

Silkworm Development Strategy in Pasuruan, East Java

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Abstract. Pasuruhan, East Java is one of the areas where there are farmers who cultivate silkworms of *Samia cynthia ricini*, in the cultivation process, farmers are affiliated with a company, namely CV Karya Usaha Petani Unggul (CV KUPU) Sutra. This company carries out silk production activities from upstream to downstream. The determination of the respondents was carried out by purposive or deliberate means. The number of respondents in this study was 16 people consisting of seed providers and feed providers, cultivators, spinners, weavers, batik, shoe craftsmen, knitting craftsmen and marketers. The analysis technique to determine the development strategy is to use the Quantitative Strategic Planning Matrix (QSPM). The result shows the priority development strategy for *CV Kupu Sutra* is to increase cooperation with new partners as buyers of silk products. While the alternative strategy applied by *CV Kupu Sutra* is to maximize the performance of employees who produce yarn.

1 Introduction

The livestock subsector is one of the subsectors of agriculture that focuses on raising, breeding, and utilizing livestock. Farm animals are classified as food livestock and non-food livestock. Food livestock includes cattle, sheep, goats, chickens, ducks, and so on. Food livestock are farmed for various purposes including providing animal protein, increasing food security, and industrial raw materials. Non-food farm animals include silkworms, maggots, and so on. Non-food livestock such as silkworms are farmed because they produce silk threads and maggots as alternative feed for chickens, ducks and fish.

Sericulture is an agro-industry, the end product of which is silk. Sericulture includes various activities such as mulberry cultivation, silkworm rearing and post silk cocoon activities [1]. Silk is fibrous protein of animal organ produced by the silkworm for spinning a cocoon [2]. Silkworm is easy to be raised and has high cocoon yield [3]. Silkworm is a type of insect that needs to be cultivated because it has a high economic value. Silkworms (*Philosamia ricini*) are also cultivated in the North East region of India [4]. Silkworm farmers, whether individuals, groups or companies, play a role in cultivating silkworms, ranging from small, medium or large scale. These silkworms are a source of silk thread production that has promising business prospects. This is driven by the need for abundant land and feed in the cultivation process [5].

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The demand for silk yarn continues to increase significantly. This phenomenon is driven by several factors, including the growing human population around the world as well as changing consumer trends towards high-quality and sustainable products. In particular, the increasing awareness of sustainability and product quality is driving the demand for silk yarn, which is considered one of the most environmentally friendly natural fibers and has advantages in comfort and beauty [6]. In addition, the growing global fashion market, supported by social media and e-commerce platforms, also contributes significantly to the increasing demand for textile products, including silk yarn, as consumers are increasingly concerned about the quality, uniqueness and sustainability of the products they purchase. Therefore, efforts to develop and increase the production of silk threads are important to meet these growing market demands.

One of the products derived from silkworms that has attracted widespread interest, especially among adults, is silk fabric which has various advantages. The advantages of silk fabrics compared to other types of fabrics are that silk fabrics have the ability to adapt to environmental temperatures and have a soft texture so they are comfortable to use [7] The yarn from silkworms is eco-friendly materials increases to reduce waste management and pollution issues [8]. The adaptability of this fabric makes silk fabric a popular choice because of its ability to adjust to changing temperature conditions. Thus, these silk fabric products offer unique functional benefits and are different from other types of fabrics, attracting consumers to use them for a variety of purposes, ranging from clothing to furniture and home décor. In addition, there are various other products such as bags, clothing, trinkets, and so on [9]

There are many types of silkworms that can produce silk threads, including *Syntherata apicalis*, *Opodiphtera intermedia*, *Opodiphtera papuana*, *Coscinoceran hercules*, and others The type of silkworm *Samia cynthia ricini* is a type of non-mulberry silkworm that eats castor leaves as its main food [10]. Unlike silkworms that generally feed on mulberry leaves, this silkworm has a preference for castor leaves. This phenomenon is interesting because it expands the potential scope of silkworm cultivation, especially for areas that have abundant availability of castor leaves. It also provides an alternative for silkworm farmers to diversify feed sources and reduce dependence on one type of plant as the main food for silkworms. Thus, knowledge of this silkworm species and its tendency to feed on castor leaves can provide new insights in the development of the silkworm industry.

Samia cynthia ricini reared at this density had the highest survival rate, faster egg development time, heavier cocoon shell weight and highest fecundity [11]. *Samia cynthia ricini* silkworm business development includes various things such as quality, quantity, and marketing strategies that are useful for increasing higher selling prices. The development in question is the development of activities from upstream to downstream involving the process of cultivation, silk fiber processing, spinning, weaving, and distribution. The end result that will be obtained from this business development is silk yarn that can be used as a variety of products. In the current era of globalization, companies must be able to design a competitive strategy so as not to compete with other companies, a competitive strategy is one way for companies to find out their competitiveness in every strength that exists in a company [12]. A strengths, weaknesses, opportunities, and threats (SWOT) analysis has become a key tool used by businesses for strategic planning[13], so as a fundamental tool for organizations to evaluate their position in the market and is widely used to analyze the internal and external environments of organizations during times of indecision [14][15]. QSPM (Quantitative Strategic Planning Matrix) is a management tool that helps prioritize the various strategic factors that have been identified in a SWOT analysis [16], used to determine priority strategies that are considered best to implement [17].

Pasuruhan, East Java is one of the areas where there are farmers who cultivate silkworms of *Samia cynthia ricini*, in the cultivation process, farmers are affiliated with a company,

namely CV Karya Usaha Petani Unggul (CV KUPU) SUTRA. This company carries out silk production activities from upstream to downstream. In the upstream part, CV KUPU SUTRA produces silk cocoons assisted by the company's partners, one of which is the farmer. The partner farmers will deposit the cocoons produced at their place of business to CV KUPU SUTRA. Meanwhile, downstream, CV KUPU Sutera will process the cocoons into finished materials that have a higher value.

In line with the production process, the company faces various problems arising from internal and external factors. In order not to threaten the company, an effective development strategy is needed, so the purpose of this research is to formulate a development strategy for CV KUPU Sutera in Pasuruan, East Java.

2 Research Method

This research was conducted in Pasuruhan, East Java, with the object of research being CV KUPU silk. This CV is the only company engaged in the field of silkworms from upstream to downstream. The determination of the respondents was carried out by purposive or deliberate means. The number of respondents in this study was 16 people consisting of seed providers and feed providers, cultivators, spinners, weavers, batik, shoe craftsmen, knitting craftsmen and marketers.

The analysis technique to determine the development strategy is to use the Quantitative Strategic Planning Matrix (QSPM) which is carried out through three stages. The first stage of data collection involves collecting a description of the situation and conditions at CV KUPU Sutera using the Internal Factor Analysis Strategy (IFAS) and External Factor Analysis Strategy (EFAS) matrices. The second stage is data matching using the strengths, weaknesses, opportunities, and threats (SWOT) matrix to compare internal and external factors. The third stage is decision making using QSPM analysis to obtain alternative development strategies for CV KUPU Sutera.

3 Research Result and Discussion

Analysis of the company's environment begins with recognizing the company's environmental conditions. This is used to develop strategies using SWOT analysis. Environmental conditions are divided into two parts, namely internal environmental conditions which include the strengths and weaknesses of the company and external conditions which include opportunities and threats faced by the company. For success in any field, weaknesses must be overcome through strengths and threats must be turned into opportunities ([18]).

The formulation of development strategies at CV Kupu Sutera Pasuruan, East Java goes through three stages, namely the input stage using the IFAS matrix and EFAS matrix, the matching stage using the IE matrix and SWOT matrix, and the decision stage using QSPM.

3.1 Internal Analyze

Internal analysis is an analysis that is directly related to company operations such as suppliers, employees, shareholders, board of directors' managers, distributors, customers and others (Djanabar, 2013). Internal factors can be determined by calculating ratios, measuring performance and comparing with past achievements or with industry averages. Table 1 is the results of the internal analysis of CV Kupu Sutera Pasuruan East Java.

Table 1. IFAS Matrix CV Kupu Sutera Pasuruan, East Java

No.	Internal Factor	Weight	Rating	Score
Strength				
1	Easy access to the company's location	0.169	4.00	0.68
2	Variety of products	0.169	4.00	0.68
3	Affordable product prices	0.153	4.00	0.61
4	Has a business partner	0.153	4.00	0.61
5	Have an independent weaving place	0.169	4.00	0.68
Total strength		0.814		3.25
Weakness				
6	Lack of promotion and branding of products produced	0.102	3.00	0.31
7	Limited production	0.051	4.00	0.20
8	The company does not have a silkworm cultivation site	0.034	4.00	0.14
Total weakness		0.186		0.64
Total strength and weakness		1.00		3.90
Total difference between strengths and weaknesses				2.61

Based on Table 1, it can be seen that the total strength score is 3.25. While the total weakness score is 0.64. From this it can be concluded that the strength score is greater than the weakness score with a score difference of 2.61.

On the strength side, the most influential is the easy access road to the company's location, varied products, and having an independent weaving place. CV KUPU SUTRA is located in Pasuruhan, a city that is very easy to access using large and small vehicles, making it easier for suppliers and consumers to visit CV KUPU SUTRA. Silk products from CV KUPU SUTRA consist of bags, shawls (plain or with Bebebatik), clothes, hats, and shoes (regular shoes: flat shoes, sports shoes, knit shoes). Some silk products such as fabrics, some are combined with cotton fibers. To make shoes, the material is also added with cotton because if it is all silk, the fabric will be hard and stiff. Weaving place, *CV Kupu Sutra* has its own weaving place so that this will facilitate and speed up the process of making silk yarn.

On the weakness side, a major influencing factor is the lack of promotion and branding of the products produced. Until now, the promotion carried out is still limited to exhibitions only. *CV Kupu Sutra* products are sold through outlets and showrooms at the Company's office. Branding of kupu silk products is still being improved, with important people being endorsed as consumers of silk products.

3.2 External Analysis

External analysis is an analysis outside the company that can affect the company's overall vitality such as economic strength, technological strength, sociopolitical strength, demographic strength, and lifestyle [19]. External factors can provide the basics for managers to anticipate opportunities, plan the right decisions according to existing opportunities and help managers to protect the company against threats or develop the right strategy that can turn threats into benefits for the company in the future. The following are the results of the external analysis of *CV Kupu Sutra* Pasuruan, East Java.

Based on Table 2, it can be seen that the total opportunity score owned by *CV Kupu Sutra* Pasuruan, East Java is 2.89, while the total threat score is 0.64. It can be concluded that the total opportunity score has a value greater than the threat score with a score difference of 2.25.

The influential factors that become opportunities in the development of silkworms respectively are climatic conditions suitable for silkworm cultivation, the absence of local competitors, having a good relationship with the community, and helping the community's economy. Pasuruhan is an area that is not too hot which is suitable for silkworm cultivation,

this is a very big opportunity for *CV Kupu Sutra* to develop silkworms. The silkworm farmers in Pasuruhan and its surroundings are all affiliated with this company, there is no other company in this area that is engaged in silkworm and its products. *CV Kupu Sutra* is located in the urban area of Pasuruhan, where there are many visitors who are interested in silk, both from silkworm cultivation, spinning and the showroom of silk products. The large number of visitors is not a problem for the surrounding community, as the CV owner and family members have a good relationship with the local community. For silkworm cultivators, there is a sense of additional income, with a very flexible time, but can produce a high income.

Table 2. IFAS Matrix CV Kupu Sutera Pasuruan, East Java

No.	Internal Factor	Weight	Rating	Score
Opportunity				
1	Climate conditions are suitable for silkworm cultivation	0.154	4.00	0.62
2	No local competitors	0.154	4.00	0.62
3	Good relationship with the community	0.154	4.00	0.62
4	Increased demand for silk products	0.123	3.50	0.43
5	Helps the community's economy	0.154	4.00	0.62
Total opportunity		0.738		2.89
Threat				
6	There is no written partnership MoU	0.123	2.00	0.25
7	No support from the government	0.108	2.50	0.27
8	Dependence on external parties	0.031	4.00	0.12
Total threat		0.262		0.64
Total opportunity and threat		1.00		3.53
Total difference between opportunity and threat				2.25

On the threat side, the influential factor is the lack of support from the government. The total score of opportunities and threats of 3.53 shows that *CV Kupu Sutera Pasuruan* is responding to existing opportunities and threats.

3.3 Internal External Matrix

The IE matrix is used to determine the company's current position and produce a suitable development strategy for *CV Kupu Sutera Pasuruan*, East Java based on internal factors and external factors. The IE matrix is based on the results of the IFAS and EFAS matrices. Based on the IFAS and EFAS matrix, the total internal factor score is 3.90 and the total external factor score is 3.53. The following are the results of the IE matrix obtained from the total IFAS and EFAS matrix scores.

		Total IFAS Score		
		Strength 3.0-4.0	Average 2.0-2.99	Weak 1.0-1.99
Total EFAS Score	High 3.0-4.0	Cell I Growth	Cell II Growth	Cell III Stabilization
	Middle 2.0-2.99	Cell IV Growth	Cell V Stabilization	Cell VI Divertations
	Low 1.0-1.99	Cell VII Stabilization	Cell VIII Divertations	Cell IX Divertations

Fig. 1. IE Matrix CV Kupu Sutera Pasuruan, East Java

Based on Figure 1, it can be seen that the total IFAS and EFAS scores of CV Kupu Sutera Pasuruan, East Java are located in cell I, which is a growth area. Development strategies that can be carried out include expanding the business, adding types of products, changing or improving the quality of results cocoon to with more advanced technological input [20] and increasing access to a wider marketing network.

3.4 Matrix SWOT

The tool used to compile company strategy factors is the SWOT matrix (Rangkuti, 2016). This matrix can clearly describe how the external opportunities and threats faced by the company can be adjusted to its strengths and weaknesses. The following is a SWOT matrix for CV Kupu Pasuruan, East Java:

Table 3. SWOT Matrix of CV Kupu Sutera Pasuruan, East Java

IFAS/EFAS	Strength (S)	Weakness (W)
	<ol style="list-style-type: none"> 1. Easy access to the company's location (S1) 2. Variety of products (S2) 3. Affordable product prices (S3) 4. Has a business partner (S4) 5. Have an independent weaving place (S5) 	<ol style="list-style-type: none"> 1. Lack of promotion and branding of products produced (W1) 2. Limited production (W2) 3. The company does not have a place for silkworm cultivation (W3)
Opportunity (O) <ol style="list-style-type: none"> 1. Climate conditions are suitable for silkworm cultivation (O1) 2. No local competitors (O2) 3. Having a good relationship with the community (O3) 4. Increased demand for silk products (O4) 5. Helping the community economy (O5) 	Strategy (SO) <ol style="list-style-type: none"> 1. Optimize the marketing of processed silk products (S2,S3,S5,O2,O4) 2. Add cooperation with new partners as buyers of silk production (S1,S4,O1,O3,O5) 	Strategy (WO) <ol style="list-style-type: none"> 1. Conduct more intensive promotions through social media (W1,O2,O4) 2. Provide training on silkworm cultivation to the community (W2,W3,O1,O3,O5)
Threat (T) <ol style="list-style-type: none"> 1. There is no written partnership MoU written (T1) 2. No support from the government (T2) 3. Dependence on external parties (T3) 	Strategy (ST) <ol style="list-style-type: none"> 1. Increase the trust of business partners by making an MoU (S4,T1,T3) 	Strategy (WT) <ol style="list-style-type: none"> 1. Maximize employee performance for production with existing threads (W2,W3,T3)

Based on the SWOT analysis in Table 3, it shows that the alternative strategies that can be provided for CV Kupu Sutera Pasuruan, East Java start from the best strategy, namely the S-O strategy, W-O strategy, S-T strategy and W-T strategy.

3.5 QSPM

QSPM analysis is an analytical tool that allows strategists to objectively evaluate various alternative strategies based on important internal and external success factors to determine the varied strategies that have been formulated in the SWOT analysis. The following is the

QSPM of *CV Kupu Sutra* Pasuruan, East Java: Feasibility analysis is one measure of the success of a farm.

Table 4. QSPM CV Kupu Sutra Pasuruan, East Java

No	Development Strategy	Total Score
1	Adding cooperation with new partners as buyers of silk products	2.503
2	Optimizing marketing of processed silk products	2.475
3	Provide training on silkworm cultivation to the community	1.571
4	Conduct more intensive promotion through social media	1.413
5	Increase the trust of business partners by making an MoU	1.011
6	Maximizing employee performance for production with existing threads	0.248

Based on Table 4, it shows that the development strategy that is a priority for CV Kupu Sutra Pasuruan, East Java is to increase cooperation with new partners as buyers of silk products with a score of 2.503. Adding buyers of silk products must be done, if at this time consumers are those who have money, because silk is a product whose value is very expensive. Therefore, *CV Kupu Sutra* needs to find new breakthroughs that can attract middle-class consumers by making low quality silk, namely materials from silk yarn mixed with cotton yarn.

An alternative strategy that can be implemented by *CV Kupu Sutra*, East Java is to maximize employee performance to produce existing yarn with a score of 0.248. The concept of empowerment is applied at *CV Kupu Sutra* to carry out spinning and weaving. Spinning is done by mothers or young women who need additional income, so it is only part-time labor. This is what causes its performance to be less than optimal. Therefore, increased human resource capacity is needed [20].

4 Conclusion

Based on the total IFAS and EFAS scores of *CV Kupu Sutra* Pasuruan, East Java are located in cell I, which is a growth area. Development strategies that can be carried out include expanding the business, adding types of products, changing or improving the quality of results, and increasing access to a wider marketing network.

The priority development strategy for *CV Kupu Sutra* is to increase cooperation with new partners as buyers of silk products. While the alternative strategy applied by *CV Kupu Sutra* is to maximize the performance of employees who produce yarn.

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