The Trend of Halal Cosmetics Supply Chain Research in a Decade: A Systematic Review and Bibliometric Analysis

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Abstract: The Halal cosmetics sector has risen in recent years, and it has received attention from academics and practitioners. Prior works on halal studies have examined food and beverage, but not the supply chain of halal cosmetics. This study aims to explore the distributions and trends of the halal cosmetics supply chain and to identify the gap in this research domain. The integrated systematic literature review and bibliometric analysis were employed to gain insight and evaluate the literature of this study. Based on the reviewed articles, the number of published halal cosmetics supply chain studies is limited. Data were obtained from the Scopus database, resulting in a limited dataset of 58 articles published between 2012 and 2023. Several tools and software were utilized for data extraction and analysis, including Publish or Perish, Excel Spreadsheet, and VOS Viewer. Co-citations analysis and co-words analysis were used to map the trends of publications and distinguish current research potentials. The findings reported the top authors of this research area, the main sub-research areas, and the most cited articles. In addition, new research directions in the realm of halal cosmetics supply chains were offered. Future academics could investigate new study clusters of the halal cosmetics supply chain empirically.

Keywords: *Halal Cosmetics Supply Chain, Systematic Literature Review, Bibliometric Analysis, Network Analysis, Co-Citation Analysis.*

1. Introduction

The halal sector is expanding in response to the global demand for halal products (Fadzillah, 2022). Although the halal industry is new in the global economy, the industry has proliferated, valuing US$560 billion per year while the overall value is estimated at US$2.3 trillion (Azam & Abdullah, 2020). The demand for halal products is rising globally as the Muslim community expands. The population of Muslims globally is predicted to grow between 1.6 billion in 2010 to 2.7 billion in 2050, implying that the Muslim population will expand by nearly 1.1 billion during the following forty years (Pew Research Center, 2015). The halal industry is divided into product and service sectors (Ahmed, 2023a). The product sectors range from health products and cosmetics to pharmaceuticals, while service sectors are marketing, packaging, supply chain, manufacturing, logistics, financing, and branding. In addition, hospitality management, fashion, travel, and tourism are part of the extended sectors in the halal industry. There are highest demands for halal products in many Muslim-majority nations, and the halal business has grown to substantially contribute to the world economy. It is a complete process beginning with production until the product or service is delivered to the customers.

Halal is not only concerned with meat, poultry and food but it also incorporates lifestyle requirements such as personal care, cosmetics, and health products (Akram, 2020). Hence, the halal cosmetic industry is emerging and has become a primary concern among Muslims globally. The priority concern of Muslim consumers is being alert to the contents and ingredients of the cosmetics. Only products that satisfy their needs and give them "peace of mind" are being used and consumed (Shah et al., 2021). Certification by a recognized halal certification body is often required for a product to be marketed as halal, and several organizations around the world provide such certification. Halal cosmetics are cosmetic products that are formulated, manufactured, and packaged according to compliance with Islamic principles and requirements (Sugibayashi et al., 2019; Shamsuddin & Yusof, 2020). These products are free from ingredients that are considered haram (forbidden) in Islam, such as alcohol, pork, and any other animal-derived ingredients that are not sourced from animals slaughtered according to Islamic rules.

According to Isa et al. (2023), the industry of halal cosmetics is a rapidly growing segment of the global cosmetics industry, driven by the increasing demand from Muslim consumers who want to use products that align with their religious beliefs and values. Halal cosmetics are popular not only amongst Muslim consumers but also among non-Muslims who want natural and organic products. Halal certification for cosmetics involves a rigorous process that ensures the products are permitted from haram ingredients and meet the safety and quality standards set by the halal certification bodies (Latif et al., 2014; Masood, 2022). The certification process involves a thorough review of the ingredients, manufacturing processes, and packaging to ensure that they comply with halal requirements. Some halal-certified cosmetic brands also adhere to other ethical standards, such as being cruelty-free and vegan. These brands are not only catering to the Muslim market but also to the increasing demand for sustainable and ethical products in the global market. The academic literature on halal cosmetics supply chains has been relatively new since its emergence in the last decade. Several halal studies were conducted on pharmaceuticals and cosmetics in the previous literature.

Nonetheless, the research has primarily focused on the adoption of halal transportation and halal warehousing among Malaysian halal manufacturers (Ngah et al., 2019), certification, ingredients, and consumer behavior (Putri et al., 2019). Thus, limited empirical studies have been conducted on the halal cosmetics supply chain. For that reason, an integrated systematic literature review (SLR) and bibliometric analysis have been employed for further analysis. A bibliometric analysis is undertaken to determine the study's structure and identify the different literature patterns. Undertaking a bibliometric analysis will provide data extracted from citations, keywords, authors and a range of journals (Leung et al., 2017, Fauzi, 2022). Thus, the study aims to identify the research gaps by analyzing the bibliometric and systematic approach of halal cosmetics supply chain literature. A co-citation analysis combined with the co-occurrence of the keyword analysis was undertaken to visualize the growth of this study area. The following section starts with the study's introduction, followed by the literature review on halal cosmetics and the bibliometric approach. Then, the methodology section is discussed. Section four highlights the study's findings. The final section concludes the study and offers some suggestions for future research.

Overview of Halal Cosmetics Supply Chain: The halal cosmetics supply chain is the process by which halal cosmetics are produced, transported, and distributed to retailers and consumers. The supply chain begins with the sourcing of raw materials, which must meet halal standards, and concludes with the distribution of finished goods to retailers or consumers. The global demand for halal cosmetics among Muslim customers is increasing significantly (Gateway, 2024). By 2030, the Muslim community will account for 2.2 billion of the world's population. Due to this expansion, the halal products' demand will increase substantially (Mustafar et al., 2018). Muslim consumers are currently demanding high-quality products that must follow Islamic law (Sugibayashi, 2019). Halal cosmetics are in high demand among the large Muslim population and non-Muslim consumers who trust these products. The latter group is drawn to halal products due to their perceived decent consumerism and higher quality assurance standards (Sugibayashi et al., 2019). Non-Muslims prefer halal cosmetics because they believe they are clean and safe to use (Ahmed, 2023b). Asia is the primary market for halal cosmetics in terms of geography, with production anticipated to outpace other regions. The Global Islamic Economy 2021/22 report by Dinar Standard revealed a significant rise in the expenditure of Muslim consumers on beauty items.

In 2018, its worth was estimated at US$64 billion, and it is projected to increase to US$95 billion by 2024. According to Gateway (2020), Southeast Asia is the leading manufacturer of halal cosmetics, accounting for 40% of the market share. The Middle East follows with a 12% market share, while the United States and Europe both maintain a 4% market share. In 2020, Salaam Gateway, the largest website directory of halal cosmetic products, stated that the growing presence of halal cosmetic products in Asia can be attributed to the heightened consciousness among Muslim consumers and the well-established halal Islamic law that includes specific guidelines for cosmetics, particularly in Malaysia and Indonesia. Malaysia is a prominent Asian nation in the halal cosmetics sector, boasting an increasing number of halal-certified cosmetic brands (Swidi et al., 2010). The nation possesses a robust regulatory framework for the certification of halal products, and the government has undertaken steps to foster the growth of the halal industry. In addition, Indonesia holds the distinction of being the most populous nation with a Muslim majority and boasts a substantial market for halal cosmetics. The nation is seeing an increasing quantity of cosmetic companies that have obtained halal certification.

The government has enacted regulations to foster the expansion of the halal sector (Suparno, 2020). In addition, as emphasized by Hanim et al. (2015), Pakistan is a nation where most of the population adheres to the Islamic faith. This has resulted in a burgeoning market for halal cosmetics, with the country boasting several companies that have obtained halal certification. Furthermore, the government has taken measures to encourage the growth and advancement of the halal industry. Several studies have been conducted on the expansion of the halal cosmetics supply chain framework. Zainuddin et al. (2019) investigated the efficacy of the halal supply chain using a mixed-methods approach that comprises a case study and a survey. The objectives of the study were to look at the impact of halal certification and labeling on the efficiency of the halal supply chain. Yusoff et al. (2015) emphasized the significance of understanding the halal supply chain in influencing both Muslim and non-Muslim customers' purchasing preferences for halal products.

Ngah et al. (2019) also investigated the factors that influence cosmetics and pharmaceutical companies' decisions to use halal storage services. While empirical study on the halal cosmetics supply chain has been undertaken, there is a lack of systematic discussion on using bibliometric analysis for the halal cosmetics supply chain model. As a result, the objective of this research is to answer the following questions:
 i.   What is the knowledge framework of existing halal cosmetics supply chain studies?
ii. Under the current research structure of this area, is identifying insightful suggestions for future development in the halal cosmetics supply chain field possible?

Thus, to serve these purposes, the study's objectives are to complement the previous reviews on the area of the supply chain of halal cosmetics and identify the future trends in this area of study systematically. The research area of the halal cosmetics supply chain remains under-researched, specifically concerning bibliometric analysis on halal cosmetics supply chain-related issues, which analysis is yet to be done. Therefore, the bibliometric analysis in this study area requires immediate consideration.

2. Systematic Literature Review on Halal Cosmetics Supply Chain

A systematic review, according to Armstrong et al. (2011), is a sort of literature review that uses descriptive methodologies to collect secondary data, critically analyze studies, and qualitatively or quantitatively synthesize results. The objective of systematic review is to overcome these challenges by discovering, measuring, and synthesizing the findings of relevant, high-quality studies that address one or more research issues. A systematic literature review (SLR) was used to collect relevant material on the factors influencing natural lighting in the classroom. The SLR methodology was used by the reviewers to develop suggested daylighting design features, particularly for the classroom educational facility. The four stages of the SLR method are depicted in Figure 1.

Figure 1: Stages of SLR Method

Phase 1: Identifications
Phase 2: Data Screening
Phase 3: Eligibility
Phase 4: Data

A thorough analysis of the literature on the area of halal cosmetics supply chain and supply chain agility published in peer-reviewed journals was carried out by searching major bibliographic databases for publications published between 2012 and 2023. The major bibliographic database used in searching the relevant articles is the Scopus database. The data were extracted using a software known as Publish or Perish (POP). The keywords and title words are used to capture a variety of related topics. The research trend for halal cosmetics in the past ten years also shows that most previous studies on halal cosmetics focused on purchase intention, halal cosmetic adoption, knowledge and religiosity, awareness, and halal cosmetics concepts (Mohd Subri et al., 2022). Furthermore, most of the methods used in this study area are conceptual which include surveys, case studies, and SLR. However, limited studies are adopting SLR to analyze data on halal cosmetics

supply chains. Past studies were using SLR; however, the studies only focused on halal cosmetics, not the halal cosmetics supply chain. Mohd Subri et al. (2022) applied the SLR analysis to the area of halal cosmetics by focusing on the research trends and opportunities of halal cosmetics. Meanwhile, Isa et al. (2023) conducted an SLR on the research related to consumer adoption of halal cosmetics. Therefore, the SLR analysis in this research area is necessary.

Bibliometric Analysis in Halal Cosmetics Supply Chain: According to Pritchard (1969), the pioneer of bibliometric analysis, the word bibliometric is "the application of mathematical and statistical methods to books and other means of communication." This analysis allows literature in their field to be examined and helps researchers identify the major themes (Leung et al., 2017). Donthu et al. (2021) stressed that bibliometric analysis is also used by scholars to reveal the latest and developing trends in journal and article performance, research constituents, and collaboration patterns as this analysis explores the structure of specific domains in the literature. Therefore, combining bibliometric analysis with scientific mapping techniques enables researchers to visualize the academic research structured field (Cobo et al., 2011). According to Han et al. (2020), different bibliometric analysis approaches are influenced by the types of information used in the analysis, resulting in varying outcomes. Co-word analysis keywords co-occurrence analysis, and co-authorship analyses are the most often used approaches for citation-based analysis (Van Eck & Waltman, 2014). Van Eck and Waltman (2014) described three citation-based analytic methods: citation analysis, co-citations analysis, and bibliographic coupling.

Co-citations and co-word analysis were used to analyze the data in this study. According to Ding et al. (2014), the most used bibliometric method is co-citation analysis. Co-citation occurs when two publications are quoted in the same article (Ahmi et al., 2020). These two publications are thought to be related because they are frequently cited in other articles (Benckendorff & Zehrer, 2013). Co-words, on the other hand, relate to the occurrence of two or more items at the same time (Ahmi et al., 2020), while VOSviewer creates a visual representation of keyword co-citation and co-occurrence. According to Mohd Subri et al. (2022), halal cosmetics have become an emergent industry globally. The halal cosmetic industry is a highly competitive industry with numerous domestic and international players. Nevertheless, academic studies on halal cosmetics, especially on the supply chain, are limited and still in the early stage of publication (Azmi et al., 2021). Various studies have been undertaken on halal cosmetics areas, including research by Abd Rahman et al. (2015), Sugibayashi et al. (2019), Zulkifli and Abd Rahman, (2019), and Ngah et al. (2021). However, currently the study on the halal cosmetics supply chain is still unavailable.

The research trend for halal cosmetics in the past ten years also shows that most previous studies on halal cosmetics had focused on purchase intention, halal cosmetic adoption, knowledge and religiosity, awareness, and halal cosmetics concepts (Mohd Subri et al., 2022). Furthermore, the most common method used in this study area is conceptual which includes survey, case study, literature review, and systematic literature review. There are limited studies that adopt bibliometric analysis to analyze the data. According to the authors' research, the area of study on halal cosmetics supply chain that uses bibliometric and network analysis techniques is non-existent. In halal cosmetics, only one study employed bibliometric analysis. Azmi et al. (2021) conducted a bibliometric examination of halal cosmetics literature that spanned two decades. The year of publication, affiliations and author names, keywords, the language utilized, and geographical distribution of the publications were used to evaluate the data analysis. This research spans the years from 2000 to 2020. Despite the availability of empirical studies on bibliometric analysis of halal cosmetics, the use of bibliometric analysis for the halal cosmetic supply chain model has not been thoroughly studied. As a result, the bibliometric analysis in this research area is required.

3. Materials and Methods

The next section outlines the specific materials and research approach employed in the present study. To conduct the review, an interpretive systematic literature review (SLR) and bibliometric analysis are utilized.

Phase 1 – Systematic Literature Review (SLR): The review protocol, publication standard of publication, or recognized guidelines are applied in the systematic review. In social science research, the analysis methodology is analogous to a research design. It is critical to choose which review to read. At the start of the investigation,

a protocol, publication standard, or recognized guideline is used (Okoli & Schabram, 2012). The established guideline by Donthu et al. (2021) is adapted for this study. This established standard is created exclusively for the sector of education. However, the guideline is adaptable to different sectors and has been utilized in a variety of them. Formulating the research issues is the first step of this study, followed by a systematic searching method, screening the inclusion and exclusion criteria, assessing the eligibility, data extraction, data analysis, and reporting.

Formulating the Research Problems: The PICo refers to population, intervention, control, and outcomes. The difficulties of research or research questions for this investigation are developed using the works of Lockwood et al. (2015) and Mohamed Shaffril et al. (2020). PICo is used as a guideline in developing the questions of the study. PICo involves three fundamental concepts: population or issue, interest, and context. This research's population can be characterized as panel survey data that encompasses a wide range of topics, including trends and distributions, limitations, and methodologies. Therefore, the research questions are developed based on this concept: "What is the knowledge framework of existing halal cosmetics supply chain studies?" and "Under the current research structure of this area, is identifying insightful suggestions for future development in the halal cosmetics supply chain field possible?".

Systematic Search Strategies: The publications are found in one of the most important bibliographic databases which is Scopus. It has been studied for over 11 years from 2012 to 2023. Scopus is used as the database for the literature search. The database was chosen because it is one of the comprehensive peer-reviewed abstracts and database of citations in a variety of relevant fields, including environmental studies, multidisciplinary social sciences, social issues, developments and planning, and others. Furthermore, Scopus offers the largest repository of business search results, which are commonly employed in systematic literature reviews (Durach et al., 2015). To monitor and screen the articles from the databases, the Publish or Perish (POP) tool is employed. The keywords for the search procedure are identified using earlier literature.

Table 1: The Search String Used to Retrieve Records

Database	Search String
Scopus	TITLE-ABS-KEY (("halal cosmetics" OR "halal" OR "cosmetics") AND ("halal cosmetics supply chain"))

Screening the Inclusion and Exclusion: The articles are improved during the screening process based on four criteria in the bibliographic database: (i) timeline, (ii) language, (iii) document type, and (iv) subject area.

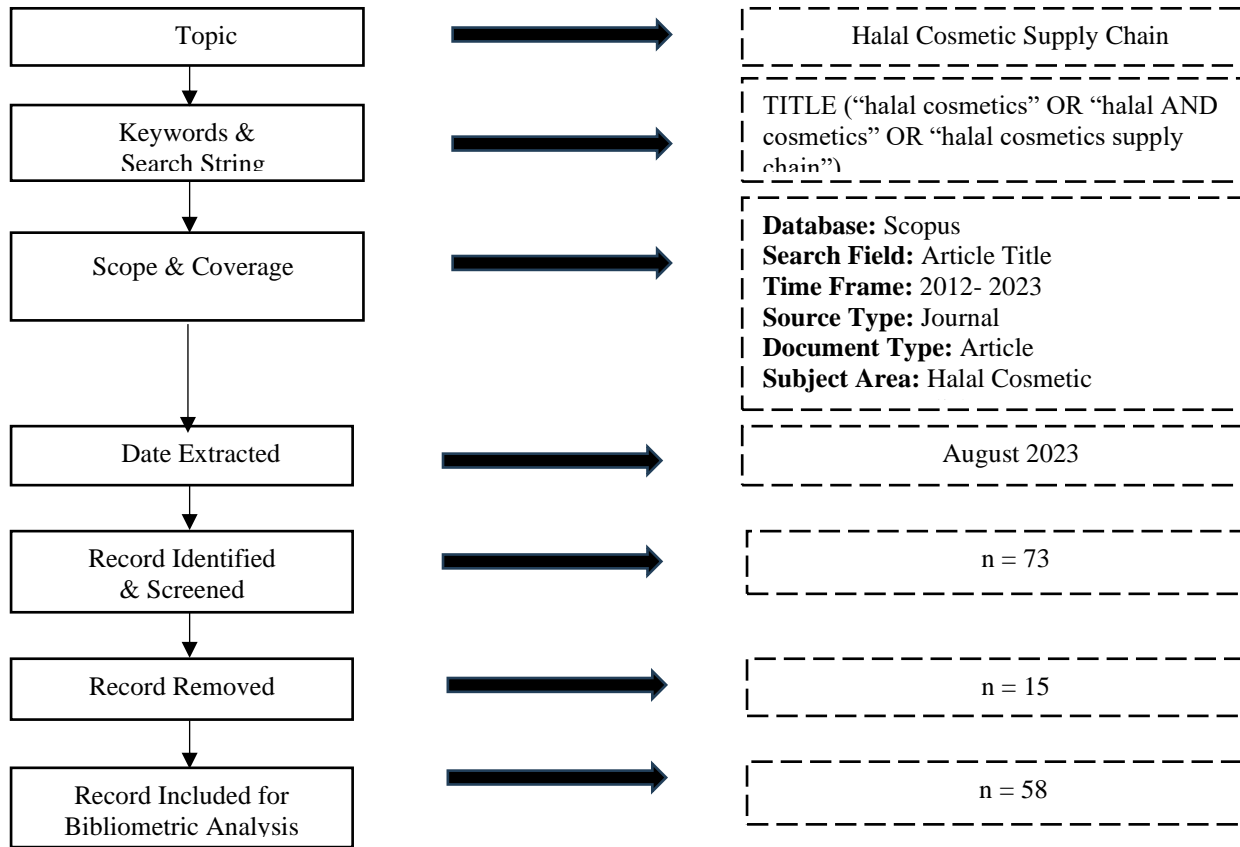**Table 2: Inclusion and Exclusion Criteria**

Criterion	Inclusion	Exclusion
Timeline	2012-2023	Other databases
Language	English	Non – English
Document Type	Journal article	Book series, book chapter in the book, conferences proceeding, editorial, non-research paper, review papers, opinion pieces.
Subject area	Social sciences, business, and management	Other subject areas in bibliographic databases of Scopus.

Eligibility: The search term in Table 1 is generated using the list of acknowledged keywords. The review questions are analyzed by searching for precise keyword groups on titles and abstracts. A total of 73 items are obtained through the search approach. Nevertheless, 15 records are removed from the dataset. Consequently, a total of 58 papers are selected for further scrutiny.

Data Extraction: Scopus, the most comprehensive database for global abstract and citation, is used to acquire the bibliographical data for this study. Keywords "halal cosmetic" AND "halal cosmetics supply chain" are searched in the database using TITLE-ABS-KEY ("halal cosmetic" OR "halal AND cosmetic" OR "halal cosmetics supply chain"). In terms of publishing time, the period under consideration ranges from 2012 to 2023. In the preliminary search, 73 publications are found relevant to halal, and all the articles' titles and abstracts are thoroughly assessed. Following that, three materials are removed from the search: books, reviews, and notes.

As a result, 58 publications are retained for additional examination in this study. Each source of information yields abstract, author affiliation, institution name, publication year, source name, and the number of citations. The descriptive analysis is evaluated using the Scopus Analyser. Following data cleansing, the data are exported to an Excel spreadsheet and Published or Perish (POP). The VOSviewer is used for co-citations analysis and keyword co-occurrences analysis. FIGURE 2 depicts the method used to specify the study topic, identify keywords to search for, set the scope and coverage based on specified criteria, and determine the total number of documents to be evaluated in the study.

Figure 2: Systematic Protocol of Retrieving the Datasets

Topic	Halal Cosmetic Supply Chain
Keywords & Search String	TITLE ("halal cosmetics" OR "halal AND cosmetics" OR "halal cosmetics supply chain")
Scope & Coverage	**Database:** Scopus **Search Field:** Article Title **Time Frame:** 2012- 2023 **Source Type:** Journal **Document Type:** Article **Subject Area:** Halal Cosmetic
Date Extracted	August 2023
Record Identified & Screened	n = 73
Record Removed	n = 15
Record Included for Bibliometric Analysis	n = 58

Data Analysis: The tools used for the identification of the most productive journal, current publication trend, contributing institutions, contributing countries, and authors are Scopus Analyser, Publish or Perish (POP) and Excel spreadsheet. These tools utilize information such as the number of published information sources and the most cited articles. To verify the ranking of the journal and H-index, the SCImago Journal website and Country rank are consulted. Afterward, the bibliometric network is constructed and visualized by exporting the CSV files to VOSviewer software. The VOSviewer software is a tool utilized for the construction and visualization of networks involving documents, sources, authors, companies, or even countries. Networks can be constructed using several types of analysis, such as co-authorships, citations, or co-citation interactions.

Phase 2 – Bibliometric Analysis: In 1969, a scholar known as Pritchard introduced the bibliometrics method. Bibliometrics is a discipline within information and library sciences that employs quantitative methods to analyze bibliographic data. Additional factors to consider are the publication year, country of origin, and authors (Pritchard, 1969). Bibliometric analysis is a method that uses data of quantitative from previous publications to assess publishing patterns in various academic fields. Additionally, it allows the researcher to assess the corpus of literature in their specific area of research and pinpoint the primary subjects of interest (Feng et al., 2017; Vogel & Güttel, 2013). Researchers can utilize bibliometric analysis to examine trends, reader behavior, citation patterns, knowledge repositories, author networks, and the importance of a subject (Liang & Liu, 2018). The present study examines two widely used forms of citation-based analysis, namely bibliometric

analysis of co-word analysis, sometimes referred to as keywords co-occurrences analysis, and co-citations analysis.

4. Results and Discussion

Publication Trend: Table 3 and Figure 3 show the publication trend of halal cosmetic supply chain topics per year. The graph displays an upward trend reflecting an increasing interest among the researchers in the area. The publication on halal cosmetic research began to grow from 2012 to 2019, and the trend slightly dropped in 2020 and 2021. However, starting from the year 2022, the number of publications showed an upward trend as the halal cosmetics supply chain became more popular. More than five papers were published from 2017 to 2022. Hopefully by the year 2023, publications for this area will grow and become more popular among the academia.

Table 3: The Publication Trend of Halal Cosmetic Supply Chain

Year	Total Documents	Percentage (%)
2012	1	2%
2013	1	2%
2014	1	2%
2015	3	5%
2016	3	5%
2017	5	8%
2018	7	12%
2019	10	17%
2020	7	12%
2021	7	12%
2022	8	14%
2023	5	9%
Total	58	100.00%

Figure 3: Publication Trend of Halal Cosmetics Supply Chain
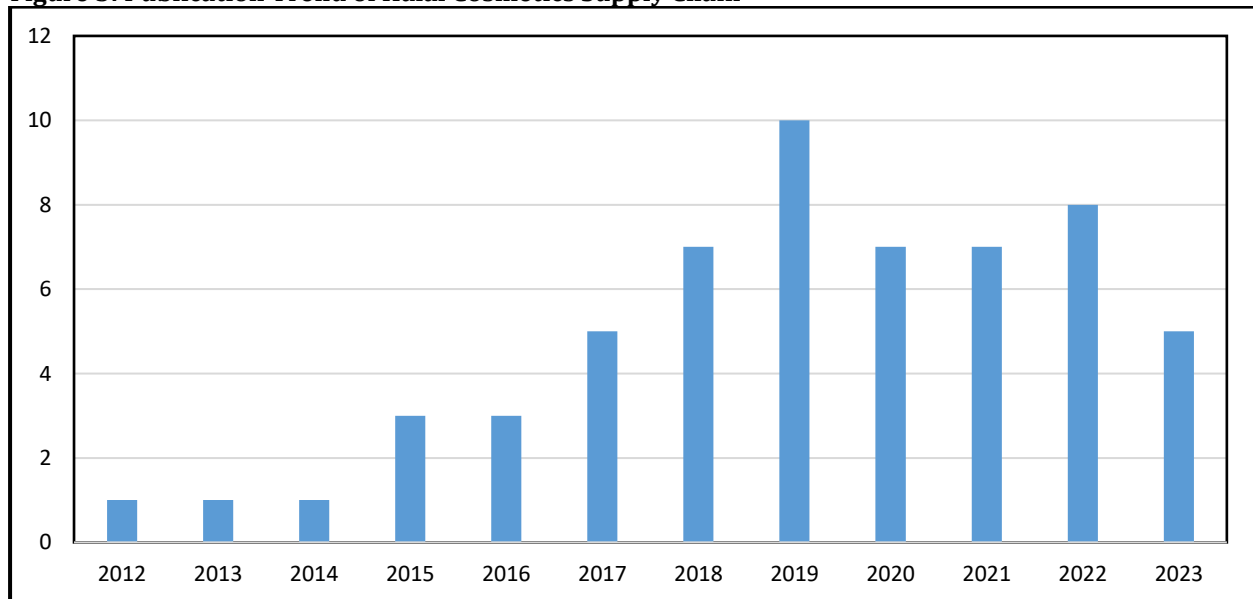
Most Cited Articles: The Scopus Analyser website generated a total of 15 articles. These 15 articles, as shown in Table 4, are the most frequently mentioned on halal cosmetics. The analysis yielded the title, the initial author, the year of publication, the journal name, the total number of citations, and the number of citations. The most important publication, published in the Journal of Islamic Marketing, was mentioned 524 times by several

authors in halal cosmetic studies. Ab Rahman (2015) wrote the most cited paper, "Consumers and Halal Cosmetic Products: Knowledge, Religiosity, Attitude, and Intention."

Table 4: Top 15 Most Cited Halal Cosmetic Supply Chain Articles for the Period of 2012-2023

Title	First author	Year	Journal	C/Y	TC
Consumers and halal cosmetic products: Knowledge, religiosity, attitude, and intention	Abd Rahman, E. Asrarhaghighi, S. Ab Rahman	2015	Journal of Islamic Marketing	65.5	524
Assessing knowledge and religiosity on consumer behavior towards halal food and cosmetic products	Rahman et al.	2015	International Journal of Social Science and Humanity	32.75	262
Exploring antecedents and consequences of Indonesian Muslim youths' attitude towards halal cosmetic products: A case study in Jakarta	Briliana, N. Mursito	2017	Asia Pacific Management Review	32.67	196
The Effect of Halal Label, Halal Awareness, Product Price, and Brand Image on the Purchasing Decision on Cosmetic Products (Case Study on Consumers of Sari Ayu Martha Tilaar in Binjai City)	H Aspan, IM Sipayung, AP Muharrami	2017	International Journal of Global Sustainability	24.83	149
Factors influencing attitude towards halal cosmetic among young adult Urban Muslim women: A focus group analysis	Hashim and Musa	2014	Pertanika Journals of Science and Technology	15.56	140
A review of cosmetic and personal care products: Halal perspective and detection of ingredient	P Hashim, D Mat Hashim	2013	Pertanika Journals of Science and Technology	12.00	120
An Overview of Online Purchase Intention of Halal Cosmetic Products: A Perspective From Malaysia	RNN Naseri	2021	Turkish Journal of Computer and Mathematics Education	51.50	103
Halal certification organizations in the United Kingdom: An exploration of halal cosmetic certification	Annabi, O.O. Ibidapo-Obe	2017	Journal of Islamic Marketing	14.17	85
Relationship between product factors, advertising, and purchase intention of halal cosmetic	H SR, H Hashim, RN Yusof, NN Alias	2013	Pertanika Journal of Social Science and Humanities	8.10	81
A qualitative investigation into consumption of halal cosmetic products: The evidence from India	Shahid, S.	2018	Journal of Islamic Marketing	14.80	74
Muslim consumers' purchase behavior towards halal cosmetic products in Malaysia	Haque, A.	2018	Management Science Letters	13	65
The emerging Halal cosmetic and personal care market	M Hunter	2012	Personal Care	5.64	62
Online purchase intention of halal cosmetics: Stimulus-Organism-Response framework application	Suparno, C.	2020	Journal of Islamic Marketing	143	16
Purchase behavior of the millennial female generation on halal cosmetic products	Handriana, T.	2020	Journal of Islamic Marketing	27.0	55

| Determinants of purchase Intention of halal cosmetic products among Generation Y consumers | Khan, A Sarwar, BC Tan | 2021 | Journal of Islamic Marketing | 26.00 | 52 |

Note: TC-Total Citations, C/Y – Cited Per Year

Productive Journals: Based on the data of the Scopus database, 15 journals were recognized as the most productive in publishing halal cosmetics publications over 11 years from 2012 to 2023. Table 4 shows that the Journal of Islamic Marketing has the highest productivity with 13 publications, followed by the International Journal of Supply Chain Management which has four publications. Both publications originated in the United Kingdom and have SCImago Journal Rank values of 0.52 and 0.19, respectively. The results show that the majority of the top 15 productive journals are from the United Kingdom and India. The Malaysian Journal of Consumer and Family Economics and Global Journal Al Thaqafah are two of the journals featured. With a score of 39, the Journal of Islamic Marketing has the highest H-index.

Table 5: Top 15 Productive Journals Publishing Articles in the Halal Cosmetics Supply Chain

Journal	2012-2023	Sjr	H	Cs	Snip	Country of Origin
Journal of Islamic Marketing	16	0.551	43	4.7	1.24	United Kingdom
International Journal of Supply Chain Management	4	0.19	17	1	0.438	United Kingdom
Malaysian Journal of Consumer and Family Economics	3	0.175	3	0.4	0.212	Malaysia
Global Journal Al-Thaqafah	3	0.176	6	0.3	0.237	Malaysia
Advanced Science Letters	2	0.126	27	0.4	0.316	United States
Humanities and Social Sciences Reviews	2	0.663	9	0.6	0.457	India
Journal of Islamic Accounting and Business Research	2	0.359	22	2.2	0.828	United Kingdom
Journal of Islamic Monetary Economics and Finance	2	1.0	8	1.0	1.0	Indonesia
Academy of Entrepreneurship Journal	1	0.205	12	1.1	0.384	United States
Applied Biological Chemistry	1	0.417	21	3.2	0.836	Netherland
Asia Pacific Management Review	1	0.711	20	5	2.001	Taiwan
Bali Medical Journal	1	0.117	4	0.5	0.302	Indonesia
Cogent Arts and Humanities	1	0.169	7	0.5	0.73	United Kingdom
Cosmetics	1	0.449	21	3.4	1.003	Switzerland
FWU Journal of Social Sciences	1	0.231	3	0.4	0.439	Pakistan

Note: SJR – SCImago Journal Ranking/ H – H-Index

Top Ten Authors: To identify the authors who published the most publications in the halal cosmetics supply chain field, Microsoft Excel is used to analyze the data. The top ten authors are listed in Table 5. The result shows that Ngah, A. H. has three publications, while seven authors have two publications each. The remaining two authors have one publication each. Based on the results, it can be understood that there are no dominant authors in the field as it is still in the initial growing stage. Table 6 also shows the citation and the H-Index of the top authors that have the most publications in the halal cosmetics supply chain field. The analysis shows that Ngah, A. H., Abd Rahman and Islam have the highest citations and H-Index.

Table 6: Top Ten Authors with the Most Publications on the Halal Cosmetics Supply Chain

Authors	No. of publications	Citations	H-index
Ngah, A.H.	3	771	15
Abdinagoro, S.B.	2	129	6
Al Rasyid, H.	2	7	1
Arbak, S.	2	2	1

Islam, R.	2	758	15
Mohamed, R.H.N.	2	27	2
Putri, T.U.	2	3	1
Yeo, B.L.	2	2	1
Ab Rahman, S.	1	314	8
Abd Rahman, A.	1	900	15

Affiliated Organizations: Data are analyzed using Excel to retrieve the author's origin and affiliated organizations. Table 7 shows the top ten organizations publishing the most halal cosmetics supply chain articles. Universiti Teknologi MARA (UiTM) in Malaysia published six articles, followed by Universiti Utara Malaysia and Universiti Putra Malaysia with three articles. UiTM is the leading contributing organisation and this university's authors are also among the top ten authors with the most papers on halal cosmetics supply chain.

Table 7: Top Ten Organisations Contributing to the Topic of Halal Cosmetics Supply Chain

No. of Publications	Location	Organization
6	Malaysia	Universiti Teknologi MARA
4	Malaysia	Universiti Putra Malaysia
3	Malaysia	Universiti Utara Malaysia
3	India	Jamia Millia Islamia
3	Malaysia	Universiti Malaya
3	Indonesia	Universitas Airlangga
3	Malaysia	Universiti Malaysia Terengganu
3	Indonesia	Bina Nusantara University
3	Malaysia	Tunku Abdul Rahman University of Management and Technology
2	Malaysia	Universiti Sains Malaysia
2	Malaysia	Universiti Kebangsaan Malaysia

Co-Citation Analysis: It is used to measure the influence of academia in the study area. A publication or an author is considered influential in the field of study if the citation index is high. The network of co-citation is visualized in Figure 3 while the top ten authors of halal cosmetics research are listed in Table 6. VOSviewer bibliometric software is used to generate the results. The authors are the unit of analysis in the study that uses co-citation analysis. The relatedness of the writers is assessed by the degree of their citation within the same publication in co-citation analysis. According to Ahmi et al. (2020), when two authors are cited in the same work, their relationship becomes more apparent. Therefore, the authors who have a minimum citation of 10 ten times are selected in this study.

**Table 8: The Ten Prominent Authors with the Highest Total Link Strength**

Authors	Citations	TLS
Ajzen, I.	35	925
Wilson, J.A.J.	31	855
Hair, J.F.	29	712
Liu, J.	27	696
Ringle, C.M.	29	680
Sarstedt, M.	27	668
Verbeke, W.	23	591
Amin, H.	21	568
Ab Rahman, S.	19	509
Fishbein, K.	18	478

Note: TLS – Total Link Strength

According to the data, only 49 of the 3405 authors meet the threshold. For the co-citation network analysis, these 49 writers are chosen. The overall strength of co-citation linkages for each author with other writers is calculated in the analysis. Table 8 only displays the ten authors with the highest total link strengths among the

49 authors. Figure 4 depicts a network of co-citations in the halal cosmetic supply chain. The size of the bubble denotes the number of citations for the article, and the line thickness represents the relatedness strength of co-citations. Ajzen, I. was identified as the author with the greatest total link strength (925) and the greatest number of citations (35). Different colors are used to indicate the cluster difference to which the article is related. Figure 4 depicts the co-citation network analysis generated for four clusters related to the halal cosmetics concept. The red hue denotes the most powerful cluster, with 15 items, followed by green, also with 15 pieces. Blue has the third strongest cluster with 13 items, and yellow has the weakest cluster with six things.

Figure 4: Visualising Co-Citation Network in Halal Cosmetic Supply Chain Research
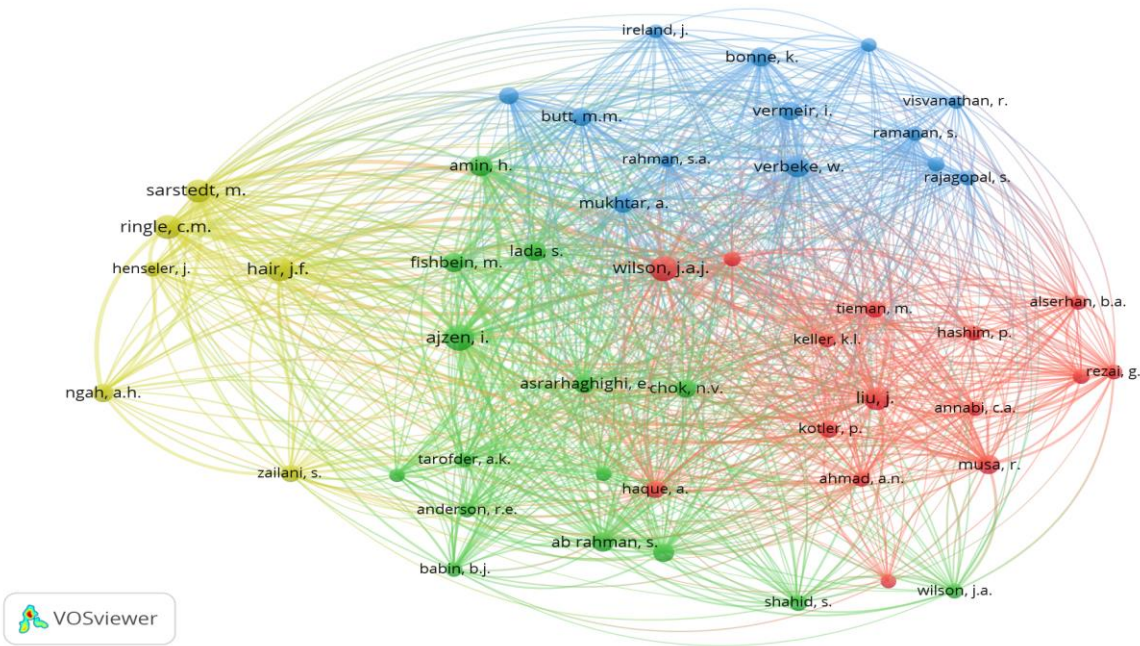
Based on the VOSviewer analysis, there are four optional clusters (Clusters 1,2,3 and 4). As listed in Table 9, each cluster can be seen as having a common research area. Group 1 is Cluster 1, covering topics that include consumer behavior, halal certification, and halal perspective. Group 2 is Cluster 2 which discusses knowledge, religiosity, and attitude towards halal cosmetics and consumer purchase intention in halal cosmetics. Group 3 is Cluster 3, which discusses purchase intentions for halal cosmetics and personal care items, as well as the halal concept. Lastly, Cluster 4 discusses the option of halal and the awareness of consumers of halal cosmetics.

Table 9: Top Articles in Each Cluster Based on Co-Citation in Halal Cosmetics Supply Chain Research (2012-2023)

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Ahmad, A.N.	Ab Rahman, S.	Alam, S.S.	Hair, J.F.
Alserhan, B.A	Abd Rahman, A.	Bergeaud-Blacker, F.	Henseler, J.
Annabi, C.A.	Ajzen, I.	Bonne, K.	Ngah, A.H.
Haque, A.	Amin, H.	Butt, M.M.	Ringle, C.M.
Hashim, P.	Anderson, R.E.	Ireland, J.	Sarstedt, M.
Keller, K.L.	Asrarhaghighi, E.	Mukhtar, A.	Zailani, S.
Kotler, P.	Aziz, Y.A.	Rahman, S.A.	
Liu, J.	Babin, B.J.	Rajagopal, S.	
Mohamed, Z.	Black, W.C.	Ramanan, S.	
Musa, R.	Chock, N.V.	Satapathy, S.	
Rahman, A.A.	Fishbein, M.	Verbeke, W.	
Rezai, G.	Lada, S.	Vermeir, I.	
Schiffman, L.G.	Shahid, S.	Visvanathan, R.	

Tieman, M.	Tarofder, A.K.
Wilson, J.A.J.	Wilson J.A

Co-Word Analysis: Co-occurrences of the keywords analysis are conducted after the co-citation analysis. Figure 4 illustrates the co-word network of the halal cosmetics supply chain. In Table 10, the ten prominent co-words in halal cosmetics supply chain research are listed. VOSviewer bibliometric software is used to generate the data. The co- words are the fact of two or more things that occur together simultaneously. According to Ahmi et al. (2020), the co-word analysis implies how two or more keywords are paired within the database. Therefore, this study selects two as the minimum number of keyword occurrences. Out of 216 keywords found, only 30 keywords meet the threshold. The 30 keywords are selected for co-words analysis where the total strength of the co-words in the keyword links with other keywords is calculated. Nevertheless, Table 10 only displays the ten most prominent keywords with the highest total link strengths. Referring to the diagram in Figure 5, the number of keywords received by the articles is presented in the circle size while the line thickness presents the strength of co-words relatedness. The study has identified the keyword with the highest total link strength (33) and the number of occurrences (26).

Figure 5: Visualising Co-Word Network in Halal Cosmetics Supply Chain Research
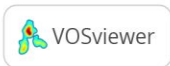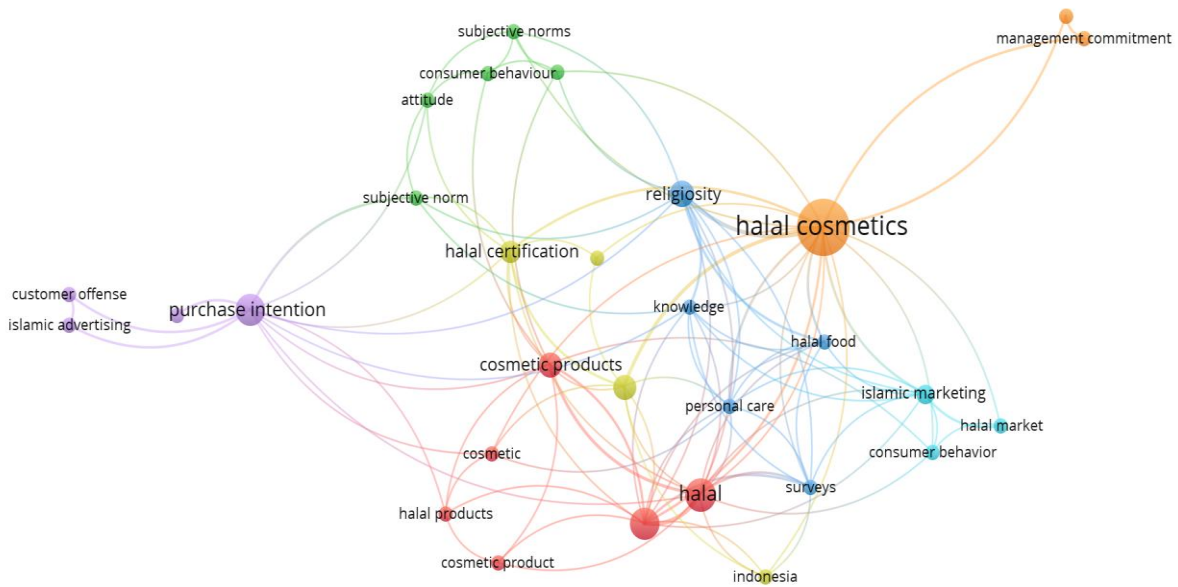

Table 10: The Ten Prominent Co-Words with the Highest Total Link Strength

Keywords	Occurrences	TLS
Halal cosmetics	26	33
Halal	9	23
Cosmetics	8	22
Religiosity	6	18
Purchase Intention	8	16
Cosmetic Products	5	13
Malaysia	5	13
Islamic Marketing	3	12
Halal Certification	4	11
Knowledge	2	11

Note: TLS – Total Link Strength

As shown in Figure 6, co-word analysis developed seven related to one concept of halal cosmetics. The different colors show the difference in the cluster in which the article is associated. The strongest cluster is red colored with six items, followed by green and dark blue clusters with five items. Next, the third strongest clusters are yellow and purple with four items, respectively. Lastly, the weakest clusters are orange and soft blue with three items each. The categorization of the keywords in this research on the halal cosmetics supply chain is shown in Table 11. The keywords are categorized based on seven different clusters. The first cluster comprises seven keywords that focus on cosmetics. The second cluster entails five keywords focusing on consumers, such as consumer behavior and subjective norms. The third clusters also comprise five keywords that focus on knowledge, such as knowledge in personal care. Clusters four and five contain four keywords categorized in halal foundation and awareness. Lastly, clusters six and seven comprise three keywords categorized into theme marketing and concept development. The detailed keyword categorization of this halal cosmetics supply chain research is shown in Table 11.

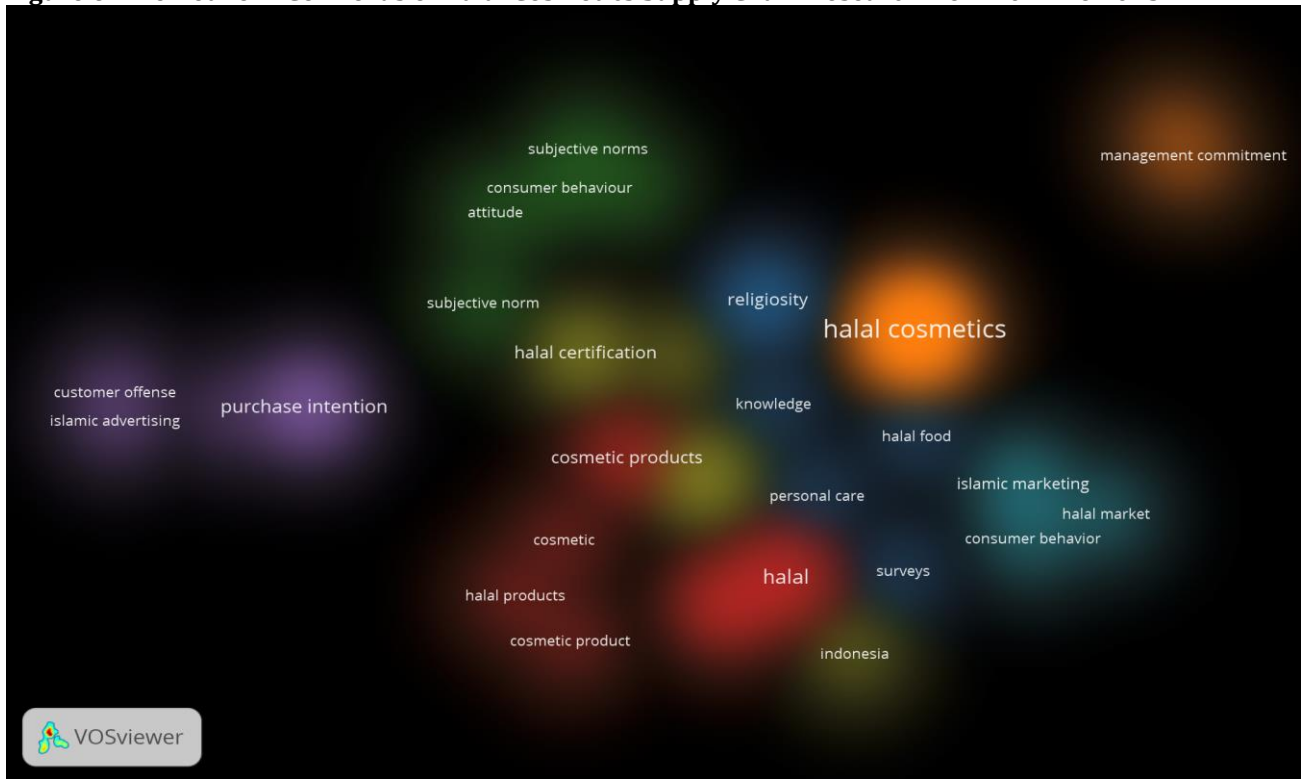**Figure 6: The Network Co-Words of Halal Cosmetics Supply Chain Research from 2012 To 2023**

Table 11: Co-Word Clusters in Halal Cosmetics Supply Chain Research (2012-2023)

Clusters	Themes	Keywords (Weight occurrence)
1	Cosmetics	Cosmetic (2), Cosmetic product (2), Cosmetic products (5), Cosmetics (8), Halal (9), Halal product (2)
2	Consumer	Attitude (2), Consumer behavior (2), India (2), Subjective norms (2), Subjective norm (2)
3	Knowledge	Knowledge (2), Personal care (2), Religiosity (6), Surveys (2), Halal food (2)
4	Halal Foundation	Cosmetics manufacturer (2), Halal certification (4), Indonesia (2), Malaysia (5)
5	Awareness	Customer Offence (2), Halal cosmetic (2), Islamic advertising (2), Purchase intention (8)
6	Marketing	Consumer behavior (2), Halal market (2), Islamic marketing (3)
7	Concept Development	Halal cosmetics (26), Management commitment (2), Statistical process control (2)

5. Conclusions and Future Research Directions

The halal cosmetics supply chain is gaining popularity in research studies, attracting more scholars globally. Through bibliometric analysis, this study developed the network map of co-citation analysis and co-word analysis. All the publications published from 2012 to 2023 were taken from the Scopus database using Publish or Perish software. A total of 58 articles in this research area were retrieved. Although the number of articles is small, the data have shown an increasing number of publications since 2012. The publication years for all 58 articles indicate that the halal cosmetics supply chain field has gained interest in the academic world. There were many influential articles published between the year 2012 and 2020. In 2022, the data showed a substantial increase in publication in this area. ASEAN researchers have published an increasing number of articles in recent years. Authors from Malaysia and Indonesia are the most productive researchers published in this area. This research also analyzed primary publications, prominent institutions, and the best papers published. Based on the analysis, the most productive journals that published the highest number of articles on halal cosmetics supply chain are the Journal of Islamic Marketing and the International Journal of Supply Chain Management. This study also revealed that the most cited authors are Abd. Rahman and Ahmad received the highest citations (524 and 262, respectively).

Additionally, our investigation discovered that halal cosmetics, which appears 26 times as the top co-word, is the most prominent co-word with the highest overall link strength. Interestingly, the study produced seven clusters with different themes such as cosmetics, consumer, knowledge, halal foundation, awareness, marketing, and concept development. From these clusters, many research opportunities can be developed in the future. For example, applying industry 4.0 technology such as blockchain technology and artificial intelligence to support downstream halal cosmetics supply chains can be categorized under the marketing cluster. Meanwhile, the concept of a development cluster can focus on effective management and the best practices of creating halal cosmetics products so that they will be Shariah compliant. Furthermore, the awareness cluster can explore more specifically the context of consumer purchase intention and brand positioning. This study has revealed remarkable findings. Nevertheless, several limitations exist in this study. Firstly, this study only focused on articles extracted from the Scopus database. Although Scopus covers more articles than other databases, some articles might be missing. Thus, other bibliographic databases such as Web of Science, Emerald, and ProQuest can be employed for future research. Secondly, despite the increasing number of publications, the halal cosmetics supply chain study is still limited. Therefore, future research should explore more on the halal cosmetic supply chain domain.

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