

Analysis of Soy Milk Production Costs to determine the number of production units and the time to reach the Break Even Point using the Break Event Point method in Soy Milk SMEs in Mataram

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ABSTRACT: *Pure Soybean Milk SME is a SME that produces soy milk, and during its operation this SME has never carried out a comprehensive calculation analysis of how many units of product should be produced so that the business returns on capital by paying attention to production factors or resources used. Therefore, this research aims to find out the production costs and income of these SMEs until they reach the break-even point and to find out how long it takes to reach the break-even point and see the business prospects of SMEs from looking at existing profits. The method used is the Break Even Point method by preparing existing data in the field then processing it and presenting it in tabular form. This is then done by seeing that the amount of soy milk with an average monthly production capacity is 7,803 bottles of 330 ml milk, with a production cost of Rp. . 3,141 per bottle and the selling price is IDR 5,000 per bottle, with fixed costs (FC) of IDR 57,300,000, so what must be produced to reach the break even point (Break Even Point) is 30,816 bottles. Break Even Point was achieved in 3.95 month with variable costs (VC) IDR 96,779,910 and Total Cost (TC) = Total Revenue (TR) = IDR 154,079,910.*

Keywords: *Small and Medium Business, Break Even Point, Soy Milk*

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I. INTRODUCTION

The development of the food processing industry in Indonesia is supported by natural agricultural resources, both vegetable and animal, which are capable of producing various processed products that can be made and developed from local or regional natural resources. Currently, in several Asian countries, many food products are derived from local food types and processed traditionally. With the development of local products, the number and types of food products are increasing.[1]

The development of the agricultural sector is not only in farming but in small businesses which play a role in processing agricultural products. Especially for Small and Medium Enterprises (SMEs) which are starting to develop rapidly. Small and Medium Enterprises (SMEs) are stand-alone economic activities/productive businesses. SMEs are considered to be the savior of the regional economy, because economic actors can play a role in reducing unemployment and are able to absorb a lot of workers. Small and medium businesses also contribute a lot to regional and state income. Small and medium businesses also make a lot of use of agricultural products in Indonesia. The development of the food processing industry in Indonesia, which is supported by agricultural resources, has resulted in small and medium enterprises (SMEs) increasing in number and developing. In Indonesia itself there are many agricultural product processing industries, one of which is the soybean processing industry[1].

Soy milk or soy juice as one of the agro-industrial products made from soybeans is the result of extracting soybeans from water which has high nutritional value. Most soy milk producers use imported soybeans to produce their business products, because soybeans are not native to Indonesia and the soybeans that are usually cultivated in Indonesia are soybeans with superior seeds that can survive outside their natural habitat. The important role given by the soy milk agro-industry is as a potential to increase the supply of soy commodity inputs in Indonesia, especially NTB, in meeting the needs of agro-industry that processes soybean commodities for consumption by the public. Several soy milk producers in the city of Mataram use soy milk products as a source of income to meet their daily needs, because the process of making soy milk is very easy and does not require special skills [2]

One of the businesses made from soybeans in Mataram is the Pure Soybean Milk SME. Pure Soybean Milk SME is a business making soy milk or soy juice which is still carried out traditionally, especially in the home industry [3] This SME is called a home industry because the industry is still small scale, the workforce is limited, the capital is not too large and they work at home. Pure Soybean Milk SME has a workforce that comes from within the family, that is, only the father and mother own the business. This soy milk processing business is located in Punia Village, Mataram District, Mataram City

This Pure Soybean Milk SMEs, from the moment it opened its business until now, the business owner has never carried out a comprehensive analysis of the calculation of production costs, profits and losses and calculated how many units of product must be made so that the business returns on capital by paying attention to production factors or the resources used. Seeing that the aim of starting this business is to gain profit, you must first know the minimum sales volume that must be produced by the company so that it does not experience losses. An analysis is needed that provides information regarding sales planning. Therefore, there is a need for Break Even Point (BEP) analysis as an analytical tool in planning and further increasing the company's profits [4]

The break even point aims to determine the relationship between costs, profits, selling prices and production volume [5] Where these costs can affect the size of profits. Meanwhile, the selling price can affect the production volume. If costs are less than income, then profits will be made. Apart from that, if the determined selling price is more effective, the sales volume will also be increased to achieve maximum profits. BEP analysis also aims to plan costs and profit and loss plans for a company manager. So, with this BEP analysis the company will be more effective in running its business [6]

II. STUDIES OF METHOD

The data required for this research is primary data and secondary data. Primary data is data Primary data is data obtained through direct surveys in the field regarding data on fixed costs and variable costs used in producing soy milk using action research methods and direct interviews. Meanwhile, secondary data was obtained from the SME where the research was conducted in the form of data on the number of sales every day. After this process is carried out, the total fixed costs, total variable costs and total income per unit of time will be calculated and the variable costs and sales price per unit ((bottle 300 ml)) of product will be calculated. From the data from these calculations, the number of production units and the time required to reach the break-even point can be calculated.[7]

Scope of Study

This research was conducted in Punia Village, Mataram City, NTB to obtain related data; (1) Fixed costs, (2) variable costs (3) selling price, (4) Average production quantity per month, (5) number of units to reach BEP, (6) Time needed to reach BEP (months)

Tools used in research

The tools used in this research are stationery for recording data, recording equipment for interviews, stopwatches for measuring time, scales for measuring weight, measuring cups for measuring production volume, laptops for processing data and writing tools.

Determining the number of pieces and time required to reach the break-even point/profit

The Break Even Point formula used to determine the break even point value is as follows[5]

$$\text{BEP (X)} = \text{FC}/(\text{p}-\text{c})$$

Where:

BEP (X) = Breakeven point in quantity of products (Unit)

FC = Fixed Cost (Rp)

X = Production volume (units)

p = Price / selling price per unit (Rp/unit)

c = Cost / Variable costs of making one unit of product (Rp/unit)

By knowing BEP(X), the time needed to reach BEP can also be determined in the following way:

$$\text{BEP (t)} = (\text{BEP (X)})/\text{X}_{\text{month}}$$

Where:

t = Time to reach BEP (Months)

BEP(t) = Breakeven point in the amount of time (months)

X_{Month} = Number of products produced per month (Units/month)

III. RESULTS AND DISCUSSION

The costs of making soy milk consist of fixed costs and variable costs. In this research, fixed costs include equipment costs and building rental costs. What is included in non-fixed costs (variable costs) are raw material costs, operational costs and direct labor costs. Meanwhile, the income obtained from the soy milk business is total income (Total Revenue).

Table 1. Number of soy milk products produced each month in the period (2022-20223).

No	Bulan Month	Number of Working Days per month (Days)	The amount of soy milk per month (units)
1	October	27	7.851
2	November	27	7.851
3	December	26	7.560
4	January	26	7.560
5	February	27	7.851
6	March	28	8.142
7	April	26	7.560
8	May	28	8.142
9	June	26	7.560
10	July	28	8.142
11	August	27	7.851
12	September	26	7.560
Total		322	93.634
Average per month		26,83	7.803

$$\begin{aligned}
 \text{Average soy milk produced per day} &= \frac{\text{Average amount of soy milk produced permonth}}{\text{average number of working days per month}} \\
 &= \frac{7.803 \text{ soy milk bottle/month}}{26.83 \text{ day/month}} \\
 &= 291 \text{ bottle of soy milk per day}
 \end{aligned}$$

From the average amount of soy milk produced by soy milk companies per month, the average number per day is 291 bottles of 330 ml soy milk per day.

Fixed costs in the manufacture of Pure Soybean Milk SMEs are costs incurred by the industry owner, the size of which is not influenced by the amount of production or the expenditure is constant during the production process. In the soy milk industry, data on fixed costs (FC) in producing soy milk include equipment costs, maintenance costs and building rental costs. The total fixed costs incurred by the owner of the soy milk industry are:

$$\begin{aligned}
 \text{FC} &= \text{Equipment Costs} + \text{Maintenance Costs} + \text{Building Rental Costs} \\
 &= \text{IDR } 8,630,000 + \text{IDR } 420,000 + \text{IDR } 36,000,000 \\
 &= \text{IDR } 45,050,000
 \end{aligned}$$

a. Direct labor costs in one manufacturing process

Direct labor wage costs in the soy milk production process with 4 hours of work, data on the components of direct labor wage costs is obtained in Table 2. below.

Table 2. Components of direct labor costs in making soy milk at Pure Soy Milk SMEs.

No.	Components of Labor Costs	Amount (Person)	Wage Costs per person (IDR/person)	Total Wages per Day (IDR/day)
1	Soy milk production process	2	90.000,00	180.000,00

The variable costs for making soy milk per day (47.98 liters) within 4 working hours are:

$$\begin{aligned}
 \text{VCmilk} &= \text{raw material costs} + \text{operational costs} + \text{labor costs} \\
 &= \text{IDR } 149.250 + \text{IDR } 10.133,41 + \text{IDR } 180.000,00 \\
 &= \text{IDR } 339.383,41
 \end{aligned}$$

It was obtained that the variable cost calculation for one production time was IDR 339,383.41/47.98 liters or IDR 339,383.41/145 bottles of 330 ml soy milk or IDR 2,341 / 330 ml bottle of soy milk.

Based on research and research data processing, the variable costs for making 1 bottle of soy milk (c) are

obtained, namely:

$$\begin{aligned}
 c &= \text{Cost of making soy milk + packaging costs} \\
 &= \text{IDR } 2.341 + \text{IDR } 800 \\
 &= \text{IDR } 3.141 \text{ per bottle of soy milk}
 \end{aligned}$$

So that the variable costs/month (VC) in making soy milk can be obtained, namely:

$$VC = c \cdot X \text{ where } X \text{ is the amount of production/month}$$

Of the total amount produced by soy milk companies, the monthly average is 7,803 bottles of soy milk. So the costs that must be incurred and the income obtained by the Pure Soybean Milk SME can be calculated using the following equation:

$$\begin{aligned}
 \text{Average monthly variable costs (VC)} &= c \cdot X_{\text{month}} \\
 &= \text{IDR } 3.141 \times 7.803 \\
 &= \text{IDR } 24.505.306
 \end{aligned}$$

From the calculation results, it is known that the soy milk variable costs (VC) incurred to produce 7,803 bottles of 330 ml soy milk products in one month are IDR. 24,505,306

The amount of income generated by soy milk entrepreneurs each month is influenced by the number of working days per month. Based on research conducted, the amount of soy milk produced is an average of 7,803 bottles per month. The selling price for soy milk that is ready to be marketed is Rp. 5,000 per 330 ml bottle of soy milk. The monthly income received by Soy Milk SMEs is the sum of the average amount produced per month and the selling price per 330 ml bottle of soy milk.

$$\begin{aligned}
 \text{Total Revenue (TR)} &= p \cdot X_{\text{month}} \\
 &= \text{IDR } 5.000 \times 7.803 \text{ per month} \\
 &= \text{IDR } 39.014.040 \text{ per month}
 \end{aligned}$$

From the data collected, a table can be created as shown in table 3 below:

Table 3 Average total costs and income in soy milk companies, Soy Milk SMEs

Long Time Month)	Average amount of soy milk produced (Accumulated) (bottles)	Fixed Cost (FC) (IDR)	Variabel Cost (VC) (IDR)	Total Cost (TC) (Accumulated) (IDR)	Total Revenue (TR) (Accumulated) (IDR)
0	0	57.300.000	0	57.300.000	0
1	7.803	-	24.505.909	81.805.306	39.014.040
2	15.606	-	49.011.817	106.311.214	78.029.040
3	23.409	-	73.517.726	130.817.123	117.044.040
4	31.212	-	98.023.634	155.323.032	156.059.040
5	39.015	-	122.529.543	179.828.940	195.074.040
6	46.818	-	147.035.452	204.334.849	234.089.040
7	54.621	-	171.541.360	228.840.758	273.104.040
8	62.424	-	196.047.269	253.346.666	312.119.040
9	70.227	-	220.553.177	277.852.575	351.134.040
10	78.030	-	245.059.086	302.358.483	390.149.040
11	85.833	-	269.564.995	326.864.392	429.164.040
12	93.636	-	294.070.903	351.370.301	468.179.040

Break Even Point (BEP) Analysis of Soy Milk SMEs

Based on the data on fixed costs (Fixed Cost) and variable costs that have been obtained in making soy milk, it will then be used as data to analyze whether the business is feasible or not in terms of Break Even Point Analysis (BEP). This analysis is important to carry out to provide recommendations for business actors whether the business is profitable and to know the break-even point where total production costs are equal to total income. Next, you can see the Break Even Point value below.

Calculation:

$$\begin{aligned}
 \text{Selling price per bottle (p)} &= \text{IDR } 5,000 \\
 \text{Variable costs per bottle (c)} &= \text{IDR } 3,141 \\
 \text{Fixed costs (FC)} &= \text{IDR } 57,300,000 \\
 \text{Average production} &= 7,803 \text{ bottles/month}
 \end{aligned}$$

1. The amount of soy milk sold to break even is:

$$\begin{aligned}
 \text{BEP (X)} &= \text{FC} / (p - c) \\
 &= \text{IDR } 57,300,000 / (\text{IDR } 5,000 - \text{IDR } 3,141)
 \end{aligned}$$

= 30.816 soy milk bottle
 2. Time to break even point:
 $BEP (t) = (X_{BEP} / (X \text{ per month}))$
 = 30.816 / 7,803
 = 3,95 month

Based on the table above, and the results of the BEP calculation, a BEP graph can be created as in Figure 1 below:

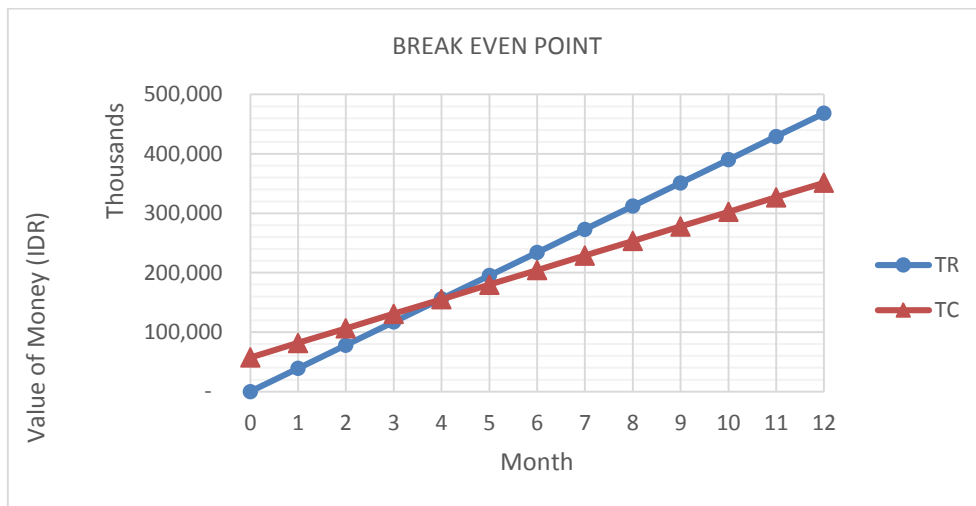


Figure 1. Break Even Point graph on soy milk production

Based on Figure 1. It can be seen that the amount of soy milk with an average monthly production capacity is 7,803 bottles of 330 ml milk, with a production cost of IDR. 3,141 per bottle and the selling price is IDR 5,000 per bottle, with fixed costs (FC) of IDR 57,300,000, so what must be produced to reach the break even point (Break Even Point) is 30,816 bottles. Break Even Point was achieved in 3.95 with variable costs (VC) IDR 96,779,910 and Total Cost (TC) = Total Revenue (TR) = IDR 154,079,910.

IV. CONCLUSION

Based on the research results, it can be concluded that the number of products produced to reach the Break Even Point (BEP) condition was 30,816 bottles of soy milk and was achieved in 3.95 months with total expenditure costs (TC) equal to total income (TR), namely IDR 154,079,910 and with fixed costs (Fixed Cost (FC)) namely IDR 57,300,000

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