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Article

The Analysis of Added Value and Business Development Strategies for the Semboro Orange Extract Agroindustry Using the High Pulsed Electric Field (HPEF) Pasteurization System

Budi Hariono[1], Mokhamad Fatoni Kurnianto[2], Aulia Brilliantina[3]*

[1] Department of Agricultural Technology; Politeknik Negeri Jember ; budi_hariono@polije.ac.id
[2] Department of Agricultural Technology; Politeknik Negeri Jember; m_fatoni_k@polije.ac.id
[3] Department of Agricultural Technology; Politeknik Negeri Jember; aulia_b@polije.ac.id
* Correspondence: aulia_b@polije.ac.id;

Abstract: Semboro Siamese oranges have a higher selling value However, the selling value of the Siamese oranges is still relatively low, thus some efforts need to be made to increase the added value of the Siamese oranges. One way that can be done is by producing Siamese orange extract using the High Pulsed Electric Field (HPEF) technology. The aim of this research is to determine the added value and business development strategies of the HPEF Siamese orange extract. The analysis methods used were Hayami and SWOT. The research results show that there is a linearity between the two methods which indicates a positive value with a ratio of value and added value that is classified as high category, and there are development strategies that can be implemented by expanding marketing areas and improving product quality and safety by applying the existing technology.

Keywords: Analysis of Added Value; Business Development Strategies; High Pulsed Electric Field (HPEF); Semboro Orange Extract.

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1. Introduction

In the context of the Indonesian economy, the agricultural sector has a central and vital role (1–3). The agricultural sector occupies the second position in supporting the increase in Gross Domestic Product (GDP) (4). The vision of the Indonesian government is to make this country an international food source by 2045. To achieve this goal, the agricultural sector has a key role that cannot be ignored. Agricultural activities involve various aspects such as cultivation of food crops, plantations, fisheries, forestry, and animal husbandry (5). The focus of this research is on the agricultural sector, with special emphasis on citrus plantations. In line with this, growth in the agricultural sector recorded the highest growth, supported by an increase in several commodities, including those from the horticultural sector.

The quality of Siamese oranges is unable to match the number of existing citrus commodities. The competition between local oranges and imported oranges is still dominated by imported oranges. According to the data released by the department of agriculture, the period between 2007 and 2014 showed an increasing trend of orange imports. The average import volume growth is 81.93% per year. Contributing factors include the unpleasant taste of local oranges, the unattractive appearance of oranges, and the uncertainty in their production. As a result, the selling price of local oranges is unable to compete with imported oranges. One of the provinces that recorded the largest Siamese orange harvesting area in Indonesia is East Java (6). This means that East Java has a significant contribution in the production of Siamese oranges. However, the production of Siamese oranges has not been able to overcome the dominance of imported oranges.

In Jember Regency, Siamese oranges are cultivated especially in four sub-districts, including Umbulsari (594,200 trees), Semboro (443,250 trees), Sumberbaru (159,340 trees)

and Jombang Sub-district (82,961 trees) with total production of 19,919 tons/year, 11,081 tons/year, 19,839 tons/year and 9,541 tons/year respectively (The Department of Agriculture and Food Security of East Java Province, 2023). The increase in added value of Siamese oranges in Jember Regency is still relatively low, even though it has competitive and comparative values (7). Among the four sub-districts that cultivate Siamese oranges, Semboro oranges have the largest population of Siamese oranges, around 3,500 ha out of 5,600 ha with orange production reaching 65,145 tons, with an average orange productivity in Semboro of 172.93 quintals per hectare (8).

Aligned with the growing of Siamese orange agribusiness in Jember Regency, more and more farmers are developing citrus plantation areas and orange production per year is increasing, thus marketing constraints begin to appear. Complaints often arise from citrus farmers regarding an indistinct marketing system and market play by the collectors in marketing areas, including East Java, Central Java and DKI Jaya. This causes the prices to fall below the existing standard prices and citrus farmers often suffer losses. Therefore, innovation is needed in the form of processed Siamese oranges to increase the competitiveness and the selling value of these orange crops.

One way to increase the added value of Siamese oranges is to produce orange extract using the HPEF non-thermal pasteurization technology. According to (9). the processing of orange juice using heat will reduce the quality of the citrus juice produced due to oxidation which causes a reduction in the vitamin C content and loses the original taste and aroma of the orange. Meanwhile, when using HPEF technology, Siamese orange juice does not lose vitamin C, the original taste or aroma of the orange juice. Siamese orange extract with HPEF technology is relatively new, so it is necessary to identify the internal and external factors as well as calculate how much profit the business actor gets. In addition, relatively few research related to this topic have been reviewed in Indonesia. Based on these problems, the purpose of this research is to find out the added value by using the hayami method and to identify the business development strategies by using the SWOT method.

2. Materials and Methods

2.1 Research Location and Time

The research was conducted from May-August 2023 in Jember Regency, which is one of the largest Siamese orange producing districts in East Java. The research location and the technique for determining respondents were selected and conducted purposively. According to (10) purposive is a technique for determining respondents who have been taken into consideration and can fulfil the required information used in the research. Respondents in this research included the orange plantations owners, the department of industry, and the academics.

2.2 Data Sources

Data sources were divided into two types, primary data and secondary data. Primary data included the costs involved in each production stage, as well as collecting IFE and EFE data to assess strategies that can be adopted by business actors in making decisions. In SWOT analysis, IFE (Internal Factor Evaluation) and EFE (External Factor Evaluation) are two essential tools used to evaluate the internal and external factors that affect an organization's performance. IFE is a tool used to evaluate the internal factors within an organization. This includes the strengths and weaknesses present in the organization's internal environment. EFE is a tool used to evaluate the external factors that impact the organization. This includes the opportunities and threats present in the external environment. The secondary data used included the information regarding the average per capita consumption, the average production in the province, and the orange production in Jember Regency. Secondary data were obtained from various sources such as books, journals, BPS, and other sources. On the other hand, primary data referred to the information obtained directly through observation, interviews, and questionnaires.

2.3 Data Analysis Methods

The method of data analysis used was a quantitative-descriptive approach. The data analysis technique applied to measure the added value was the Hayami method, meanwhile for the development strategies, the SWOT approach was used. The implementation of the Hayami method provides guidance to business actors in evaluating the potential benefits of innovation in increasing the product value. On the other hand, the SWOT method allows business actors to formulate strategies based on the identification of internal and external factors. SWOT analysis is a strategic planning tool used to identify and evaluate the Strengths, Weaknesses, Opportunities, and Threats associated with a business or project. It provides a framework for analyzing both internal and external factors that can impact the success of an organization. Data were collected through questionnaires and interviews, then the information obtained were processed by using the Microsoft Excel software.

2.4 The Analysis of Added Value

The implementation of the Hayami Method Table in the analysis of added value involves three variables which include input, output, price, revenue, profit generated, and also remuneration to business owners. The data were collected based on interviews with relevant parties in the orange commodity supply chain, including farmers, middlemen, distributors, and business operators in the orange beverage sector. The steps in calculating the Hayami method can be seen in Table 1.

Table 1. Components of the Added Value Calculation

No	Variable	Value	
	Output, Input, and Prices		
1	Output (kg)	OP	
2	Input (kg)	IP	
3	Labor (kg)	LB	
4	Conversion factor	FKO	OP/IP
5	Labor coefficient (Hok/kg)	KTK	LB/IP
6	Output price	HO	
7	Average labor wages (IDR/Hok)	UP	
	Revenues and Profits		
8	Raw material price (IDR/kg)	HBB	
9	Other input (IDR/kg)	IPL	
10	Output value (IDR/kg)	NO	FKO*HO
11	a. Added value (IDR/kg)	NT	NO-IPL-HBB
	b. Ratio of added value (%)	RNT	(NT/NO) x 100
12	a. Labor rewards (IDR/kg)	RTK	KTK x UP
	b. Labor share (%)	PTK	(RTK/NT) x 100
13	a. Profit (IDR/kg)	PFT	NT – RTK
	b. Profit level (%)	TPF	(PFT/NT) x 100
	Remuneration for the Owner of Production Factor		
14	Margin (IDR/kg)	MR	NO – HBB
	a. Labor revenue (%)	MTK	(RTK/MR) x 100
	b. Other input contributions (%)	MIL	(IPL/MR) x 100
	c. Profit (%)	MP	(PFT/MR) x 100

Source : (11)

2.5 SWOT

(12) explains several stages that need to be conducted to determine the position of the quadrant to establish the position of business actors, as follows:

a. Identification of internal factors and external factors.
b. In determining the weight value of each factor item, there are 4 categories including 0.20 which is very strong, 0.15 which is above average, 0.10 which is average, and 0.05 which is below average. The weight value is worth 1.00 from the accumulated results of each factor such as internal factors which have strengths and weaknesses with a total value of 1.00, and it also applies to external factors.
c. In determining the rating value, there are 4 categories including 4 which is very strong, 3 which is quite strong, 2 which is not so weak, and 1 which is very weak.
d. The score is calculated by multiplying the weight value and the rating value that has been obtained previously.

After completing the IFE and the EFE matrix calculations, the next step is to determine the coordinate points on the SWOT diagram based on the difference in scores between the two factors. In this diagram, the Y axis reflects differences in external factors, while the X axis reflects differences in internal factors (13). Aggressive strategies or SO can be implemented by optimizing internal strengths and external opportunities to encourage company growth. WO strategy is used to manage a company by exploiting opportunities and overcoming internal weaknesses. The ST strategy arises when facing threats that have the potential to harm the company, which requires management to focus on internal strengths. Meanwhile, the WT strategy is implemented with the aim to maintain the business's position in facing challenges (14).

3. Results and Discussion

3.1 Analysis on the Hayami Added Value

The analysis of added value in the processing of Semboro Siamese orange extract by using the HPEF technology was conducted by implementing the Hayami method. The results of the analysis on the added value of the agroindustry products can be seen in table 2.

Table 2. Calculation on the average added value of the Semboro Siamese orange extract agroindustry using HPEF technology per production process

No	Variable	Value
	Output, Input, and Prices	
1	Output resulted (Kg/production process)	39
2	Raw materials used (Kg/production process)	20
3	Labor (hour/production process)	8
4	Conversion factor	1,95
5	Labor coefficient	0,4
6	Output price (IDR/kg)	33000
7	Average labor wages (IDR/production process)	35000
	Revenues and Profits	
8	Raw material price (IDR/kg raw material)	6500
9	Other input contributions (IDR/kg output)	6513,157
10	Output value (IDR/kg)	64350
11	a. Added value (IDR/kg)	51336,843
	b. Ratio of added value (%)	79,77
12	a. Labor rewards (IDR/kg)	14000
	b. Labor share (%)	27,27
13	a. Profit (IDR/kg)	37336,843
	b. Profit level (%)	72,72
	Remuneration for the Owner of Production Factor	

No	Variable	Value
14	Margin (IDR/kg)	58350
	a. Labor revenue (%)	23,99
	b. Other input contributions (%)	11,16
	c. Profit (%)	63,98

Source: Primary data at the research location, 2023

Table 2 informs that the average added value obtained by the Semboro Siamese orange extract agroindustry by using the HPEF technology for every 1 kg of Siamese orange material into Semboro Siamese orange extract by using the HPEF technology is Rp. 51,336.84,-. It means that for every 1 kg of Siamese orange raw material used can provide added value of Rp. 51336.84,-. The ratios of added value are used to measure the progress achieved in the field of productivity of an agroindustry which concerns the added value of its products. The ratio value is obtained from the components of the added value of the Hayami Method. This ratio will be calculated and analyzed, including the ratio of added value per worker and profit per added value (15).

3.2 Matrix of the IFE (Internal Factor Evaluation)

Based on the conducted interviews and validation, there are 11 indicators that become internal indicators (strengths and weaknesses) of the Semboro Siamese orange extract agroindustry using HPEF technology. Based on the calculations in Table 3, it can be seen that the total internal matrix of strengths is 1.79 and the total internal matrix of weaknesses is 1.46. Therefore, the total internal matrix score, which is the sum of the internal matrices of weaknesses and strengths, is 3.25..

Table 3. Internal factor matrix of the Semboro Siamese orange extract agroindustry using HPEF technology

No	Dominant Internal Factor Strengths	Amount	Rating	Weight	Weight x Rating
1	Product taste and quality	16	4	0,12	0,48
2	There are facilities to support operations	6	2	0,05	0,07
3	Industry experience	13	3	0,10	0,32
4	Product practicality (easy to carry)	13	3	0,10	0,32
5	There are packaging labels	11	3	0,08	0,23
6	Customer loyalty	14	4	0,11	0,37
No	Weaknesses	Amount	Rating	Weight	Weight x Rating
1	Lack of promotion	11	2,75	0,08	0,23
2	The product is not optimal	12	3,00	0,09	0,27
3	The technology used is still new	15	3,75	0,11	0,43
4	The education level of workers is still low	5	1,25	0,04	0,05
5	Products are perishable	16	4,00	0,12	0,48
	TOTAL	133		1,00	3,25

3.3 Matrix of the EFE (External Factor Evaluation)

Based on the conducted interviews and validation, 7 indicators are obtained which become external indicators (opportunities and threats) of the Semboro Siamese orange extract agroindustry using HPEF technology. Based on the calculations in Table 4, it can be seen that the total external opportunity matrix is 1.68 and the total external threat matrix is 1.20, Therefore, the total external matrix score, which is the sum of the external matrices of opportunity and threat is 2.88.

Table 4. External factor matrix of the Semboro Siamese orange extract agroindustry using HPEF technology

No	Dominant External Factor Opportunities	Amount	Rating	Weight	Weight x Rating
1	Technological developments are increasingly advanced	13	3	0,18	0,60
2	The existence of an image as a typical regional food	7	2	0,10	0,17
3	Population growth is getting higher	14	4	0,20	0,69
4	The availability of training and guidance from the local government	8	2	0,11	0,23
No	Threats	Amount	Rating	Weight	Weight x Rating
1	Fluctuating production costs	4	1,00	0,06	0,06
2	Raw materials are seasonal	10	2,50	0,14	0,35
3	There are substitute products	15	3,75	0,21	0,79
	TOTAL	71		1,00	2,88

3.4 Matrix of IE for Positioning

The values obtained from the IFE and the EFE matrix will be entered into the Internal-External matrix to map the position of the Semboro Siamese orange extract agroindustry using HPEF technology. This Internal-External Matrix puts production in a nine-cell view. This IE Matrix is based on two key dimensions, including the total IFE weight score on the X axis and the EFE weight score on the Y axis (16). Based on the IFE matrix (table 3) and the EFE Matrix (table 4), it can be seen that the position on the X axis is at point 3.25 and the position on the Y axis is at point 2.88. For this quadrant, the appropriate strategy is an intensive approach, including market penetration, product development, and market development. Alternatively, a forward and horizontal integration strategy can be employed. This integration strategy involves gaining control over distributors, suppliers, and competitors. Forward integration focuses on enhancing control over distributors, while horizontal integration aims to manage competitors.

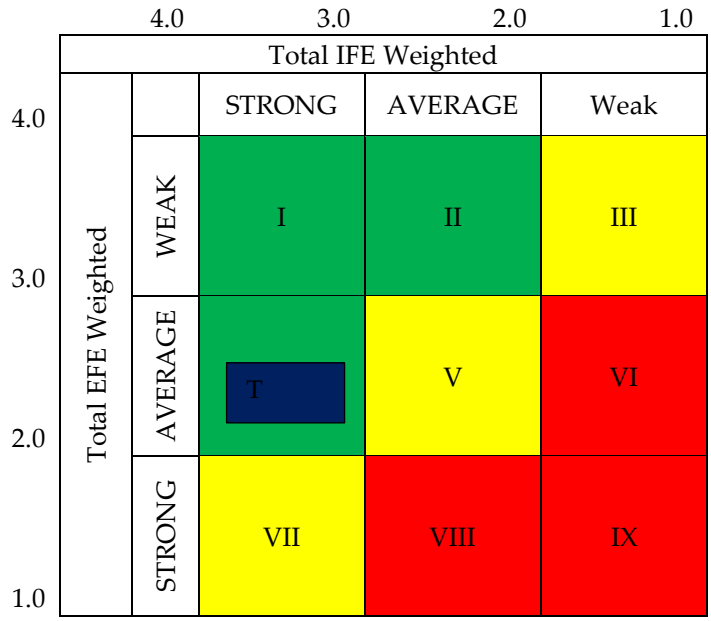

Figure 1. IE Matrix Production of the Semboro Siamese orange extract using HPEF technology

3.5 SWOT Matrix

The SWOT matrix is a tool used to help determine strategies by considering strengths, weaknesses, opportunities and threats (17). The SWOT matrix consists of SO (Strengths-Opportunities) strategy, WO (Weakness-Opportunities) strategy, ST (Strengths-Threats) strategy and WT (Weakness-Threats) strategy. Based on the analysis through the IE matrix, it can be obtained that the Semboro Siamese orange extract agroindustry using HPEF technology is in quadrant IV. Companies in the 4th quadrant include companies that are described as growing and build. Intensive strategy (market penetration, market development, and product development) or integrative strategy (backward integration, forward integration, and horizontal integration) is the right strategy for this area (18). This quadrant is very suitable to implement strategies such as Table 5. The SO strategy can be implemented by expanding marketing areas and improving product quality and safety by applying the existing technology. Based on research results (8), the HPEF pasteurization method can maintain the vitamin C content from the production process, compared to the thermal method. Moreover, according to research results (18), the HPEF method can reduce the total microbial content by 94.58% in Siamese orange milk drinks.

Table 5. Analysis of the SWOT Matrix

IFAS / EFAS	S	W
O	Expanding the marketing area and improving product quality and safety with the application of existing technology	Conducting promotional activities through the mass media and optimizing the amount of production by highlighting regional characteristics
T	Developing the products of HPEF siamese orange extract and improving the product quality and added value	Improving the quality of human resources in terms of technology and management

4. Conclusion

Based on the research results conducted, it can be concluded that the added value analysis of the Siamese orange extract agroindustry is classified in the high category and the added value of Siamese oranges is proven to provide benefits to business actors. The development strategies that can be implemented by business actors in the future are including the expansion of marketing areas, the improvement of quality and product safety with the application of existing technology, as well as the improvement of human resource quality in terms of technology and management.

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