectives of inbound halal logistics (Ahmad Tarmizi *et al.*, 2014). An acceptance is positively associated with intention and behaviour responses (Dix *et al.*, 2016). Hence, full acceptance of new practices among supply chain players towards inbound halal logistics will ensure proper halal practices.

Financial resources make up most of the production factors from a business perspective (Siano *et al.*, 2010). Hence, financial resources are a critical factor in providing enough requirements for dedicated facilities for inbound halal logistics. However, as revealed by Ahmad Tarmizi *et al.* (2014) that financial resources are one barrier to implement proper halal logistics. Zailani *et al.* (2017) further described that lack of financial resources may lead to many halal food SMEs unable to perform total halal logistics activities.

However, mosques as a non-profit organization depend on the external environment for generating financial resources to operate (Mohamed *et al.*, 2014). With a restricted budget and lack of financial resources, local mosque management also might face the same challenges of implementing total inbound halal logistics. Thus, a good financial resource in providing dedicated equipment and facilities is important in ensuring proper inbound halal logistics practices.

Based on the halal standard for halal food handling (MS1500:2009), there is need for training people who are involved in halal food preparation. Besides halal food providers, there is also other knowledge that could be gained through courses and training for a better understanding of halal food handling. Training on halal management will ensure that the levels of knowledge and skill meet the halal and human capital standards among the halal industry players (Hashim & Shariff, 2016). Attending enough halal training is vital in ensuring an adequate supply of competent personnel to meet the long-term requirement of the industry (Pahim *et al.*, 2012).

Blalock (2019) suggested relevant course and training are important to gain knowledge and it should be handled by established and qualified instructors. The course and training will improve the trainee's ability to handle the real situation (Bauerle *et al.*, 2016) and improve the quality of the organizations' operational practices (Bächmann *et al.*, 2019). According to Ahmad Tarmizi *et al.* (2014), upper-level management needs to provide comprehensive training to other levels of management to comprehend the risks and understand their roles in performing halal logistics.

Trust is very important in supply chain information (Ellram *et al.*, 1999). A good relationship between supplier and buyer is important in supporting supply chain activities and thus, creating trust (Duffy & Fearne, 2009; Tieman & Ghazali, 2013). Based on Niu *et al.* (2012), trust is an important factor in an industry supply chain. Trust can be a valuable capital to improve cooperation and coordination of economic interaction, enhance organization competitive advantages, and help individuals cope with environmental challenges. Kadir *et al.* (2016) described that trust is a willingness to rely on a trading partner who has a confidence, which can reduce the cost of a transaction, reduce the extensive need for a formal contract, and facilitate an organization's supply chain plan. Despite halal certification and trusted halal logo, trust between

buyer and supplier is needed to ensure halal raw materials are supplied, accordingly (Ali *et al.*, 2017).

## 3. Methodology

This study attempted to determine factors that influence inbound halal logistics practices among local mosques. Hence, as depicted in Figure 1, the conceptual framework of inbound halal logistics practices among local mosques and factors that influence their practices was established to answer the stated research objective. Seven independent variables (factors) were adapted from previous studies (Abd. Rahman *et al.*, 2015; Ab Talib *et al.*, 2015; Kadir *et al.*, 2016; Pahim *et al.*, 2012;) namely; knowledge, dedicated facilities, religious responsibility, management support, financial resources, course and training, and trust. Meanwhile, the dependent variable for this study was the inbound halal logistics practices.

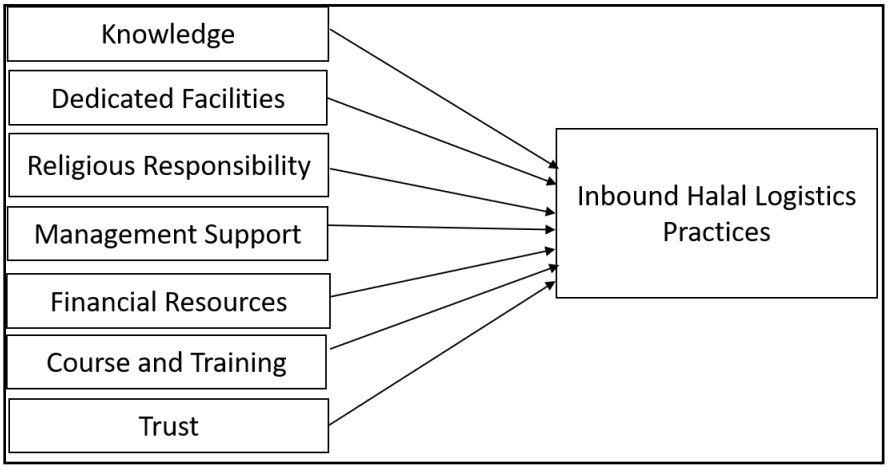


**Figure 1.** Conceptual framework of factors influencing local mosques inbound halal logistics practices. Source: Abd Rahman *et al.* (2015), Ab Talib *et al.* (2015), Pahim *et al.* (2012), and Kadir *et al.* (2016)

This study used a quantitative approach with a total sample of 466 mosques. Stratified random sampling was used to select the local mosques in Peninsular Malaysia, which were represented by the mosque management committees. Data and responses from the mosque management committees were obtained through self-administrated questionnaires using a structured questionnaire. The structured questionnaire consisted of relevant questions mainly questions on inbound halal logistics knowledge as well as questions on factors that influence halal logistics practices among local mosques. Most of the statements to determine respondents' perceptions on halal logistics were established based on 5-point Likert scales: 1-strongly disagree; 2-disagree; 3-neither agree nor disagree; 4-agree; 5-strongly agree. These statements were mainly used in factor analysis, aiming at extracting factors that influence inbound halal logistics practices

among local mosques. Data collected were analysed using several statistical analyses such as descriptive , mean score, factors, and logistic regression analyses. Descriptive analysis was used to analyse local mosque profiles, while mean score analysis was used to measure the inbound halal Halal logistics knowledge based on scoring table adapted from Appiah *et al.* (2011) and Vaiappuri *et al.* (2012). Twelve (12) statements related to the inbound halal logistics knowledge were established with two choices of answer namely; 1-No and 2-Yes. For each correct answer, a score of one (1) was given, while an incorrect answer was given a zero (0) score. Based on the score (Table 1), a cumulative score between 7 to 12 indicates a high knowledge level, while a cumulative score between 0 to 6 indicates a low knowledge level of respondents.

**Table 1.** Knowledge level score.

| **Knowledge level** | **Score** |
|---|---|
| High | 7–12 |
| Low | 0–6 |

Source: Adapted from Appiah *et al.* (2011) and Vaiapurri *et al.* (2012)

Based on studies of Hassan *et al.* (2015), Lammertyn *et al.* (2000) and Vaiappuri *et al.* (2012), relevant analyses were used to further analyse the data. Factors analysis was carried out to determine a group of factors towards practicing inbound halal logistics by local mosques. Meanwhile, logistic regression analysis was employed to determine the most influential factors of inbound halal logistics practices among local mosques. Table 2 shows the coding system used for dependent and independent variables in logistic regression analysis.

**Table 2.** Coding **s**ystem for **i**nbound halal logistics.

| **Variables** | **Coding** |
|---|---|
| Knowledge level | 0 = Low knowledge<br>1 = High knowledge |
| Dedicated facilities | Dichotomous (Factor Score) |
| Religious responsibility | Dichotomous (Factor Score) |
| Management support | Dichotomous (Factor Score) |
| Financial resources | Dichotomous (Factor Score) |
| Course and training | Dichotomous (Factor Score) |
| Trust | Dichotomous (Factor Score) |

Note: DV= Inbound halal logistics practices

Equation (1) was established for logistic regression analysis as follows:

$$Y=\beta 1\ X1 + \beta 2\ X2 + \beta 3\ X3 + \beta 4\ X4 + \beta 5\ X5 + \beta 6\ X6 + \beta 7\ X7 + \varepsilon \quad (1)$$

Where;

Y = Inbound halal logistics practices
β1…. β7 = regression coefficient
X1 = Level of knowledge
X2 = Dedicated facilities
X3 = Religious responsibility
X4 = Management support
X5 = Financial resources
X6 = Course and training
X7 = Trust
ε = Error

## 4. Results and Discussions

### *Mosques Profiles*

A summary of mosques profiles is listed in Table 3. A total of 466 mosques located in Peninsular Malaysia participated in this study with a majority of them was categorized as Masjid Jamek (35.1%, 164). The other mosques types were categorized as Masjid Kampung (34.5%, 161), Masjid Daerah (15.7%, 73), Masjid Negeri (7.3%, 34), Masjid Institut (4.3%, 20), while the remaining were small mosques (3%, 14). The number of qariah is referred to as the Muslim community who actively involved in mosque activities and living nearby mosque areas. The results showed that 50% (233) of local mosques have between 400 to 1,000 qariah, while 44.8% (209) of local mosques have less than 400 qariah. The remaining 5.2% (24) of local mosques have more than 1,000 qariah. The majority 54.7% (255) of local mosques revealed that about 6-10 events were held in a year, while 198 (42.5%) and 13 (2.8%) local mosques had more than 10 and less than 5 events in a year, respectively. The majority of the local mosques (65.6%, 306) took the responsibility to prepare the meal on their own, while only 160 (34.3%) of the local mosques outsourced it to catering services.

**Table 3.** Mosques Profiles.

| Profile | Frequency (n) | Percentage (%) |
|---|---|---|
| **Type of mosque** | | |
| Masjid Negeri | 34 | 7.3 |
| Masjid Institut | 20 | 4.3 |
| Masjid Daerah | 73 | 15.7 |
| Masjid Jamek | 161 | 34.5 |
| Masjid Kampung | 164 | 25.2 |
| Others (small mosques) | 14 | 3.0 |
| **Number of *qariah*** | | |
| ≤ 400 | 209 | 44.8 |
| 401–1,000 | 233 | 50.0 |

| | | |
|---|---|---|
| >1,000 | 24 | 5.2 |
| **Number of events per year** | | |
| ≤5 | 13 | 2.8 |
| 6–10 | 255 | 54.7 |
| >10 | 198 | 42.5 |
| **Food preparation for events** | | |
| Outsource (catering services) | 160 | 34.3 |
| Prepared by the mosques | 306 | 65.6 |
| **Total** | **466** | **100** |

### *Knowledge Level on Inbound Halal Logistics Practices*

A total of 12 statements were established concerning knowledge on inbound halal logistics practices among local mosques. Table 4 shows the responses of the respondents on each statement based on 'Yes' or 'No' answers. Most of the statements were adapted from studies of Tieman (2009) and Abd. Latif (2011).

**Table 4.** Statements of knowledge on inbound halal logistics practices.

| No | Statement | Yes | | No | |
|---|---|---|---|---|---|
| | | % | *n* | % | *n* |
| 1 | Knowledge of halal logistics is important in creating halal compliance. | 94.4 | 440 | 5.6 | 26 |
| 2 | MS-2400-1:2010 is the Malaysia Standard for halal logistics. | 1.7 | 8 | 98.3 | 458 |
| 3 | Inbound logistics are important to ensure the food product is guaranteed halal. | 86.5 | 403 | 13.5 | 63 |
| 4 | Halal integrity must be preserved during logistics activities along the food supply chain. | 80.9 | 377 | 19.1 | 89 |
| 5 | Inbound halal logistics is a process of procurement, movement, storage, and handling the raw materials, product ingredients, and finished products. | 76.6 | 357 | 23.4 | 109 |
| 6 | The objective of halal logistics is to ensure halal integrity along the food supply chain. | 74.7 | 348 | 25.3 | 118 |
| 7 | Dedicated workers are required during handling inbound halal logistics. | 59.2 | 275 | 40.8 | 191 |
| 8 | Halal logistics is to ensure that no cross-contamination during transporting halal foods or products. | 93.1 | 433 | 6.9 | 33 |
| 9 | Halal logistics involves activities such as transportation, warehousing, and retailing. | 13.5 | 63 | 85 | 403 |
| 10 | Segregation of halal and non-halal items is required for inbound halal logistics. | 85.8 | 400 | 14.2 | 66 |
| 11 | Containers that are used for inbound logistics of non-halal products need to have ritual cleansing before it is used for halal products. | 97.9 | 456 | 2.1 | 10 |
| 12 | Halal logistics is to avoid any cross-contamination in food handling during logistics activities to ensure the food is safe to eat. | 91.8 | 427 | 8.2 | 39 |

Note: $n = 466$

Two scores were assigned to the respondents based on if they choose 'No' and 'Yes'. For each correct answer, a score of one (1) was given, while an incorrect answer was given a zero (0) score. Mean score analysis was used to measure knowledge level with two scales of indicator

namely; high level (7-12) and low level (0-6) adapted from Appiah *et al.* (2011) and Vaiapurri *et al.* (2012) (Refer to Table 1). The respondents who scored between 7-12 were considered to have high knowledge in inbound halal logistics practices, while the respondents who scored between 0-6 showed low knowledge in inbound halal logistics practices.

Based on Table 5, the results revealed that 81.9% (382) of local mosques have high knowledge of inbound halal logistics practices, while the remaining 18.1% (84) local mosques have low knowledge of inbound halal logistics practices. Hashim and Shariff (2016) described that adequate knowledge of halal related matters would provide a clear understanding to perform halal practices. Ahmad Tarmizi *et al.* (2020) further indicated that knowledge is crucial when adopting or implementing halal logistics as new practices in an organization.

**Table 5.** Knowledge level on inbound halal logistics practices.

| Level (score) | Frequency (n) | Percentage (%) |
|---|---|---|
| High (7-12) | 382 | 81.9 |
| Low (0-6) | 84 | 18.1 |
| **Total** | **466** | **100** |

### *Factors that Influence Inbound Halal Logistics Practices*

Factor analysis was conducted to extract factors from inbound halal logistics practices among local mosques. The result of Kieser-Meyer-Olkin (KMO) in Table 6 showed 0.782 which was above 0.6 and based on Kaiser (1974), this shows that the variances among the variables are estimable. The Bartlett's test of sphericity showed significant at 1% level of significance, showing that the factor analysis with variables was appropriate (Raykov & Marcoulides, 2012).

**Table 6.** KMO and Bartlett's Test.

| | |
|---|---|
| Keiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) | 0.782 |
| Bartlett's Test of Sphericity | |
| Approx. Chi-Square | 8.974E3 |
| df | 465 |
| Sig | 0.000 |

Cronbach's alpha for the reliability test showed $\alpha = 0.822$, indicating all the 25 statements are valid and reliable. The results in Table 7 showed that the cumulative percentage of variance for the six (6) factors was 52.550%. The six (6) factors extracted were labelled as 'dedicated facilities', 'religious responsibility', 'management support', 'financial resources', 'course and training', and 'trust'. The first factor that influenced the local mosques towards inbound Halal logistics practices was labelled as 'dedicated facilities' with an eigenvalue of 5.476 and Cronbach's $\alpha$ of 0.891. This factor comprised of five sub-variables, which explained a total variance of 18.254%. The second factor was labelled as 'religious responsibility' with an

eigenvalue of 2.463 and Cronbach's $\alpha$ of 0.696. This factor comprised five sub-variables, which explained a total variance of 8.809%. The third factor comprised of four sub-variables was labelled as 'management support' with an eigenvalue of 2.205 and Cronbach's $\alpha$ of 0.721, which explained a total variance of 7.349%. The fourth and fifth factor was labelled as 'financial resources' and 'course and training', comprised of four sub-variables, respectively. The fourth factor explained a total variance of 6.850% with an eigenvalue of 2.055 and Cronbach's $\alpha$ of 0.722, while the fifth factor explained a total variance of 6.168% with an eigenvalue of 1.850 and Cronbach's $\alpha$ of 0.717. The last factor was labelled as 'trust', comprised three sub-variables with an eigenvalue of 1.536 and Cronbach's $\alpha$ of 0.716, and explained a total variance of 5.119%.

Logistic regression analysis was used to determine the factors that influence inbound halal logistics practices among local mosques. Table 8 summarizes seven variables tested using logistic regression analysis. All variables were significant at 1% and 5% levels of significance, respectively. The -2 Log-Likelihood produced a value of 368.603 for the final model iteration and is considered desirable. The value of Cox and Snell *R* square was 0.386, whereas the value of the Nagelkerke *R* square value was 0.527. The Wald values of logistic regression analysis showed how important each of the significant factors affects the inbound halal logistics practices among the local mosques. The bigger the Wald value, the higher the effect of that variable in determining inbound halal logistics practices among the local mosques. The direction of the relationship for factors that increase and decrease the likelihood of the answer 'Yes' could be interpreted from the positive sign of values and estimated coefficient values. The exponential (B) values were used in the equation to calculate the probability of a case falling into a specific category (Pallant, 2005). Based on the results, knowledge level was the variable that showed the most effect with a Wald value of 10.270, while trust appeared as the variable that showed the least effect with a Wald value of 4.587.

All significant variables had estimated coefficient values that showed the existence of a positive relationship. The results revealed the estimated coefficient for the knowledge level showed a positive relationship. This indicated that the mosque management committees, who have high knowledge of inbound halal logistics were 2.643 times likely to practice proper inbound halal logistics as compared to the mosque management committees with low knowledge of inbound halal logistics. As addressed by Abd Rahman *et al.* (2015) that knowledge influences the skills and intention attitude of a person, hence high knowledge of inbound halal logistics among the mosque management committees leads to proper inbound halal logistics practices.

**Table 7.** Factors extracted from local mosques inbound halal logistics practices.

| Statement | Factor loading | Eigenvalue | % of variance | Cumulative % of variance | Cronbach's alpha |
|---|---|---|---|---|---|
| **Factor 1: Dedicated Facilities** | | | | | |
| 1. Proper equipment for handling, storage, and transportation of halal products can prevent the occurrence of cross-contamination. | 0.921 | 5.476 | 18.254 | 18.254 | 0.891 |
| 2. The mosque needs to have adequate equipment to enhance inbound halal logistics. | 0.883 | | | | |
| 3. Transportation is an important asset that can minimize the contamination of food. | 0.794 | | | | |
| 4. The importance of ritual cleansing is to ensure all equipment is kept clean and dedicated. | 0.764 | | | | |
| 5. Containers use in preparing food at the mosque must undergo a proper ritual cleansing. | 0.725 | | | | |
| **Factor 2: Religious Responsibility** | | | | | |
| 1. The mosque always chooses suppliers who adhere to halal standards. | 0.784 | 2.463 | 8.809 | 27.064 | 0.696 |
| 2. The mosque should be provided with procedures as guidelines for selecting halal suppliers. | 0.744 | | | | |
| 3. The mosque is responsible for ensuring that the raw materials delivered are halal. | 0.713 | | | | |
| 4. It is the responsibility of the mosque to serve food that *halalan toyyiban* to the mosque congregation. | 0.676 | | | | |
| 5. Food products supplied by the Muslims are guaranteed halal. | 0.614 | | | | |
| **Factor 3: Management Support** | | | | | |
| 1. The mosque management committees should give full support to the established procedure of selecting halal products. | 0.852 | 2.205 | 7.349 | 34.412 | 0.721 |
| 2. Collectively support of the mosque management committees will encourage proper practices of inbound halal logistics. | 0.827 | | | | |
| 3. Inbound halal logistics should be monitored by the mosque management committees to ensure its effectiveness. | 0.749 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4. The mosque management committees should have the same goals to successfully practice halal logistics. | 0.636 | | | | |
| **Factor 4: Financial Resources** | | | | | |
| 1. The mosque is willing to invest more in ensuring that the products received are *halalan toyyiban*. | 0.817 | 2.055 | 6.850 | 41.263 | 0.722 |
| 2. Enough financial resources will help the mosque to ensure products or materials received have followed halal logistics standards. | 0.669 | | | | |
| 3. The mosque will ensure raw materials purchased is *halalan toyyiban* although expensive if the mosque provides a lot of provisions. | 0.584 | | | | |
| 4. The mosque can adopt a more secure supplier selection guideline if it has enough financial resources. | 0.544 | | | | |
| **Factor 5: Course and Training** | | | | | |
| 1. Course and training related to halal logistics would help in the implementation of halal logistics among the mosque management committees. | 0.910 | 1.850 | 6.168 | 47.430 | 0.717 |
| 2. The mosque management committees should provide courses on halal logistics. | 0.831 | | | | |
| 3. The frequency of courses on halal logistics will strengthen the knowledge of halal logistics. | 0.773 | | | | |
| 4. Course and training are very important to improve knowledge of halal logistics practices. | 0.771 | | | | |
| **Factor 6: Trust** | | | | | |
| 1. The mosque management committees should trust that raw materials and food ingredients supplied by the suppliers are *halalan toyyiban*. | 0.849 | 1.536 | 5.119 | 52.550 | 0.716 |
| 2. Raw or semi-processed materials that are sold by non-Muslims with halallogos are halal-trusted goods. | 0.764 | | | | |
| 3. The local mosque management should build a good relationship with local suppliers to procure halal raw materials. | 0.660 | | | | |

The estimated coefficient for religious responsibility and course and training showed positive relationships, indicating the mosque management committees, who had a high religious responsibility showed 0.613 times likely to practice proper inbound halal logistics as compared to the mosques' management committees, who had a low religious responsibility. The local mosque management committees should comply with the Muslim dietary law to show obligation and responsibility towards the Islamic religion (Bonne & Verbeke, 2007). While the mosque management committees, who have attended halal courses and training showed 0.641 times likely to engage in proper inbound halal logistics, as compared to the mosque management committees who have not attended halal courses and training. As mentioned by Pahim *et al.* (2012), attending enough halal training is important to supply adequate knowledge and skills of competent local mosques to meet the inbound halal logistics practice requirements.

The result also revealed that the estimated coefficient for dedicated facilities, financial resources, management support, and trust showed a positive relationship. This showed that the local mosques which used dedicated facilities are 0.674 times likely to practice proper inbound halal logistics, as compared to the local mosques that did not have dedicated facilities. The existing dedicated facilities to handle halal food preparation, will reduce the risk of cross-contamination, reduce human mistakes, and help to protect the integrity of the halal food supply chain (Jaafar *et al.*, 2011). The local mosques that have good financial resources showed 1.483 times more likely to practice proper inbound halal logistics, as compared to the local mosques with inadequate financial resources. As argued by Zailani *et al.* (2017), lack of financial resources could lead to the inbound halal logistics not being performed well by an organization. The result also showed that the local mosques that have good management support showed 0.721 times more likely to practice proper inbound halal logistics, as compared to the local mosques that did not have good management support. This result was similar to Stirpe *et al.* (2015) that proper inbound logistics practices will be effective, if they have good support from the management. Finally, the local mosques that have high trust in their suppliers showed 1.349 times more likely to practice proper inbound halal logistics than those local mosques that had low trust in their suppliers. Trust builds a good relationship between supplier and buyer, which is important in supporting supply chain activities (Tieman & Ghazali, 2013). Hence, trust helps the local mosques to secure resources of halal raw materials for a longer period. Table 8 summarizes the overall results of the logistic regression analysis of this study.

**Table 8.** Logistic Regression Analysis.

| Variables | Estimated coefficient (*β*) | Standard error | Wald | Significance | Exponential (B) |
|---|---|---|---|---|---|
| Knowledge level | 0.972 | 0.303 | 10.270 | 0.001* | 2.643 |
| Religious responsibility | 0.489 | 0.157 | 9.685 | 0.002* | 0.613 |
| Course and training | 0.445 | 0.157 | 8.073 | 0.004* | 0.641 |
| Dedicated facilities | 0.394 | 0.149 | 6.960 | 0.008* | 0.674 |
| Financial resources | 0.394 | 0.134 | 8.657 | 0.003* | 1.483 |
| Management support | 0.328 | 0.150 | 4.801 | 0.028** | 0.721 |
| Trust | 0.299 | 0.140 | 4.587 | 0.032** | 1.349 |
| Constant | 18.085 | 2.983 | 36.744 | 0.000 | 0.000 |
| -2 Log-Likelihood | 368.603 | Nagelkerke R | | | 0.527 |
| Cox and Snell *R* square | 0.386 | Hosmer and Lemeshow Test | | | 0.000 |

Note: DV: Inbound halal logistics practices
*significant at 1% level of significance
**significant at 5% level of significance

Based on the results, the final logistic regression model is shown in Equation 2 as follows: -

Inbound halal logistics practices = 18.085 + 0.972 (Knowledge level) + 0.489 (Religious responsibility) + 0.445 (Course and training) + 0.394 (Dedicated facilities) + 0.394 (Financial resources) + 0.328 (Management support) + 0.299 (Trust) + ε

## 5. Conclusion

The results revealed that most local mosques have high knowledge of inbound halal logistics, indicating proper practices of inbound halal logistics among the local mosques. The local mosques need to consider all the factors that have influenced proper inbound halal logistics practices such as knowledge, dedicated facilities, religious responsibility, management support, financial resources, course and training, and trust. This study provides valuable information to enhance inbound halal logistics practices in handling halal food among the local mosques in Malaysia. It is recommended that the local mosques to organize continuous halal course and training among mosque management committees to strengthen their knowledge of halal logistics. It is also recommended that the local mosques should have specific guidelines on inbound halal logistics practices to ensure effective implementation of halal logistics. The importance of the guidelines is to avoid human mistakes, reduce the possibility of cross-contamination with non-halal products, and safeguard the halal integrity of the food. Hence, the responsibility to protect halal integrity along the halal food supply chain is not only played by the producers and industry practitioners, but all Muslims must also take active roles in ensuring all food supply chain players practice halal logistics for the food to be served as *halalan toyyiban* food.

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**Conflict of Interest**

The author declares no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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