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Supply Chain Priority Strategy and Added Value of Jackfruit in Tambang Sub-District, Kampar District, Riau Province

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A B S T R A C T

This research aimed to a) identify the flow of the jackfruit supply chain; b) obtain the added value of the jackfruit chips agroindustry; c) analyze the level of efficiency of the jackfruit chips agroindustry; d) formulate strategies and determine strategic priorities for increasing the supply chain and added value of jackfruit. The methods used in this research are both qualitative and quantitative. The research stage starts by analyzing the jackfruit supply chain using a framework of the food supply chain network (FSCN), calculating the added value of chips in the jackfruit chips agroindustry using the Hayami method and analyzing the level of efficiency of the jackfruit chips agroindustry. The researchers then formulate a strategy using SWOT and select priority strategies using the method of analytical hierarchy process (AHP). The research results showed that the supply chain structure consists of two structures, namely structure 1 (supplier-jackfruit chips agroindustry-consumer) and structure 2 (supplier-jackfruit chips agroindustry-retail-consumer). The flow of goods occurs from suppliers to consumers, the flow of money from consumers to suppliers, and the flow of information from suppliers to consumers and vice versa. The calculation of added value obtained from micro, small, and medium enterprises (SMEs) in Sinar Hidayah was IDR 8,198.71/kg, Usaha Baru Ibu was IDR 13,960.58/kg, and Restu was IDR 4,718.75/kg. The R/C ratio in SME Sinar Hidayah is 1.72, Usaha Baru Ibu is 2.42, and Restu is 1.26. Based on the results of the strategy formulation, the priority strategy was obtained, namely expanding the raw material and marketing network for jackfruit chips with a weight of 0.331, and the selected criteria was logistics with a weight of 0.322.

1. INTRODUCTION

1.1. Research Background

The agricultural sector includes fruit, vegetable, tuber, and other crops. Some agricultural products, such as fruits and vegetables, are perishable or easily damaged, so the product shelf life is not long if not given post-harvest handling. Post-harvest handling can reduce the risk of product damage by processing raw materials into more durable and profitable products for farmers, intermediary traders, industries, and consumers. One type of fruit that is an agricultural commodity is jackfruit. Jackfruit is a plant that originated from India and is quite widely cultivated in Indonesia. Generally, this plant is planted in home yards as a land filler. Based on statistical data in 2021, jackfruit production in Indonesia reached 906,514 tons/year. Riau Province is a province that has jackfruit plants with a production of 20,424 tons/year. Kampar Regency is one of the regencies that has the potential to develop jackfruit commodities. The area of jackfruit land in 2016 in Kampar Regency was 649 ha, with a production of 2,667 tons/year [1].

Jackfruit is processed into chips by industries in the Kampar area. The jackfruit chips industry uses raw materials supplied by collecting traders and jackfruit farmers in the Tambang sub-district as well as outside the sub-district, such as Pasir Pangaraian, Pangkalan Kerinci, Bangkinang, and other areas, then processed into jackfruit chips and distributed to distributors and direct consumers. There is an interrelated relationship between the actors to form the supply chain. The supply chain is an entity that is interrelated and interacts in a series of business activities ranging from upstream (initial stage) to downstream (final stage) to achieve common goals [2]. Three flows that need to be managed in the jackfruit supply chain are material, financial, and information flow [3].

Material flow in the jackfruit supply chain is related to the movement of raw materials to finished products. The demand for jackfruit chips is increasing, and there are limited raw materials in the form of ripe jackfruit to meet this demand. The provision

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of ripe jackfruit raw materials is still a challenge for the agroindustry because jackfruit plants are only as plants in the yard, not as a farming business.

While jackfruit can be utilized when young or ripe, most farmers in Tambang subdistrict prefer to sell jackfruit when it is young because the harvesting time is faster and the selling price is quite high. In addition, farmers sell jackfruit to various collectors freely by choosing the highest purchase price, making it difficult for the collectors to guarantee the quantity of jackfruit desired by the agroindustry. The distribution of raw materials from farmers and collectors to the processing industry is often delayed due to the distance between raw materials and the processing site, thus disrupting the smoothness of the production process and the distribution of jackfruit chips and the risk of damage to raw materials.

The raw materials used include perishable raw materials, so an adequate and smooth supply chain management system is needed. The sustainability of the supply chain system will be guaranteed if there is certainty regarding the amount of jackfruit raw material supply and demand for jackfruit [4]. Processing jackfruit into jackfruit chips adds value to the product, resulting in a higher selling price. The value added provided to each agroindustry is influenced by technical and market factors. Analysis of value addition to supply chain members can encourage supply chain actors to carry out activities that provide value to jackfruit chips products to make the agroindustry profitable and efficient.

Value-added is the compensation received by workers and profits earned by agroindustry entrepreneurs [5]. This analysis is also useful to determine how much value is added to each unit of output produced [6]. The flow of increasing jackfruit-added value occurs in every upstream-to-downstream supply chain actor [7]. The jackfruit supply chain has not been identified, and the added value and profit obtained by the agroindustry are not yet known. These problems were observed in three jackfruit chip agroindustry in Tambang sub-district, namely Sinar Hidayah, Usaha Baru Ibu, and Restu. The problems were structured to formulate strategies using the SWOT method to improve supply chain management and added value of jackfruit. The results of the strategy formulation obtained were subjected to pairwise comparison assessment through the AHP method to obtain recommendations for the selected strategy.

1.2. Literature Review

1.2.1 Supply Chain

The supply chain is a system in which organizations distribute goods produced and services to each customer. This chain can also be said to be a network of integrated organizations with a similar goal, namely, to meet the needs of the best possible supply and distribution of goods [8]. The supply chain is also defined as a group of companies that are connected to each other and aim to provide value-added in transforming inputs into outputs according to consumer demand [9]. Supply chain analysis uses the food supply chain network method, which consists of network structure, business processes, chain management, and chain resources [10].

1.2.2 Added Value

The increase in value made by supply chain actors through a production process or adding other inputs to the materials used during the production process is referred to as added value [11]. Value-added analysis is used to obtain information about the estimated added value, profit for investors, labor rewards obtained from processing raw materials per kilogram into the final product [12]. Value addition to a product can occur by utilizing natural resources, labor and technology [13].

The concept of added value is the change or increase that occurs in the product due to the treatment given to a commodity. The treatment includes sorting, processing, packaging, and others [14]. Value added is calculated using the Hayami method so that it can calculate the amount of output, input, conversion factor, labor reward, the contribution of other inputs, margin, value-added, and profit of a product [15]. The categories of value-added ratio in an industry can be divided into three: low, medium, and high. An industry with a value-added ratio of less than 15% indicates a low value-added industry. In comparison, a 15-40% value-added ratio indicates a medium value-added industry, and an industry with a value-added ratio of more than 40% indicates that the industry is high value-added [5].

1.2.3 Revenue and Income

Revenue is the amount of production multiplied by the unit price valued in rupiah [16]. Income is the amount of net profit obtained from the difference between revenue and total business costs, measured in rupiah (Rp) [17]. Total costs are categorized into fixed costs and non-fixed costs or variable costs. Fixed costs are all types that do not depend on the production size. Fixed costs include land rent in the form of money or taxes; the amount of fixed costs is constant. Variable costs are costs that change in line with fluctuations in the amount of production. Non-fixed costs include raw material costs and additional material costs [18].

1.2.4 Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE)

Internal and external factor analysis uses internal factor evaluation (IFE) and external factor evaluation (EFE) matrices. The IFE matrix evaluates internal factors (strengths and weaknesses) in business activities and serves as the basis for identifying and evaluating the relationship between these factors. Intuitive judgment is required in developing the IFE matrix. Internal factors are related to marketing, finance, operations, organization, and human resources. EFE matrix to summarize and evaluate the economy, socio-culture, population statistics, environment, politics, government, law, technology and competitive information [19].

1.2.5 Internal-External Matrix

The internal, external matrix is created based on the General Electric model (GE-Model) by using measures of strengths within the company and external impacts that will be faced to obtain an appropriate strategy at the corporate level [20].

1.2.6 SWOT [20]

SWOT analysis is to connect internal and external factors in a company. Decisions made by the company are related to the company's mission, vision, and policies that need to be developed

1.2.7 Past Research

Recused the supply chain and added value of jackfruit chips in the natural panda chips agroindustry in Gedong Tataan District, Pesawaran Regency, with descriptive methods and data envelopment analysis, resulting in supply chain

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efficiency of 37.50% for the category of decision-making units (DMU) farmers, 100% for DMU retail and agroindustry. The supply chain system has not been able to provide fair profit sharing, while jackfruit chips provide positive value addition and have the potential to be developed [21]. The analysis of the network structure and business processes in the supply chain of beach sand vegetables with the food supply chain network (FSCN) resulted in five distribution pattern structures. It emphasized the importance of building trust in the supply chain flow, coordination, collaboration and policy support for sustainable profit [22]. The analysis of the palm oil supply chain at PT Tribakti Sarimas, Riau, with SWOT and AHP methods, resulted in the company having to make maximum use of facilities and infrastructure to improve the quality of CPO with a weight of 0.165 [23]. Analyzing the added value of cassava as raw material for chips at UD Sinar Gemilang, Bobol Village, Sekar District, Bojonegoro Regency, using the Hayami method resulted in an added value ratio of 65.1% [24].

1.3. Research Objective

The objectives of this research are as follows: (1) To identify the supply chain flow of jackfruit in Tambang Sub-District, Kampar District; (2) To obtain the added value of jackfruit chips agroindustry in Tambang Sub-District, Kampar District; (3) To analyze the efficiency level of the jackfruit chips agroindustry in Tambang Sub-District, Kampar District; (4) To formulate and prioritize strategies to improve the supply chain and added value of jackfruit.

2. METHODS

2.1. Location of Research

The research was conducted in Kecamatan Tambang, Kabupaten Kampar, Riau Province. The research focused on Kualu Nenas Village, the centre of the pineapple chips and jackfruit chips industries. The research location was chosen intentionally or through purposive sampling.

2.2. Sampling Technique

The sampling technique used to identify the supply chain and added value of jackfruit used two sampling techniques, namely snowball sampling and purposive sampling. Respondents used in this study were 10 jackfruit farmers, 4 jackfruit collectors, 3 jackfruit chips agroindustry people, 2 lecturers of Agricultural Industrial Technology and 1 Coordinator of the Agricultural Extension Center (AEC) of Tambang District, Kampar Regency.

2.3. Stages of Research

The implementation stage of this research begins with a literature study, followed by identifying problems or constraints faced and formulating problems in accordance with these problems. Furthermore, setting research objectives, collecting primary and secondary data through field observations, direct interviews with the parties concerned, and literature studies in the form of records or reports from supply chain actors. The next stage is processing and analyzing research data. The analysis carried out includes supply chain analysis, value-added analysis, analysis of the efficiency level of jackfruit chips agroindustry, formulating strategies and determining priority strategies to obtain the right strategy to be considered for the parties concerned.

2.4. Data Type and Sources

The data used in this research consists of two data sources, namely primary data and secondary data. Primary data is needed in qualitative and quantitative data obtained through field observations, interviews, and questionnaires. In contrast, secondary data is obtained through literature studies, internet searches, articles, and other documents that are still relevant to the research.

2.5. Analytical Methods

Data analysis was carried out using the following methods.

1. Jackfruit supply chain analysis was conducted by observing the coordination between institutions or supply chain actors from farmers to the industry. The food supply chain network (FSCN) framework includes network structure, business processes, management, and resources.
2. Value-added analysis is done by calculating using the Hayami method in the jackfruit chips agroindustry.

Table 1. Procedure for Calculating Added Value Using the Hayami Method

Variables	Value
I. Output, Input and Price	
1. Output (kg jackfruit chips)	A
2. Input (kg jackfruit)	B
3. Labor (HOK/week)	C
4. Conversion Factor	D=A/B
5. Labor Coefficient (HOK/kg input)	E=C/B
6. Price of jackfruit chips (IDR/kg output)	F
7. Labor Wages (Rp/HOK)	G
II. Revenue and Profit	
8. Jackfruit Price (IDR/kg input)	H
9. Other Input Contributions (IDR/kg)	I
10. Output Value (IDR/kg)	J=D x F
11. a. Added Value (IDR/kg input)	K=J-I-H
b. Added Value Ratio (%)	L%= (K/J) x 100%
12. a. Labor Income (IDR/kg input)	M= E x G
b. Labor Share (%)	N%= (M/K) x 100%
13. a. Profit (IDR/kg input)	O=K-M
b. Profit Rate (%)	P%=(O/K) x 100%
III. Returns to Owners of Factors of Production	
14. Margin (IDR/kg)	Q= J-H
Labor Income (%)	R=M/Q x 100%
Contribution of other input (%)	S= I/Q x 100%
Company Profit (%)	T = O/Q x 100%

Source: [5]

3. Analysis of the efficiency of jackfruit chips agroindustry in one particular period. Efficiency analysis determines

whether the agroindustry is efficient and profitable to develop. The following is the calculation of the efficiency analysis of jackfruit chips agroindustry

a. Total cost

$$TC = FC + VC$$

Information:
TC = Total cost (IDR/year)
FC = Fixed cost (IDR/year)
VC = variable cost (Rp/year)

b. Total revenue

$$TR = P \times Q$$

Information:
TR = Total revenue (IDR/year)
P = Price (IDR/kg)
Q = Quantity (IDR/year)

c. Efficiency analysis is an analysis used to determine whether the agroindustry is efficient and profitable to develop or not. The equation to calculate the efficiency analysis is as follows:

$$\text{R/C ratio} = \frac{TR}{TC}$$

4. Input stage. Analysis of internal factors and external factors using internal factor evaluation (IFE) and external factor evaluation (EFE) matrix calculations
5. Matching stage This stage adjusts the internal resources of the company with external conditions and develops appropriate strategic alternatives. The results of the IFE and EFE matrices are used in developing supply chain strategies and added value of jackfruit by utilizing strengths and opportunities reducing weaknesses, and avoiding threats. The total score of the IFE and EFE matrices is entered into the IE matrix to obtain one of the main categories (grow and build, hold and maintain, harvest or divest). Strategy formulation using the SWOT method (strengths, weaknesses, opportunities, threats). Alternative results in the SWOT matrix are processed using the AHP method.
6. Priority of strategies formulated using analytical hierarchy process (AHP) conducted by three experts. The data was processed using the Expert Choice 11 application

3. RESULT AND DISCUSSION

3.1. Supply Chain Mechanism

3.1.1. Supply chain network structure

The supply chain network structure consists of several supply chain actors who have their respective roles. Jackfruit chain actors consist of several actors, including jackfruit farmers and jackfruit collecting traders, jackfruit chips agroindustry (MSME Sinar Hidayah, MSME Usaha Baru Ibu, MSME Restu), retail, and consumers. The following is an explanation of each member of the jackfruit supply chain.

a. Raw material supplier
The jackfruit supply chain has two raw materials suppliers: jackfruit farmers and jackfruit traders. First, jackfruit farmers cultivate jackfruit in their yards and gardens. The cultivated jackfruit is Dulang jackfruit, which has the characteristics of a fruit with a sweet taste, low water content, large dami Jackfruit, yellow colour and thick. Activities carried out by jackfruit farmers include land preparation, planting jackfruit seedlings, maintenance, and harvesting jackfruit fruit. Jackfruit is sold directly to traders and the jackfruit chips agroindustry. The size of the fruit determines the price of jackfruit. Second, the collecting traders act as people who collect or look for jackfruit from several farmers around the agroindustry or outside the area. These traders collect jackfruit for one week and then deliver it to the agroindustry in Kualu Nenas Village.

b. Processing section
This agroindustry buys raw materials from farmers and jackfruit traders. Several stages of making jackfruit chips are peeling, washing, draining, frying, draining oil, and packaging. In making jackfruit chips, some agroindustry add baking soda at the appropriate dose. The jackfruit chips produced are sold in outlets and to souvenir shops in Pekanbaru City.

c. Retail
Retail is the customer of the jackfruit chips agroindustry. Retail is the link between agroindustry and consumers. The consumers in question will buy jackfruit chips from several jackfruit chip agroindustry in retail. Some of the retailers that become customers of the jackfruit chips agroindustry are souvenir shops, lower markets and fruit markets in Pekanbaru.

d. Consumer Consumers are the last supply chain actor in the jackfruit supply chain in Tambang Sub-District. Consumers buy jackfruit chips at the agroindustry in Tambang sub-district or available retailers.

Two jackfruit supply chain structures were formed based on the actors in the jackfruit supply chain. The network structure of the jackfruit supply chain can be seen in Figure 1.

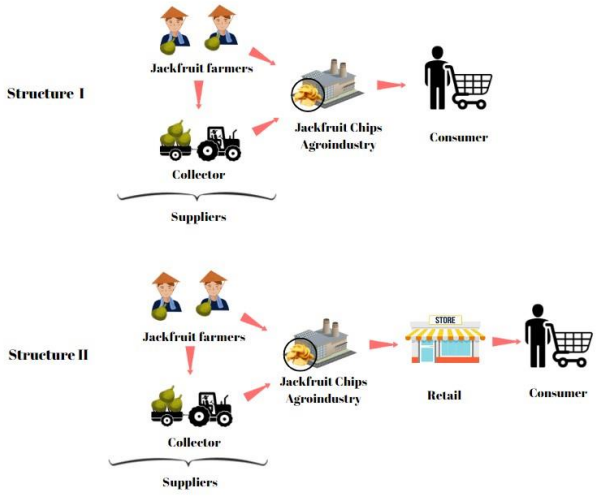

Fig 1. Jackfruit Chips Supply Chain Structure

The following jackfruit supply chain structure is divided into two chain structure flows.

1. Supply chain structure I (Supplier ⇨ Jackfruit chips agroindustry ⇨ Consumer). In this chain, the suppliers involved are farmers and traders who supply jackfruit to the agroindustry. Then this agroindustry sells jackfruit chips to consumers directly.
2. Supply chain structure II (Supplier ⇨ Jackfruit chips agroindustry ⇨ Retail/Stores ⇨ Consumers). Supply chain II explains that jackfruit suppliers supply to the agroindustry for processing into jackfruit chips. The

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production of jackfruit chips is distributed to retailers who have become customers of the jackfruit chips agroindustry. Retail is in the form of supermarkets and souvenir shops that have become regular customers of the jackfruit chips agroindustry. Then, retail sells products to end consumers.

The supply chain flow is divided into three, namely, the flow of goods, the flow of money, and the flow of information. The flow of goods occurs from upstream to downstream, namely the jackfruit processing into jackfruit chips. The flow of money that occurs from downstream to upstream. The flow of information occurs reciprocally from upstream to downstream or vice versa. The following explains the jackfruit supply chain flow in the Tambang sub-district.

a. Flow of goods

The flow of goods in structure I (Figure 1) starts from suppliers, namely jackfruit farmers and collecting traders who work as finders and collectors of jackfruit from several farmers. Furthermore, it is sent to the jackfruit chips agroindustry to be processed into jackfruit chips. The jackfruit is delivered by farmers using motorcycle transportation and collecting traders using pick-up trucks. Jackfruit is delivered once a week, and the demand is not always the same, which is sometimes fulfilled and does not depend on the ability to find jackfruit from collecting traders. Jackfruit delivered in one week was 25 pieces at Sinar Hidayah MSME, 50 pieces at Usaha Baru Ibu MSME and 130 pieces at Restu MSME. The jackfruit chips produced by UMKM Sinar Hidayah 12 kg, UMKM Usaha Baru Ibu 35 kg and UMKM Restu 31 kg are sold to consumers in packages of 50-100 g and > 1 kg, while in structure II (Figure 7) jackfruit suppliers send jackfruit chips to the agroindustry to produce jackfruit chips. The marketing of jackfruit chips through retail is done by delivering every time the stock in retail runs out.

b. Money flow

In structure I (Figure 7), the flow of money starts from consumers, jackfruit chip agroindustry to jackfruit farmers, while in structure II it starts from consumers, retail, jackfruit chip agroindustry to jackfruit farmers. Payments from consumers and retail can be made in cash/transfer and payments from agroindustry to suppliers in cash. The money paid by consumers/retailers to the agroindustry is used to pay for jackfruit purchased from suppliers and other operational needs. Money earned by intermediary traders is used to buy jackfruit from farmers.

c. Information flow

The flow of information in structure I start from suppliers, jackfruit chip agroindustry to consumers and vice versa, while structure II starts from suppliers, jackfruit chip agroindustry, retail, consumers, and vice versa. each supply chain actor has a very significant role in providing information. The delivery of information by the jackfruit chip agroindustry to suppliers regarding the quality of jackfruit that is good to be produced into jackfruit chips, the price, and quantity required by the agroindustry, while the information conveyed from suppliers to the jackfruit chip agroindustry is the availability of jackfruit in the field. Information from retail to the jackfruit chip agroindustry is in the form of demand for jackfruit chips, prices, the amount of stock in retail, and other information according to the agreement of both parties. This information can support the smooth production of jackfruit chips.

3.1.2. Supply chain business process

a. Cycle Overview

Material suppliers, the jackfruit chip agroindustry, and consumers or customers are the main members of the jackfruit supply chain. Jackfruit suppliers are obtained directly from intermediary traders or farmers. These raw materials come from locations around the factory and other regions. Suppliers sell jackfruit in fruit form to the jackfruit chip agroindustry. Suppliers distribute jackfruit to each jackfruit chip agroindustry in accordance with orders if fulfilled. The jackfruit is processed into jackfruit chips with other supporting ingredients such as baking soda and cooking oil. Then, the chips are sold to consumers or customers. An overview of the cycle can be seen in Figure 2.

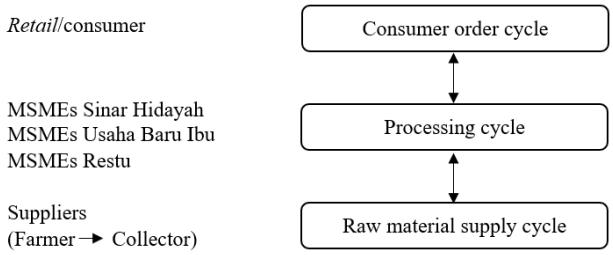

Fig 2. Overview of the Jackfruit Supply Chain Cycle in Tambang Sub-District

The raw material supply cycle is based on orders from the jackfruit chips agroindustry, but suppliers also supply jackfruit with the amount available in the garden. Delivery of jackfruit to the agroindustry is done at least once a week. The processing cycle occurs as long as raw materials are available and production facilities are adequate in the agroindustry. In the consumer ordering cycle, consumers purchase products with the desired number of chips. Consumers can order jackfruit chips offline or online.

b. Push/pull overview

A push review is an action that anticipates orders for jackfruit chips from consumers and a pull review is an action taken because of orders for jackfruit chips from consumers. The following push/pull review of the jackfruit supply chain in the Tambang sub-district can be seen in Figure 3.

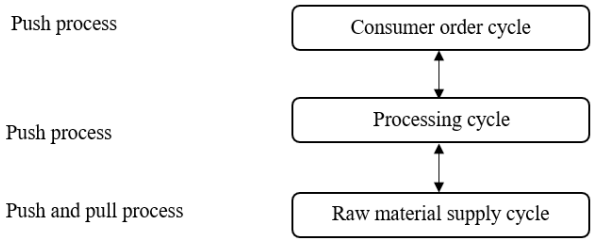

Fig 3. Push/Pull Overview of the Jackfruit Supply Chain in Tambang Sub-District

Figure 3 shows that the raw material supply cycle occurs in a push and pull process, while the processing and consumer order cycles occur in a push process. In the raw material supply cycle, the pull process occurs because the agroindustry orders jackfruit to suppliers with a certain amount each week. Still, if the supply of jackfruit in collectors and farmers is excess stock, it is offered to the jackfruit chip agroindustry to anticipate the lack of stock (push process). The processing cycle in the

jackfruit chips agroindustry occurs in a push process because it uses a make-to-stock production system. Make-to-stock produces the final product to be stocked and meet consumer demand [25]. MSME Sinar Hidayah, MSME Usaha Baru Ibu and MSME Restu produce jackfruit chips to anticipate customer demand. The customer order cycle occurs in a push process, where retailers purchase products to anticipate end-consumer demand. This cycle occurs because the number of purchases of jackfruit chips from end consumers varies.

2. Chain resources
   Jackfruit's supply chain consists of two resources, namely physical resources and human resources. Physical resources in the jackfruit chips agroindustry include raw materials, additional materials, processing sites, and transportation facilities.
3. Supply chain management
   a. Contractual agreement. The supplier and the jackfruit chip agroindustry have no written contractual agreement. The two parties only make verbal agreements in ordering jackfruit.
   b. The transaction system that occurs in the jackfruit supply chain in the Tambang sub-district consists of two transactions, namely supplier transactions with the jackfruit chip agroindustry and agroindustry transactions with retail/consumers.

3.2. Added Value of The Jackfruit Chips Agroindustry

Value-added analysis was conducted on each jackfruit chips agroindustry in Tambang sub-district. The added value generated in each agroindustry is different. The following is the calculation of the added value of each jackfruit chip agroindustry in one week in Table 2.

Table 2. Calculation of Added Value of Jackfruit Chips in One Week

Variables	Information	MSME Sinar Hidayah	MSME Usaha Baru Ibu	MSME Restu
I. Output, Input dan Price				
1. Output (kg jackfruit chips)	A	12	35	31
2. Input (kg jackfruit)	B	135	270	520
3. Labor (HOK/week)	C	2	4	12
4. Conversion Factor	D=A/B	0,09	0,13	0,06
5. Labor Coefficient (HOK/kg input)	E=C/B	0,01	0,01	0,02
6. Price of jackfruit chips (IDR/kg)	F	160.000,00	150.000,00	160.000,00
7. Labor Wages (IDR/HOK)	G	80.000,00	90.000,00	65.000,00
II. Revenue and Profit				
8. Jackfruit Price (IDR/kg)	H	2.777,78	2.777,78	2.500,00
9. Other Input Contributions (IDR/kg)	I	3.245,74	2.706,08	2.319,72
10. Output value (IDR/kg)	J=D x F	14.222,22	19.444,90	9.538,46
11. a. Added Value (IDR/kg)	K=J-I-H	8.198,71	13.960,58	4.718,75
b. Added Value Ratio (%)	L%= (K/J) x 100%	58	72	49
12. a. Labor Income (IDR/kg input)	M= E x G	1.185,19	1.333,33	1.500,00
b. Labor Share (%)	N%= (M/K) x 100%	14	10	32
13. a. Profit (IDR/kg input)	O=K-M	7.013,52	12.627,25	3.218,75
b. Profit Rate (%)	P%=(O/K) x 100%	86	90	68
III. Returns to Owners of Factors of Production				
14. Margin (IDR/kg)	Q= J-H	11.444,44	16.666,67	7.038,46
a. Labor Income (%)	R=M/Q x 100%	10	8	21
b. Contribution of other input (%)	S= I/Q x 100%	28	16	33
c. Company Profit (%)	T = O/Q x 100%	61	76	46

The table shows that the highest added value is found in MSME Usaha Baru Ibu at 72%. Sinar Hidayah MSME with an added value of 58% and Restu MSME has an added value of 49%. The magnitude of the value-added ratio in all jackfruit chips agroindustry is in the high category. Stated that high added value has a ratio of > 40% [5].

MSME Sinar Hidayah processes 135 kg of jackfruit per week and the resulting jackfruit chips are 12 kg. The conversion factor obtained is 0.09, this conversion factor is the result of the amount of jackfruit chips produced divided by the amount of jackfruit to be processed. The labor coefficient at MSMEs Sinar Hidayah is 0.01. This coefficient is obtained from labor divided by input. This MSMEs has a workforce of 2 people, the number of working days in one week is one day with working hours of 8 hours. The wage given to labor is IDR 80,000. The price of jackfruit paid is IDR 2,777.78 per kg of jackfruit. Other input contributions to MSMEs Sinar Hidayah include cooking oil, baking soda, packaging and depreciation costs amounting to IDR

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3,245.74/kg. The value added generated was IDR 8,198.71 and the labor income to be paid was IDR 1,185.19. The profit obtained by MSMEs Sinar Hidayah amounted to IDR 7,013.52.

MSMEs Usaha Baru Ibu processes 270 kg of jackfruit by producing 35 kg of jackfruit chips. The labor used is 2 people, the number of working hours is 8 hours and two working days a week. The resulting conversion factor is 0.13, i.e. 1 kg of input produces 0.13 kg of jackfruit chips. The labor coefficient required to process 1 kg of jackfruit is 0.01 HOK/kg with a labor wage of IDR 90,000. Other inputs provided in processing jackfruit are cooking oil and packaging and depreciation costs of IDR 2,706.08/kg of input. Value added is obtained from the output value minus the contribution of other inputs and the price of jackfruit/kg. The added value of jackfruit chips produced at MSMEs Usaha Baru Ibu amounted to IDR 13,960.58, and the profit obtained was IDR 12,627.25. The margin is obtained from the output value minus the input price; the margin in this MSME is IDR 16,666.67. The return on labor income is 8%, and the profit obtained by MSMEs is 76%.

MSMEs Restu processes 520 kg of jackfruit per week and produces 31 kg of chips. The resulting conversion factor is quite small at 0.06 because the chips produced are drier than other MSMEs. The labor used is 3 people with a total working hour of 11 hours for 4 days a week. The labor wage provided is IDR 65,000.00/HOK. The price of jackfruit chips is IDR 160,000 per kg and the price of jackfruit per kg is IDR 2,500. In addition, MSMEs use other materials such as cooking oil, packaging, depreciation of equipment at a cost of IDR 2,319.72/kg of input. The output value is obtained from the conversion factor multiplied by the price of jackfruit chips, resulting in IDR 9,538.46. The added value provided is IDR 4,718.75, and the profit is IDR 3,218.75, while in return, the owner has a margin of IDR 7,038.46 and a profit of 46%.

3.3. Efficiency Level of Jackfruit Chips Agroindustry

The efficiency of the jackfruit chips agroindustry is analyzed by analyzing the costs incurred and the revenue obtained by the agroindustry in a certain period. The following are the results of calculating the efficiency of each jackfruit chips agroindustry in Table 3.

Table 3. Calculation Results of Agroindustry Efficiency of Jackfruit Chips

MSMEs	Revenue (TR) (IDR/year)	Cost (TC) (IDR/year)	Income (π) (IDR/year)	R/C ratio
Sinar Hidayah	92.160.000	53.575.074,74	38.584.925,26	1,72
Usaha Baru Ibu	252.000.000	104.021.150,18	147.978.849,82	2,42
Restu	238.080.000	189.591.172,32	48.488.827,68	1,26

Efficiency analysis was conducted to determine each industry's efficiency level by looking at the results of the comparison of total revenue and total cost. Based on Table 3, shows that the efficiency value of MSME Sinar Hidayah is 1.72, the efficiency value of MSME Usaha Baru Ibu is 2.42, and the efficiency value of MSME Restu is 1.26. Based on the efficiency value of each agroindustry, it can be assessed that MSMEs Sinar Hidayah, Usaha Baru Ibu and Restu are efficient and profitable because they obtain an efficiency value greater than one.

3.4. Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) Matrix

The information on the condition of the jackfruit supply chain in Tambang sub-district was then analyzed for internal and external factors. The IFE and EFE matrices were obtained from interviews and assessments conducted by 5 respondents. The resulting weighting is the average weight of all respondents. Ratings on the IFE and EFE matrices are generated from an average of 5 respondents. The results of the assessment of internal factors in the form of weights and ratings can be seen in Table 4.

Based on this table, the main strength is the strategic sales location of jackfruit processed products, which has a total score of 0.3195. This factor is the main strength because the sales location of Jackfruit Chips is on the crossroads, so many tourists visit the shop. The weakness of the internal company is the availability of raw materials in the form of jackfruit, which is still low with a score of 0.0703. This is because the supply of jackfruit raw materials is not smooth from suppliers to agroindustry. Many jackfruit farmers sell jackfruit in a young condition at a fairly high price and lack information on jackfruit producers' location.

Table 4. IFE Matrix Assessment

Strength	Weight	Rating	Score
Characteristics of processed jackfruit products with distinctive flavours and without preservatives	0.0607	4	0.2428
Strategic sales location of processed jackfruit product	0.0799	4	**0.3195**
Flexible payment	0.0575	3	0.1725
Available human resources	0.0671	4	0.2684
The product brand is well known to the public	0.0671	3	0.2013
Partnerships have been established between supply chain actors	0.0767	4	0.3067
Having repeat customers	0.0639	4	0.2556
Weakness	**Weight**	**Rating**	**Score**
Business capital is still limited	0.0607	2	0.1214
Jackfruit ripeness is not uniform	0.0671	2	0.1342
Communication between supply chain actors is not smooth	0.0575	2	0.1150
Human resource capability is still low	0.0543	2	0.1086
Delivery time for raw materials is still slow	0.0735	1	0.0735
Distribution of processed jackfruit products is not yet widespread	0.0767	1	0.0767
Raw material availability is still low	0.0703	1	**0.0703**
Promotion has not been maximized	0.0671	2	0.1342
Total	1.0000		2.6006

The total IFE matrix score is 2.6006, which indicates that the internal position of the jackfruit chips agroindustry is strong. The location of sales influences the increase in sales figures, the more strategic the location, the greater the opportunity for the business to be developed [26].

Furthermore, the EFE matrix assessment is based on the company's response to opportunities and threats that occur at this time. The following are the results of the EFE matrix assessment in Table 5.

Table 5. EFE Matrix Assessment

Opportunities	Weight	Rating	Score
Demand for jackfruit chips is increasing	0.1805	3	**0.5414**
The development of digital promotional media	0.1729	3	0.5188
Availability of financial institutions that provide capital loans	0.1429	3	0.4286
Threats	Weight	Rating	Skor
Jackfruit price fluctuations	0.1353	3	0.4060
Dependence on one actor of the jackfruit supply chain	0.1128	2	0.2256
The existence of competitors of products	0.1429	3	**0.4286**
Government assistance and supervision is still lacking	0.1128	3	0.3383
Total	1.0000		2.8872

Based on Table 5, increasing product demand is an opportunity with a score of 0.5414, followed by the factor of developing digital promotional media. The main threat to the jackfruit supply chain is the presence of competitors of similar products, with a score of 0.4286. Therefore, these opportunities must be utilized by the agroindustry in order to maximize its business. The EFE analysis results have a score of 2.8872, which can be interpreted to mean that the supply chain in the agroindustry can respond well to opportunities and threats. If the score is above the average of 2.5, then the agroindustry can take advantage of opportunities, and the effects of threats are minimized.

3.5. Internal External (IE) Matrix

Determination of the company's position is done by looking at the results of the IFE and EFE matrix assessments. The results of the IFE matrix have a score of 2.6006, and the EFE matrix has 2.8872. In the IE matrix, the jackfruit supply chain is in the position of cell V, as seen in Figure 4. Cell V shows the best strategy, namely, hold and maintain.

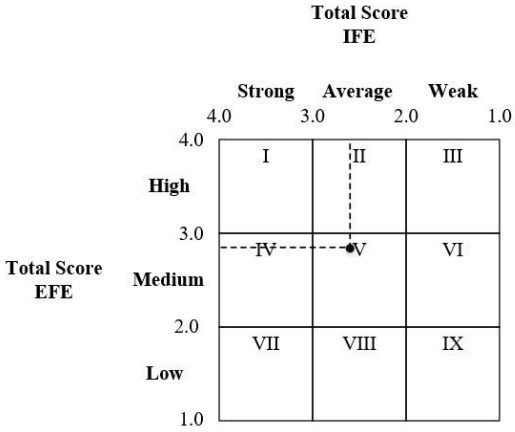

Fig 4. IE Matrix

3.6. SWOT Analysis

A jackfruit supply chain strategy in the Tambang sub-district can be formulated using a SWOT matrix analysis. The SWOT matrix plays a role in identifying various alternative strategies by comparing internal and external factors. The results of the SWOT matrix analysis created a variety of alternative strategies that can be implemented to improve the performance of the jackfruit supply chain in Tambang Sub-District, which can be presented as follows.

Table 6. Nangka SWOT Matrix.

Internal Factors **External Factors**	**Strength (S)** S1. Characteristics of processed jackfruit products with distinctive flavours and without preservatives S2. Strategic sales location of processed jackfruit product S3. Flexible payment S4. Available human resources S5. The product brand is well-known to the public S6. Partnerships have been established between supply chain actors S7. Having repeat customers	**Weakness (W)** W1. Business capital is still limited W2. Jackfruit ripeness is not uniform W3. Communication between supply chain actors is not smooth W4. Human resource capability is still low W5. Delivery time for raw materials is still slow W6. Distribution of processed jackfruit products is not yet widespread W7. Raw material availability is still low W8. Promotion has not been maximized
Opportunities (O) O1. Demand for jackfruit chips is increasing O2. The development of digital promotional media O3. Availability of financial institutions that provide capital loans	**SO Strategy** 1. Improve raw material quantity and product quality (S1, S3, S5, S6, S7, O1)	**WO Strategy** 1. Improving communication between jackfruit supply chain actors (W2, W3, W5, W7, O1) 2. Establish cooperation with bank or non-bank financial institutions (W1, O3) 3. Expanding the marketing of jackfruit chips (W6, W8, O1, O2)
Threats (T) T1. Jackfruit price fluctuations T2. Dependence on one actor of the jackfruit supply chain T3. The existence of competitors of similar products T4. Government assistance and supervision is still lacking	**ST Strategy** 1. Institutionalization of jackfruit supply chain actors (S6, S7, T1, T2, T3)	**WT Strategy** 1. Training on business management and jackfruit chip processing (W2, W4, T3, T4) 2. Enhance partnership between suppliers and producers (W3, W5, W7, T2)

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3.6 Strategy Priority of Supply Chain and Added Value of Jackfruit

Strategy prioritization uses the analytical hierarchy process (AHP) method. The data obtained from the questionnaire results were processed using expert choice software based on problems in a hierarchical structure. This hierarchical structure consists of three levels: goal setting, determining the criteria that can affect the effectiveness of the jackfruit supply chain in Tambang District. The next level is determining alternative strategies that jackfruit supply chain actors can implement. This alternative strategy is obtained from the SWOT matrix that has been matched. The hierarchical structure can be seen in Figure 5.

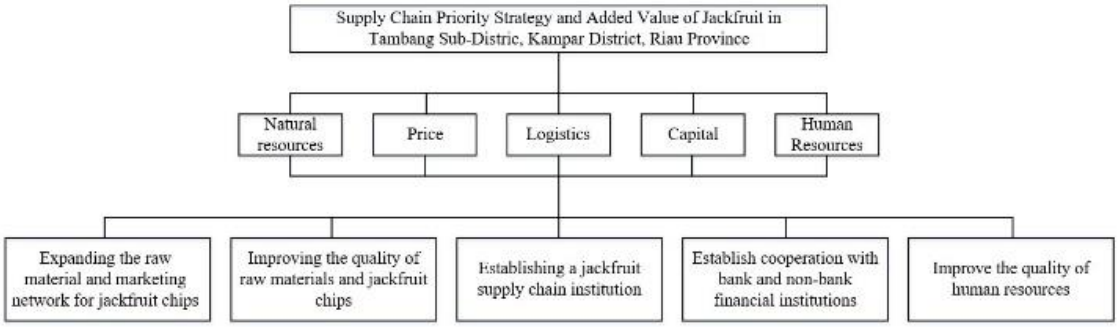

Fig 5. Hierarchical Structure of Jackfruit Supply Chain

Based on the hierarchical structure in Figure 5, the selection of priority strategies for the supply chain and added value of jackfruit in the Tambang sub-district has five criteria. The following criteria influence the jackfruit supply chain in the Tambang sub-district.

1. Natural resources. These criteria support the supply of raw materials needed by supply chain actors.
2. Human resources This criterion relates to jackfruit supply chain workers. These human resources include farmers, collectors, agroindustry actors, and other related parties.
3. Logistics. Logistics is the activity of procurement, inventory, storage, transportation, warehousing, packaging, security, and handling of goods in the form of raw materials and finished goods.
4. Capital. Capital available from both supply chain actors and bank or non-bank financial institutions can support jackfruit supply chain activities. The capital can purchase raw materials, additional materials, tools, logistics, and other costs.
5. Price This criterion shows the price of raw materials, products, and additives. The price of jackfruit chips is quite volatile because it depends on the purchase price of jackfruit received by the agroindustry.

The resulting criteria analysis can be seen in Table 7.

Table 7. Results of Criteria Analysis in Jackfruit Supply Chain Strategy

Criteria	Weight
Natural resources	0.304
Human resources	0.121
Logistics	0.322
Capital	0.117
Price	0.136

Table 7 shows the results of the prioritization analysis of criteria based on the objectives of the jackfruit supply chain priority strategy. Based on the table, the priority criterion is logistics with a weight of 0.322, followed by natural resource criteria with a weight of 0.304, price criteria with a weight of 0.136, human resource criteria with a weight of 0.121 and finally, capital criteria with a total weight of 0.117.

The alternatives obtained from the SWOT matrix results are grouped into five strategies in AHP processing. The following strategy grouping results can be seen in Table 8.

Table 8. Grouping SWOT Matrix Strategies into AHP Strategies

SWOT Matrix Strategy		AHP Strategy
• Improve raw material quantity and product quality • Enhance partnerships between suppliers and producers • Expanding the marketing of jackfruit chips	⇨	• Expanding the network of raw materials and marketing of jackfruit chips • Improving the quality of raw materials and jackfruit chips
• Improving communication between jackfruit supply chain actors • Institutionalization of jackfruit supply chain actors	⇨	• Establishing jackfruit supply chain institutions
• Establish cooperation with bank or non-bank financial institutions	⇨	• Establish cooperation with bank or non-bank financial institutions
• Training on business management and jackfruit chips processing	⇨	• Improve the quality of human resources

The following synthesis results of strategy priority measurement can be seen in Table 9.

Table 9. Synthesized Results of Chain Strategy Priority Measurement

No	Strategy	Weight
1	Expanding the network of raw materials and marketing of jackfruit chips	0.331
2	Improving the quality of raw materials and jackfruit chips	0.236
3	Establishing jackfruit supply chain institutions	0.162
4	Establish cooperation with bank or non-bank financial institutions	0.115
5	Improve the quality of human resources	0.156

The weight generated through expert choice is by the limits of the consistency ratio that has been determined. The consistency ratio of the supply chain prioritization strategy and the added value of jackfruit in the Tambang sub-district is 0.04. The consistency ratio benchmark shows the level of consistency of expert opinion on criteria and strategy decisions analyzed through pairwise comparisons [27]. The value can be accounted for if the consistency ratio is less than 0.1.

The results of the strategy assessment show that the recommended priority strategy is to expand the network of raw materials and marketing of jackfruit chips with a weight of 0.331. The strategy in question is that the jackfruit chip agroindustry is advised to expand the raw material network by building or adding raw material suppliers to increase the quantity of raw materials. An increase in the production of jackfruit chips accompanies the supply of raw materials. The addition of suppliers is followed by convincing suppliers to sell jackfruit in ripe conditions according to agroindustry needs. This can be done by providing incentives to farmers. Furthermore, marketing jackfruit chips is carried out by utilizing digital marketing promotions. This will increase income for jackfruit supply chain actors. To achieve this, it is necessary to improve the quality of raw materials and jackfruit chips produced to be competitive.

4. CONCLUSION

Based on the results of the research that has been carried out, the following conclusions can be drawn. (1) The results of identifying the jackfruit supply chain involved are farmers, jackfruit collectors, agroindustry, retail, and consumers. The supply chain structure consists of two structures, namely structure 1 (supplier-agroindustry jackfruit chips-consumer) and structure 2 (supplier-agroindustry jackfruit chips-retail-consumer). The flow of goods occurs from suppliers to consumers, the flow of money occurs from consumers to suppliers, and the flow of information occurs from suppliers to consumers and vice versa.; (2) The added value obtained by MSME Sinar Hidayah amounted to IDR 8,198.71/kg, MSME Usaha Baru Ibu IDR 13,960.58/kg and MSME Restu IDR 4,718.75/kg. All jackfruit chips agroindustry in the Tambang sub-district has positive added value and a high category. (3) Analysis of the efficiency level in the jackfruit chips agroindustry has a revenue cost ratio (R/C ratio) value in each MSME of more than one. The R/C ratio value of MSME Sinar Hidayah is 1.72, MSME Usaha Baru Ibu is 2.42, and MSME Restu is 1.26. Based on the efficiency value of each agroindustry, it can be assessed that MSME Sinar Hidayah, MSME Usaha Baru Ibu, and MSME Restu are efficient and profitable because they obtain an efficiency value greater than one. (4) The selected priority strategy is to expand the network of raw materials and marketing of jackfruit chips with a weight of 0.331. This strategy is also supported by improving product quality. The selected criterion is logistics, with a weight of 0.322.

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REFERENCE

[1] [BPS] Badan Pusat Statistik. 2021. Produksi Tanaman Buah-Buahan. https://www.bps.go.id/indicator/55/62/1/produksi-tanaman-buah-buahan.html [viewed 31 Oktober 2022].

[2] R.A Hadiguna. Manajemen rantai pasok agroindustri: pendekatan berkelanjutan untuk pengukuran kinerja dan penilaian risiko. Padang, Andalas University Press, 2016

[3] T. O Siswandi, A. A. P. A. S. Wiranatha, dan A. Hartiati. 2019. "Pengembangan manajemen rantai pasok kopi arabika Kintamani Bali". *Jurnal Rekayasa dan Manajemen Agroindustri*, vol. 7 no. 1, pp. 113–120, 2019.

[4] R. R Amalia, N. Hairiyah, dan Nuryati. "Pemetaan rantai pasok dan analisis nilai tambah komoditas jagung di Kabupaten Tanah Laut". *Jurnal Agroindustri*, vol. 1, no 1, pp. 147–155, 2020.

[5] Y. Hayami., T. Kawagoe, Y. Morooka, dan M. Siregar. *Agricultural Marketing and Processing in Upland Java A Perspective From A Sunda Village*. Bogor, Indonesia. The CGPRT Centre, 1987.

[6] Intyas, C. A., dan M. Firdaus. "Analisis nilai tambah usaha kerupuk ikan cumi di Desa Weru, Kecamatan Paciran, Kabupaten Lamongan". *JFMR-Journal of Fisheries and Marine Research*, vol. 4, no. 2, pp. 214–221. 2020

[7] Marimin, dan A. S. Slamet. Analisis pengambilan keputusan manajemen rantai pasok bisnis komoditi dan produk pertanian. *Pangan*, vol. 19, no. 2, pp. 169–188. 2010

[8] R. E. Indrajit dan R. Djokopranoto. Konsep manajemen *supply chain* : strategi mengelola manajemen rantai pasokan bagi perusahaan modern di indonesia. Jakarta, PT Gramedia Widiasarana Indonesia, 2002.

[9] D. Lu. *Fundamentals of Supply Chain Management*. Denmark. Ventus Publishing Aps, 2014.

[10] Vorst, J. G. A. J. Van Der. Performance measurement in agri-food supply-chain networks. Quantifying the Agri-Food supply Chain. pp. 15–26, 2006

[11] Zulkarnain, A. Lamusa, dan D. Tangkesalu. Analisis nilai tambah kopi jahe pada industri sal-han di Kota Palu. *Agrotekbis*. Vol. 1, no. 5, pp. 493–499. 2013.

[12] Putra, S. I., D. S. Gunawan, dan S. D. Purnomo. Analisis pendapatan dan nilai tambah industri pengolahan kopi : pendekatan metode Hayami. *Indonesian Journal Of Development Economics*, vol. 3, no.3, pp. 994–1005, 2020.

[13] W. Hamidi, dan S. Elida. Analysis of value added and development strategy of public sago agroindustry business in Kepulauan Meranti Regency. International Journal of Scientific and Technology Research, vol. 7, no. 2, pp. 94–99. 2018.

https://doi.org/10.29165/ajarcde.v8i1.368

[14] S.P Taufiqurrahman, I. Fajri, dan M. P. Lukman Hakim SP. The Value-Added analysis of gayo arabica coffee based on processing. International Journal of Multicultural and Multireligious Understanding, vol. 7, no. 1, pp. 56–59. 2020.

[15] Nugrahadista, B. D. Analisis nilai tambah, kelayakan usaha dan strategi pengembangan pada UMKM Keripik Tempe Putra Ridhlo Di Kota Malang. [skripsi] Universitas Brawijaya. p. 120. 2018.

[16] M. Y Aulana, Romano, dan Sofyan. Analisis Rantai Nilai dan Kelayakan Usahatani Garam di Desa Cebrek Kecamatan Simpang Tiga Kabupaten Pidie. *Jurnal Ilmiah Mahasiswa Pertanian Unsyiah*, vol. 3, no. 4, pp. 249–261. 2018.

[17] D, Saadudin, Y. Rusman, dan C. Pardani. Analisis biaya, pendapatan, dan R/C usahatani jahe (*Zingiber officinale*) (Suatu Kasus di Desa Kertajaya Kecamatan Panawangan Kabupaten Ciamis). *Jurnal Ilmiah Mahasiswa Agroinfo Galuh*, vol. 3, no. 1, pp. 1–7. 2016.

[18] R. Hanafie. Pengantar ekonomi pertanian. Yogyakarta. Andi Yogyakarta. 2010.

[19] F. David. *Strategic management concepts and case* (Thirteenth). Boston (US): Pearson Prentice Hall. 2011.

[20] F. Rangkuti. Analisis SWOT: Teknik Membedah Kasus Bisnis. Jakarta: PT Gramedia Pustaka Utama. 2006.

[21] R. Y. Sari, A. I. Hasyim, dan S. Widjaya. Rantai pasok dan nilai tambah keripik nangka pada agroindustri keripik panda alami Di Kecamatan Gedong Tataan Kabupaten Pesawaran. *Jurnal Ilmu-Ilmu Agribisnis*, vol 6, no. 3, pp. 257–262, 2019.

[22] B. D Probowati, A. D. Guritno, M. Maksum, dan D. Ismoyowati. Analisis struktur jaringan dan proses Bisnis dalam rantai pasok sayuran lahan pasir pantai. *Jurnal Agrointek*, vol. 15, no. 1, pp. 48–60. 2021.

[23] A. Pramana, Y. Zamaya, A. R. Ningsih, F. H. Hamzah, Y. Zalfiatri, D. Kurnia, dan N. Rimayanti. *The Analysis Of Supply Chain Of Palm Oil in PT. Tribakti Sarimas, Riau*. *Agrointek : Jurnal Teknologi Industri Pertanian*, vol, 16, no. 3, pp. 337–344, 2022.

[24] F. A. Firnanda, dan N. D. B. Tamami. Analisis nilai tambah ubi kayu sebagai bahan baku keripik di UD. Sinar Gemilang Desa Bobol Kecamatan Sekar Kabupaten Bojonegoro. *Agriscience*, vol. 2, no.2, pp. 255–265, 2021.

[25] D. H Saputra., A. Sugiyono, dan B. D. Bernardhi. *Production Planning Rambak Cracker To Meet Demand at* UMKM Dwi Jaya Kendal. *Journal of Applied Science and Technology*, vol. 1, no. 1, pp. 6–11, 2021.

[26] Alyas, dan M. Rakib. Strategi pengembangan usaha mikro, kecil, dan menengah dalam penguatan ekonomi kerakyatan (studi kasus pada usaha roti maros di Kabupaten Maros). *Jurnal Sosiohumaniora*, vol. 19, no. 2, pp. 114–120, 2017.

[27] A. H. Rangkuti. Teknik Pengambilan Keputusan Multi Kriteria Menggunakan Metode BAYES, MPE, CPI dan AHP. *ComTech: Computer, Mathematics and Engineering Applications*, vol. 2, no. 1, pp. 229–238. 2011