

Blockchain Technology to Improve Transparency Halal Food Global Supply Chain

Inayatulloh

Information Systems Department
School of Information system
Bina Nusantara University
Jakarta, Indonesia 11480
Inay@binus.ac.id

Maisyarah Rahmi Hasan

Islamic Economic Law Department
Faculty of Sharia
Universitas Islam Negeri Sultan Aji Muhammad Idris Samarinda,
maisyarahrahmi@iain-samarinda.ac.id

Destiana Kumala

Sekolah Tinggi Ekonomi Bisnis Islam Syariah Bina Mandiri
Bogor, Indonesia 11480
destiana.kumala@binamandiri.ac.id

Rozali Toyib

Universitas Muhammadiyah
Bengkulu, Indonesia
rozalitoiyib@umb.ac.id

Sawqi Saad El Hasan

Sekolah Tinggi Ekonomi Bisnis Islam Syari'ah Bina Mandiri.
sawqi@binamandiri.ac.id

Muhammad Abrar Kasmin Hutagalung

Universitas Potensi Utama
mabrarkasmin@gmail.com

Rofiq Noorman Haryadi

Sekolah Tinggi Ekonomi Bisnis Islam Syariah Bina Mandiri
Bogor, Indonesia 11480
rofiq@binamandiri.ac.id

Muhammad Salman Al Farisi

Sekolah Tinggi Ekonomi Bisnis Syari'ah Bina Mandiri
salman@binamandiri.ac.id

Abstract

Halal food is any food or activity that is permitted to be used or carried out according to Islamic rules. This term is used to indicate food and drink that are permitted to be consumed according to Islam according to the type of food, how to process it and how to obtain it. Indonesia is a country where the majority of consumers are Muslims and with the inclusion of many types of food from many countries, it will cause problems related to the halal-ness of the food. Currently there is no system that can be accessed by consumers that guarantees the halal-ness of imported food so that it is difficult for Muslim consumers to obtain valid and renewable information on halal imported food. On the other hand, currently block chain technology has several features that can be used to create transparent, immutable, decentralized transactions and other features. Thus, the aim of the research is to help Muslim consumers get halal food by building a model of the halal food supply chain using block chain technology. The research method uses a qualitative approach through observation to obtain problems regarding the concerns of Muslim consumers consuming non-halal food originating from several countries. Literature studies are used to find alternative solutions with information technology and ultimately determine blockchain technology as the solution.

Keywords

Block Chain Technology, Halal Food, Supply Chain.

1. Introduction

The development of the world of trade that leads to free trade causes the flow of goods and or services marketed to consumers to be diverse from many countries. This realization is certainly beneficial for consumers because consumers' needs for the desired goods and or services can be fulfilled and there are more choices of goods and services. These food products for every human being are basic needs, so that anyone is certainly faced with the situation to determine or choose food products on the market. The high circulation of food products from several countries due to the open global market increasing competition from domestic and foreign companies has resulted in weak supervision of halal food entering Indonesia (Masruroh 2020) (Sood 2014) (Maman et al. 2018).

Islamic life revolves around the concepts of halal and haram. Halal refers to food and drink, which means "consumption by Muslims is permitted". On the other hand, Haram Prohibited matter. However, some foods fall into the undefined area between Halal and Haram products, the mash boo (suspect) products of unknown origin, or products with uncertainties regarding their status in Islam. The Halal Food Law is binding and must be complied with by individual Muslims at all times. The impact of religion on food consumption depends on how individuals evaluate and follow their religion (Benussi 2021) (Hall et al. 2020) (Asa et al. 2018).

Problems arise related to the weak supervision of the large number of food products from various countries entering Indonesia. Because Indonesian consumers, who are predominantly Muslim, need halal guarantees from these food products, a system is needed that can help Muslim consumers get information about halal food products imported from various countries (Sofiana et al. 2021) (Luthviati and Suviwat 2021) (Ratnasari et al. 2018).

Meanwhile, block chain technology has the ability to create a transparent, immutable, decentralized transaction that can be used to monitor halal products for Indonesian Muslim consumers. Thus, the aim of this research is to build a blockchain model to support global supply chain transparency for halal food.

The research method uses a qualitative approach by observing the number of imported food products that enter Indonesia while Muslim consumers do not get access to know the halal assurance of the products they consume. Literature studies are also used to strengthen the findings of the problem regarding the weak supervision of halal food in Indonesia. Literature studies are also used to find alternative solutions with an information technology approach and determine block chain technology as the best solution to build a global system of halal food in Indonesia.

2. Literature Review

Global Supply Chain

global supply-chain management is defined as the distribution of goods and services throughout a trans-nation all the best for the future companies' global network to maximize profit and minimize waste. Essentially, global supply chain-

management is the same as supply-chain management, but it focuses on companies and organizations that are transnational (Tripathi and Manish 2021).

Global supply-chain management has six main areas of concentration: logistics management, competitor orientation, customer orientation, supply-chain coordination, supply management, and operations management. These six areas of concentration can be divided into four main areas: marketing, logistics, supply management, and operations management. Successful management of a global supply chain also requires complying with various international regulations set by a variety of non-governmental organizations (Lim et al. 2021) (Ellram and Monique 2019) (Ivanov 2021).

Global supply-chain management can be impacted by several factors who impose policies that regulate certain aspects of supply chains. Governmental and non-governmental organizations play a key role in the field as they create and enforce laws or regulations which companies must abide by. A good government have a good framework including a regulation (Anza et al. 2017). These regulatory policies often regulate social issues that pertain to the implementation and operation of a global supply chain (e.g., labour, environmental, etc.). These regulatory policies force companies to obey the regulations set in place which often impact a company's profit.

Operating and managing a global supply chain comes with several risks. These risks can be divided into two main categories: supply-side risk and demand side risk. Supply-side risk is a category that includes risks accompanied by the availability of raw materials which effects the ability of the company to satisfy customer demands. Demand-side risk is a category that includes risks that pertain to the availability of the finished product. Depending on the supply chain, a manager may choose to minimize or take on these risks.

Successful global supply-chain management occurs after implementing the appropriate framework of concentration, complying with international regulations set by governments and non-governmental organizations, and recognizing and appropriately handling the risks involved while maximizing profit and minimizing waste. Figure 1 show the general international shipping process as a part of global supply chain (Zavala et al. 2020) (Min 2019) (Buyukozkan and Fethullah 2018).

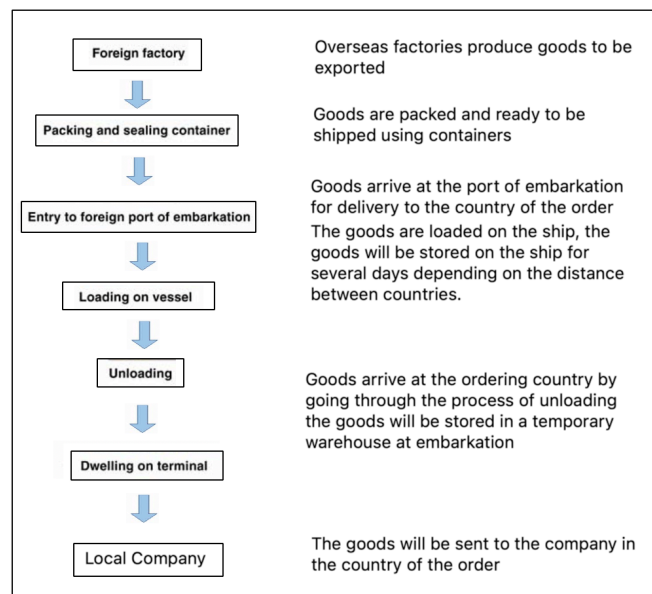


Figure 1. International Shipping Process

Block chain

Several technologies have developed today in various fields, including education (Ramadhan et al. 2022) and business. One technology that is developing rapidly is blockchain technology. Blockchain is a technology that utilizes

computing to create groups or blocks that are interconnected with each other. These blocks contain transaction records and track assets of a business network. Each block contains a ledger or ledger along with three other elements, namely data, hash (data mapping function), and hash of the previous block. The type of data used depends on the purpose, for example it contains all the details of the transaction. Meanwhile, the hash contains data in the form of a digital signature or fingerprint to identify a block and all its contents in a certain unique code.

Blockchain works by recording immutable information. The decentralized nature of blockchain means that this technology does not need to rely on external authorities for validation and integrity of data authenticity. This process is a decentralized process that usually occurs between network nodes to ensure the information is valid. After the decentralization process, the data will be added into a new block. Each block contains a unique hash or code. Although the average blockchain transaction is an investment, the fact is that blockchain can store various types of information in the same block.

Blockchain technology continues to develop so that it can be applied to various sectors including telecommunications, property, media, medical, and agriculture even to the financial services sector because of its similar nature as a digital cash book that can be accessed anytime and anywhere without intermediaries or third parties. . Blockchain makes transactions more transparent so that it can avoid data misappropriation, bribery or corruption and even money laundering if properly regulated. Blockchain technology can also help speed up the transaction approval process and loan disbursement and reduce transaction complexity.

3. Methods

Figure 2 describes the proposed model. Halal food for Muslim consumers is very important so that the concern of Muslim consumers towards halal food and the food to be consumed is a top priority before buying or consuming food. Foods that come from local companies where the majority of the population is Muslim may find it easier to monitor the halal status of these foods. However, if the food is from abroad, it is very difficult to get halal guarantee from the imported food. The above problem initiated the start of this research which was followed by finding alternative solutions using information technology. Of the many alternative solutions, research determines blockchain technology to be the best solution to provide a global supply chain for halal food. The research continued by studying the global supply chain mechanism and adopting blockchain technology in the global supply chain. The final stage of research is building a block chain model for the global halal food supply chain.

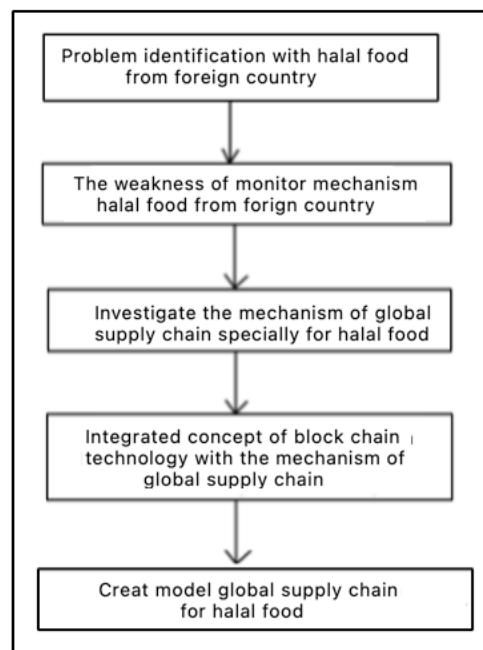


Figure 2. Research Method

4. Results and Discussion

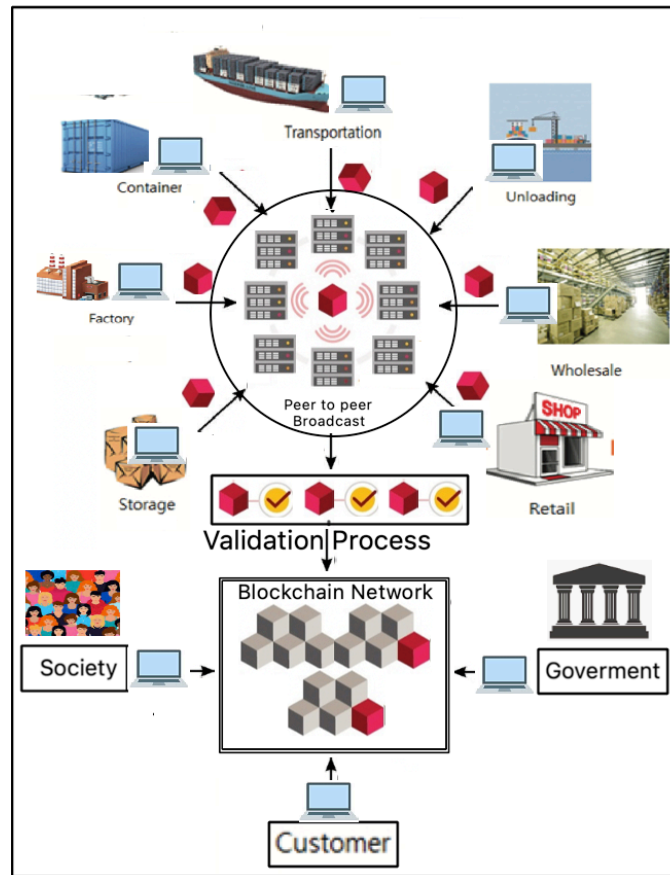


Figure 3. Proposed Model

Figure 3 illustrates the proposed model. The upper part of the model describes all parties involved in halal food production joined in a block chain network. The first party when halal food is produced in foreign factories that are connected to the blockchain network where the production system is connected to the blockchain network so that all production processes and basic food ingredients can be monitored so that they comply with halal food standards.

The next party related to the supply chain is storage where the storage of halal food must be separated from other foods that have the potential to damage the halal-ness of halal food. Other stages, such as loading and unloading vessels, must pay attention to the placement of halal food, not to be damaged by other foods. In the final stage where the halal food arrives at the retail destination country, the halal food must be guaranteed. Blockchain technology is used when producing halal food in foreign countries where every raw material and production process is integrated with a block chain network. Each of these stages will become a new block that is broadcast peer to peer to all nodes on the blockchain network. This stage is the stage that determines the transparency of the halal-ness of raw materials and the processing of halal food because if the new block does not comply with halal standards, the food cannot continue the next process.

The same process is carried out by all processes and parts involved in the global supply chain such as storage in warehouses, shipping via sea, land and air fleets which ensure that the placement of halal food is not mixed with other products that can damage the halal-ness of halal food.

At the same time, Muslim customers can access the distribution channels for the halal food they consume from the existing block chain network. The government and society can also access halal food distribution channels through applications that are integrated with the global halal food supply chain blockchain network.

5. Conclusion

The number of parties involved from several countries and the complexity of the global halal food supply chain process makes it difficult to supervise all processes in accordance with halal standards. Whereas the halal-ness of a food product is as important as the food needs for Muslim consumers. Improved mechanisms in the global halal food supply chain cannot guarantee the transparency of all parts and processes in accordance with halal standards. The adoption of blockchain technology in the global halal food supply chain is a solution that integrates supervisory mechanisms and information technology. Blockchain technology with its advantages guarantees factories that produce halal food using halal food ingredients and processing with halal standards because each process will be validated by all nodes connected in the blockchain network and similarly for all processes in the global halal food supply chain.

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Biographies

Inayatulloh SE. MMSI, CDMS.CSCA is a lecturer at Bina Nusantara University, School of Information System Jakarta Indonesia and also a doctoral candidate of computer science, experienced in managing systems in the retail, automotive, convection and education industries. research domain in e-learning, e-business, e-commerce, cloud computing, IoT and block chain technology.

Rozali Toyib is a lecturer at the University of Muhammadiyah Bengkulu in the Faculty of Engineering, various activities have been carried out such as seminars in the IT sector, Applied Research in the IT field, IT workshops and is active in various professional organizations as an administrator of the Bengkulu Branch of the Indonesian Informatics Expert Association (IAII), Assistant for the Program Centre of Excellence Vocational High School (SMK-PK) and is active as a coach for student affairs in student creativity programs.

Maisyarah Rahmi Hasan Got bachelor from Al Azhar University, Egypt, 2008. Graduated from International Islamic University Malaysia (IIUM) for master 2012, and PhD on Islamic Revealed Knowledge and Heritage 2019. Now is a lecturer at State Islamic University Sultan Aji Muhammad Idris (UINSI) Samarinda

Destiana Kumala, S.kom, M.M., C. HR. Adm. Completed Bachelor of Information Systems Education (2009) and Master of Management with a concentration on Human Resources (2012), besides that the author has also completed training in Human Resources Administration (2021). Currently active as a permanent lecturer at STEBIS Bina Mandiri Cileungsi in the sharia business management study program and focuses on the field of management science. Apart from being the vice chairman of the academic field, the author is also a researcher in the fields of economics, management and computers

Rizky Maulana an education staff of Bina Mandiri School of Sharia Business (STEBIS Bina Mandiri Cileungsi). He works as a quality assurance staff as well as a non-permanent lecturer. As a researcher, He wrote several papers that has been published in several nationally accredited journals. He obtained his bachelor's degree in economics from the Sultan Ageng Tirtayasa University in 2017 and master's degree in economic policy and development from the University of Indonesia in 2020. He is currently attending IPB University to persue his doctoral degree in economics.