



# Sentiment Analysis on Halal Traceability: Dimensions-based Literature Index

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This study aims to investigate sentiments related to Halal Traceability in academic literature from 2004 to 2023. An analysis was conducted on 119 publications covering various aspects of this topic, using sentiment analysis methods and related research. The results of the analysis showed that the majority of the literature had a neutral sentiment (49.6%), followed by negative (26.9%) and positive (23.5%) sentiments. Factors that influence this sentiment include the understanding of the halal concept, the certification process, the use of technologies such as blockchain and RFID in the halal supply chain, regulatory changes, market dynamics, and the level of consumer awareness and knowledge related to halal. The findings provide important insights into the dynamics affecting halal governance and the challenges faced in ensuring the integrity and safety of halal products. The practical implications are the importance of a better understanding of the concept of halal, the application of the latest technology in tracking halal products, and adequate policies to support the development and protection of the halal product market. By understanding the sentiments associated with Halal Traceability, stakeholders can take appropriate steps to improve consumer confidence and the efficiency of the halal governance system.

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## INTRODUCTION

Food is no longer just a physiological need, but has become a reflection of sustainability and safety in an increasingly complex world (Lang & Barling, 2012). Amidst the uncertainty of its origin and quality, the issue of halal food is inevitably taking center stage (Jia & Chaozi, 2021). When we talk about food, sustainability and safety become inevitable. As people become more aware of the origin and quality of food, the issue of halal food is gaining more attention. Halal is not just about compliance with religious laws, but also about the confidence that the food consumed has gone through a transparent, documented and safe process (Khan & Haleem, 2016).

The concept of halal traceability is a form of synthesis between advanced technology and ethics in the halal food supply chain (Rajebet al., 2021). In an increasingly connected and digitized era, it is important to understand the public sentiment towards halal traceability as an early stage in ensuring sustainability and safety in the consumption of halal food (Azizah, 2022). This research also marks a move towards a deeper understanding of the concept of halal traceability in the digital age. Information technology has transformed the landscape of food information, changing the way we perceive and access it. As increasingly savvy consumers, we need to understand how technology impacts our perceptions and demands for halal traceability. This research will provide a deep insight into the crucial role of halal traceability in maintaining quality and trust in halal food in the digital era. This research aims to uncover the sentiment of the literature related to halal traceability and the extent to which it is seen as important in the halal food ecosystem.

Halal traceability is no longer just a technical aspect of tracking and documentation, but also reflects the ethical values and beliefs that underpin the halal food industry. In an increasingly digital age, understanding the public sentiment towards halal traceability can help shape and improve governance efforts in the industry. As such, this research will make an important contribution to our understanding of sustainability and safety in halal food consumption in the evolving digital age.

Through sentiment analysis methods and relevant data, this research is expected to provide a deeper understanding of the important role of halal traceability in ensuring the sustainability and safety of halal food. This research is not just about food, but also about trust, transparency and a better future for all

stakeholders in the halal food industry. From this background, the author is interested in discussing the perception of halal traceability from primary data published in journals for the last 20 years (2004-2023). Some of the benefits obtained from this research are knowing the extent of the portrait of the development of halal traceability research perceptions in the world through selected publication articles. In addition, this study looks at meta-analysis related to trends in halal traceability research.

## METHOD

This study uses sophisticated and comprehensive methods to analyze trends in research on Halal Traceability over the past two decades, from 2004 to 2023. We utilized metadata from the Dimension platform, which contains a wide array of relevant research journals and scholarly articles, as the main data source. The methodology used in this study is a qualitative approach combined with descriptive statistics, allowing us to explore 119 publications on Halal Traceability. As explained by Yusuf (2017), this qualitative approach aims to explore the meaning, characteristics, symptoms, understandings, concepts, symbols, and descriptions of the phenomenon being studied. The result is a deeper understanding of the issue of Halal Traceability presented in a narrative manner.

Furthermore, we developed the study framework shown in figure 1, which provides details on the approach used in sentiment analysis of scientific publications on Halal Traceability. Sentiment analysis is an important tool for identifying the views and opinions of the scientific literature on a particular issue. Sentiment analysis involves processing text, not numbers. In this context, subjectivity, orientation, opinion holder, and identification target are key aspects. Tools often used in sentiment analysis, such as SentiWordNet and WordNet, are usually available in English, and most research has been conducted in that language.

Sentiment analysis aims to classify the polarity of a text, i.e. whether it is positive, negative, or neutral, at the document, phrase, or feature level. The results allow us to present the research sentimentally, in other words, determining whether the opinions contained in a document, sentence or feature entity are sad, happy or angry. To process the data, we used Microsoft Excel 2019 software and the SentiStrength sentiment analysis tool. The results of this sentiment analysis will be a valuable guide to form a perspective on Halal Traceability.

Finally, we also adopted a meta-analysis technique to evaluate the impact in the research domain we examined. This includes a review of the number of

publications, most frequently cited articles, leading authors, as well as the classification of journals involved in research on Islamic Philanthropy.

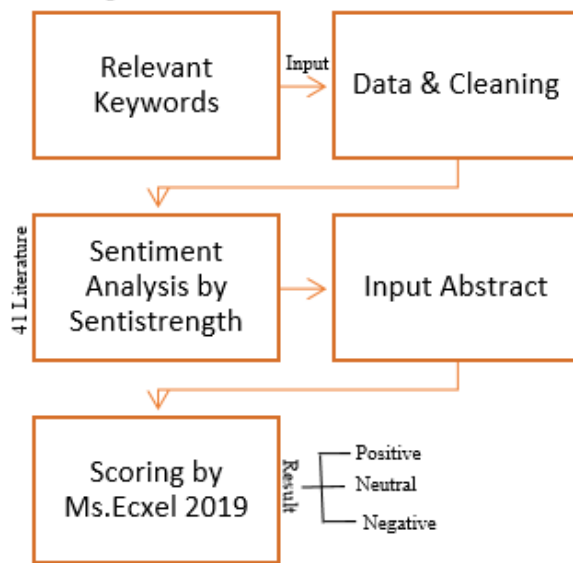


Figure 1. Methodology for Sentiment Analysis

Source: Author

## RESULTS AND DISCUSSION

Our analysis reveals that halal traceability has become an increasingly popular research topic in recent years. In this context, research on halal product traceability has received significant attention from researchers. This research reflects the increasing global awareness of the importance of halal food safety, especially among Muslim consumers, who are increasingly sensitive to the origin and legitimacy of the

products they consume. Factors such as technological advancements, regulatory changes, and consumer demand for transparency in the supply chain have amplified interest in this research. The analysis of annual publication counts provides concrete evidence of the growth trend of research related to halal traceability, creating opportunities for stakeholders to improve safety and trust in the halal food industry. The following is the number of publications per year on Halal Traceability.

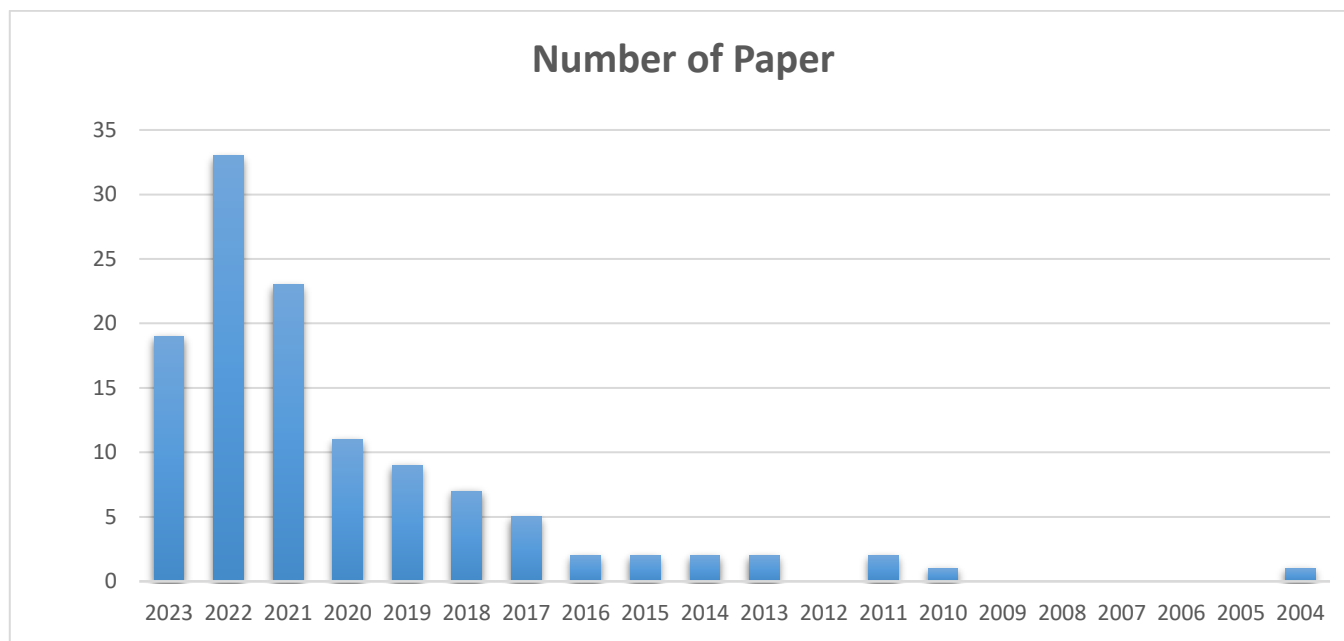


Figure 2: Publication Trends

This section describes the number of published papers on the perception of halal traceability. There are 119 papers published in the 20-year observation period, from 2004 to 2023. Table 1 illustrates the distribution of papers per year which varies over the past 20 years with a range of 0 to 33 papers. The most papers on the

perception of Halal Traceability banking were published in 2022 with 33 papers and the earliest publication was in 2004 with 1 publication in that year. Furthermore, there is a research gap between 2005 and 2012 due to a vacuum of research related to the theme of halal traceability in those years.

**Table 1.** Journal Classification

Focus Study	Total
Journal of Islamic Marketing	7
Journal of Food Science	4
IOP Conference Series Materials Science and Engineering	4
IOP Conference Series Earth and Environmental Science	4
Un certain Supply Chain Management	3

Table 1 provides an overview of the main journal classifications in research on Halal Traceability. The Journal of Islamic Marketing highlights aspects of halal product marketing and branding strategies, while the Journal of Food Science is more related to the analysis of food ingredients and food technology in the context of halal compliance. IOP Conference Series Materials Science and Engineering reflects the focus on material and technology development in ensuring halal products,

while IOP Conference Series Earth and Environmental Science is more related to environmental aspects in the halal supply chain. Uncertain Supply Chain describes the emphasis on uncertain supply chain management in the halal context. This classification reveals the wide diversity in Halal Traceability research covering religious, technical, food science, supply chain management, and environmental aspects.

**Table 2.** Five (5) Top Authors

Authors	Number of Publications
Suhaiza Hanim Zailani	5
Abderahman Rejeb	5
Sucipto	4
Nitty Hirawaty Kamarulzaman	4
Dwi Iryaning Handayani	4

Table 2 above describes the five most productive article authors with publications on halal traceability published in the last 20 years. Suhaiza Hanim and Abderahman Rejeb are the authors with the most publications, namely with five publications, followed by Sucipto, Nitty Hirawaty Kamarulzaman, Dwi Iryaning Handayani with four publications and other authors only published three, two and one publication. One of the studies written by Zailani et al., with the title "Halal

Traceability and Halal Tracking Systems in Strengthening Halal Food Supply Chain for Food Industry in Malaysia (A Review)". The study states that advances in science and technology as well as ongoing efforts to increase public understanding, it is important for industry players and consumers to fully understand the concept of Halal. Halal tracking and tracking systems are emerging as a profitable field in the global Halal market.

**Table 3.** Most Cited Publications

Citation	Authors	Paper Name	Year
119	Azmi, Fadhlur Rahim; Musa, Haslinda; Zailani, Suhaiza Hanim Mohamad; Fam, Soo-Fen	Blockchain Technology in the Food Industry: A Review of Potentials, Challenges and Future Research Directions	2020
105	Poniman, Delma; Purchase, Sharon; Sneddon, Joanne	Conceptual Framework on Halal Food Supply Chain Integrity Enhancement	2014
103	Han, Qiang; Bao, Wenxing	Halal Traceability and Halal Tracking Systems in Strengthening Halal Food Supply Chain for Food Industry in Malaysia (A Review)	2010
93	Kadir, Muhammad Hijrah Abd; Rasi, Raja Zuraidah Raja Mohd; Omar, Siti Sarah; Manap, Zariq Imran Abdul	Halal supply chain critical success factors: a literature review	2015
83	Efendi, Ahmat Muzaeni Arif; Kholis, Muhammad Nur; Nurmaydha, Agency	Implementing Traceability Systems in Specific Supply Chain Management (SCM) through Critical Success Factors (CSFs)	2018
75	Rejeb, Abderahman; Keogh, John G.; Zailani, Suhaiza; Treiblmaier, Horst; Rejeb, Karim	Applying Blockchain for Halal food traceability	2020
73	Tan, Albert; Gligor, David; Ngah, Azizi	The blockchain-based Halal traceability system: a hype or reality?	2020
53	Setyaningrum, Paramita	Influence of perceived benefits and traceability system on the readiness for Halal Assurance System implementation among food manufacturers	2017
75	Talib, Mohamed Syazwan Ab; Abu Bakar Abdul Hamid; Zulfakar, Mohd Hafiz	Traceability systems in the Western Australia halal food supply chain	2015

In Table 3, the publications with the highest number of citations from each indexed and reputable journal are listed, with the most cited article being the work of Azmi et al., titled "Blockchain Technology in the Food Industry: A Review of Potentials, Challenges and Future Research Directions." The study summarizes the impact of blockchain technology in the food industry and how the combination of features such as immutability, increased visibility, transparency, and data integrity, provide numerous benefits that increase trust in the wider food supply chain. In addition, blockchain can also enhance the integrity of trust claims such as sustainable products. While the technology has attracted much attention and market expectation, a comprehensive picture of the potential benefits and challenges of blockchain in the food supply chain still

needs to be further clarified. Potential challenges include technical, organizational, and regulatory issues.

## SENTIMENT ANALYSIS

Furthermore, this research tries to calculate sentiment with the theme of halal traceability published from 2004 to 2023 from indexed and reputable journals. As is known, sentiment analysis is a research commonly used to measure public sentiment towards a theme. The tool used in this research is SentiStrength as a data processing tool. Specific documents, both in articles, reviews, and conference articles related to the theme of halal traceability as many as 119 were selected as data sources. The following figure is the result of sentiment analysis on halal traceability:

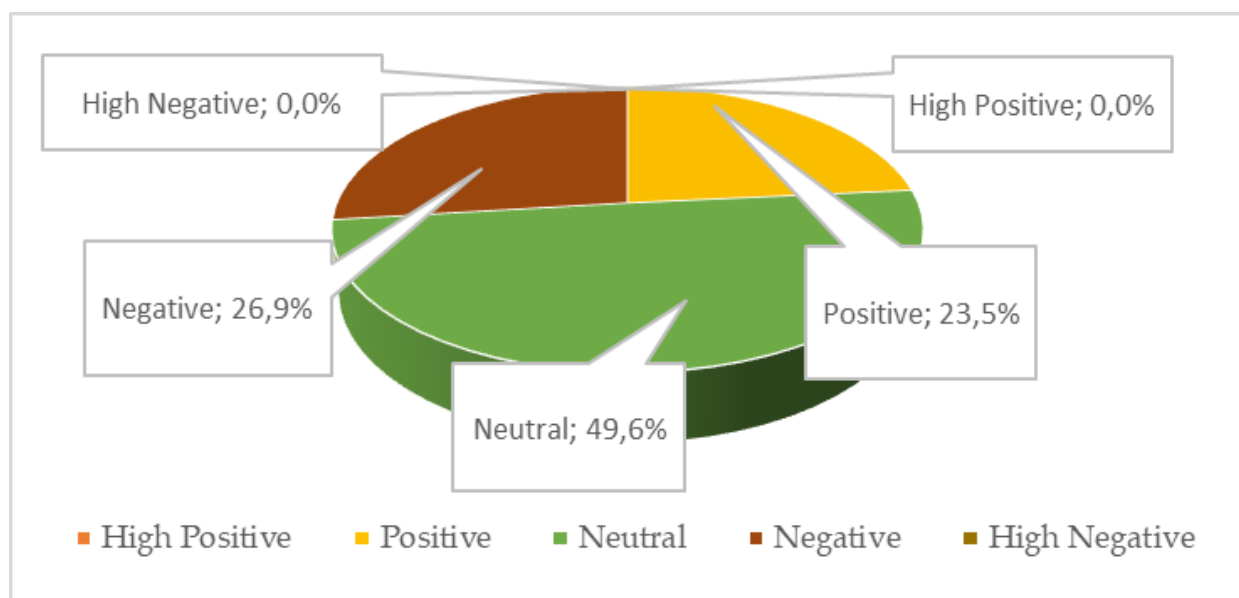


Figure 3. Sentiment Result

The sentiment score is obtained from the title and abstract of the article. Results are sorted from a very negative (-5) to a very positive (+5) interval, with 0 being neutral. The score is calculated by multiplying the sentiment score assigned to each word in SentiStrength. The majority of literature on halal traceability has a negative sentiment of 26.9%, indicating a pessimistic view and certain concerns regarding the resilience and vulnerability of halal traceability to certain challenges. Furthermore, the positive sentiment has a lower value of 23.5%. This positive sentiment reflects an optimistic view towards and stability of halal traceability. Neutral sentiment has a ratio of 49.6%, indicating that most literature may outline facts or a more objective approach without explicitly expressing positive or negative

judgments. This overall sentiment analysis provides valuable insights into the diversity of views in the literature regarding halal traceability in the context of halal product safety.

The data above also shows that the majority of sentiments in the literature are negative in response to halal traceability. However, this study found that neutral responses also dominate and outnumber negative responses. Therefore, we want to see and identify what are the factors that influence this sentiment. Because this varied situation must continue to be developed, one of which is by increasing the quantity of scientific literature literacy in indexed journals. With the literacy of halal traceability in the field of halal governance.

**Table 4.** Key Factors Affecting Sentiment

Positive	Negative
<ul style="list-style-type: none"> <li>• Benefits</li> <li>• Implementation</li> <li>• Important</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance</li> <li>• Integration</li> <li>• Integrity</li> <li>• Awareness</li> </ul>

Table 4 above summarizes the research findings, which include the main characteristics that influence researchers' sentiments, both positive and negative, based on articles published on halal traceability over the past 20 years.

The negative sentiment towards Halal traceability in the literature underscores the importance of understanding the concept of Halal in the industry and in the eyes of consumers. Halal traceability and tracking systems are becoming a focus in the global Halal market, particularly in Malaysia. Malaysia's recent claim to be the Halal center of the world was questioned after a surprising inspection by Malaysian authorities, which showed several "Halal" food manufacturers violating regulations. The chaos associated with this issue fueled Muslim consumers' doubts about the effectiveness of the Halal food tracking and traceability system in Malaysia. In addition, there are challenges in integrating the entire Halal food supply chain, including inbound and outbound logistics, with the aim of improving product integrity. Currently, Halal traceability systems are only applicable to trace from raw material sources to industrial warehouses or inbound logistics (Mohmed et al., 2016; Usman et al., 2018).

The negative sentiment in the literature also emphasizes the importance of product Integrity, given the importance of ensuring that the entire supply chain, from raw materials to finished products, adheres to Halal principles in Islam. In order to verify product adherence to Halal principles, methods of tracing Halal and non-Halal raw materials become indispensable. Although the level of awareness about Halal products is high, the integrity of the final product is still questionable. While consumer awareness of Halal products affects purchase intention, research shows that Halal product tracking does not moderate this relationship. In other words, Halal product tracking does not affect the extent to which consumers' awareness of Halal products affects their purchase intention. This underscores the importance of literacy about halal search to consumers as a consideration for them in making a purchase decision (Sin et al., 2019; Jannah & Al-Banna, 2021).

The positive sentiment in the literature towards Halal traceability reflects the extensive exploration of Halal traceability systems and their benefits in the Halal food industry. This reflects a deeper understanding of the concept of Halal and how traceability systems can provide significant benefits in Halal food processing. This positive sentiment reflects an awareness of the need for traceability systems in maintaining the Halal status of products and meeting the growing demand for Halal products worldwide (Poniman et al., 2015; Abd Rahman et al., 2017).

Halal traceability refers to the process of tracking and documenting the production, processing, and distribution of halal products throughout the supply chain. This traceability ensures that halal standards and requirements are met at every stage of the product's journey, from the sourcing of raw materials to the final product reaching consumers. Halal traceability is important for consumers who follow halal dietary guidelines, as it provides transparency and assurance regarding the authenticity and compliance of halal products. It also plays a crucial role in ensuring integrity and trust in halal supply chains.

### Bibliometric Analysis

As mentioned, bibliometric analysis is used to determine the extent of studies related to this topic and map important research that has been carried out by previous researchers. Several examples of studies with similar methods and frameworks have been carried out by Khalifah et al., (2024), Puspita (2023), Rusydiana (2019), Kartikawati & Uula (2024), and also Herindar & Shikur (2023).

Based on the results of the analysis using VOSviewer on keywords with the theme of halal traceability, there are many parts and are interrelated with other keywords. Keywords that have the same color indicate a very close relationship. In the mapping displayed there are several keywords that often appear in takaful efficiency themed articles which are divided into 6 colors namely red, green, yellow, purple, light blue and turquoise.



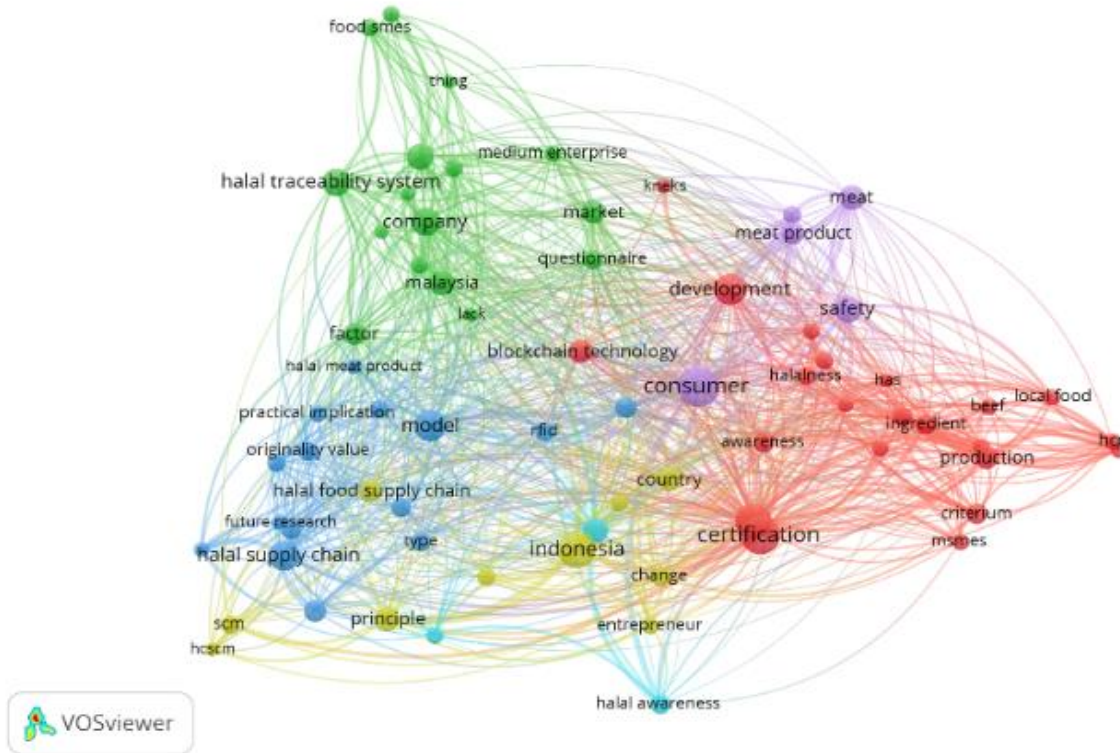


Figure 4. Bibliometric analysis

The following is the naming and analysis for each cluster in the context of halal governance and the direction of further research.

#### Red Cluster 1 (Awareness and Certification):

Keywords: awareness, beef, blockchain technology, certification, criterium, development, halal assurance system, halal certificate, halal standard, halalness, has, hcp, ingredient, kneks, local foodn, menu, msms, need, process, producer, production and term. Analysis: This cluster focuses on halal awareness, certification, halal assurance systems and halal standards. This indicates the importance of halal understanding and certification in maintaining the integrity of halal products. Halal governance can play an important role in ensuring that halal certification is followed correctly. Previous research has highlighted the importance of public awareness and understanding of halal products. Khan and Haleem (2016) explained that halal is not just about fulfilling religious demands, but also about the belief that the food consumed has met halal requirements in a transparent manner. This creates high trust among consumers towards halal products.

Meanwhile, halal certification and the use of blockchain technology are important tools in ensuring traceability and integrity in the halal product supply chain. Ismail et al. (2018) emphasized that the halal

assurance system has a major role in ensuring that the entire supply chain of halal products meets halal requirements. Blockchain technology has also been identified as a potential solution to ensure traceability and authenticity of halal products (Amin et al., 2020).

Overall, Red Cluster 1 reflects that understanding the concept of halal, halal certification, and the use of technology such as blockchain play an important role in halal governance and maintaining the integrity of halal products. This is in line with previous findings in the literature that show how important halal awareness and certification are in the context of halal products.

#### Green Cluster 2 (Factors and Markets):

Keywords: adoption, company, factor, food product, food smes, halal food product, halal integrity, halal traceability system, iot, lack, Malaysia, market, medium enterprise, questionnaire, thing and use. This cluster is related to the factors that influence the adoption of halal traceability practices and the role of the market in halal governance. The influence of these factors can be taken into consideration in the development of policies and regulations that support halal governance.

Factors that influence the adoption of halal traceability practices, such as Internet of Things (IoT)



technology, lack of understanding, and company size, are an important part of understanding the barriers and opportunities in traceability system implementation. Several studies have shown that the adoption of IoT in halal food traceability systems can improve traceability effectiveness and ensure product integrity (Miah et al., 2019).

The market plays an important role in determining the demand for halal products. Malaysia, as one of the major players in the halal food industry, has a significant market for halal products. Therefore, understanding market dynamics and consumer preferences in the context of halal products is key in maintaining halal integrity and governance (Talib et al., 2017).

Previous research has observed that factors such as consumer awareness of halal food and technology acceptance play an important role in improving halal governance (Alam et al., 2019). In addition, the role of companies in meeting halal requirements and maintaining the integrity of their products has also been the focus of research related to halal governance.

Overall, Green Cluster 2 reflects the importance of understanding the factors that influence the adoption of halal traceability practices and the role of the market in the context of halal governance. This is consistent with previous research findings that highlight the role of such factors in driving the success of halal governance.

### **Blue Cluster 3 (Concept and Technology):**

Keywords: concept, csfs, design methodology approach, future research, halal meat product, halal supply chain, halal supply chain management, literature review, model, originality value, practical implication, problem, rfid, type and value. Analysis: This cluster covers the concept, technology, and role of blockchain in halal supply chain. Technologies such as blockchain and RFID can be used to ensure transparency and traceability in halal governance.

In the context of halal governance, understanding the concept and approach of design methodology is very important. Previous research has identified critical success factors (CSFs) in the implementation of halal governance, which involve appropriate concepts, designs and methodological approaches (Sutrisno et al., 2016). In the context of future research, it is important to identify research areas that require further attention and explore the value of originality, practical implications, and models that can strengthen halal governance (Hasan et al., 2019).

Technologies such as Radio-Frequency Identification (RFID) and blockchain are also a focus in Blue Cluster 3. The use of RFID in halal governance can improve traceability and ensure transparency in the supply chain (Ismail et al., 2014). Similarly, blockchain has gained attention for its potential to improve halal supply chain management (Rajab et al., 2021). Using this technology, halal governance can ensure product integrity and trace products from source to consumer. Thus, Blue Cluster 3 emphasizes the importance of understanding the concepts, technologies, and roles of blockchain and RFID in supporting halal governance. Previous research has noted that understanding the concepts and application of technology are important factors in ensuring sustainability and safety in the halal food industry.

### **Yellow Cluster 4 (Changes and Principles):**

Keywords: changes, consumption, country, entrepreneur, halal food industry, halal food supply chain, hcscm, Indonesia, principle, scm. Analysis: This cluster deals with changes in the context of the country and halal principles. Changes in halal regulations and principles can affect halal governance in a country.

First, changes in halal regulations and principles are a key aspect of halal governance (Kumar et al., 2015). Changes in halal regulations and requirements can affect manufacturers, distributors and consumers in the halal food industry. Therefore, understanding how these changes affect the halal food supply chain is important to maintain the integrity of halal products.

Secondly, consumption of halal food is an important factor in this industry. The consumption of halal food products relates to consumer preferences and how the demand for such products affects the market. Research has shown that consumers who are increasingly aware of halal products can change market dynamics (Agrawal et al., 2020). In the context of Indonesia, as one of the countries with the largest Muslim population, halal food consumption has a significant impact on the halal economy and governance. Third, the role of the country in regulating the halal food industry is an important factor. Countries such as Indonesia have been active in regulating and promoting the halal food industry through halal governance principles (Badan Penyelenggara Jaminan Produk Halal - BPJPH). Halal regulations and governance implemented by countries have an impact on the halal industry and supply chain.

Finally, halal principles play a central role in halal governance. These principles include aspects such

as compliance with religious laws, health, and product safety. These principles must be applied throughout the halal food supply chain to ensure product integrity and meet consumer expectations. Thus, this yellow Cluster highlights the importance of understanding regulatory changes, consumption, the role of the state, and halal principles in maintaining effective halal governance.

#### **Purple Cluster 5 (Consumer and Meat Products):**

**Keywords:** consumer, meat, meat product, respondent, safety. **Analysis:** This cluster deals with consumers and meat products in the context of halal. Consumer perceptions of halal meat products and their safety can be a major concern in halal governance.

Consumers play a central role in the halal food industry. Previous studies (Mohamed & Sahari, 2011) have shown that consumer preferences and perceptions of halal food products can influence the demand and supply of halal products. Consumers who are increasingly aware of the halal and safety aspects in halal meat products can influence halal governance policies and practices. Therefore, a deep understanding of consumer perceptions and preferences towards halal meat products is key in ensuring the effectiveness of halal governance.

Halal meat products have special characteristics related to halalness and safety. The safety and quality of halal meat products are very important for consumers who consume them. Previous studies (Hajmeer & Scrimgeour, 2010) have shown that the safety and halalness of halal meat products must be strictly maintained during the entire supply chain. Consumers' perception of the safety of halal meat products can also have an impact on trust in the product. Therefore, good governance in halal meat products is essential to ensure consumer satisfaction and trust. In the context of this cluster, a deep understanding of consumer preferences, their perceptions of halal meat products, and the safety and halalness of halal meat products are critical elements in maintaining the quality and trust of these products in the market.

#### **Cluster 6 (Awareness and Knowledge):**

**Keywords:** halal awareness, halal traceability and knowledge. **Analysis:** This cluster highlights awareness and knowledge related to halal traceability. Increased awareness and knowledge in halal traceability can support more effective halal governance.

Awareness about the halalness of food and the traceability process associated with it is important in halal governance. Previous studies (Ayub et al., 2019)

have shown that consumers' level of awareness about the halalness of products can influence their purchasing decisions. The higher the level of consumer awareness about the importance of halal traceability, the more likely they will choose halal products. Therefore, efforts to increase public awareness of halal traceability can contribute to the effectiveness of halal governance.

Knowledge of halal traceability is a key element in ensuring good halal governance. Previous studies (Maulida et al., 2020) show that a deep understanding of traceability systems in the halal food supply chain can help producers and authorities ensure compliance with halal principles. This knowledge includes an understanding of the technologies, processes, and regulations related to halal traceability. Therefore, increased knowledge in halal traceability can improve overall halal governance. In the context of this cluster, higher awareness and knowledge of halal traceability can help support the effectiveness of halal governance, both from the perspective of consumers and producers.

Overall, this sentiment analysis of the literature provides an overview of a number of aspects related to halal governance, including understanding, certification, adoption factors, technology, principles, consumer perception, and knowledge. A deeper understanding of these factors can help strengthen halal governance and support the integrity of halal products.

## **CONCLUSION**

This study underwent sentiment analysis of literature related to halal traceability, which was published from 2004 to 2023. The results of this analysis provide an overview of the dominant sentiments in the literature related to halal traceability, as well as the factors that influence these sentiments. A total of 119 documents, including articles, reviews, and conference articles, were used as data sources for this analysis.

The sentiment analysis results show that the majority of literature related to halal traceability has a neutral sentiment, with 49.6% of the total data. Negative sentiment follows with a percentage of 26.9%, while positive sentiment has a lower percentage of 23.5%. These results reflect the diversity of views in the literature regarding halal traceability in the context of halal product safety. The main conclusions of this sentiment analysis are:

1. **Negative Sentiments:** The majority of negative sentiments in the literature related to halal traceability reflect a pessimistic view and certain concerns regarding the resilience and

vulnerability of halal traceability to certain challenges. The causes of this negative sentiment involve changes in regulation, supply chain integration, and product compliance and integrity in the halal context.

2. Positive Sentiment: Although lower in number, the positive sentiment reflects an optimistic view towards the role of halal traceability in maintaining the integrity and stability of halal products. This reflects a deep understanding of the concept of halal and how traceability systems can provide significant benefits in halal food processing.

Furthermore, the bibliometric analysis used on keywords related to halal traceability showed a very close relationship between various keywords in the literature. This provides an understanding of how this topic is evolving in the scientific literature. Based on the sentiment and bibliometric analysis, some important findings were found that can be used to understand halal governance:

1. Awareness and understanding of halal concepts, halal certification, and technologies such as blockchain are important elements in maintaining the integrity of halal products.
2. Factors such as technology adoption, firm size, and market role play an important role in the development of halal governance.
3. The concept, technology, and role of blockchain in halal governance play an important role in maintaining transparency and traceability in the halal food supply chain.
4. Changes in regulation, halal food consumption, the role of the state, and halal principles are important factors in effective halal governance.
5. Consumer preferences and perceptions of halal meat products as well as product safety and halalness are the main focus in maintaining the quality and trust of these products.
6. Higher awareness and knowledge of halal traceability can support the effectiveness of halal governance.

This research provides valuable insights into the diversity of views and key factors that influence sentiment in the halal traceability literature. By understanding these elements, halal governance can be strengthened and the integrity of halal products can be better safeguarded.

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