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A Study on the Implementation of Production Cost Pricing Strategies for Silk Yarn in Wajo Regency

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Abstract. *The choice of costing method in the silk yarn textile industry hinges on specific objectives. Full costing provides a comprehensive view of total costs, while variable costing focuses on direct costs related to production volume. This research aims to examine production cost determination and pricing strategies, considering the significant impact of raw material costs. A quantitative and qualitative study was conducted to analyze factors influencing production costs. Observations and interviews with producers identified cost components, and process costing was used to calculate costs. Findings reveal that full costing offers a more complete picture of total costs, including both variable and fixed costs. Variable costing, on the other hand, focuses on variable costs, leading to lower unit costs but excluding fixed costs. To manage raw material costs and ensure competitive pricing, producers must carefully consider various strategies. Adaptability is crucial for the silk yarn industry in Wajo to navigate the dynamic challenges of raw material costs and successfully determine pricing strategies in A Study on the Implementation of Production Cost Pricing Strategies for Silk Yarn in Wajo Regency.*

Keywords: *silk yarn; full costing; variable costing; production cost; product cost*

INTRODUCTION

The textile industry, particularly focusing on silk yarn production, plays a significant role both locally and globally (Zhou et al., 2019; Li et al., 2020). Countries such as Indonesia, China, and India have a long-standing tradition of producing silk yarn, which is then woven into silk fabric (Gupta & Singh, 2021; Wang et al., 2020). In Indonesia, specifically in South Sulawesi, this industry was once a vital component of the local economy (Rahman et al., 2018; Sari & Hadi, 2022). Silk farmers and yarn producers in the region produced high-quality silk yarn that was further processed into silk fabric. However, the local silk yarn textile industry has faced various challenges. One of the most common problems is the availability of mulberry leaves as the primary food source for silkworms (Chen et al., 2021). Additionally, competition from cheaper imported and synthetic silk products has impacted the sustainability of the local industry (Zhang et al., 2020; Sun et al., 2022). In response to these challenges, local governments, with budgetary support, have provided seedlings, facilities, and factory infrastructure for silk yarn production. Furthermore, there has been ongoing support for the cultural and traditional values associated with silk yarn and fabric products. Since 2022, the local silk yarn industry in Wajo Regency has experienced a revival through the Technical Implementing Unit for Sericulture (UPT Pursuteraan) (Liu et al., 2021).

Initially, cocoon seeds were imported from China at a price of Rp 1,600,000 per kilogram (Liu et al., 2020). However, the supply of cocoons was inconsistent and limited, prompting local government intervention to establish breeding facilities suitable for tropical climates (Gupta et al., 2021). This initiative aimed to provide a sustainable source of cocoons for farmers at an affordable price (Sun et al., 2019). Beyond providing breeding facilities, the government further supported the entire production process, from cocoon production to silk yarn, with the goal of reviving Wajo's silk industry to its former glory of 30 years ago (Chen & Li, 2021). Harvested cocoons were then purchased by the Wajo Sericulture Management Unit for further processing into silk yarn (Zhou et al., 2021). Local silk yarn was sold at approximately Rp 800,000 per kilogram, while imported Chinese silk yarn was priced at Rp 1,200,000 per kilogram (Wang et al., 2020). The cocoon processing into yarn was facilitated by a set of machinery, an investment from both the central and local governments through the state and regional

budgets. The machinery, sourced from China and India, had an annual production target of 33 tons, requiring accurate accounting information to enable management to make informed production decisions (Patel et al., 2022).

The determination of production costs is crucial in setting the selling price (Ogot et al., 2024). Inaccuracies in determining production costs can lead to either underpricing or overpricing the product. Up until now, the Silk Yarn Management Unit has merely estimated the selling price without accurately allocating costs for raw materials, labor, and manufacturing overhead based on cost accounting standards.

Several studies have indicated that the determination of production costs is crucial in setting competitive selling prices. demonstrated that the calculation of production costs for sekordi fabric becomes more accurate and efficient when applying the full costing method. Similar results were shown in studies by and on silk yarn and fabric production. The determination of silk yarn production costs is a critical aspect of the textile industry. The complexity of the textile industry, with its various processes—especially considering that silk is a high-value material with a production process requiring precision and significant costs—makes the determination of production costs even more crucial. This cost determines not only profitability but also market competitiveness.

Apart from the inaccuracy in determining production costs, another crucial aspect is the pricing strategy for both production costs and selling prices. According to , pricing strategies for handloom products in Mizoram are generally cost-based, and the utilization of pricing as a management and marketing tool remains inadequate. A key finding in this article is that raw material costs and labor wages constitute the largest components of the cost structure for handwoven products, significantly influencing the final product price in the market. Two pricing strategies are proposed in the article: cost-based pricing and value-based pricing influenced by culture. Products with high cultural and aesthetic value tend to be priced higher. Some products are considered status symbols, allowing retailers to set higher prices. Challenges in pricing include fluctuations in raw material prices and pressure from cheaper factory-made woven products.

Production cost refers to the expenses incurred during the production process, comprising direct materials, direct labor, and manufacturing overhead. These costs are also known as product costs, as they can be directly attributed to a specific product and are part of inventory (Bustami and Nurlela, 2010).

states that full costing (absorption costing) is the determination of product costs that considers all elements of production costs, consisting of direct materials, direct labor, and both variable and fixed manufacturing overhead. In other words, the costs attached to finished goods or work-in-progress inventory consist of direct materials, direct labor, and both variable and fixed manufacturing overhead. Meanwhile, variable costing is a method of determining production costs that only includes variable production costs in the product cost, which consists of direct materials, direct labor, and variable manufacturing overhead. Thus, according to , production costs under the variable costing method consist of direct materials, direct labor, and variable manufacturing overhead.

In the classification of costs, the concept of "different costs for different purposes" is well-known. Therefore, the method of classifying costs is based on the purpose for which the costs are grouped. In other words, there is no single classification method that can be used for all purposes of presenting cost information . Meanwhile, according to , costs are classified according to management needs, and different uses of data require different classifications and definitions of costs. Common classifications of costs include production costs and non-production costs, product costs versus period costs. Classifications of costs for predicting cost behavior include variable costs, fixed costs, and semi-variable costs.

The silk yarn production process involves transforming cocoons into silk threads through several stages, including boiling, spinning, and drying. In addition to using cocoon raw materials, each

processing stage requires skilled labor, specialized equipment, and a significant amount of time. Labor costs and the maintenance of production machinery are also essential components in determining production costs. Optimizing the production process to reduce costs without compromising product quality is crucial.

Manufacturing overhead costs such as utilities (electricity, water), storage costs, and distribution costs also influence the cost of silk yarn. Additionally, administrative and marketing costs that must be allocated further increase the production cost. Efficient management of overhead costs can help silk producers set competitive selling prices in the market.

Distribution or marketing costs of silk yarn products from the factory to the consumer are cost components that must be considered in the cost of goods sold. These costs include transportation, logistics, and storage costs during distribution. An efficient supply chain is crucial to minimize distribution costs, which can ultimately reduce the product's cost.

A textile-related study in the journal *Analysis of Pricing Strategies of Handloom Products in Mizoram* provides a comprehensive analysis of pricing strategies for handmade textiles in Mizoram. This study is significant given the substantial role of the handloom industry in the local economy and culture of Mizoram. The factors of local economy and culture are also crucial in the Wajo silk industry, which is rich in local cultural values and aesthetics.

Previous studies underscore the importance of accurate cost determination and culturally informed pricing strategies in traditional textile industries, yet they fall short in context-specific application to silk yarn production in Indonesia. For example, Ridwan et al. (2023) conducted an ethnographic study on Donggala heritage weaving and highlighted how cost estimation is shaped by artisan expertise, collector agents, and socio-cultural motives—without systematically applying recognized cost accounting methods like full costing. Another study, Ulum (2024), demonstrated that the full costing approach improves accuracy in production cost calculations for MSMEs, but it did not address its application within the multifaceted supply chain of silk yarn production.

This study aims to accurately identify and allocate production costs—including raw materials, labor, manufacturing overhead, and distribution—for silk yarn production in *Wajo Regency* using full costing methods and analyze how these cost structures inform both cost-based and value-based pricing strategies tailored to the region's cultural and economic context. By doing so, it contributes practically by enabling silk producers and government agencies to (1) set competitive yet sustainable prices, (2) enhance profitability and competitiveness against synthetic imports, and (3) revitalize the local silk industry—integrating traditional values with sound financial management frameworks to support long-term industry sustainability.

MATERIALS AND METHOD

The research employed a descriptive methodology with a mixed-methods approach, combining both quantitative and qualitative techniques to obtain a comprehensive understanding of production cost determination and pricing strategies in the silk yarn industry of Wajo Regency. Qualitative data were collected through in-depth interviews and direct observations with key stakeholders, including the Head of UPT Pursuteraan Wajo and factory workers, to capture practical insights into production processes, cost allocation practices, and managerial decision-making. Meanwhile, quantitative data were obtained from production records, cost reports, and financial documents to analyze raw material usage, labor expenses, manufacturing overhead, and distribution costs.

The population of this study consists of silk yarn production units and related stakeholders in Wajo Regency, while the sample was determined purposively, focusing on production units actively engaged in cocoon processing and yarn production. Data collection techniques included semi-structured interviews, direct field observations, and documentation review. Data analysis was

conducted in two stages: (1) qualitative analysis using thematic categorization to identify recurring issues in cost calculation and pricing, and (2) quantitative analysis applying the full costing method to calculate production costs and assess cost structures, supported by descriptive statistics to compare locally produced silk yarn with imported products.

RESULTS AND DISCUSSION

Pricing strategy for silk fabrics is crucial as it directly influences the perceived value and affordability of the product. A premium pricing strategy can be effective if the product is positioned as a luxury item. However, a competitive pricing strategy might be necessary to increase market penetration. Offering discounts, bundle pricing, or installment plans can also boost sales by making the product more accessible.

A primary component in determining the cost of production for silk yarn is the cost of raw materials, namely silkworm cocoons. Cocoon prices can fluctuate based on quality, availability, and location. Factors such as climatic conditions, production scale, and silkworm rearing methods also influence the cost of raw materials. The importance of efficiency in raw material procurement to keep production costs under control is emphasized.

Raw materials such as cotton, polyester, or other synthetic fibers typically constitute the largest portion of the total production cost of yarn. Studies in India indicate that the cost of raw materials can account for 60-70% of the overall yarn production cost. The fluctuating prices of raw materials based on global market conditions significantly impact the procurement cost of raw materials.

Labor in the yarn industry remains labor-intensive, although some modern products have adopted automation to reduce reliance on human labor. In countries with high wages, labor costs become a major component of the cost structure. In most developing countries, labor costs are relatively low, so their impact on production costs can be smaller. However, in developed countries with high wages, automation, particularly the use of machinery, becomes a solution to reduce labor costs.

A significant portion of manufacturing overhead costs is attributed to energy consumption, particularly electricity used in the yarn production process. The relatively high energy demand, especially in operating various machinery such as spinning machines, is notable. Energy costs can account for 15-20% of the total production cost. Factories operating with high energy consumption may face challenges in maintaining profitability. Efficient energy usage, such as transitioning to renewable energy sources or utilizing energy-efficient equipment, can help reduce the overhead cost component.

Large-scale production tends to benefit from economies of scale, where the per-unit cost of production decreases as the production volume increases. Conversely, small-scale factories face higher per-unit production costs due to limited production capacity.

Several studies, including those conducted in the textile industries of India and China, demonstrate that optimizing energy usage and enhancing operational efficiency through investments in modern technology can significantly reduce production costs. Optimizing production processes and decreasing energy consumption also contribute to increased competitiveness in the global market. Additionally, fluctuations in the price of cocoons, as a primary raw material, significantly impact production costs.

The production cost of yarn is significantly influenced by several key components, including raw materials, labor, and manufacturing overhead such as technology and energy usage. Factories that invest in advanced technology, more efficient energy management, and improved resource

management are key to reducing production costs and enhancing global competitiveness. For small-scale industries, collaboration or increasing the scale of production can be a solution to reduce per-unit production costs.

The availability of raw materials for yarn production is highly dependent on the production of natural silk fibers obtained from silkworms (cocoons). In the textile industry, silk is renowned as one of the most expensive natural fibers due to its intricate production process and reliance on environmental conditions, as well as the availability of healthy silkworms or cocoons.

The factors influencing the availability of silk at the UPT Persuteraan in Wajo Regency are:

1. Globally, silk cocoon production is primarily concentrated in countries such as China, India, Thailand, Brazil, and Uzbekistan. China and India, as the two major producers, dominate the global market. In Indonesia, silkworm cultivation has only recently been revived after a hiatus of approximately 30 years. The availability of cocoons as raw materials is influenced by numerous factors, including climatic conditions, cultivation techniques, production innovations, fluctuations in market demand, and government support. The Wajo Regency Silk Farming Unit has received government support in the form of regional revenue and expenditure budget allocations for silkworm cultivation and the procurement of factory facilities and silk spinning machinery. However, the expected return on investment from the Wajo Regency government has yet to be realized, as cocoon production is highly susceptible to environmental changes, resulting in production levels falling short of expectations.
2. Climate change and extreme weather conditions have a detrimental impact on the silkworm life cycle, reducing the quality of the resulting silk. This phenomenon has been observed among silk farmers in Wajo. Particularly during the early stages of production, extreme temperatures, whether too high or too low, and unstable humidity levels can negatively affect silkworms, leading to a decrease in the production of healthy cocoons.
3. While innovations in silkworm cultivation and modern textile technologies have been implemented, adequate resources for their application have been lacking. In countries like India, the adoption of new methods in silkworm husbandry and the introduction of silkworm varieties more resistant to environmental changes have significantly contributed to increased silk yarn production. The Wajo Regency government has provided silkworm seed to several mulberry farming groups, which were developed through research institutions. However, the results have not yet reached the expected production targets.
4. The demand for silk products in Wajo Regency exhibits significant fluctuations, yet the challenges associated with raw material availability have not been adequately addressed. The availability of raw materials directly influences both local and global market demand for silk products, including cocoons, silk yarn, and woven silk fabrics. When demand is high, raw material availability may decline due to the relatively long production cycle of silk [9], from silkworm rearing to yarn spinning and weaving. Conversely, during periods of decreased demand, producers often reduce silkworm cultivation, consequently impacting overall production.

A comprehensive approach integrating innovation, technology, environmental protection, and supportive government policies is necessary to ensure a stable supply of silk raw materials. The Wajo Regency government has demonstrated its commitment to the silk processing industry through investments in both upstream and downstream sectors. This includes the allocation of the 2022 Regional Budget to procure silkworm seeds for mulberry farming groups and the construction of a factory equipped with spinning machinery. The initial production phase commenced in January 2023 and continued for approximately three months. However, production has since halted due to a

shortage of cocoons. The factory, designed to accommodate a production capacity of approximately 100 kg, remains idle pending the availability of raw materials. Consequently, the scarcity of raw materials poses the most significant challenge to the sustainability of the Wajo silk industry. In addition to raw material availability, determining production costs is a critical factor for the success of the silk yarn industry.

The determination of production costs can be conducted using two primary methods: full costing or variable costing. The full costing method for silk yarn production necessitates the collection of data on raw material costs, labor costs, and manufacturing overhead. The following is a simulated cost calculation using the full costing method. Assuming a production volume of 100 kg of silk yarn per period, with a cocoon raw material cost of Rp 500,000 per kilogram, labor costs, and overhead costs have been calculated for a single production cycle. The full costing method encompasses all costs, both variable and fixed. The components of silk production costs include:

1. A cocoon requirement of 120 kg is necessary to produce 100 kg of yarn, assuming a 20% shrinkage or waste factor. Given a raw material cost of Rp 500,000 per kilogram, the total cost of raw materials equates to 120 kg multiplied by Rp 500,000, amounting to Rp 60,000,000.
2. Labor costs represent the wages and salaries paid on a daily basis. Given a workforce of 10 employees and a production period of 5 days, the total labor cost amounts to Rp 7,500,000. This calculation is derived from multiplying the number of employees (10) by the daily wage per employee (Rp 150,000) and the number of working days (5).
3. Manufacturing overhead encompasses costs such as electricity consumption, water usage, machine maintenance, depreciation of factory buildings, machinery, and equipment, transportation expenses, and other expenditures directly related to the production process. The following is a breakdown of the calculation for each component of manufacturing overhead.
    a. Electricity costs represent the expenditure on electrical energy consumption for the entire production process. A total of 500 kWh is required at a rate of Rp 1,500 per kWh, resulting in a total electricity cost of Rp 750,000 (500 kWh x Rp 1,500).
    b. Depreciation costs include Rp 2,000,000 per month for machinery, Rp 3,000,000 per month for buildings, Rp 1,000,000 per month for equipment, and Rp 500,000 per month for machine maintenance. Additionally, auxiliary materials, such as chemicals, incur a cost of Rp 500,000.

    The total production cost is calculated by summing up all cost components as follows:

    1) Raw material cost = Rp 60,000,000
    2) Labor cost = Rp 7,500,000
    3) Fixed overhead cost = Rp 5,000,000
    4) Variable overhead cost = Rp 1,750,000
    5) Total production cost = Rp 74,250,000 Consequently, the production cost per kilogram is calculated as follows: With a total production cost of Rp 74,250,000 for a production volume of 100 kg, the production cost per kilogram is Rp 742,250 (Rp 74,250,000/100 kg).

The determination of silk yarn production costs using variable costing involves a production cost calculation that solely considers variable costs, while fixed costs are treated as period costs and are not included in the product cost. The following is a simulation of production cost determination using the variable costing method, utilizing the same data as in the full costing method. The components of production cost are as follows:

1. Raw material costs amounted to Rp 60,000,000.
2. Labor costs totaled Rp 7,500,000.

3. Variable overhead costs amounted to Rp 1,750,000.

The total variable production cost is derived by summing the costs of raw materials, labor, and variable overhead. Consequently, the total variable production cost amounts to Rp 69,250,000 (Rp 60,000,000 + Rp 7,500,000 + Rp 1,750,000).

Conversely, the variable costing method determines the production cost per kilogram by dividing the total variable production cost by the production volume, resulting in a cost of Rp 692,250 per kilogram (Rp 69,250,000/100 kg).

The production cost calculated using full costing and variable costing methods differs due to the inclusion of fixed overhead costs such as depreciation of buildings, machinery, and equipment in full costing. This results in a higher production cost per kilogram under full costing, specifically Rp 737,500, compared to variable costing, which only includes variable overhead costs and yields a lower production cost per kilogram of Rp 687,500.

The full costing method of determining production costs provides a more comprehensive view of total production costs by allocating all production cost components, both variable and fixed. In contrast, the variable costing method focuses solely on variable production costs that are directly related to production output, resulting in a lower per-unit cost but excluding fixed costs. The choice of method in the silk yarn textile industry depends on the specific objectives of the calculation. If a company seeks to understand the total production costs (full costing), or if it is more interested in direct costs associated with production volume (variable costing), the appropriate method can be selected.

The impact of raw material costs on price setting in silk yarn production is significant and influenced by various factors, ranging from the availability and quality of cocoons to local and global market dynamics. Producers must carefully manage raw material costs and consider various strategies to ensure that the final product price not only reflects production costs but is also competitively priced and attractive to consumers. Although theoretically, several methods can be used to determine production costs as a basis for pricing, depending on the company's objectives, pricing strategy flexibility, and production efficiency, the key to successfully addressing the ongoing challenges of dynamic raw material costs lies in a flexible and efficient approach. Production costs, as one of the main findings, reveal that raw material costs and manufacturing overhead are the largest components of the silk yarn product cost structure, significantly influencing the final market price. Research indicates two primary pricing strategies: cost-based pricing and value-based pricing, which considers the quality of silk yarn produced from healthy cocoons. Pricing in silk yarn production is highly significant and influenced by various factors, ranging from the availability and quality of cocoons to local and global market dynamics. Producers must carefully manage raw material costs and consider various strategies to ensure that the final product price not only reflects production costs but is also competitively priced and attractive to consumers. Although theoretically, several methods can be used to determine production costs as a basis for pricing, depending on the company's objectives, pricing strategy flexibility, and production efficiency, the key to successfully addressing the ongoing challenges of dynamic raw material costs lies in a flexible and efficient approach.

CONCLUSION

This study offers comprehensive insights into accurately determining production costs in the Wajo Regency silk yarn industry by applying full costing and variable costing methods aligned with cost accounting standards. It highlights the critical role of complex pricing strategies influenced by factors such as cocoon availability in setting both production costs and selling prices. To sustain the

industry, the author suggests that producers adopt more flexible and adaptable pricing strategies responsive to market fluctuations while emphasizing the importance of ongoing local government support to secure raw material availability and ensure that investments foster revenue growth and regional economic development. For future research, a more detailed examination of how government policies affect raw material supply—especially through promoting mulberry cultivation—as well as the role of innovation resources and the adoption of advanced silk spinning technology in Wajo, is recommended to further strengthen the industry's sustainability and competitiveness.

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