

INDONESIAN HALAL FOOD INDUSTRY: DEVELOPMENT, OPPORTUNITIES AND CHALLENGES ON HALAL SUPPLY CHAINS

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Abstract

This paper aims to determine the development, opportunities and challenges of the halal supply chain in the Indonesian halal food industry. The method used is descriptive qualitative method. A qualitative approach is a procedure that produces descriptive data in the form of written or spoken words from people and the observed behavior of giving a comprehensive picture. The type of research is descriptive with the aim that researchers can reveal facts, phenomena, and conditions present. Research results show in the era of the halal food chain and halal science as it is today, competition for halal food needs is higher than overseas, therefore halal food companies must maintain production, with the application and other technology companies must respond to consumers faster. The market potential for the halal food industry in Indonesia is developing rapidly. Over the past few years, Indonesia is ranked first as Halal food consumers in the world. Nevertheless, the market potential is very the amount has not been able to be used optimally by the government to improve Indonesia's economy. Maintaining the quality of halal food products is one way to compete with other countries in the halal food industry.

Abstrak

Makalah ini bertujuan untuk menentukan perkembangan, peluang dan tantangan rantai pasokan halal di industri makanan halal Indonesia. Metode yang digunakan adalah metode deskriptif kualitatif. Pendekatan kualitatif adalah prosedur yang menghasilkan data deskriptif dalam bentuk kata-kata tertulis atau lisan dari orang-orang dan perilaku yang diamati dalam memberikan gambaran yang komprehensif. Jenis penelitian ini adalah deskriptif dengan tujuan agar peneliti dapat mengungkapkan fakta, fenomena, dan kondisi yang ada. Hasil penelitian menunjukkan di era rantai

makanan halal dan sains halal seperti sekarang ini, persaingan untuk kebutuhan makanan halal lebih tinggi dari luar negeri, oleh karena itu perusahaan makanan halal harus mempertahankan produksinya, dengan aplikasi dan perusahaan teknologi lainnya harus merespon konsumen lebih cepat. Potensi pasar untuk industri makanan halal di Indonesia berkembang pesat. Selama beberapa tahun terakhir, Indonesia menempati peringkat pertama sebagai konsumen makanan halal di dunia. Kendati demikian, potensi pasar sangat besar jumlahnya belum dapat dimanfaatkan secara optimal oleh pemerintah untuk meningkatkan perekonomian Indonesia. Mempertahankan kualitas produk makanan halal merupakan salah satu cara untuk bersaing dengan negara lain dalam industri makanan halal.

Keywords: halal food industry; halal supply chains; Indonesia.

Introduction

In recent years the Indonesian government has been active developing the halal food industry in the country, which is characterized by government efforts promote the growth of the halal industry in the country, starting with the sector Islamic finance and continues to develop the real sector, including the halal food and beverage sector. Halal industry can be said to be a new opportunity in the industrial world that is currently being loved by countries in the world. An understanding of the halal industry can be enlightened by understanding the halal world first (Selvarajah Krishnan, Che Musa Che Omar, Ershad Zahran, Nazreen Syazwan, Sharifah Alyaa, 2017). The large number of the world's Muslims reaching one third of the world's population and the increasing needs of generations of Muslims is the reason the countries in the world began to penetrate into the halal industrial market. In this case not only includes countries with a majority Muslim population, but Muslim minority countries also take part in the development of the current halal industry. This can be said to be a sign that the halal industrial product market has a great opportunity to support increased economic growth and development. In other words, the food industry is becoming more concerned and sensitive about the manufacture and source of halal products (Abdalla M. Bashir, Abdullah Bayat, Samuel Oladipo Oluatase, Zul Ariff Abdul Latiff, 2018).

Indonesia is a country with the largest Muslim population in the world. Based on data from the Central Statistics Agency (BPS), the total population of Indonesia reaches 237.6 million, with a Muslim population reaching 207 people or around 87 percent. With the largest Muslim population in the world, Indonesia has a large market potential for the global halal industry. Reports State of the Global Islamic Economy, published by Thomson Reuters put Indonesia in the first rank for consumers of halal food products in the amount of \$ 154,9 billion. However, the Indonesian government has not been able to maximize the market potential because Indonesia is still ranked 10th in the category of halal food producers.

Referring to this, it is very important for Indonesia to actively participate in improving halal products in the country, especially the food sector. As a country with a majority Muslim population, it is hoped that Indonesia will not only become a very potential market share in the halal industry, but also be able to seize this great opportunity. Products from the halal food industry are the main and most recognized components of the halal industry (Mohd Hafiz Zulfakar, Marhani Mohamed Anuar, Mohamed Syazwan Ab Talib, 2014). But on the other hand in the halal industry, there are other challenges, especially in the halal food industry where the behavior of consuming halal food is not necessarily in line with the large Muslim population. Although the appeal of the halal market segment and its potential for growth is so rapid, but research into the consumption of halal food in the Muslim market segment has more or less been ignored (Nor Sara Nadia Muhammad, Wan Edura Wan Rashid, Norafifa Mohd Ariffin, Norhidayah Mohd Rashid, 2014). The understanding and implementation of Islamic Sharia which among others are reflected in the behavior of halal food consumption starting from the source of supply, storage, transportation, manufacturing, handling, and distribution of food must comply with the concept of *halal toy-yiban*. This means that halal food products must not be mixed with non-halal products in all logistics activities to ensure that the halal status of a product can be maintained and maintained.

Kosher food handling throughout the supply chain (supply chain) is important in the halal food industry, for the production of food *halalan tayyiban* would be meaningless if the halal and food hygiene are not taken care of throughout the shipping process from sources of supply to the ultimate consumer. Often, the interpretation of halal is largely in the food producers (Sharifah Mariam Alhabshi, 2013). Food intake into a human being is passed down from one generation to another, which supplies a lot of nutrients for humans to survive (Mohammad Parhan Bin Mat Isa, Risyawati Mohamed Ismail, 2015). However, in recent years, halal food consumers have increasingly worried about the authenticity of the food they eat (Hamadah Nur Lubis, Noor Faizah Mohd-Naim, Nur Nazurah Alizul, Minhaz Uddin Ahmed, 2016). State of the product *halalan tayyiban* can only be achieved if all the possible contamination of illicit and dangerous products can be avoided not only in production but also during the process of the supply chain took place. Lawful process should be viewed from the perspective of the supply chain for halal products can only be produced when all activities along the supply chain process based on the provisions in Islam, not only in the production process. Considering halalness is very important for Muslims for their type and food choices, a lot of research on halal has grown significantly in recent years (Yasid, Fikri Farhan, Yuli Andriansyah, 2015).

For Muslims, the discussion about food must meet the requirements of halal and thoyyib as many provisions in the Holy Qur'an and the Hadith of the Prophet Muhammad SAW, including those contained in Surat Al Maidah, 88: "*And eat halal food again both of what Allah has blessed you for, and fear Allah whom you have faith in Him*". In the Al-Qur'an, instructs humans (Muslims) to eat halal and good food, two things that constitute unity where according to shariah and good in terms of health, nutrition, aesthetics and others. Consumerism is considered as an important component of the Islamic economic system that brings together material and meaningful elements (Mustafa Afifi Bin Ab Halim, Wati Binti Mohd, Mohd Mahyeddin Mohd Salleh, Asming Yalawae, Mr. Syed Mohd Najib Syed Omar,

Asmidah Ahmad, Azlin Alisa Binti Ahmad, Mohd Izhar Arif Bin Mohd Kashim, 2014).

The discussion on halal products will be so complete if it covers the entire production process from the beginning to the end consumers. In this case also includes the halal logistics or tracking process. The halal supply chain is now an emerging business that has attracted global attention (Ahmad Noorsiah, Sariwati Mohd Shariff, 2015). To ensure and guarantee the halalness of food products in the supply chain, a traceability system is needed. Traceability system is a popular tracking system used by businesses and the food industry to ensure that their food products are safe (food safety). The application of technology in the halal supply chain especially in halal products is very important for halal control especially on location, tracking, item identification and data communication. Risk factors for traceability in food products contribute to the risk of contamination of food products during shipping (Yacoob TZ, Jaafar HS, and Rahman FA, 2016).

At a time when the development of science and technology related to food was not yet advanced, one could easily distinguish between halal food and haram food. In the conditions in the Industrial Revolution 4.0 era like today, differentiating halal or haram food is not an easy matter. This is related to the rapid development of science and technology in the field of food, where food no longer consists of raw materials only, but there are additional ingredients that are likely to come from prohibited foods and their derivatives. Likewise, the production and distribution process that is not in accordance with Islamic sharia. For example if the food production process has been contaminated with food that is forbidden. These problems make it difficult for ordinary people to distinguish between illicit and halal food products. It takes in-depth knowledge about science and technology in the field of food, also knowledge of the rules of Islamic law.

The Industrial Revolution is an advanced change through the intelligence of the mind that uses several machines for processing power as well as mobile power. The Industrial Revolution had begun

since the entry of the Dutch East Indies into the Archipelago which came to be known as the First Industrial Revolution in which human and animal labor was replaced by several machines. One of them is the steam engine which is able to boost the economies of various countries up to six times from before the Industrial Revolution 1.0. Then the Industrial Revolution 2.0 occurred marked by the existence of electric power generators and motorcycles that were ignited with fire which triggered the emergence of home telephones, planes, cars, motorcycles and so forth. Next Industrial Revolution 3.0 emerged marked by the internet and digital technology such as computers and mobile phones which later became the forerunner to the emergence of the 4.0 Industrial Revolution which had actually begun to feel its signs since the 90s, where humans had begun to be introduced to the internet even though they do not realize that the internet will have a very large and very important impact like what is happening at this time which is marked by the unification of several technologies, such as the existence of artificial intelligence applications, smart robots, driverless cars and 3D printing machines (Azmar, NJ, 2018).

Industrial Revolution 4.0, besides having an impact on the manufacturing sector, also greatly affected globalization, disguising international boundaries and competition. So that halal food is easier to obtain for producers and consumers by using elastic machines, the halal food industry is more affordable both domestically and abroad with the help of some halal food detection devices or applications both from places, materials and so on. useful and effective in finding halal food without having to struggle and no doubt about its halal status and can lead to more and more competitiveness.

This paper aims to determine the opportunities and challenges of the halal supply chain in the Indonesian food industry in the Industrial Revolution 4.0 era. The method used is descriptive qualitative method. A qualitative approach is a procedure that produces descriptive data in the form of written or spoken words from people and the observed behavior of giving a comprehensive picture. The type of research is descriptive with the aim that researchers can reveal facts, phenomena, and conditions that occur when the research is

ongoing and present what is sourced from books, magazines, newspapers, journals or direct interviews with competent resource persons who are examined to answer problems by researchers .

Results and Discussion

Industrial Revolution 4.0 is an opportunity to make life more prosperous and has introduced technology so easily (H Kagermann.WW, 2013). Like mobile phones that have been circulating in various corners. Some people are able to buy and provide convenience and benefits to the buyer. There are three things that distinguish the fourth Industrial Revolution from the previous Revolution, namely: *First*, reform is more widespread than ever before. *Second*, increase production and costs less. *Third*, the effect is more on the system level in various places. The Industrial Revolution 4.0 can utilize all elements of society both groups and individuals and facilitate and expand economic networks but can also cause social inequality so extra care is needed in every economic decision and action to be taken so as not to further disturb the atmosphere and social relations of all levels of society. Given the speed of trade globalization, the halal industry is progressing and becoming a significant industry locally and internationally (Dayang Haryani Diana Ag.Damit, Amran Harun, David Martin, 2017). With the presence of the 4.0 Industrial Revolution, the food industry will be more efficient in processing or processing various kinds of food, especially in halal food which is in great demand by the majority of the Muslim population in Indonesia. There are many opportunities and opportunities for everyone to get ahead in the Industrial 4.0 era.

Halal has now become a universal concept. Halal is a term that is exclusively used in Islam which means it is permitted or halal. No party can claim that food is halal without complying with Islamic law. Halal and non-halal include all symbols in Muslim life, not limited to food and drink, but also for safety, animal welfare, social justice and a sustainable environment. Halal and *Toyyiban*, which means clean and healthy, symbolize intolerance towards cleanliness, safety and

quality of food consumed by Muslims (Kasmarini Baharuddin, Norliya Ahmad Kassim, Siti Khairiyah Nordin, 2015).

Halal in Arabic is interpreted as permissible and in accordance with Islamic Sharia. Or in other words halal is which means permitted, permitted, legitimate, approved, and legal (Jabar Zaman Khan Khattak, Zubair Anwar, Hussain Mustatab Wahedi, Ghulam Abbas, Haider Zaman Khan Khattak, Humaira Ismatullah, 2011). If it is related to food and drink, then the understanding is food and drink which is permissible for Muslims to consume it. As for the principles of halal and haram in Islam, namely: (1) Prohibiting the halal and justifying the unlawful consequences of apostasy; (2) Something that leads to something that is unlawful, so that it is also punished unlawful; (3) Outsmarting forbidden to make a product to be considered halal, the law is haram; (4) Basically everything is lawful unless there is a prohibited prohibition; (5) Something that is forbidden is because of its bad and dangerous; (6) In something that is halal there is something that makes us unnecessary to the unlawful; (7) Avoid the unclear so as not to fall into the unlawful; (8) Haram is haram for all except in an emergency; (9) Halal and haram of God's will; (10) Good intentions do not produce anything that is unlawful if the process is still good and in accordance with Islamic sharia; (11) Emergency matters can change illicit to halal according to the level of emergency. From the arguments above, Islam provides the concept of halay thiba in determining the quality of food. this concept was later translated into Halal Assurance System and developed by the majority of Muslims (Mufraini. MA, 2011).

According to the Indonesian Ulama Council (MUI) halal products are products that are in accordance with Islamic sharia, including: *First*, animals slaughtered must be in accordance with Islamic teachings. *Second*, the ingredients may not contain pork. *Third*, not from prohibited materials such as materials made from blood. *Fourth*, product storage, selling and transporting goods that are not used that are other unclean unless sanctified by Islamic procedures. *Fifth*, the ingredients may not be from khamr be it food or drink. *Sixth*, human organs, disgusting impurities and so on. To get halal certification for

all products, the supply chain from agriculture to food preparations must be halal (Fazlyn Ann Zainal Abidin, Fadilah Mohd Hassan, Nur Sapinah Mat Zin, Wan Nabilah Wan Azmi, Mohd Iswadi Ismail, 2019).

In the halal product guarantee law stated that halal products are products that comply with Islamic sharia, while the guarantee or dependents of halal products is the legal provisions against halal products marked with halal certificates. The implementation of the halal guarantee system is very important to ensure effective and efficient production of halal products. Obviously, the halal industry has tremendous potential but is currently overshadowed by many problems such as the lack of a specific regulatory framework governing halal products, especially in most countries in the world and the uneven level of halal awareness that exists among Muslim consumers (Harmen Shah, Faridah Yusof, 2014). It was explained that the halal guarantee system was developed based on the concept of three zeros (3.0), namely zero limit, zero defect, zero risk. The implementation of the halal guarantee system is very important to ensure effective and efficient production of halal products (Mohd Aliff Abdul Majid, Izhar Hafifi Abidin, Hayati Adilin Mohd Abd Majid, Chemah Tambiy Chik, 2015). In 2014 Law No. 33 of 2014 which there are 68 articles related to the guarantee of halal products it is explained that products circulating and entering and traded in Indonesia are required to be halal-certified. It has been proven to be very difficult to get the respective halal standards from various halal authorities especially in the world (Marco Tieman, Maznah Che Ghazali, 2014) The purpose of the existence of the Law is explained in article 3, namely the implementation of halal product guarantees whose purpose is to: *First*, increase more value to entrepreneurs to sell and produce halal products. *Second*, giving comfort to the people who use and use these products. With the Act there are two parties who benefit, the buyer as the product user and the goods maker as the provider of halal products (Hasan. S, 2014).

Law No. 18 of 2012 concerning food relating to the regulation of halal food products Chapter VIII food labels and advertisements.

Article 97 paragraphs 1, 2, and 3 explain that food sold both domestically and from abroad must include a halal label and list of ingredients, date, month, expiration year, distribution permit number and so on, both in the package and in outside the packaging written in Indonesian. Imported food and food produced from domestic products on the container must have the name containing pork in large red letters placed in a square box and given a picture of pork if there is pig content in the product. This is stated in the legislation of the Minister of Health of the Republic of Indonesia Number 280 / Menkes / Per / XI / 1976 concerning the provisions and markings of ingredients containing pork in article 2 (Yono. AM, 2005)

The above law will provide comfort when consuming and utilizing goods or services that are in various places. Because food can be contaminated with food that is not halal when distributed to retailers or when displayed in retail stores (Fara Adura Mohd Yusoff, King of Nerina Raja Yusof, Siti Rahayu Hussin, 2015). Halal certificates are a guarantee that a product is halal. The Minister of Religion of the Republic of Indonesia decides that halal certificates as collateral for the halal status of a product are marked with halal stamps so that they are safe for consumption by Muslim communities. Consciousness is aware, remember, know, feel, wake up, and understand. Halal awareness can be known with halal materials, slaughtering according to shari'ah, the place is not occupied by unclean goods (Azizi Y, A, 2013). Ordinary people are often less aware and understand that halal food is food that is permissible in Islam.

Halal food industry in the Industrial Revolution 4.0 era provides comfort and convenience for humans both in terms of producers and consumers, in using elastic machines, the halal food industry is increasingly affordable with the presence of a number of halal food detection devices or applications both from place, materials and so on which is very useful and effective in finding halal food without having to struggle and no doubt about its halal status and provides several benefits, including: *First*, simplifying the process of ordering halal food. *Second*, make it easier to price and menu updates. *Third*,

facilitate sales, *Fourth*, increase competitiveness. *Fifth*, providing a better customer experience in producing halal food that used to use ordinary food grade lubricants, now there is food engine oil (food grade lubricants) that is halal stamped BPOM. With the development of electronic device technology is changing the minds of people who used to use human power replaced by machines (Yulia. OY, 2000).

With the detection of food halal, Muslims easier in choosing kosher food such as: *First*, kosher test, its usefulness to determine whether the food is made of a material that is unclean what is not, when it appeared two lines means the food contains pork, when out of the line then it means it doesn't contain pork and so on. This tool is also used to check drinks, which will later be changed in function so that it can check halal meat to eat, and its detector resembles a kind of android (P. Zang, GV, 2002). *Second*, Modern Halal Valley, includes a group of the first and largest integrated halal industry in Indonesia for the food and other halal industries. A high standard tool for halal food, environmental sustainability, and halal safety, this tool also provides various halal material requirements for halal products as well as exports to international markets and domestic management (Santo. Y, 2018).

The development of the halal food industry in Indonesia requires a chain that can illustrate a map of opportunities and challenges in the halal industry. If halal food producers want to develop in the long run and increase their competitiveness, then they need to make food vendors related factors that better meet the needs of Muslim consumers (Haijuan Yang. Lijun Huang, 2017). Realizing this need, entrepreneurs must take advantage of business opportunities in the halal industry to benefit from increased profits for the halal food area that has a large potential to generate revenue. In the context of the halal food industry, the halal value of a product must be maintained from raw materials to finished products that are ready for consumption. The main consumers of halal food are Muslims, because halal food is designed to meet Islamic requirements (Jan Mei Son, Carol Wallace, 2017). The implementation of halal supply chain management is very necessary to ensure the quality of halal products.

Handling of products must be different and separated between halal and non-halal. The process must take place from upstream to downstream, so that consumers can easily distinguish the two. It is believed that consumer acceptance of food is often the key to success as far as food processing methods are concerned (Selvarajah Krishnan, Muhamad Haniff Hanafi Mohd Aderis, Muhammad Nabil Azman, Muhammad Nazrin Azham Kamaluddin, 2017). With the halal supply chain then the expectation would be the quality standards, quality, service halal products become a reality. Everything is integrated starting from input, production, distribution, marketing, and consumption. Food products in their inputs must be guaranteed halal from the moment they are bred, animal feed, fertilizers and chemicals used must be halal. Then the halal value of the product must be maintained while in the processing of raw materials to the final product. Then the process and distribution of halal food and beverage products must also be guaranteed in warehousing, packing, cooling rooms, and processing.

Indonesia is not only potential as the largest halal food market share, but also the largest halal food producer with the wealth of its natural resources. However, these opportunities have not been utilized to the fullest. The existence of food acculturation indicates the adoption of habits to the new diet and food culture by a group of people from other countries dominant cultures (Abdelhadi Halawa, 2018). Indonesia, in this case, is still the destination market for halal products from abroad. The development of Indonesia's halal industry is considered stagnant. This is because businesses in Indonesia do not consider the halal industry as a big and important business opportunity.

Halal supply chain is a necessity to implement halal value creation into logistics and supply chains that have been recognized recently. Halal food supply chain starts with finding various permitted raw materials and preparing them as needed (Jan Mei Son, Mahmood Chandia, Joe Mac Regenstein, 2017). However, there are deficiencies in efforts to utilize resources and capabilities in contributing to the creation of halal value for competitive advantage and subsequent

corporate performance. The halal supply chain itself has become a new business that has emerged and is attracting global attention. Not only attract food industry practitioners to practice and adhere to the concept of halal, but other sectors such as cosmetics, pharmaceuticals, health care products as well as academics and researchers from higher education institutions also need to know and understand the halal supply chain to support the halal integrity of halal products . Activities in the halal supply chain are warehousing, sourcing, transportation, handling and shipping of halal products, inventory management and other business management strategies such as value-based management (Ngah. AH. Zainuddin Y, 2012).

Halal supply chain refers to the process of managing procurement, movement, storage and handling of materials, spare parts, livestock and semi-finished inventory, food and non-food, and related information along with the flow of documentation through organizations that adhere to general principles of sharia law (Bahrudin. SSM. Illyas. MI. Desa. MI, 2011). In addition, the halal supply chain adopts conventional supply chains but with Islamic legal requirements in force. The imposition of Islamic law in supply chain management acts as a basic requirement for sharia-based halal management processes in the sense that all must be halal (permitted) and also thoyyib along the whole chain (Omar. EN. Jaafar. HS. Osman. MR, 2012).

Logistics plays an important role in protecting product quality and conditions through proper transportation, storage and handling in the supply chain, to achieving its final destination. The success of the halal industry depends on the ability of logistics service management to ensure the integrity of halal products. All halal products must comply with sharia law which states that products must be safe, harmless and healthy from beginning to end (Tieman, M, 2008).

The main element that ensures halal products remain halal is when these halal products reach consumers is transportation and logistics. The basic principle of halal transportation is to ensure the physical separation of halal goods from non-halal cargo in transportation. This is to avoid the possibility of cross contamination as well

as to avoid the possibility of making mistakes and to ensure the transportation system meets the expectations of various Muslim consumers . The consumption trend by Muslim consumers is not only halal products but also halal logistics. Thus, adopting halal in the logistical context, halal products must be ensured halal during and throughout all logistical activities which specifically include transportation, storage and warehousing and retail must also comply with sharia principles as a whole (Kamaruddin. R. Iberahim. H. Shabudin. A, 2012).

Halal supply chain requires a process approach, where processes and procedures must be clearly documented as proof of the halal logistics system. Currently, the food chain has become a part of the style of life has undergone many changes (Khadijah Nakyinsige. Yakooob Bin Che Man. Awis Qurni Sazili, 2012). Although a well-established and well-documented halal food logistics system must be able to prevent contamination, proactive corrective measures need to be defined to reduce or at least minimize the risk of contamination of halal products and business strategies to overcome the perceptions and sensitivity of Muslim consumers . The main purpose of the halal supply chain is to ensure the integrity of halal products for end consumers (Jaafar. HS. Faisol. N. Rahman. FA. Muhammad. A, 2015).

Therefore, the integrity of halal in the halal supply chain means enforcing halal conditions for food and thoyyib for the way food is sent along the supply network by service providers of transporters, warehouse operators and retailers and producers concerned with an honest attitude and can be trusted in carrying out operations and the system works in the halal industry. Halal integrity is a guarantee of halal products, especially for the halal food industry. Protection and prevention measures must be taken to ensure that halal products still remain halal even during the transportation process in the supply chain. As such, halal supply chain management ensures halal integrity is guaranteed from the source (origin) to the point of purchase of the consumer end. This means that halal logistics plays an important role in halal supply chain management in linking suppliers with end customers so as to create a halal supply network, but the integrity of

halal in the halal supply chain has not been guaranteed in the industry and its logistics practices. But sometimes consumers worry about the possible adverse effects of eating modified foods (Risyawati Binti Mohamed Ismail, Mastora Mustafar, Siti Norezam Othman, 2018). In this case Muslim consumers are willing to pay the costs associated with halal logistics to ensure that shariah compliance parameters in every aspect of the food supply chain are maintained. This shows that the halal logistics policy especially related to the halal supply chain must be obeyed so that Muslim access to halal products can be guaranteed (Rohana. K. Hadijah. I. Alwi, S, 2012).

In Indonesia, the halal supply chain is increasingly becoming a concern for the government and industry in the country, especially related to the halal integrity of a food product. There are a number of reasons for this. First, the issue of primary attention to halality is more likely than ever before due to the increasing complexity of the supply chain. Second, the complexity of the current halal supply chain, with a high percentage of imported materials, makes integrity problems difficult to detect. Third, the issue of halal integrity in the field of food that was once detected to be viral on the internet, describes that the integrity of the halal system in a country as well as the trademark owner concerned. Abandonment of the halal requirements throughout the supply chain is gradually will lead to a weakening of consumer confidence in the products certified kosher. As proof of that halal trust is through the evolution of Muslim companies (purely based on trust systems), halal products (halal certified products), halal supply chains (supply chain approach to halal), to halal value chains (halal is handled throughout the value chain).

To protect halal integrity throughout the supply chain or value chain, separation and communication are needed to provide a higher level of assurance to Muslim consumers in terms of protection for brand owners. This separation can be achieved by physical separation systems in transportation, storage and terminals (sea / air / land), to ensure that the flow of halal and non-halal goods is not combined with cargo carriers and for (destinations) Muslim countries are not

mixed in transportation and storage (Marco Tieman, Jack GAJ, van der Vorst, Maznah Che Ghazali, 2012)

The separation process can occur at a high cost, especially in non-Muslim countries where the flow of halal goods is of a small nature and is not always easily recognized, because the status of halal cargo cannot always be identified and communicated along the supply chain. Under the international halal standard for logistics, halal supply chain codes have been recommended to be marked on shipping labels and documents, and communicated as handling instructions through a logistics and customs system. This allows easy identification of halal flows to be recognized along the supply chain from producers, logistics service providers, trade, to retail and restaurants. However, until now the halal industry has not applied many halal logistics standards, because halal certification agencies have not yet expanded the halal requirements towards the supply chain. This has resulted in a halal industry where food safety requirements (*thoyyib*) accept a halal supply chain approach.

The supply chain is a party network that connects sources to the point of purchase of consumers. Horizontal supply chain structure refers to the number of levels throughout the supply chain. The supply chain may be long with many levels (many fast moving consumer goods supply chains), or short with only a few levels (such as a mass supply chain). The vertical supply chain structure refers to the number of suppliers/customers represented at each level. A company can have a narrow vertical structure (multiple suppliers and/or customers) or wide (many suppliers and/or customers) (Douglas M. Lambert, Martha C. Cooper, 2000). Because managing the entire supply chain is a complex task, there is tremendous potential to improve the performance of halal supply chains through increased coordination throughout the supply chain.

Effective vertical collaboration of halal supply chains can be achieved through (1) halal clusters and (2) halal supply chain orchestras. Halal clusters are spatial groupings of halal production chains (halal food, cosmetics or pharmaceutical manufacturing) in industrial

zones or economic zones, where most supply chains are geographically positioned within the halal cluster, providing tangible evidence, including: (1) logistical excellence (with shorter transportation times), (2) optimal use of by-products, including waste and energy, (3) increase the capacity of cluster participants and the growth of innovation and (4) stimulate the formation of new businesses that support innovation and expand the halal cluster.

The halal community or institution can establish a halal cluster to promote halal innovation projects, promote new Islamic economic activities and to strengthen the halal brand. In addition to local collaboration in clusters, there are advantages to collaborating with halal clusters in other countries to facilitate access to raw material and market (consumer) supply. There are currently halal park initiatives in Brunei (Bio Innovation Corridor), China (Qinzhou), Malaysia (21 parks), and the United Kingdom (Birmingham and Norfolk). Halal parks in China and Britain are private sector initiatives. Whereas in Brunei the state is purely an initiative of the government. Malaysia has a mix of parks managed by local governments, government-related companies, and the private sector. Thailand (Pattani) and the Philippines (Mindanao) are currently planning to develop a halal park.

The series of halal supply chains helps in managing global halal supply chains in accordance with the destination market specifications and ensuring that integrity is maintained throughout the halal network. The series utilizes a public halal distribution center at the main gate, transportation consolidation, and the use of innovative logistics concepts (such as halal cargo boxes) (Marco Tieman, 2012). This role can be fulfilled by fourth-party logistics service providers, namely integrators who gather resources, planning capabilities, and technology from their own organizations and other organizations to design, build and run comprehensive supply chain solutions.

Vertical collaboration of halal supply chains makes it possible to:

1. Effective halal supply chain guarantee, namely a reference to an international halal logistics standard and consistent communication of halal status (halal supply chain code) throughout the supply chain
2. Standardization of halal assets in the supply chain: from sources to consumer purchasing points; and
3. Supply chain optimization by sharing demand data through the supply chain (facilitating better customer responses), reducing inventory, and better transportation planning.

New innovative solutions are needed to optimize halal supply chains that exploit collaboration, both vertically with supply chain partners and horizontally between companies in the same industry . The method in the proposed vertical collaboration is halal cluster and halal supply chain series. Vertical collaboration enables effective halal supply chain guarantees, standardization of halal assets in the halal supply chain, and optimization of the supply chain. The possible method in horizontal collaboration is a model of direct collaboration and collaboration through intermediaries. Horizontal collaboration makes it possible to share information, pool resources and incorporate halal volumes.

The application of the concept of vertical and horizontal collaboration provides better control of the halal supply chain from sources to the point of purchase of consumers and increases consumer confidence in halal-certified products. The concept of vertical and horizontal collaboration requires a more advanced halal certification system (beyond product certification), expanding halal regulations along the supply chain. Halal certification bodies, which are often accredited by the government, therefore increasingly enhance (indirect) control of the halal supply chain by the government. This can reduce exposure to the halal system and brand owners of a country. The government is recommended to stimulate vertical and horizontal collaboration initiatives in the halal industry and the development of more advanced halal standards, incorporating international halal standards, which support the supply chain approach to halal.

Industrial pilot projects and case study research are needed to test various concepts of halal supply chain collaboration and provide practical solutions for the halal industry to optimize halal supply chains. This is to support the development of a customer-driven supply chain that is better able to meet the diverse needs of the Muslim market and to meet general halal standards throughout the supply chain from source to consumer purchase point. Empowering consumers through the use of strong information technology in all areas of life will lead to the emergence of goods and services economically as well as superior knowledge (Mohd Imran Khan. Abid Haleem. Shahbaz Khan, 2018).

Food handling throughout the supply chain process is important, because the production of halal tayyiban food will be meaningless if the halal and cleanliness of food is not taken care of during the delivery process from the source of supply to the final consumer. The status of halal tayyiban product can only be achieved if all possible contamination of haram and dangerous products can be avoided not only in production but also during the supply chain process. The halal process must be seen from the perspective of the supply chain because halal products can only be produced when all activities along the supply chain process are based on the provisions in Islam, not only on production.

Indonesia is a country with the largest percentage of the world's Muslim population, around 12.5% of the world's population or as much as 88% of around 250 million Indonesians. This will increase the need for a halal market in Indonesia. The market is no longer just talking in the context of food, but also a lifestyle . Seeing this phenomenon, the supply chain sector in the food sector must certainly also apply halal aspects to its industry. The government through the Indonesian Ulama Council (MUI) has indeed conducted halal certification for raw materials for products, semi-finished products, and finished products. But the halal of a product is not only in terms of how the product is produced, but also must be seen from how the product is processed, including in this case the process of handling the flow of material / product such as transportation, storage, and

so on. So, halal not only concerns the product content, but also relates to the halal logistics system and halal supply chain . Practices and practical guidelines for the food industry regarding the preparation and handling of halal food must be based on quality, sanitation and safety considerations and serve as a basic requirement for food products as well as food trade or business in Indonesia (Indah Susilowati. Edy Riyanto. Mayanggita Kirana. Izza Marufah. Alias Radam, 2018).

Malaysia and the United Arab Emirates (UAE) are examples of countries that have already implemented halal supply chains. Malaysia already has a Halal Industry Masterplan including a halal supply chain in it, and even declared itself as the Premier Halal Hub in the World . Meanwhile, the Emirates Authority for Standardization and Metrology (ESMA) and the Department of Economic Development in Dubai (DED) are developing a halal logistics standard. Going forward Dubai hopes to become the capital of the Islamic economy with the aim of raising awareness of halal provisions among local businesses, and encouraging producers to obtain halal certification and promote their halal products in foreign markets.

The implementation of halal supply chain in Indonesia faces problems, including:

1. Indonesia does not yet have halal standards for logistical matters in the hands of consumers
2. There is no supply chain company in Indonesia that has a halal license
3. Not many industries in Indonesia have looked at business opportunities with halal standardization
4. Pioneering Malaysia in the halal supply chain can be a threat to Indonesia, including for the food industry and Indonesian logistic service providers
5. Not yet regulated halal regulations and guarantee systems and the absence of tools / software that ensures halal

The challenges faced by the halal supply chain in Indonesia include:

1. The implementation of halal supply chain requires coordination and collaboration that is longer than halal products. Halal supply chain must be understood by the actors in the supply chain. The lagging understanding and implementation of halal supply chain has the potential to weaken competitiveness
2. Other challenges are: development of the halal industry (such as halal park operators , halal producers, warehousing, and technology), business development of halal logistics services, tariff and non-tariff barriers, development of niche markets, ability to pay from customers, and customer education.
3. The difficulty of managing to ensure halal in the supply chain perspective is because the halal food chain becomes longer and more complex from producers to consumers

In addition, in general, halal supply chain actors, consumers and the government will face several problems and challenges in ensuring the implementation of halal supply chains, such as:

1. Not many industry players are really interested in implementing halal supply chain because there are additional costs.
2. About 90 percent of halal products are produced in non-Muslim countries. Halal status and halal logistics of a product are uncertain.
3. There are not many halal supply chain experts, therefore halal supply chain training is important for employees involved in handling halal products.
4. Traceability of halal products is considered important in ensuring the status of halal products during the halal logistics process.

So in this case to encourage and facilitate the implementation of the halal supply chain in Indonesia, it needs a strong role of the Indonesian government, in this case including preparing facilities and infrastructure in the implementation of the halal supply chain which includes logistics centers, warehousing airports, goods terminals, ports, goods terminals, warehousing and so on. Business providers and halal supply chain services require deeper insights from the attitudes and behavior of halal consumers (Amr Al-Ansi. Hossein GT Olya. Heesup Han, 2018).

The development of halal supply chains in Indonesia needs to be encouraged and directed for integrated supply chain management . The blueprint halal supply chain development in Indonesia needs to be prepared, as the master plan for development of the halal industry in Indonesia. The blueprint will be needed for the supply chain concept of halal industry in Indonesia.

Indonesia can play a role in the development of the halal food industry in terms of :

1. SMEs are given a great opportunity to develop halal products
2. Halal food industry must be promoted to be able to build awareness about the importance of using halal service products
3. Society must be given understanding that consuming products labeled as halal is important because of the halal label in food products is a guarantee of halal products

Halal supply chain is the application of halal *toyyiban* halal principles throughout halal logistics activities. All activities starting from the source of supply, storage, transportation, manufacturing, handling, and distribution must comply with the concept of halal *toyyiban*. The purpose of the halal supply chain is to guarantee the halal product along the flow in halal logistics. This halal supply chain develops due to the increasingly high level of consumer awareness, in addition to halal products as well as halal logistical processes. One of the benefits of the halal supply chain is the ability of logistics service management in ensuring the integrity of halal products.

Halal supply chain technology from the industrial revolution 4.0 that can benefit halal logistics operations is smart logistics . The main objective is to ensure that halal products are stored and moved safely and efficiently. With the right combination of technology, smart logistics can increase halal traceability, efficient route planning, and better connectivity, helping to ensure that halal retailers and consumers are confident in the safety and quality of their products.

The industrial revolution 4.0 presents huge challenges and opportunities for the advancement of the halal industry in Indonesia. Thus, the readiness of halal industry stakeholders is needed, especially in the field of halal supply chain in solving complex problems

in the process of digitizing the halal supply chain. Halal industry players are required to continue to innovate in digital product research and is a mandate to advance the Indonesian halal industry.

Conclusion

In the era of the industrial revolution 4.0 as it is today, competition for halal food needs is higher than overseas, therefore halal food companies must maintain production, with the application and other technology companies must respond to consumers faster, production must be flexible and incorporate automatic technology. In order not to lose competitiveness with foreign countries, besides that halal certificates become the main thing in world competition because with halal certificates marked with halal stamps, the food ingredients used must be halal and will greatly affect the purchase value in all corners of the world, Halal food is growing rapidly because not only Muslims are tempted by halal food but also non-Muslims due to the fact that halal food is guaranteed in terms of hygiene and health. The invasion of imported food is quite a challenge especially as Indonesia is a Muslim-majority country, other countries will compete to reach consumers in order to achieve the profits of their companies.

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