AGRISEP: Journal of Agricultural Socio-Economics and Agribusiness Studies

https://ejournal.unib.ac.id/agrisep

RESEARCH ARTICLE DOI: https://doi.org/10.31186/jagrisep.24.02.547-564

VALUE ADDED ANALYSIS OF PINEAPPLE LEAF-WASTE PRODUCTS AND STRATEGIC DEVELOPMENT FOR MIWA PRODUCER COOPERATIVE IN PRABUMULIH

Erni Purbiyanti*; Yulia Sari; Merna Ayu Sulastri; Trisna Wahyu Swasdiningrum Putri; Ghaitsa Safira Adzra

Agribusiness Study Program, Faculty of Agriculture, University of Sriwijaya, South Sumatra, Indonesia
* Corresponding author: erni.purbiyanti@fp.unsri.ac.id

ARTICLE INFO

Keywords:
Value added
Development strategy
Pineapple leaf waste

Submitted:
09 October 2024
Revised:
19 February 2025
Accepted:
22 September 2025

ABSTRACT

Pineapple leaf waste (PALW) is often perceived as an agricultural by-product with limited utility and lacking economic value. This study pioneers the evaluation of added value from pineapple leaf waste in Prabumulih. It explores innovative strategies for developing the Wiwa Producer Cooperative using the Hayami method and SWOT analysis. The findings reveal that all processed products, such as woven fabric and cloths, derived from pineapple leaf waste generated a high and profitable value-added ratio. A key strength factor is that the Miwa Pineapple Producer Cooperative is a pioneer of pineapple leaf processing in Prabumulih. However, significant weaknesses include limited human resources and capital, while opportunities exist in promotional events, and threats arise from the lengthy production process. The cooperative adopts an aggressive strategy, emphasising market penetration, market development, and product innovation through the Strengths-Opportunities (S-O) approach. The findings underline the economic potential of pineapple leaf waste as a sustainable resource, offering a pathway to rural economic empowerment and environmental conservation. This study provides actionable strategies for policymakers and cooperative leaders to enhance competitiveness, foster innovation, and promote sustainable practices in the agricultural sector. By participating in broader promotional events, maintaining product quality, expanding market reach, and innovating product offerings, the cooperative can ensure sustainable growth and contribute to the circular economy.

Cite as:
Purbiyanti, E., Sari, Y., Sulastri, M. A., Putri, T. W. S., & Adzra, G. S. (2025). Value Added Analysis of Pineapple Leaf-Waste Products and Strategic Development for Miwa Producer Cooperative in Prabumulih. *Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian dan Agribisnis*, 24(02), 547–564. https://doi.org/10.31186/jagrisep.24.02.547-564

INTRODUCTION

Agricultural waste management is an increasingly pressing issue as the scale of global agricultural activities expands. Residues from farm activities, when not properly managed, can contribute to soil degradation, air pollution, and water

pollution (Koul et al., 2022; Phiri et al., 2024; Yadav et al., 2024). The pineapple industry is a significant sector in the country, with substantial quantities of pineapple leaves generated annually as a by-product (Sethupathi et al., 2024). Among various agricultural residues, pineapple leaf waste presents a significant opportunity for value addition. However, research has demonstrated that pineapple leaf fibres (PALF) possess desirable properties such as strength, durability, and biodegradability, making them suitable for various applications, including textiles and composites (Joshi & Patel, 2022). The concept of waste valorisation involves converting waste into high-value products, aligning with the principles of the circular economy, which aims to minimise waste and maximise resource efficiency (Haque et al., 2023; Maria et al., 2024). This potential for value addition highlights the need for innovative approaches to waste management in the pineapple industry.

South Sumatra serves as the second-largest pineapple production centre in Indonesia and the primary centre for pineapple production on Sumatra Island. One of the key regions for agribusiness development of pineapple commodities in South Sumatra is Prabumulih City. According to data from Statistics Indonesia, pineapple production in South Sumatra has continued to rise, reaching 567,120 tons in 2022. Prabumulih City is one of the largest pineapple-producing regions in South Sumatra, ranking third with a total production of 19,688 quintals (BPS, 2022). The pineapple cultivation area in Prabumulih City covers approximately 400 hectares. The city's agricultural activities result in a substantial amount of pineapple leaf waste, which is often neglected or improperly managed. Pineapple leaves are the most abundant waste generated from pineapple farming activities, accounting for approximately 90% of the total waste in each harvest. (Imman et al., 2021; Nashiruddin et al., 2022), Each pineapple harvest produces waste composed of 1% stem, 9% stem shoots, and 90% leaves.

Pineapple plants produce only one fruit per season (Hossain, 2016). A single pineapple plant can generate approximately 30-50 leaves with an average weight of 35 g, resulting in 1050 – 1750 g of leaf waste (Sibaly & Jeetah, 2017). If pineapple plants are spaced 1 meter apart, every 100 square meters of land used for pineapple cultivation can produce 105-175 kg of waste. Consequently, one hectare of land can yield up to 1.05 - 3 tons of waste (Chen et al., 2020; Sibaly & Jeetah, 2017). PALF can be used to create textiles, ropes, and eco-friendly materials, which offer both economic and environmental benefits (Jain & Sinha, 2022; Sethupathi et al., 2024). Fibres from pineapple leaves are also utilised as raw materials for paper pulp, tissue, cigarette filters, or developed as composite materials for reinforced plastics and roofing (Lutfi et al., 2023). The processing industry will generate value added, which in turn will increase its income.

The concept of value addition involves increasing the economic value of raw materials by converting them into higher-value products. In the case of pineapple leaf waste, the value addition is achieved through the extraction and processing of fibres into products with commercial value. Studies have highlighted the mechanical properties of PALF, such as tensile strength and flexibility, which make it suitable for diverse applications, including textiles and composites (Sayeed et al., 2023; Sethupathi et al., 2024). In countries such as India, pineapple leaf fibre extraction has provided additional income for smallholder farmers, improving their livelihoods and reducing waste (Roshini & Madhu, 2024). The utilisation of PALF presents a

viable, sustainable alternative for developing an economy-focused agricultural solution in Bangladesh (Jalil et al., 2021). It has been shown that utilising pineapple leaf fibres can provide additional income for smallholder farmers and support sustainable agricultural practices. However, the existing literature often focuses on the technical aspects of pineapple leaf fibre processing or the general economic benefits. At the same time, limited attention has been given to the value-added analysis of pineapple leaf waste at the cooperative level, particularly in Indonesia. So far, there has been no analysis related to MSMEs for added value and prospects seen using the SWOT approach.

This study addresses this gap by focusing on the Miwa Pineapple Producers Cooperative in Prabumulih City, a pioneering initiative in South Sumatra that processes pineapple leaf waste into derivative products for the textile industry. Unlike previous research, this study integrates the Hayami method to analyse the value added generated by processing activities. It employs SWOT analysis to evaluate internal and external factors influencing the cooperative's development. By examining both the economic value and strategic positioning of the cooperative, this study provides a comprehensive framework for enhancing waste management and economic opportunities, particularly in regions where pineapple production generates substantial agricultural residues.

Developing a business plan requires a business analysis, including a value-added analysis by the Hayami method to identify the potential for business development. The Hayami method is chosen because, in addition to determining the value added of a product, it also helps to assess the output value, production productivity, and the compensation to the owners of production factors such as capital, other input contributions, company profits, and labour. To ensure the sustainability and growth of the pineapple leaf waste processing cooperative, development strategies must be formulated by considering the cooperative's internal and external environment through a SWOT analysis.

RESEARCH METHOD

Time and Location

This research was conducted in 2023 at the Miwa Pineapple Cooperative, Belitung Street, Lr. RT.004/RW.002, Gunung Ibul Sub-district, Prabumulih Timur District, Prabumulih City, South Sumatra Province, Indonesia. The Miwa Pineapple Cooperative is a cooperative engaged in the pineapple leaf fibre production business and was established in 2022. The selection of the Miwa Cooperative was based on purposive sampling because Miwa is the pioneer in producing various products from pineapple leaf waste in Prabumulih. As the first cooperative in the region to focus on processing pineapple leaf fibres into value-added products, Miwa plays a pivotal role in promoting sustainable waste management and economic development. Its innovative efforts serve as a model for similar initiatives, making it an ideal case study to explore the potential and challenges of pineapple leaf waste valorisation.

Data Analysis Method

The research method used is a case study, with a sampling method using purposive sampling. In addition to the value-added analysis, Hayami method

analysis was conducted for Miwa Pineapple Cooperative. The business development strategy is carried out by SWOT analysis. The first objective is to describe the pineapple leaf fibre processing process at the Prabumulih City Producer Cooperative, based on data obtained from interviews, questionnaires, observations, and documentation. The second objective is related to the analysis of the value added of the Pineapple leaf processing business in Prabumulih City using the Hayami method. The variables that were used can be seen in Table 1. Furthermore, to answer the third objective, namely analysing the development strategy of the Pineapple leaf waste processing producer cooperative in Prabumulih City, a SWOT Analysis is used.

Hayami Method

Table 1. Hayami Method Value Added Analysis

No	Variable	Unit	Value
I. Output, Input, Price			
1	Output	kg	(1)
2	Input	kg	(2)
3	Labor	HOK	(3)
4	Conversion Factor		(4) = (1) / (2)
5	Labor Coefficient	HOK/kg	(5) = (3) / (2)
6	Output Price	Rp/kg	(6)
7	Labor Wages	Rp/HOK	(7)
II. Revenue and Profit			
8	Raw material price	Rp/kg	(8)
9	Other input contribution	Rp/kg	(9)
10	Output value	Rp/kg	(10) = (4) x (6)
11	a. Value added	Rp/kg	(11a) = (10) – (9) – (8)
	b. Value added ratio	%	(11b) = (11a/10) x 100%
12	a. Labor income	Rp/kg	(12a) = (5) x (7)
	b. Labor share	%	(12b) = (12a/11a) x 100%
13	a. Profit	Rp/kg	(13a) = (11a – 12a)
	b. Profit level	%	(13b) = (13a/11a) x 100%
Returns to Factors of Production			
14	Margin	(Rp/kg)	(14) = (10) – (8)
	a. Labor income		(14a) = (12a/14) x 100%
	b. Contribution of Other Inputs (yarn, dye, lining fabric, etc)		(14b) = (9/14) x 100%
	c. Operating Profit		(14c) = (13a/14) x 100%

Source: Hayami et al. (1987)

According to Hubies (1997), the criteria for testing the value-added ratio can be divided into three criteria, namely:

1. Low if it has a percentage of <15%
2. Medium if it has a percentage of 15% - 40%
3. High if it has a percentage of >40%

SWOT Analysis

The business development strategy is carried out by SWOT analysis, which consists of 3 stages, namely the income stage, the matching stage and the decision stage. The SWOT approach, as well as Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) analysis, can help determine the best strategy.

1. The input stage analysis

Data processing involves inputting and analysing internal and external factors affecting the Miwa Pineapple Producer Cooperative in Prabumulih City, based on a summary of information obtained using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices.

2. The Matching Stage

The second stage involves matching the results of the IFE and EFE matrices to the Grand Strategy Matrix. This matrix is derived by calculating the difference between internal factors (the difference between the total strength and weakness scores) and external factors (the difference between the total opportunity and threat scores).

X = Total strength score – Total weakness score

Y = Total opportunity score – Total threat score

3. Decision Stage Analysis

The final stage is decision-making, where the appropriate strategy is selected based on the cooperative's internal and external environment. The SWOT matrix is constructed by matching the four factors in pairs, resulting in four possible strategic alternatives: S-O, S-T, W-O, and W-T.

RESULT AND DISCUSSION

Miwa Pineaple as Produsen Cooperative

The Miwa Pineapple Producers Cooperative is an organisation based in Prabumulih City, South Sumatra, Indonesia. Established in 2022, the cooperative is a pioneering initiative in the region, focusing on the utilisation of pineapple leaf waste to produce high-value products such as textile fibres, fabrics, and woven items. By leveraging the abundant supply of pineapple leaves, Miwa promotes sustainable agricultural practices while providing economic opportunities for local communities. Before becoming fiber and processed into various products, pineapple leaves go through several stages of processing, namely (1) harvesting pineapple leaves, (2) sorting pineapple leaves, (3) extracting pineapple leaves, (4) washing pineapple leaf fiber, (5) drying, (6) unraveling, (7) extracting and refining, (8) measuring water content, (9) weighing, and (10) packaging. The Prabumulih City Cooperative carries out the production of woven pineapple leaf bags and sandals. Before being processed into various products, woven pineapple leaves go through several processes. The following is the process: (1) harvesting pineapple leaves, (2) cutting pineapple leaves, (3) boiling pineapple leaves, (4) drying and (5) weaving. In this research, pineapple leaf fibre is used to produce woven fabric and clothing.

Value Added Analysis of Pieneaple Leaf Fiber Products

Processing pineapple leaf fibre into woven fabric and clothing can provide value-added benefits as a reward for the use of production factors. Based on Table 2, it can be seen that the amount of pineapple leaf fibre raw material used in one production is 2 kg, and it can produce 10 meters of woven fabric. The conversion factor for woven fabric products is 5.00. This shows that every 1 kg of pineapple leaf fibre can grow 5 meters of woven fabric. If the conversion factor is more than 1, then in the production process, there is an increase in output volume or the output volume is greater than the volume of raw materials, and vice versa (Hayami et al., 1987). In clothing products, the amount of raw material used is 8 meters of woven fabric, which will produce 24 pieces of clothing. The conversion factor for clothing products is 3.00. This means that every 1 meter of woven fabric can produce three pieces of clothing.

The output price of woven fabric is IDR 250,000.00/meter, and the output price of clothing is IDR 550,000.00/piece. This difference in selling price is due to additional costs incurred to produce clothing. One of them is the cost of convection, and higher skills are required. In line with the research of Wulandari et al., (2016) related to the value added of the bamboo craft industry in Sleman Regency, the highest price of the bamboo craft industry is for table and chair products. This is because more auxiliary materials are needed, higher skills are required in their manufacture because table and chair products have aesthetic value, and table and chair products require more non-family labour compared to besek and gedek products.

Recapitulation of Value Added Analysis of Pineapple Leaf Fibre can be seen in Table 2. Based on Table 2, the price of raw materials is determined based on market prices. The price of raw materials for woven fabric in the form of pineapple leaf fibre is IDR 125,000.00/kg, while the price of raw materials for clothes in the form of woven cloth is IDR 250,000.00/meter. Other input contributions are calculated based on all costs other than raw material and labour costs, then divided by the amount of raw materials used during one production. Transportation costs, fuel costs, packaging costs, and equipment depreciation costs are other input contributions. The output value describes the industry's ability to manage the processing of pineapple leaf fibre products. The output value of woven fabric and clothing products is IDR 1,250,000.00/meter and IDR 1,650,000.00/piece of clothing, respectively.

The value added generated from processing pineapple leaf fibre into woven fabric and clothes is the difference between the output value and the price of raw materials and other input contributions. The value added for woven fabric is Rp 950,750.00/kg with a value added ratio of 76.06%, meaning that the output value of Rp 1,250,000.00/meter contains 76.06% value added from the output of woven fabric. The value added for clothes is Rp 794,406.25/meter with a value added ratio of 48.15%, meaning that the output value of Rp 1,650,000.00/meter contains 48.15% value added from the output of clothes.

Table 2. Recapitulation of Value Added Analysis of Pineapple Leaf Fiber Products

No	Variable	Value	
		Woven Fabric	Clothes
I.	Output, Input, Price		
1	Output (unit*/production)	10.00	24.00
2	Input (unit*/production)	2.00	8.00
3	Labor (HOK)	66.15	14.70
4	Conversion Factor	5.00	3.00
5	Labor Coefficient (HOK)	33.08	1.84
6	Output Price (Rp/unit*)	250,000.00	550,000.00
7	Labor Wages (Rp/HOK)	22,978.08	108,843.54
II.	Income and Profit		
8	Raw material price	Rp 125,000.00/kg	Rp 250,000.00/m
9	Other input contribution	Rp 174,250.00/kg	Rp 605,593.75/m
10	Output value	Rp 1,250,000.00/m	Rp 1,650,000.00/unit
11	a. Value added	Rp 950,750.00/kg	Rp 794,406.25/m
	b. Value added ratio	76.06%	48.15%
12	a. Labor income	Rp 760,000.00/kg	Rp 200,000.00/m
	b. Labor share	79.94%	25.18%
13	a. Profit per unit*	Rp 190,750.00/kg	Rp 594.41/m
	b. Profit rate per unit	20.06%	74.82%
	c. Profit per unit	Rp 38,150.00/unit	Rp 198,135.42/unit
	d.Profit rate per unit	4.01%	24.94%
III.	Remuneration of Owners of Production Factors		
14	Margin	Rp 1,125,000.00/kg	Rp1,400,000.00/m
	a. Labor income	67.56%	14.29%
	b. Contribution of other inputs (yarn, dye, lining fabric, etc)	15.49%	43.26%
	c. Operating Profit	16.96%	42.46%

*) Note: units based on product type (woven fabric output=meters, woven fabric input=kg, woven fabric output price=Rp/meter, clothing output=pieces, clothing input=meters, clothing output price=Rp/unit)

Based on the opinion of Hubies (1997), the ratio of the value added of woven leaf fibre into woven fabric and clothes is included in the high category. This value means that 76.06% of the output of woven fabric and 48.15% of the output of clothes received is value added from the product processing process. This value added is in line with the results of research conducted by Alaydrus (2022) regarding value-added analysis and business development strategy for Ulap Doyo (Curculigo latifolia) in Loa Ipuh District, Kutai Kartanegara Regency, where the Ulap Doyo processing business in Loa Ipuh Village generated a value added of IDR 2,728,929/kg or 76,952%. According to (Mufidah & Roesminingsi, 2020), Ikat woven cloth in Lamongan Regency is not only sold in the form of cloth, but has also been made into clothes or sarongs according to consumer demand, which can increase the income and welfare of artisans.

The margin value is obtained from the difference between the output value and the price of raw materials. This margin value is then distributed to labour income, other input contributions, and business profits. Based on Table 4, it is known that the largest margin value is for clothing products. The margin portion for labour income in woven fabric products is the highest because this product requires more labour or time devoted to one production, which is quite a lot, so that the cost allocation needed for labour compensation is also quite large. Moreover, in producing woven fabric, these activities can create employment opportunities for residents around the research location. This is in line with research conducted by Puspita et al.,(2021), which states that soybean product production activities are labour-intensive because they require many workers. This will, of course, open up employment opportunities in the surrounding area.

The margin portion for other input contributions in clothing products is the highest because clothing products require more auxiliary materials. The largest business profit margin is in clothing products. This means that the business of making clothing products from pineapple leaf fibre woven fabric is more profitable because the labour costs are less than those of woven fabric products.

Development Strategy of Pineapple Leaf Waste Producer Cooperative

The analysis of development strategies uses the SWOT method, which involves three stages: the input stage, the matching stage, and the decision stage.

The Input Stage

In this stage, data processing is conducted by entering and analyzing external and internal factors of Miwa Pineapple Producer Cooperative in Prabumulih City. This is based on a summary of information obtained using the Internal Factor Evaluation (IFE) matrix and the External Factor Evaluation (EFE) matrix. The internal factors (strengths and weaknesses) affecting the pineapple leaf waste products were evaluated using the IFE (Internal Factor Evaluation) matrix to determine the magnitude of their influence. According to David & David (2017), if the total internal factor score (IFE) > 2.5, then the company can minimize existing weaknesses because the company's position is still strong.

The results of the IFE analysis can be seen in Table 3. Based on the analysis of internal factors using the IFE matrix, the most significant strength of the cooperative is its position as a pioneer in pineapple leaf processing, with a total strength score of 3.31. Being a pioneer allows the cooperative to secure the first place in consumers' minds and strengthens its position in the market.

The most influential weakness is limited human resources and capital, as indicated by the highest weakness score of 0.70. Lack of human resources and capital will affect the production process, as producing a product requires both capital and labour. However, the strength sub-total score (3.31) is greater than the weakness sub-total score (2.98), with a difference of 0.33, showing that the cooperative's strengths outweigh its weaknesses. Its internal strengths can still mitigate the internal weaknesses of the cooperative.

Table 3. IFE Matrix Analysis

Factor Strength	Variable	Weight	Rating	Score
1	Low-cost, easily accessible, and high-quality raw material	0.20	3.32	0.66
2	Can be developed into various value-added processed products, such as woven fabrics, clothing, woven bags, sandals, and more.	0.19	3.26	0.63
3	One of the pioneering cooperatives in pineapple leaf processing.	3.26	3.42	0.71
4	Environmentally friendly production process.	0.21	3.37	0.67
5	Complete certifications and documentation.	0.20	3.16	0.63
Subtotal of Strengths			3.31	
Factor Weakness	Variable	Weight	Rating	Score
1	Limited facilities and infrastructure.	0.20	2.68	0.54
2	The processing time for the products is relatively long.	0.19	2.53	0.48
3	The quality of fibers from partner cooperatives sometimes does not meet the standards.	0.20	3.05	0.60
4	The production volume has not yet met market demand.	0.21	3.21	0.66
5	Limited human resources and capital.	0.21	3.37	0.70
Subtotal of weakness			2.98	
Total IFE			6.29	

The analysis of external factors using the EFE (External Factor Evaluation) matrix can be seen in Table 4. This analysis evaluates the opportunities and threats that may impact the business environment of pineapple leaf waste products. The EFE matrix helps to determine the relative importance of each external factor by assigning

weights and ratings, providing insight into how well the business is positioned to respond to these external challenges and opportunities. The results in Table 4 illustrate the overall score, which reflects the business's ability to leverage opportunities and mitigate threats effectively.

The most significant opportunity for the development of Miwa Pineapple Producer Cooperative is the availability of events as promotional platforms, with a score of 0.73. These events, organised by local government agencies, offer a great opportunity for business owners to increase their sales and expand consumer demand in the long run.

The most significant threat is the lengthy product processing time, with the highest score of 0.87. This occurs mainly because most processes are done manually by human labour instead of machines, particularly in the production of woven cloth. Based on the analysis, the opportunity score is higher than the threat score, indicating that the cooperative's opportunities can outweigh its threats.

Table 4. EFE Matrix Analysis

Factor Opportunities	Variable	Weight	Rating	Score
1	Support from the government.	0.20	3.26	0.66
2	Availability of mentoring and training.	0.19	3.47	0.66
3	Availability of social media and marketing platforms (e-commerce).	0.20	3.32	0.65
4	Events are available as promotional tools.	0.21	3.53	0.73
5	Access to capital is available.	0.21	3.37	0.70
Subtotal of Opportunities				3.39
Factor Threats	Variable	Weight	Rating	Score
1	Weather changes hinder the drying process.	0.20	3.11	0.61
2	The presence of similar competitors.	0.18	2.84	0.52
3	The business location is less strategic.	0.18	2.53	0.46
4	Demand is unpredictable.	0.21	3.37	0.71
5	Low mastery of technology.	0.23	3.79	0.87
Subtotal of Threats				3.16
Total EFE				6.55

Based on the results of the analysis of Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) with the following coefficients, it is known that the IFE score (6.29) is lower than the EFE score (6.55). This shows that cooperatives prioritise external factors over internal factors.

The Matching Stage

The results of the matching stage can be seen in the calculation results below.

X = Total strength score – Total weakness score

X = 3.31 - 2.98

X = 0.33

Y = Total opportunity score – Total threat score

Y = 3.39 - 3.16

Y = 0.22

The IFE score is 0.33, and the EFE score is 0.22. The analysis of the matrix indicates that Miwa Pineapple Cooperative is in quadrant I, meaning it is in a strong position with opportunities available. The position in quadrant 1 indicates support for an aggressive growth policy, which emphasises a growth-oriented strategy or, in other words, an approach that aggressively seeks to expand and develop the organisation or business (Ulma et al., 2022). This strategy often involves taking bold steps, such as entering new markets, increasing investment, or introducing innovative products, to maximise opportunities and accelerate overall growth (Ulma et al., 2022). The recommended strategy is aggressive. Companies in this quadrant should focus on market penetration and product development.

The Decision Stage

The strategies are crucial in determining the innovative strategies to be implemented for developing products (Alaydrus, 2022; Muhammad, 2018; Taru et al., 2023). From the previous analysis, it is evident that Miwa Pineapple Cooperative is in a strong and opportunistic position, and thus, the most appropriate strategy is the S-O strategy. This finding is similar to (Nalle et al., 2022) that found that the S-O strategy is the best strategy to realize inclusive development. Figure 1 presents the four decision sets using the SWOT matrix, explaining as follows:

The SO strategy is a strategy that leverages the existing strengths of the Miwa Pineapple Producers Cooperative in Prabumulih City to capitalise on available opportunities. The formulated SO strategies are as follows:

Participating in an event outside the city of Prabumulih to promote its signature pineapple leaf processed products is a strategic initiative to elevate the city's unique offerings. Pineapple leaf processed products hold significant potential as flagship items, given Prabumulih's recognition as the "Pineapple City". According to Hamdat (2020), exhibitions are an effective platform for introducing products, allowing direct interaction with consumers, obtaining feedback, and expanding market networks. The discussion of results, particularly the SWOT analysis, could be enhanced by delving deeper into the implications of the findings for cooperative management and policy-making. For example, identifying opportunities such as increasing demand for eco-friendly products can guide cooperative strategies, while understanding threats like competition or resource constraints can help shape risk mitigation policies. Additionally, the practical applications of the findings should be highlighted, particularly in addressing the challenges cooperatives face, such as limited resources and infrastructure. For instance, cooperatives could explore resource-sharing models, such as joint-use facilities for processing pineapple leaf products or collaborative marketing efforts to reduce costs. Policymakers can also support these efforts by providing incentives for innovation or improving infrastructure, enabling cooperatives to optimise their operations and broaden their market reach

IFE / EFE	Strength (S)	Weakness (W)
	1. Low-cost, easily accessible, and high-quality raw materials. 2. Can be developed into various value-added processed products, such as woven fabrics, clothing, woven bags, sandals, and more. 3. One of the pioneering cooperatives in pineapple leaf processing. 4. Environmentally friendly production process. 5. Complete certifications and documentation.	1. Limited facilities and infrastructure. 2. The processing time for the products is relatively long. 3. The quality of fibers from partner cooperatives sometimes does not meet the standards. 4. The production volume has not yet met market demand. 5. Limited human resources and capital.
Opportunity (O)	Strength-Opportunity (SO)	Weakness-Opportunity (WO)
1. Support from the government. 2. Availability of mentoring and training. 3. Availability of social media and marketing platforms (e-commerce). 4. Events are available as promotional tools. 5. Access to capital is available.	Strategies (S-O Strategies) 1. Participate in events outside Prabumulih City to promote processed products derived from pineapple leaves that are distinctive to Prabumulih. 2. Maintain the quality and standards of the products. 3. Expand marketing areas through social media and marketing platforms (e-commerce). 4. Conduct product innovations by adding variants or creating new designs and patterns.	Strategies (W-O) 1. Leverage government support and assistance for capital strengthening. 2. Create opportunities for investors or external partners. 3. Regularly conduct mentoring, training, and supervision related to product quality standards. 4. Establish daily production targets.
Threats (T)	Strength-Threat (S-T)	Weakness-Threat (W-T)
1. Weather changes hinder the drying process. 2. Presence of similar competitors. 3. The business location is less strategic. 4. Unpredictable demand. 5. Low mastery of technology.	1. Utilize more modern technology to facilitate product processing. 2. Establish unique product characteristics to gain a competitive advantage over similar competitors. 3. Partner with souvenir centers specific to Prabumulih City.	1. Optimize capital to enhance production. 2. Provide digital marketing training to members. 3. Actively promote on social media.

Figure 1.
SWOT Matrix

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The advantages can be leveraged by participating in events such as exhibitions that showcase processed pineapple leaf products typical of Prabumulih. These events serve as promotional platforms to introduce processed pineapple leaf products and raise awareness about the city of Prabumulih beyond its borders. However, if we look at other research conducted by Alamin et al., (2024), the strategy of increasing the added value of pineapple production is carried out in the development of micro, small, and medium units of the community based on the creative economy. In line with (Orlando & Anwar, 2023), the role of MSME bazaars in increasing consumer interest in local products is an effort to empower MSMEs to support inclusive and sustainable economic growth.

Maintaining consistent product quality and standards is crucial for preserving consumer trust and satisfaction. In addition to building consumer trust, maintaining product quality can reduce costs associated with product failures. Putriana et al., (2023) mention that product quality is a determining factor that has a significant impact on the company's reputation, customer satisfaction, and sustainability. Ensuring product quality and standards can be achieved by setting clear standards, providing training for employees, and implementing quality control systems. Research (Berry et al., 1988) states that product and service quality are key elements in building customer trust and loyalty.

Expanding the marketing area through social media and e-commerce platforms. The adoption of e-commerce is a strategic solution to address marketing challenges in the digital transformation era (Purbiyanti et al., 2024). Marketing through these channels allows for a broader reach, targeting markets not only within the city or province but also nationally and internationally. In line with the research by Fahamsyah et al., (2024), the strategies that can be implemented are market expansion and business expansion. Digital marketing has proven effective in introducing products with a wider consumer reach (Fitriani & Siswahyudianto, 2022). Data analysis in the research (Alamin et al., 2024) found strategies to enhance product marketing for better optimisation and to boost the creative economy in the processing of pineapple products.

Innovating products by adding new variations or creative designs and motifs. Because consumers have diverse needs and preferences, it is important to continuously innovate in order to create products that meet their demands. Product innovation is essential to increase the selling value of their goods or services. Product innovation can also strengthen market position by offering a wider range of choices. Lita et al., (2022) mention that product innovation can be achieved by adding variations and creative designs, which can strengthen market position and enhance business competitiveness.

To overcome the challenges of limited resources and infrastructure, cooperatives can adopt practical strategies based on the findings. For instance, establishing shared facilities for processing pineapple leaf products can reduce operational costs and maximize the use of existing infrastructure. Cooperatives could also utilize government or institutional support programs for funding and infrastructure development, which can improve logistics and supply chain efficiency. Additionally, implementing digital tools such as online inventory systems or marketing platforms can optimise resource management and reduce dependence on physical infrastructure. Partnerships with MSMEs or larger companies can further

provide cooperatives with access to better infrastructure and expertise, enabling them to scale their operations while maintaining efficiency.

CONCLUSION

Conclusion

The most significant strength of the Miwa Pineapple Producers Cooperative is its position as a pioneer in pineapple leaf processing. Being a pioneer allows the cooperative to secure the first place in consumers' minds and strengthens its position in the market. The most influential weakness is limited human resources and capital. The internal weaknesses of the cooperative can still be mitigated by its internal strengths. The most significant opportunity for the development of Miwa Pineapple Producer Cooperative is the availability of events as promotional platforms. These events, organised by local government agencies, offer a great opportunity for business owners to increase their sales and expand consumer demand in the long run. The most significant threat is the lengthy product processing time. This problem can be overcome by adding machines with greater capacity to speed up production time. The Miwa Pineapple Producers Cooperative in Prabumulih City should adopt an S-O strategy (Quadrant I), meaning it is in a strong position with opportunities available. The position in quadrant 1 indicates support for an aggressive growth policy, which emphasises a growth-oriented strategy or, in other words, an approach that aggressively seeks to expand and develop the organisation or business.

Strategies that can be pursued include participating in events outside of Prabumulih City to promote the distinctive pineapple leaf processed products of Prabumulih; Maintaining product quality and standards; Expanding market reach through social media and marketing platforms (e-commerce); and Innovating products by adding variations or creating new shapes and designs. The research on the Miwa Pineapple Cooperative in Prabumulih City highlights the significant value added and profitability potential of processing pineapple leaf waste. Beyond the local context, this study underscores the broader implications for agricultural waste management in Indonesia or similar settings. The successful utilisation of pineapple leaves demonstrates how agricultural by-products, often considered waste, can be transformed into high-value products, contributing to sustainable practices and reducing environmental impacts. This approach can serve as a model for other agricultural sectors, such as utilising rice husks, palm oil fronds, or coconut shells, to create eco-friendly and economically viable solutions. To optimise these efforts, the cooperative management is encouraged to follow a structured roadmap: improve the quality of the product, make some variant products from the fibre leaves of pineapple, join the events outside of Prabumulih, and promote their product to expand the market.

AUTHOR CONTRIBUTION STATEMENT

[Author 1]: research design, analytical guidance, and research supervision; [Author 2]: data analysis, and addressed reviewer's comments; [Author 3]: the initial manuscript draft and edited the manuscript; [Author 4]: research conceptualization,

and data analysis; [Author 5]: research conceptualization, datta collection, and data analysis. All authors reviewed and approved the final version of the article.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ACKNOWLEDGMENT

Thanks are extended to the Miwa Pineapple Producers Cooperative for participating in this research.

ETHIC STATEMENT

Ethical review and approval were waived for this study as it did not involve any intervention and posed minimal risk to participants. Nevertheless, informed consent was obtained from all respondents before participation, and all data were anonymized and kept confidential.

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