

Integrating Sertu in Halal Supply Chains: Compliance, Contamination Prevention and Transparency

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ABSTRACT

The integration of sertu, an Islamic ceremonial cleansing technique, into contemporary halal supply chains is critically examined in this article, with a focus on the method's crucial role in supply chain transparency, regulatory compliance, and contamination control. The importance of halal integrity in the global economy is established at the outset of the study, particularly in the food, logistics, and non-food industries, where cross-contamination threats persist. The intricacy of industrial procedures is the issue that prevents sertu from being applied consistently, particularly when handling halal and non-halal products at the same time. The method for this study is a qualitative review technique to examine how sertu is operationalized, the difficulties in standardization, and the consequences for certification and customer trust by synthesizing academic literature, industry reports, and regulatory standards (MS2400). Important conclusions reveal that, although halal procedures are theoretically required to restore halal status and are mandated by religion, their application frequently conflicts with automation protocols, industrial efficiency, and food safety standards. The paper also suggests sertu can be institutionalised into halal assurance processes with the aid of technological solutions like digital documentation and blockchain traceability, according to the study. It comes to the conclusion that uniform policies, employee education, cooperation with halal authorities, and investments in transparent, traceable systems are necessary for a successful sertu integration. Without these, halal-certified businesses run the danger of breaking the law, losing customers' trust, and harming their brand in the very competitive worldwide halal market.

Keywords: Sertu, Halal Supply Chain, Contamination Prevention, Halal Compliance, Blockchain, Supply Chain Transparency

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INTRODUCTION

Halal refers to "things or actions permitted or lawful" as defined by Islamic Shariah rules. Therefore, halal services and foods are defined as those that are permitted to be used or consumed in compliance with Islamic Shariah law. Particularly for companies that cater to Muslims, halal compliance is a crucial component of the global food sector. From the procurement of ingredients to the production process, the halal certification process ensures that products comply with Islamic dietary requirements. Sertu is a ceremonial cleaning procedure that must be performed when any halal equipment or products come into contact with Haram (forbidden) materials, such as pig or any of its derivatives. It is an essential component of adhering to halal regulations. In particular, its significance in avoiding contamination and ensuring halal compliance is highlighted in this comprehensive assessment of sertu's role in the halal supply chain. The incorporation of sertu methods into contemporary food production systems is highlighted, along with the state of the literature and issues.

A key component of the halal business is the production of halal food products. According to Islamic dietary standards found in the Quran, Hadith, and Sunnah, any food or beverage product must meet certain requirements to be certified by the authorities. The 1.9 billion Muslims worldwide who practise Islam have led to an increase in demand for halal goods, which has caused the global halal market to expand rapidly in recent years. The global halal economy is expected to reach \$3.2 trillion by 2027, with food and beverages making up the greatest portion at \$1.27 trillion, according to a report by Standard, (2023). A product's certification as halal guarantees that it complies with Islamic dietary regulations, which cover food preparation, handling, and storage in addition to ingredient requirements. Muslim-majority nations like Malaysia and Indonesia have established strict systems for halal certification that serve as the model for halal standards worldwide.

Halal is no longer only a religious idea; for businesses, it has become a significant symbol of quality and a way of life (Talib et al., 2019). In the event food is certified as halal, Muslims feel more secure (Irani et al., 2015). The globalization of the economy and the Muslim population's high rate of immigration have made halal markets accessible to those outside of Islamic nations, allowing them to function as both producers and consumers. The market for halal food has grown rapidly due to the broad acceptance of halal food by non-Muslim consumers who consider it to be high-quality, sanitary, safe, and healthful (Nurrachmi, 2018).

For Muslim consumers, halal compliance is essential to fostering brand loyalty and consumer trust. According to a Hackett & Grim (2021), survey from 2021, 69% of Muslim customers prioritize halal certification when making food purchases, and they also prefer transparent supply chains that guarantee conformity to Islamic principles and the prevention of contamination. Blockchain technology is one innovation that has been made possible by the increasing demand for and awareness of halal-certified products. It is utilised to improve the traceability and transparency of the halal supply chain. To underscore the significance of halal compliance in preserving market competitiveness and consumer confidence, a Thomson Reuters analysis from 2021 also revealed that businesses that followed halal standards experienced a 28% rise in consumer trust compared to non-certified businesses.

The study's justification is the increasing intricacy of halal supply chain, which frequently entails computerised procedures that might not be able to support customary cleansing practices like *sertu*. Furthermore, there have been serious compliance issues due to inconsistent implementation, a shortage of skilled workers, and a lack of knowledge of the spiritual value of *sertu* in various businesses and geographical areas (Ahmad & Shariff, 2016b). By analysing its operational execution, difficulties, and possible technological integrations, this article aims to investigate the crucial role that *sertu*, the Islamic cleansing process, plays in preserving halal integrity across the supply chain. The study's objectives are to evaluate *sertu*'s role in preventing *najis mughallazah* (extreme impurity) contamination, guaranteeing Shariah law compliance, and enhancing traceability and transparency in the halal supply chain. In situations where halal and non-halal products are handled concurrently, companies are under increasing pressure to maintain not only halal certification but also religious purification practices like *sertu* as halal supply chains grow internationally in response to rising Muslim consumer demand (Ahmad & Shariff, 2017; Aziz et al., 2021). In order to close a significant knowledge gap regarding the standardisation and institutionalisation of *sertu* within halal supply chains, thereby promoting both religious compliance and operational efficiency in this article synthesises regulatory frameworks, industry practices, and scholarly literature.

LITERATURE REVIEW

Halal Sertu and Supply Chain

Sertu entails seven washings of the limbs, clothes, locations, utensils, and equipment that come into contact with the *najis mughallazah*, one of which is with water mixed with soil. Six washes with either pure water or another clean water should come after the initial water wash, which should be mixed with soil (JAKIM, 2020). The process of cleaning workstations, vehicles, warehouses, and containers to be free of dirt, stains, or any other impurities that damage the storage area of halal goods is referred to as *sertu* in the context of the halal supply chain. The degree of stains and the washing agent or medium are the determining factors in the cleaning procedure that involves sweeping, scrubbing, and washing (Sirajuddin et al., 2016). Water is often used as a washing agent since it is inexpensive, natural, and effective at eliminating stains, grease, and chemical agents. The purity, spiritual, and religious values, as well as faith, are all part of the cleansing process, which is more than simply a cleaning procedure. When following the religious principles, faith, and beliefs with complete sincerity and honesty, ritual cleansing in *sertu* assists in eliminating not just impurities and dirt but also evil spirits and negative energy. *Sertu* is regarded as a necessary component of halal logistics operations, which include the process of cleaning the infrastructure, including floors and loading bays with water, as well as the vehicles and containers used in transit, the warehouse, and the surrounding areas, following religious principles and verses from the Quran.

The complete process of manufacturing and distributing goods that abide by Islamic law is included in the halal supply chain. This entails obtaining raw ingredients that are halal, processing them at establishments that have received certification, and making sure that distribution, storage, and transit adhere to halal regulations. A halal supply chain's principal elements are as follows (Team, 2025):

1. Sourcing of ingredients: Making sure every component is halal and devoid of anything considered to be prohibited (Rahman et al., 2024).
2. Production and handling: separating items that are halal from those that are not to prevent cross-contamination (Raes & Shamsuddin, 2025).
3. Preventing cross-contamination by keeping halal and non-halal commodities in separate areas during storage and transit (Supian, 2018).
4. Halal certification entities that are widely recognised conduct ongoing verification through certification and audits (Amid, 2024).

The intricate supply chains raise serious concerns about contamination, particularly for companies that deal with both halal and non-halal goods. Sertu then becomes crucial in this situation. Sertu cleansing, also known as Shariah ceremonial cleansing or purifying cleansing, is defined by Islamic law as the process of getting rid of the highest possible amount of impurity or severe najis (*najis mughallazah*). It involves removing any contaminating materials from dogs, pigs, and other animals by personal contact or other means. For example, after inadvertently or purposely coming into contact with canine saliva, a Muslim is required to cleanse the affected part of their skin using the sertu cleansing methods and procedures, described in conformity with Islamic law. The term "sertu" refers to a specific cleansing method outlined in Islamic law, particularly when haram items (such as pig) are present. One of the seven cleanings required by the sertu technique is the mixing of water and earth (soil) to remove contamination from an area or piece of equipment. According to hadiths, this is known as *ta'abudi*, which means washing seven times. This method is not only important to ensure that the area or equipment can be used for halal purposes again, but it is also standard protocol. Sertu is essential when halal-certified surfaces or products are contaminated with significant impurities (*najis mughallazah*), specifically pork or derivatives. Sertu cleansing processes and procedures must comply with the standards of Malaysian Standards MS2400:2010 for the *halalan-toyyiban* assurance pipeline, often known as halal supply chain management.

According to Ngah et al., (2020), the growth of the halal business, both domestically and abroad, has indirectly increased demand for cleansing or sertu services. However, there is a dilemma in the industry because hadith merely explains Islamic cleansing or sertu in general, whereas industrial needs are more complicated. After all, the process includes water-sensitive equipment and machines. As a result, it requires a more detailed Islamic cleansing or sertu standard before it can be practiced by the industry. Sertu has expanded swiftly, utilising sophisticated and modern technology and technologies, but it remains founded in Islamic teachings. Sertu items used in the sector include soil-based soaps and liquid detergents. Furthermore, building human capital through specialised training is critical to creating more Islamic sertu professionals in the business (Ngah et al., 2020).

Case study 1: Cold Storage and Cross-Contamination in Malaysian Logistics

A Malaysian logistics company that handles both halal and non-halal frozen items was discovered to use common storage facilities, which could lead to contamination. JAKIM required the organisation to do sertu cleansing before recertification. Sertu action was taken, and sertu was applied to polluted storage units, floors, and loading bays using a water and clay mixture following MS2400. Supply chain operations were delayed, but recertification was secured, and consumer trust was restored (Ahmad & Shariff, 2016b).

Case study 2: Cosmetic Factory in Johor and Equipment Contamination

A cosmetics manufacturing business discovered that some production tanks that had previously been used for non-halal animal-based materials had been reused without proper sanitation. Sertu action was taken, and JAKIM imposed sertu cleansing methods, including soil-based scrubbing and documentation following MS2400 requirements. The impact was that production was halted for three days, and staff retraining was undertaken (M. Yaacob & Rahman, 2023).

Although the sertu procedure is not required under normal conditions, medium and large-scale businesses or industries are urged to develop a documented Standard Operating Procedure (SOP) for sertu as a preventive step. This is especially crucial in the event of noncompliance problems that may demand sertu washing, which is stated as a major requirement under the Halal Assurance System (HAS) of the Malaysian Halal Management System 2020. The Malaysian Halal Management System (2020) also states that any sertu procedures created must adhere to the guidelines issued by the Department of Islamic Development Malaysia (JAKIM), as well as the regulations enforced by the respective State Islamic Religious Departments (JAIN) or State Islamic Religious Councils. Furthermore, relevant records must be kept and made easily accessible for examination during halal certification inspections. In cases of serious contamination (*najis mughallazah*), the sertu process is required upon direction from an authorised regulatory authority. Officers from JAIN or MAIN must also be present during the cleansing process to act as witnesses and ensure that the sertu procedure is carried out appropriately and by Islamic norms (JAKIM, 2020).

In the Malaysian halal sector, a few recommendations for the application of best practices were also made. Below are some recommendations that have been highlighted in this regard: creating detailed guidelines for each halal scheme; managing and procedures for joiners; providing career opportunities for certified joiners; organising courses and training; addressing the difficulties encountered during process implementation; managing and charging for services; creating a database of sertu service providers; and fostering innovation in sertu (Aziz et al., 2021).

The Role of Sertu in Contamination Prevention

Salleh et al., (2020) did a study on the implementation of industrial sertu and discovered significant disparities between Shariah-based sertu practices and their industrial applications, especially in terms of procedures and methodologies. These disparities are especially noticeable when working with water-sensitive machinery and equipment, as well as demanding settings such as carpeted floors. In response to these practical issues, the Department of Islamic Development Malaysia (JAKIM) has created a guideline called "Sertu Guidelines from the Islamic Perspective." This guideline is used as an official reference by sertu service providers and State Islamic Religious Departments (JAIN) during the sertu cleansing procedure. When it comes to keeping the halal supply chain clean, sertu is important. Even inadvertent contamination needs to be immediately corrected via the Sertu procedure since halal products must never come into contact with substances considered to be prohibited. The failure to properly cleanse the batch of items could result in it being declared non-halal, which could cause serious financial losses, harm

to the company's reputation, and mistrust from consumers. In food processing situations where both halal and non-Halal items are handled, it is crucial to adhere to stringent protocols, as demonstrated by research conducted by Nurdeng Deuraseh (2021). Sertu methods, according to the research, are necessary to ensure that conveyor belts, storage areas, and tools may all be cleaned and reused without compromising the quality of halal food. If non-halal materials get contaminated with halal materials, the halal product will become less pure.

Sertu cleansing with water mixed with clay is the necessary method for cleaning and purifying storage, handling, and equipment polluted by severe najis (contaminant of pig and canine origin) (Ahmad, 2018; Ahmad & Shariff, 2016c; Ariffin et al., 2019; Rahman et al., 2022).

1. Raw material: Water

The following lists operations by category. Water must always be the primary cleaning and washing agent when doing sertu, or ritual cleaning. Water quality requirements are as follows: it must be natural (*mutlaq*), not *mustakmal*, and free of najis (MS2400: 2010). Following Shariah law, *mutlak* water is pure water in its unadulterated form, devoid of any combination, and capable of cleaning and purifying processes. *Mutlak* water is defined as water that has not been exposed to or used, whether it is for personal hygiene, removing dirt or other debris, or combining with chemicals like soap. It is commonly acknowledged that water from rivers, wells, rain, dew, sea, melted snow, springs, and taps qualifies as absolute (*mutlak*) water (Yaacob & Rahman, 2023). The following process (procedure) classifies the methods of using water for sertu operations.

2. Product: Soil or agent of cleansing

The soils must not contain *musta'mal*, or soil that has been used for dry ablution, and must be devoid of najis (MS2400: 2010). A method of eliminating the diseases and germs that such impurities contain is sertu, or purification with soil. Researchers have discovered that utilising soil is the sole method for thoroughly cleaning and eliminating any bacteria or any diseases that might be present in the pollutants in Najis *Muglazah*. Clay is typically referred to be soil; nevertheless, advances in technology have produced cleaning solutions such as soap, chemical agents, and products made of sertu clay (Kassim et al., 2014). According to the proportionate ratio (amount) of water (raw material) used in the cleansing procedure, the amount of soil or agent used for ritual cleansing must be calculated.

Paper-based sertu soap production requires that the goods used are suitable. For example, there must be no najis and the paper must be pristine. According to T. Z. Yaacob et al., (2023), Shariah-compliant soil and clay conditions must be free of najis. For the final products to meet Shariah purification requirements, these are the necessary elements. The literature highlights the usage of specific cleaning products, including soap, during sertu cleansing following Islamic regulations in order to remove pollutants (Ahmad & Shariff, 2016a).

3. Process: Procedure of cleansing

Using *mutlak* water combined with soil for one wash and *mutlak* water for six washes, the diseased region or portions are cleansed (washed) seven times in the sertu process. The MS2400: 2010 standards provide the following cleaning procedure guidelines; quote:
a. A wash must be done seven times, with one wash consisting of water combined with

soil; b. The initial wash should be done to eliminate all najas, even if multiple washes are necessary. c. The water used for the initial cleaning will not be left behind, and this wash will be considered the second wash. d. Only enough dirt is used to create a suspension; and e. Using a cleaning chemical that contains soil is acceptable.

f. This procedure will also involve managing the water's flow and discharge into appropriate drains and drainage systems for cleaning and rinsing. It is necessary to eliminate any najas before beginning the *sertu* cleanse. The following clay and water specifications must be followed when implementing *sertu* (Latiff, 2016; Shariff & Ahmad, 2019).

4. People: Registered Person

According to Tieman, (2011), trust in the halal food supply chain can be as straightforward as pure trust. Based on Muslims' faith in the religious duty to offer only halal items in their day-to-day commercial operations, halal customers will be able to buy halal food from a halal supplier or store. A person who is qualified in Shariah law must oversee and verify the Shariah cleansing procedure. Therefore, it follows that the individuals or designated cleaning contractor responsible for carrying out the *sertu* cleansing procedure must also be aware of the Shariah procedural standards and able to both comply with them and carry out the ritual cleansing in an honourable manner. To perform this work with honesty, these individuals must be qualified, certified, and trained by the halal authority. To lead and oversee the entire *halalan-toyyiban* assurance management system, the MS2400 standard criteria further specify that the organisation must designate a *halalan-toyyiban* leader, establish *halalan-toyyiban* committed parties, and designate a shariah adviser. It is vital for a Shariah-compliant individual, someone authorised by the State of Islamic Affairs Department, or professional *sertu/samak* cleaners certified or recognised by Malaysia's Department of Islamic Development (JAKIM) to perform, oversee, and verify cleansing. The Malaysia Standard 1500:2009 has been constructed by the Malaysia Halal Authority. Shariah competent individuals are required to oversee and verify the Shariah cleansing procedure, as stated in MS1500:2009 Clause 6.7.2. Accordingly, it is necessary for the individuals or designated cleaning contractors who carry out the *sertu* cleaning procedure to be aware of the Shariah procedural standards and capable of adhering to them when performing the *sertu* washing while preserving the integrity of the halal food.

5. Record: Paper Documentation

As specified in MS2400: 2010 (JAKIM, 2020), all *sertu* cleansing that is performed or carried out must be documented. Records and documentation serve as objective proof of the procedures that have been correctly followed and adhere to all Shariah criteria. They are also useful for tracking and tracing, and last but not least, for auditing and ensuring the integrity of the halal logistics system. Standard operating procedures and documentation are required not only to show that the halal management system complies with MS2400 criteria and is adequate, but also to ensure that *sertu* operations are conducted by established protocols and guidelines. Documents like the *halalan-toyyiban* policy, organisation chart, job descriptions of the *halalan-toyyiban* committees and halal executives, training manual, appointments of certified contractors hired for *sertu* operations, and communications are a few examples; other crucial records that show *sertu* operations were completed include training attendance records, product purchases, and process logs.

All business participants must adopt and follow more precise guidelines for the Islamic cleaning (sertu) process in the halal sector. It is essential to identify any issues that arise during the sertu process to ensure compliance with Islamic law's obligations. The MS2400 Halal Assurance Pipeline Standards, which Malaysia pioneered in halal supply chain management, are highly respected worldwide (Department of Standards Malaysia, 2010). Malaysia is the global leader in halal certification. Along with the Department of Standards Malaysia, JAKIM (Department of Islamic Development Malaysia) is widely recognized as the leading authority on halal policy development, certification procedures, and auditing standards.

CHALLENGES IN IMPLEMENTING SERTU IN MODERN PRODUCTION

Scaling up and streamlining sertu within contemporary food production systems is one of the biggest obstacles. The risk of cross-contamination rises since many food production facilities handle a variety of products, including both non-halal and halal commodities. Large-scale machinery and automated systems also frequently have complex elements that are challenging to completely clean with conventional sertu techniques. According to Ahmad & Shariff, (2016a), there is a lack of awareness about sertu cleansing operations in Malaysia among logistics industry players, as well as a lack of integration and collaboration between industry and halal authorities in sertu implementation (Ahmad & Shariff, 2016c, 2016a). They also discovered that there is little discussion in these publications about the issues of sertu or samak cleansing on vehicles and containers in maintaining the halal integrity of goods from farm to fork (Ahmad & Shariff, 2016a). Timetables for manufacturing may be impacted by the labour-intensive procedure and potential equipment outages. However, in contemporary, ultra-sanitized settings, where the inclusion of foreign materials (like earth) may clash with other food safety regulations, the use of soil in the sertu process presents practical difficulties.

The Traceability Systems for Sertu Compliance

The difficulties of combining traditional religious practices with cutting-edge technology methods employed in food manufacture are one of the main obstacles to applying sertu (Islamic ritual cleansing) in modern food production. The majority of contemporary production lines are built to be very efficient, with little process flow disruptions. Large-scale operations' automated processes may be interfered with by the ritual cleansing necessitated by sertu, which entails certain steps like mixing earth and water. However, with the continued expansion of the worldwide halal food market, which is expected to exceed \$2 trillion by 2025 (Worldwide Halal Industry Report, 2023), it can be technologically challenging to guarantee that robotic or automated systems satisfy sertu's exact standards.

A robust tracing system that can highlight issues that arise at each stage of the supply chain is essential to figuring out what's wrong with halal in a company's operations. To ensure the survival of the halal business in the global market, an efficient traceability system for the industry must be built and modelled, taking into account the importance of the local halal supply chain (Shafii & Khadijah, 2012). In creating an economic research gate, the study recommends focusing on the following areas: Percentage of involvement in the Halal traceability and tracking system, acceptable degree of risk in the halal traceability and tracking, and break-even threshold in the system (Ahmad & Shariff, 2016). According to Ali

et al., (2017), there are four supply chain dimensions that are associated with raw materials, production, service, and the customer. These dimensions can be used to classify the "shades" of halal integrity in the halal supply chain.

Guidelines and Operational Standardization

Considering sertu requires more labour, resources, and training to ensure that the ritual cleansing procedures are followed, its implementation in food production facilities may result in higher operating costs. As per the latest industry estimates, the implementation of halal-compliant cleaning procedures, such as sertu, may result in a 15-20% increase in operational costs. This is attributed to the need for specialised cleaning equipment, the need to halt production for sertu procedures, and the need for more stringent supervision (Halal Market Analysis, 2022). The competitiveness of businesses with narrow profit margins, such as processed food, may be greatly impacted by these higher costs. Further complicating matters is the operational downtime that sertu requires. This is especially true in the fast-moving consumer goods (FMCG) businesses, where any production stoppage can result in delayed supply chain deliveries and a consequent loss of income.

The success of halal productions may be threatened by a lack of knowledge about halal (permissible) and its link with tayyiban (wholesomeness), particularly among manufacturers, service providers, and customers. Insufficient knowledge of the halal procedures may cause the process to move slowly and reduce the number of halal certificates that are approved (Alina et al., 2013; Noordin et al., 2009). For the halal integrity of the supply chain to remain intact from upstream to downstream, all stakeholders must share the same concept and operational procedure for handling halal products (Mohamed et al., 2016). The shared worries of those involved in the sector. The belief is that engaging in sertu activities will be costly, involving not only the cost of sertu services but also charges for energy and resources, as well as production delays. It is imperative for stakeholders in the halal business to do a thorough study, given that the expenses incurred may not be as substantial as the possible return on investment and the significance of satisfying customer demand for halal products. It is currently challenging for firms to comply consistently with sertu due to the lack of consistency in its interpretation and application across industries and geographical locations. Whether a company is located in a remote area or operates in an industry with diverse workflows, standardising these rules will assist in maximising efficiency. In keeping with the global halal norm, this will also help multinational corporations adhere to local requirements.

Furthermore, there is a paucity of both practice and service provider companies. This issue involves a number of aspects, including the creation of liquids that do not conform with the required fatwas and the failure to follow authorities' recommendations. Inadequacies in severance processes can cast doubt on the cleanliness and authenticity of the service provider's severance process (Mahyeddin et al., 2020). Other than that, focuses on non-uniform and guided implementation. Despite JAKIM implementing sertu guidelines for the industry, sertu service providers frequently fail to comply with these guidelines. This emphasises the need for better monitoring and enforcement of sertu guideline compliance at both the JAKIM and JAIN levels to promote sertu industry growth. Identifying these challenges highlights the necessity for reform actions such as coordinating jurisdictions, enforcing guidelines, and boosting public awareness to boost trust in Malaysia's halal industry (Mahyeddin et al., 2020).

Lack of Sertu Training and Consistent Compliance.

Providing enough training in sertu processes to all staff members is another major difficulty, especially in large food manufacturing operations. Multinational corporations operating in areas where halal regulations are less well-known or severely regulated should be particularly aware of this. According to a survey by the Halal Industry Development Corporation (HIDC, 2021), close to 32% of businesses with halal certification stated that all of their employees were properly trained on sertu processes. It can be challenging to maintain consistent compliance, especially in establishments that handle both non-halal and halal products. Incorrect sertu execution can result in contamination, loss of halal certification, and harm to the reputation of the business. Maintaining compliance depends on ongoing staff training, supervision, and adherence to halal standards.

The shortage of labour to carry out the sertu. The industry's main power and time are constrained because providing sertu cleansing services is not their primary operation. Additionally, dealing with the same limitation of not having enough workers to meet demand. Nonetheless, businesses are working to bring on and educate additional businesses under their direction and control so that they can provide services to businesses outside of their primary operation. It is quite concerning that the halal food production business lacks proper training in sertu (Islamic purification), especially as the global demand for halal food is growing. The perception is that sertu activity will result in significant costs, not just for sertu services, but also for energy and resource expenses, as well as production downtime. However, halal sector participants should do a thorough study because the costs may not be considerable when compared to the possible return on investment and the importance of meeting customer demand for halal products (Rahman et al., 2022).

Based on the company's size and location, Halim et al. (2020) discovered that the average cost of adopting a Halal compliance program, including sertu, varied large of amount. Compared to 48% for general Halal compliance training, Hassan et al. (2022) found that only 12% of Halal-certified businesses trained their employees on sertu procedures using e-learning platforms or digital simulations. Sertu's religious significance may not be fully understood by many workers in non-Muslim nations, which makes it more difficult for trainers to emphasise.

RECOMMENDATION IN SERTU COMPREHENSIVENS

Global Standards and Variations in Sertu Practices

The fundamentals of sertu are the same throughout the Muslim world, although local interpretations of Islamic law led to differences in the practice's application. There are clear rules for sertu in nations like Brunei, Malaysia, and Indonesia where halal certifying organisations like MUI in Indonesia and JAKIM in Malaysia play a significant role. Businesses pursuing certification are required to follow these requirements, which are part of the larger halal certification procedure. On the other hand, sertu may not be as well understood and used in Western nations where there is a minority Muslim population. To ensure they are following halal regulations, companies operating in these areas might need to consult with local Islamic scholars or certification organisations for specific advice. In the Malaysian Standards for Halalan-Toyyiban Assurance Pipeline -Part 1: Management System Requirements for Transportation of Goods and/or Cargo Chain Services (MS2400-1:2010),

sertu is referred to be Islamic ceremonial purification. Sertu is defined as Shariah ceremonial cleansing, which is an act of removing impurities using cleansing processes in line with Shariah criteria as specified in the MS2400-1 standard requirements (Ahmad & Shariff, 2016c).

Businesses are looking for creative ways to integrate sertu into their manufacturing processes without sacrificing efficiency in light of the development of current technologies. For instance, it has been suggested that high-pressure water jets and steam cleaning be used in addition to or instead of conventional sertu techniques. In order to make sure that these technological advancements adhere to the sertu process's theological standards, they must be carefully considered. Ensuring halal compliance throughout the supply chain is another area of research for blockchain technology. Verifying that sertu processes have been successfully followed following contamination occurrences can be aided by blockchain technology, which offers a transparent and tamper-proof record of every step in the supply chain. As per a PwC analysis from 2023, 45% of Malaysian companies that have received halal certification are investigating the possibility of utilising blockchain technology to improve their traceability systems. This is especially true for sertu compliance and contamination management.

Sertu in Non-Food Sectors

Sertu's concepts apply to a variety of industries, including logistics, cosmetics, and medicines, even though the food business is often linked with them. Whenever a business handles goods for Muslim customers, it is their responsibility to make sure that no materials considered haram come into contact with them. For example, if cosmetics manufacturing equipment is tainted with non-halal components, sertu is required to be cleaned it before halal-certified items may be made. Sertu is utilised in logistics, especially in cold chain management, when products that are not halal and those that are halal may be carried together. It is used to clean trucks or containers that have come into contact with haram products. As per a report published by Frost & Sullivan (2021), the logistics industry in Southeast Asia is progressively integrating sertu protocols to fulfil the prerequisites of Halal certification for the transportation of food and cosmetics.

Avoiding direct contact between halal food and any non-halal components in halal segregation is one of the most frequently highlighted requirements for the successful implementation of the halal industry and halal supply chain. This can be accomplished by physical segregation, whereby, to maintain their halal status, halal products should not come into direct contact with or be combined with non-halal goods or components along the supply chain process. The potential of cross-contamination between contaminated and halal products increases when contaminants are present in the halal supply chain processes. This can lead to contaminated halal products that are therefore considered non-halal and prohibited. Accordingly, the most common contaminants in the halal supply chain and logistics are najis and precursors, which may have been present in the transport and containers that once held non-halal products; additionally, there may be traces of contaminants that came from the non-halal products as a result of a combination of factors (such as temperature, humidity, air pressure, and air quality), or human handling during warehouse operations and retailing (Mohd Shariff, Jaafar & Muhammad, 2014).

From the point of manufacture to the point of final destination, halal items must be transported under Shariah law to prevent cross-contamination (Kusnadi et al., 2017). To preserve the halal integrity of their products, a manufacturer of halal products, on the other

hand, must ensure that halal transportation services are employed throughout the operations. Many issues have come up when clients dispute whether supply chain operations are halal. Customers are also doubting halal certification and sanitary standards. Therefore, the focus of this study is on halal makers' intentions to use halal transportation as well as their halal logistical skills. The transportation method of containerisation is the exclusive subject of this study. In response to demands from customers and other stakeholders, this is being done to make sure that operations comply with the halal method. If they use these services, it will help dispel any reservations that Muslim customers may have about using the halal items that are on the market.

Economic Impacts of Sertu on The Halal Industry

Sertu has important economic ramifications, especially for major producers. Sertu can be expensive to do, taking into account labour costs, possible downtime, and the requirement for certain cleaning supplies. But, the price of breaking sertu regulations is far higher since it may result in product recalls, certification revocation, and reputational harm to the company. The global halal food and beverage sector is predicted to grow to \$3 trillion by 2026, per the Global Halal Industry Report (2022). Businesses that disregard sertu rules run the risk of being shut out of profitable marketplaces in this growing sector, especially in nations where Muslims predominate. Before Muslims became more conscious of halal status and the surge in demand for halal products, the majority of logistics service providers were not following an appropriate segregation procedure when it came to their transportation and storage operations. This predicament resulted from economical budgeting reasons that forced the corporations to lower their operating costs to attain economies of scale in their operating costs. It has been demonstrated that using specialised infrastructure, such as handling equipment, warehouses and storage facilities, and transportation fleets, will prevent the likelihood of halal items being mixed with non-halal products.

In this context, eight key recommendations have been proposed: the need for specific guidelines tailored to each halal certification scheme; standardised procedures and management for sertu; the establishment of sertu as a certified professional career path; the necessity of organising structured sertu training and courses; the identification of the challenges encountered in implementing sertu processes; financial management and service provision related to sertu; the development (Aziz et al., 2021). Consequently, by following this procedure, it is possible to prevent needless human error and guarantee that operations meet the requirements of Muslim customers. According to a study by Demirci et al., (2016), Muslim customers preferred it when halal and nonhalal foods were separated during physical distribution. Thus, the other research on the value of devoted assets in halal business operations that was gathered for this study was supported by this finding.

CONCLUSION

In particular, sertu helps to ensure that Islamic dietary regulations are followed and that contamination does not occur, which is crucial to the integrity of the halal supply chain. Both opportunities and obstacles for successfully implementing sertu have been brought about by the increased complexity of global supply networks and technological breakthroughs. Halal supply chains can be made more dependable and efficient by incorporating best practices and contemporary technologies, even though ancient sertu procedures are still crucial. Businesses must give sertu practices priority if they want to stay competitive and win over customers in

the growing global halal market. This calls for the adoption of creative solutions that tackle the real-world difficulties of contamination control in expansive, contemporary production systems, in addition to strict devotion to religious precepts. Overcoming logistical, legal, and pedagogical obstacles is necessary to integrate sertu into contemporary food production. Manufacturers have to strike a compromise between their operational efficiency, religious commitments, and adherence to food safety laws. To tackle these obstacles, it could be necessary to work with organisations that certify products as halal to create workable norms, to teach employees, and to investigate technological solutions that respect religious beliefs while upholding strict standards for food safety and productivity.

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