Export performance and competitiveness of Indonesian coconut oil and desiccated coconut

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Abstract. Competitiveness is an essential key in market penetration in export destination countries. This study aims to analyze Indonesian coconut oil, refined, bleached and deodorized and desiccated coconut (DC) export performance and its competitiveness in the export market. The competitiveness measurement is seen from comparative and competitive advantages over the two products in each leading export destination market. The analysis method used graphical illustrations and the RCA and EPD covering the period of 2009-2018. The study shows that coconut oil and DC's export performance increases in all export markets during the analysis period. The Chinese market is a prospective market for coconut oil with the most significant export growth, 10.51% per year, and the largest market share after the USA and South Korea. Meanwhile, the Russian market is the biggest after Germany and Singapore for DC products. The result shows that coconut oil and DC product have comparative competitiveness in all export markets. Coconut oil products are no longer competitive in the South Korean market because their exports are not growing dynamically. The Chinese market is still open, but Indonesia cannot take advantage of this opportunity (lost opportunity). Meantime, DC products have an ideal position in the Russian market and the USA market for coconut oil, namely the rising star. Indonesia gains additional market share with dynamic growth (fast-growing product). Active efforts to find new markets through market diversification and diplomacy while maintaining existing markets can be an option to increase the export of coconut oil and desiccated product.

1. Introduction

Indonesia is the first considerable coconut-producing country worldwide, followed by the Philippines and India [1,2]. However, coconut is still cultivated conventionally, and the average productivity (copra equivalent) is relatively low [1,3] (Indonesia: 1.15 tons/ha, whereas world: 4.94 tons/ha). This situation because plants are dominated by mature plants (>30–40 years), the replanting program has not been running as targeted, and low intensification in cultivation. In addition, limited availability of superior seeds and fertilizers, high harvest costs, and area had decreased at 0.96% /year. Those are some of the factors causing the low productivity of coconut [4].

Over the past decade, coconut export has not been as expected because the export value has decreased slowly by 0.20% per year during 2009–2019 period [5]. However, the export volume of coconut and its derivatives shows an increase steadily at 3.53% per year. The decline in the value of exports is mainly due to changes in the exchange rate or oversupply of the world, and products types shipped being exported are still in raw materials form [3], so that added value is still very limited.
According to the Agricultural Quarantine Agency data, Indonesian coconut exports experienced a significant increase in 2019 compared to 2018. Coconut exports in 2018 amounted to 1.33 million tons, with a frequency of 13,133 times, increased to 13.99 million tons with a frequency of 13,916 times in 2019 [5].

Indonesia is one of the biggest exporters of coconut oil globally besides the Philippines and Malaysia [2]. Indonesia also has the second-largest market share of coconut oil and desiccated coconut after the Philippines [6]. These two products are the main products exported by Indonesia [1,7]. There is an increase in demand for coconut oil in the import market, especially from European Union, United States, China, and Malaysia. Indonesia and the Philippines contributed 67% to fulfill the demand for coconut in the world market [1]. This condition implies a great opportunity for Indonesia to fill the demand in the international market.

Therefore, it is important to know and understand the competitiveness of these products in export destinations to improve their performance in the global market. Two factors determine a country’s competitiveness in global trade, namely, comparative and competitive advantage. The comparative advantage can be considered a natural factor [7]. In contrast, competitive advantage is regarded as a factor acquired or can be developed.

2. Materials and methods

2.1. Materials

This study uses secondary data type time series and yearly from 2009–2018 with a world market scope. The coconut products analyzed were coconut oil, including refined, bleached and deodorized/CO (HS code 15131990); and desiccated coconut/DC (HS code 08011100). Data sourced from Trade Map, UNComtrade, Central Bureau of Statistics, Ministry of Agriculture, and Ministry of Trade.

2.2. Methods

The data is analyzed using graphics and charts to indicate changes of Indonesian share export to destination market during ten years period. This research uses RCA (Revealed Comparative Advantage) and EPD (Export Product Dynamic) methods to analyze a product’s competitiveness. Following the framework of [8–10,11], we used the RCA method to quantify commodities' comparative advantage in international trade. Indonesian coconut products export is a variable calculated through the share of Indonesia’s export against Indonesia’s total exports to importing countries and compared with the percentage of export value from all countries to the importing countries.

Mathematically, the formulation of RCA is

\[ RCA_j = \frac{X_{ij}}{\sum_j X_{ij}} / \frac{X_{wj}}{\sum_j X_{wj}} \]

where:

RCAj = level competitiveness of coconut products from Indonesia to export market i
Xij = export value of coconut products from Indonesia to export market i (USD)
Xwj = total export value of all commodities from Indonesia to export market i (USD)
\( \sum_j X_{ij} \) = export value of coconut products from the world to export market i (USD)
\( \sum_j X_{wj} \) = total export value of all commodities from the world to export market i (USD)

j = coconut products: CO and DC
i = export market

Coconut commodity has a comparative advantage or strong competitiveness in export destination if the index of RCA is >1. On the contrary, if the RCA index is <1, the commodity does not have a comparative advantage. The analysis is continued by using EPD methods to determine market position and dynamically measure the product's competitiveness. Furthermore, there are some critical issues of competitiveness [12], i.e., (1) dynamic processes; (2) competitiveness valued as a relative measure; (3) competitiveness is an instrument that brings through sustainable market exploitation to obtain a benefit over other competitors; (4) competitiveness is a comprehensive viewpoint on the capability to defend
the outcome accomplished thru trading which depends on achievement and obstacles to be noted and managed; and (5) to maintain the competitiveness of limited natural resources need to be considered.

The Export Product Dynamic method comprises a matrix that puts the commodity into four characteristics [13], as presented in Table 1. Matrix of a commodity's competitiveness in Table 1 can convert into quadrants, as illustrated in Figure 1. Position in quadrant describes the business ability (X-axis) and market interest (Y-axis) of a commodity. Business ability is calculated from share of market growth of export destinations. In contrast, market interest is analyzed build on demand growth in the export destination. Thus, the composite of market interest and business ability generate the behavior product's position into these four bunch.

Table 1. Matrix of competitiveness position in Export Product Dynamic

| Share of country's export in international trade | Share of product in international trade |
|------------------------------------------------|----------------------------------------|
| Rising (competitive)                            | Rising (dynamic)                       |
| Falling (non-competitive)                       | Falling (stagnant)                     |

Mathematically, the formula of the business ability (X-axis) is

\[
\frac{\sum^{n-1}x_{it} \times 100\% - \sum^{t-1}x_{it} \times 100\%}{T}
\]

Meantime, the formula of the market interest of a commodity (Y-axis) is as follows:

\[
\frac{\sum^{n-1}x_{it} \times 100\% - \sum^{t-1}x_{it} \times 100\%}{T}
\]

where:

\(X_{it}\) = the export value of coconut products from Indonesia to export market \(i\) (USD)
\(X_{iw}\) = export value of worlds' coconut products to export market \(i\) (USD)
\(X_{i}\) = export value of all commodities from Indonesia to export market \(i\) (USD)
\(X_{w}\) = export value of all commodities from the world to export market \(i\) (USD)
\(T\) = total years
\(t\) = year \(t\)

The analyzed results of export share accretion and market interest of a commodity can be placed in one of the quadrants in Figure 1. Thus, the position of an export commodity can be recognized into four characteristics graphically: rising star, falling star, lost opportunity, and retreat. The rising star position is the goal position and has the top rank in export trade, which means that the percentage is experiencing growth rapidly. On the other hand, a lost opportunity is an unforeseen position resulting from reducing the domestic market share when the export market share is still going up. The falling star is a worse lost opportunity position, which means an accretion in the share of the commodity in the particular country's destination. Still, a lower portion of products in world trade and product markets in export destination countries are no longer dynamic. Finally, the retreat post indicated the commodity was stagnant and not competitive in the country's destinations [11].

![Figure 1. Product's competitiveness position using Export Product Dynamic.](image-url)
3. Results and discussion

3.1. Export performance of coconut oil and desiccated coconut

Coconut trade has opportunities and prospective markets in the world market. Based on the average planting area data for 2013–2016, Indonesia is in the top rank with 30.21% of the world [3]. The countries in the next level were the Philippines with a share of 29.44%, and India with 17.04%. The rest are other countries in the world whose contribution is 23.31% [14]. Along with land area, Indonesian coconut production during 2013–2017 is also in the first rank to produce coconut in the world. The contribution of Indonesian coconut production was 29.80%, followed by the Philippines at 24.02%, India at 18.80%, Brazil at 4.46%, and Sri Lanka at 4.41%.

Coconut oil (CO) is a raw material for chemical, food, cosmetics, and other industries [7]. Therefore, CO is an essential product for Indonesia as a significant foreign exchange earner compared to other derivative products from coconut. Indonesia earned USD 419 million per year from the export of this product during the 2009–2018 period, but unfortunately, it has started to decline by 0.37% annually.

Figure 2 depicts that the major export destinations for Indonesian CO are the China, United States, and South Korea. These three markets have a 65% share of Indonesia's total CO exports, and this share has increased significantly every year. The export market to China has the highest export share and tends to increase every year, while the second-largest market is South Korea but has a fairly large market decline tendency (6.18%). The export market of the United States is still quite good and tends to grow with an average growth of 7.10%. Thus, the American market has the opportunity and huge potential to develop in the future. Strategy to seize this market is also an important thing for the Government to do.

Indonesia is the second-largest exporter of desiccated coconut worldwide after the Philippines [3,7]. This product is a durable product of dry coconut used for coconut milk, cake mixes, and other foods. For a decade (from 2009 to 2018), the main export destinations for Indonesian DC products were Germany, Singapore, and Russia. During the ten years, the largest share of exports was Singapore, followed by Germany and Russia, with each share of 20.44%, 9.12%, and 5.96% (Figure 3). For the last ten years, the export value of Indonesian DC was also the largest from Singapore, amounting to USD 16.9 million, followed by Germany at USD 11.3 million and Russia with USD 7.5 million. As a result, the average foreign exchange earnings from exports of DC has reached USD 114 million.

The export of DC to the world market shows a positive trend yearly, with an average growth rate of 9.31% for volume and 12.79% for export value. Russia follows this positive trend as the third largest export destination country with not too significant growth, only 0.78% annually. On the other hand, exports to Germany and Singapore showed a downward trend with average growth rates of 0.16% and 1.38% per year. Therefore, based on this result, strategy and policy to escalate exports to these countries need to do quickly while actively seeking new markets and the exports’ barrier should be minimized. The improvements of Good Manufacturing Practices (GMP) at the processing, especially for Small and Medium Enterprises (SMEs), are the most important to do immediately [11].

![Figure 2](image2.png)  ![Figure 3](image3.png)

**Figure 2.** Indonesian coconut oil export by destination (%), 2009–2018.

**Figure 3.** Indonesian desiccated coconut export by destination (%), 2009–2018.
Furthermore, it was shown that consciousness of the quality and safety (including non-tariff measurement issue such as content of fungi and bacteria) of the commodity must be pointed to all interested parties to strengthen the coconut industry [15]. In total, DC's export performance in the world market shows a relatively fast growth of 13% annually. Therefore, opportunities to increase exports to new markets destination are still wide open.

3.2. Competitiveness analysis of coconut oil and desiccated coconut

Competitiveness analysis using the RCA method shows that Indonesian CO has competitiveness in all country's destinations during the 2009–2018 period, as presented in Figure 4. Therefore, the RCA value greater than 1 means that the CO product has a comparative advantage above the world average. In other words, this product has strong competitiveness [16]. This result was also confirmed by the previous studies [2,6,17,18].

![Figure 4. RCA of coconut oil, 2009–2018.](image)

Indonesian CO, which is comparatively superior in China, the United States, and South Korea, is important information for carrying out an in-depth analysis of the dynamics of competitiveness, particularly in 2014–2018. The competitiveness position in specific export destination markets can change (dynamically) as competition increases with the emergence of new competing countries. Therefore, Indonesia's ability to maintain and improve its competitive advantages, such as the ability to meet various export requirements, are the critical aspects to grow and the speed in responding to various changes in the global market.

The high RCA index of Indonesian coconut oil export in the Chinese market indicated that this product's share and growth is higher than South Korea and the United States market. Therefore, Indonesia's coconut oil exports to China are predicted more competitive regarding a competitive export price and the still growing demand for coconut oil products. Furthermore, another study [2] also confirmed that Indonesia has high competitiveness for coconut oil compared to the Philippines and Malaysia.

DC products have a comparative advantage in the German and Russian markets and vice versa in Singapore during the 2009–2018 period (Figure 5). The RCA value in the German and Russian markets is above one, and in the Singapore market, the RCA value is below 1, which is on average 0.95. The dynamics of the inter-year RCA value from 2009 to 2018 for DC products in the three main export markets indicate fluctuating competitiveness. However, on average, competitiveness remains in the German and Russian markets. On the contrary, Indonesian DC is not competitive in Singapore.
Based on the results of the EPD analysis, Indonesian CO exports in the export destination countries of South Korea were in the falling star position. The share of product exports is still increasing when the share of total exports in South Korea is not growing (stagnant). At the same time, China is unfavorable due to its lost opportunity, as shown in Table 2. The export market is still wide open in this market, but Indonesia cannot take advantage of this opportunity. In other words, the market demand for imports from China continues to grow but Indonesia's share of CO exports has decreased. However, it is still possible to make efforts to increase exports while maintaining the existing market.

**Table 2.** Indonesian coconut oil analysis using the EPD methods, 2009–2018.

| Export market | The average export growth of coconut oil (%) | The average total export growth (%) | Position          |
|---------------|---------------------------------------------|-----------------------------------|-------------------|
| China         | -1.431                                      | 0.014                             | Lost opportunity  |
| USA           | 0.870                                       | 0.003                             | Rising star       |
| South Korea   | 2.484                                       | -0.082                            | Falling star      |

Exports of CO from Indonesia to the United States have a rising star position during the 2009–2018 period. This position is ideal, where the accretion-share of CO exports and the share of Indonesia's total exports in the United States increases or growing fast. This analysis concludes that the United States market is a promising market to continue to be filled with this product. Therefore, strategies and efforts to maintain this position by increasing the competitiveness of CO to the United States need to be continued, besides increasing production accompanied by improvements in product quality and production cost efficiency.

In the Russian market, the export of DC is also in a rising star position. This observation indicated that Indonesia is gaining additional market share in DC products with fast-growing products (Table 3). This can be seen from the market share value DC, and Indonesia's total exports to Russia tend to increase and have a positive trend. In contrast, in Germany and Singapore, the exports of DC are in a falling star position. In this case, DC product still has a competitive advantage, but its competitiveness is weak, and the commodity's accretion tends to be stagnant.

**Table 3.** Indonesian desiccated coconut oil analysis using the EPD methods, 2009–2018.

| Export market | Desiccated coconut export growth rate (%) | The average total export growth (%) | Position          |
|---------------|------------------------------------------|-----------------------------------|-------------------|
| German        | 1.629                                     | -0.004                            | Falling star      |
| Singapore     | 0.050                                     | -0.007                            | Falling star      |
| Russia        | 2.467                                     | 0.026                             | Rising star       |

The European Union (Germany) is the main market for Indonesian DC [1]. However, Germany applies specific standards such as sustainability aspects. Therefore, the strategy that can be done is to
increase coconut production on the upstream side and industrial capacity with products required by the importing country.

4. Conclusions
Indonesia's export performance of coconut oil and desiccated coconut has increased over the past decade. The Chinese market is a prospective market together with the United States and South Korea for Indonesian coconut oil. The Russian market, Germany, and Singapore are the most important market for Indonesian desiccated coconut.

This research implies that Indonesian coconut oil and desiccated coconut have a comparative advantage and are competitive in the international market. Both of these products are rising stars in the United States and Russia. It means that the market is still wide open, and it is growing positively, rapidly, and dynamically (growing fast product). Therefore, the strategy that can be carried out is increasing exports and improving competitiveness to these destination countries by increasing production and industrial capacity accompanied by fulfilling the specific standard required.

The Chinese market is still wide open for coconut oil products from Indonesia. This opportunity should be exploited through increasing export volume. Government and all stakeholders can accelerate maintaining and improving the competitiveness of coconut products in the destination country. Active efforts to find new markets through market diversification and diplomacy while maintaining existing markets can be an option to increase the export of coconut oil and desiccated product.

Acknowledgment
The authors wish to thank Dr. Sudi Mardianto, Director of Indonesian Center for Agricultural Socio Economic and Policy Studies (ICASEPS), for his support and facilitation for doing this research.

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