

Trends and Intellectual Structure of Halal Industry Research Based on Bibliometric and Network Visualization 2010–2024

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ABSTRACT

The halal industry has witnessed remarkable growth in recent years, emerging as a global economic force. This study employs bibliometric analysis and network visualization to explore the trends and intellectual structure of halal industry research from 2010 to 2024. By examining keyword co-occurrence, co-authorship, and country collaboration patterns, the study identifies key themes such as halal certification, supply chain transparency, halal tourism, and ethical considerations in animal welfare. Southeast Asia, particularly Indonesia and Malaysia, leads the field, with increasing collaboration across regions, including Western countries and non-Muslim-majority nations like Turkey, Australia, and South Korea. The study reveals an evolving research landscape, showcasing the integration of technology and sustainability into halal industry practices, and provides a roadmap for future scholarly exploration within this growing sector.

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1. INTRODUCTION

The halal industry has emerged as one of the most dynamic and rapidly expanding sectors in the global economy over the past decade. Originally rooted in the Islamic principle of permissibility, halal products and services now encompass a wide range of sectors including food and beverages, pharmaceuticals, cosmetics, logistics, finance, tourism, and digital technology [1]. The underlying concept of halal is more than regulatory compliance, it represents ethical consumption, cultural identity, and economic inclusivity for Muslim and non-Muslim consumers alike [2]. This evolution has elevated the halal industry from a niche market to a global phenomenon, attracting investments, policies, and research attention worldwide.

One of the primary drivers of the halal industry's expansion has been the rapid growth of the global Muslim population, which is projected to reach nearly 3 billion by 2060 [3]. This demographic trend has heightened demand for halal-certified goods and services, reinforcing the importance of standardized practices, transparent supply chains, and credible certification systems [4]. However, the halal market's growth is not confined to Muslim-majority regions; consumer awareness regarding food safety, ethical sourcing, and lifestyle values has spurred interest in halal products among non-Muslims as well [3]. Consequently, the halal industry has become a multidisciplinary field of study, intersecting business, supply chain management, consumer behavior, public policy, and religious studies [5].

Parallel to the industry's expansion, academic research on halal topics has proliferated over the last decade. Bibliometric analyses indicate a marked increase in scientific publications across various disciplines investigating halal markets, standards, certification challenges, consumer acceptance, and technological integration [6], [7]. Researchers have explored halal supply chain transparency using blockchain technology [8], assessed halal certification's impact on international trade competitiveness [9], and examined consumer trust mechanisms in multicultural markets [10]. These diverse research activities underscore the complexity and multiplicity of halal research streams, which reflect both theoretical interest and practical relevance.

Despite rapid scholarly growth, the structure and developmental trajectory of halal research remain underexplored in a holistic manner. Most literature reviews are domain-specific (e.g., halal food or halal tourism) and often lack an integrated view of how research networks evolve, how themes interconnect, and which intellectual clusters drive scholarly advancement [11]. As research output continues to rise, it becomes crucial to systematically map this landscape to understand emerging trends, influential authors, institutional collaborations, and thematic patterns. Bibliometric and network visualization techniques provide powerful tools for such mapping, enabling researchers to objectively assess the intellectual structure of a research field [12].

Network visualization (through co-citation, co-authorship, and keyword co-occurrence analyses) allows academics to identify central themes, intellectual clusters, and knowledge flows within a research domain [13]. For the halal industry, this can reveal how concepts such as halal certification, consumer perception, supply chain management, and innovation are interlinked across time and space. Moreover, visual maps help uncover latent research communities and pinpoint under-researched areas that may represent

opportunities for future study. Therefore, combining bibliometric indicators with network visualization not only enhances understanding of the research domain's past and present but also signals directions for future inquiry. Given the increasing globalization of halal markets and the corresponding rise in research output, a comprehensive bibliometric analysis becomes both timely and necessary. An integrative approach that spans publications from 2010 to 2024 can capture significant shifts in research focus, scholarly collaborations across countries, and the emergence of new intellectual paradigms within the halal research ecosystem. Such analysis will be particularly valuable for scholars, policymakers, industry stakeholders, and educators who seek to align research priorities with market needs and societal expectations.

Although the halal industry has attracted substantial academic inquiry, there is a noticeable absence of an overarching, systematic study that traces the evolution of research themes and the interconnections among scholars, institutions, and countries over the last 15 years. Existing reviews typically focus on specific sectors or geographic regions, lacking a comprehensive assessment of the intellectual structure and knowledge dynamics that underpin the entire halal research landscape. This gap inhibits a clear understanding of research trends, influential contributors, and collaborative networks that have shaped the trajectory of halal research from 2010 to 2024, a period marked by significant industry growth and scholarly diversification. The objective of this study is to conduct a comprehensive bibliometric and network visualization analysis of halal industry research published between 2010 and 2024.

2. METHOD

This study employed a bibliometric research design combined with network visualization techniques to systematically examine the trends and intellectual structure of halal industry research published between 2010

and 2024. Bibliometric analysis was selected due to its ability to quantitatively assess large volumes of scholarly literature and to reveal patterns related to publication growth, authorship, institutional collaboration, and thematic development within a research field. The analysis focused on peer-reviewed journal articles to ensure the academic rigor and reliability of the data. The selected time frame was chosen to capture the formative and expansion phases of halal industry research, reflecting significant developments in both academic discourse and industry practices.

Data were retrieved from Scopus Database. A structured search strategy was applied using relevant keywords such as halal industry, halal food, halal certification, halal supply chain, Islamic consumer behavior, and related terms. The search was limited to articles published in English to maintain consistency in analysis. After the initial retrieval, data cleaning procedures were conducted to remove duplicate records, non-relevant publications, conference papers, and documents with incomplete bibliographic information. The final dataset included bibliographic details such as

authors, titles, abstracts, keywords, citations, affiliations, and publication years, which were exported in compatible formats for further analysis.

The bibliometric analysis was performed using VOSviewer. Descriptive indicators such as annual publication trends, most productive authors, leading journals, and contributing countries were first examined. Subsequently, network visualization techniques including co-authorship analysis, co-citation analysis, and keyword co-occurrence analysis were applied to explore collaboration patterns and thematic structures within the halal research domain. Visualization maps were generated to identify major research clusters, emerging topics, and the relationships among key concepts over time. Through the integration of quantitative metrics and visual interpretation, this methodological approach provides a comprehensive understanding of the evolution, structure, and future direction of halal industry research.

3. RESULT AND DISCUSSION

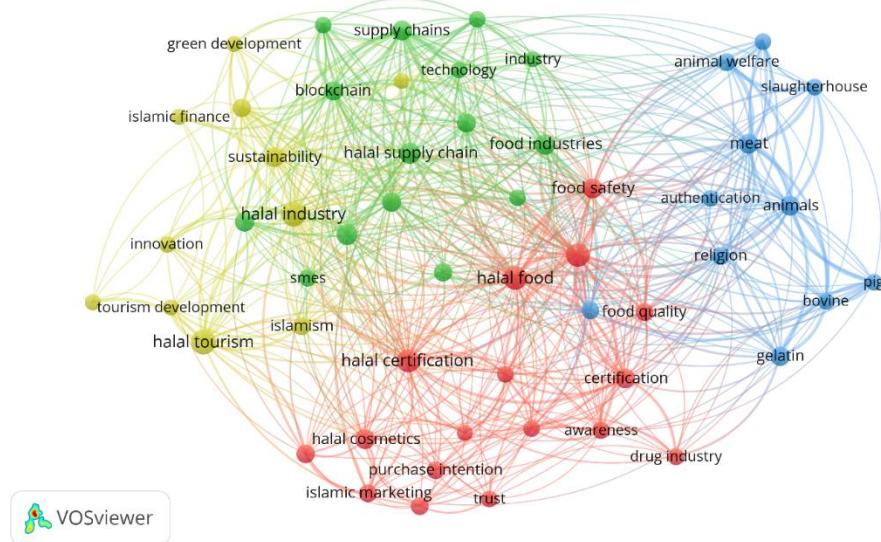


Figure 1. Network Visualization

Source; Data Analysis

Figure 1 illustrates the intellectual structure of research in the halal industry, showing keyword co-occurrence from 2010 to

2024. The network is divided into four main clusters based on the relatedness of keywords. The green cluster represents the technological

and industrial side of halal research. Key keywords here include halal supply chain, food industries, technology, and blockchain. The significant connections between halal industry and sustainability suggest a growing interest in integrating sustainable practices within halal industries. This cluster reflects the industry's increasing emphasis on innovation and the role of technology, such as blockchain, in improving traceability and transparency within halal supply chains. This red cluster is centered around halal food and halal certification, showing the importance of food safety and quality in halal research. Keywords like halal cosmetics, awareness, and purchase intention indicate a broader scope that also touches on consumer perceptions and market demand for halal-certified products. The close relationship between food safety and certification underscores the ongoing efforts to ensure halal food standards meet both religious and safety requirements.

The yellow cluster is focused on halal tourism, with links to tourism development, innovation, and sustainability. This area highlights the intersection of the halal economy with the global tourism sector. It suggests that researchers are exploring how halal principles can be integrated into tourism, emphasizing innovation in services and facilities that cater to halal-conscious travelers. Additionally, the inclusion of Islamic finance and SMEs (small

and medium enterprises) points to the role of financing and small businesses in developing halal tourism infrastructure. The blue cluster centers around animal welfare, meat, slaughterhouse, and religion, revealing the ethical and religious dimensions of halal research. Pig and gelatin are highlighted as non-halal substances, indicating the strong focus on differentiating halal products from their non-halal counterparts, particularly in the context of animal-based products. The presence of keywords like authentication and food quality suggests a focus on ensuring the authenticity and quality of halal-certified meat and animal products, with an emphasis on adhering to religious standards.

This network also shows the interconnectedness of various research areas. The overlap between halal tourism and innovation suggests that research is moving toward creating new business models and services in halal tourism. Similarly, the integration of Islamic finance with halal industries and blockchain technology indicates a convergence of financial and technological solutions to enhance halal industry practices. This interdisciplinary approach reflects the dynamic growth of the halal economy, which is not confined to just food but extends to various sectors, including tourism, cosmetics, and even pharmaceuticals.

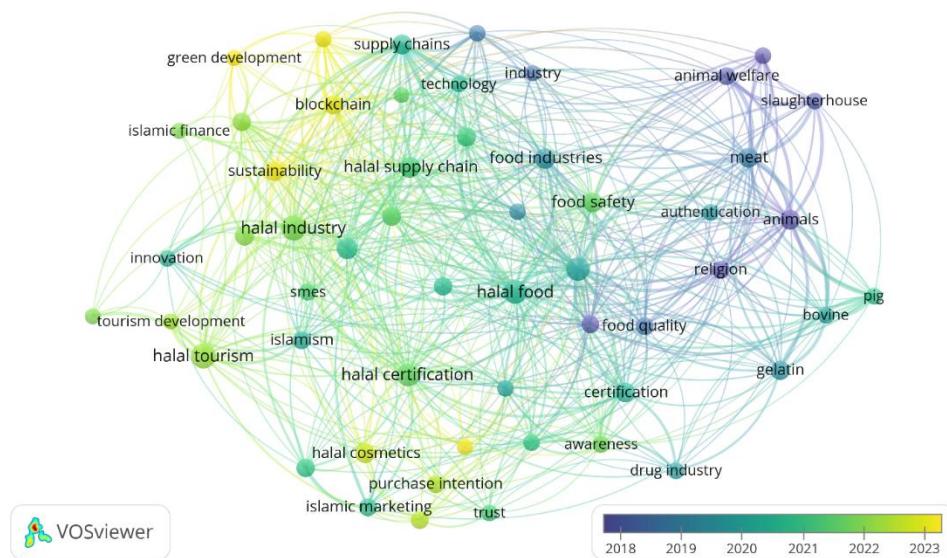


Figure 2. Overlay Visualization

Source: Data Analysis

Figure 2 highlights the intellectual evolution of halal industry research from 2018 to 2023, showing how research topics and keywords have interconnected over time. The color gradient in the visualization represents the time span, with keywords from earlier years in yellow (2018–2019) and those from more recent years in blue (2022–2023). The green and yellow nodes dominate the cluster representing the halal industry, supply chains, and blockchain technology, which have become increasingly important in halal industry research. Keywords such as halal supply chain and food industries have been central over the years, but the introduction of newer terms like blockchain and technology suggests that more recent research is integrating digital tools for improving halal supply chains. These technologies have gained prominence in the last few years, reflecting the shift toward enhancing transparency and efficiency within halal industry practices.

The purple cluster, representing halal food and halal certification, have remained consistent over the years, with keywords like

food quality, authentication, and certification strongly linked. These keywords suggest a sustained interest in ensuring the authenticity and quality of halal-certified products. Research on food safety continues to be a central concern, with halal certification being a consistent theme. Over time, the certification process has become more deeply examined in relation to food safety standards, showing its growing significance in the halal food sector. The blue and purple nodes at the periphery of the network indicate a growing focus on animal welfare, religion, and slaughterhouse in more recent years, with keywords like pig, bovine, and gelatin highlighting the ethical considerations within halal practices. These topics have gained prominence in the 2020s, as more research addresses the intersection of religion and animal welfare in halal certification processes. This shift reflects the broader ethical concerns surrounding halal products, particularly with respect to the treatment of animals and the exclusion of non-halal ingredients in food products.

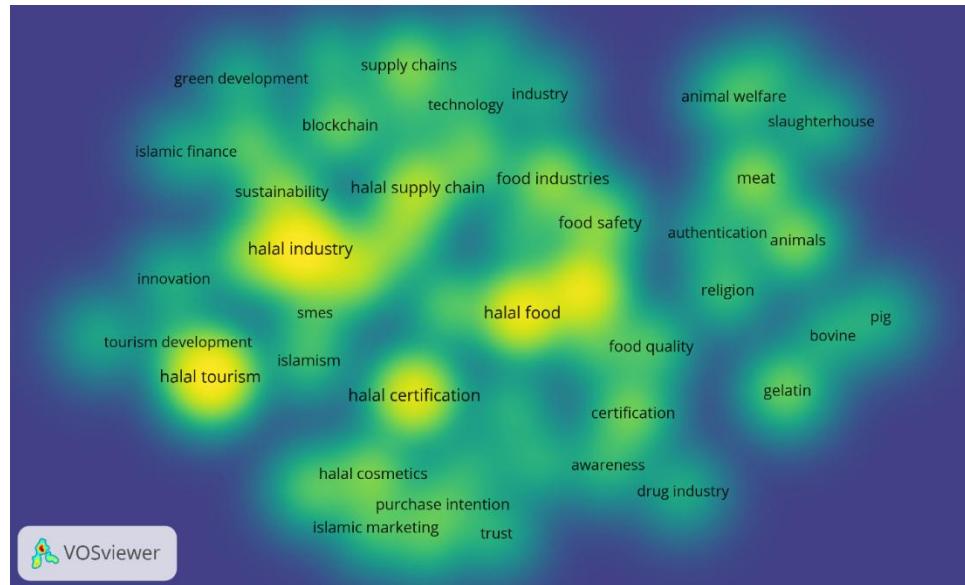


Figure 3. Density Visualization

Source: Data Analysis

Figure 3 visualizes the density of research topics in the halal industry based on keyword co-occurrence. The most intense green areas in the center, such as halal industry, halal food, and halal certification, represent the key research focuses within this field, showing strong connections and frequent co-occurrences across various publications. These keywords indicate that the halal food sector and certification processes have dominated research over the past years, reflecting their central importance in the halal industry. The high density around halal industry also shows the increasing significance of this broad sector, integrating various aspects like food safety, quality, and supply chains. The surrounding

lighter green areas, including blockchain, technology, and halal tourism, highlight the growing incorporation of modern technologies and the broader halal economy. These clusters reveal the expanding scope of halal research, where topics like blockchain and sustainability are becoming increasingly relevant to halal practices, especially in the context of halal supply chains and tourism. The presence of animal welfare, meat, pig, and gelatin in the periphery indicates a continued focus on the ethical and religious considerations in halal certification, emphasizing the differentiation between halal and non-halal products in terms of animal-based goods.



Figure 4. Author Visualization

Source; Data Analysis

Figure 4 represents the co-authorship relationships among various researchers in a specific field, highlighting the collaboration patterns. The different colored clusters represent groups of authors who have frequently co-authored papers together, with each color indicating a distinct group of connected authors. The stronger the connection between authors, the closer they are in the network. For example, the green cluster shows a group of authors, such as Othman Rashidi and Mohamed Syazwan, who have worked

together. Similarly, the purple and yellow clusters, containing names like Vanany Iwan W. and Riaz Mian Nadeem, reflect other collaborative networks. These co-authorship links provide insights into the academic collaboration structures and the centrality of certain authors in the research community, suggesting that some individuals are more central to the network, acting as bridges between clusters.

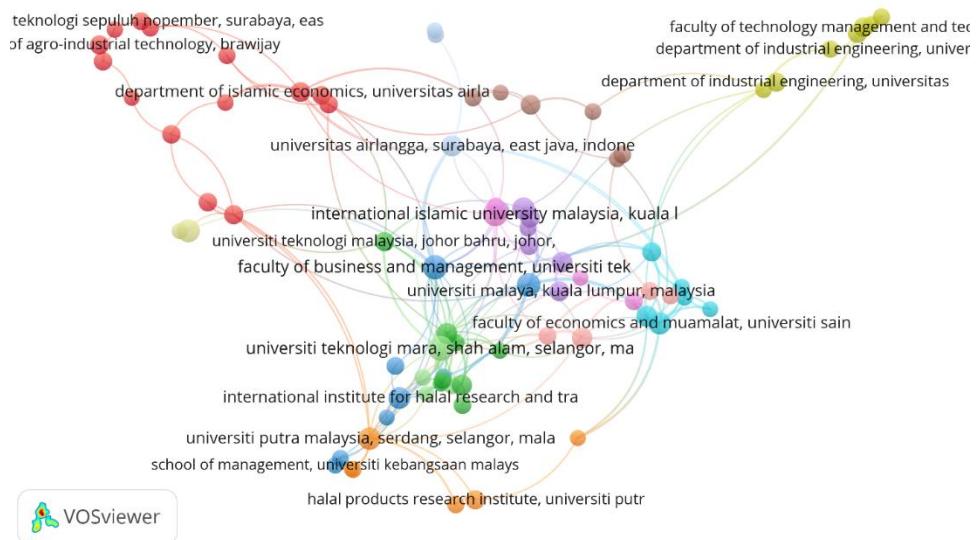


Figure 5. Institution Visualization

Source: Data Analysis

Figure 5 maps the collaboration network of universities and research institutions involved in halal industry research. The network reveals how different institutions are connected through joint publications and research efforts. Each cluster represents a group of institutions with strong collaboration, such as the Universitas Airlangga, International Islamic University Malaysia, and Universiti Teknologi Malaysia. The colors indicate different clusters, with connections between institutions showing the frequency of collaborative work. For example, the green cluster focuses on the

Faculty of Business and Management and Universiti Teknologi Mara, highlighting a specific group of institutions in Southeast Asia collaborating on halal-related research. The network also indicates isolated institutions like Teknologi Sepuluh Nopember, Surabaya and Faculty of Technology Management that have fewer but still notable connections with other institutions. This visualization provides a comprehensive view of the academic collaboration landscape in halal research across the region.

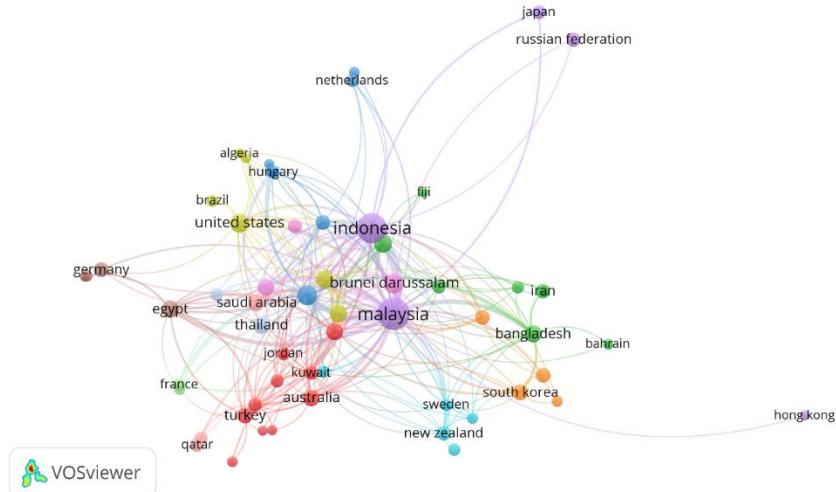


Figure 6. Country Visualization

Source: Data Analysis

Figure 6 illustrates the global collaboration patterns among countries in halal industry research. The network is color-coded to represent clusters of countries with strong research connections. The central cluster, dominated by Indonesia and Malaysia, reflects their leading roles in halal research, with extensive collaborations across Asia and beyond. Countries such as Brunei Darussalam, Saudi Arabia, and Thailand are closely connected to this cluster, emphasizing the Southeast Asian dominance in halal-related studies. Other notable clusters emerge from

countries like Turkey, Australia, and South Korea, indicating their active involvement in this research field. The presence of Western countries such as the United States, Germany, and France on the periphery highlights the global interest in halal industry research, though their collaborations appear less concentrated compared to Southeast Asia. This visualization provides a comprehensive view of the geographical spread and collaboration networks in halal research, revealing the central role of Southeast Asia while also showing increasing global participation.

Table 1. Top Cited Literature

Citations	Authors and year	Title
538	[14]	<i>Applying the Theory of Planned Behavior (TPB) in halal food purchasing</i>
404	[15]	<i>Halal tourism: Concepts, practices, challenges and future</i>
362	[16]	<i>Gelatin alternatives for the food industry: recent developments, challenges and prospects</i>
275	[17]	<i>Risk assessment of halal products and services: Implication for tourism industry</i>
271	[18]	<i>The application of Halal in supply chain management: In-depth interviews</i>
238	[19]	<i>Consumers and halal cosmetic products: Knowledge, religiosity, attitude and intention</i>
231	[20]	<i>Blockchain Technology in the Food Industry: A Review of Potentials, Challenges and Future Research Directions</i>
225	[21]	<i>A sustainable Blockchain framework for the halal food supply chain: Lessons from Malaysia</i>
220	[22]	<i>A comprehensive review on gelatin: Understanding impact of the sources, extraction methods, and modifications on potential packaging applications</i>
212	[4]	<i>Deciphering 'Islamic hospitality': Developments, challenges and opportunities</i>

Source: Scopus, 2026

Discussion

The network visualization of global collaborations in halal industry research reveals a clear dominance of Southeast Asia, particularly Indonesia and Malaysia, in driving the research agenda. These two countries have established strong collaborations with neighboring nations like Brunei Darussalam, Saudi Arabia, and Thailand, reflecting their leadership in halal industry practices, policies, and research. This central positioning can be attributed to the economic importance of the halal sector in these regions, which have large Muslim populations and extensive halal food, cosmetics, and tourism industries. Furthermore, the active involvement of Southeast Asian countries in shaping halal certification standards and promoting halal industries globally is evident in their extensive collaborative networks.

In addition to Southeast Asia, countries like Turkey, Australia, and South Korea also show significant involvement in halal research, indicating that the halal industry is becoming a subject of interest beyond the Islamic world. Turkey, with its strategic position bridging Europe and the Middle East, plays a unique role in halal food production and certification

standards, which likely facilitates its collaborations with both Western and Islamic nations. Similarly, Australia and South Korea's connections to halal research may be driven by their growing halal export markets and increasing awareness of halal requirements in international trade. These countries' collaboration with key Southeast Asian nations underscores the global nature of halal industry research and its expansion into diverse sectors like halal tourism, cosmetics, and pharmaceuticals.

While Western countries such as the United States, Germany, and France are on the periphery of this network, they still show involvement, particularly in specific research areas like halal certification, animal welfare, and halal tourism. Their position suggests that halal industry research is gradually gaining traction in non-Muslim majority countries, driven by both consumer demand for halal-certified products and the desire to tap into the global halal market. The increasing presence of these countries in the research network indicates the potential for further growth in halal-related industries globally, as international collaboration and interest in halal standards continue to evolve. The spread of halal industry

research across multiple continents reflects the sector's growing importance and its integration into mainstream global trade and cultural practices.

4. CONCLUSION

This study highlights the evolving landscape of halal industry research, with Southeast Asia, particularly Indonesia and Malaysia, emerging as central hubs for collaboration and innovation in this field. The network analysis demonstrates how these countries, along with key regional partners like Brunei Darussalam and Saudi Arabia, are at the forefront of shaping global halal industry

standards and practices. Additionally, the involvement of countries outside the Islamic world, such as Turkey, Australia, and South Korea, reflects the increasing globalization of the halal sector, spanning industries from food and cosmetics to tourism and pharmaceuticals. Despite being less central, Western countries are also making inroads into halal research, suggesting a broader recognition of the sector's economic potential. This study underscores the growing global interest in halal industry research and the importance of cross-border collaborations in driving its development, paving the way for future advancements in halal certification, ethical standards, and market expansion.

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