

## Development of Halal-Friendly Port: A Link to Sustainable Practice

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### Abstract

The port is part of a supply chain whereby around 50% of the volume of international trade in goods is carried by sea, and the percentage is even higher for most developing countries. The expansion of trade demand specialisation in cargo handling enhances the role of ports in fulfilling the market demand. As the Muslim population is projected to grow 26.4% from the world's total projected population of 8.3 billion by 2030, halal awareness and concern are increasing gradually. Standards development plays a significant role in providing guidelines for implementing halal initiatives. In Malaysia, the halal standard for logistics operation is MS2400 which describes the requirements for halal supply chain management and certification established in 2010. The standards cover main domestic logistics activities, particularly halal transportation, warehousing and retailing. The halal concept is increasingly attracting the attention of businesses. The development of the halal concept for a product has now expanded to include the movement of halal products along the supply chain where halal products can be exposed to the risk of being contaminated which can affect their halal status. Based on the case study approach, this study explored the development of a halal-friendly port in Malaysia to ensure a complete halal supply chain and has linked the halal process as part of sustainability, which shows the relationship between the halal supply chain and sustainability is relevant and important. It is hoped that the study contributes to the improvement of halal implementation in port container operations and portrays the sustainable paradigm that will benefit port operators and examine opportunities for value-added services.

**Keywords:** Halal Port, Halal Supply Chain, Port Operation, Contamination, Sustainable

### Introduction

Logistics refers to the movement, storage, and flow of goods, services, and information inside and outside the organization while supply chain management (SCM) is a way to link major business processes within and across companies into a high-performance business

model that drives competitive advantage (Michigan State University, 2022). Hence these two terms should not be used interchangeably but supplement each other. According to (Fernando, 2022), SCM established maximize value for the customer and gain company advantages from the whole process of five critical elements of developing a strategy, sourcing raw materials, production, distribution, and returns. By adopting a supply chain approach, extensive development of sustainability could be implemented because the supply chain encompasses products from sourcing and processing of raw materials to delivery of products to the final consumers (Seuring & Muller, 2008; Linton et al., 2007).

This also reflects maritime transport appears to be at the heart of international trade and the global economy, with ports crucial to connecting domestic and global supply chains (Verschuur et al., 2022). The port serves as a gateway through which four systems—transfer, delivery or receiving, ship, and storage—are used to manage cargo logistics. Various applications of sustainability as an approach to improving logistics have been developed (Piecyk, 2015). However, research has shown that addressing the environmental and social challenges in developing more sustainable logistics requires innovative thinking (Russo-Spena & De Chiara, 2012). The term sustainability has always been referred to as an integration of social, environmental, and economic responsibilities in business disciplines. (Elkington, 1997) popularises the three dimensions as the Triple Bottom Line (TBL) principle (also known as the three pillars: profit, planet, and people). It has also increasingly appeared as the key topic in supply chain management, especially in discussing its function in reducing the cost of operation, reducing waste, and using more from less and efficiency-oriented planning.

Companies are now responsible for their supply chains and are increasingly obliged to measure, control and disclose their sustainability performance as well as their entire supply chain sustainability performance (Qorri et al., 2018). This is because organizations need to measure and manage effectively and efficiently their supply chain sustainability performance to improve their competitive advantage. Following these developments, the importance of monitoring and steering the process of sustainable development has also grown (Jaafar et al., 2011; Ab Talib & Abdul Hamid, 2014; Tieman et al., 2012) more so because of the establishment of performance measurement also promotes innovation, improving work processes, increasing efficiency while at the same time protecting the environment. However, the sustainability assessment methods are still varying in terms of focus and comprehensiveness. It is claimed that supply chain performance measurement is vital to measure the efficiency of supply chain management (Balfaqih et al., 2016).

In a different scenario, the idea of halal has drawn business entities from all over. It is a concept that is rooted in Islamic principles on the basis that Muslims are required to consume only halal products. Halal is obtained when all production and delivery processes to the final consumers comply with Islamic principles. The concept of halal is to ensure that the products are free from contamination with haram as well as hazardous products. As a result, non-Muslims are becoming attracted to halal products' safety and quality aspects. Thus, the demand is predicated on the belief among Muslims that they should only consume halal products, and from a business perception, it has been considered as a business plan that would bring market growth (Muhammad et al., 2009). This is because the number of Muslims has marked a significant increase and it is projected to be the fastest-growing major religious group by 70% growth between 2015-2060 as in Figure 1.2 (Pew Research Center, 2017).

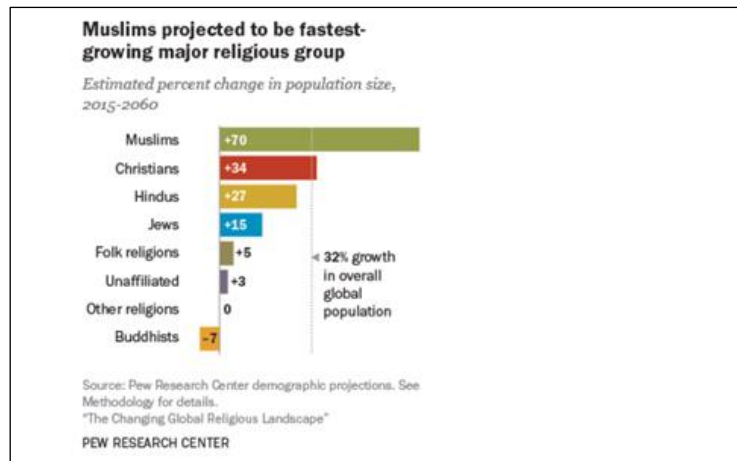


Figure 1.2: The Percent Change of Muslim Population Growth, 2015-2060

The present literature shows that the growth of the halal concept for a product has now extended to include the movement of halal products along the supply chain (Omar & Jaafar, 2011; Bahruddin et al., 2011; Omar et al., 2013; Jaafar et al., 2011). This is because producing halal goods involves not only the production processes but also all operations that take place along the supply chain, such as procurement, handling, storage, warehousing, manufacturing, and shipping. Throughout these supply chain activities, various circumstances could expose the halal products to the risk of contamination with haram and hazardous products that would affect the status of a halal product.

Relating to the supply chain, ports play an important role in ensuring the halal condition of goods in transit for import and export activities. The emergence of halal ports is in the interest of logistics services to ensure halal integrity and, as a result, improve halal supply chain performance. However, the study on implementing halal in ports is still underrated with few works of literature only highlighting the roles, issues, and challenges except the latest study by Jaafar et.al in 2021. Halal supply chain standard has been widely accepted as an international standard under the Standard Metrology Institute for Islamic Countries (SMIIC) through the publication of its development at the end of 2020. The standard adapted from the Malaysian Standard (MS2400) was published in early 2021 and covers transportation, warehousing, and retailing.

This study will employ a port in southern Malaysia to develop the implementation of a sustainable halal-friendly framework in the port operations focusing on containerisation where there is a significant missing link in addressing the integrity of a complete halal supply chain. The objectives of the study are

- 1) To explore the halal critical point in the implementation of a sustainable halal-friendly port
- 2) To develop the concept and framework of a halal-friendly sustainable port due to its role as an international gateway that would complement the entire supply chain in a global context
- 3) To explore the improvement needed in addressing the halal integrity of handling containers in port operation.

The goal of this study is to present a further identification of the halal critical point in the port particularly in the operation taking account of the previous study on the halal port

by Jaafar et al (2021) and to propose a refined framework for halal handling in containerisation operation.

## **Literature Review**

### **Sustainability in the Port Industry**

Ports serve as vital connectives in international logistics and are observing a growing amount of change in both the ownership structure and the responsibilities they play. According to UNCTAD (1999), ports are now regarded as a 'service centre', as they incorporate integration of a transport network, value-adding services such as transport consolidation, product mixture, or cross-docking activities as well as a networking place for stakeholders within various supply chains to meet (Stank et al., 2001; Paixao & Marlow, 2003). This will entice more shippers due to the ports' modern and dynamic roles in enhancing port efficiency which can have a positive effect on the local economy, helping port authorities, service providers, customers, and other port stakeholders (Jaafar et al., 2021).

To accomplish sustainability, ports play a crucial role in developing collaborations among the members of the port community, including warehouse operators, freight forwarders, and shipping agents, and ensuring excellent operational and logistics services (Lopez & Poole, 1998). The increasing competition among ports has forced ports to focus on fulfilling customer demand through the provision of numerous value-added services to expand their customer base. Such services may involve cargo security, types of consolidation, and cargo handling, among others (Baird, 2002; Li & Oh, 2010). The competitive activities in ports have spilled over to the whole of the supply chain activities, as the entities and services were linked to each other (The World Bank, 2000; Yoon & Nam, 2006). Accordingly, ports form the core components within the whole logistical chain in international freight routes (Li & Oh, 2010; Wang et al, 2017).

In terms of services, the role of port cities as the focal points for imports and exports as well as the flow of goods across borders indicate the vital influence of ports on sustainable development (Grobar, 2008; Hesse, 2004; Rodriguez et al., 1997). The sustainability of port operations is highly reliant on service quality and customer satisfaction (Yeo et al., 2015). Yeo et al. suggested that "failure or unreliability of port services can significantly influence port customers." According to Cheon & Deakin (2010), Seuring & Muller (2008); Dinwoodie et al (2012), (as cited in Jaafar et al., 2021), various research related to the sustainable development of ports provide a broad spectrum in the development of ports strategies, practice implementation, policies, procedures, and activities to manage sustainability issues. It is even more complex to address the sustainability issues specific to economic, social, and environmental performance measures. Sloan (2010), as cited in Jaafar et al (2021) highlighted that measuring the sustainability performance of supply chains is intrinsically complicated and multidimensional. A comprehensive supply chain performance measurement tool is deemed needed to evaluate and enhance sustainability performance. To be sustainable, firms involved in risks Shevchenko et al (2016) and the transformation toward sustainability entails innovative actions that bring about "creative destruction of unsustainable practices and their replacement with sustainable technologies and business models" leading to the invention based on Walley (1994); Cohen (2007) study (as cited in Jaafar et al., 2021). Even though it is quite risky in terms of the company's survival, Venus (2011); Kim and Chiang (2017) highlighted that the move toward sustainable ports may enhance port competitiveness. Therefore, companies may face negative consequences, such as an absence of attractiveness

and increasing operational issues, if they fail to satisfy their customers (Grobar, 2008; Hesse, 2004).

The port's role act as the gateway to international trade, with maritime transport, including ports is under scrutiny and tight regulations to maintain sustainable operations such as decarbonisation, climate change adaptation, labour rights, and streamlines through operation technologies (Alamouh et al., 2021). According to them, ports can implement action and measures to improve sustainability while considering the TBLs, which also share the same similarities based on the foundation and contribution to United Nations Sustainable Development Goals (UN SDG), in a broader scope addressing world economic, social, and environmental issues. The sustainable actions and measures by ports will contribute to achieving the UN SDGs either directly or indirectly where there is a link between port sustainability and UN SDGs.

### **Halal Logistics and Supply Chain**

Halal is an Arabic term, Al-Halal (The Lawful), which means 'permitted, concerning which no restriction exists, and the doing of which the Law-Giver, Allah SWT has allowed'. On the other hand, Haram or Al-Haram (The Prohibited) refers to what the 'Law-Giver has prohibited. Anyone who commits is liable to incur the punishment in the Hereafter as well as a legal punishment in this world. Between halal and haram is Al-Makruh (The detestable) represents 'the disapproved by the Law-Giver but not very strongly'. In recent years and studies, halal has evolved where

"Halal is growing beyond the religious boundary and is seen fulfilling these demands, as its essence lies in the wholesome attribute of the consumables" (Khan & Haleem, 2022, p. 2793). The halal industry is categorized into two scopes: halal products and halal services (Aziz & Zailani, 2016). They also outline the similarity study by Othman (2009), which distinguishes three components of the halal industry, namely food and beverages, non-food, and services. Recently in 2020, the size of the global market for halal food was valued at USD 1.2 trillion. The market for halal food is projected to grow at a CAGR of around 17% from 2023 to 2028, reaching a value of about USD 3 trillion by 2026 (Expert Market Research, 2022). The handling of food along with the logistics and supply chain process is deemed crucial (Al-Qaradawi, 2001) because the halalan tayyiban food production will be meaningless if the halal and cleanliness of the food is not taken care of throughout the process of delivery from the source of supply to the final consumers. 'Toyyib' refers to the halal product should be wholesome, safe, nutritious, non-poisonous, non-intoxicating, or non-hazardous to health (Tieman, 2011) whereas it requires close coordination & collaboration among the stakeholders involved to create value and improve the performance of supply chain (Khan et al., 2018)

Therefore, the status of a halalan tayyib product could be achieved when all possible contamination caused by haram and hazardous products could be avoided throughout its supply chain process (Omar and Jaafar, 2011; Bahrudin et al., 2011; Omar et al., 2013; Jaafar et al., 2011). Hence, a halal process could be viewed from a supply chain perspective because a halal product could only be obtained when the entire activities throughout the supply chain process are dedicated or segregated from the haram and hazardous products (Jaafar et al., 2017). Though global Muslims support halal food because of their religious responsibilities, non-Muslims often turn to Halal food because of concerns about unhygienic and unsafe foods (Zailani et al., 2019). The study of Muhamad et al (2016) also describes the present trend of Muslim consumers holding motivation towards Islamic rules and teachings in their lifestyle and business activities. As an increasing number of customers demand more customized

products and service offerings, stores are looking for new and innovative ways to differentiate themselves (Selim et al., 2019).

A previous study by Khan et al (2018) proposed a definition of HSCM that focuses on developing Halal as a process-oriented approach and involves close coordination & collaboration among the stakeholders to create value and improve the performance of the supply chain. In other definitions, halal logistic services are defined as a process of planning, implementing, and managing the efficient, unified flow and storage of halal-certified raw materials, halal semi-finished or halal-finished goods from source to demand point, ensuring full compliance of the recognized halal logistics standards throughout the process (Malaysian Standard, MS 2400, 2019). According to Selim et al (2019), the Malaysian Government has taken the initiative to ensure that organizations adhere to the traceability system, which enables the identification of products from immediate suppliers. Figure 2.1 is the Venn diagram that presents the halal logistics integral link which consists of four main sources such as suppliers, manufacturing, distribution and sales, and trade and consumers (Selim et al., 2019). Companies, who would like to apply for halal certification, may apply the three standards separately. Halal-certified companies need to have a comprehensive and robust halal assurance management system because halal products may be contaminated easily if companies do not follow the procedures and systems that they have developed. Any occurrence of contamination would mean that the product cannot be consumed.

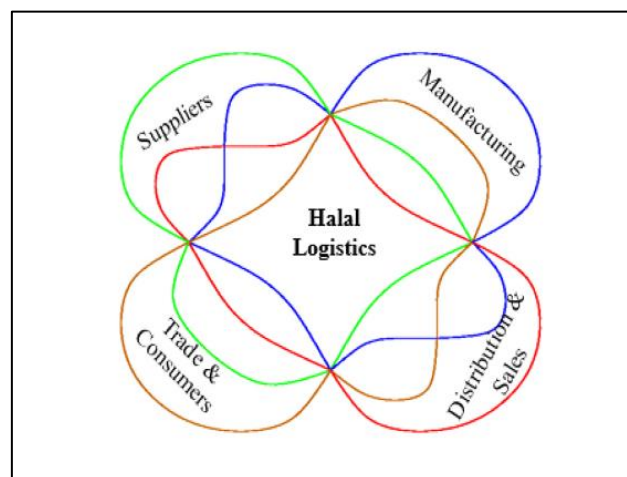


Figure 2.1: Integral Link of Halal Logistics

Halal practices do not stop once the product has been manufactured, as a halal product could easily lose its halal status if it is contaminated during transport and storage prior to retailing (Zailani et al., 2017). Hence, given that logistics bridges the gap between the point of production (i.e halal certified) and the point of consumer purchase (where the halal product is sold), the logistics of halal products is fundamental to ensuring the integrity of halal products at the point of consumption (Tieman, 2011). Consequently, several control points are needed throughout the process because the risks of contamination exist in all stages.

In addition, Rajagopal et al (2011) noted that logistics providers must look beyond the implementation of the halal operations of their own company and the concerns of their customers to gain insights into the level of halal that adds value to their logistics activities. Since logistics is a derived demand, the emergence of halal logistics may result from the increasing demand for halal products. Additionally, halal services are perceived as an added

benefit in logistics when a logistics service provider (LSP) wants to offer diversified services that could create a competitive advantage that will satisfy customers (Zailani et al., 2018)

### **The Concept of Halal-Friendly Port**

In Malaysia, studies on halal logistics particularly in the context of port are lacking in the current literature (Dubey et al., 2016). However, the prospects of ports looking into halal logistics or providing halal services gradually have raised awareness among the port community and shifted to see its potential. Aziz and Zailani (2016) described the offering of halal services as of interest to the port to assure halal integrity along the supply chain. Past studies have shown the significance of assurance in halal supply chains where ports play a vital role and involve challenges in implementing it. This is due to the complex logistics ecosystem which involves activities of transporting, storage, distribution, handling, and ports over the years has evolved greatly as an integrated hub. As reported by The News Straits Times (2023), the halal industry and maritime transportation such as ports and shipping are closely linked and need to connect to drive the development of the halal economy in Malaysia. It requires a comprehensive halal logistics and transportation system for the assurance that halal goods are transported in compliance with halal standards.

Ports consist of facilities and equipment in their demised area in support of cargo-handling activities from the wharf to the port's gate and vice versa. Upon following operation and safety standards at the port, a designated area for certain types of cargo is allocated such as refrigerated and dangerous goods. Moreover, (Ustadi & Osman, 2022) argue that providing dedicated facilities and a halal-compliance handling method is simply not sufficient, but the port should be built and operated as a fully halal facility.

In light of this, a few studies by Aziz & Zailani (2016); Tieman et al (2012); Ustadi & Osman (2022) were not well discussed, especially in terms of the application of halal elements in the port operation flow. The port is yet to be part of the logistical chain at any point during the implementation of halal so that integrity is guaranteed from the manufacturer to the consumer. However, referring to the latest study by Jaafar et al (2021) has developed a halal-friendly framework for a port operation that supports the sustainability agenda and to considered part of innovative moves. The study has discovered four variables that derive from the literature and interviews with the port authority before the focus group indicating the variables that can contribute to the successful implementation of the Halal-Friendly Sustainable Port (HFSP) model. The findings from the focus group supported (1) dedication and segregation practices, (2) sanitation practices in the port operations, (3) determination of halal control points, and (4) traceability of the halal cargo that are vital components for HFSP establishment. Figure 2.2 portrays the variables for the HFSP model.

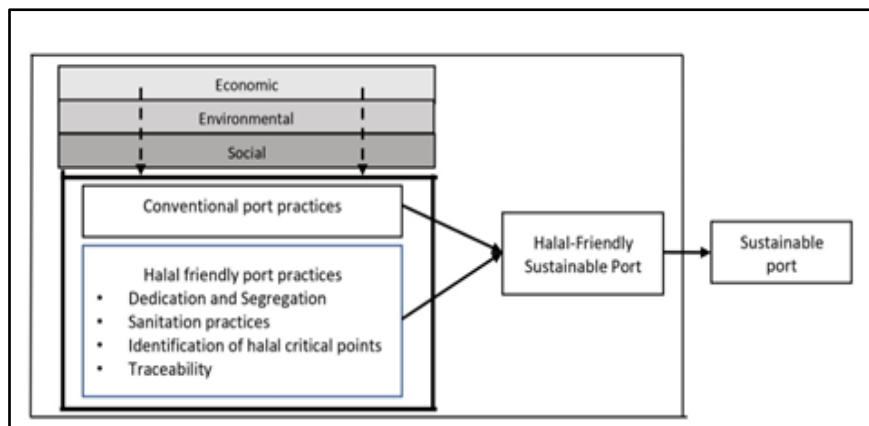


Figure 2.2: Halal-Friendly Sustainable Port Model

Jaafar et al (2021) found that the current port user (interviews from the focus groups) are aware of the importance of halal goods because of the increase in demand for halal consumption but does not realise the goods or products may also be contaminated during the handling, transportation and storing activities along the supply chain (refer to Figure 2.2). The study has also determined four control points throughout the process flow in the port area which are (i) Declaration of halal cargoes at the port entry point; (ii) Loading and unloading; (iii) Storage and warehousing; and (iv) Cargo inspection;

The study has highlighted and embedded all three components of the triple bottom line (i.e., environmental, economic, and social) to produce a sustainability value for the port. It maps the targets and indicators of Sustainable Development Goals (SDG) that could be met by the HFSP model (Jaafar et al., 2021). The global halal demand will only continue to increase in value and diversify in services provided eventually. Unfortunately, research into the gap of sustainability for halal intervention along the total supply chain is scarce for port operations. However, further research is needed to define the halal framework flow more clearly for port implementation to address the challenges of sustainability. The study indicated that the HFSP model was developed based on exploratory study. Thus, this study extends this model through a more comprehensive qualitative approach in the development of a more refined model.

## Methodology

### Case Study Approach

A single case study is used in the development of a halal-friendly port framework whereby a port in southern Malaysia is employed. This study utilized a qualitative approach where data collection is sourced from primary data through focus group discussion and interviews and secondary data from the literature. This is because based on gaps in the literature review revealed there is not much has been written about the halal port specifically in container operation and justifies what Cresswell (2014) highlights as the reasons for conducting a qualitative method. The benefit of conducting the focus group would enable interaction and deeper discussion among the informants and further develop the concept or framework in line with research objectives.

### Sampling Technique

A purposive sampling technique is applied in which the informants are carefully selected based on their specific expertise, knowledge and experience about port operation and halal



logistics. Since the study is niche and very few individuals are aware of the development of halal ports and port operations, it is essential to obtain information from an appropriate informant. The informants consist of middle and top-level managers who are experts in their field of work and the data collection is collected through two mediums which are focus group discussions with the port operator and interview sessions with relevant parties relating to port and halal. A total of 17 informants contributed in this study.

**Thematic Analysis**

After data collection, all transcribed text data are processed using Atlas. ti 2023 software. The first step is the coding process of the data which later derives the determinants and subsequently leads to emerging themes. A thematic analysis is most suitable to use to derive the overarching themes that emerge from the data collection through coding and generating themes involves interpretation (Kiger & Varpio, 2020).

**Findings & Discussion**

This study aims to lay out the conceptual framework for managing halal cargo in port operations of Malaysia’s southern port as a case study in the scope of containerisation. Based on the output of the analysis of the transcriptions, there are seven determinants derived from 21 categories (source from 115 quotations) after an iterative process of thematic analysis using Atlas,ti software resulted in the framework of a halal-friendly port. The analysis generates “Halal Control Point as depicted in Figure 4.8 and the framework of a “Halal-friendly Port” is shown in Figure 4.9 below

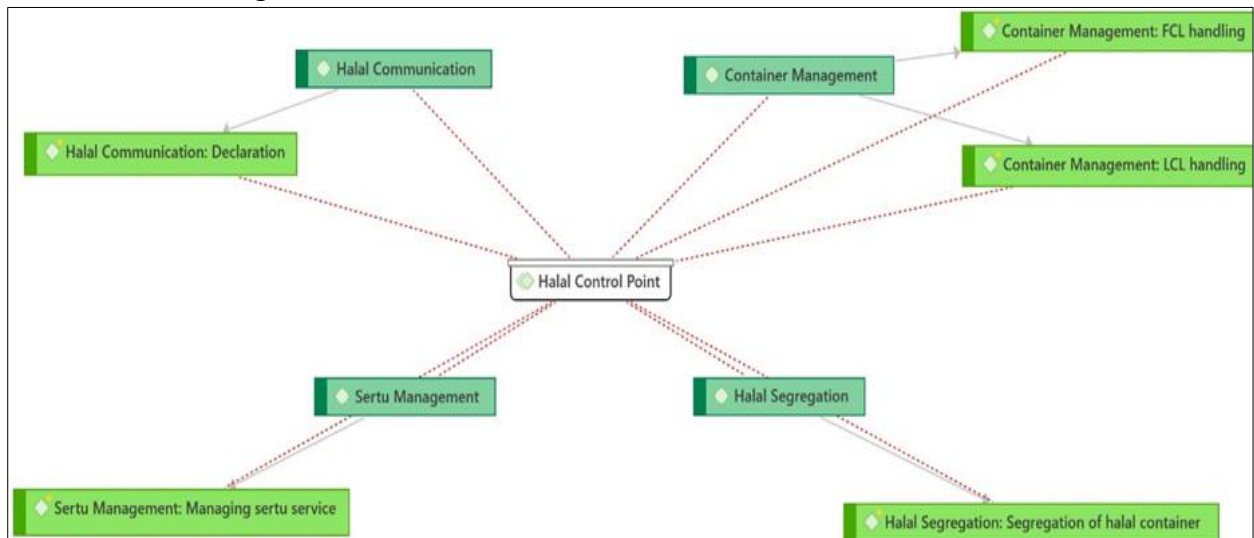


Figure 4.8: The Halal Control Points in the Case Study

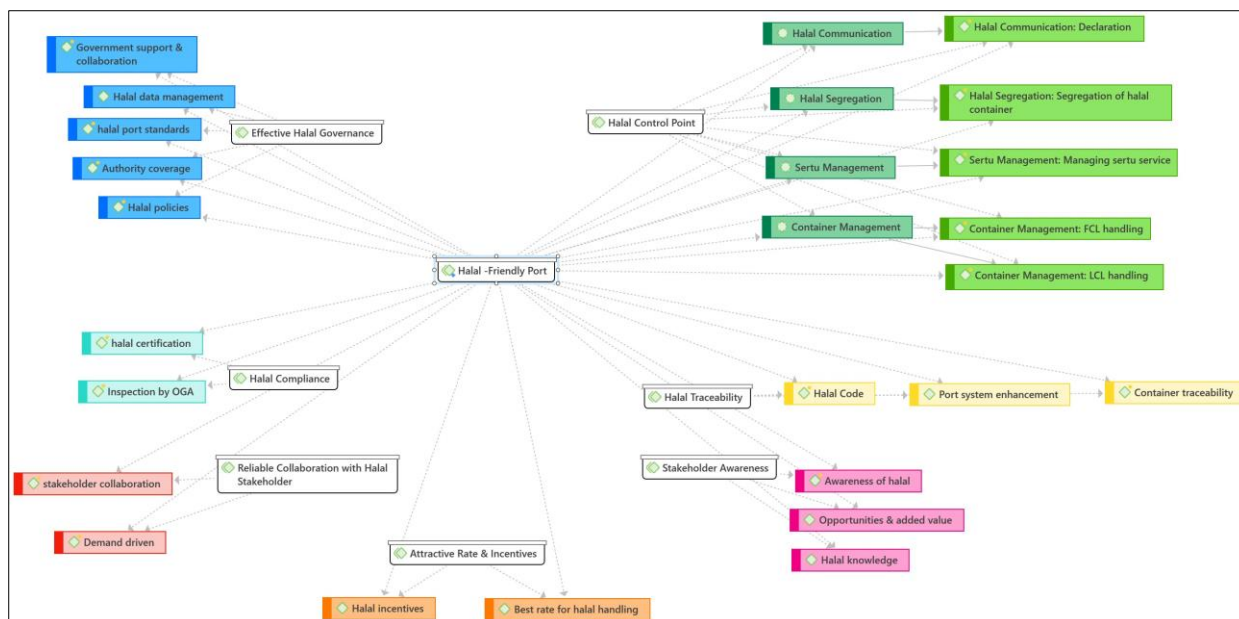


Figure 4.9: Framework of a Halal-Friendly Port

Since the secondary data regarding halal handling in ports is limited, this study successfully obtains the data directly from the industry player (informants) and helps the researcher understand the port operation in implementing halal handling, resulting in a new contribution of knowledge in extending from the previous study by Jaafar et al., 2021. A framework for the case study of the southern port was developed using the seven themes or variables that emerged from the focus group and interviews. The themes are (1) effective halal governance (2) halal control points (3) reliable collaboration with halal stakeholders (4) stakeholder awareness (5) effective traceability (6) halal compliance and (7) attractive rates and incentives.

#### a) Effective Halal Governance

The findings of this study indicate a widely shared view on the efficacy of halal governance. This criterion of governance encompasses a range of components, such as authority coverage, government support and collaboration, a halal database, halal policy, and standards. It is widely acknowledged that halal governance plays a pivotal role in driving the adoption of halal practices in both supply chains and organisation management decisions. Khan et al (2022) emphasized the importance of management commitment and support, as managing a halal supply chain is complex and requires a high level of commitment from top management in terms of leadership and resource allocation. Despite sustained efforts to promote and develop halal logistics, the absence of government cooperation has posed a significant challenge to the growth of this industry. The above-mentioned are in line with the findings from this study of halal ports which in need of effective halal governance especially from the government support and authority coverage. In addition, the halal database plays a crucial role in providing necessary information and predicting potential halal trading performance at the port. However, Malaysia currently lacks sufficient halal data. It would be advantageous to centralize the halal data for the convenience of relevant stakeholders, as confirmed by an informant. From the interviews and discussion, it is found halal policy and standards are absent in port operations. The proposed policy and the guidelines will serve as a standard of procedure (SOP) for both import and export points (between countries) in

handling halal containers. This study has addressed the gap of the absence which supports the importance of halal policy and standards to be developed and streamlined. Although the port authority of the case study port has managed to develop its halal port policy, it is understood during this research that the policy is yet to be implemented due to certain issues of management arising. Hence, coordination in halal standards and policy should be important to standardize the output. The standardisation task shall be from the government's cooperative effort in demonstrating clear and robust halal governance.

#### b) Halal Control Point

As a result of the focus group discussion and Shariah perspectives, it is concluded there are four main control points in container operation at the port. These are guided by the risk matrix from MS2400 standards as a rule of thumb in the determination of HCP in the process flow. The most influencing halal control point in the operation is communication which refers to the declaration of halal cargo when entering the port either for imports or exports. The communication from the port user (importer/exporter/forwarding agent) is the focal point where there is an absence of declaring halal cargo or using halal code in the port system's current practice, unlike the usage of customs tariff code. If the usage of halal code is there, then the port operator will be notified along with the integration of other government agency systems. Following these, many benefits will arise when the halal data can be captured effectively and the integrity of halal will also be guaranteed.

In addition, the management of the container would also be essential when it is loaded either as FCL or LCL handling as mentioned earlier. The FCL container of halal cargo would be straightforward to manage as it originated from one ownership of the cargo. Unlike LCL containers, it is mostly consolidated from various types of cargo ensembled in the warehouse and the possibility of cross-contamination can highly occur. Aziz & Zailani, 2016 have mentioned the flow consolidation of halal cargo is highly critical and coordination plays a key role in the halal supply chains. Based on the case study, it was discovered that there are currently no halal-certified warehouses or transportation within the port demised area. To ensure the purity and cleanliness of halal cargo and prevent contamination, it is crucial to have a certified halal warehouse handle the consolidation of LCL containers along with certified halal transportation within the supply chain. Implementing this approach will result in a complete halal supply chain that includes halal-certified transportation, a halal warehouse, and halal services by port operators.

The importance of ritual cleansing in halal or *sertu* aligns with the previous variable by Jaafar et al (2021) in container operations where cleanliness and safety are fundamental to halal. The sanitisation practices for haram substances are to avoid contamination of the halal cargo in the container. This practice can be managed if the port user uses halal transportation where a dedicated or separate container carries and loads halal cargo to maintain integrity. From the discussion and interviews, most informants share the same view that the *sertu* should be managed as a one-stop center in the port or executed by the port operator itself.

The segregation control point is one of the main concepts for halal handling. In container operation, segregation should be applied for LCL containers to avoid contamination of halal cargo. However, from the halal authority perspective, segregation needs to apply at the container yard as well. The notion will be impossible for the port operator because, in terms of port business operation, the segregation will not be significant as it aims to fully optimise the usage of the yard in line with port efficiency. Further on this, the management of the container especially for LCL handling to be the first controlled, so the risk of

contamination is avoidable and subsequently the segregation at the yard would not be a priority. This is because the main cause is the risk of contamination from container management which needs to be controlled at the beginning. From the port operator's perspective, there is no major contamination between halal containers and non-halal containers (conventional containers) if placed side by side or stacked up and down as any other cargo is sealed and arranged appropriately inside the container. Eventually, the risk of contamination by other factors is zero or unlikely to happen. Furthermore, the common sense and practicality of logistics operations in the urgency of segregation should be paid attention to. If segregation is to be applied at CY then the next question would be the issue of segregation when loading onto the vessel. This would create hardship to implement and is not practical as most container vessels are internationally operated.

### c) Reliable Collaboration with Halal Stakeholders

A collaboration approach is vital in making the objective successful and sustainable in the long run. Since standards of halal port operations, are yet to be established, two categories have contributed to this theme: stakeholder collaboration and demand-driven. The collaboration is to link the puzzle of halal demand which in this case is between halal products and halal logistics. The importance of collaboration is to connect and network among halal players with the port while preventing the risk of cross-contamination in halal handling since there is no halal enforcement in navigating the agenda. Tieman et al., 2012 mentioned in their study of principles in halal supply chain management that halal requires coordination where an integrated supply chain can only be optimised when the chain participants function together to improve the overall supply chain. These depict reliable coordination with halal stakeholders or players that should be coordinated from one end to another and vice versa to maintain halal integrity along the supply chain. Ab Talib & Abdul Hamid, 2014 have emphasized the chances of breakage and contamination are greater if other logistics parties are not practising halal logistics which is due to a lack of collaboration.

In terms of sustainability services, Wang et al., 2017 have highlighted that ports play an important role in the sustainable supply chain through highly operational and efficient logistics activities for the benefit of the collaborative port community which includes warehouse operators, transport operators, shipping agents and forwarders. Hence, maintaining the port operation efficiency without interruption from handling of halal containerisation is the main priority for the operator as well. In engaging sustainable port business, Wang et al., 2017 opined that understanding customer needs and striving for their satisfaction are challenges and opportunities to port. This is in line with halal services that are currently demand-driven and any activity of the service sector is oriented directly to the customer.

Hence, the collaboration will improve potential future access between countries or international gateways such as through connectivity of IMG-GT which covers Indonesia, Malaysia and Thailand region or BIMP-EAGA connectivity which covers Brunei-Indonesia-Malaysia-Philippines and East Asia. Therefore, the initiative of halal logistics especially in ports is required to ensure the integrity of halal cargo throughout the supply chain among country members. This determinant has shed light on new findings which is the importance of collaboration with halal stakeholders particularly from the logistic sector.

**d) Stakeholders' Awareness,"**

The importance of halal ports is closely linked to stakeholders' awareness. Few logistics experts believe that a lack of knowledge and awareness about halal practices leads to misunderstandings about the opportunities and benefits of halal logistics. This misconception affects the logistics industry's views on embracing halal practices. During interviews, some informants expressed reluctance to implement halal practices which they claimed increased in costs and difficulties associated with segregation. However, it has been observed that certified halal logistics companies have found that halal practices provide a sense of security to manufacturers and consumers, as it ensures that halal integrity is preserved throughout the supply chain. According to an interview with a certified halal transportation company, they were able to handle halal cargo without any additional costs, and it was the same as conventional handling. According to a study conducted by Wang et al. in 2017, ports can experience growth by offering unique value-added services, such as efficient cargo handling and security. This leads to increased competition among ports in nearby geographic areas. As a result, the importance of value-added logistics and various services offered along the logistics chain is becoming increasingly significant. By providing halal port services in containerisation, customers could benefit from an expanded range of services within the port supply chain. This awareness could provide significant value added and opportunities for the case study port, which is located near the straits of Malacca, adjacent to Singapore and Indonesia.

**e) Effective Traceability**

Ensuring the transparency and integrity of the halal supply chain requires tracing halal cargo movement. Discussions and interviews have shown that halal cargo traceability in containerisation involves halal code, physical container traceability, and integration with port systems to identify halal handling and capture data for efficient port operation. To identify halal containers upon entering the port, a code or remark is needed as there is currently no such code for halal cargo submission unlike the HS code or DG code for conventional cargo. The study by Khan et al, 2022 validated these findings and highlighted the positive influence of reliable IT intervention in supply chain integration and information. The complexity of supply chain networks increases vulnerability to fraud, and integration is crucial at all stages to ensure halal integrity and HSC efficiency. ICT support enables traceability and confirms product information authenticity, building trust among stakeholders in the halal supply chain by addressing critical points. The halal code and logo on cargo containers are essential for port and logistics providers to manage and transport halal goods. These markers make it easier to track and monitor the cargo, guaranteeing that it is handled and transported while meeting halal standards. This process of traceability ensures the safety and integrity of halal cargo within the halal supply chain. Until this study was conducted, the case study port had developed a new halal remark/code column in their terminal system to be used by the agents for ease of traceability of halal containers.

**f) Halal Compliance**

The discussion on halal integrity is also related to halal compliance. In this study context, halal compliance is derived from halal certification and inspection by the authority or OGA at the port. The trading activities at the port involve certain agencies for cargo clearance. Currently, the conventional handling for importation, especially halal frozen poultry entering Malaysia, must adhere to the documentation requirement which must have halal certification

(recognised by JAKIM) and permit. This study deduces that halal compliance is crucial in such situations that the safety and security of halal containers should be improved through the proficiency of the officer during inspections and the management of authenticity in halal certification. It is important to take these issues seriously and implement necessary measures to ensure compliance with halal standards.

#### g) Effective Rates and Incentives

It is crucial to take note that the handling of halal goods by halal logistics or at ports is heavily dependent on demand. This implies that incentives must be offered to attract interest and facilitate effective management when halal certification is voluntary in Malaysia. Although most of the focus on halal matters pertains to food or products, halal logistics is a newly emerging field that has garnered considerable attention in recent years. Nonetheless, some individuals have expressed reluctance due to misconceptions about the associated costs of implementing halal logistics. To make halal logistics more appealing to port operators and the community, halal incentives must be put forward. Such incentives are deemed necessary to coordinate and leverage the costs involved in halal handling. The incentives and rates mentioned here can be forms of financial incentives aspect by the government for halal adopters such as grants, tax relief or stimuli packages. This is because logistics operations are capital-intensive. It is highly recommended that the government and port authorities assess the incurred costs and play vital roles in facilitating incentives if they aspire to establish themselves as a global halal hub for their country. This is in conjunction with Wang et al., 2017 view that port policymakers need to understand customers and need a balance between three elements such as cost incurred, services and facilities to promote repeated business networks and increase long-term benefits. This research has outlined valuable perspectives on halal incentives and rates that are significant to the stakeholders and may increase the uptake to venture and offer halal logistics services for ports. The findings of this determinant reaffirm and align with the study by (Ab Talib et al., 2020).

#### **Discussion on Linkage to Sustainable Practice of Halal Port Operation**

The adoption of sustainable practices is commonly referred to as the Triple Bottom Line (TBL), which encompasses environmental, economic, and social dimensions. In the case of ports, sustainability efforts tend to concentrate primarily on environmental dimensions, such as air quality improvement, minimizing carbon emissions, energy efficiency, alternative fuels and noise reduction. Only a few studies captured economic and social aspects. More recent research has indicated that the implementation of sustainable measures within ports can significantly improve their competitiveness as they perceive business opportunities. A wider focus on people and the environment is crucial for long-term resilience and prosperity, even though financial profit is a key objective for any organization and essential for existence.

Ports recognize the importance of sustainability planning in maintaining the well-being of their surrounding environments and communities. Achieving sustainability goals can be accomplished through comprehensive planning that incorporates various aspects of the port's sustainability vision. Relating to the previous study by Jaafar et al., 2021 embedded the halal implementation with the UN SDG as highlighted which portrays sustainability value. The study has highlighted halal implementation in ports linked to the economy dimension in Goal 3 (good health & well-being) and Goal 9 (industry, innovation & infrastructure). At the same time, linked to the social dimension in Goal 10 (reduced inequalities) and Goal 17 (partnership

with the goals). The environmental dimension is linked to Goal 12 (responsible consumption and production).

The sustainable practice or action for ports may have many approaches depending on the port's size, location, governance, financial, key demand drivers, regulation and key stakeholders (Ports Australia, 2020; Alamoush et al., 2021). These studies have proposed guidelines and actions area in the development of sustainable port strategies that can align with halal practices. According to the framework results in this case study, it is evident that the determinants shed light on such contributions with matching similarities with port sustainable practices which attain sustainable development goals. Figure 5.7 proposes the framework of sustainable halal-friendly port in container operation.

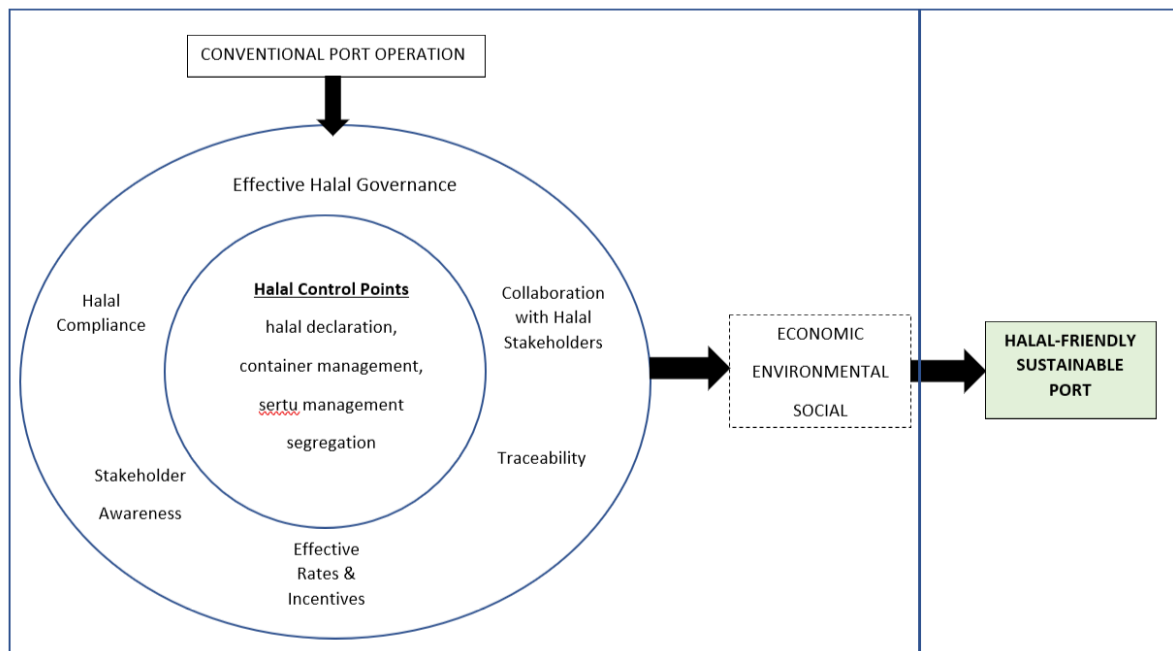


Figure 5.7: Framework of Sustainable Halal-Friendly Port

The “effectiveness of halal governance” and “reliable collaboration with halal stakeholders” are similar to one of port sustainable actions i.e. safety and security, trade and logistics facilitation and economic growth which are related to UN SDGs of Goal 3, 9, 10 and 17 and portrays to social and economic dimensions of TBL. Further, the determinants of “stakeholders’ awareness’ and “halal compliance are parallel to port sustainable actions i.e. safety and security, community and employees’ rights which are linked to Goal 10 and Goal 17 of UN SDGs and portray to social dimensions.

While determinants of “effectiveness of traceability” and “attractive rates and incentives” support the port's sustainable actions i.e. digitalisation in port operations, trade and logistics facilitation and economic growth which are related to Goal 3 and Goal 9 of UN SDGs and portray to economic dimensions. Further the determinant of “halal control points’ is associated to port sustainable actions in waste management (interrelated with the environment either directly or indirectly) where reduction in contamination may reduce global food waste and food losses along the supply chain which aligns with the Goal 12 and portrays to environment dimensions.

The framework of this study is reaffirmed with previous studies conducted by Jaafar et al., 2021 and Khan & Haleem, 2022 where halal practices produce sustainable value and correlated with the study by Alamoush et al., 2021 regarding port sustainability practices

which contributed to achieving UN SDGs. Table 5.8 illustrates the factors associated with port sustainability action linked to UN SDGs and TBL dimensions.

Table 5.8  
*Sustainable Halal-Friendly Port Framework’s that achieves Port Sustainability Practices and Sustainable Development Goals.*

Halal-friendly Port Framework (Determinants)	Port Sustainability Actions Areas (Alamouh et al.,2021 & Jaafar et al.,2021)	Linked to UN Sustainable Development Goals	TBL Dimensions
Effectiveness of Halal Governance	<p>Safety &amp; Security: Through monitoring, minimising contamination and risk</p> <p>Trade &amp; Logistics Facilitation: which support valued added logistics activities</p> <p>Economic Growth: which can attract foreign investment</p>	<p>Goal 3 (Good health &amp; well-being)</p> <p>Goal 9 (Industry, Innovation &amp; Infrastructure)</p> <p>Goal 10 (Reduced Inequalities)</p> <p>Goal 17 (Partnership for the Goals)</p>	<p>Social</p> <p>Economic</p>
Halal Control Points	<p>Waste Management: reduction of contamination may preserve environment protection (directly or indirectly) e.g. water pollution and global food waste</p>	<p>Goal 12 (Responsible Consumption &amp; Production)</p>	<p>Environment</p>
Reliable Collaborations with Halal Stakeholders	<p>Safety &amp; Security in monitoring, minimising contamination, risk and improved safety</p> <p>Trade &amp; Logistics Facilitation: which support valued added logistics activities</p> <p>Economic Growth: which can attract foreign investment</p>	<p>Goal 3 (Good Health &amp; Well-being)</p> <p>Goal 9 (Industry, Innovation &amp; Infrastructure)</p> <p>Goal 10 (Reduced Inequalities)</p>	<p>Social</p> <p>Economic</p>



		Goal 17 (Partnership for the Goals)	
Stakeholder Awareness	Community: support and encouragement of participation of halal agenda  Employees Rights: provision of continuous training and education	Goal 10 (Reduced Inequalities)  Goal 17 (Partnership for the Goals)	Social
Effective Traceability	Digitalisation in port operation e.g. enhances single window, port community system and utilising blockchain	Goal 3 (Good Health & Well-being)  Goal 9 (Industry, Innovation & Infrastructure)	Economic
Halal Compliance	Safety & Security: Through monitoring, minimising contamination and risk	Goal 10 (Reduced Inequalities)  Goal 17 (Partnership for the Goals)	Social
Attractive Rates & Incentives	Trade & Logistics Facilitation: which support valued added logistics activities  Economic Growth: which can attract foreign investment	Goal 3 (Good Health & Well-being)  Goal 9 (Industry, Innovation & Infrastructure)	Economic

### Conclusion

This study develops a new framework to handling halal goods in port container operations, specifically in Malaysia. The first objective of this study: "To explore the halal critical point in the implementation of a sustainable halal-friendly port", has been accomplished through focus group discussion and interviews by discussing further each of the control points in container operations using the risk matrix of MS2400 halal logistics as a reference and aligned with Shariah's requirement.

The second objective: “To develop the concept and framework of a halal-friendly sustainable port due to its role as an international gateway that would complement the entire supply chain in a global context”, has been achieved whereby thematic analysis was used to identify the overarching themes and revealed seven determinants that form the framework of a halal-friendly port. The most significant determinants were effective halal governance and halal control points, which were supported by five other determinants: reliable collaboration with halal stakeholders, stakeholder awareness, effective traceability, halal compliance, and attractive rates and incentives. These determinants demonstrate the link between halal practices and produce sustainable value, which aligns with the sustainable development goals and port sustainable practices in general.

Lastly, the third objective of this study: “To explore the improvement needed in addressing the halal integrity of handling containers in port operation” whereby the output from the discussion has revealed that there are improvements required in the implementation of halal in container operation at the port. As a result, the determination of halal control points from the case study port and the development of a new framework has highlighted these improvements, indicating that Objective 3 has been achieved.

### **Research Contribution**

#### **Implication of Theory**

This study has utilised the research done by Jaafar et al.,2021 as a reference for halal implementation in ports and Alamoush et al.,2021 on the port sustainability foundation in line with UN SDGs. As a result, the research identified several ways in which the halal movement contributes to port sustainability, as follows:

Firstly, this research introduces a new extended approach to handling halal goods in port container operations, specifically in Malaysia. The study identifies key factors that can contribute to the smooth facilitation of halal trade in the country's port environment. While the data was gathered from the case study port and stakeholders in Malaysia, the findings can be applied to other ports and halal goods more broadly. The research adds to the existing literature on halal logistics and port sustainability, offering a framework that can help improve the understanding of halal handling in academics.

Furthermore, this research proposes seven determinants that should be considered when handling halal containers at the port, in line with sustainability principles. Previous studies have not provided a comprehensive assessment of the halal container handling process at the port, making this study a valuable addition to the field. By expanding on the importance of these determinants, the study contributes to the body of knowledge on halal logistics activities.

The study also highlights a gap in Malaysia's halal logistics standards, which currently cover warehousing and transportation that are limited to the port operator. By taking a case study approach, this research can help fill the gap by providing recommendations for enhancing the container operation flow in halal implementation. The findings can also benefit port operators and authorities by providing in-depth insights into the halal-friendly port.

Lastly, this study emphasizes the linkage of halal implementation with sustainable practice in the port sector. By improving halal implementation and highlighting the potential of halal services in the logistics business, there are opportunities to add value to the port sector in a competitive market. These practices can be aligned with sustainability principles and support the UN SDGs agenda by 2030, making them an attractive business strategy.

**Implication to Industry**

The findings of this study are not just important for Malaysia's port community, but also for the economy and society. The framework developed in this study outlines a strategy for improving halal logistics in the port environment, which is crucial for the industry's growth that also helps in competing for the existing market. While previous literature has provided general recommendations for developing halal ports, this study delves deeper into the determinants that impact containerisation operations.

What's interesting is that this study sheds light and emphasized further the effectiveness of halal governance with halal trade facilitation at the port. This is especially important for the government, as the port plays a significant role in contributing to the country's economy in terms of imports and exports. The new findings from this study could help the port develop a workflow for halal container operation. The study also highlights the stakeholder's perspective in the port industry, which is a neutral academic perspective without any interest from any parties within the community. The logistics concerns of stakeholders can serve as a guideline for the government or agencies in building a robust halal supply chain to address halal concerns and could be used by managers for strategic decision-making.

Moreover, the reliable collaboration of halal stakeholders is beneficial to all parties in logistics, which in turn boosts logistics performance and halal trade inclusively. The proposed framework includes a sustainable component in the halal movement, which could be an attraction for the logistics industry to be competitive in a niche market. These findings are important for the port industry as they provide valuable insights into how halal practices can be leveraged to enhance sustainability outcomes, whilst also contributing to broader global sustainability goals. The determinants complement the halal strategy by closing the gap between logistic players and halal matters through harmonisation and alignment efforts.

**Limitation and Direction to Future Research**

The study conducted involved the participation of port stakeholders at the southern port of Malaysia, which was used as a case study port. This multipurpose port is strategically located at the Straits of Malacca, neighbouring Singapore (the second-busiest port globally) and Indonesia. However, it is important to note that the findings and discussion from the case study port context may not be the same as other ports. The data collection may have informants' opinions and is subject to bias error, which may make the study appear biased to the port stakeholders and community only. Additionally, it is important to acknowledge that every port business is different in terms of size, location, key demand drivers, monetary considerations, historical limitations, ecological setting, directive, and relations with key stakeholders such as surrounding communities and port users. However, it is worth noting that the scope of this study is limited to container operation only within the seaport and not associated with inland port considerations.

Accordingly, it is advisable to perform further research to assess the financial implications of integrating halal practices in container operations or the entire port. This study relied on qualitative means, so conducting a quantitative survey could validate the findings and establish the significance of the identified factors. Given the attention to managing halal containers, a forthcoming study could explore breakbulk cargo activities in the port, which could provide more comprehensive support for implementing halal practices in the port industry.

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