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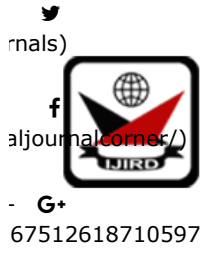
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Cost Driven Strategies in Effort to Sustainability of Tofu Agro Industry Business: The Case in Covid-19 Pandemic Situation in Mataram City, Indonesia

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Abstract:

The method used in calculating the cost of productions is the full costing method and the variable costing method. In the main study, a new alternative is proposed, namely is a cost driven method by the calculation of the price of tofu production. The goal to be achieved is to find out the cost of production of tofu and the opportunity to apply it using the formula for the ratio of the cost of production, as a comparison is the cost of production using the breakeven point price method. The cost of tofu production is IDR41,621.21 / board using the cost determination method and IDR26,801.04 / board using the breakeven point price method. The ratio of the cost of production using the cost driven method to the break-even point method is 1.55, meaning that the cost-driven method is likely to be applied in the calculation of the cost of tofu production as a new alternative in addition to using the full costing and variable costing methods. In the Covid-19 pandemic situation, the tofu agro-industry business provides benefits for entrepreneurs, so it can be used as a strategy to ensure efforts to maintain the sustainability of the tofu agro-industry business.

Keywords: Break-even-point price, cost production ratio, full costing, variable costing

1. Introduction

Tofu is a processed product from the clumping process of soybean juice [1]. Tofu is known to the public as a daily food as a side dish or snack. Viewed from the nutritional aspect, tofu is able to function as a source of nutrients such as protein, fat, vitamins, and minerals [2]. In addition to the cheap price, tofu is a food that is much favored by the community. Housewives from low, middle and high incomes like to consume tofu in their diet, therefore, the tofu agroindustry has a strategic role in efforts to fulfill household consumption, expand employment opportunities, empower small and medium enterprises, and develop the economic sector [3].

At the end of 2019, the whole world was shocked by the discovery of a new virus called Covid-19 or often known as the corona virus. This virus causes panic all over the world, because of its very fast spread [4]. Due to the speed of transmission of the virus, several local governments have imposed a *lockdown system* to limit economic and social activities [5]. As a result of this corona outbreak, many people have lost their jobs due to restrictions on activities [6]. The impact of the Covid-19 pandemic is felt in all sectors, including the agricultural sector. The impact that is most felt by entrepreneurs themselves is the high price of raw material needs but the price of the products sold must remain cheap.

In early 2021, around 160 thousand tofu and tempeh entrepreneurs went on a production strike due to a very significant increase in soybean prices. Soybean prices, which are usually IDR6,500/kg, have increased to IDR9,000–IDR9,400 per kilogram [7]. The increase in the price of soybean raw materials has an impact on increasing production costs, as well as having an impact on changes in the structure of production costs. Based on the results of a study by [8] that the cost of raw materials is the largest cost element in the tofu agroindustry, so that changes in raw material prices are a determining factor for production costs in addition to labor and firewood costs [7].

It is common practice for tofu entrepreneurs, when the price of raw materials goes up, it is difficult for tofu entrepreneurs to raise the selling price, because the price increase has an impact on decreasing the demand for tofu. The strategy applied is to reduce production and at the same time reduce the amount of production from usual, which is adjusted to the number of orders from its customers.

The strategy of reducing product size and reducing the amount of production is a short-term strategy, but in the long term this strategy cannot be maintained because it will result in a decrease in sales turnover which in turn has an impact on decreasing business profits and lowering household income. Therefore, there must be a strategy that can be applied in the long term, namely a strategy that is able to maintain the sustainability of the tofu agroindustry business, as well as being able to cope with the economic impact of the Covid-19 pandemic. The proposed strategy to maintain the sustainability of the tofu agro industry is the application of the cost driven method, which is a method of determining production costs by determining the cost elements that have the most influence on the cost of production. The cost driven method has been applied to transportation companies or transportation services by using mileage, in educational institutions namely teaching hours and the number of parallel classes, in service companies using effective working hours.

In this study, the cost driven method was adopted as a determinant in the calculation of the cost of production as an alternative to calculating the cost of production using the cost structure method, activity-based costs, determining the full costing of production costs and determining the variable costing of production cost [9] The method of calculating full costing of production costs and variable costing is relatively very difficult [10]. Therefore, an easier alternative is needed, so that it can be easily applied by tofu agroindustry entrepreneurs with a relatively low level of education.

The purpose of the study was to determine the cost of tofu production using a cost-determining method using the price breakeven point method, and to analyze the opportunities for implementing a cost-determining strategy that can maintain the sustainability of the tofu agro-industry business in Mataram City.

2. Research Methods

The research was carried out in 2021, which is still in a Covid-19 pandemic situation. Data collection was carried out from June to September 2021 when there was a wave of the Delta Variant Covid-19 attack.

The research location is in Kekalik Jaya Village Urban in Sekarbela District and in Abianbadan Baru Village Urban in Sandubaya District, because these two villages are centers of tofu agro-industry in Mataram City [11]

As the unit of analysis, the tofu agro-industry business is actively operating in 2021. The sample size is set at 40 business units using the *quota sampling method*. The number of sample units (n1) in Kekalik Jaya Village Urban = 27 units, the number of sample units (n2) in Abiantubuh Baru Village Urban = 13 units. Determination of the number of sample units in each village urban was carried out using a proportional accidental sampling technique.

The respondents are owners and/or managers of tofu agro-industry businesses at the research location. Owners are individuals or households who act as investors in tofu agro-industry business units. Manager is an individual who is given the task and authority by the owner to carry out the business operations of tofu agroindustry. Data collection is done by combining 3 (three) methods as follows:

- Delivery of questionnaires to respondents in google. Form format.
- Direct face-to-face interviews using structured questionnaires while still implementing health protocols, namely maintaining distance, avoiding crowds, using masks, and washing hands with soap or *hand sanitizer*.
- Direct observation to the location where the production process is located to view and discuss the production process by paying attention to aspects of product safety and health.

The data and information that have been collected are processed and analyzed using a computer or laptop. The application used is *excel*. Data processing consists of *coding* and tabulation. The results of tabulation and data processing are displayed in tabular format. The data analysis process is as follows:

1. To achieve the first objective, an analysis was carried out:

a. Cost of goods sold using the method of cost driven [7]:

$$CGScd = 1,862 \times \frac{\sum RMCi}{\sum Qi} \dots\dots\dots (1)$$

Description:

CGScd = cost of goods sold using the method of cost driven (IDR/board)

k min = 1.862

RMCi = cost of raw materials / soybean seeds (IDR/production process) -i

Qi = number of production per production process (board/production process)

b. Cost of goods sold using the method of breakeven point price (CGSbe)

$$CGSbe = \frac{\sum FCi}{\sum Qi} \dots\dots\dots (2)$$

Description:

CGSbe = cost of goods sold using the method of berak even point proce (IDR/board)

Qi = production per production process responden ke-i

FCi = fixed cost responden i

2. The second objective is achieved by analyzing the ratio of the cost of goods sold:

$$Rcgs = \frac{CGScd}{CGSbe} \dots\dots\dots (3)$$

Description:

Rcgs = ratio of cost of goods sold

CGScd = cost of goods sold using the method of cost driven

CGSbe = cost of goods sold using the method of break-even point price

Decision Criteria:

- If Rcgs > 1 then the cost determinant has the opportunity to be applied in ensuring the sustainability of the tofu agro-industry business,
- If Rcgs <= 1, then the cost determinant is not likely to be applied in ensuring the sustainability of the tofu agro-industry business.

3. Results and Discussion

3.1. Tofu Production Cost

3.1.1. Variables Cost

By using the structural cost method that production costs consist of Variables costs and fixed costs [11]. Variables cost is costs whose amount is related to the volume of production, while fixed cost is costs whose amount does not change even though the production volume changes [17]. Variables cost in tofu agroindustry consist of raw material costs, labor costs, costs of auxiliary materials (firewood, salt water, electricity, and clean water).

The largest variable cost element is the cost of raw materials (soybean seeds) of 89.57% of the total variable cost of IDR827, 506/production process, while other cost elements are relatively small when compared to the cost of raw materials. Therefore, it can be ascertained that raw materials are the determinants of costs in the tofu production process. The results of this study are in accordance with the results of research conducted in 2015 by [8], [12] and [16] that soybean seeds are the biggest cost element in the processing production process made from soybeans (tofu and tempeh). Both in the pandemic situation and before the Covid-19 pandemic showed that the raw material cost element placed the largest proportion of costs. The fluctuations in the price of soybean seed raw materials that took place during the Covid-19 Pandemic period with a price increase of almost 200% had a direct impact on increasing production costs. The price increase is directly related to the increase in production costs, as well as changing the cost structure of tofu production. The percentage of tofu agro-industry Variables costs in Mataram City in 2021 is shown in Table 1.

No	Type	Unit	Volume	Price (IDR/unit)	Total Cost (IDR)	Percentage (%)
1	Raw Material Cost					
	-Soya bean	kg	63.50	11,672	741,172	89.57
2	Labor Costs Outside the Family	HKO	0.25	38,000	9,500	1.15
3	Auxiliary material costs				-	-
3.1	Firewood	tie	5.30	10,000	53,000	6.40
3.2	Salt water	liter	2.25	1,000	2,250	0.27
3.3	Electricity				13,892	1.68
3.4	Water				7,692	0.93
	Amount				827,506	100.00

Table 1: Variables Cost in Tofu Agroindustry per Production Process in 2021
Source: Processed from Primary Data

The second largest variable cost element is firewood at 6.50% per production process. Firewood as a source of energy when steaming and boiling soybean juice, and the process of clumping soybean juice into tofu. For craftsmen in Kekalik Jaya Village, the use of firewood is substituted with agricultural waste such as husks, corn dreadlocks, peanut dregs, and others. The use of agricultural waste is intended to reduce production costs in the process of making tofu, because the price of agricultural waste is relatively cheap, which only replaces the cost of sacks and transportation costs.

The household-scale tofu agro-industry activity is a labor-intensive business [16], but is dominated by the use of labor in the family. Sources of labor in the family are father, mother and children [13] and [14]. The use of labor outside the family is relatively small with the number of working hours of one to three hours of effective work per production process. The use of labor in the family is more than the use of labor outside the family, as the results of research conducted by [19] that the use of labor in the family is more than the use of labor outside the family. Tofu agro-industry

entrepreneurs prioritize creating job opportunities for themselves rather than for others, this is natural because the business scale is still classified as a micro-small business or a household-scale business.

3.1.2. Fixed Costs

In the process of tofu production requires infrastructure and facilities or equipment. The infrastructure owned consists of semi-permanent buildings as a place of business, wells or water networks from the Regional Drinking Water Company as a source of clean water. The facilities or equipment used are water machines, milling machines, furnaces, frying pans, plastic tubs, baskets, and others.

The depreciation of the infrastructure and facilities is calculated. The depreciation value is included in the group of fixed costs in addition to the cost (interest) of capital. The results of the calculation of depreciation costs for infrastructure and facilities or equipment are calculated using the straight-line method [18]. By using the straight-line calculation method, it is obtained that the depreciation value of tofu agroindustry infrastructure and business facilities is IDR14,650 or 23.96% of the total fixed costs of IDR61,154 per production process.

No	Type	Average (IDR)	Percentage (%)
1	Tool Shrink	14,650	23.96
2	Capital Interest	36,777	60.14
3	Equipment Maintenance Cost		-
	-Grinding machine	1.059	1.73
	-Furnace	253	0.41
4	Marketing Fee		-
	-Gasoline/Transportation	8,415	13.76
	Amount	61,154	100.00

Table 2: Fixed Costs in Tofu Agroindustry per Production Process in Mataram City in 2021

Source: Processed From Primary Data

Capital interest is the largest fixed cost or 60.14% of the total fixed cost of IDR61,154 per production process. The capital used is generally sourced from loan capital from formal and non-formal institutions. In one production process, the cost of capital is calculated using commercial capital interest of 12% per year or one percent per month. Because the production process takes place every day, the capital interest is 1/30% per production process.

Other fixed costs are transportation costs for selling tofu products and equipment maintenance costs. Marketing and maintenance costs are ranked third and fourth in the cost structure of processing soybeans into tofu.

3.1.3. Total Production Cost

The sum of the Variables costs and fixed costs is called the total cost of production. The total cost of production is the same as the cost of production [20]. The production cost structure consists of Variables costs and fixed costs. The composition of tofu production costs can be seen in Table 3. Variables costs occupy the largest proportion, while fixed costs occupy a smaller proportion.

With a variable cost structure of 93.12% of the total production cost, it shows that the tofu agro-industry business is a labor-intensive economic activity, not capital-intensive. Every labor-intensive company is able to absorb employment, as well as create job opportunities for urban communities. The job opportunities created are as suppliers of raw material for soybean seeds, suppliers of firewood, suppliers of salt water, and distributors of tofu products to consumers.

No	Type	Average Cost (IDR)	Percentage (%)
1	Variable Cost	827,506	93.12
2	Fixed cost	61.154	6.88
	Amount	888,660	100.00

Table 3: Average Production Costs in Tofu Agroindustry per Production Process in Mataram City in 2021

Source: Processed from Primary Data

In the Covid-19 pandemic situation, the tofu agro-industry business activities still exist, because there are no other options for entrepreneurs, except they continue to produce so that customers are not disappointed, and entrepreneurs get income or income to meet the living needs of the whole family, including the workers. Income is obtained from the sale of tofu products to distributors or from consumers.

3.2. Production and Production Value

The product consists of tofu and tofu dregs. Tofu products are stated in plank units, while tofu dregs are stated in bags. In one production process, the average number of tofu produced is 21.5 boards. All the tofu products produced were sold out, because the quantity of the production process was adjusted to the volume of requests from customers. Tofu products are produced in limited quantities, because they cannot be stored for long periods of time. Raw tofu can be stored longer in the freezer or in the refrigerator. The tofu products produced are immediately sold so that they arrive at consumers in good condition and fit for consumption. Table 4 shows the production value of tofu and tofu dregs.

No	Production	Physical Quantity	Price (IDR)	Production Value (IDR)
1	Tofu (board)	21.50	53.175	1,143,262.50
2	Tofu Dregs (board)	5.20	20,000	104,000.00
	Revenue			1,247,262.50

Table 4: Production and Production Value in Tofu Agro Industry per Production Process in Mataram City in 2021
Source: Processed from Primary Data

The sum of the production value of tofu and tofu dregs obtained a production value of IDR1,247,050 per production process. The composition of tofu production value is 91.66%, while tofu waste is 8.36%.

The by-products consist of tofu dregs and liquid waste. The by-product that can be sold is tofu dregs for animal feed, while liquid waste has not been utilized as a product of economic value. Actually, tofu agro industry liquid waste can be processed into liquid organic fertilizer through a fermentation process.

3.3. Cost of Goods Sold

Various methods can be used to calculate the cost of goods manufactured. Commonly used methods are full costing and variable costing [9] and [10]. However, in this study, the calculation of the cost of production uses the cost determination method and the price breakeven point method [21] as alternatives offered in this study.

3.3.1. Metode Cost Driven

From the results of a study conducted by [7] that the method of cost driven is recommended to be used as an alternative strategy in a fluctuating price situation in order to provide convenience for entrepreneurs in the cost of production, as well as make it cost drivenasier to determine the selling price of the product. The equations used are: equation (1).

$$CGScd = \frac{IDR741,172}{21.5 + 5.20} = IDR51,687.73/unit$$

The cost of production consisting of the cost of production of tofu and the cost of production of tofu dregs. By using the proportion of tofu production and tofu dregs, it can be calculated the cost of production of each [15], namely the cost of production of tofu IDR41,621.21/board, and the cost of production of tofu dregs IDR10,066. 52/ bag as calculated below:

- CGScd (tofu) = 0.8052 x IDR51687.73 = IDR41,621.21 / board.
- CGScd (tofu dregs) = 0.1488 x IDR51687.73 = IDR10,066.52/bag.

The cost of production of tofu is lower than the selling price of IDR53,175/board (Table 4). Likewise, the cost of tofu dregs is lower than the selling price of IDR20,000/bag (Table 4). On the basis of this comparison, tofu agroindustry entrepreneurs can be sure to gain business profits, because the selling price of each product is above their respective production costs.

3.3.2. Price Break Even Point Method

3.3.2.1. Contribution Margin

The contribution margin of tofu is the difference between the price per unit and the variable cost per unit [15]. The price per unit of tofu is IDR53,175/board, while the variable cost per unit is IDR35,278.70/board. Thus, the contribution margin per unit of tofu is IDR17,896.30/board.

The contribution margin of tofu dregs is the difference between the price per unit of tofu dregs and the variable cost per unit. The price per unit of tofu dregs is IDR20,000/bag, while the variable cost per unit is IDR3,209.95/bag. So, the contribution margin of tofu dregs is IDR16,790.05/bag. A positive contribution margin indicates that the tofu agroindustry is profitable in the long term, if the production volume is above the breakeven point, the tofu agroindustry is profitable in the short and long term.

3.3.2.2. Break Even Point Price

The calculation of the cost of production using the breakeven point method uses equation (2). The calculation results are as follows:

- CGSbe = IDR888.660/26.70 = IDR33.283.15/unit
- CGSbe tofu = 0.8052 x IDR33,283.15 = IDR26,801.03/board
- CGSbe tofu dregs = 0.1948 x IDR33,283.15 = IDR6,482.11/bag

The cost of production of tofu is lower than the selling price of IDR53,175/bag and the CGS of tofu dregs is lower than the selling price of tofu dregs of IDR20,000/bag (Table 4). The selling price of tofu pulp is almost twice the CGS, while the selling price of tofu pulp is almost three times the CGS. Thus, it can be ascertained that the tofu agro-industry business provides benefits for business owners even in the conditions of the Covid-19 pandemic.

3.4. Cost of Production Ratio

Tests on the use of costs driven as a method of calculating the cost of production used the concept of the ratio of the cost of goods manufactured. The ratio of the cost of production (Rcgs) is the ratio of the cost driven to the CGS breakeven point price. Rcgs uses equation (3) with the following calculation results:

- $Rcgs = IDR51,687.73 / IDR33,283.15 = 1.55$
- $Rcgs\ tofu = IDR41,621.21 / IDR26,801.04 = 1.55$
- $Rcgs\ tofu\ dregs = IDR10,066.52 / IDR6482.11 = 1.55$

The result of the calculation of $Rcgs > 1$ means that the calculation of the cost of production using a cost determinant has the opportunity to be applied in ensuring the sustainability of the tofu agro-industry business as part of a strategy to maintain the sustainability of the tofu agro-industry business during the Covid-19 pandemic, but it still has to be re-tested in the post-Covid-19 pandemic situation. Conceptually, the cost-determining method can be used as an analytical tool to calculate the cost of production, and can also be used to predict future profit achievements, so that it is effectively used as an instrument for business planning.

4. Conclusions and Suggestions

4.1. Conclusion

- The cost of tofu production is IDR41,621.21 / board using the cost-driven method and IDR26,801.04 / board using the breakeven point price method.
- The ratio of the cost of production using the cost-driven method to the break-even point price method is 1.55, meaning that the cost-driven method is likely to be applied in the calculation of the cost of tofu production as a new alternative in addition to using the full costing and variable costing methods.
- In the Covid-19 pandemic situation, the tofu agro-industry business provides benefits for entrepreneurs, so it can be used as a strategy to ensure efforts to maintain the sustainability of the tofu agro-industry business.

4.2. Suggestion

- Further testing is needed on the use of the cost-driven method in calculating the cost of production of tofu in the post-Covid-19 pandemic situation.
- It is suggested to the tofu agroindustry entrepreneurs to use the method of cost-driven in calculating the cost of production, because it is easier and more practical and can also be used as an instrument for planning profits to be obtained in the future.
- It is necessary to conduct research on the use of cost-driven methods in calculating the cost of goods sold in other production centers at home and abroad.

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