



Review

Bibliometric analysis of palm oil competitiveness study in Indonesia and the linkage to agricultural trade

Novyandra Ilham Bahtera ^(ID*)1)2), Tanti Novianti ^(ID)3), Ratih Septiyanti ⁴⁾

1) Department of Agribusiness, Faculty of Agriculture, Fisheries, and Marine Science, Universitas Bangka Belitung, Bangka Belitung, Indonesia

2) Doctoral of Agricultural Economics, Faculty of Economics and Management, IPB University, West Java, Indonesia

3) School of Business, IPB University, West Java, Indonesia

4) Master of Science Agribusiness, Faculty of Economics and Management, IPB University, West Java, Indonesia

ARTICLE HISTORY

Received:

23 Juny 2025

Revised:

24 August 2025

Accepted:

05 October 2025

Published:

29 October 2025

KEYWORDS

Bibliometric analysis;

Global agricultural trade;

Palm oil competitiveness;

Sustainable development;

Trade policy

ABSTRACT

The global palm oil industry has become a focal point in agricultural trade due to its economic significance and environmental implications. As one of the world's largest producers, Indonesia faces increasing pressure to maintain its competitiveness while addressing sustainability and trade policy challenges. This study aims to assess the development of scientific literature on Indonesian palm oil competitiveness and its relationship with global agricultural trade dynamics. The study was conducted using bibliometric analysis of 648 scientific articles obtained from Google Scholar and Scopus using the keyword "palm oil competitiveness". The articles were published in the time span from 1992 to 2025 for documents sourced from Google Scholar and the time span from 1985 to 2025 for documents sourced from Scopus. The data was analyzed using Bibliometrix (R) and VOSviewer software to identify publication trends, main keywords, and interconnections between topics in the literature. The results showed a significant increase in the number of publications in the last decade, signalling high attention to the issue of palm oil competitiveness. Keywords such as "competitiveness", "export performance", "market share", and "sustainable development" were central in the literature network, illustrating the important role of economic, policy, and sustainability aspects in strengthening Indonesia's palm oil position in the global market. The findings showed that palm oil competitiveness did not only depend on production efficiency, but also required downstream policy support, capacity building of farmers, and strengthening of trade diplomacy. This research was expected to serve as a reference for academics and policymakers in formulating a sustainable, equitable palm oil development strategy that was able to adaptively respond to global trade challenges.

Copyright © 2025 Author(s).



This article is an open access article distributed under the terms and conditions of the **Creative Commons Attribution NonCommercial ShareAlike 4.0 International License**.

Citation (APA Style):

Bahtera, N. I., Novianti, T., & Septiyanti, R. (2025). Bibliometric Analysis of Palm Oil Competitiveness Study in Indonesia and The Linkage to Agricultural Trade. *Jambura Agribus. J.*, 7(1), 19-34.

DOI: <http://dx.doi.org/10.37046/jai.v7i1.32937>

*) Corresponding Author

INTRODUCTION

Indonesia is the world's leading producer of palm oil, accounting for about 58% of global production (Setiajiati et al., 2024; Sulaiman et al., 2024). Indonesia's palm oil market share in the world market is approximately 54-59% (Siahaan, 2025). Through employment and foreign exchange earnings, this position helps the national economy. Indonesia's palm oil industry employs about 16.5 million people, both directly and indirectly, making it a vital source of rural employment and local economic growth. It is also a major foreign exchange earner, contributing USD 34.9 billion in 2021, USD 37.7 billion in 2022, USD 29.54 billion in 2023, and USD 9.78 billion by May 2024 (Indonesian Palm Oil Association, 2025).

Indonesia is the world's largest palm oil producer, with an annual production volume of nearly 43 million tonnes (Maulana et al., 2023). This country exports palm oil to various destinations, with significant exports to countries such as India, China, Pakistan, the Netherlands, Malaysia, Bangladesh, Egypt, Italy, Spain and Singapore (Gultom & Sinaga, 2023). Given the important role of Indonesian palm oil commodities in the agricultural industry and global trade, their competitiveness in international markets has been the subject of several studies (Antika et al., 2024; Hajar et al., 2024; Husna, 2024; Setiajiati et al., 2024). Bibliometric analyses of studies related to palm oil competitiveness in Indonesia are essential for understanding research progress, spotting trends, and determining future research directions. Researchers and policy makers can gain a thorough understanding of scientific contributions in improving the competitiveness of this strategic commodity with this method.

The urgency of this research is increasing along with the dynamics of global agricultural trade and the challenges faced by the Indonesian palm oil industry, such as protectionist policies, sustainability issues (Antika et al., 2024) and climate change impacts (Corning et al., 2024). An in-depth understanding of the relationship between palm oil competitiveness and agricultural trade through bibliometric analysis can help in formulating effective strategies to maintain and improve Indonesia's position in the global market. In addition, the results of this study are expected to make a significant academic contribution to the scientific literature related to agribusiness and agricultural economics, as well as a reference for policy makers in formulating policies that support the sustainability and competitiveness of the national palm oil industry.

Competitiveness has been defined by several intellectuals. For instance, Chen (2017) defines competitiveness as the ability to sell or supply goods and services effectively in the market, reflecting the economic efficiency and productivity of enterprises or countries. Sargsyan (2017) states that competitiveness is also related to the ability to achieve high living standards and economic growth, making it the cornerstone of national economic evaluation. Meanwhile,

competitiveness according to Huang & Huang (2018) is associated with economic success for which it is important to consider its wider implications such as sustainability and environmental impact. The integration of sustainable practices can improve competitiveness by encouraging innovation and long-term viability. Specifically, palm oil competitiveness includes the ability of palm oil products to maintain and improve their market position in the global trading environment (Pratiwi, 2021).

The Indonesian palm oil industry is a major player in the global market, with the country being the largest producer and exporter of palm oil. Indonesian palm oil consistently demonstrates high Revealed Comparative Advantage (RCA) values, indicating strong comparative advantages in key export destinations such as India, Malaysia, Singapore, the Netherlands, Italy, and Spain (Maulana et al., 2023). Indonesian palm oil exports are competitive in major markets such as the United States, China, and India, with economic distance, GDP per capita, and trade agreements being significant predictors of export success (Pratiwi, 2021). In addition, important factors that increase the competitiveness of Indonesian palm oil are economic growth, exchange rates, and the populations of importing countries (Pratama et al., 2024).

In general, this article aims to conduct a bibliometric analysis on the topic of palm oil competitiveness from various scientific literatures. Specifically, this article aims to: 1) explain the development of studies on palm oil competitiveness from the beginning of this issue to the current condition; 2) understand what keywords are related to palm oil competitiveness; and 3) to analyse the relationship between one keyword and other keywords on research topics on palm oil competitiveness. The hypotheses built from this research are: 1) research issues on palm oil competitiveness are increasing in number from year to year; 2) there are a number of specific keywords related to research issues on palm oil competitiveness; and 3) these keywords have an interrelated relationship between one another and can be observed.

METHOD

The literature search was conducted in March 2025 using Harzing's Publish or Perish (PoP) software version 8 for Google Scholar sourced documents and using the Scopus website for Scopus documents. The search was conducted using the keyword "palm oil competitiveness" and was conducted without any restrictions on the year of publication. The results obtained were 500 documents sourced from Google Scholar and 167 documents sourced from Scopus. After inclusion, the total number of documents used was 648, comprising 481 documents from Google Scholar and 167 documents from Scopus.

There were a number of inclusion criteria in the literature search, namely: 1) Articles were published in a number of publication media, namely scientific journals, seminar proceedings, dissertations, theses, but not including books and unpublished research reports; and 2) Articles were specific to the competitiveness of palm oil commodities, not other commodities. The search results using these keywords and inclusion criteria produced 481 articles sourced from Google Scholar and remained at 167 articles from Scopus. The articles were published in the time span from 1992 to 2025 for documents sourced from Google Scholar and the time span from 1985 to 2025 for documents sourced from Scopus. The various articles obtained were then stored in Research Information Systems (RIS) format for documents sourced from Google Scholar and Comma Separated Values (CSV) for documents sourced from Scopus.

Data Management

Articles obtained through PoP software were sourced from Google Scholar and then saved in RIS format and sourced from the Scopus website in CSV format and then imported into Mendeley software version 1.19.8. At this stage, we checked the completeness of the attributes of each article in the form of article title, author name, publication year, abstract, and keywords. Articles with incomplete attributes were then excluded from the next stage of analysis, with the following characteristics: 1) the website could not be accessed or did not even have a website; and 2) there was no article title, author name, abstract and/or keywords. The number of articles that met the criteria and continued in the next stage of analysis was 648 articles combined from Google Scholar and Scopus.

Data Analysis and Visualisation

The bibliometric database was analysed using PoP software, R version 4.4.2, specifically with the Bibliometrix package (Aria & Cuccurullo, 2017). A minimum number of five keywords per year was used to analyse the development of topics on an annual basis. To generate a conceptual structure map of the keywords, a factorial analysis was conducted using the multiple relationship analysis method. VOSviewer software version 1.6.20 was used to visualise keywords across the network (van Eck & Waltman, 2010).

RESULTS AND DISCUSSION

Development of Palm Oil Competitiveness Study

Studies on the competitiveness of palm oil had started since 1985 until 2025. Based on Table 1, the characteristics of scientific publications related to palm oil competitiveness showed an active and collaborative trend. Google Scholar data recorded 481 documents with a total of 13,350 citations, resulting in an average of 27.76 citations per document and 404.55 citations per year. The document per author ratio of 0.37 indicated the dominance of collaborative

publications. The average document age of 8.3 years reflected that the literature on this topic was still relatively new and relevant. Meanwhile, data from Scopus showed 167 documents with 605 authors involved, including 21 single authors. The author collaboration ratio of 3.6 emphasised the high tendency of cooperation in scientific publications in this field. The average document age of 7.7 years also supported the finding that the study of palm oil competitiveness had continued to evolve in the last decade. In other words, the data reflected the dynamics of a strong, collaborative literature that remained relevant in addressing strategic issues in the palm oil industry.

Table 1. General data on palm oil competitiveness studies sourced from Goolge Scholar and Scopus

Description (Google Scholar)	Results	Description (Scopus)	Results
Time span	1992-2025	Time span	1985-2025
Number of Documents	481	Number of Documents	167
Number of citations	13,350	Number of authors	605
Number of citations per year	404.55	Number of single authors	21
Number of citations per document	27.75	Number of co-authors / docs.	3.88
Number of citations per author	6703.48	Growth per year	5.34%
Number of documents per author	240.72	Average age of documents (years)	7.35
Number of authors per document	2.62	Number of citations per document	11.61
h-index	55		

Source: data processed, 2025

Over the past decade, research on Indonesia's palm oil competitiveness had proliferated due to the increasing urgency to understand and optimised the factors underlying Indonesia's dominance in the global crude palm oil (CPO) market. Technological advancements and efficiencies in the production process had improved quality and reduced costs, resulting in increased competitiveness through more competitive prices and higher export volumes (Betrix et al., 2022). In addition, Indonesia had consistently maintained a significant global market share, strengthening its position as a major exporter of CPO (Hidayat et al., 2023; Susanto, 2020). Comparative advantage analysis using the Revealed Comparative Advantage (RCA) method also showed Indonesia's stable RCA value was four, signalling a strong competitive advantage in the international market (Azida et al., 2023; Zuhdi et al., 2021). Furthermore, economic and trade policies, such as diesel price subsidies and the biodiesel programme, had contributed to domestic price stability and strengthened exports (Hidayat et al., 2023; Pratiwi, 2021). This combination of factors made palm oil competitiveness an important strategic issue to be examined in depth in the context of national economic development and global market dynamics.

Table 2. Most cited articles on the topic of palm oil competitiveness

No.	Title	Author	Year	Journal	Citation
1	Unpacking Indonesia's independent oil palm smallholders: An actor-disaggregated approach to identifying environmental and social performance challenges	Jelsma, I.	2017	Land Use Policy, 69, 281-297	246
2	Feasibility Study of Performing a Life Cycle Assessment on Crude Palm Oil Production in Malaysia	Yusoff, S.	2007	The International Journal of Life Cycle Assessment, 12, 50-58.	163
3	Life cycle costing and externalities of palm oil biodiesel in Thailand	Silalertruksa, T.	2011	Journal of Cleaner Production	121
4	Cost competitiveness of palm oil biodiesel production in Indonesia	Harahap, F.	2018	Energy	88
5	Production of solid biofuels from organic waste in developing countries: A review from sustainability and economic feasibility perspectives	Angulo-Mosquera, L.S.	2021	Science of the Total Environment	88
6	Techno-economic performance analysis of bio-oil based Fischer-Tropsch and CHP synthesis platform	Ng, KS.	2011	Biomass and Bioenergy	74

Source: data processed, 2025

Based on data from Table 2, the most cited articles on the topic of palm oil competitiveness were generally published in internationally reputable scientific journals that focused on sustainability, renewable energy, and land use policy, such as Land Use Policy, Journal of Cleaner Production, The International Journal of Life Cycle Assessment, Energy, and Biomass and Bioenergy. The articles addressed a variety of strategic topics, including supply chain analysis and practices of independent oil palm smallholders (Jelsma et al., 2017), life cycle assessment of the palm oil industry (Yusoff & Hansen, 2007), and cost and external impact analysis of palm-based biodiesel production (Harahap et al., 2019; Silalertruksa et al., 2012). These studies confirmed that the competitiveness of oil palm was not only determined by economic efficiency, but also by environmental considerations and energy policy support. The high citation rate of these articles reflected the importance of a multidimensional approach in understanding the competitiveness of oil palm, and showed that this topic was relevant in the global discourse on sustainable development and energy transition.

Keyword Analysis

The cumulative trend in the frequency of keyword occurrences showed a significant increase since 2010, reflecting the intensification of scientific studies related to palm oil competitiveness (Table 3). The keyword "sustainable development" had experienced the sharpest and most consistent spike, indicating that this aspect had become a major focus in the academic literature. In addition, the keywords "Indonesia", "competitiveness", and "oil palm" also showed a notable increase in frequency, indicating a great deal of attention to Indonesia's competitive position in the global palm oil industry. Meanwhile, other keywords such as "commerce", "Malaysia", and "trade" saw a more moderate increase. This pattern underlined a shift in the focus of scholarly studies from trade issues alone to more complex strategic issues, such as sustainability and competitive advantage in a geopolitical and environmental context. In the last five years (2020-2024), trends in palm oil competitiveness research topics showed an increase in keywords such as fruit and Indonesia, indicating a shift in focus to geographical issues and derivative products. Classic topics such as palm oil, oil palm and sustainable development consistently appear, reflecting the relevance of sustainability and supply chain issues. Meanwhile, topics such as costs, competition and economics began to appear less frequently after 2020, raising the question of whether there has been a shift in research approaches or a decline in interest in these themes. These findings reflected the dynamic development of palm oil studies, which continued to change according to global needs and contexts.

Table 3. Keywords that appear most frequently on the topic of palm oil competitiveness
(Based on the results of the words frequency over time)

Frequency	Keywords
>40	Sustainable Development (43)
30-39	Palm Oil (30), Oil Palm (35)
20-29	Indonesia (25)
10-19	Malaysia (14), Elaeis (10), Competitiveness (18), Competition (15), Agriculture (12)
<10	Commerce (7)

Source: data processed, 2025

Based on Figure 1, the topic trend analysis showed the dynamic development of issues related to palm oil competitiveness from year to year. In the early period (2007-2012), topics such as biodiesel, biofuels, and Malaysia dominated the study, indicating the literature's focus on bioenergy and regional competitiveness comparisons. From 2015 to 2020, there was a shift towards topics such as competition, costs, commerce, and oil palm, signalling attention to aspects of cost efficiency and market structure in the palm oil industry. From 2017, the topics of sustainable development and competitiveness started to gain prominence, and peaked in

2019-2021, indicating that sustainability issues were starting to become a major focus in the scientific discourse. In the last decade (2015-2025), the topics of Indonesia, crude palm oil, and sustainable development appeared consistently with high frequency, reflecting the increasing concern for Indonesia's strategic position as a major producer and the integration of sustainability principles in strengthening the competitiveness of the palm oil industry.

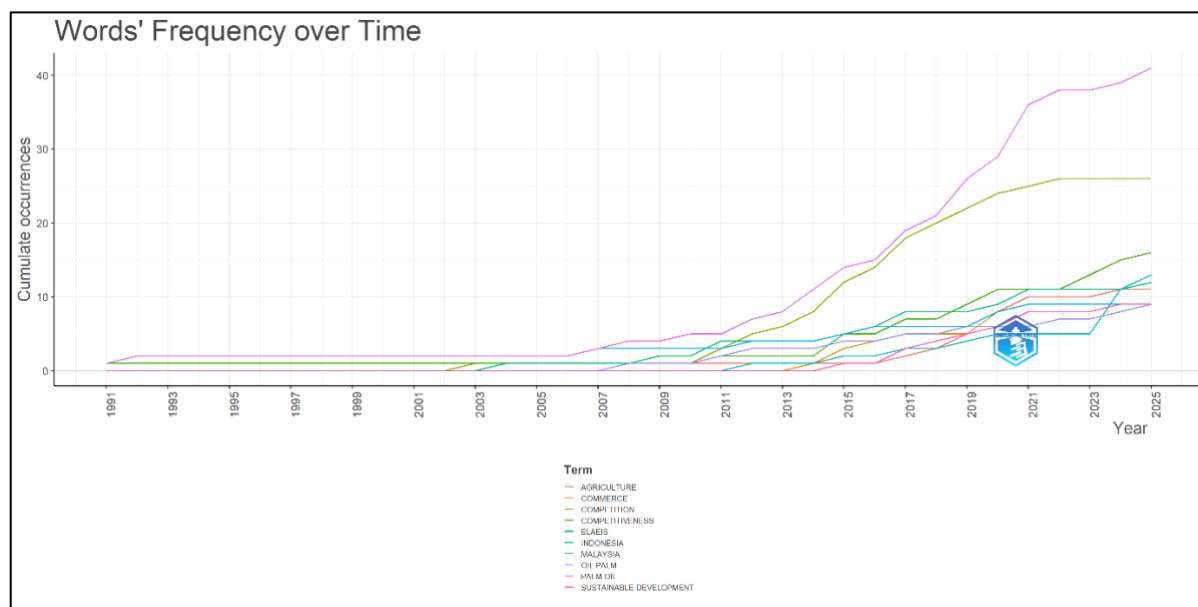


Figure 1. Words' frequency over time

The factorial analysis figure showed four main clusters of keywords that categorised the focus of the palm oil competitiveness study (Figure 2). The purple cluster was the largest group covering environment, sustainability, and public policy issues, such as sustainability, environmental management, deforestation, and developing countries. The red cluster represented topics related to renewable energy and bioenergy economics, characterised by keywords such as biodiesel, bioenergy, cost competitiveness, and renewable energy resources. The light blue cluster was more technical and focuses on biofuel production efficiency, with words such as life cycle, production cost, and biofuels. Meanwhile, the green cluster was separate and more methodological, covering controlled studies, and economic aspects. These four clusters showed that research on oil palm was expanding across topics, from environmental aspects to efficiency and economic strategies.

The network visualisation of the keywords shown in Figure 3 showed that palm oil competitiveness occupied a central position and served as a link between the various clusters of research topics. The red cluster centred on competitiveness, export competitiveness, export performance, export tax, market share, and crude palm oil (CPO), highlighting aspects of export performance and competitive position in the global market. The yellow cluster, with keywords such as palm oil, biodiesel, biofuel, price, and production, described the production

and renewable energy dimensions. The green cluster addressed sustainability and governance, covering sustainability, ISPO, governance, and smallholders. The blue cluster focused on competitive advantages, such as comparative advantage, palm oil industry, and RSPO. While the purple cluster highlighted the macroeconomic context, with keywords such as international trade, economic growth, and exchange rates. The central position of competitiveness showed that palm oil competitiveness is an intermediate variable that was influenced by factors such as price, export policy, and sustainability, and in turn affected Indonesia's export performance, market share, and position in the international market.

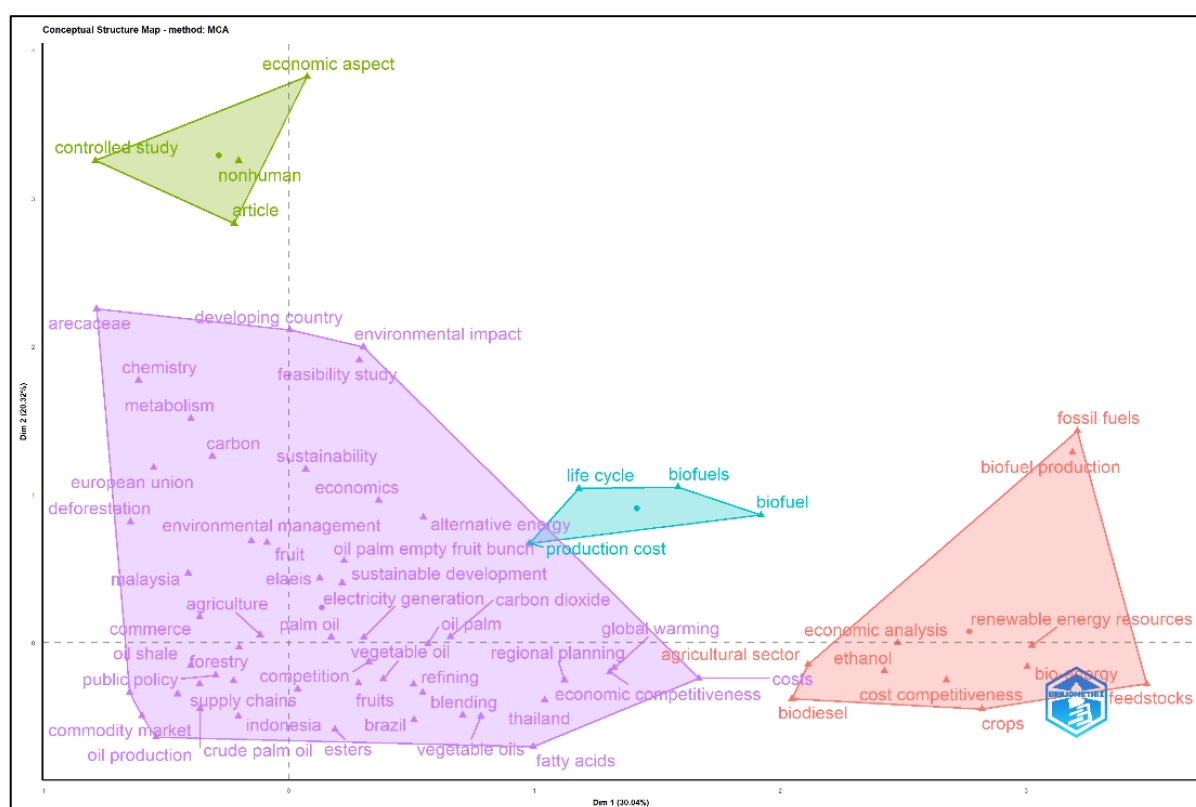


Figure 2. Conceptual structure map (factor analysis) of keywords on the topic of palm oil competitiveness

Source: Data processed, 2025

Based on Figures 2 and 3, it showed that palm oil competitiveness was a strategic node that connected various factors such as price, export policy, sustainability, and production. The uniqueness of competitiveness lied in its ability to be the meeting point between technical and policy issues, which can directly drive improved export performance and expansion of market share. With this position, competitiveness was the main lever in strengthening Indonesia's position in the international market. The competitiveness of Indonesia's palm oil industry was a multifaceted issue that integrated technical, economic and policy dimensions, significantly influencing its position in the international market. Indonesia's palm oil competitiveness was

mainly driven by its production capacity, export strategy (Betrix et al., 2022; Husin et al., 2023), and ability to adapt to global market demands (Pratama et al., 2024). The country's strategic focused on increasing production efficiency, improving product quality, and expanding downstream industries played a crucial role in maintaining and strengthening its market position. These efforts were complemented by adaptive policies and economic diplomacy to navigate global challenges and opportunities (Hasan & Reed, 2001).

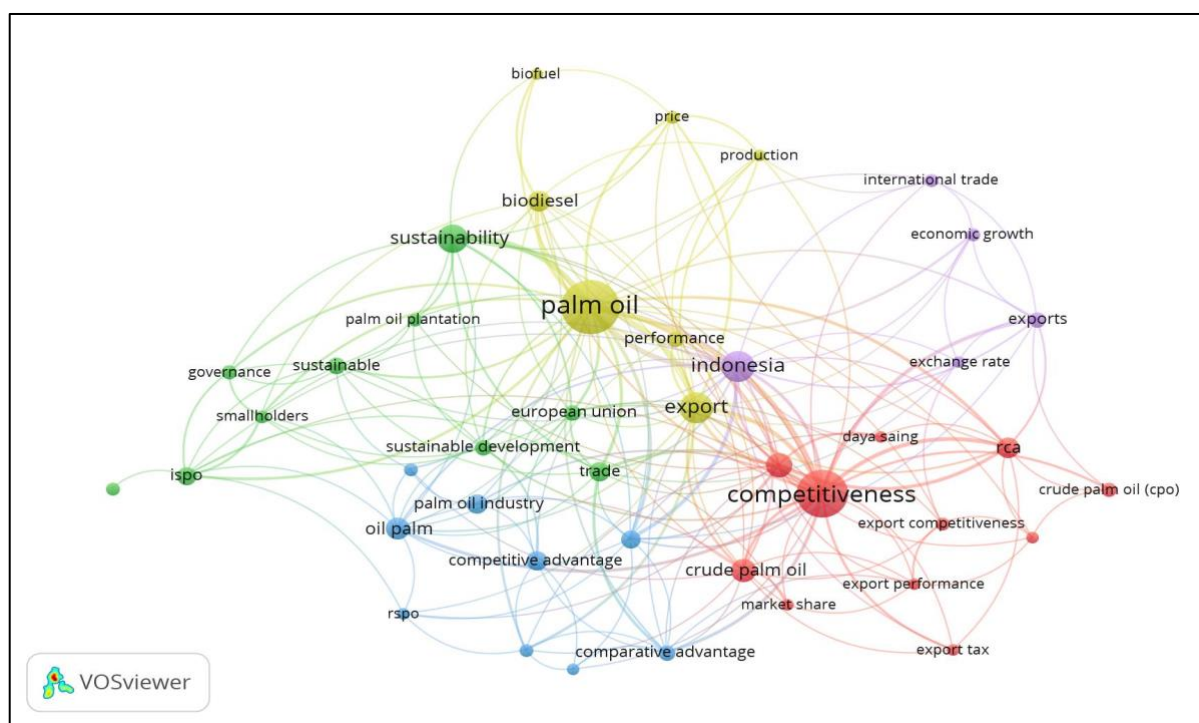


Figure 3. Network visualisation of palm oil competitiveness keywords

Source: Data processed, 2025

Relevance of Oil Palm Competitiveness and Agricultural Trade

Based on the visualisation map, agricultural trade in the context of palm oil was reflected through its linkages with keywords such as “trade”, “international trade”, and “exports”, which indicated cross-border activities that influence the dynamics of the palm oil industry. Effective agricultural trade was expected to contribute positively to the improvement of palm oil competitiveness, which was closely linked to keywords such as “competitiveness”, “export performance”, “market share”, “export competitiveness”, and “crude palm oil”. These relationships suggested that optimising agricultural trade, through export-supportive policies and strengthening product positioning in the global market, could be a strategic factor in improving the competitive advantage of Indonesian palm oil at the international level.

Government policies played a crucial role in strengthening Indonesia's palm oil competitiveness in the global market through support for international trade, technological

improvements (Betrix et al., 2022; Husin et al., 2023), and sustainable environmental management (Hamid & Paramitaningrum, 2023; Purnomo et al., 2022; Qudsi et al., 2020; Surez, 2024). On the production side, support for farmer efficiency, industrial downstream, and technological innovation had improved the quality and added value of CPO exports. In addition, the implementation of sustainability standards such as ISPO helped meet global environmental demands and improves the industry's image (Espinoza-Castro et al., 2024; Harsono et al., 2012; Komives & Jackson, 2014). However, the effectiveness of these policies was still faced with domestic challenges and international competition, which demanded adaptive and integrated policy responses.

The government's role in supporting palm oil competitiveness in the agricultural trade was very strategic, especially through policies that not only encouraged exports and global market access, but also strengthened the capacity of key actors in the sector, such as farmers, palm oil companies, and agricultural extension workers. Policies directed at improving farmers' competencies through training, access to technology, and incentives for sustainable cultivation will have an impact on production efficiency and yield quality (Azahari et al., 2024; Bahtera, 2016; Bahtera et al., 2016, 2024; Purnomo et al., 2022). On the other hand, support to palm oil companies in terms of downstream, sustainability certification, and fulfilment of international standards also increased the added value and competitiveness of products in the global market (Naidu et al., 2024; Satnyoto et al., 2024). Agricultural extension workers also played an important role as a bridge between policies and implementers in the field, ensuring information, innovations, and best practices were well conveyed to farmers (Hameed & Sawicka, 2023; Rai et al., 2023; Raji et al., 2024). Thus, synergistic collaboration between government policies and the competencies of key actors in the industry was key to sustainably improving the competitiveness of Indonesian palm oil in the international agricultural trade.

Improving palm oil competitiveness through downstream strategies in Indonesia required a comprehensive and integrated policy approach. This involved not only diversifying palm oil derivative products but also improving Indonesia's position in the global supply chain. Key strategies include strengthening partnerships between farmers and processing industries (Husin et al., 2023), developing industrial estates near raw material sources (Perizade & Mulyana, 2014), and providing incentives for downstream investments (Rofiqi et al., 2016). In addition, research support, technological innovation, and technical assistance through agricultural extension are essential to ensure the downstream process was effective and inclusive (Hasibuan, 2021). Thus, downstream should be viewed as part of a sustainable and equitable agricultural development policy, in order to improve the competitiveness of palm oil while strengthening the role of the local economy in global agricultural trade.

CONCLUSION

The results of the bibliometric analysis showed that studies on the competitiveness of Indonesian palm oil had developed significantly in the last decade. The increase in the number of publications and collaboration between authors indicated that this topic was an important concern in the agribusiness and agricultural economics literature. Palm oil competitiveness was not only related to production efficiency and export strategies, but also included issues of sustainability, energy policy, and environmental management. Keywords such as “competitiveness”, “export performance”, “market share”, and “sustainable development” occupied a central position in the literature network, reflecting the linkages between technical, economic, and policy aspects in shaping Indonesia's palm oil competitiveness in the global market.

The role of the government has proven crucial in supporting the competitiveness of Indonesian palm oil through policies that encourage international trade, strengthen technology adoption, develop downstream industries, and implement sustainability standards. Strategies such as establishing palm oil industrial zones, providing incentives for downstream products, and building capacity for farmers and companies have been key to strengthening Indonesia's position in the global supply chain. Agricultural extension officers also play an important role as intermediaries between policy and field actors, ensuring that innovations are effectively implemented at the grassroots level.

In this context, strengthening agricultural trade represents both a strategic outcome and a driver of competitiveness for the palm oil sector. By expanding market access and diversifying export destinations, Indonesia can not only protect itself from volatility in major importing countries but also strengthen its position in global negotiations on agricultural commodities. Furthermore, aligning palm oil trade with international sustainability standards such as ISPO and RSPO increases market acceptance while reducing trade barriers. Therefore, improving the competitiveness of Indonesian palm oil requires an integrated and adaptive policy approach that explicitly includes agricultural trade as a central dimension connecting upstream production with downstream value-added processing and global market opportunities. Placing downstream development at the core of the strategy not only enhances the competitive advantage of palm oil but also expands its contribution to global agricultural trade in a sustainable and inclusive manner.

ACKNOWLEDGMENT

The authors would like to thank the Department of Agricultural Economics, Faculty of Economics and Management, IPB University, for the moral and administrative support for the study.

REFERENCES

- Antika, M., Heryadi, R. D., & Sari, D. S. (2024). WTO dalam Kontroversi Perdagangan: Peninjauan Kasus Black Campaign Uni Eropa terhadap CPO (Crude Palm Oil) Indonesia. *Sriwijaya Journal of International Relations*, 4(1), 1–16. <https://doi.org/10.47753/sjir.v3i1.95>
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Azahari, D. H., Laksani, D. D., Amalia, R., & Kusumawardhana, R. (2024). Strategy for Increasing Exports of Indonesian Palm Oil. *IOP Conference Series: Earth and Environmental Science*, 1379(2024), 012026. <https://doi.org/10.1088/1755-1315/1379/1/012026>
- Azida, S., Yamin, M., & Riswani, R. (2023). Analisis Daya Saing Crude Palm Oil (CPO) Indonesia Di Pasar Internasional. *Agrica*, 16(1), 84–94. <https://doi.org/10.37478/agr.v16i1.2732>
- Bahtera, N. I. (2016). Socio-Economic Profile and Perception of Smallholders towards the Empowerment Program in Tanjung Jabung Barat, Indonesia. *Asia Business and Economics Journal*, 2(1), 27–35. http://www.bec.nu.ac.th/abejournal/book_detail.php?id=2
- Bahtera, N. I., Arshad, F. M., Sidique, S. F., Djama, M., & Abu-samah, A. (2016). The determinants of participation in empowerment programs in jambi province, indonesia. *Asia Pacific Journal of Advanced Business and Social Studies*, 2(2), 534–550. Retrieved 10 July 2025, from <https://apiarpublications.com/journal-paper/the-determinants-of-participation-in-empowerment-programs-in-jambi-province-indonesia/>
- Bahtera, N. I., Yulia, Y., & Herza, H. (2024). Pemberdayaan Petani Kelapa Sawit di Desa Tiang Tara melalui Pelatihan Good Agricultural Practices. *Jurnal Abdi Insani*, 11(3), 428–440. <https://doi.org/10.29303/abdiinsani.v11i3.1760>
- Betrix, B., Fajri, H. C., & Rawung, S. S. (2022). Competitiveness of Indonesia's Crude Palm Oil (CPO) in International Markets: Based on Database 2018. *Journal of International Conference Proceedings*, 5(2), 106–115. <https://doi.org/10.32535/jicp.v5i2.1677>
- Chen, T. (2017). Competitive and sustainable manufacturing in the age of globalization. *Sustainability (Switzerland)*, 9(1), 26. <https://doi.org/10.3390/su9010026>
- Corning, S. N., Boere, E., Krasovskiy, A., Lessa Derci Augustynczyk, A., Shepherd, T., Ghosh, R., Kraxner, F., & Havlík, P. (2024). Flammable futures—storylines of climatic impacts on wildfire events and palm oil plantations in Indonesia. *Environmental Research Letters*, 19(2024), 114039. <https://doi.org/10.1088/1748-9326/ad7bcc>
- Espinoza-Castro, F., Lara-Ramírez, A., & Buele, J. (2024). Environmental Sustainability in Industrial Operations: A Comprehensive Review. *2024 IEEE Eighth Ecuador Technical Chapters Meeting (ETCM)*, 1–5. <https://doi.org/10.1109/ETCM63562.2024.10746185>
- Gultom, L. S., & Sinaga, N. M. (2023). Indonesian Crude Palm Oil (CPO) Exports Through the Gravity Model Approach. *Jurnal Penelitian Pendidikan IPA*, 9(8), 6509–6519. <https://doi.org/10.29303/jppipa.v9i8.4664>

- Hajar, R. S., Yun, B., & Hwang, H. (2024). Analyzing the Impact of Indonesian Sustainable Palm Oil (ISPO) Certification and the Factors that Influence Crude Palm Oil (CPO) Exports. *International Journal of Social Service and Research*, 4(10), 1–11. <https://doi.org/10.32649/ajas.2023.179947>
- Hameed, T. S., & Sawicka, B. (2023). Role of Agricultural Extension in Adoption of Sustainable Agriculture Practices. *Anbar Journal of Agricultural Sciences*, 21(1), 250–260. <https://doi.org/10.32649/ajas.2023.179947>
- Hamid, S., & Paramitaningrum. (2023). Indonesian Economic Diplomacy toward Palm Oil: Indonesia's Respond to the EU Resolution on Palm Oil and Deforestation of Rainforest. *E3S Web of Conferences*, 388(04006), 1–7. <https://doi.org/10.1051/e3sconf/202338804006>
- Harahap, F., Silveira, S., & Khatiwada, D. (2019). Cost competitiveness of palm oil biodiesel production in Indonesia. *Energy*, 170, 62–72. <https://doi.org/10.1016/j.energy.2018.12.115>
- Harsono, D., Chozin, M. A., & Fauzi, A. M. (2012). Analysis on Indonesian Sustainable Palm Oil (ISPO): A qualitative assessment the success factors for ISPO. *Jurnal Manajemen & Agribisnis*, 9, 39–48. <https://journal.ipb.ac.id/index.php/jmagr/article/view/5529>
- Hasan, M. F., & Reed, M. R. (2001). An Analysis of Factors Determining Competitiveness: The Case of The Indonesian Palm Oil Industry. *Jurnal Agro Ekonomi*, 19(1), 1-17. https://web.archive.org/web/20170922233629id_/http://ejurnal.litbang.pertanian.go.id/index.php/jae/article/viewFile/4838/4094
- Hasibuan, H. A. (2021). Processing and Palm Oil-Based Food Product Development Opportunities In Indonesia. *Jurnal Penelitian Dan Pengembangan Pertanian*, 40(2), 111-124. <https://doi.org/10.21082/jp3.v40n2.2021.p111-124>
- Hidayat, A., Robiani, B., Marwa, T., & Suhel, S. (2023). Competitiveness, market structure, and energy policies: a case study of the world's largest crude palm oil exporter. *International Journal of Energy Economics and Policy*, 13(3), 111–121. <https://doi.org/10.32479/ijeep.14199>
- Huang, J., & Huang, Y. (2018). Competitiveness as a broad concept: definitions and methodologies in three industry contexts. *International Journal of Management Concepts and Philosophy*, 11(2), 172-189. <https://doi.org/10.1504/ijmcp.2018.10013499>
- Husin, S., Wijaya, C., Ghafur, A. H. S., Machmud, T. M. Z., & Mardanugraha, E. (2023). Palm Oil Downstream Strategy: Enhancing Indonesia's Bargaining Position in International Palm Oil Trade. *Migration Letters*, 20(5), 678–689. <https://doi.org/10.59670/ml.v20i5.4057>
- Husna, J. T. (2024). Cooperation between Indonesia and Pakistan in Boosting Export Performance of Wilmar International's Processed Palm Oil Products. *International Journal of Social Service and Research*, 4(9), 1–8. <https://doi.org/10.46799/ijssr.v4i9.930>
- Indonesian Palm Oil Association. (2025). *The Facts on Palm What is the truth on Indonesia's most important crop?* Indonesian Palm Oil Association. Accessed date: July 15, 2025. Available from: <https://www.indonesiapalmoilfacts.com/facts-sheets/>
-

- Jelsma, I., Schoneveld, G. C., Zoomers, A., & van Westen, A. C. (2017). Unpacking Indonesia's independent oil palm smallholders: an actor-disaggregated approach to identifying environmental and social performance challenges. *Land Use Policy*, 69, 281–297. <https://doi.org/10.1016/j.landusepol.2017.08.012>
- Komives, K., & Jackson, A. (2014). Introduction to Voluntary Sustainability Standard Systems. In: Schmitz-Hoffmann, C., Schmidt, M., Hansmann, B., Palekhov, D. (eds) Voluntary Standard Systems. *Natural Resource Management in Transition*, 1, 3–19. https://doi.org/10.1007/978-3-642-35716-9_1
- Maulana, F. R., Sukiyono, K., Nusril, N., & Sriyoto, S. (2023). Analysis of Indonesian Palm Oil Competitiveness in the Main Export Destination Countries. *Indonesian Journal of Agricultural Research*, 6(2), 68–78. <https://doi.org/10.32734/injar.v6i2.11420>
- Naidu, L., Mohd Huda, M. I., & Moorthy, R. (2024). Trade Competitiveness and Sustainability Policies of Malaysian Palm Oil in the European Union: Strategic Responses by Stakeholders Agencies. *Malaysian Journal of History, Politics & Strategic Studies*, 51(1), 21–36. <https://doi.org/10.17576/jebat.2024.5101.02>
- Perizade, B., & Mulyana, A. (2014). Strategi Percepatan Pengembangan Industri Hilir Karet dan Kelapa Sawit di Sumatera Selatan. *Jurnal Manajemen Dan Bisnis Sriwijaya*, 12(2), 91–98. <https://doi.org/10.29259/jmbs.v12i2.3210>
- Pratama, M. K. P. P., Sukmawati, C. P., & Abidin, A. Z. (2024). Global Dominance in Crude Palm Oil (CPO): Strategic Factors Shaping Indonesia's Competitive Edge-A Panel Data Approach. *Buletin Ilmiah Litbang Perdagangan*, 18(2), 141–158. <https://doi.org/10.55981/bilp.2024.7205>
- Pratiwi, I. E. (2021). The predictors of Indonesia's palm oil export competitiveness: A gravity model approach. *Journal of International Studies*, 14(3), 250–202. <https://www.cceol.com/search/article-detail?id=995847>
- Purnomo, H., Kusumadewi, S. D., Ilham, Q. P., Kartikasara, N. H., Okarda, B., Dermawan, A., Puspitaloka, D., & M.A., B. (2022). *Harnessing Political Economy and Global Green Trade to Increase Indonesia's Palm Oil Sustainability*, (370). CIFOR. <https://doi.org/10.17528/cifor/008637>
- Qudsi, M. I. El, Kusumawardhana, I., & Kyrychenko, V. (2020). The garuda strikes back: Indonesian economic diplomacy to tackle European Union protectionism on crude palm oil. *Journal of International Studies on Energy Affairs*, 1(2), 110–135. <https://doi.org/10.51413/JISEA.VOL1.ISS2.2020.110-135>
- Rai, A. K., Ranjan, A., Bharti, S. D., Saikanth, D. R. K., Surender, Rout, S., & Gautam, R. (2023). Agricultural Extension's Key Role in Modern Farming: A Review. *Asian Journal of Agricultural Extension, Economics & Sociology*, 41(9), 475–485. <https://doi.org/10.9734/ajaees/2023/v41i92066>
- Raji, E., Ijomah, T. I., & Eyieyien, O. G. (2024). Improving agricultural practices and productivity through extension services and innovative training programs. *International Journal of Applied Research in Social Sciences*, 6(7), 1297–1309. <https://doi.org/10.51594/ijarss.v6i7.1267>
- Rofiqi, D. M., Maarif, M. S., & Hermawan, A. (2016). Strategi Percepatan Pengembangan Industri Turunan Minyak Kelapa Sawit Mentah (MSM) di Indonesia. *Jurnal Teknologi Industri Pertanian*, 26(3), 246–254. <https://journal.ipb.ac.id/jurnaltin/article/view/15705>
-

- Sargsyan, A. (2017). Variety of Approaches in Assessment of Global Competitiveness. *International Journal of Economics & Management Sciences*, 6(6), 1-4. <https://doi.org/10.4172/2162-6359.1000479>
- Satnyoto, A., Bainus, A., Sumadinata, W. S., Darmawan, W. B., & Damayanti, A. (2024). Indonesia's Strategy in Dealing with The European Union Green Protectionism in The Palm Oil Trade. *International Journal of Innovative Research in Multidisciplinary Education*, 3(1), 34–46. <https://doi.org/10.58806/ijirme.2024.v3i1n05>
- Setiajiati, F., Nurrochmat, D. R., Van Assen, B. W., & Purwawangsa, H. (2024). Current status of Indonesia's palm oil products and their competitiveness in the global market. *IOP Conference Series: Earth and Environmental Science*, 1379(2024), 012022. <https://doi.org/10.1088/1755-1315/1379/1/012022>
- Siahaan, M. (2025). *Palm oil industry in Indonesia- statistics & facts*. Statista. <https://www.statista.com/topics/5921/palm-oil-industry-in-indonesia/#topicOverview>
- Silalertruksa, T., Bonnet, S., & Gheewala, S. H. (2012). Life cycle costing and externalities of palm oil biodiesel in Thailand. *Journal of Cleaner Production*, 28, 225–232. <https://doi.org/10.1016/j.jclepro.2011.07.022>
- Sulaiman, A. A., Djufry, F., Syamsuri, P., Setiyanto, A., Haris Bahrin, A., Hendrawati, D., & Fauzan Ridha, M. (2024). Sawit Indonesia dalam Dinamika Pasar Dunia. In E. Kustanti & H. Suryantini (Eds.), *Plantation Plan, Development, and Control Manager PT CT Agro*. (Pertama). Pertanian Press. <https://sawitiindonesia.com/mengelola-manajemen-afdeling>
- Surez, M. F. (2024). Peran Diplomasi Ekonomi Berkelanjutan dalam Mewujudkan Indonesia Emas 2045. *Seminar Nasional Prosiding Ilmu Manajemen Kewirausahaan Dan Bisnis*, 1(1), 260-273. <https://doi.org/10.61132/prosemnasimkb.v1i1.21>
- Susanto, D. A. (2020). Daya Saing Ekspor Produk Cpo Indonesia Dan Potensi Hilirisasi Diolah Menjadi Biodiesel. *Jurnal Perspektif Bea Dan Cukai*, 4(2), 64-76. <https://doi.org/10.31092/jpbc.v4i2.952>
- van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538. <https://doi.org/10.1007/s11192-009-0146-3>
- Yusoff, S., & Hansen, S. B. (2007). Feasibility study of performing an life cycle assessment on crude palm oil production in Malaysia. *International Journal of Life Cycle Assessment*, 12(1), 50–58. <https://doi.org/10.1065/lca2005.08.226>
- Zuhdi, D. A. F., Abdullah, M. F., Suliswanto, M. S. W., & Wahyudi, S. T. (2021). The Competitiveness of Indonesian Crude Palm Oil in International Market. *Jurnal Ekonomi Pembangunan*, 19(1), 111–124. <https://jep.ejournal.unsri.ac.id/index.php/jep/article/view/13193>