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Export Performance and Competitiveness Analysis of Indonesian Crab Products in the ASEAN Market

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ABSTRACT

One of the primary export fishing products from Indonesia is crab. Since the ASEAN nations of Singapore and Malaysia have the same potential of the US and Japan, several crab businesses have established export destination markets there. The goal of this study was to assess the Indonesian competitiveness relative to other countries exports of crabs in the markets of Singapore and Malaysia from 2017 to 2021 to improve strategies for boosting Indonesian crabs' competitiveness in the international market, particularly in Singapore and Malaysia. The revealed comparative advantage (RCA) index with time-series data from 2017 to 2021 and the diamond Porter model (DPM) approach were the analytical methods used in this study. Three different varieties of crab from Indonesia are shipped to Singapore and Malaysia. According to RCA estimations, two out of every three Indonesian crabs have high competitiveness, but they still need to be enhanced in light of the intense competition. According to the DPM research, the strategy, structure, and competition of the Indonesian crab business still need improvement. Other elements, particularly those related to circumstances, government, and opportunities are also important. To achieve a favorable effect on the Indonesian economy and foster a more wealthy society, the competitiveness of Indonesian crab items should rise.

INTRODUCTION

As a maritime country, Indonesia has an extensive sea area. Fishery resources are a priority sector for national economic development because they have enormous potential. This can be seen in the period from 2015 to 2020. It was noted that the volume of Indonesian fishery exports increased by 16.33% **(MMAF, 2016; MMAF, 2021)**. During this period, the consumption of world fishery products experienced a significant increase. **Yusuf *et al.* (2018)** and **Luhur *et al.* (2019)** stated that, these conditions will indirectly and positively impact the demand for the Indonesian fishery products in the global market. Various fishery products are demanded in the global market, including shrimp, tuna, skipjack and crab, with a product export value of 5.20 billion US$ **(MMAF, 2021)**.

Crabs are commonly found offshore along the Indo-Pacific seas **(Germano *et al.*, 2006)**. In Indonesia, crab is one of the priority export commodities and has received a

reasonably good sustainability management rating from Seafood Watch **(Prince *et al.*, 2020)**. Crabs are widely distributed along the west coast of Sumatra, the north and south coasts of Java, the eastern part of Kalimantan, the southern part of Sulawesi to the western part of Papua **(La Sara *et al.*, 2016)**. In Indonesia, the demand for crabs is yearly increasing, with relatively high prices **(Hisam *et al.*, 2018)**. In addition, during the Covid-19 pandemic, there were disruptions in the crab supply chain in several locations in Indonesia. Local collectors do not accommodate fishermen's catches, and exporters do not provide local collectors, so the crab supply chain is currently working to form a network independently **(Salam *et al.*, 2021)**.

For the Indonesia's crab export performance to rise and return to a positive trend, it is vital to develop markets for potential countries and increase the production of products that have added value. The Indonesian government under the Ministry of Maritime Affairs and Fisheries (MMAF) Research and Human Resources Agency has issued various policies related to crab marketing patterns, one of which is to increase the market reach of crab products **(Sari *et al.*, 2020)**. **Yusuf *et al.* (2021)** reported that a more comprehensive and integrated business, such as market diversification to the ASEAN region is up-and-coming and has good economic opportunities after the Covid-19 pandemic. Economic integration in the ASEAN region will make it much easier to market Indonesian crab products. In its latest data release, **UN Comtrade (2021)** confirmed that there was a shift in the market objectives of the Indonesian fishery products from the United States and Europe markets to countries in ASEAN such as Singapore and Malaysia **(Apridar, 2014; Yusuf *et al*., 2021)**.

Competitive countries dominate free trade in global markets **(Peneder & Streicher, 2018)**. Countries with a high level of competitiveness will dominate the market and have the ability to survive against good competitors. Export market competition will continue to increase and become more competitive. This cannot be separated from each country producing the same product with equivalent quality, so a competitiveness analysis is vital to determine the position of the Indonesian crab exports, especially in the ASEAN market.

Research on the competitive position of Indonesian crab products in the ASEAN market, especially in Singapore and Malaysia, has never been reported. This research is fundamental, considering that crab is the main export commodity of Indonesian fishery products. Singapore and Malaysia are ASEAN countries with a very potential fishery market. Based on UN data **(Comtrade, 2021)**, in the last 5 years, Singapore and Malaysia have been two countries that import crab products with high export values of 50 million and 31 million US$, respectively, compared to the United States representing America (17 million US$), Japan representing Asia (1 million US$), and the European Union (5 million US$). In addition, Singapore and Malaysia are geographically close to Indonesia, making it more cost-effective. Thus, this study aimed to determine the competitive position of Indonesian crab commodities in the Singapore and Malaysia

markets using revealed comparative advantage (RCA) and diamond porter model (DPM) analysis.

MATERIALS AND METHODS

1. Data collection

This study uses quantitative data from the United Nations Commodity Trade Exports of the Indonesian crab products to the Singapore and Malaysia markets from 2017 to 2021.

2. Revealed comparative advantage (RCA)

The data obtained are then processed and analyzed based on supporting theories to draw conclusions. The principle of the RCA method is to measure the export performance of a country's commodity by evaluating the role of that commodity's exports, which shows the comparison between a country's commodity market share in the global market and the country's total exports. The value of RCA > 1 indicates that this commodity has a comparative advantage over the average commodity on a world scale. However, if RCA< 1, then the commodity has a low comparative advantage. The higher the RCA value of a commodity, the higher its comparative advantage. The RCA value can be found using the following formula:

RCA=(Xij/Xit)/(Xnj/Xnt)

Where,

RCA - a comparative competitiveness index;

Xij - export value of crab commodity from country j;

Xit - total export value of all commodities of country j;

Xnj - the export value of crab commodities from the world, and

Xnt - total export value of all commodities.

3. Diamond porter model (DPM)

The level of competitiveness is influenced by the factors that make up the daytime power, which can be identified descriptively based on primary and secondary sources using the DPM approach. **Porter (1990)** introduced the theory of a country's competitive ability to win the market competition by involving 4 main mutually reinforcing aspects; namely, (1) factor conditions, (2) demand conditions, (3) related and supporting industries, and (4) strategy, structure, and competition of the company, as shown in Fig. (1).

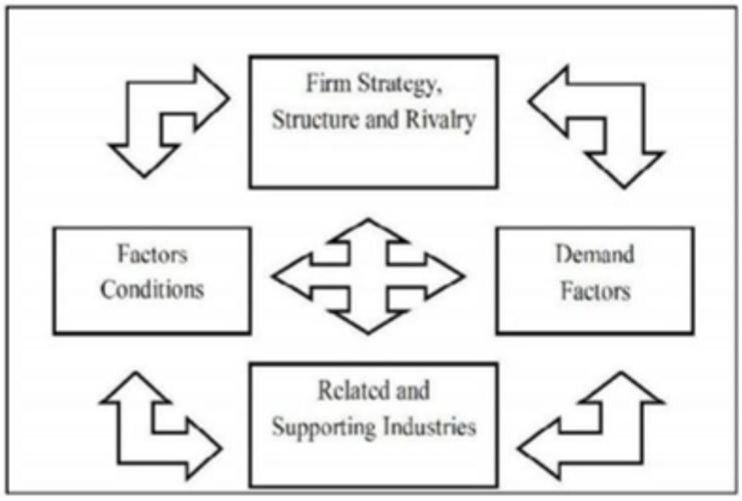

Fig. 1. Diamond porter model **(Porter, 1990)**

In addition to the 4 factors above, it also involves supporting components: (5) government factors and opportunities. This model will produce a structure that will determine the rules of competition, and all sectors play an important role in long-term competition **(Sun *et al.* 2010)**.

RESULTS

1. Export values

The growth of Indonesian crab exports to the Singapore and Malaysia markets experienced significant fluctuations. During the 2017-2021 period, Indonesia exported various blue swimming crab products with coding based on the harmonized system (HS), including HS 030614 (cooked crab by boiling water), HS 030633 (live crab), and HS 030693 (smoked crab), with the values shown in Table (1).

Total export of crabs concerning these three products during the last 5 years to Singapore and Malaysia has reached a value of 60 million US$, with details of 29 million US$ to the Singapore market, which has an annual value of 5.9 million US$, and 31 million US$ to the Malaysian market, with an annual value of 6.2 million US$.

Table 1. Export commodities of crab by country of destination, 2017-2021

Year	Value (US$)					
	Singapore			Malaysia		
	HS 030614	HS 030633	HS 030693	HS 030614	HS 030633	HS 030693
2017	472.126	5.082.098	1.211.876	596.273	4.612.478	324.532
2018	461.585	5.084.175	634.613	1.054.495	6.645.245	108.730
2019	1.115.149	5.395.147	30.560	742.550	7.547.672	6.460
2020	409.146	5.225.874	-	1.254.269	4.894.315	46.375
2021	389.138	4.226.843	-	1.642.758	1.686.067	48.221

2. Market share

Market share of Indonesian crab products in Singapore has yet to be optimal, with only controlling less than 20% of the market, especially for HS 030614 and HS 030633 products. When compared to the market leader, namely India, which managed to dominate the market share of these two products, respectively, 59.97 and 42.02%. Very tight competition causes product quality to be a determinant in addition to the currency exchange rate, affecting the price of crabs in the destination market. Data regarding the market share of the Indonesian crab products in the 2017-2021 period in Singapore and Malaysia can be seen in Fig. (2).

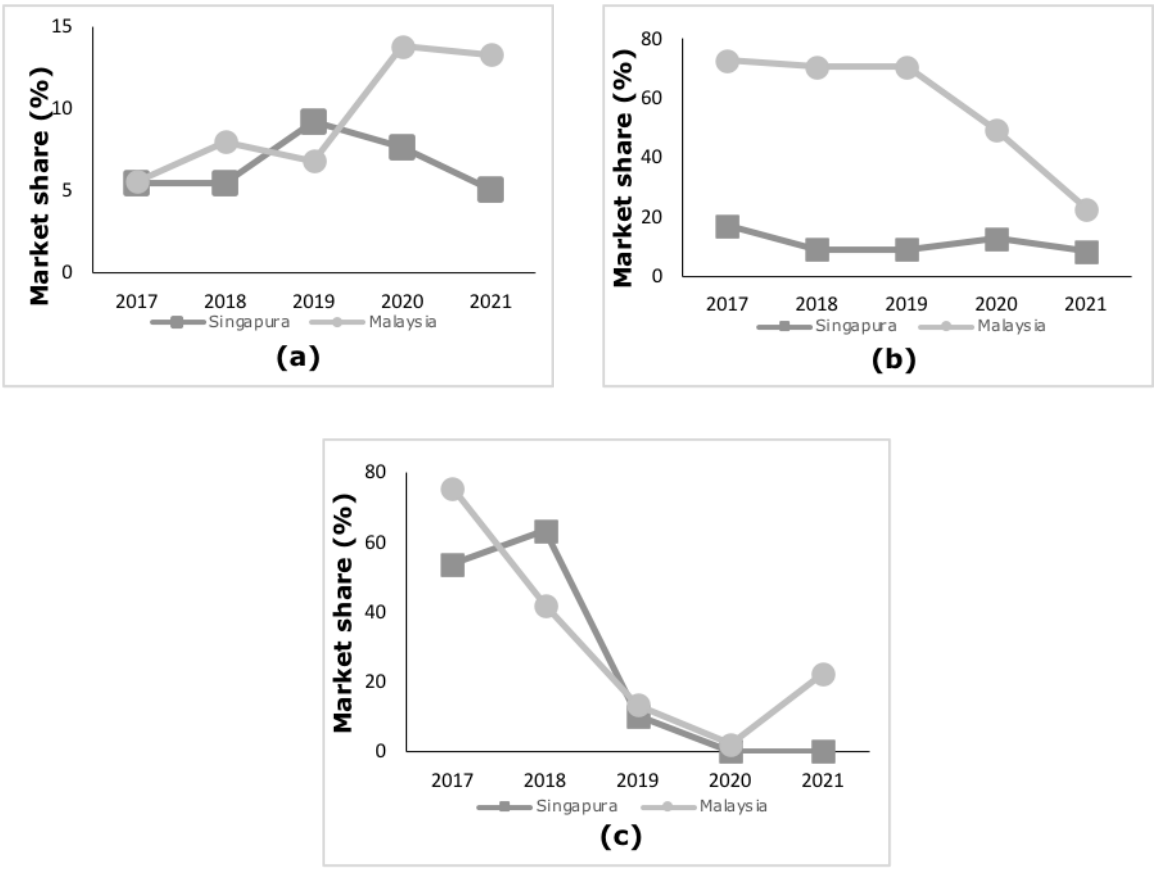

Fig. 2. Market share of Indonesian crab products in Singapore and Malaysia, (a) HS 030614, (b) HS 030633, (c) HS 030693.

3. RCA value

Export performance of Indonesian crab in the Singapore and Malaysia markets is seen on a comparative value basis. RCA analysis will produce a comparative value of a commodity whether it has a comparative advantage with a value of RCA>1 or not with a value of RCA<1. In this study, RCA analysis was carried out on 3 Indonesian crab products exported to the Singapore and Malaysia markets from 2017-2021; namely, HS 030614, HS 030633 and HS 030693.

Table 2. RCA value in the Singaporean and Malaysian markets

Year	Product code					
	Singapore			Malaysia		
	HS 030614	HS 030633	HS 030693	HS 030614	HS 030633	HS 030693
2017	0,35	3.,45	5,37	3,63	15,64	5,39
2018	0,53	3,60	9,52	1,51	11,77	8,12
2019	0,41	5,66	4,75	1,23	9,61	4,31
2020	0,88	4,89	-	1,56	6,05	0,25
2021	0,55	2,29	-	1,12	3,01	3,75
Average	0,55	3,98	6,54	1,81	9,21	4,36

RCA value in Malaysia is higher because the selling price of the three products in the Malaysian market is higher than in the Singaporean market. The price offered is higher and the export value is higher. Increasing the value of exports would increase the comparative advantage of these commodities **(Khasanah *et al.*, 2019)**.

DISCUSSION

HS 030633 is the type of product most widely exported to Singapore and Malaysia, with a value reaching 82.69% of the total volume, while HS 030693 crab products recorded the lowest export volume (3.95%). Fluctuations in the value and volume of exports are influenced by several aspects, such as the size of market demand and import policies from destination countries, domestic production, selling prices and product quality from competitors.

Market share of Indonesian crab products in Singapore only controlling less than 20% of the market. Meanwhile, India, in this case, dominating Singapore's market needs above 33%, especially for HS 030633 crab products, with an export value of 19 million US$. The market share of HS 030633 is expected to be increased because in terms of price, Indonesia can compete with a selling price of 74.16% lower than India. While, the HS 030693 crab product, which initially controlled up to 60% market share, has experienced a decline. This is due to the decline in Singapore's import demand, which has started a policy of reducing imports of processed products (including HS 030693) in the last few years **(Tan *et al.*, 2020)**. Therefore, the trend of the market dominance of the Indonesian crab products in the Singapore market tends to be stable. However, different things can be seen in Malaysia's Indonesian crab market dominance trend, which tends to decrease (HS 030633 and HS 030693). It was reported that, only HS 030614 crab products had a positive market domination trend. The decline in market share in Malaysia is associated with the Malaysian government's policy of optimizing domestic products.

This is indicated by the export value of the Malaysian crab products in 2021 increasing by 94.64% from the previous years.

The RCA value of the three Indonesian crab products in the Malaysian market (Table 2) is > 1 (1.81-9.21), which indicates that crab products have a comparative advantage in the Malaysian market. Crab products with HS code 030693 need special attention. In 2017-2108, Indonesia managed to become the market leader by controlling the market by around 41.92-75.60%. However, in the last 3 years, there has been a decline in the export value of HS 030693 crab products due to the impact of the decline in the imports of Malaysian processed crab. The domestic production of the Malaysian crab products has increased significantly over the last few years.

Export performance of HS 030633 crab products is excellent, with an average RCA value of 9.21. The market domination position is very stable and has also succeeded in becoming the market leader of the Malaysian market from 2017-2020 by being able to dominate the market dominantly (57.04%). The main competitors for HS 030633 crab products are China (26.45%) and Bangladesh (13.59%). Interesting findings are found in the crab product of HS 030614. Although competitiveness is consistent with the RCA value>1, the Indonesian market share in the crab product of HS 030614 is only 6.56%. This value is lower than the market leader including Myanmar, which reached 35.33%.

Export performance of the Indonesian crab products to Singapore varies widely (Table 2). Crab product HS 030693 has the highest export performance, with an RCA value of 6.54 and can dominate the Singapore market convincingly (42.40%). The main competitor for HS 030693 crab product is India (39.99%). Crab product which has the following comparative advantage is HS 030633, with an RCA value of 3.98. The competitive position of HS 030633 products in the Singapore market is very competitive, with an export value of 11.21%, only lower than the Indian products (26.75%), which can become the market leader for the Indonesian HS 030693 crab products in the Singapore market.

For crab product HS 030614, Indonesia has an RCA value< 1, with a trend tending to stagnate without any significant strengthening every year. Inconsistent export volume, significant Indian dominance and fluctuating prices are some conditions that make the Indonesian crab products unable to compete in the Singapore market. Despite having reasonably good competitiveness in 2018, in the following years until 2021, the performance and export value of crab products HS 030614, HS 030633, and HS 030693 experienced a very significant decline. This condition is very unfavourable for the Indonesian crab exports, considering that the total export value of crab HS 030614, HS 030633, and HS 030693 in the Singapore market in 2021 is very high, reaching 42 million US$ (HS 030614), 237 million US$ (HS 030633) and 3.9 million US$ (HS 030693), respectively. Indonesia is only able to meet 10% of Singapore's market needs.

1. Analysis of export competitiveness of Indonesian crab with component of diamond porter model

Export performance and competitiveness of the Indonesian crab market is influenced by the development of the global crab market **(Khasanah *et al.*, 2019)**. The DPM technique can be used to identify the elements affecting the competitive position of the Indonesian crab industry. DPM analysis basically uses four key elements (condition factors, demand conditions, related and supporting factors, structure, competitiveness, and strategy), which are then complemented by supporting factors (opportunity factors and government factors).

1.1. Factor condition

The primary factors affecting a product's competitive position are its resources. Natural resources are in great supply in Indonesia. Over the past five years (2017-2021), Indonesia's export crab output has dramatically expanded (53.32%). Despite the sea area of 5.8 million km^2, water area of 0.8 million km^2, and natural resources that may be used with great potential, the level of crab production is not seen to be appropriate. A key element that will effect competitiveness over time and help it draw in new investors is labor or human resources **(Kharub & Sharma, 2017)**. Indicators of evaluation include the availability of a sufficient labor force, education level and technical abilities that directly affect product quality. Both industrial workers, fishermen and farmers who work alone or in groups are readily accessible as labor in Indonesia. Indeed, employees in the public and private sectors have the necessary technological abilities, and they earn money in accordance with the laws and are often paid less than those in rival nations. The fundamental issue is that conventional crab fisherman frequently lack understanding. But in recent years, the government has given fishermen training. Resources from science and technology cannot be completely ruled out, and their utilization is essential for raising production **(Petrakis *et al.*, 2015)**. The problem in Indonesian crab exports to Singapore and Malaysia is the poor added- value product, which makes some goods less competitive and have a comparatively low selling price in comparison to rival products. Indonesia also lacks the most advanced equipment for processing crabs. Major rivals such as Thailand, Vietnam and India; however, have more advanced technology. The competitiveness of the Indonesian crab business is taken into careful consideration by these conditional elements, particularly in terms of natural and human resources. Many responders offered positive evaluations of this characteristic. Resources in research and technology are a worry, though. Even though it is packed by thorough study, Indonesia is nonetheless technologically behind. Indonesia is still slightly behind its competitors; this has also received an inadequate response from several respondents.

1.2. Factor demand

Crab consumption seems to rise each year in Malaysia and Singapore. Between 2017 and 2021, Singapore and Malaysia imported crab goods worth a combined value

of US$ 284 million and US$ 103 million, respectively. Indonesia, one of the biggest producers of crab in the world, has continuously satisfied the demands of the crab market in both nations. Since 2017, Indonesia has supplied crabs to Singapore and Malaysia for $12 million, or around 15.73% of the entire value of their annual imports. The volume and value of exports, which typically trend favorably yearly, may be used to gauge the growth in demand for the Indonesian crab exports. Crab sector businesses are required to adhere to standards due to increasingly strict requirements. **Thurer *et al.* (2013)** claimed that, in order to prevent a decline in product demand, manufacturers must take into account a number of factors, including delivery wait times, the capacity to satisfy flexible requests and product quality. Indonesia has mostly complied with required regulations; nonetheless, some crab products continue to provide difficulties.

1.3. Related and supporting industries

The cost, flexibility and quality of the product distribution process are greatly influenced by supporting industries from upstream to downstream **(Woods & Hecker, 2011)**. Only approximately 24% of the 2.9 million hectares of the cultivation land in Indonesia used for fisheries output as of 2019 were really in use. The cultivation of crab ponds has started to be relocated. A government initiative that aims to raise aquaculture crab output by more than 27.8% from 2020 to 2024 and makes it a priority in the national strategic plan also supports this. The demand for crab feed will surely rise as a result of this situation. The feed costs account for around 36% of the cost of raising farmed crabs **(Sathiadhas & Najmudeen, 2004)**. The cultivator's company and the crab feed business are combined to create a successful venture for both parties **(Sagheer *et al.*, 2007)**. There are at least 47 recognized crab feed industries in Indonesia. This situation drives businesses to boost feed output and quality throughout the supply chain from processing to distribution to the export competitiveness in a highly competitive worldwide market.

1.4. Firm strategy, structure and rivalry

The Indonesian crab business is becoming more competitive in the Singaporean and Malaysian markets. Some Indonesian crab goods, particularly processed crab products, cannot compete despite the relatively high selling price. Indonesia continues to face pressure from rivals such Bangladesh, Myanmar, and possibly India. The traditional method of capturing crabs is still used in Indonesia; however, the amount of crabs caught is experiencing a decline due to environmental and meteorological factors. The export of crab from Indonesia is undoubtedly challenged by this. The good news is that Indonesia has developed a unique plan to increase the crab industry's competitiveness in the international market, particularly Singapore and Malaysia. This situation is expected to improve the competitive position of the Indonesian processed crabs in global markets, including Singapore and Malaysia.

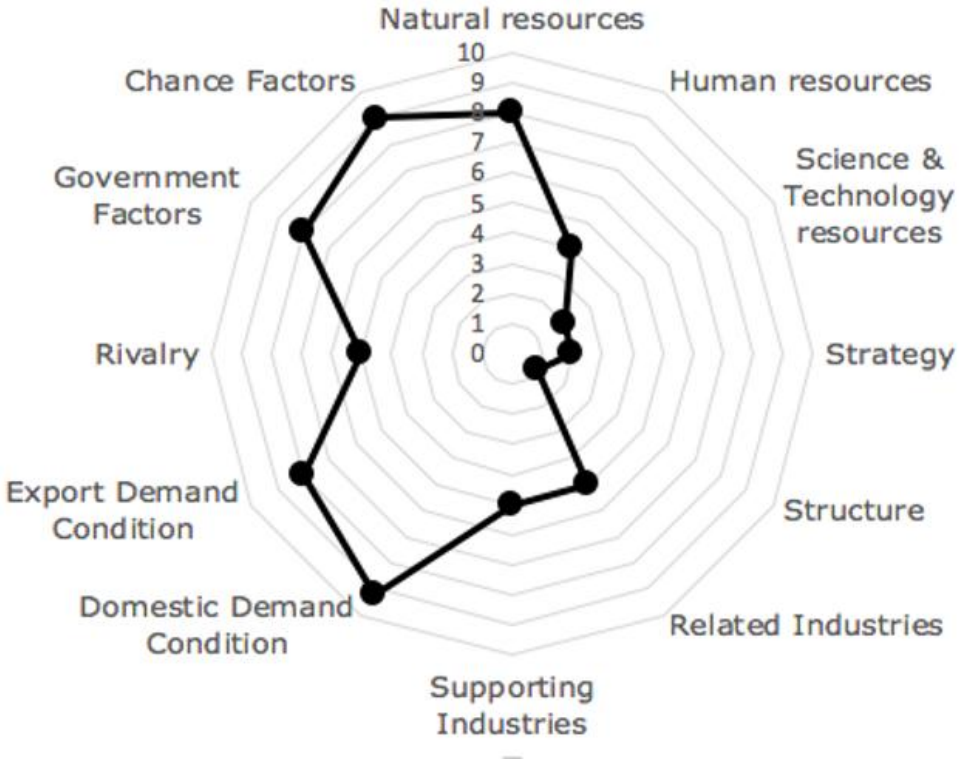

Fig. 2. The results of the analysis of the competitiveness of Indonesian crab exports using porter's diamond theory

1.5. Factor of government and chances

The government has a responsibility to play a role in formulating laws pertaining to the exploitation of natural resources, worker and environmental safety, financial stability, the development of infrastructure, adding to the creation of cooperative relationships with export-receiving nations **(Dogl *et al.* 2012; Deniz *et al.* 2013)**. The Indonesian government contributes funding to expand fisheries products up to Rp. 5 trillion in the process of increasing crab exports, with a target of crab export growth exceeding 27.8% each year. Additionally, the government is putting up a program to boost technology, innovation and acceptance in order to expand the production of crabs with added value. Therefore, the Indonesian government is committed to encourage crab exports. Perum Perindo will create crab feed through BUMN that is capable of competing in its class. Since the crab factory needs raw materials and cutting-edge equipment to make high-quality goods, Perum Perindo works with PT Sang Hyang Seri to provide feed that is competitive in the market. Even if it is merely a supporting component in the diamond porter theory, the role of the government and chance is really important **(Tuna, 2006)**.

CONCLUSION

Based on their RCA values, crab items with the HS codes of 030633 and 030693 are highly competitive in the marketplaces of Singapore and Malaysia. The Malaysian market is where the HS 030614 performs successfully but not in Singapore. In order to promote the development of value-added goods, it is required to expand research and offer cutting-edge technology, according to the study of the DPM model. The distribution of better seeds to fishermen who have begun crab farming programs, production education and efficient, effective post-harvest handling must be enhanced to produce quality crabs that are accepted in the international market. Product downstream is also significant. The strategies put forth by the Indonesian government are already helping to increase the Indonesian crab export performance in the international markets, notably Singapore and Malaysia. Overall, Indonesia can increase its export performance to ASEAN nations, particularly Singapore and Malaysia, and become the industry leader in fisheries goods, particularly crabs.

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