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The Determinants of Cocoa Competitiveness in West Sulawesi Province

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ABSTRACT

This study aims to analyze the export competitiveness of processed cocoa beans from West Sulawesi Province to the Malaysian and Singaporean markets. Two analyses were conducted using the Revealed Comparative Advantage (RCA) and Export Product Dynamic (EPD) methods. The results show that processed cocoa beans from West Sulawesi Province have a strong comparative advantage in the Malaysian market but are less competitive in the Singaporean market. Key success factors include the high quality of processed cocoa beans produced, consistent supply, and supportive international import policies. Additionally, increasing export volume and the quality of raw cocoa beans is crucial to enhance competitiveness in the Singaporean market. This research makes a significant contribution to understanding the potential of processed cocoa beans in West Sulawesi Province, although continuous efforts are needed to maintain and improve competitiveness in the international market. This indicates that the West Sulawesi provincial government can strengthen economic cooperation with Malaysia to increase exports and that the quality of processed cocoa products exported to the Singapore market needs to be improved.

Keywords: Cocoa Competitiveness; Comparative Advantage; Export Competitiveness; International Market; Processed Cocoa Bean Products

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INTRODUCTION

Cocoa (Theobroma cacao L) is one of the plantation crops developed in order to increase the country's foreign exchange resources from the non-oil and gas sector. The cocoa plant is a member of the *genus Theobroma* of the family *Sterculaieeae* which is widely cultivated (Asufre, 2019). The cacao plant has a fruit, the fruit is fermented and made into a powder called chocolate powder. Cocoa is one of the export commodities from the plantation subsector which is a national superior commodity that contributes the third largest foreign exchange after palm oil and rubber (Mahendradatta et al., 2020). Indonesia is ranked third as the world's largest cocoa-producing country. Until 2024, Indonesia's cocoa plantation area is more than 2.3 million ha, Indonesia has cocoa plantation centers spread across several provinces, including Sulawesi Island which is the province that has the highest cocoa plantation area of 1,029 ha, with a production of 368,807 per ton until 2024 compared to other regions (Masitah & Hasbiadi, 2022).

Table 1. Acreage and Total Production of Sulawesi Cocoa Plantations in 2024

No.	Province	People's Plantation/Smallholders	
		Area (ha)	Production (tons)
1	North Sulawesi	21.998	6.324
2	Gorontalo	19.780	4.559
3	Central Sulawesi	375.890	138.345
4	South Sulawesi	311.980	121.501
5	West Sulawesi	299.803	98.078
Total		1.029.451	115.961

Source: Processed from Indonesian Plantation Statistics, Directorate General of Plantation from 2022-2024 (Ditjenbun, 2023)

Based on Table 1, Central Sulawesi Province holds the largest plantation position with an area of 378,890 ha, and production of 138 thousand tons until 2024. While specifically West Sulawesi Province ranks 3rd with an area of 299,803 ha, and 98 thousand tons of total cocoa production in West Sulawesi Province in the 2022-2024 timeframe, the West Sulawesi Provincial Government continues to encourage increased cocoa production from smallholder plantations, this is done as a form of government commitment to the potential of Cocoa which is the mainstay commodity of the region (Central Agency of Statistics of West Sulawesi [BPS Sulawesi Barat], n.d.). The area and total production of cocoa plantations in West Sulawesi Province are shown in Table 2.

Table 2. Area and Total Production of Cocoa Plantations in West Sulawesi Province in 2024

No.	Regency	People's Plantation/Smallholders	
		Area (ha)	Production (tons)
1	Kab. Majene	1.790	6.578
2	Kab. Polewali Mandar	2.107	11.578
3	Kab. Mamasa	198	878
4	Kab. Mamuju	1.980	10.314
5	Kab. Pasangkayu	1.887	8.675
6	Kab. Mamuju Tengah	2.460	13.796

Source: Processed from Indonesian Plantation Statistics, Directorate General of Plantation from 2024 (Ditjenbun, 2023)

The location of cocoa cultivation centers in West Sulawesi is Polewali Mandar Regency, which is one of the largest cocoa producers in West Sulawesi Province, it has a cocoa area of 2,107 ha, this number has increased from the previous year, and total production

of 11,578 tons until 2024, this cocoa production comes from smallholder plantations spread across 14 sub-districts in Polewali Mandar Regency, involving 138.37 farmers NTP (Farmer Exchange Rate) in 2024, up 2.41 percent compared to NTP in 2023 (BPS Sulawesi Barat, n.d.). According to the official website of the Central Agency of Statistics of West Sulawesi (BPS Sulawesi Barat, n.d.), the increase in the West Sulawesi NTP was due to the increase in the Farmer Price Index (It) which was faster than the increase in the Farmer Price Index (Ib). It was recorded to increase by 3.51 percent, while Ib increased by 1.07 percent due to the increase in cocoa commodity prices. Meanwhile, the increase in Ib was caused by an increase in the price of several goods and services from processed cocoa beans that are consumed or used for production costs such as chocolate, plant medicines, and cocoa oil (Ditjenbun, 2023).

According to Ditjenbun (2023), the production of processed cocoa products is a leading commodity because, in addition to making a large contribution to the Gross Regional Domestic Product (GRDP), it also acts as a provider of employment for most of the population. The cocoa crop area in West Sulawesi reached 299,803 hectares with a total production of 115,961 tons in 2022 (Bank Indonesia, 2020). International trade, particularly in the context of the trading system, has the effect of making certain markets such as the cocoa market more competitive (BPS Sulawesi Barat, n.d.). In a competitive environment, countries that have strong comparative and competitive advantages will have a greater capacity to maintain their competitive advantage and even penetrate and dominate the international market (Rojaba & Jalunggono, 2022). Therefore, Indonesia's cocoa exports both in the form of beans and processed products must have increased competitive and comparative competitiveness in order to continue to grow and be able to compete and even become a leader in the international market.

Although West Sulawesi Province has great potential in cocoa production, the development of the cocoa commodity processing industry in this area is still constrained by an unoptimized processing system. To increase the added value and improve the competitiveness of cocoa products, it is necessary to conduct more in-depth research on improving the competitiveness of processed cocoa products, especially processed cocoa bean products. Previous research has shown that Indonesia has a comparative advantage in cocoa butter production (Hasibuan et al., 2012; Samsuddin, 2018). To improve the competitiveness of processed cocoa in West Sulawesi Province, it is necessary to increase export volume, domestic and export prices, and supportive policies, such as the cocoa bean export duty policy. Therefore, this study uses the Revealed Comparative Advantage (RCA) and Export Product Dynamic (EPD) approaches to analyze the competitiveness of processed cocoa products in West Sulawesi Province so that they can access the international market. Multiple Linear Regression to analyze important factors affecting the improvement of competitiveness of processed cocoa products, in order to answer research problems. The importance of analyzing the improvement of competitiveness of processed cocoa products is supported by research conducted by Rahmadona et al. (2023) and Rojaba & Jalunggono (2022) which should focus more on the development of processed product quality and the role of government policy (Harnani et al., 2022). The novelty of this research: First, the development of the model used is more complex than in previous studies; Second, the research approach and problem-solving method adopted in this study uses the RCA and EPD approaches; Third, the testing method and research population.

LITERATURE REVIEW

Cocoa competitiveness is a key element in ensuring the sustainability and economic growth of the agricultural sector, particularly in an increasingly competitive international market (Emelda et al., 2014). Competitiveness describes the ability of a country's cocoa

products to compete on the basis of quality, price, and the ability to meet global market demands. Comparative advantage and competitive advantage are two important concepts in understanding competitiveness, comparative advantage refers to a country's ability to produce cocoa products at a lower cost than other countries (Kasmin & Nursalam, 2019). This is often based on natural factors such as climate, soil fertility, and relatively lower labor costs. A country with a comparative advantage in cocoa production can produce and export the product at a more competitive price, which in turn increases its competitiveness in the international market. Meanwhile, competitive advantage focuses more on aspects that can be developed and improved through innovation, technology, and effective management.

Competitive advantage includes efforts to improve product quality through the use of advanced technology in the production process, post-harvest processing, and product handling (Adiputra et al., 2023). In addition, effective marketing strategies that respond to global market trends also play an important role in building competitive advantage (Kaplinsky, 2004). With a competitive advantage, a country's cocoa products can have added value and differentiation that distinguishes them from competing products, thereby attracting consumer interest and gaining a strong position in the international market. In this context, increasing the competitiveness of cocoa products requires a synergy between government policies, technological innovation, and the active participation of farmers and cocoa industry players. Government support in the form of subsidies, training, and access to global market information can help improve farmers' ability to produce high-quality cocoa products. On the other hand, industry players must continue to innovate in production and marketing processes to ensure that their cocoa products remain superior and in demand by international consumers.

RESEARCH METHOD

Analysis of the competitiveness of cocoa commodities in West Sulawesi Province (processed cocoa beans) to access the International Market was analyzed using RCA to analyze Comparative advantage and EPD to analyze Competitive advantage. The following is the formula for comparative advantage using the RCA method (Balassa, 1965):

$$RCA = \frac{XijX \times j}{XiwX \times w} \quad (1)$$

Information:
RCA : Revealed Comparative Advantage number (Index)
X*j : Total export value of Country j (USD $)
Xiw : World export value of commodity i (USD $)
X*w : World total export value (USD $)

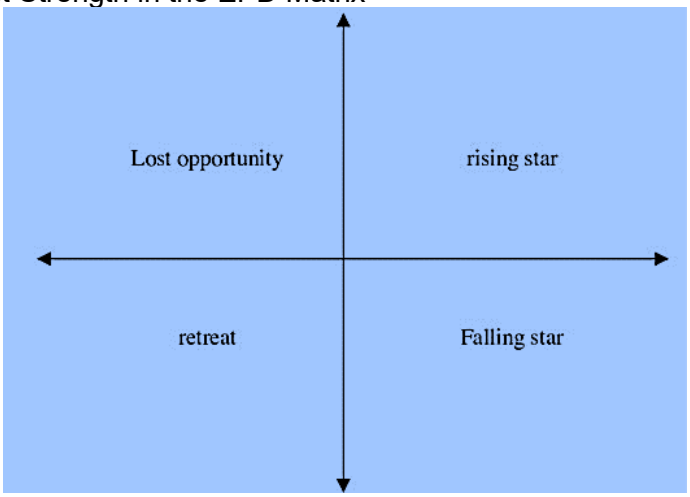
The RCA assessment is as follows: (1) RCA value > 1, then processed cocoa products in West Sulawesi Province have a comparative advantage above the world average so that West Sulawesi cocoa commodities have strong competitiveness; (2) RCA value < 1, then processed cocoa products in West Sulawesi Province have a comparative advantage below the world average so the West Sulawesi cocoa commodity has weak competitiveness.

The competitive advantage of cocoa commodities in West Sulawesi Province was analyzed using the EPD method. The EPD method is an analytical tool used to identify and evaluate the competitive position of an export product in the international market, as described by Mayer et al. (2003). By using this method, we can gain insights into whether

a product shows high growth potential, remains stable, or is experiencing a decline in its competitiveness. Two key components are central to this analysis: product market share and export market share. Product market share refers to the proportion of a product's total global exports that originate from a particular country, while export market share measures the proportion of a country's total exports that come from a specific product. These indicators help assess how well the cocoa commodity from West Sulawesi performs relative to global competition and within the broader scope of the country's export activities.

These two variables are then plotted in a matrix divided into four quadrants, as follows in Figure 1.

Figure 1. Product Strength in the EPD Matrix



The position in the quadrant describes the business strength (X-axis) and market attractiveness (Y-axis) of the product formulated as follows (Abdullah & Pusat Pendidikan dan Studi Kebanksentralan, Bank Indonesia, 2002):

X-axis

$$\Sigma(\boldsymbol{XijWij})\boldsymbol{t\ nt} = \mathbf{1x\ 100}\ \% - \Sigma(\boldsymbol{XijWij})\boldsymbol{t-1\ nt}=\mathbf{1x\ 100}\ \%\ \boldsymbol{T}$$

Y-axis:

$$\mathrm{Y}\ \Sigma(\boldsymbol{XtWt})\boldsymbol{t\ nt}=\mathbf{1x\ 100}\ \% - \Sigma(\boldsymbol{XtWt})\boldsymbol{t-1\ nt}=\mathbf{1x\ 100}\ \%\ \boldsymbol{T}$$

Information:
Xij = Export value of Cocoa Products of West Sulawesi Province to Malaysia and Singapore Market
Xt = Total export value of Cocoa commodity of West Sulawesi Province to Malaysia and Singapore Market
Wij = World export value of processed cocoa beans (cocoa products) to Malaysia and Singapore Market
Wt = Total world export value to Malaysia and Singapore Market
T = Number of years studied

There are four quadrants of competitive advantage indicators, namely Quadrant 1 refers to the growth of commodity market share and total market share of the country in world trade, which shows that the country's export share in the world market is increasing; Quadrant 2 shows that the commodity market share is declining while the total market share of the country has experienced growth in world trade; Quadrant 3 shows that there

is an increase in the commodity market share, but a decrease in its total market share in world trade, it is said that the country is able to utilize the market well, its market share is increasing although not its total market share in the world market; Quadrant 4 shows low product market share and export market share, this commodity is less competitive and needs to be considered for abandonment or restructuring.

Quadrant Interpretation

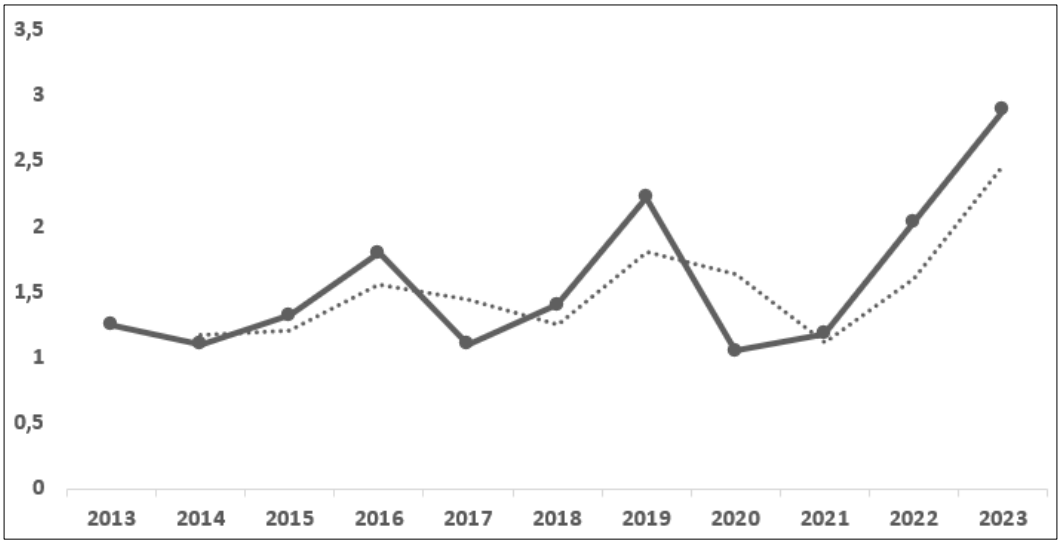
Cocoa-processed products in West Sulawesi Province fall into four distinct quadrants based on their market and export performance. Quadrant I, or the "Rising Star," represents cocoa-processed products with both a high product market share and a high export market share. These products demonstrate excellent growth potential and are considered superior commodities with the capacity to dominate both local and international markets. Quadrant II, referred to as the "Question Mark," includes cocoa products with a high product market share but a low export market share. While these products show strong potential, strategic efforts are needed to expand their presence in the export market, enabling them to capitalize on their domestic success and enhance their global competitiveness.

Quadrant III, known as the "Cash Cow," consists of processed cocoa products that hold a high export market share but a low product market share. These products are well-established in the export market and generate steady returns, although their growth has become relatively stagnant. Lastly, Quadrant IV, or the "Dog," includes processed cocoa products with both low product market share and low export market share. These products are less competitive in both markets, requiring significant restructuring or even potential discontinuation if improvements cannot be achieved. Each quadrant highlights the need for targeted strategies to optimize the performance and sustainability of cocoa-processed products in West Sulawesi Province.

Factors affecting the competitiveness of processed cocoa products of West Sulawesi Province in the Malaysian Market and Singapore Market using multiple linear regression with IBM SPSS Statistics 29. Also, the Classical Assumption Test used is the heteroscedasticity test (significance greater than 0. 05), multicollinearity test (VIF>10, and tolerance value <0.10), normality test with significant Kolmogorov-Smirnov value (p>0.05), autocorrelation test using Run Test with Asymp.Sig (2-tailed) value greater than 0.05 significance level (Ghozali, 2018). Hypothesis testing uses the F test (F count> Ftable) and t-test (significant value <0.05) to see all independent variables simultaneously and significantly affect the dependent variable (Ghozali, 2018).

RESULTS

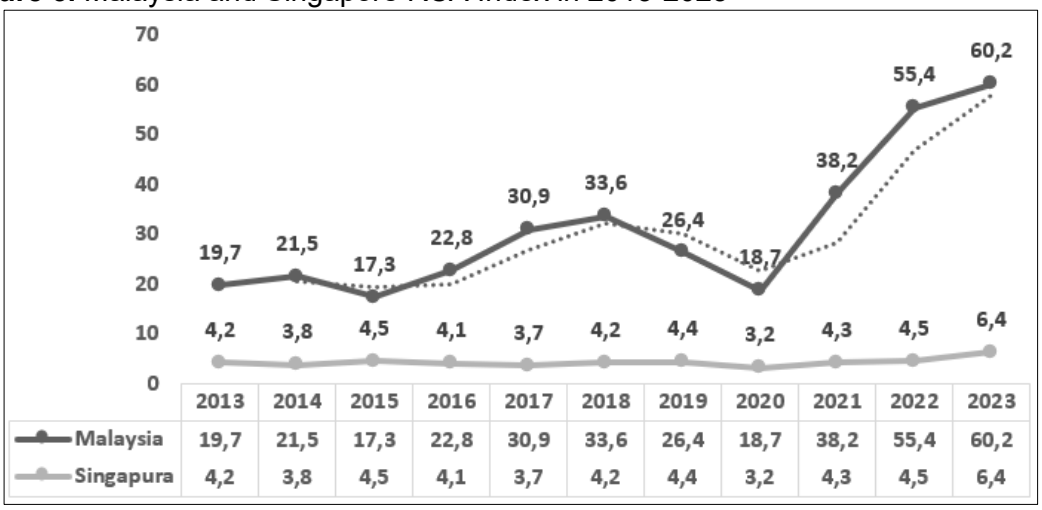
Figure 2. Indonesia's RCA Index in 2013-2023



Source: Data processed, 2024

Indonesia has a high competitive advantage and has an ideal market position where trade in the product is experiencing additional market share that is growing rapidly (Zikria et al., 2019). The first analysis uses the RCA index, this index shows that until 2013 Indonesia had a comparative advantage in producing cocoa beans, but after that, it increased by 2.22 in 2019 with a comparative advantage indicated by an RCA value of more than 1 (Figure 2). The highest value was reached in 2023 with an RCA index of 2.89, while in 2020 it dropped significantly to 1.01 due to the COVID-19 pandemic which resulted in a significant decrease in cocoa bean exports. During 2013-2024, the average RCA index was 1.57. The comparative advantage of Indonesian cocoa bean exports is measured using RCA. If the RCA value is > 1, it indicates that cocoa bean exports have a comparative advantage above the (world) average or are strongly competitive.

Figure 3. Malaysia and Singapore RCA Index in 2013-2023



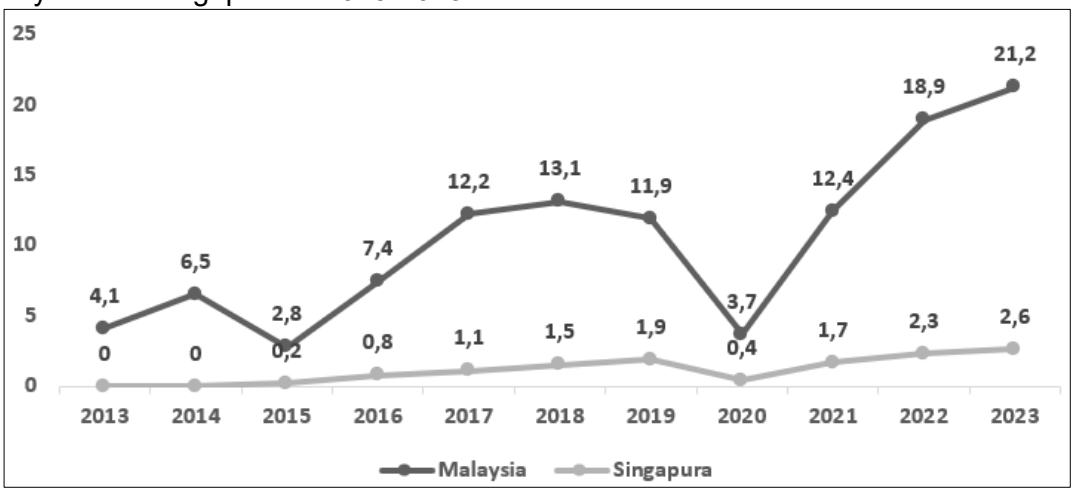
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Malaysia	19,7	21,5	17,3	22,8	30,9	33,6	26,4	18,7	38,2	55,4	60,2
Singapura	4,2	3,8	4,5	4,1	3,7	4,2	4,4	3,2	4,3	4,5	6,4

Source: Data processed (2024)

Competitiveness can be measured by market share, and increasing market share means increasing competitiveness. Cocoa products have different market structures, with Indonesian cocoa products generally tending towards perfectly competitive markets and other cocoa products tending towards Malaysia and Singapore. Compared to Malaysia, Singapore's RCA is much lower. Over the period 2013-2023, Malaysia's average RCA value was 31.4 and Singapore's was only 4.3 (Figure 3). The high RCA for these two

countries is mainly due to the fact that cocoa beans are a major export commodity in Indonesia. For Malaysia, the contribution of cocoa bean exports to the total RCA value in 2023 was 60.5 on average over the period 2013-2023, while for Singapore it was only 6.4 in 2023. Meanwhile, the contribution of cocoa beans to Indonesia's total exports averaged 89.98% for the Malaysian market and 10.02% for the Singapore market over the same period (Feni et al., 2022). This indicates that most of Indonesia's cocoa bean exports during this period were directed to Malaysia.

Figure 4. Competitiveness (RCA) of the Processed Cocoa Beans on the Markets of Malaysia and Singapore in 2013-2023



Source: Data processed (2024)

Figure 4 shows that the RCA value of processed cocoa beans from West Sulawesi Province to the Malaysian market is greater than one, with an average RCA value of 10.3 from 2013 to 2023. This means that West Sulawesi Province has a comparative advantage and processed cocoa beans from West Sulawesi are highly competitive in the Malaysian market. Meanwhile, the Singapore market has an average RCA value of more than 1.13 in the same period, indicating that the competitiveness of West Sulawesi processed cocoa beans is above the world average, meaning that West Sulawesi processed cocoa beans are also highly competitive in the Singapore market. The RCA value of the Malaysian and Singaporean markets is higher than the RCA value of West Sulawesi due to the good quality of processed cocoa beans produced, sustainability of supply, and international policies that provide convenience to importing countries. However, the province of West Sulawesi still has to compete with other countries in Southeast Asia, particularly the Philippines and Vietnam. The Philippines has an annual cocoa production of around 10,000 tons, mainly from the islands of Mindanao and Luzon, while Vietnam produces around 6,000 tons, mainly from the Mekong Delta region (Adam, 2022). By improving the quality of processed cocoa beans from several areas in West Sulawesi that have melting point advantages. The high RCA value of cocoa raw materials means that the processed cocoa beans produced are not easily melted compared to processed cocoa beans from other Southeast Asian countries. As a result, processed cocoa beans from West Sulawesi are still preferred by importing countries such as Malaysia and Singapore. The results of this study are in line with the study by Putri et al. (2023), which states that the RCA value shows that Indonesia's competitiveness is strong for cocoa butter, cocoa butter, and cocoa butter commodities.

Table 3. EPD Results

Export Destination Markets for Processed Cocoa Beans	Position Value (X, Y)		Position Categories
	X	Y	

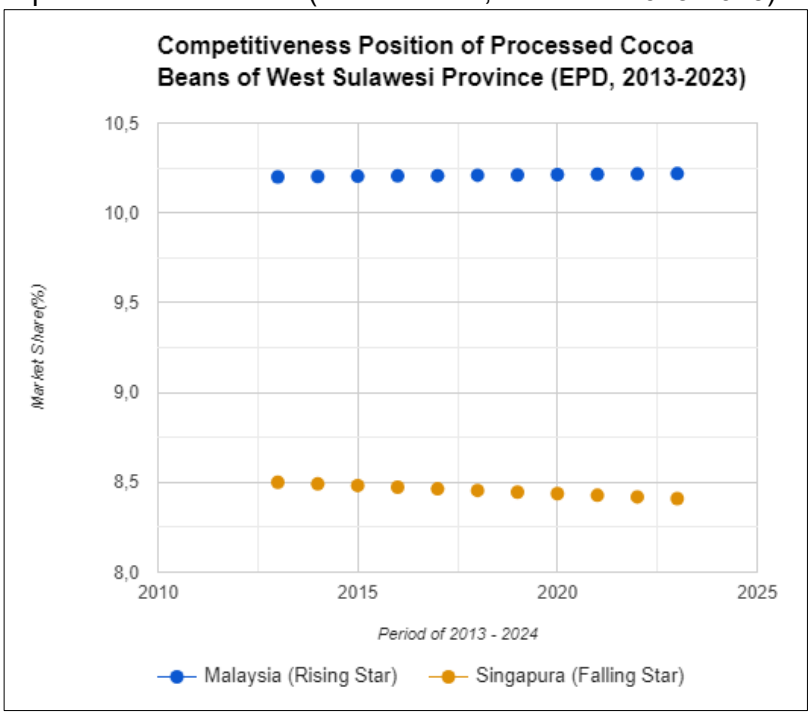
EPD to Malaysian Market	West Sulawesi cocoa beans - Malaysian market	0.000178772	9.74266E-05
EPD to Singapore Market	West Sulawesi cocoa beans - Singapore market	-0.00106501	9.31789E-05

Source: Data processed (2024)

The second analysis uses the EPD approach, the EPD method is used in this research to analyze and identify the competitive position of an export product in the international market. The analysis of the competitive advantage of cocoa commodities is shown in Table 3 which is used in calculating the competitive analysis obtained if the company implements value-creation strategies that are not simultaneous with the strategies implemented by existing or potential competitors (Mayer et al., 2003). The competitive advantage of processed cocoa beans from West Sulawesi Province to the Malaysian Market and Singapore Markets using the EPD method. This approach identifies four quadrants that represent the market share position of processed cocoa (cocoa butter). Quadrant I (Rising Star), Quadrant II (Lost Opportunity), Quadrant III (Retreat), Quadrant IV (Falling Star).

Table 3 shows that the EPD position value of processed cocoa beans in West Sulawesi Province for the Malaysian market is positive in the X and Y positions, placing it in Quadrant I, namely Rising Star. This means that processed cocoa beans in West Sulawesi Province have a high product market share and export market share. This indicates that the product has excellent growth potential and is a superior product. The EPD value of processed cocoa beans in West Sulawesi Province for the Singapore market is negative at positions X and Y, placing it in Quadrant IV, namely Falling Star. This means that processed cocoa beans in West Sulawesi Province with market share and exports are in the low category. These processed cocoa beans are less competitive and need to be considered for abandonment or restructuring.

Figure 5. Competitiveness Position (EPD Results, Period of 2013-2023)



Source: Data processed (2024)

Figure 5 demonstrates the competitive advantage of processed cocoa products from West Sulawesi Province in the Malaysian market, positioned in quadrant I or 'rising star.' This indicates a positive export market share and product value, signifying competitiveness. Additionally, processed cocoa products from West Sulawesi Province in the Malaysian market are dynamic, exhibiting a faster growth rate in market share compared to the average of all cocoa commodity products. Conversely, the competitive advantage in the Singaporean market is positioned in quadrant IV or 'falling star.' In this quadrant, processed cocoa products are less competitively advantaged and are not considered dynamic. While the export market share growth is positive, the product market share is negative. The results of this study are in accordance with research by Adha et al. (2023) which states that Indonesia has a high competitive advantage for processed cocoa beans, in the form of chocolate and butter products.

DISCUSSION

The results indicate that processed cocoa bean products from West Sulawesi Province exhibit dynamic characteristics, particularly in terms of price elasticity of supply and market share growth. These findings suggest that the supply of processed cocoa beans is not sensitive to price changes. Consequently, increasing export revenue requires boosting export volume rather than reducing domestic prices. In terms of competition with other countries, West Sulawesi Province's processed cocoa beans show a complementary relationship with the Malaysian market, as evidenced by the high RCA index for Malaysia. This advantage stems from the good quality of processed cocoa beans, a consistent supply, and international policies that facilitate imports. This complementary relationship has been reflected in the continuous export of processed cocoa beans from West Sulawesi to Malaysia from 2013 to 2023, suggesting that a growing demand in the Malaysian market would yield greater benefits compared to other countries.

Conversely, most of West Sulawesi Province's cocoa bean exports to Singapore remain in raw (unfermented) form. These raw cocoa beans are often of suboptimal quality due to imperfections in the drying process, which negatively impact the quality of processed products manufactured in Singapore. This ultimately affects the volume and selling prices of these products in the international market. Data analysis highlights that the export performance of processed cocoa beans from West Sulawesi Province to Singapore remains low, signaling quality-related issues that must be addressed urgently. Constraints in technical aspects, such as cocoa bean quality, processing methods, and overall product standards, need immediate improvement. Previous studies have shown that product quality and processing standards significantly influence the competitive advantage of commodities (Adha et al., 2023; Fahmid et al., 2018; Rahmi & Rufaidah, 2018). Hariyati and Daqianus (2023) further emphasize that factors such as good product quality, consistent supply, and favorable international policies significantly shape export activities.

The findings reveal that cocoa products from West Sulawesi demonstrate a competitive advantage in the Malaysian market compared to Singapore. This suggests that the West Sulawesi provincial government could focus on strengthening economic cooperation with Malaysia to further boost exports of processed cocoa products. To enhance competitiveness in the Singapore market, efforts should be directed toward improving the quality of exported products. This can be achieved by addressing the drying process, enhancing processing quality, and providing technical training to farmers and business actors involved in cocoa production. These measures are critical for meeting the quality standards required for international markets.

Theoretically, this study reinforces the export base theory, which highlights the importance of product quality and selling price in determining the export performance of a region's commodities. The results also underscore that product quality significantly influences both volume and selling price in the international market. Future research could explore additional factors affecting the export performance of processed cocoa products, such as production costs, trade policies, and consumer preferences. These insights would provide a more comprehensive understanding of the strategies needed to enhance the competitiveness of cocoa exports from West Sulawesi Province.

CONCLUSION

This study demonstrates that West Sulawesi Province possesses a competitive advantage in the production of cocoa beans and its processed products, particularly for the Malaysian market. This is evidenced by the high RCA values for both commodities. The EPD analysis further reveals that processed cocoa products from West Sulawesi have high potential (Rising Star) in the Malaysian market, but are less competitive (Falling Star) in the Singaporean market. Key success factors include high-quality cocoa beans, consistent supply, and supportive international import policies. However, there is a need to enhance the quality of raw cocoa beans to boost competitiveness in the Singaporean market.

Additionally, increasing the export volume of processed cocoa products is crucial for revenue growth. Overall, this study presents a positive outlook on the potential of the cocoa industry in West Sulawesi Province, although sustained efforts are required to maintain and enhance its competitiveness in the international market.

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DECLARATION OF CONFLICTING INTERESTS
The authors declared no potential conflicts of interest.

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