COMPETITIVENESS OF THE TOP 15 MAIN EXPORT DESTINATIONS OF INDONESIA'S NATURAL RUBBER FOR 1991–2020

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Abstract: This study aims to analyze the position and performance of Indonesia's natural rubber exports in terms of the concept of comparative advantage in the market world. The data used in this study were sourced from UN Comtrade, which is processed with a 30-year data series (1991-2020) and is categorized into six periods. The analytical methods used are Structural Trend Ranking (STR), Revealed Comparative Advantage (RCA), Export Product Dynamic (EPD), and X-Model. The results showed that 15 countries have consistently been the main Indonesian natural rubber market for 30 years. The RCA analysis showed that Indonesian natural rubber had strong competitiveness in all destination countries, except India in the first period. In contrast, the EPD analysis found that Indonesia's rubber market position was not always static and competitive. There was shown in the period 2011-2015, the average position of Indonesia's natural rubber market is in a market position that is not wanted to "retreat" in export destination countries. However, based on the X-Model results, the average Indonesian natural rubber is in a potential market position in all export destination countries in the 1991-2020 period.

Keywords: Export Product Dynamic (EPD), natural rubber, Revealed Comparative Advantage (RCA), Structural Trend Ranking (STR), x-model

Abstrak: *Penelitian ini bertujuan menganalisis posisi dan kinerja ekspor karet alam Indonesia dalam konsep keunggulan secara komparatif di pasar dunia. Data yang digunakan pada penelitian ini bersumber dari UN Comtrade yang diolah dengan seri data 30 tahun (1991-2020) dan dikategorikan menjadi enam periode. Metode analisis yang digunakan adalah Structural Trend Ranking (STR), Revealed Comparative Advantage (RCA), Export Product Dynamic (EPD), dan X-Model. Hasil penelitian menunjukkan bahwa terdapat 15 negara yang konsisten selama 30 tahun menjadi pasar utama karet alam Indonesia. Analisis RCA memperlihatkan karet alam Indonesia memiliki daya saing kuat di semua negara tujuan, kecuali India pada periode pertama, sedangkan analisis EPD menemukan bahwa posisi pasar karet Indonesia tidak selalu statis dan kompetitif pada setiap periode. Hal ini ditunjukkan pada periode 2011-2015, rata-rata posisi pasar karet alam Indonesia berada pada posisi pasar yang tidak diinginkan "retreat" di negara tujuan ekspor. Namun berdasarkan hasil X-Model rata-rata karet alam Indonesia berada pada posisi pasar yang potensial di semua negara tujuan ekpor pada periode 1991-2020.*

Kata kunci: *Export Product Dynamic (EPD), karet alam, Revealed Comparative Advantage (RCA), Structural Trend Ranking (STR), x-model*

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INTRODUCTION

Indonesia is one of the world's largest producers and exporters of natural rubber (Sembiring and Syaukat, 2021; Sinta 2020; Yuningtyas et al. 2021; Haryanto et al. 2019). Natural rubber' Indonesia contributes 26% of the world's total natural rubber production (Virginia and Novianti, 2020) and 33% of the world's total natural rubber exports (Octaviani, 2018). In 2011 rubber production was 2.99 million tons, continuing to increase until in 2020 reached 3.36 million tons (FAO, 2021). This increase is mostly due to the rubber area increasing yearly (Iskandar, 2020; Perdana, 2019). However, in terms of productivity, it is still relatively low compared to other natural rubber producers (Ulum, 2018).

Low productivity causes a decline in the performance of Indonesia's rubber exports, especially during the period 2011 to 2020. Based on data from WITS (2021), Indonesia's natural rubber exports in 2011 amounted to US$ 11.41 billion, while in 2020, it was only US$ 2.90 billion or decreased by US$ 8.51 billion. It is also indicated that there is intense competition between world natural rubber exporters such as Thailand and Ivory Coast (Septiani et al. 2021). The Thailand government is very focused on developing rubber plantations and is trying to expand rubber plantations in Thailand (Ardanari et al. 2020). Thailand's natural rubber has great support, one of which is replanting through a research institute called the Thailand Rubber Research Institute (Kongmanee and Ahmed, 2020; Kajornkasirat et al. 2021).

The Ivory Coast government has also applied the same thing; there has been an increase in the quality of agricultural products in the country (Kouakou, 2020). Indonesia's natural rubber export growth is lower than rubber exporters in other realms (Saryono, 2021). This is most likely caused by the lack of export performance of Indonesian natural rubber worldwide. In Lisdiani's research (2021), Indonesia's main natural rubber exports are the United States, Japan, China, India, and South Korea. The country's position is the largest natural rubber consumer in the world. One of the largest tire companies in the world is headquartered in Akron, Ohio, United States of America, namely "Goodyear Tire and Rubber Company" (Chaplinsky & Estey, 2017). Japan, China, and South Korea outperform the tire industry in Asia, but Indonesia is still less competitive than Thailand (Sinaga and Hartoyo, 2019).

Based on this description, to increase the advantages and competitiveness of natural rubber in Indonesia, this paper aims to analyze the position of Indonesian natural rubber in the concept of comparative advantage and analyze the performance of Indonesia's natural rubber exports in the market world. The novelty in this study, when compared to previous research, is the analysis period of 30 years (1991-2020) by categorizing it into six (6) periods. This is intended to show the performance of Indonesia's natural rubber exports every five (5) years. After analyzing the Structural Trend Ranking (STR), export destinations were obtained with clustering methods to select the top 15th major destinations of Indonesia's natural rubber exports.

In this study, the problem-solving approach used in analyzing the position and performance of Indonesia's natural rubber exports is the Revealed Comparative Advantage (RCA) and Export Product Dynamic (EPD) methods. For the research to be more comprehensive, a clustering of the potential of natural rubber was carried out by combining the results of the RCA method analysis with the results of the EPD method analysis known as the X-Model method (Simamora and Nadapdap 2021).

METHODS

This research used data were sourced from UN Comtrade. The data taken includes data on exports of natural rubber from each country studied, total exports of all commodities in each country studied, total world exports for natural rubber commodities, and total world exports for all commodities. In the secondary data collection process, tabulated data were processed using Microsoft Excel with a data series using 30 years of data taken from 1991 to 2020.

This study categorizes it into six periods. The first period is 1991-1995, the second period is 1996-2000, the third period is 2001-2005, the fourth period is 2006-2010, the fifth period is 2011-2015, and the sixth period is 2016-2020. The destination country's main exporters were obtained from the statistical trend ranking method with a clustering approach. The stages of analysis in this research function by following the research objectives. Each analysis tool is designed to be interrelated and complementary to one another. To measure the performance of a country's product competitiveness, the Balassa Index is used (Prasad, 2004). The calculation of RCA can be seen in formula

(1) as follows:

$$RCA_j = \frac{Xj_A/X_A}{Xj_w/X_w}$$

Note: RCAj (Revealed Comparative Advantage for commodity j); XjA (Country A's export value for commodity j); XA (Total export value of country A); Xjw (The export value of commodity j in the world); Xw (Total value of world exports).

RCA value > 1 indicates that the product or commodity has a high comparative advantage in the market. Conversely, if the RCA value < 1, this commodity cannot compete in the global market because it is not efficient. To avoid the occurrence of problems in the RCA value range that is too far and to find out whether the performance of Indonesian natural rubber is dynamic or not, an analysis is carried out using the Export Product Dynamic (EPD) method (Esterhuizen (2006). The EPD calculation is divided into 2 axes, namely the X-axis and Y-axis :

To determine the X axis

$$\frac{\sum_{t=1}^{t}\left(\frac{Xij}{Xit}\right)_t \text{ x } 100\% - \sum_{t=1}^{t}\left(\frac{Xij}{Xit}\right)_{t-1} \text{ x } 100\%}{T}$$

To determine the Y axis

$$\frac{\sum_{t=1}^{t}\left(\frac{Wtj}{Wtt}\right)_t \text{ x } 100\% - \sum_{t=1}^{t}\left(\frac{Wtj}{Wtt}\right)_{t-1} \text{ x } 100\%}{T}$$

Note: Xij is the export value of country natural rubber *j's*; Xit is the world's natural rubber export value; Wtj is the total of all commodities of country *j*, Wtt is the total of all world commodities. For the research to be more comprehensive, a clustering of the potential of natural rubber was carried out by combining the results of the RCA method analysis with the results of the EPD method, known as the X-Model method. This clustering was carried out to focus on the trade market and to see the competitiveness of Indonesia's natural rubber commodities from two sides so that the research could be more comprehensive (Table 1). Table 1 Clustering analysis of X-Model potential export product.

Figure 1 shows a framework that shows the stages of this research. Changes in Indonesia's natural rubber exports from 1991 to 2020 are categorized into 6 periods. The main export destination countries were analyzed using the STR method. After obtaining the destination country, an analysis of competitiveness and export performance is carried out using the RCA and EPD methods. The results of this study are expected to analyze the level of competitiveness of Indonesian natural rubber in the main export destination markets, so that policy recommendations can be obtained to improve the competitiveness of Indonesian natural rubber.

RESULTS

In this study, the main destination country for Indonesian natural rubber is a country that has consistently been in the top 15 for 30 years as a target for Indonesia's natural rubber exports. The results showed that the countries that are defined as the top 15th country of destination of exports of natural rubber Indonesia are (1) the United States, (2) Japan, (3) the Republic of Korea, (4) Germany, (5) Canada, (6) China, (7) Spain, (8) France, (9) Brazil, (10) Belgium, (11) Singapore, (12) Turkey, (13) Netherlands, (14) Mexico and (15) India. Furthermore, the competitiveness of Indonesia's natural rubber against these 15 countries will be analyzed in 1991-2020, which is divided into six periods. First period 1991-1995, second period 1996-2000, third period 2001-2005, fourth period 2006-2010, fifth period 2011-2015, sixth period 2016-2020. The methods used in this research are RCA, EPD, and X-Model.

Table 1. Cluster analysis of X-Model potential export product

RCA	EPD	X-Model
>1	Rising star	Optimistic market
	Lost opportunity	Potential market
	Falling star	Potential market
	Retreat	Less potential
<1	Rising star	Potential market
	Lost opportunity	Less potential
	Falling star	Less potential

Source: Ministry of Trade (2013)

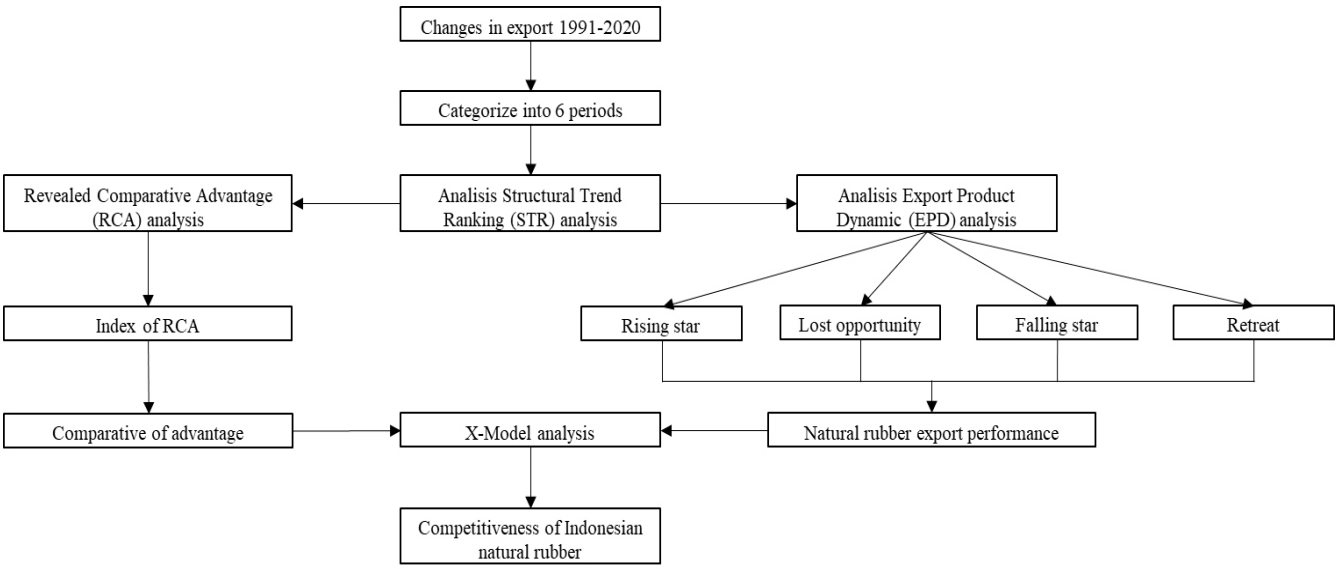

Figure 1. Framework of this research

Based on the average RCA results for period 1 (1991-1995) in Figure 2, Indonesian natural rubber in the main destination countries has strong competitiveness, except for India because Indonesia only exported natural rubber in 1995 with an export value of US$ 745,280. Therefore, if averaged over a period, the RCA value of Indian natural rubber to India is only 0.48. The highest RCA value in this period occurred in Mexico because, in 1995, there was an increase in imports of natural rubber from Indonesia. However, the total imports of all other commodities did not increase. The main market shares of Indonesia's natural rubber, namely the United States, Japan, China, and South Korea, were also very competitive, with an RCA value of more than one. However, the value was still smaller than other importing countries.

Indonesian natural rubber is experiencing dynamic and competitive growth only in Brazil and India. Although the RCA value of Indian natural rubber in India is less than one, based on the results of the EPD analysis, it is in a rising star position. Indonesian natural rubber is experiencing rapid growth in Spain, but its market share is not competitive (Figure 3). Although the RCA value of Indonesian natural rubber in Mexico is the highest, Mexico will no longer import from Indonesia based on the EPD analysis so far, also be seen from the decline in total imports of all other commodities from Indonesia to Mexico. Meanwhile, Indonesia's trade is increasing or competitive in other countries, but not in natural rubber commodities.

Based on the RCA and EPD methods analysis results, it is possible to classify the potential of Indonesian natural rubber in export destination countries using the X-Model method. The grouping is obtained by considering competitiveness (RCA) and market position (EPD) to see whether these commodities have high potential or not in export destination countries. The estimation results of the X-Model analysis show that Indonesia's natural rubber exports in export destination countries are in a potential market position (RCA > 1 and EPD is in the "falling star"), except for Mexico and Belgium, which are in a less market position. potential (RCA > 1 and EPD is at "retreat"). The X-Model Method shows that the Indonesian natural rubber market has optimistic market development potential in Turkey.

Indonesia's natural rubber exports were increased to all export destination countries in period 2 (1996-2000) (Figure 4). In the previous period, Indonesian natural rubber in India had weak competitiveness, and in 1999 Indonesia again did not export natural rubber to India. However, after calculating the average RCA value, it increased by 1.33%. This shows that the average RCA yield of Indonesian natural rubber for period 2 has strong competitiveness in all export destination countries. Mexico and Canada still outperformed the highest RCA values for Indonesian natural rubber. However, the RCA value of Indonesian natural rubber in Japan, China, and Spain decreased, although not significantly.

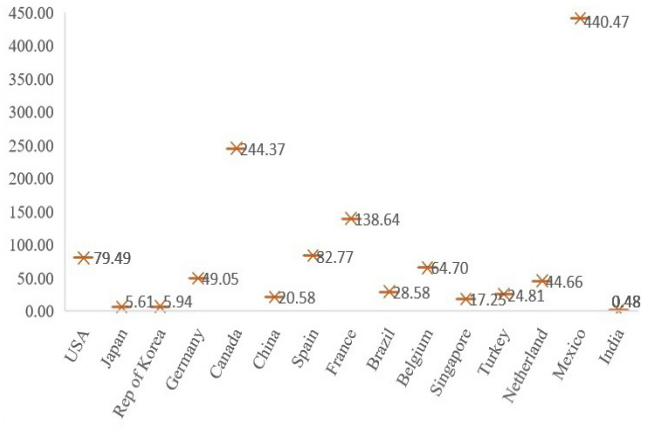

Figure 2. RCA of Indonesia's natural rubber period 1991-1995

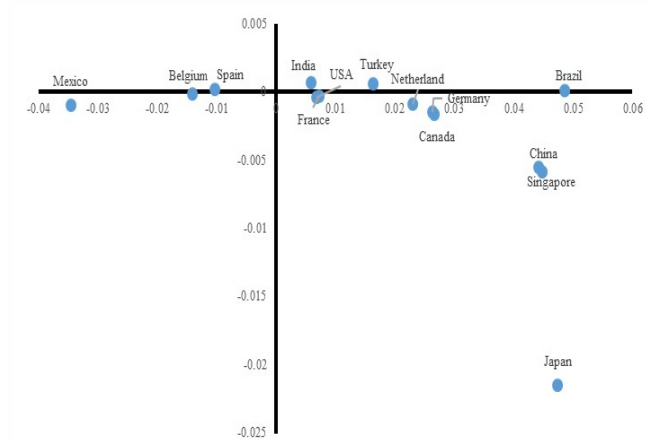

Figure 3. EPD of Indonesia's natural rubber period 1991-1995

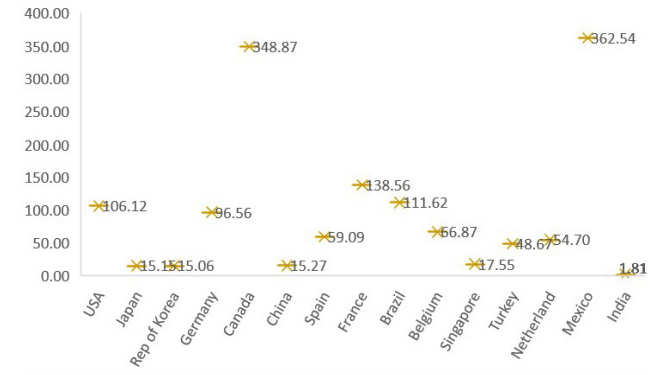

Figure 4. RCA of Indonesia's natural rubber period 1996-2000

Although Japan's RCA value has decreased, the results of the EPD analysis show that Indonesian natural rubber is experiencing dynamic and competitive growth in that country, followed by South Korea (Figure 5). The Belgian market position also experienced a significant increase from the previous period of "retreat" to "rising star" in this period. Indonesia's trade to Brazil increased but not natural rubber. It also happened to Germany, Turkey, and the Netherlands, which was in the same position as Brazil, namely "falling star." The Indonesian market was static and uncompetitive (no longer desirable) in the United States, China, and Spain. Indonesian natural rubber is experiencing rapid growth in Canada, Singapore, Mexico, and India, but its market share is not competitive. Indonesia's natural rubber in this period is in a "lost opportunity" position in these countries.

The estimation results of X-Model analysis for 1996-2000 show that Indonesia's natural rubber exports are in a different market position. The Indonesian natural rubber market has optimistic market development potential in Japan, Korea, and Belgium (RCA > 1 and EPD is at the "rising star." During this period, the potential market position for Indonesian natural rubber is in eight countries, namely Germany, Canada, Brazil, Singapore, Turkey, the Netherlands, Mexico, and India. The most significant market declines occurred in the United States, China, Spain, and France, with "less potential" market positions due to new competitors in the world rubber market. Nature in these countries resulted in decreased natural rubber trading in Indonesia.

From 2001 - to 2005, the United States and Singapore as an importer of Indonesian natural rubber exports to Mexico (Figure 6). There are also competitors of natural rubber in the new world, namely Guatemala. This shows that the RCA value of Indonesian natural rubber to Mexico continues to decline to 100 from the previous period. In contrast to Mexico, there was an increase in the value of RCA in all destination countries for Indonesia's natural rubber exports. This is evidenced in this period by the increase in the value of Indonesia's natural rubber exports to the world every year. In 2001-2005 Indonesia became the world's largest producer and exporter of natural rubber. By the decrease in the results of the RCA method, the EPD analysis also found that in the period 2001-2005, the Indonesian market was very static and uncompetitive (no longer desirable) in Mexico. Mexico, Belgium, Germany, and the Netherlands experienced a significant decline in the

"retreat" position (Figure 7). There was also a decline in Japan, which became the "falling star" position. This shows an increase in Indonesia's trade but not in natural rubber, followed by the United States, Canada, China, Spain, France, and Singapore. In contrast to these countries, Indonesia's natural rubber in Brazil, Turkey, and India experienced dynamic and competitive growth, so it became a "rising star" market position in this period. While the market share is not competitive, Indonesia's natural rubber exports are growing rapidly in the Republic of Korea.

Indonesia's natural rubber exports are in a potential market position in export destination countries such as the United States, Japan, the Republic of Korea, Canada, China, Spain, France, and Singapore. Although the United States and Singapore have become the world's natural rubber exporting countries, this has not changed the position of their natural rubber imports from Indonesia. This is in contrast to Germany, Belgium, the Netherlands, and Mexico, which show "less potential" market positions (RCA > 1 but EPD positions "retreat"). Based on the results of the X-Model method during this period, the potential development of the Indonesian natural rubber market is optimistically located in Brazil and India. This shows that Indonesian natural rubber has succeeded in becoming the country's leading product in this period compared to the previous period.

The value of Indonesia's natural rubber exports in France increased significantly in the 2006-2010 period compared to the previous period (Figure 8). The reason is the decline in France's main natural rubber markets, namely Ivory Coast and Malaysia, due to obstruction of access by importing countries. This supports the RCA value of Indonesian natural rubber in France, which increased by 232% from the previous period and made Indonesia the main importer of their natural rubber. Canada dropped to the second rank in Indonesia's RCA value, but there was an increase compared to the previous period. The RCA value of all export destination countries for Indonesia's natural rubber also experienced a steady increase because Indonesia was also the world's main exporter of natural rubber during this period. However, something different happened in Mexico, which always experienced a decrease in the RCA value of Indonesian natural rubber. This happened because Mexico began to develop a local rubber market in its country.

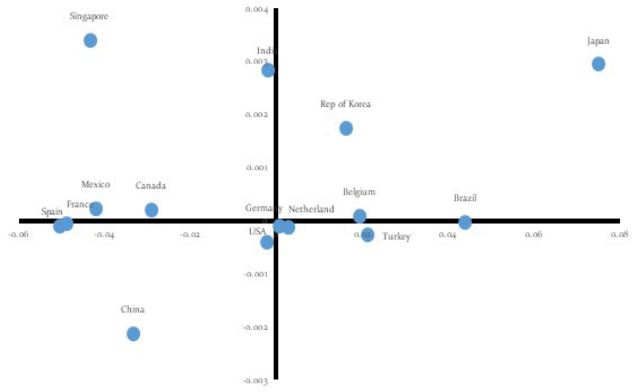

Figure 5. EPD of Indonesia's natural rubber period 1996-2000

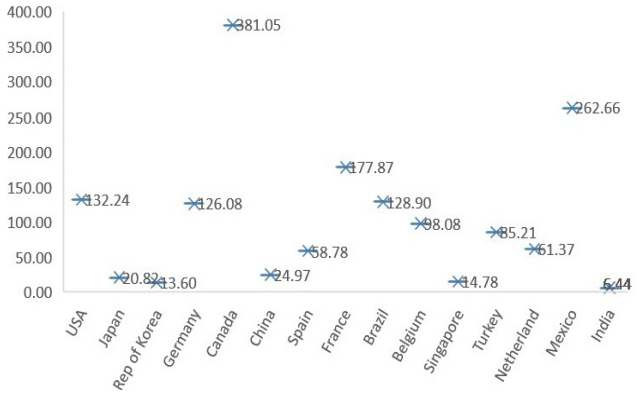

Figure 6. RCA of Indonesia's natural rubber period 2001-2005

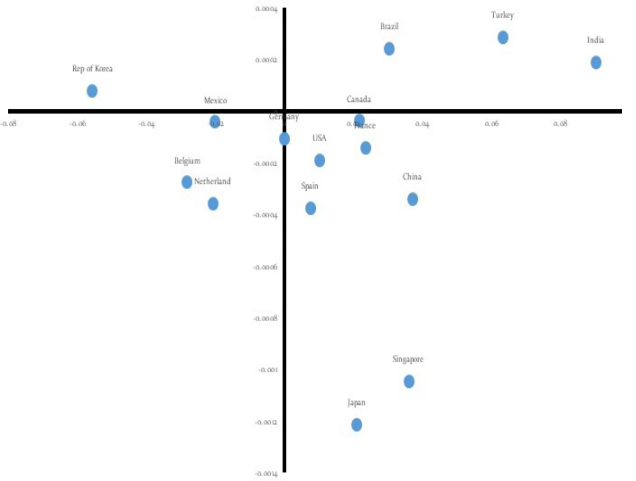

Figure 7. EPD of Indonesia's natural rubber period 2001-2005

In contrast to the RCA results, the EPD analysis states that Indonesian natural rubber is experiencing dynamic and competitive growth. This happened after comparing Indonesia and other rubber-exporting countries to Mexico, and it turned out that Indonesia deserved to be ahead in that period. The same thing happened to Canada so that both countries reached a "rising star" market position in the period 2001-2006 (Figure 9). The United States, Japan, and the Republic of Korea experienced a significant decline compared to the previous period, resulting in the Indonesian market being unwanted in these countries. This was due to decreased total exports of all Indonesian commodities to the United States, Japan, and Korea. Belgium remains in the same position as the previous period, namely "retreat". Although Indonesia's RCA value is highest in France, based on the results of the EPD analysis, it is not natural rubber. This is also the case in China, Spain, Singapore, Turkey, the Netherlands, and India. Germany has improved its market position due to Indonesia's natural rubber exports, but its market share is not competitive. The estimation results of X-Model analysis for the period 2006-2010 show that Indonesia's natural rubber exports have optimistic market developments in Canada and Mexico (RCA > 1 and EPD "rising star"). However, the average value of Indonesia's natural rubber exports was in a potential market position in this period, except for the United States, Japan, the Republic of Korea, and Belgium (RCA > 1 but EPD "retreat" position).

In the period 2011-2015, there was a change in the position of the RCA value (Figure 10). Canada became the country with the highest RCA value. On the other hand, France fell in second place. Followed by Belgium, which experienced a significant increase compared to the previous period. This is because, so far, Indonesia has been a major natural rubber importer. In the previous period, Mexico was in a "rising star" market position, so there was a significant increase in Indonesia's RCA value for the country during that period. Germany experienced a decrease in RCA value because other competitors outperformed Indonesian natural rubber. Besides that, Germany had also started exporting natural rubber to certain countries. The United States, Japan, South Korea, and Brazil continued to experience an increase in the RCA value each year. In contrast, the RCA value in Brazil and Singapore decreased during this period.

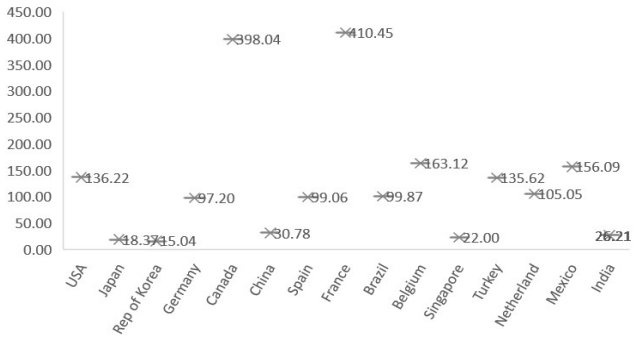

Figure 8. RCA of Indonesia's natural rubber period 2006-2010

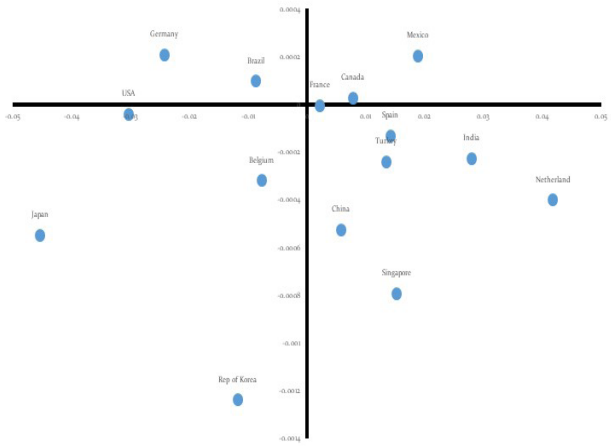

Figure 9. EPD of Indonesia's natural rubber period 2006-2010

Figure 10. RCA of Indonesia's natural rubber period 2011-2015

Based on the results of the EPD analysis for the 2011-2015 period, the position of Indonesian natural rubber in export destination countries is in a static and uncompetitive market (Figure 11). However, many countries experienced an increase in the index in the RCA analysis if Indonesia's natural rubber exports were compared to other competitors and the total exports of all Indonesian commodities. During this period, Indonesia was in a "retreat" position in almost all its markets. Export destination country. There was an increase in Indonesian trade but not in natural rubber in Korea, Germany, France, and Belgium. So it can be concluded that Indonesian natural rubber did not experience dynamic and competitive growth in that period. The results of the X-Model analysis show that Indonesia is in a less potential market position. Starting from the previous period, in 2009, there was a decrease in natural rubber production in rubber-producing countries by 10 percent, not only in Indonesia. This decline was caused by the decline in international rubber prices so that producers switched to planting other crops and the economic crisis in the United States (US) as the world's largest natural rubber importer (Nainggolan and Budyanra, 2020). The declining quality of Indonesian rubber also causes another thing due to lack of maintenance and the increasing number of plants that do not produce because they are old and damaged. In the end, it will affect the productivity of Indonesia's rubber plants (Iskandar, 2018). Syarifa et al. (2016) research show that some rubber farmers have begun to replace old rubber plants with sweet potatoes instead of taking good care of them. This also strengthens the statement that Indonesia's natural rubber quality is declining. Efforts that can be made on Indonesian rubber plants are to pay attention to the replanting of old rubber trees through seed technology and post-harvest technology to obtain good and affordable high-quality rubber seeds, especially for small-scale farmers' plantations (Sembiring and Syaukat, 2021).

Based on the analysis results using the RCA method during the period 2016-2020, the competitiveness of Indonesian natural rubber in each export destination country has a strong comparative advantage and competitiveness (Figure 12). France is again the country with the highest RCA index, followed by Canada and Belgium. Although Indonesia lost to Thailand as the world's main natural rubber exporter in this period, its contribution was still large in the world's main importing countries. The US, Japan, China Rep. Korea, and China became Indonesia's main natural rubber market shares. However, their RCA indexes were lower than France, Canada, and Belgium. Mexico and Singapore experienced significant declines during this period. Mexico has changed from a rubber importer to a world rubber exporter. Meanwhile, Singapore has begun to reduce its domestic rubber processing. It is proven that in 2020 Indonesia only exported US$ 30 to Singapore.

Indonesian natural rubber is experiencing dynamic and competitive growth in the United States, Canada, China, France, Mexico and India (Figure 13). The increase in market position in this period was the impact of the performance of rubber owned by the people who received support from the government through the issuance of a "Phytosanitary Certificate". This will also benefit Indonesia's natural rubber to meet the needs of export destination countries (Agrofarm, 2021).

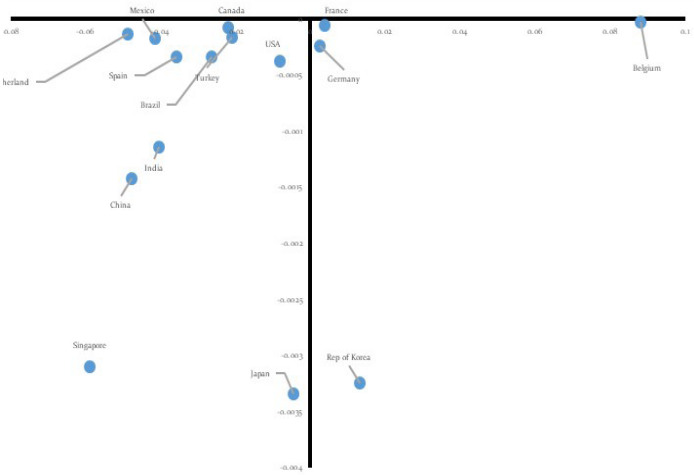

Figure 11. EPD of Indonesia's natural rubber period 2011-2015

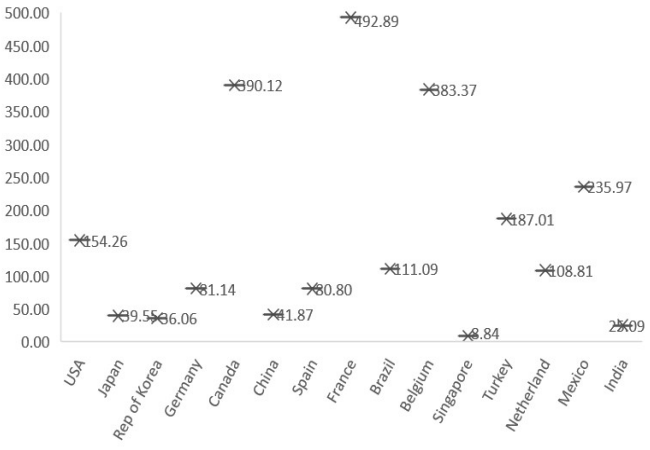

Figure 12. RCA of Indonesia's natural rubber period 2016-2020

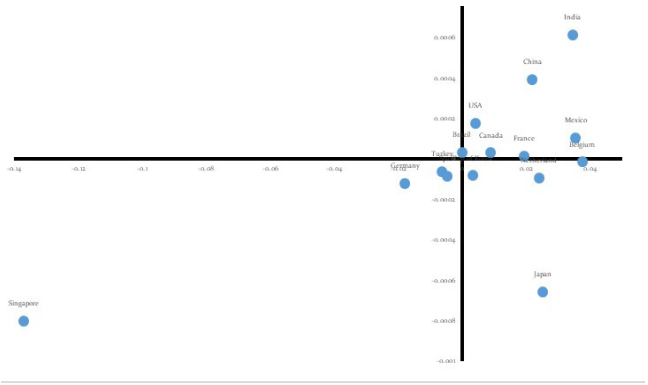

Figure 13. EPD of Indonesia's natural rubber period 2016-2020

The increase in Indonesia's trade also occurred in Japan, the Republic of Korea, Belgium, and the Netherlands, but not in natural rubber commodities. Indonesia is in the "falling star" position. Meanwhile, Indonesia is experiencing dynamic growth but uncompetitive market share in Brazil and Singapore. Germany, Spain, and Turkey are in a "retreat" position, indicating that the Indonesian market is no longer desirable. This is due to a decline in the export performance of Indonesia's natural rubber products in the period 2009 to 2019 (Saryono, 2021). The same problem is the declining quality of Indonesian natural rubber but has not been resolved from the previous period (2011-2015). The replanting technique can be one of the optimization steps for Indonesian natural rubber. The Indonesian natural rubber market is optimistic in "rising star" countries on the EPD method, including the USA, Canada, China, France, Mexico, and India. Potential countries are also a good share category for Indonesia to continue trading natural rubber. During this period, countries including potential markets were Japan, the Republic of Korea, Brazil, Belgium, Singapore, and Turkey. In contrast, Germany and Spain have less potential in this period.

Managerial Implications

The managerial implications of this research have implications for the main national rubber stakeholders, namely the government and exporters. The government must immediately evaluate the performance of Indonesia's rubber exports during the period 1991-2020 to regulate the rubber trading system in the international market. Exporters must be alert to any changes to avoid losing competitiveness with other rubber exporters globally. Priority should be given to improving the quality of Indonesian natural rubber, such as replanting techniques and old rubber trees through seed technology cultivation techniques and postharvest technology to obtain good and affordable high-quality rubber seeds, especially for the small-scale farmer.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the research results, the top 15th main destination country for Indonesian natural rubber is a country for the period 1991-2020 is (1) the USA, (2) Japan, (3) Rep of Korea, (4) Germany, (5) Canada, (6) China, (7) Spain, (8) France, (9) Brazil, (10) Belgium, (11) Singapore, (12) Turkey, (13) Netherland, (14) Mexico, and (15) India. The results of the RCA analysis show that Indonesia'sIndonesia's natural rubber has strong competitiveness in export destination countries except for India in the first period (1991-1995) because Indonesia only exported natural rubber to India in 1995. The high RCA index in destination countries does not always reflect the good position of Indonesian natural rubber in the country. Based on the results of the EPD analysis, Indonesian natural rubber is in the most unwanted "retreat" market position, namely in the fifth period (2011-2015), while the best "rising star" market position is in the sixth period (2016-2020). Based on the RCA and EPD values obtained, this study also conducted an analysis using the X-Model method, which showed that, on average Indonesian natural rubber was in a potential market position in all export destination countries in 1991-2020.

Recommendations

The difference in the position of the Indonesian natural rubber market, which is different in each period, can be a consideration for policymakers to promote the natural rubber trade in other markets in the next period. Efforts to maintain and increase this potential can be made through (1) Attention to replanting techniques and old rubber trees through cultivation techniques of seed technology and postharvest technology to get good and affordable high-quality rubber seeds, especially for smallholder plantations owned by smallholders. Small farmers, and (2) cooperate with other countries by establishing fair regulations. Future research is expected to see the potential of Indonesia'sIndonesia's natural rubber market in the international market.

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