

# Analysis of Factors Influencing Processed Cocoa Industry in East Java Indonesia

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**Abstract**— This study aims to analyze the factors that influence the environment in the effort to develop the processed cocoa industry and the efforts made to encourage the development of the East Java processed cocoa industry. The basic method used was descriptive quantitative and qualitative descriptive with secondary data related to cocoa commodities in 2007-2016. The analytical method used to answer the first objective of the factors that influence competitiveness in the perspective of the development of East Java's processed cocoa industry was multiple linear regression analysis and the Porter's Diamond Method to identify competitiveness constraints. Then a descriptive qualitative method through literature study was employed to answer the second objective of the efforts made to improve the development of the processed cocoa industry in East Java. The results of this study indicate that from the Porter's Diamond Method, in general, the East Java processed cocoa industry is not competitive due to limited infrastructure and the difficulty of access to capital sources. The factors that influence competitiveness in the perspective of the development of the East Java processed cocoa industry are export volumes, export prices and cocoa productivity which have a significant positive effect. Based on the constraints from the identification using Porter's Diamond Method, efforts must be made to improve the competitiveness of the processed cocoa industry, namely improving the quality and quality of processed cocoa, increasing export volumes, maintaining export prices, developing processed cocoa industry clusters, facilitating capital access, deregulating policies and developing infrastructure.

**Keywords**—competitiveness, cocoa industry, cocoa, East Java, Porter's Diamond Method

## I. INTRODUCTION

Increasing the country's economic competitiveness is one step to improve the welfare of the people. Economic competitiveness can be increased from various economic sectors, the economic sector that has a strategic role is the industrial sector because it can create jobs for the community. A balanced growth of the industrial sector between upstream and downstream industries can be used as a strong economic foundation to build industrialization systems that have high competitiveness [1;2].

Most of the raw materials used in the industrial sector come from the agricultural sector of the plantation sub-sector [3]. The main commodity of plantation sub-sector in Indonesia which shows positive development and becomes a mainstay is cocoa [4], with foreign exchange income reaching 1.05 billion

US dollars [5]. Based on data from the Indonesian Cocoa Association in 2008, cocoa produced in the form of 70% of raw cocoa beans and only 30% of processed cocoa products. Cocoa processed into cocoa butter, cocoa liquor, cocoa cake and cocoa powder products is used to meet domestic and export needs.

In international trade, Indonesia is one of the main exporters of cocoa beans after Ivory Coast and Nigeria with a market share of 15%, but for processed cocoa products (in the form of cocoa paste, cocoa butter and powdered cocoa), Indonesia's position is in a lower position with less than 6% market share [6;7]. The high difference in the value of exports between cocoa beans and processed cocoa products, shows that the cocoa downstream industry has not been well developed. Indonesia still relies on cocoa beans as an export product, whereas in the international market there is greater demand for processed cocoa products.

In Indonesia, East Java ranked 8th in 2014 as a producer of cocoa beans after South Sulawesi, Central Sulawesi, Southeast Sulawesi, West Sulawesi, North Sumatra, West Sumatra and Aceh. The cocoa commodity was developed in the Smallholder Estate, the State Large Plantation (PTPN) and the Large Private Plantation (PBS). The area of cocoa in East Java in 2012 covering an area of 63,040 Ha was divided into 32,010 Ha of Smallholder Estates, 26,487 Ha of PTPN, and 4,543 Ha of Large Private Estates [8]. But the production of East Java cocoa beans was not well utilized by the regional processed cocoa industry. Indonesian cocoa beans were exported more to some of the biggest importing countries, namely Malaysia, the United States, Singapore, Brazil, France and China [9].

East Java's cocoa production is better in the form of cocoa beans. In addition, the Government established value added tax (10% VAT) on primary commodities (in Law *Undang-Undang* No. 18 of 2000) for domestic cocoa beans. This policy is considered to be less supportive of the development of domestic cocoa downstream industry. It also contains additional costs if producing processed cocoa using domestic cocoa beans. This makes farmers prefer to export in the form of cocoa beans rather than processing it to the industrial stage.

The volume of processed cocoa exports in East Java continued to increase from 2012 (12,019,800 US \$) until 2015 (25,878,112 US \$), but the volume of imports also increased in 2015 (9,901,842 US \$) and in 2016 (11,487,146 US \$). This

is very challenging for the domestic processed cocoa industry which still imports cocoa beans and processed cocoa products from other countries. In 2014 there were 16 processed cocoa industries spread across six provinces, and only 10 companies carried out production activities. Previously in 1998 there were 28 processed cocoa companies operating in Indonesia. Of the 10 cocoa industries, there are 2 industries in East Java and still operating that are supported by the paring, cleaning, drying and other industries. However, the processed cocoa industry in East Java operates still far below its production capacity.

The constraints above can cause East Java's processed cocoa industry to not develop well. Moreover, the quality of cocoa beans is low due to post-harvest handling that has not been implemented properly [8;10], the access to capital sources to cocoa agribusiness actors is difficult [11;12]. In East Java, this is proved by limited infrastructure such as the downstream and upstream industry distribution channels. East Java's processed cocoa industry that is not well developed will certainly affect the regional economic centers. Therefore, by developing the potential of the processed cocoa industry, it is expected to boost national economy.

Based on the description above, there are several obstacles that hamper the development of East Java's processed cocoa industry, so that the existing cocoa processing industry is not well developed, whereas East Java has a lot of potential to develop the processed cocoa industry. This study aims to analyze (1) the factors that influence the competitiveness of the processed cocoa industry in East Java and (2) the efforts that must be carried out to improve the processed cocoa industry in East Java.

## II. RESEARCH METHODS

This study uses a descriptive analytical base method and the type of data used is secondary data. The study area was determined using purposive sampling method in East Java as it was one of the cocoa-producing provinces in Indonesia, especially Java. Porter's Diamond theory was employed to determine the factors that can affect the competitiveness of processed cocoa in the perspective of the development of the processed cocoa industry in East Java which analyzed later using multiple linear regression analysis. While to answer the second objective of determining the efforts to improve the development of the processed cocoa industry in East Java, qualitative descriptive analysis was used.

In the first purpose of the Porter's Diamond method, several components in the Porter's Diamond method can be quantified as follows:

- a) Export volume of processed cocoa in East Java
- b) Export prices of processed cocoa in East Java
- c) The level of productivity of processed cocoa in East Java

These three variables are independent variables that influence the competitiveness of processed cocoa with the Multiple Linear Regression equation model:

$$DSt = \alpha + \beta_1 VEt + \beta_2 PROt + \beta_3 HEt + et \quad (1)$$

Where:

- A = constant  
B = estimated parameters, with  $\beta = 1, 2, 3$ , and 4.  
DSt = level of competitiveness of processed cocoa in East Java in the year t (%) with the RCA value as a proxy.  
VEt = volume of processed cocoa exports in East Java in the period t (%).  
HEt = price of processed cocoa exports in East Java in the period t (%).  
PROt = level of productivity of processed cocoa in the period t (%).  
Et = error term in the period t  
T = year t (2007- 2016)

Tests on classical assumptions were conducted in the form of tests of normality, multicollinearity, and heteroscedasticity and to test the hypothesis adjusted  $R^2$  value, F test and T test.

## III. RESULTS AND DISCUSSION

### A. Identification of the Constraints of East Java's Cocoa Industry Development (M 'Porter Diamond)

To identify the constraints of the cocoa industry's competitiveness, it was carried out by the Porter (Porter's Diamond Theory) diamond theory approach. Porter's diamond theory consists of four factors that determine competitiveness measurement of the cocoa processing industry, namely resource factors, demand factors, related industry factors and supporting industries, competitive factors and the company's structure and strategy [13;14;15]. In addition to these four factors, there are still two more factors that influence competitiveness, namely the role of the government and the opportunity factor. Cocoa industry should adopt a pragmatic approach to integrate those factors [16].

#### 1) Resource Factor (Condition Factor)

The condition of resource factors consists of natural resources, human resources, scientific and technological resources, capital resources, and infrastructure resources. The five resource factors affect the level of competitiveness of the Indonesian cocoa processing industry [17]. The first factor is natural resources, natural resources that greatly affect the competitiveness of the cocoa processing industry is the area of planting cocoa plantations. In East Java cocoa plantation area increased from 2006-2015. The increase in cocoa plantation area boosts the production of cocoa beans which are profitable for the cocoa processing industry because of the increase in the amount of raw material for the manufacture of processed cocoa products [18].

The second factor is the human resource factor, the observations found that most of the nearly 50% of cocoa farmers and cocoa processing industry players have a low level of education, namely primary school [19]. This has an impact on the weakness of managerial ability so that it is difficult to develop its business independently. The third factor is the scientific and technological resources in the traditional cocoa processing industry [20], so that the quality of the final

product of processed cocoa is not good. The fourth factor is capital resources, at the level of farmers and processed industries, especially those with small-scale industries that have difficult access, with the interest rate 13.2% per year [21]. Difficult access to capital prevents businesses from improving the quality of cocoa products. The fifth factor namely infrastructure resources, which is the deciding factor for the success of the efforts of increasing the competitiveness of industry in Indonesia. Which have not been able to support the development of the East Java processed cocoa industry [22].

#### 2) Demand Factor

The decline in exports not only on Indonesia cocoa beans [23] but also on exports of processed cocoa. Trend of East Java's processed cocoa export volume in 2006 (7,321,044 Kg) to 2015 (4,494,952 Kg) decreased. This indicates that East Java's processed cocoa continues to decline even though the demand for processed cocoa continues to increase every year to meet consumption at the regional, national and international levels.

#### 3) Related Industry Factors and Supporting Industries

Related Industry Factors are cocoa seed industry and cocoa plantations. Superior plant holds a important role in cocoa farming in Indonesia [24]. In Indonesia there are 17 cocoa seed gardens, 7 gardens are not activated as a source of seeds because they are attacked by fruit pest, and only 10 gardens are active. The cocoa seed plantation areas are located in the provinces of West Sumatra, Lampung, West Java, Central Java, Southeast Sulawesi, and East Nusa Tenggara. While the existence of cocoa plantations in East Java still cannot drive the growth of the East Java's processed cocoa industry. This is because the cocoa beans produced are exported more than self-processed.

Supporting industrial factors in the form of Education, Training, Research and Development Services Industry create superior human resources and have good ability in processing cocoa. In addition there is a Food and Beverage Industry that utilizes the products of the cocoa processing industry. But the cocoa processing industry has not been optimal in Indonesia. In East Java there are only three major cocoa processing industries, namely PT Teja Sekawan Cocoa Industry, PT Lestari Cocoa Cultivation, PT. Cargill Cocoa & Chocolate.

#### 4) Competition and Industrial Structure and Corporate Strategy

The structure of the East Java's cocoa processing industry is dominated by three main players, namely PT Teja Sekawan, PT Sustainable Cocoa Cultivation, and PT Davomas Abadi, so that competition in the processed cocoa industry becomes uncompetitive. The company chose the strategy of importing raw materials from other producing countries such as Ivory Coast and Ghana because of the low quality of cocoa beans and VAT taxes that burden the government.

#### 5) The role of government

The government protects the production of local cocoa beans by imposing a tax fee in the form of VAT on the cocoa processing industry. But this has an impact on the low absorption of local cocoa beans because the cocoa processing

industry increases the import of cocoa beans. The role of the government in the development of the cocoa processing industry is still considered not optimal.

#### B. Factors That Can Affect the Competitiveness of Processed Cocoa in the Development Perspective of Processed Cocoa Industry in East Java Province

There are several factors that are assumed to affect competitiveness in the perspective of the development of processed cocoa in East Java. These factors are the competitiveness of processed cocoa, processed cocoa export volumes [25], processed cocoa export prices and cocoa productivity. To find out the factors that influence competitiveness in the perspective of the development of the processed cocoa industry in East Java, multiple regression tests can be seen in table 1.

TABLE I. THE RESULTS OF A MULTIPLE REGRESSION ANALYSIS OF FACTORS THAT INFLUENCE THE COMPETITIVENESS OF PROCESSED COCOA EAST JAVA PROVINCE

Variable	Regression Coefficient	Sig. t
Constanta	-195.445,212	0,005*)
Export Volume	0,139	0,000*)
Export Price	23,368	0,002*)
Productivity	0,237	0,023**)
Adj. R <sup>2</sup>	0,843	
Sig. F	0,00*)	

Information :

\*) = significant at the  $\alpha = 1\%$

\*\*) = significant at the  $\alpha = 5\%$

ns = non significant

All variables together affect the competitiveness of processed cocoa (sig F <0.05) with a determination coefficient of 84.3% indicating that the competitiveness of processed cocoa can be explained by the independent variables in the model, namely export volume, export prices and cocoa productivity. While the remaining 15.7% is explained by other variables outside the regression model. The factors that are outside the regression model are for example an increase in industrial technology, the ability of human resources and so on. The influence of individual variables shows that the export volume variable (X1), export price (X2) and cocoa productivity (X3) affect the competitiveness of processed cocoa (Sig t <0.05).

From table 1, the results of the calculation of multiple linear regression analysis obtained by the regression model are  $Y = (-195,445,212) + 0,139 X_1 + 23,368 X_2 + 0,237 X_3$ . The regression coefficient value has a negative sign so that if there is no export volume variable (X1), export price (X2) and cocoa productivity (X3) or the variable is considered 0 (zero) then the competitiveness of processed cocoa will decrease by (-195,445,212) . If the export volume variable (X1), export price (X2) and cocoa productivity (X3) increase, competitiveness will also increase, as seen from the regression coefficient that is positive.

The export volume regression coefficient is 0.139, meaning that each increase in one unit of export volume will



increase competitiveness by 0.139. The volume of processed cocoa exports illustrates Indonesia's demand for processed cocoa. The higher the volume of processed cocoa exports, the higher the demand of East Java's processed cocoa by importing countries. This will have an impact on increasing the competitiveness of processed cocoa in East Java. Export of cacao is driven from the side of the demand, namely the existence of a world cocoa consumption growth will last for ten years, i.e. an average of 3% per year [26]. The reality is that East Java's processed cocoa export volume shows a downward trend. This is due to the declining productivity of the processed cocoa industry in East Java each year.

The productivity of the cocoa processing industry has a positive effect on cocoa competitiveness with a regression coefficient of 4.224, meaning that each increase in productivity of 1 Rp / unit will increase cocoa competitiveness by 4.224. Productivity is the level of comparison of the output of a company with the costs incurred. Another factor is that export prices have a positive effect on competitiveness with a coefficient of 23,368, meaning that if the export price increases by one unit, the competitiveness of processed cocoa will increase by 23,368 units. The increase in export prices illustrates the quality and quality of processed cocoa in East Java, the higher the price of processed cocoa exports indicates that the quality and quality of processed cocoa in East Java is getting better, so that the value of competitiveness is increasingly high in national and international markets. East Java's processed cocoa export prices from 2006 - 2015 experienced an increase in prices from 2.71 US \$ / kg to 4.05 US \$ / kg. The increase in the prices of processed cocoa exports triggered an increase in the competitiveness position of processed cocoa [1].

#### *C. Efforts to Increase the Competitiveness of East Java's Processed Cocoa Industry Based on the Porter's Diamond Method*

##### *1) Overcoming the Resource Factors Requires Improved Quality of Processed Cocoa*

The strategy to improve the quality of processed cocoa can be done by encouraging the development of human resources and mastering technology [27]. One of the problems in the processed cocoa industry is the weak ability of human resources in the field of production techniques, mastery of technology and business management, so that the quality produced is not optimal [28]. One way of developing industrial human resources is to provide counseling to farmers to develop their businesses to the industrial level. In addition, training in industrial labor can also be one way to create superior human resources in the field of processed cocoa industry.

##### *2) Overcoming Abundant Domestic Demand Needs To Increase the Volume of Processed Cocoa Exports and Processed Cocoa Product Innovations*

Increasing the volume of processed cocoa exports can be done by expanding the market in the world. By expediting the export process to destination countries, it is expected to increase the volume of processed cocoa exports in East Java.

In addition, by increasing the production of processed cocoa commodities that are most in demand by importers such as cocoa butter and fat which are included in the special East Java processed cocoa product innovations (cocoa butter, fat cocoa & oil, cocoa paste) which currently demand in the world market is factors that are quite influential on the competitiveness of processed cocoa in East Java.

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##### *3) Overcoming Related Industries and Undeveloped Supporters It is necessary to develop Processed Cocoa Industry Cluster and Capital Access*

The development of processed cocoa industry clusters in central cocoa plantations will strengthen the linkages at all levels of the value chain of the industry including the activities of supporting industries, related industries, infrastructure providers, and other supporting services industries. These linkages was developed as an effort to build industrial networks (networking) and improve competitiveness that drives innovation. Capital access is the main problem of cocoa agribusiness actors. The difficulty of developing business to the industrial stage makes the actors only able to sell in the form of primary commodities (cocoa beans). With ease of access such as providing credit to cocoa agribusiness actors, it is expected to support the development of the processed cocoa industry in East Java.

##### *4) Overcoming Strategies, Competition Structure by Developing Infrastructure*

Cooperation is needed to develop infrastructure and physical facilities in the form of roads, bridges, ports, electricity networks, fuel, transportation, warehousing and telecommunication services in areas that have the potential to be used as cocoa processing centers. By developing infrastructure will attract investors to invest because the conducive industrial environment can support industrial processes [29].

##### *5) Overcoming Domestic Demand with Policy Deregulation*

The government is implementing progressive cocoa export taxes starting in 2010, namely 5% -15% to support domestic expulsion. This policy resulted in a decline in export of cocoa beans in 2012 (30.16%) and in 2011 (38.36) from the previous year. This decline was influenced by the absorption of cocoa in the domestic industry. This government policy must remain in order to develop the existing processed cocoa industry. In addition, the application of the Indonesian National Standard (SNI) on cocoa bean commodities is expected to improve the quality of existing raw materials. The imposition of the export

tax on the Indonesian cocoa beans in the long-term will affect the increased value of the Indonesian processed cocoa exports [30].

#### IV. CONCLUSION

The factors that influence competitiveness in the perspective of the development of the East Java processed cocoa industry are export volumes, export prices and cocoa productivity which have a significant positive effect. Based on the constraints from the identification using Porter's Diamond Method, efforts must be made to improve the competitiveness of the processed cocoa industry, namely improving the quality and quality of processed cocoa, increasing export volumes, maintaining export prices, developing processed cocoa industry clusters, facilitating capital access, deregulating policies and developing infrastructure.

#### ACKNOWLEDGMENTS

The authors gratefully thank to Universitas Pembangunan Nasional "Veteran" Jawa Timur to supporting our research.

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