

COVID-19 and Halal Food: An Application of Text Analytics

Aisyah As-Salafiyah¹

¹*SMART Indonesia*

This bibliometric study investigates the current state of various studies on COVID-19 and halal food published by journals equipped with a digital-object-identifier. The analysis is focused on descriptions of the characteristics and trends of keywords, authors and journals. The data analyzed were 203 research publications in Dimensions (<https://dimension.ai>). The search used to determine the research dataset was last updated on December 21, 2022. Descriptive statistical methods were used, and bibliometric analysis was carried out using the R Biblioshiny to determine the bibliometric map. The number of articles discussing the theme of COVID-19 and halal food has been quite large in recent months. There are so many journals that publish this theme, one of which is the most impactful is the SSRN Electronic Journal which has many authors researching this theme with various keywords. The most prolific author is Khan N and the most popular keywords used are 'Covid, Islamic, Food'. This research provides an overview of the trends in keywords, journals and authors in the most popular articles on the topic of COVID-19 and halal food, thus providing information for researchers focused on research in this area. In the end, this theme has the potential to continue to be developed.

Keywords: COVID-19; Halal Food; Descriptive, Bibliometric

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*Correspondence:

Aisyah As-Salafiyah

assalafiyahsmart@gmail.com

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1.1.

INTRODUCTION

Since December 2019, a virus called Coronavirus 2 (SARS-CoV-2) in the form of respiratory distress syndrome triggered an outbreak of pneumonia from Wuhan (the Huanan seafood market) in China, which now poses a health threat to the world community. The Coronavirus Disease-2019 (COVID-19) pandemic by SARS-CoV-2 is spreading around the world. Early symptoms of COVID-19 include pneumonia, fever, myalgia, and fatigue (Farnoosh et al., 2020). The food industry is one of the sectors most affected. Government authorities have made many efforts to advocate changes in people's behavior to minimize the spread of the virus. The practice of wearing masks, washing hands, maintaining distance, no direct interaction, and maintaining optimal personal hygiene, apart from implementing control measures at the state level to limit travel between countries (Chow, 2020).

The need for food raises the issue of food safety as an important concept that has developed over the years. Currently this concept is one of the strategies of many governments and international organizations supported by various appropriate laws and regulations in order to ensure the sustainability and stability of food supplies to achieve the expected availability, safety and quality (Dulaijan, 2020). In addition, this pandemic has made people more concerned about choosing types of food that are suitable for consumption. For Muslims, one of the lessons from this epidemic is about the importance of consuming halal and hygienic food. Consumers are increasingly aware that eating that is not halal or unhygienic processing has a great potential to cause diseases that occur today. A McKinsey survey in April 2020 found the fact that consumers in Indonesia are increasingly concerned about the cleanliness and hygiene of food products. 42% of respondents think that hygiene is an important factor in choosing food and will become the new normal (Hidayah, 2020).

Halal food is a way to reduce the risk of future outbreaks similar to COVID-19 in the future. The principle of *tayyib* (health) which is often associated with halal food can make halal food not only "allowed" in Islamic teachings but also "good" and "clean" for consumption. Because *Tayyib* emphasizes on the health aspects of Halal food, namely food safety and hygiene. According to Islamic teachings, halal food encourages the consumption of permitted animals and more plant-based foods, and regulates good eating habits (Amalia et al., 2020). This has

resulted in the issue of food becoming quite important in recent years (Raja, 2020). Given the origins of COVID-19, it seems that healthy food recommendations and according to the law of the Sharia law need more attention around the world.

Various scientific studies on COVID-19 and halal food have been carried out and published in various journals, there are more than 200 scientific research papers published by various journals both national and international in the period of observation in the last few years. The distribution of these theme papers tends to increase every month. This research examines the collection of data on scientific articles related to COVID-19 and halal food from various studies indexed in Dimension.ai to describe the development trend of COVID-19 research and halal food in graphic mapping visualization so that it can be used as a reference for future research in the future.

METHOD

Bibliometric mapping is an important research topic in the bibliometric field (Börner et al., 2003). Two distinguishable bibliometric aspects are the construction of the bibliometric map and the graphical representation of the map. In the bibliometric literature, the greatest concern is in the construction of the bibliometric map. Research related to the effects of differences in similarity measures (Ahlgren et al., 2003; Taqi et al., 2021; Van Eck & Waltman, 2009), and they tested with different mapping techniques (Boyack et al., 2005; Van Eck & Waltman, 2007; White, 2003). The graphic representation of the bibliometric map has received less attention. Although some researchers seriously study issues related to graphical representations (Chen, 2003, 2006; Skupin, 2004), most articles published in the bibliometric literature rely on simple graphical representations provided by computer programs such as SPSS and Pajek.

For thumbnails containing no more than, say, 100 items, a simple graphical representation usually yields satisfactory results. However, there appears to be a trend towards larger maps, and for such maps a simple graphic representation is inadequate. The graphical representation of a large bibliometric map can be further improved by, for example, a zoom function, special labeling algorithms, and density metaphors. Such functionality is not incorporated into

the computer programs commonly used by bibliometric researchers.

This research uses publication data related to COVID-19 and halal food sourced from the dimensional.ai database (<https://Dimensions.ai>). Dimension is an alternative indexation with the criteria that all articles have a certain digital object identifier (DOI), the search term is "COVID-19 and halal food" in the complete data. As a result, there were 203 publications on December 21, 2022. From the screening results, 203 articles were published related to the issue of COVID-19 and halal food. Bibliometric mapping data for keywords, authors, journals, and document characteristics in this study

were analyzed using the R Biblioshiny software which is available for free from: <https://bibliometrix.org/>.

RESULTS

The table above shows the number of document collections studied on the theme of COVID-19 and halal food, namely a total of 203 data consisting of 6 different types of documents, with the following explanation: (1) the types of published journal articles are 100 documents, (2) the book chapter type is 38 documents, (3) the edited book type is 15 documents, (4) monograph type is 15 documents, (5) preprint type is 10 documents, and (5) proceeding is 25 documents.

Table 1. Document Sources

No	Document Types	Number of Articles
1	Journal article	100
2	Book chapter	38
3	Edited book	15
4	Monograph	15
5	Preprint	10
6	Proceeding	25
	TOTAL	203

Based on the table above, it can be concluded that the documents that are most widely used as objects of study in research discussing COVID-19 and halal food in the first rank are journal articles with a percentage of 49.2% or 100 documents. Meanwhile, the least used documents were preprints with a percentage of 34.9% or 10 documents. This data shows that the references used are quite valid because they come from written documents that are scientific in nature and are mostly dominated by article papers.

Three Fields Plot

The Three Fields Plot is an illustration of 3 elements consisting of a list of journal names, a list of authors and a list of topics used. These three elements are plotted with a gray plot that shows their relationship with each other, starting from the name of the journal, then each journal shows the author, and each author is shown on the topic they use in their COVID- themed paper. 19 and halal food. The size of each rectangle in the list of names shows the quantity of paper associated with that element.

The first element, namely the journal. There are 10 journals indexed in the Three Fields Plot that

publish papers on the theme of COVID-19 and halal food, but the top journal that publishes the most papers on this theme is the journal SSRN Electronic Journal which is depicted in a blue rectangle and connected by several authors, namely Muhammad A, Fahad A, Naushad M, Faisal S, Khan N.

The second element in the middle is the author's name. Several authors recognized by their published journals will be associated with previous elements, such as an author named Khan N who is linked to the journal SSRN Electronic Journal and Building the Future of Food Safety Technology on the journal element. However, some others are not indexed so that they do not have any connection with any of the journals listed. In addition, each of these authors will also be associated with frequently used keyword topics on the right. There are 19 top authors listed in this plot. The size of the rectangle shows the quantity of the number of papers written by each author. In this plot, Khan N occupies the widest rectangle indicating that he writes the most on the theme of COVID-19 and halal food.

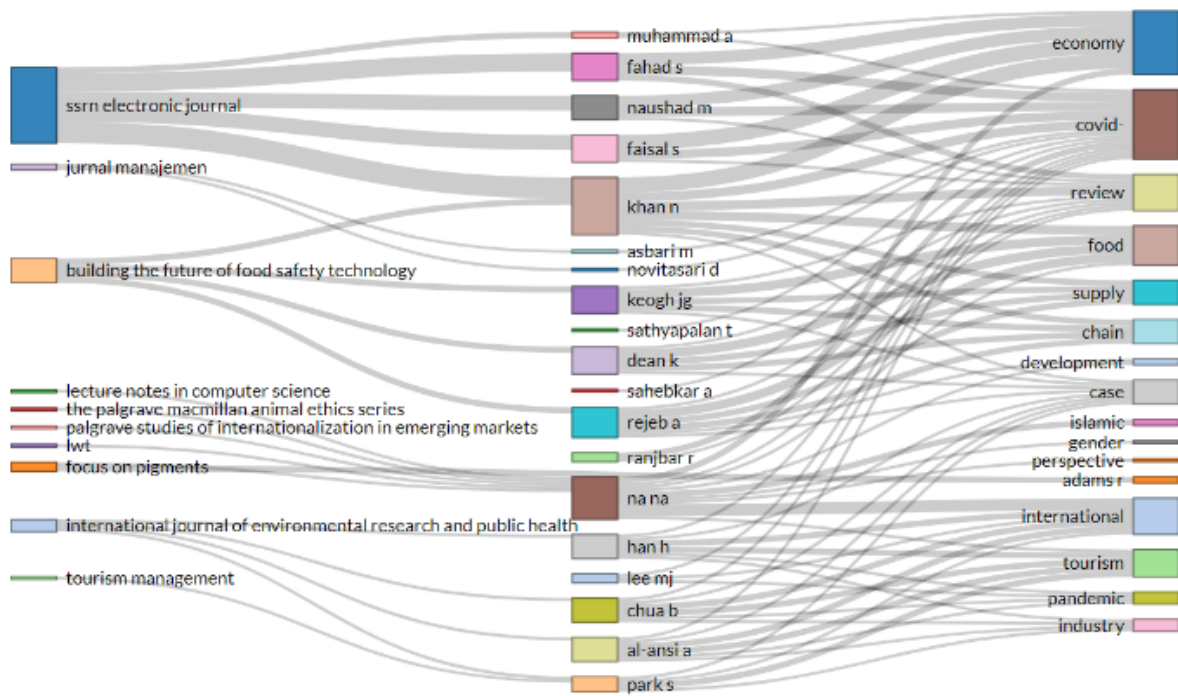


Figure 1. Three-fields plot

The third element is the keyword topic that appears the most in the paper which is the object of research. Each topic is associated with an author who uses the topic a lot. There are 16 keyword topics listed and the keywords that appear most often are

Economy, Covid, Food. It also appears that these three topics are used by almost all registered authors, this data is in accordance with the theme of this research, namely discussing scientific papers related to COVID-19 and halal food.

Table 2. Most 20 Cited Articles

NO	TITLE	SOURCE	CITED*	C/Y
1	The application of Halal in supply chain management: in-depth interviews	Tieman (2011)	320	32.0
2	Principles in halal supply chain management	Tieman et al. (2012)	219	24.3
3	Positioning Malaysia as Halal-Hub: Integration Role of Supply Chain Strategy and Halal Assurance System	Nik Muhammad et al. (2009)	188	15.7
4	Halal assurance in food supply chains: Verification of halal certificates using audits and laboratory analysis	Van der Spiegel et al. (2012)	149	16.6
5	Halal Traceability and Halal Tracking Systems in Strengthening Halal Food Supply Chain for Food Industry in Malaysia: A Review	Zailani et al. (2010)	144	13.1
6	Conceptual Framework on Halal Food Supply Chain Integrity Enhancement	Zulfakar et al. (2014)	141	20.1
7	Halal Supply Chain in the Food Industry: A Conceptual Model	Omar & Jaafar (2011)	110	11.0
8	Consumer perception on halal meat logistics	Tieman et al. (2013)	103	12.9
9	Principles in halal purchasing	Tieman & Ghazali (2013)	95	11.9
10	Halal Control Activities and Assurance Activities in Halal Food Logistics	Tieman & Ghazali (2014)	88	12.6

11	Halal integrity in the food supply chain	Soon et al. (2017)	85	21.3
12	Halal Cluster	Tieman (2015)	80	13.3
13	Lean supply chain practices in the Halal food	Manzouri et al. (2013)	78	9.8
14	Adoption of Halal Supply Chain among Malaysian Halal Manufacturers: An Exploratory Study	Ngah et al. (2014)	70	10.0
15	Increasing Production and Eliminating Waste through Lean Tools and Techniques for Halal Food Companies	Manzouri et al. (2014)	66	9.4
16	Awareness and Demand for 100% Halal Supply Chain Meat Products	Alqudsi (2014)	61	8.7
17	Strategic Approach to Halal Certification System: An Ecosystem Perspective	Noordin et al. (2014)	60	8.6
18	Halal supply chain critical success factors: a review	Talib et al. (2015)	59	9.8
19	A supply chain integrity framework for halal food	Ali et al. (2017)	57	14.3
20	Halal logistics opportunities and challenges	Zailani et al. (2017)	54	13.5

*Data based on Google scholar at September 5, 2022.

The first top article in the order of articles with the most citations, as many as 320 citations, is occupied by the paper entitled 'The application of Halal in supply chain management: in-depth interviews' written by [Tieman \(2011\)](#). The article with the second highest number of citations was an article

entitled 'Principles in halal supply chain management' with 219 citations written by [Tieman et al. \(2012\)](#). The third article with the number of citations 188 written by [Nik Muhammad et al. \(2009\)](#) entitled 'Positioning Malaysia as Halal-Hub: Integration Role of Supply Chain Strategy and Halal Assurance System.

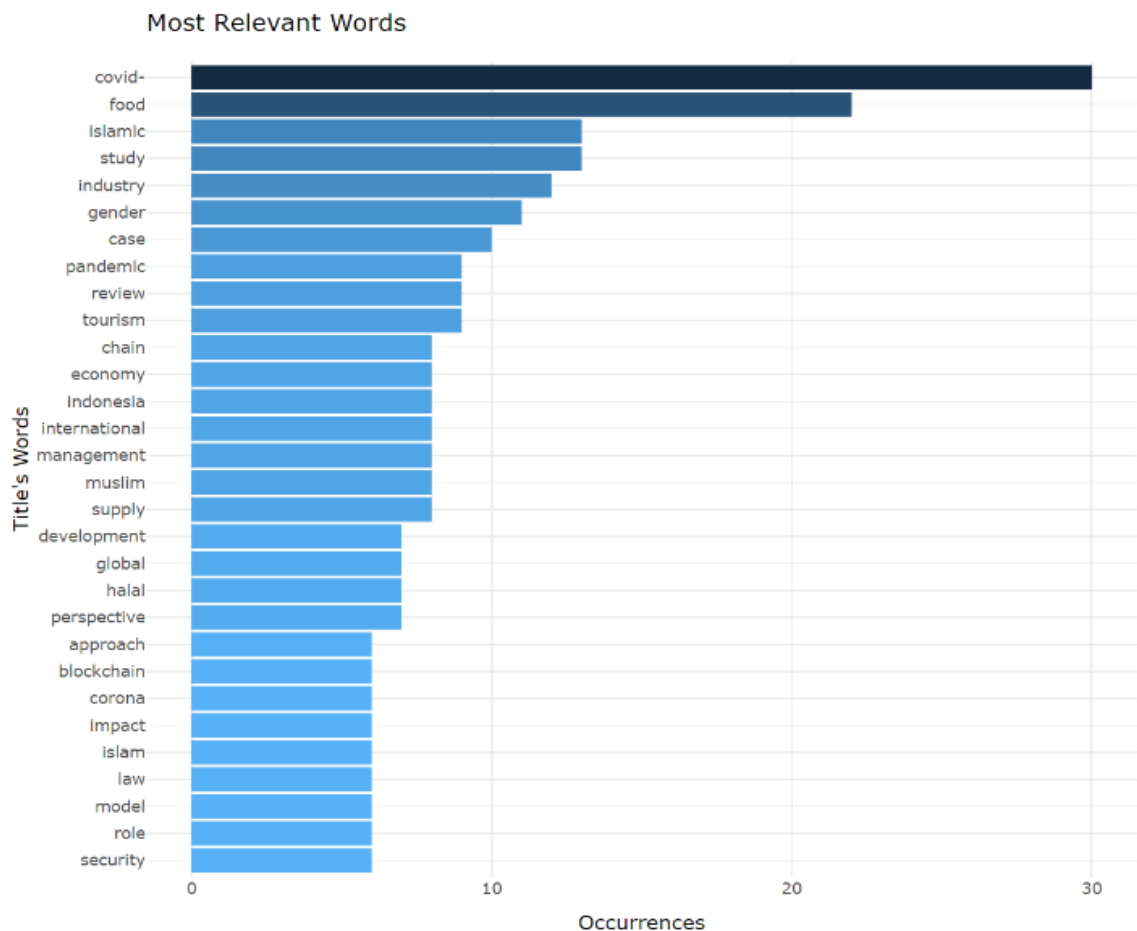


Figure 2. Most relevant words

This study also counts the relevant words used in the collection of documents that are the object of the study, there are several words with the number of occurrences between 0 and more than 30 occurrences and the top 30 words are listed as well as a blue table diagram showing the comparison of the number of occurrences of each. use of the word and its relevance to the theme of COVID-19 and halal food.

The top word with the highest number of occurrences and the most relevant to the theme of this research is 'COVID-' with a total usage of 30 times and is most relevant as shown by a dark blue line diagram, the word COVID also fits the research theme of COVID-19 and halal food, therefore the dominant word that appears in the data collection under study is this word. Then in second place is the

word 'Food' with a quantity of more than 20 occurrences. This word is of course widely used, especially in describing that the topic of food has been written mostly in connection with the COVID-19 pandemic.

Word Cloud & Clustering

The word cloud, word tree map and clustering above reveal a description of the words that often appear in the data collection paper under the theme of COVID-19 and halal food in different forms, but the results are the same, namely the words that appear most often. in the first place, namely COVID, in second place, namely Food and in the third and fourth, namely Islamic and Study.



Figure 3. Wordcloud

The Word cloud displays an overview of words with various sizes according to the quantity of the number of words appearing. In terms of placement, the word cloud tends to be random, but the dominating words are placed in the middle so that they are more visible with their large size. While the

Word Tree Map displays words that often appear in boxes similar to regions on the map, where the more words appear, the larger the square area. The clustering displays the words in the form of colored clusters by considering the relationship between one word and another.

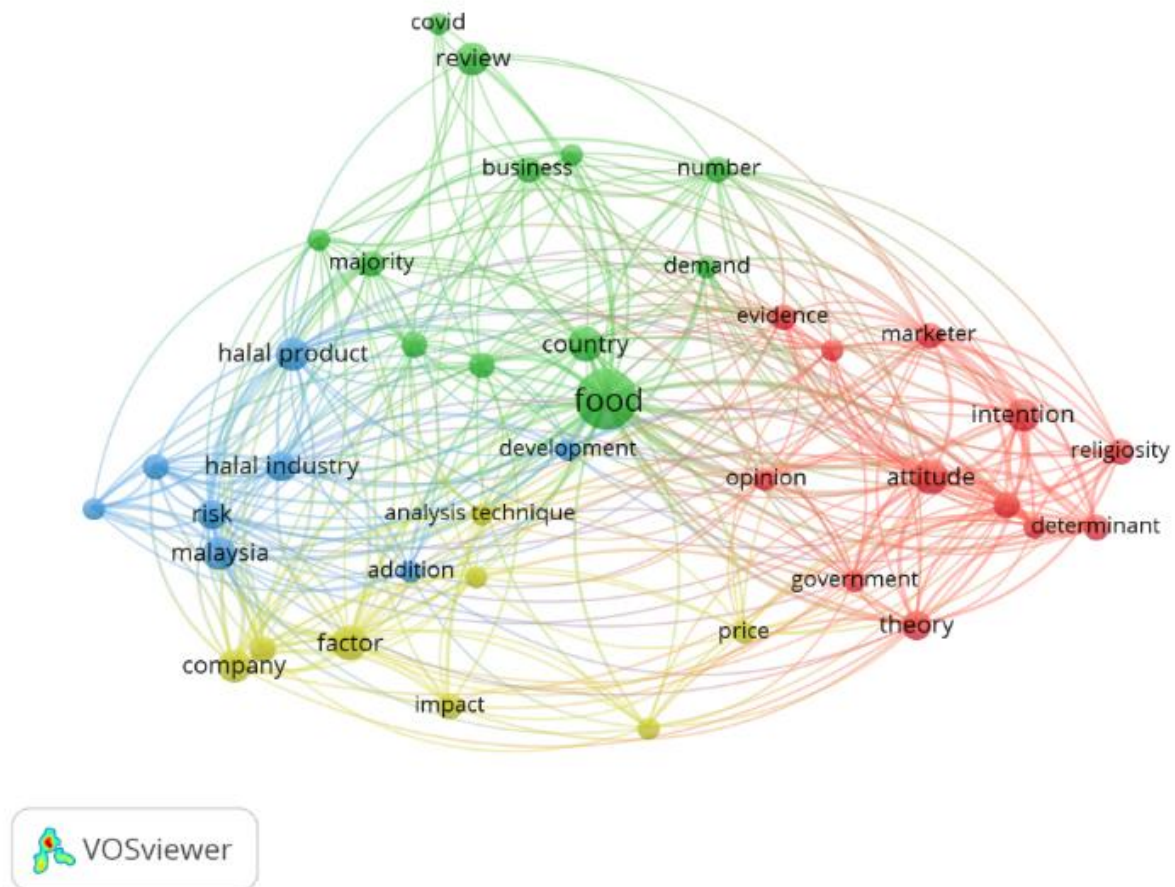


Figure 4. Keywords clustering

In this mapping, several keywords that often appear in the paper on the theme of COVID-19 and halal food are displayed and their relation to other keywords in 4 clusters, namely:

- Cluster 1 in red consists of 12 keywords, namely attitude, better understanding, determinant, evidence, government, intention, marketer, marketing strategy, opinion, religiosity, theory, variables.
- Cluster 2 in green consists of 12 keywords, namely author, business, country, covid, demand, food, halal certification, halal standard, majority, Muslim, number, review.
- Cluster 3 in blue consists of 8 keywords, namely addition, development, halal food industry, halal food supply chain, halal industry, halal product, Malaysia, risk.
- Cluster 4 is yellow colored consisting of 8 keywords, namely analysis technique, company, design methodology approach, factor, impact, influence, price, primary data.

company, design methodology approach, factor, impact, influence, price, primary data.

Thematic Map

This study also examines the thematic mapping that appears based on its density and centrality by dividing it into 4 themes as shown above. This result is obtained from a semi-automatic algorithm by reviewing the titles of all references to the research object and additional relevant keywords apart from the author's keywords so that they are able to capture deeper variations.

The upper right quadrant shows motor or driving themes, indicated by the high density and centrality, so it needs to be developed and important for further research, and among the themes included in this quadrant is 'management'. The quadrant on the top left shows specific and rare themes but high development, indicated by high density but low centrality, including 'Approach, International, Innovation'.

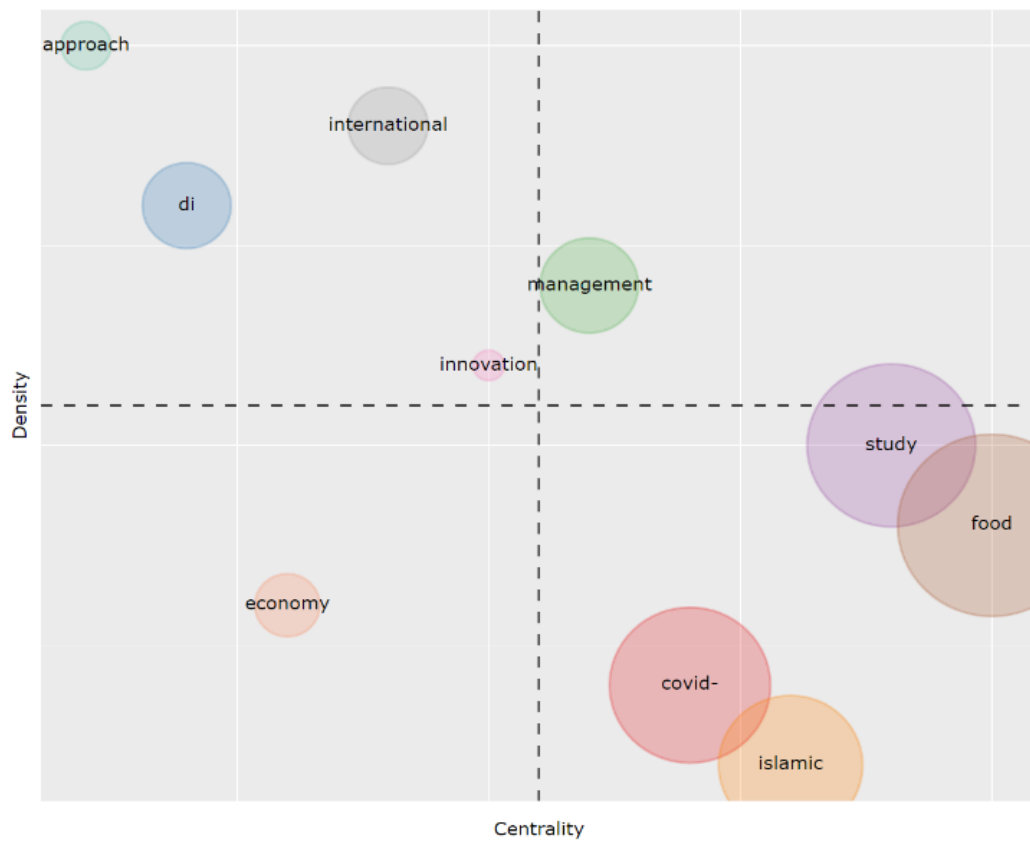


Figure 5. Thematic map

Then the lower left quadrant are themes that have been used but have experienced a downward trend, indicated by their low centrality and density, including the theme “Economy”. Finally, the lower

right quadrant known as basic themes, indicated by high centrality but low density, these themes are important for research as general topics exist, including the theme 'COVID-, Islamic, Food, Study'.

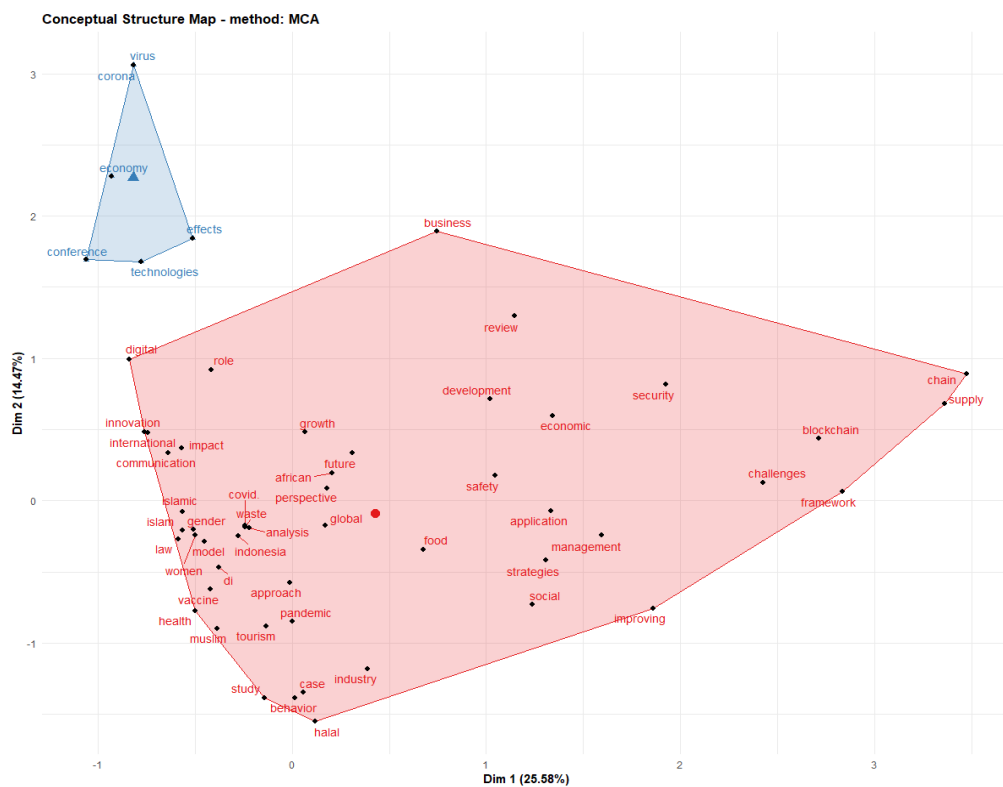


Figure 6. Conceptual structure map

This study also describes the conceptual structure map or contextual structure map of each word that often appears in research papers on the theme of COVID-19 and halal food by dividing it based on mapping the relationship between one word and another through regional mapping. Each word is placed according to the value of Dim 1 and Dim 2 (Diminutive particle) so as to produce a mapping between words whose values do not differ much.

In this data, there are 2 parts of the area which are divided, namely the red area and the blue area, each area contains words that are related to each other. Based on the picture above, the red area shows more and more various words included in it, this shows that there are many research papers that link between the words listed in this area.

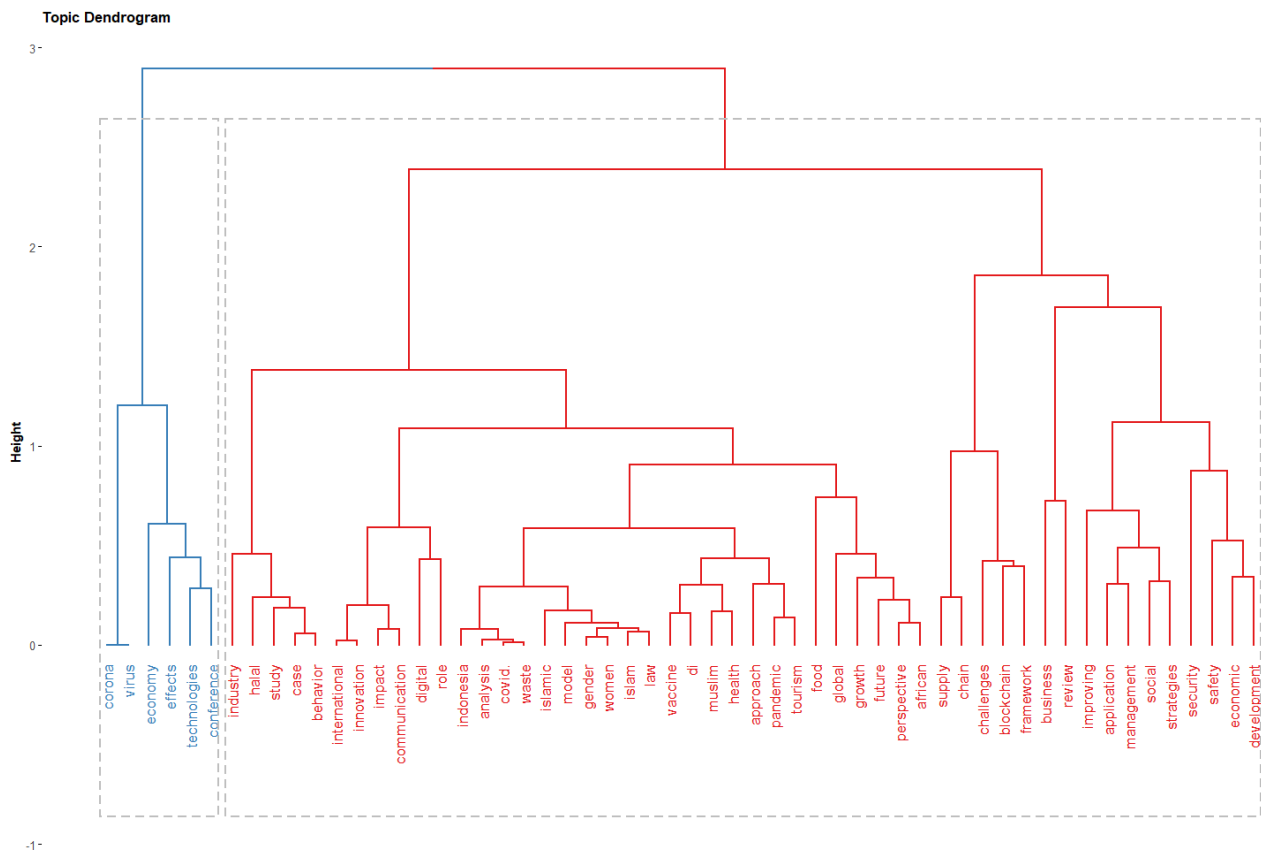


Figure 7. Topic dendrogram

Next is a dendrogram tree diagram showing the most widely used topics and their relation to other topics as well as a classification of these topics depicted in different colors. These representations of dendrogram diagrams are often used in various contexts, for example in a hierarchy of grouping, this diagram describes the distribution of relationships between elements in groups resulting from software analysis. This grouping is also arranged in such a way as to consider the height of the coordination line between topics and between clusters.

This diagram shows there are 2 classifications of topics, namely topics in red and topics in blue, this shows that the relationship between topics in the deep blue classification and topics in red classification.

Each of them is further divided into several clusters, each cluster is further divided into several sub-clusters, and so on until the topic used, several topics are part of 1 cluster, indicating there is a connection between the two in the research paper on the theme of COVID-19 and halal food the last few months.

COVID-19 itself does not directly affect the halal status of food. Halal food refers to food that is prepared according to Islamic dietary laws and guidelines, which include specific methods of slaughter, avoidance of certain ingredients (such as pork and alcohol), and adherence to cleanliness and hygiene standards. However, the COVID-19 pandemic has certainly impacted various aspects of food production, distribution, and consumption,

including those related to halal food (Rusydhiana & As-Salafiyah, 2020).

First, slaughterhouses and processing plants (Thomas et al., 2017). The pandemic has affected the operations of many slaughterhouses and processing plants worldwide due to outbreaks among workers. This has led to disruptions in the supply chain for halal meat and other products. Second, supply chain disruptions (Nizar & Abidin, 2021). Restrictions on movement, border closures, and logistical challenges have disrupted global supply chains, impacting the availability of halal products in certain regions.

Third, about hygiene and safety measures (Muslih, 2021). In response to the pandemic, stricter hygiene and safety measures have been implemented in food production facilities to prevent the spread of COVID-19. While these measures are essential for public health, they may also affect the processes involved in ensuring food is prepared according to halal standards. Forth, economic impact (Hidayat et al., 2022; Laila et al., 2021). The economic repercussions of the pandemic have affected people's purchasing power and consumption patterns. This may influence the demand for halal products and the ability of consumers to access them. Last but not least, certification processes (Jaiyeoba et al., 2023; Sudarsono et al., 2024). Organizations responsible for certifying food as halal may face challenges in conducting inspections and audits due to travel restrictions and social distancing measures. However, many have adapted by implementing remote inspection methods where possible.

Overall, while COVID-19 has introduced challenges to the production and distribution of halal food, efforts are being made to ensure that these products remain available and compliant with Islamic dietary laws. Consumers should continue to prioritize hygiene and safety measures when purchasing and consuming food during the pandemic.

CONCLUSION

The focus of this research is to try to find out the development of the theme of COVID-19 and halal food in research, especially related to economic research and Islamic finance in the world. The results show that there is an increase in the number of paper publications each year during the research period, especially the last few months. The most widely used keywords in the research object are 'Covid-, Islamic, Food'. The most productive writer who writes published papers on the theme of COVID-19 and

halal food is Khan N. The most popular journal in publishing is SSRN Electronic Journal. Furthermore, the most document type is journal articles with a total of 100.

COVID-19 does not directly affect the halal status of food. However, the COVID-19 pandemic has certainly impacted various aspects of food production, distribution, and consumption, including those related to halal food: halal slaughterhouses, supply chain, hygiene and safety measures, economic impact, and halal certification process.

It should be noted that the aim of this study is to present an overview of the research trends on the theme of COVID-19 and halal food, but the limitations have only been in recent years. Although research has been carried out using specific bibliometric indicators so that readers get a general representation of the most significant data trends in the COVID-19 theme paper and halal food, the results presented are still dynamic and can change over time with new trends that emerge in this theme.

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