DETERMINATION OF THE PROSPECTIVE PROCESSED CACAO PRODUCT AND CALCULATION OF THE ADDED VALUE IN AGRO-TOURISM BASED ON CACAO AGROINDUSTRY IN PIDIE JAYA REGENCY

– Research paper –

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Abstract: Utilization of cocoa bean to be a derivative products in industrial is wide enough, that it is necessary to determine the priority of the processed products development. This study aimed to determine the prospective processed cocoa products with a system approach using Bayes method and assessed the potential of added value by using Hayami method. Based on several assessment criteria indicated that chocolate bar is the priority product that needs to be developed and followed by several other processed products. This development was able to produce the added value of Rp 135.000 per kg of cocoa beans. Result indicated that by processing the cocoa beans into chocolate bar could provide a considerable income for the businessman.

Keywords: added value, bussiness analysis, industry development, processed cacao

INTRODUCTION

In the development of agro-tourism based on agroindustry the development of processed products is needed to attract the tourists. This development is also a step in increasing the added value and a prospect in increasing the revenue. The potential utilization of Aceh cocoa (province of Indonesian) as a raw material to produce processed cocoa products is very large, this is also supported by the quality of cocoa itself. According to Yusriana and Jaya (2015) and Yusriana *et al*. (2016), Aceh cocoa has various superiorities such as include into the AA category (SNI 2323: 2008, maximum 85 seeds per 100 g), has a distinctive aroma and flavor, where the intensity of Aceh cacao aroma is higher than the cocoa from the other areas in Indonesia such as Sulawesi and Surabaya, and has a higher taste intensity than the cocoa from East Java. In addition, Indarti (2007) stated that Aceh cocoa has a fatty acid composition which is similar to the cocoa from Malaysia and Pantai Gading, as we know Pantai Gading is one of the best cocoa producing areas in the World.

The superiority of Aceh cocoa needs to be optimally developed since it has a comparative superiority which could improve the economy and the income of economic actors. This comparative superiority could encourage the creation of another competitive superiorities which are able to compete with similar products. These superiorities could benefit the product in winning the market competition. The broad and excellent market share in the market competition gives a positive effect to the product acceptance (Tarigan, 2005).

Utilization of cocoa as raw material to produce processed products quite diverse ranging from foods and beverages, medicines, cosmetics, chemical industries and home industries (Indonesian Ministry of Industry, 2007). In agricultural revitality especially for cocoa commodity, the development of downstream agroindustry of cocoa could be conducted in three period, that is; a short-period, medium periode and long period. In the short periode is directed at the development of cocoa into cocoa powder, cocoa lipid, pasta and other processed cocoa foods. In the medium and long term, the development is directed at the development of food industries, pharmaceutical products, cosmetics and chemical industries (Drajat, 2011). Agro-tourism based on agro-industry could be a very strategic media in exploiting and promoting the superiority of Aceh cocoa. The problem is

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which of the cocoa processing products are the priority of development to support the formation of agro-tourism based on agro-industry. Therefore a prospective product determination analysis that could be developed in agro-tourism based on cocoa agroindustry in Pidie Jaya Regency (Regency of Aceh) is required. The Bayes method of decision making technique was considered to be the excellent method for determining the sequence of processed cocoa products that are prospectively developed in an agro-tourism based on agro-industry to generate the right decision.

The Bayes method is a method used in the best decision making from several available alternatives which aims to generate the optimal decision. In an optimal decision making effort, various criterias are used as consideration. The decision which is made using this method pass the qualifying stage of the probability of occurrence and is expressed by a number between 0 and 1 (Marimin, 2017, Wibowo et al., 2014).

In the business world, the calculation of added value to a developed product is required. In this case for entrepreneurs or investors to get an attractive rate of return, i.e exceeding the level of income on safe investments such as deposits in banks or other investments (Hidayat et al., 2012). Every enterprise always want to get an attractive profit economic (Zhang, 2016). Equal condition also existed in developed prospective processed cocoa products in agro-tourism based on agro-industry, to find out the formed added value in the product development, a calculation is required. The Hayami method is one of the most commonly used methods in calculating the added value. This calculation is conducted by combining the added value for processing and the added value for marketing (Hayami et al., 1987). The principle of this method is to estimate the raw material value change after processed. The added value shows the difference between the value of the product, cost of the raw materials, and other inputs before being processed with the final value obtained after processing. This method is considered to have several advantages over the other calculation techniques since beside the ratio of product's added value could be known, it also could calculate the values of output, productivities, conversion factors, labor coefficients, product value, labor's wage, other input contributions, also benefit's level and its margin values (Hidayat et al., 2012). This article was aimed at determine the prospective processed cocoa product with system approach using Bayes method and to study the potential of added value using Hayami method. Therefore, it is expected to produce a sequence of prospective cacao processed products to be developed and the value added of formed from these prospective product.

METHODS

The determination of a prospective cacao processed product was conducted using Bayes method. This method is a tool for individuals in a decision making by quantifying one or more opinions on a certain scale. There are four experts who were involved as a key information source to get a right decision in determining the prospective product. The four experts represented the cocoa agro-industry, academic of Syiah Kuala University, agricultural technology center of Aceh Province, and industry, trade, cooperative and ukm office of Pidie Jaya Regency. The steps taken in decision making of prospective cacao processed products using Bayes method were (Wibowo, 2014; Diana, 2016; Marimin, 2017):

1. Determining the alternative decision. Alternative of prospective cacao processed products were a number of cocoa downstream products obtained from cocoa industry trees.
2. Establishing the decision criteria. Criteria determination was conducted through experts' opinion gathering and literature review.
3. Determining the weight of each criteria by the experts. The criterias were then limited by the score of 1 to 5, where 1 indicated that the criteria has absolutely no effect on the alternative, and 5 indicated that the criteria greatly affect the alternative. After that, dividing the division so that the overall weight value was 1 (one).
4. Preparing a prospective cacao processed product selection questionnaire, then collected and scored each criteria on a scale of 1 to 5.
5. Performing calculation of each alternative value using the equation:

$$\textbf{Total Value}_i = \sum_{j=1}^{m} \textbf{Value}_{ij}(\textbf{Krit}_j)$$

Indication:

Total value $_i$= Total end value of the alternative number-i

Value $_{ij}$= Value of the alternative number-i in criteria number-j

Krit $_j$= level of requirement (weight) criteria number-j

i= 1,2,3,....n; n = total alternative

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j= 1,2,3,....n; n = total criteria

6. Ranking the alternative of prospective processed cocoa products to be developed in agro-tourism based on agro-industry.

To explain the stages and each stakeholder's role in the process of determining the prospective processed cocoa products to be developed in agro-tourism based on cacao agro-industry, the Business Communication diagram which was built using Sybase-PowerDesigner 16.6 software was used. The Business communication diagram could help in understanding the role of each element in the system. This research explained the role and the function of researcher, the data and information collection, and the experts which gave their opinion in determining the strategic location of agro-industrial development based on cocoa agroindustry in Pidie Jaya Regency (Figure 1).
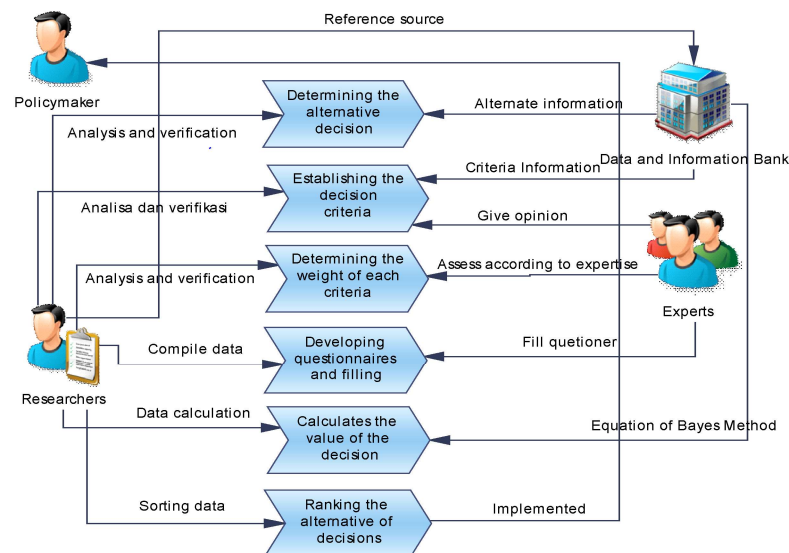

Figure 1. Bussiness Communication Diagram

Furthermore, to know the formed added value on the prospective product, calculation using Hayami method was conducted. The data source for the application of Hayami added value calculation was taken from the primary data that was the result of interview with the business actors of Socolatte Rimbun Coop agroindustry, and the secondary data was obtained from literature review. Calculation was conducted based on the money value with one period processing time. If the added value (NT> 0), showed that the cocoa processing business provided an added value positively. Calculation procedure of the added value using Hayami method can be seen in Table 1.

Table 1. Hayami method procedure in the Added Value Calculation

No.	Variable	Formula
	Output, input and price	
1	Production volume (Kg/period)	1
2	Basic raw material (Kg/period)	2
3	Manpower (HOK/period)	3
4	Conversion Factor	$4 = 1/2$
5	Manpower Coefficient (HOK/Kg)	$5 = 3/2$
6	Product selling price (Rp/Kg)	6
7	Manpower's Wage (Rp/HOK)	7
	Income and profit	
8	Basic raw material cost (Rp/Kg)	8
9	Other Inputs cost (Rp/Kg)	9
10	Output value (Rp/Kg)	$10 = 4 \times 6$
11.a	Added value (Rp/Kg)	$11a = 10 - 9 - 8$
b	Added value ratio (%)	$11b = (11a/10) \times 100\%$
12.a	Manpower's wage (Rp/Kg)	$12a = 5 \times 7$
b	Manpower's share (%)	$12b = (12a/11a) \times 100\%$
13.a	Advantage (Rp/Kg)	$13a = 11a - 12a$

No.		Variable	Formula
	b	Advantage level (%)	13b = (13a/11a)x100%
		Remuneration of production factor owner	
14		Advantage margin (Rp/Kg)	14 = 10 – 8
15.a		Manpower's wage (%)	15a = 12a/14) x100%
	b	Contribution of other input costs (%)	15b = (9/14) x 100%
	c	Entrepreneur profit (%)	15c = (13a/14)x100%

Source: Hayami, 1987; Hidayat *et al.*, 2012; Maharani *et al.*, 2013; Asheri and Rivin, 2015; Septiaji *et al.*, 2017; Sulistyowati *et al.*, 2018).

RESULTS AND DISCUSSIONS

Criteria and Alternative of Prospective Cacao Product

Based on the discussion with experts and literature review, generated several criteria and alternatives of prospective cacao products that could be developed in agro-tourism based on cocoa agroindustry in Pidie Jaya District. Criterias were the determiner of how strategic the alternatives are, on the other hand, the alternatives were the choices of the end result. The criterias were as follows (Syam *et al.*, 2006; Wardani, 2008; Abdullah, 2012; Purba *et al.*, 2015):

1. Ability and availability of production technology

   Described the level of capability and availability of technology used in developing the processed cocoa products. This was needed to be considered, considering that in the processing of cocoa to produce processed products require variety of tools and machines according to the needs of each process. The ability, skill and availability of tools/machines were the key of success or failure of a product being created. In addition, it should also be noted whether the availability of necessary technology could be obtained easily or not. Both of these things would also affect the quality and price of the resulting product.

2. Market opportunities

   Market opportunities showed the prospect of demand and interest of tourists on processed cocoa products on agro-tourism based on agro-industry to estimate the current and long-term situation with guidance from the past data.

3. Commercial value

   Described the possibility of products had a high value, so the profits that might be obtained from processed cocoa products would also be high. The greater possibility of profit, the greater the positive impact might be gained by the agro-tourism managers from the product development.

4. Labor absorption

   This criteria indicated that the amount of labor absorbed by agro-tourism based on agro industry in processing the product. The longer and complicate the processing process, so it was predicted that the greater the involvement of labor in the production division. Increasement of labor was positively correlated with the decreasement of unemployment rates and improvement of the welfare of local communities.

5. Double impact on other products

   This criteria showed that the impact of developing a product on other products. The support or profits that a product provided to other products was an important criteria because it would increase the value of each product that is developed. For example, the production process of product A is part of the B product process, or by purchasing product A, the tourist will have interest to purchase product B.

6. Investment/venture capital

   This criteria indicated that the requirement for a certain amount of capital (both fixed and non-fixed capital) used in the process of producing processed cocoa to gain profits. According to Halim (2005), investment was essentially a placement of funds at the moment in the hope of making a profit in the future.

In addition to the criteria, the analysis also produced alternative products of processed cocoa that were prospectively developed. The alternative processed cocoa products that allowed to be developed both in terms of available technology and acceptance by the local market are as shown in Table 2.

Weighting Criteria and Alternative of Processed Cocoa Product

Based on the discussion with the experts and the literature review in the previous stages, further weighting was conducted by filling the questionnaire. Each criteria was given weight to determine the most decisive criteria in the

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selection of prospective processed cocoa products to be developed in agro- tourism based on agro-industry in Pidie Jaya Regency. The weight of each criteria can be seen in Table 3.

Table 2. Alternative of potential processed cacao product

No	Decision Alternative
1.	Chocolate bar
2.	Chocolate beverage
3.	Chocolate powder
4.	Nata de cocoa
5.	Chocolate dodol
6.	Chocolate bread
7.	Chocolate candy
8.	Chocolate soap
9.	Green fertilizer

Table 3. Criteria in selecting the prospective cacao processed product

No	Criteria	Weight
1	Ability and availability of production technology	0, 184
2	Market opportunity	0,184
3	Commersial value	0,175
4	Labor absorption	0,155
5	Double impact to other product	0,165
6	Investation/capital	0,136

Based on Table 3 it could be seen that to develop processed cocoa products in agro-tourism based on agro-industry should have a high ability and availability of production technology, and also have high market opportunity, other criteria that was needed to be paid attention were commercial value that may be obtained, has a double impact on other products, ability to absorb a large number of labor, and low business capital considerations. Processing technology was the priority in developing products. This criteria strongly supported the development of agro-tourism based on agro-industry since the presence of technology affected the productivity, achievement of production targets, fulfillment of market demand in quality and quantity and could provide quality assurance and product safety (Abdullah, 2012; Howara, 2013). Processing was a process to change input into output, to achieve these goals then a technology or method to process the raw materials into finished goods is required. Development of technology in a product processing greatly facilitated the performance of a company, such as adding the use value of a

produced product (Retnoningsih et al., 2016). Related to this research, the role of processing technology was closely related to the production activities of processed cocoa product which was marketed in a tourist attractions where this product will become an added value and typical processed product.

Market opportunity and demand are another important aspects to be considered. According to Abdullah (2012), the existence of market opportunity and demand will be one of the attractions in the development of agro-tourism, which increase the number of tourists. In addition, Kotler (2002) stated that processing management or company should be able to identify opportunities, utilize and simultaneously maintain the existing market opportunities. This was because the current marketing conditions are so dynamic that could easily move the customers. Therefore, it was very important to pay attention to the market opportunities and demands of agro-industry products which supported the agrotourism.

In the development of product, the design successful measurement was not only seen from the technical aspects, but also should meet the succes criteria in terms of economic added value. Basically, product development was a step to produce industry products which should be able to generate the rate of return of capital commercially (Wignjosoebroto, 2000). To achieve a high commercial value product development goal, a series of activities started by planning, designing and product development were required. These stages began with the exploration of ideas and then proceed with the concept development, system design and detail, prototyping, evaluation and testing (both technical feasibility tests and commercial feasibility), and ended with the distribution stage (Ulrich, 2000).

In the product development, the multiple benefits and impacts which was caused by the presence of a product were desirable. Impact was a product creation activity which may affect the other products activity. This double impact was driven by processing and market forces, increasement (or decreasement) of the production amount and the demand for one type of processed product would drive the increasement (or decreasement) of the production amount and the demand of the other products. Domański and Gwosdz (2010) stated that the application of double impact has enormous benefits in the business world, the resulting effect is an economic improvement both in internal and external company. The aspect of

labor absorption and investment/venture capital was not the focus of attention in determining the product development, nevertheless these two aspects still became a consideration, considering one of the agro-tourism development goals was to realize the development and improvement of local people's welfare. One effort that could be conducted to realize the improvement of people's welfare was through the labor absorption. Wilkilson and Rocha (2009) stated that the development of integrated and well integrated agro-tourism based on agroindustry will be very important in increasing the added value of agricultural commodities and labor absorption; which is indicated by the decline in open unemployment or underemployment. The same case was also stated by Susilawati (2007), agro-tourism development provides significant benefits for the increasement of income and community welfare.

Capital or investment aspects also need to be noticed by the company in developing a product. This criteria implied that the production cost factors from raw material procurement, machinery and equipment provision and operational costs must be carefully considered in terms of efficiency because it would affect the selling price and product competitiveness, so that factors that could cause inefesiensi should be avoided (Abdullah, 2012). According to Aziz (1993), one of the important factors of agroindustry product development was the production cost must be able to provide a significant added value increasement from the primary commodity value. Therefore, the increasement of added value of agroindustry products was a benefit that can support the successful development of agro-tourism.

Alternative Priority of Prospective Processed Cocoa Product
In the selection of developed prospective processed cocoa products on agro-tourism based on agro-industry using Bayes method. Products that were able to collect high value on criteria with large weights have a higher opportunity to be selected. The assessment result based on expert opinions and actual information collected in the field on each product with each criteria were obtained values as shown in Table 4.

Table 4. Priority of prospective processed cacao product

No	Alternative Product	TA	MO	CV	LA	DI	ICV	Weight	Prt
1	Chocolate bar	0,590	0,738	0,664	0,590	0,561	0,435	**0,125**	**1**
2	Chocolate beverage	0,590	0,590	0,559	0,590	0,594	0,489	**0,119**	**3**
3	Chocolate powder	0,664	0,590	0,559	0,590	0,627	0,462	**0,122**	**2**
4	Nata de cocoa	0,517	0,443	0,419	0,528	0,396	0,353	**0,093**	**9**
5	Chocolate dodol	0,590	0,590	0,559	0,528	0,462	0,435	**0,111**	**5**
6	Chocolate bread	0,590	0,517	0,524	0,528	0,495	0,435	**0,108**	**7**
7	Chocolate candy	0,590	0,627	0,559	0,590	0,528	0,435	**0,116**	**4**
8	Chocolate soap	0,480	0,480	0,454	0,528	0,429	0,353	**0,095**	**8**
9	Green fertilizer	0,627	0,517	0,489	0,528	0,561	0,435	**0,110**	**6**
	TOTAL							**1**	

Indication: TA = Technology ability; MO = market opportunity; CV = commercial value; LA = labor absorption; DI = double impact to other product; ICV = Investasment/capital venture.

Based on Table 4, there were several prospective products that was developed in agro-tourism based on cacao agro-industry in Pidie Jaya Regency. The chocolate bars were the top priority to be developed, followed by cocoa powder, chocolate beverage, chocolate candy and some other products. These products had very close weight, this indicated that overall these products are potential to be developed, but there are several products that are more prioritized. Several things that supported the chocolate bar as the most prospective and prioritized products based on the assessment criteria were its potential for market demand and high commercial value compared to the other products. This was seen from a very high demand for chocolate bars, where the export data of chocolate products from 2012-2015 showed that the largest market share in the export volume of chocolate products was chocolate briquettes or bars. According to Express-obzor estimation by 2015 the highest per capita consumption was achieved in the chocolate bar segment with the addition of 0.75kg/person. According to Tengor (2015) based on the weighting, processed cocoa product to chocolate bars form was a more potential processed product to be developed by an industry compared to cocoa powder, beverage and chocolate jam. The same thing could also seen based on observations in the agroindustry of Coop Socolatte Rimbun, the demand of processed chocolate products in bars form tended to be higher than the other processed

products. Rimbun Coop Socolatte is the only cocoa processing agro-industry in Pidie Jaya District, even in Aceh Province.

Basically, processed cocoa products will be very potential to be developed in agro-tourism if the product is a processed product that has a unique and can be enjoyed in the tourist location and can be taken home as a typical souvenir tour. From several other assessment criteria such as technological capability, labor absorption, impacts to the other products and investments, some of the offered alternative products had a similar or close weights. Only soap and green fertilizers products that had a lower value. Both of these products were products that could not be consumed, so the product had a lower bargaining value compared to processed cocoa products that could be consumed.

Calculation of Prospective Cocoa Processed Product Added Value
Added value analysis using Hayami method was used to analyze the most prospective added value product that was produced in the previous stage, in this case was in processed chocolate products form. The calculation process using Hayami method for chocolate bar processing was conducted as follows: the calculation in added value analysis of cocoa bean processing activity was using per one kilogram unit per cocoa bean as the main raw material. The price of fermented cocoa beans received by Rimbun Coop Socolatte from farmers was Rp 32.000. Rimbun Coop Socolatte bought fermented cocoa from farmer group at a price of Rp 5 000 above the market price. The average price of Aceh cocoa in the market was Rp 27.000 (Forum Kakao Aceh, 2018), while the additional cost of raw materials such as sugar, milk, stearin and vanilly were accumulatively Rp 8000 per kg (Asheri and Rivin, 2015). Output was the amount of selling value of chocolate bars in units of weight and Rupiah. The selling price of this chocolate bar was Rp 15.000 per 50 gram or Rp 300 000/kg.
Every production period, Rimbun Coop Socolatte process 30 kg cocoa beans and takes four days to become chocolate bars ready for consumption. Using 30 kg of inputs, it is estimated to produce 18 kg of chocolate bars (Khairurrasyidin, 2017). In each production process use 5 employees per day who focus on processing the chocolate bars in seven hours working time. If converted into HOK units, Rimbun Coop Socolatte uses labor as much as 20 HOK per production period (5 people multiplied 4 days in one production period) where

1 HOK (days of workers) is seven hours. Every day this worker is given an incentive (wage) of Rp 80.000 per HOK, with assumption it has reached the minimum wage in Aceh Province. The added value analysis of the processed cocoa products can be seen in Table 5.

Table 5. Added value of potential processed product of cocoa bar

No.	Variable	Value
Output, input and price		
1	Cholotate bars production (Kg/period)	18
2	Cocoa beans (Kg/period)	30
3	Manpower (OHK/period)	20
4	Conversion Factor	0,60
5	Manpower (HOK/Kg)	0,67
6	Cholotate bars Price (Rp/Kg)	300.000
7	Labor's Wage (Rp/HOK)	80.000
Income and profit		
8	*Cocoa beans* price (Rp/Kg)	37.000
9	Sugar, milk, stearin and vanilly (Rp/Kg)	8.000
10	Output value (Rp/Kg)	180.000
11.a	Added value (Rp/Kg)	135.000
b	Added value ratio (%)	75
12.a	Manpower's wage (Rp/Kg)	53.33
b	Manpower's share (%)	0,40
13.a	Advantage (Rp/Kg)	81.667
b	Advantage level (%)	60,49
Remuneration of production factor owner		
14	Advantage margin (Rp/Kg)	143.000
15.a	Manpower's wage (%)	37,30
b	Contribution of other input costs (%)	5,60
c	Entrepreneur profit (%)	57,11

Based on Table 5, it could be seen that the conversion factor value of processed chocolate bar product was 0.6. This value indicated that each one kilogram of processed cocoa bean will produce 0.6 kg chocolate bar. This result was slightly lower compared to the discovery of Asheri and Rivin (2015) in Pipiltin Cocoa, with 30 kg of Pipiltin Cocoa cocoa beans could produce 26 kg chocolate bars or with one kilogram of cocoa bean could produce 0.87 kilogram of chocolate bar. The quality of raw materials and the technology used greatly affects the output produced, the higher moisture content of the raw materials and the lower technological capability used would generate a lower pasta proportions. The calculation of energy coefficient value in Socolatte Coop Rimbun industry was 0.67. This value could be interpreted as the number of working-day people (HOK) which was needed to process 1 kg of cocoa bean into chocolate bar was 0,67 HOK (1 HOK = 7

working hours).

The value of chocolate bar processing output was Rp 180,000, this value was obtained from the multiplication of output price per kg by conversion factor. From the results of this value ouput, Rimbun Coop Socolatte in one processing period could generate the added value of Rp 135,000 with a ratio of 75 percent. This value could be interpreted that 75 percent of the value of output was the added value of processing cocoa into chocolate bar. The added value here was a gross added value because the labor's wage was not calculated. The generated added value was greatly influenced by the selling price of the chocolate bar product, if the product was able to sell at a high price then the added value produced would also be high. Another factor that could affect the added value was the other input's cost (other raw materials) that was used, in this processing only counted inputs include the costs for sugar, milk, stearin and vanilla as the additional inputs (Asheri and Rivin, 2015), the same condition was also being conducted by Maharani *et al*. (2013) and Septiaji *et al*. (2017) contribution or other input costs were only auxiliary raw material costs. Sugar, milk, stearin and vanilla were the four auxiliaries (addition) in the processing of chocolate bars.

The generated labor's share was 0.4 percent. This result indicated that 0.4 percent of the added value of Rp 135,000 was the reward received by the worker that was Rp 53.333/kg of chocolate bar processing performed. The earned profit by Rimbun Coop Socolatte in one kg of processing was Rp 81.667 with a profit rate of 60.5 percent. This profit obtained from the calculation of the difference between the added value and the r labor's wage. Based on this, the profit value was a net benefit that the industry owner received since it has calculated the expenditure for labor, beside the main and the additional input costs.

CONCLUSIONS

Several criterias that must be fulfilled by a product to be developed in an agro-tourism based agroindustry in Pidie Jaya Regency are having a high market opportunity and commercial value, having double impact on the other products, the availability and ability of production technology, affordable investment/business capital, and able to absorb high labors. In general, the offered alternative product has a great potential to be developed, this could be seen from the result of weighting which showed a very close value between one to another product. However, there are some more prioritized products to be developed such as chocolate bar, chocolate powder, chocolate beverage and chocolate candy. Based on expert opinion analysis, the processed chocolate product in the chocolate bar form was the most prospective product to be developed. This processed product beside having a uniqueness, it could also be enjoyed in the tourist location and taken home as typical tour souvenirs, will have greater potential. The resulting added value from the chocolate bar processing with a capacity of 30 kg per period reached Rp 135. 000 per kg of cocoa beans. This showed that by processing cocoa beans into chocolate products provided a considerable income for business owners.

REFERENCES

1. Abdullah, S. (2012). *Rekayasa sistem pengembangan agrowisata berbasis masyarakat. (System engineering of agro-tourism based on community development).* Unpublished doctoral dissertation, Institut Pertanian Bogor, Bogor, Indonesia (in Indonesian).
2. Asheri, V. & Rifin, A. (2015). Analisis nilai tambah cokelat batangan (chocolate bar) di Pipiltin Cocoa, Kebayoran Baru, Jakarta Selatan. (Chocolate bar added value analysis in Pipiltin Cocoa, Kebayoran Baru, Jakarta Selatan). *Jurnal Forum Agribisnis*, 5(01), 105-119 (in Indonesian).
3. Aziz, M.A. (1993). Strategi *Pengembangan Agroindustri Buah-buahan Tropis*. (Development strategy of tropical fruits agroindustry). Jakarta (ID): Bangkit. (in Indonesian).
4. Departemen Perindustrian Indonesia. (2007). *Gambaran sekilas industri kakao*. (Picture of cacao industry). Jakarta (ID) (in Indonesian).
5. Diana, L.F. (2016). Model data mining dalam penentuan kelayakan pemilihan tempat tinggal menggunakan metode naive bayes. (Data mining model in determining the eligibility of residence election using Naive Bayes method). *Jurnal SIMETRIS*, 7(2), 725-730 (in Indonesian).
6. Drajat, B. (2011). Peluang peningkatan nilai tambah kakao domestik melalui regulasi perdagangan. (Opportunities to increase the added value of domestic cocoa through trade regulation). *Jurnal Pelita Perkebunan*, 27(2), 130-149 (in Indonesian).

7. Domanski, B. & Gwosdz, K. (2010). Multiplier Effects in Local and Regional Development. *Quaestiones Geographicae*, 29(2), 27-37. DOI: https://doi.org/-10.2478/v10117-010-0012-7.

8. Hayami, Y.T., Kawagoe, Y., Morooka, & Siregar, M. (1987). *Agricultural marketing and processing in upland java a perspective from a sunda village*. Bogor (ID): CGPRT Centre.

9. Hidayat, S., Marimin, Suryani, A., Sukardi, & Yani, M. (2012). Modifikasi metode Hayami untuk perhitungan nilai tambah pada rantai pasok agroindustri kelapa sawit. (Modification of Hayami method for calculation of added value in a supply chain of oil palm agroindustry). *Jurnal Teknologi Industri Pertanian*, 22(1), 22-31 (in Indonesian).

10. Howara, D. (2013). Strategi pengembangan pengolahan hasil perikanan di Kabupaten Donggala. (Development strategy of fishery product processing in Donggala Regency). *Jurnal Agroland*. 20(1), 75-81. DOI: http://dx.doi.org/10.22487/J.24077607.2013.v20.i1.8158 (in Indonesian).

11. Indarti, E. (2007). Efek pemanasan terhadap rendemen lemak pada proses pengepresan biji kakao. (The heating effect on the yield of lipid in the cocoa beans pressing process). *Jurnal Rekayasa Kimia Lingkungan*, 6(20), 50-54 (in Indonesian).

12. Khairurrasyidin. (2017). *Proses pengolahan kakao menjadi cokelat batang di koperasi rimbun baroh musa, Pidie Jaya Aceh*. (Processing of cocoa into chocolate bar in cooperatives of rimbun baroh musa, Pidie Jaya, Aceh). Universitas Syiah Kuala, Aceh, Indonesia (in Indonesian).

13. Kotler, P.(2002). *Marketing management*. Transalor: Teguh, H., Rusli, R.A., & Molan. B., Editor; Anggawijaya, A.H.P., Sarwihi, B. & Waldemar, Y. Jakarta: Prenhallindo.

14. Maharani, C.N.D., Lestari, D.A.H., Kasymir, E. (2013). Nilai tambah dan kelayakan usaha skala kecil dan skala menengah pengolahan limbah padat ubi kayu (onggok) di Kecamatan Pekalongan Kabupaten Lampung Timur. (Added value and feasibility of small and medium scale processing of cassava solid waste (onggok) in Pekalongan District, East Lampung Regency). *Jurnal Ilmu-Ilmu Agribisnis*. 1 (4), 284-290 (in Indonesian). DOI: http://dx.doi.org/10.23960/jiia20131284-290.

15. Marimin. (2004). *Teknik dan Aplikasi Pengambilan Keputusan Kriteria Majemuk* (*Techniques dnd Applications Of Decision Making Multiple Criteria)*. Jakarta (ID): PT. Gramedia Widiasarana Indonesia (in Indonesian).

16. Marimin. (2017). *Sistem Pendukung Pengambilan Keputusan dan Sistem Paka.* (*Decision Support System and Expert System)*. Bogor (ID): IPB Press (in Indonesian).

17. Rangkuti, A.H. (2011). Teknik Pengambilan Keputusan Multi Kriteria Menggunakan Metode Bayes, MPE, CPI dan AHP. (Multi Criteria Decision Making Techniques Using Bayes Methods, MPE, CPI dan AHP). *Jurnal Comtech*, 2(1), 229-238 (in Indonesian). DOI: https://-doi.org/10.21512/comtech.v2i1.2738

18. Purba, S.A.B., Hartianti, A., & Tuningrat, I.A.M. (2015). Pemilihan Prioritas komoditas agrowisata menggunakan metode *analytical hierarchy process* (AHP) di Desa Candikuning Ii, Kec. Baturiti, Kab. Tabanan. (Priority selection of agro-tourism commodities using analytical hierarchy process (AHP) Method in Candikuning Ii Village, Baturiti district, Tabanan regency). *Journal of Agroindustry Engineering and Management*, 03(2), 82-92 (in Indonesian).

19. Retnoningsih, F., Suryawandani, I.O., & Parining, N. (2016). Pemilihan prioritas strategi pemasaran coklat olahan berdasarkan metode *Analytical Hierarchy Process*. (Priority selection of processed chocolate marketing strategy based on Analytical Hierarchy Process Method). *Jurnal Agribisnis dan Agrowisata*, 5(1), 1-9 (in Indonesian).

20. Septiaji, I.D., Cepriadi, & Tety, E. (2017). Analisis nilai tambah agroindustri produk hilir kakao (studi kasus pabrik mini chocato kelurahan Kapalo Koto, Kecamatan Payakumbuh Selatan, Sumatera Barat. (Added value analysis of downstream cocoa product agroindustry (case study of mini chocato factory Kapalo Koto Village, Payakumbuh Selatan Sub District, West Sumatera). *Jurnal Agribisnis,* 19(02), 1-15 (in Indonesian).

21. Sulistyowati, L., Pardian, P., Syamsyiah, N., & Deliana, Y. 2018. Development of small and medium business (SMES) of mango dodol processing to increase the added value (a case study in Ujungjaya Village, Indramayu District, West Java)", IOP Conference Series: Earth and Environmental Science 142 (2018) 012042. DOI:10.1088/1755-1315/142/1/012042.

22. Syam, H., Ma'arif, M.S., Eriyatno, Sailah, I., Machfud, & Didu, M.S. (2006) . Rancang bangun model strategi sistem penunjang keputusan pengembangan agroindustri berbasis kakao melalui pola jejaring usaha. (Design of strategy model of supporting system of decision of agro-industry development based on cocoa through business networking pattern). *Jurnal Teknologi Industri Pertanian*, 16(1), 18-27 (in Indonesian).

23. Tarigan, R. (2005). *Ekonomi regional teori dan aplikasi*. (Regional eccconomic Theory dan Application). Jakarta: PT. Bumi Aksara (in Indonesian).

24. Ulrich, K.T., & Eppinger, S,D. (2000). Product design and development. Boston: Irwin Mc Graw Hill Co.

25. Wardani, I.K. (2008). Rancang bangun sistem penunjang keputusan strategi pemasaran minyak atsiri di pasar ekspor. (Design of decision support system of essential oil marketing strategies in the export market). Unpublished doctoral dissertation, Institute Pertanian Bogor, Bogor, Indonesia (in Indonesian).

26. Wibowo, A., & Honggowibowo, A.S. (2014). Sistem pendukung keputusan untuk menentukan lokasi peternakan ayam broiler dengan Metode Perbandingan Eksponensial dan Naive Bayes. (Decision support system to determine the location of broiler chickens with the Exponential Comparison Method and Naive

Bayes). *Jurnal COMPILER*, 3(2), 49-57 (in Indonesian).

27. Wignjosoebroto, S. (2000). Evaluasi ergonomis dalam proses perancangan produk. (Ergonomic evaluation in product design process). Seminar Nasional Ergonomi, Perhimpunan Ergonomi Indonesia (PEI) pada tanggal 20 Agustus 2000: 1-7 (in Indonesian).

28. Wilkinson, J., & Rocha, R. (2009). *Agro-industry trends, patterns and development impact*. FAO and UNIDO. agro-industries for development, C.A da Silva et al (Eds).

29. Yusriana, & Jaya, R. (2015). Karakteristik mutu spesifik kakao Aceh: fisik, kimia dan sensori. (Specific quality characteristics of Aceh cocoa: physical, chemical and sensory). Seminar Riset dan Standarisasi Industri V. Banda Aceh 11-12 November (in Indonesian).

30. Yusriana, Yandra, A., Sapta, R., & Haryadi, P. (2016). Analisis titik-titik kritis ketelusuran pada rantai pasok kakao Aceh. (Analysis of critical points of traceability in Aceh cocoa supply chain). *Jurnal Teknologi Industri Pertanian,* 26(1), 31- 40 (in Indonesian).

31. Zhang, W. (2016). A study of food enterprises' awareness and behaviors for social responsibility. *Acta Universitatis Cibiniensis Series E: FOOD TECHNOLOGY,*20 (2), 53-6. DOI: https://doi.org/10.1515/aucft-2016-0015