



Challenges and opportunities for workforce skills in halal agri-food sector to meet global market demands through Halalink application

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ABSTRACT

Indonesia is the largest Muslim-majority country in the world and holds significant potential in halal food farming sector. The growing global demand for halal products offers vast opportunities to expand agricultural exports and meet the needs of both domestic and international markets. However, challenges such as a lack of skilled human resources, limited awareness of halal certification processes, and technological barriers, particularly among micro, small, and medium enterprises (MSMEs), hinder the industry growth. Therefore, this study aimed to develop "Halalink," an innovative mobile application designed to address challenges by promoting halal education, collaboration, and compliance with standards. Halalink has three features including (i) Halalearns, with educational content about halal standards, (ii) Halalabs for collaboration among stakeholders, and (iii) Halalassists, which offers continuous guidance to ensure compliance with halal regulations. In conclusion, Halalink is a sustainable solution to enhance public awareness, simplify halal certification process, as well as build a competitive and ethical halal agri-food sector in Indonesia.

ARTICLE INFO

Keywords:

Agri-food sector
Indonesia
Halal certification
Halal education
Halal mobile application
MSMEs

History:

Received 30-09-2024
Revised 26-11-2024
Accepted 28-11-2024

1 Introduction

Indonesia is the largest Muslim-majority country in the world and holds significant potential in halal food farming sector. The global demand for halal products is on the rise, not only in predominantly Muslim but also in non-Muslim countries where halal certification is becoming a mark of quality and ethical production (Adinugraha *et al.* 2019). Fathoni (2020) stated that Indonesia is a key player in the global halal market, with vast opportunities to expand agricultural exports and meet both domestic as well as international demands. The rich agricultural resources and favorable climate further enhance the country ability to produce a wide range of halal-certified food products, from staples, such as rice and poultry, to high-value commodities, including spices and tropical fruits.

Abderahman *et al.* (2021) reported that realizing this potential is heavily dependent on the quality of human resources in the sector. Skilled and knowledgeable human capital is essential to ensure that agricultural practices meet the stringent requirements of halal certification, from the sourcing of inputs to the processing and distribution of food products. Organizations and companies in halal food industry must prioritize the development of the workforce to maintain competitiveness and the integrity of standards. Investing in comprehensive training programs equips employees with the necessary skills to effectively understand and implement halal certification requirements. Furthermore, fostering a culture of continuous learning will enhance overall productivity and ensure that the workforce remains adaptable to evolving industrial demands (Ali & Suleiman 2018).

Despite the significant potential, the quality of human resources in the field of halal food agriculture remains inadequate. Many employees lack the necessary training and expertise to fully understand and implement halal standards across all the stages of production. This gap in human capital poses significant challenges to industry growth, potentially hindering Indonesia ability to capitalize on the opportunities available in the global halal market (Prayuda *et al.* 2023) According to Indonesia Halal Markets Report 2021/2022, Indonesian halal industry has promising growth with

a substantial Compound Annual Growth Rate (CAGR) projected for the 2020-2025 period, particularly in the food and cosmetics sectors. Agri-food products, including fruits, vegetables, seafood, cooking oil, gourmet items, tea, and coffee, constitute the sought-after halal products in the market. The growing halal industry indisputably contributed to job creation. The primary strategy is to enhance productivity and competitiveness, with core halal industries centered around food and beverages, as well as pharmaceuticals and cosmetics. A highly skilled and knowledgeable workforce is indispensable for cultivating a robust halal industrial ecosystem in Indonesia. Halal agri-food sector faces a critical shortage of skilled labor. Many employees lack the necessary training in halal standards, food safety, and quality assurance, which are essential for maintaining product integrity and consumers' trust (Research Nester 2023). According to UU No. 33 of 2014 (UU 2014) on Halal Product Assurance, halal products are produced through a process, including a series of activities to guarantee the status, from raw material procurement to processing, storage, packaging, distribution, sales, and serving. Fulfilling compliance with halal certification requirements is challenging. Employees must be well-versed in the religious and legal aspects of halal practices, which can vary greatly between regions (Allied Market Research 2022). In general, human resources play a crucial role in this process.

2 Challenges and Opportunities in Indonesia Halal Agri-Food Industry

Based on data from the Ministry of Cooperatives and MSMEs, MSMEs contribute 97% to national employment, underscoring the significance as the backbone of the economy. Human resource development (HRD) is a potential application of MSMEs which must develop a workforce trained in halal aspects to enhance product quality and compliance with halal standards (Giyanti *et al.* 2021). However, MSMEs face numerous challenges in contributing to Indonesian halal industry. Beyond cost constraints, many business owners lack awareness of the specific criteria for classifying a product as halal. Several issues have been

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identified, including a limited understanding and awareness of halal products importance, as well as the need for mentorship to enhance the managerial capabilities of entrepreneurs (Rahdhiwiyasa 2021). A significant challenge also lies in an incorrect mindset regarding halal certification. Many MSMEs hold the misconception that halal certification applies only to large-scale businesses, neglecting the urgent need. This was reported in a study conducted by Halal Product Assurance Agency (BPJPH 2024), stating that MSMEs still believe the obligation of halal certification is solely for large-scale businesses.

MSMEs in halal agri-food sector often lack access to comprehensive training programs. This gap in training hinders the development of a skilled workforce that understands halal standards, food safety, and quality assurance (Anggara 2017). According to Anggara (2017), halal food agriculture sector in Indonesia is facing a shortage of skilled employees. The shortage is particularly pronounced in MSMEs, which often rely on untrained or inadequately trained personnel. Moreover, a significant challenge is the limited knowledge of information technology (IT). Many MSMEs lack a solid understanding of IT (Information and Technology), making it difficult to manage halal certifications online. This was observed in a study conducted by Anggara (2017), stating that a lack of IT comprehension hinders halal certification process. Consequently, effective solutions are required to prepare human resources, particularly MSMEs, to support the global growth of Indonesia halal industry.

Students can play a crucial role in addressing the issue of human resource quality by supporting Indonesia agri-food halal industry through awareness, investigation, education, innovation, and collaboration. The roles include enhancing awareness and education by conducting campaigns and outreach programs, promoting halal agri-food industry practices, as well as providing information to businesses and communities on adaptation and mitigation strategies. Moreover, through studies, students can identify challenges and provide relevant recommendations to address problems faced by halal agri-food businesses. Students can also collaborate with local producers to develop new and innovative halal products to meet the evolving needs of halal industry, thereby contributing to community services.

Table 1: Key stakeholders and the roles

No.	Stakeholders	Functions
1	Micro, small, and medium enterprises (MSMEs)	The main producers in the halal agri-food value chain, MSMEs, are responsible for ensuring that the products meet halal standards.
2	Assessment institution of food, drugs and cosmetics majelis ulama Indonesia	The institution responsible for halal certification plays a crucial role in ensuring adherence to halal standards, conducting audits, and socializing regarding awareness of halal certification.
3	Halal based agri-food community	A collection of people who have obtained halal certification and have experience in assisting and supervising directly. This community collaborates with a special institution that provides halal certifications.
4	Government	Supporting the implementation of halal policies, providing assistance to MSMEs in the certification process, and facilitating training and education related to halal.
5	Technology expert	Distribution and marketing channels, to provide easier access to halal certification information, supervision, halal supervisor assistance, and collaboration.

Based on these problems and challenges, several opportunities can be used as a strategy to improve the quality of human resources and develop halal industry in Indonesia. These opportunities aim to achieve superior human resources through human resource development (human development) in Heart, Head, and Hands. According to Apriansyah & Widigdo (2022), competencies consisting of knowledge, abilities, and attitudes have a positive impact on employee performance. Heart approach starts from heart by uniting or equalizing the goal of worship and piety to Allah, God, and Almighty. This can be achieved by creating a socialization campaign about the importance of halal certification that needs to be carried out intensively for all industry players. Second, Head approach was used and according to Nukeriana (2018), one of the factors hindering the implementation of the law on Halal Product Assurance is the lack of knowledge or information about halal certification, as well as the lack of legal awareness of consumers and producers about the rights to obtain halal certificates. As stated by Sucipto *et al.* (2022), knowledge influences the implementation of halal assurance system starting with education related to understanding halal agri-food and others to increase knowledge. Finally, Hands approach can be achieved by performing exercises to improve the skills needed in an industry. Jannah (2019) reported several ways to improve halal certification, such as socializing and providing free services to small businesses. Qomaro *et al.* (2019) also provided training on the importance of halal certification for MSMEs and how to assist in the process of submitting and filling. It is necessary to hold a training program that focuses on developing skills for sustainable halal ecosystem management and then hold technology adoption training to easily operate

new technologies while improving workforce competence.

Community assistance carried out by experts in halal field is important for the development of knowledge and skills in human resources. In addition to Heart, Head, and Hands approach, collaboration and synergy are crucial to creating a strong halal ecosystem among halal stakeholders. There must be stronger collaboration among various stakeholders, from upstream to downstream, including MSMEs actors, religious organizations knowledgeable about halal, universities, local governments, associations, communities, Islamic religious institutions, as well as e-commerce and digital platforms. This is important to ensure that halal certification services are well prepared, with effective coordination and communication among all parties. Table 1 shows the five stakeholders in the implementation of the existing solution.

3 Halalink: Empowering Halal Agri-Food Awareness and Compliance through Innovative Technology

Halal products are an important need for Muslims, in accordance with Islamic teachings. Muslims are required to consume halal food or other products, following religious orders. Al-Baqarah explained that a Muslim must consume halal and good food. Halal means allowed in Islamic law, while good means nutritious and healthy (Sayyidatunisa *et al.* 2020). Rules regarding halal aim to benefit the people, both in this world and in the hereafter. Halalness of a product is a requirement for consumers, specifically Muslims. Currently, with a large number of food products processed using various modern approaches based on science and technology, concerns arise among consumers, because not all industrial and non-industrial products apply halal certification (Setiawan *et al.* 2018).

Based on the Decision of the Minister of Religion of Indonesia Number 519 of 2001, dated November 30, 2001, Indonesian Ulema Council (MUI) was appointed as the institution responsible for conducting inspections and providing halal certification for food products. With this authority, MUI plays a role in conducting audits and providing halal certificates for food products, which are often the concern of consumers (Setiawan *et al.* 2018). Therefore, in the process of production and trade of food products in the era of globalization, consumers, specifically Muslims, need to be provided with adequate knowledge, information, and access to obtain accurate information about halal status (Subaeki & Jauhari 2016). Supported by UU Chapter 30 Number 7 (UU 1996) concerning food, every person who produces or imports food into Indonesia is required to include a label in the packaging. The label must at least contain information about the name of the product, the list of ingredients used, the net weight, the name and address of the manufacturer, halal information, as well as the date of the month and year of expiration (Subaeki & Jauhari 2016).

There is a similar mobile application developed in the study by Syahrul N. Junaini and Johari Abdullah developed a mobile application to identify halal products by using product barcodes as data inputs using smartphone cameras. This application was designed to provide information to Muslims about products that have been verified by halal authority of Malaysia (JAKIM) (Setiawan *et al.* 2018). The purpose of the study was to facilitate access to halal product information through the support of smartphone cameras and MMS services (Setiawan *et al.* 2018).

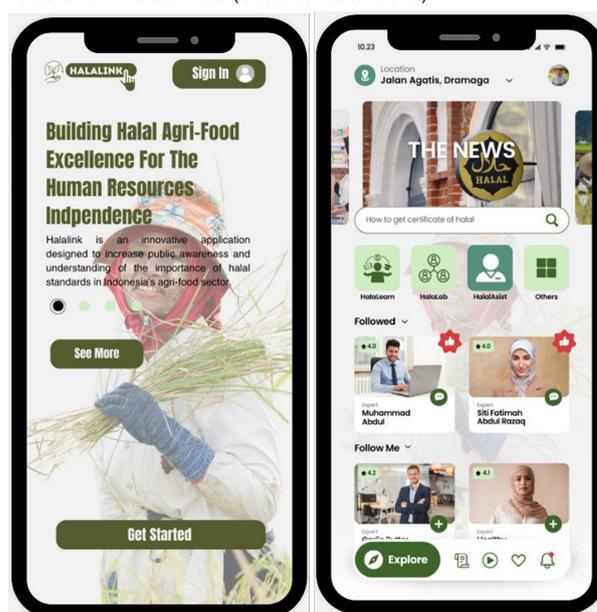


Figure 1: Prototype application of Halalink

From the challenge, the team presented Halalink application (Figure 1), which stands for Halal Agri-Food Link. Halalink is an innovative application developed to increase public awareness and understanding of

the importance as well as the significance of halal standards in Indonesia agri-food sector. This application is presented as a comprehensive solution to support halal ecosystem by providing various integrated features, ranging from education, halal certificates, and collaboration with stakeholders. The existing features include halalearns, halalalabs, and halalassists. These features are a manifestation of overcoming existing problems and challenges. (1) Halalearns provides learning videos and related information about the concept of halal in agri-food, and how to register halal certificate. This educational content is presented in various formats such as videos and articles. Beyond providing learning materials, the feature is designed to make complex halal certification processes easy to understand by engaging with multimedia content. The application not only educates users about the principles of halal agri-food but also offers interactive modules and quizzes to enhance retention. Consequently, it ensures that businesses and consumers have the knowledge to navigate halal certification confidently. (2) Halalalabs, facilitates the collaboration of human resources who are targets such as education, and socialization to achieve goals. It promotes dynamic exchanges between stakeholders, including educators, industry professionals, and regulatory bodies. The application fosters joint projects, seminars, and training sessions, aimed at continuously raising awareness and improving the application of halal standards in agri-food sector. (3) Halalassists enable users to receive guidance from halal supervisors to ensure compliance with standards, related to socialization and education. The feature functions as a continuous feedback loop, offering timely advice, updates on regulatory changes, and tailored solutions to ensure adherence to halal guidelines. This proactive support system guarantees that users remain well-informed and compliant in the operations.

To develop a strong halal industrial ecosystem in Indonesia, it is essential to build skilled and knowledgeable human resources. Students have an important role in increasing awareness, education, innovation, and collaboration to support halal agri-food industry. Through Heart, Head, and Hands approach, as well as cooperation between various stakeholders, challenges facing MSMEs in halal industry can be addressed. Halalink application is offered as a comprehensive solution to support halal ecosystem through features that prioritize education, certification, and collaboration, enhancing both the quality and sustainability of the industry in Indonesia.

4 Conclusions

In conclusion, as the country with the largest Muslim population in the world, Indonesia has immense potential to lead the global halal industry, specifically in agri-food sector. However, the sector faces significant challenges, including a shortage of skilled labor, low awareness of halal standards, as well as difficulties in adapting to technology and certification processes, particularly among MSMEs. Halalink application is considered a comprehensive solution to address these issues by integrating education, collaboration, and guidance to support halal ecosystem. The key features including Halalearns, Halalalabs, and Halalassists facilitate learning about halal standards, promote collaboration among stakeholders, as well as provide guidance to ensure compliance with requirements. By using

innovative technology and promoting cooperation, Halalink plays a role in increasing awareness, streamlining certification processes, and ensuring sustainable compliance with halal standards. Furthermore, Heart, Head, and Hands approach, which focuses on values, knowledge, and skills, combined with active student participation and stakeholder collaboration, offers a sustainable strategy to improve human resource quality in halal industry. With these efforts, Indonesia has the opportunity to strengthen the position in the global halal market while ensuring the growth of a strong, ethical, and competitive halal agri-food ecosystem.

Conflict of Interest

The authors declare no conflict of interest.

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