Variable Costing: A Tool for Management for the Chemical Corporation In Pia Latief Kediri Company

Nindy Fuzi Nadila Sibuea[1] ,Yuni Hariati[2], Iskandar Muda[3]

[1,2,3]*Universitas Sumatra Utara, Medan, Indonesia*

nindynadila@sibuea.com

ABSTRACT

Every company wants cessation of life (sustainability) in its business. To be able to continue to live and develop, the company's profit is needed, because with the profit earned, the company's capital will increase. The increase in capital causes the company to develop and be able to meet all of its operational needs. To get a profit, careful planning is needed in its business, starting from targeted sales, costs and profits. Therefore the analysis of cost volume and profit is one way to achieve the profit the company wants, so that the company can develop. In this study, the goal to be achieved is to determine the break even point, the contribution margin, and the safety margin of Pia Latief products in a multi-product manner. The analysis used is a quantitative approach using secondary data. In deferring variable costs and fixed costs on overhead costs, the highest point and lowest point method is used. The Pia Latief company produces two types of pia, namely wet pia and dry pia. The results of research conducted in 2017 obtained a break-even point for wet pia of 10,707 units and dry pia of 6,227 units. The contribution margin in 2017 was IDR 1,873,010,837, while in a ratio of 55.2%. The margin of safety for wet pia is 96.21% while dry pia is 96.2%. To achieve a profit increase of 5% in 2018, the company must sell 296,072 units of wet pia and 172,184 units of dry pia.

Keywords: *Variable Costing, A Tool for Management for the Chemical Corporation*

INTRODUCTION

The development of small and medium enterprises in the City of Kediri is increasing, it can be seen that currently there are more and more businesses in the City of Kediri, especially food. The Pia Latief company is one of the small and medium enterprises located in the City of Kediri which is currently experiencing development, however, along with the development of its business, the company's management has not been well organized (Nasution et al., 20210. Planning costs, sales and profits is a problem that must be solved so that the company can develop better.

Cost assignment is only based on the habits that have been issued so far, so it is not known how cost efficient it is to produce one unit of product. Therefore, cost volume profit analysis is an alternative solution for companies to make profit planning. With this analysis, it can be seen at what volume level the company breaks even point and at what sales level the company gets profits and how much a decrease in sales is allowed so that the company does not experience losses.

LITERATURE REVIEW
Profit Planning

Profit planning is so important in the company, especially to determine the level of sales and costs that must be incurred by the company (Afzalia etg al., 2022). According to Harahap (2011) which states that: "Profit planning is a work plan that has been carefully calculated where the financial implications are expressed in the form of projected calculations of profits, balance sheets, cash and working capital for the long term and short term." So that with good profit planning, the company will continue to grow and achieve the desired profit.

In the short-term profit planning process, management requires differential accounting information to consider the impact of changes in sales volume, selling prices, and costs on company profits. Break-even analysis and cost-volume-profit analysis are techniques to assist management in short-term profit planning. To make decisions about profit planning, there are two formulas that can be used, namely:

   1. The Profit Volume Cost Equation

      To determine profit planning, the equation according to Krismiaji and Aryani (2011) can be used as follows:

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3128

$$\text{Sales = variable costs + fixed costs + profit}$$

2. The Contribution Margin Approach
   The second approach is to expand the contribution margin formula by including the profit target: (Krismiaji and Aryani (2011:169))

$$X = \frac{F + 1}{Contribution\ Margin\ Each\ Unit}$$

$$Contribution\ Margin = P - V$$

Instruction:
X   = Sales unit to achieve the target
F   = Fixed cost
I   = Profit
P   = Selling price each unit
V   = Variable cost each unit

Definitian Of Cost Behavior

According to Mulyadi (2009), "cost behavior can be said as the relationship between total costs and changes in the volume of activity". Meanwhile, according to Garison (2006), cost behavior is a cost that will react or change with changes in activity levels. Understanding the behavior of costs is key to some organizational decision making (Muda, 2019). Managers who know the behavior of costs will be able to predict better what will happen to costs under various conditions.

The three most common classifications of cost behavior are variable costs, fixed costs, and semi-variable costs.

1. Variabel Cost
   According to Mulyadi (2009), variable costs are costs whose numbers change in proportion to changes in the volume of activity. Meanwhile, according to Garrison (2006: 257), variable costs are costs that change in proportion to changes in activity levels.

2. *Fixed Cost*
   According to Mulyadi (2009: 466), fixed costs are costs that are fixed in a certain volume of activity. Meanwhile, according to Carter (2009:69), fixed costs are costs that do not change in total when business activity increases and decreases.

3. Mixed Cost
   According to Mulyadi (2009), semi-variable costs are costs that have fixed and variable elements in them. Meanwhile, according to Garrison (2006), mixed costs are costs that show both the characteristics of fixed costs and variable costs.

According to Garrison (2006), separating the elements of fixed costs and variable costs from semi-variable costs can be done in several ways, namely:

1. The Scatter Graph Method
   The Scatter graph method takes into account all cost data. The costs incurred at various levels of activity are plotted onto a graph and a line is drawn from the points drawn. Line making with

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3129

attention and perform data inspection. The analysis pays attention that the line is able to reflect all existing points and not only the highs and lows. Usually, the line will be drawn with the series of points above and below it balanced. The graph is called a scatter graph and the lines drawn from these points are called regression lines. The regression line is the average line. The average variable cost is shown by the slope of the line while the fixed cost is shown at the point where it intersects the Y axis.

2. Hight – Low Method

Semi-variable cost analysis using the high-low method begins by identifying the period with the lowest activity level and the period with the highest activity level. The difference in costs in the two periods is divided by the change in activity between the two extreme periods to estimate the variable cost per unit of activity. The high-low method is the simplest method and can be used to estimate fixed costs and variable costs quickly but has the disadvantage of only being based on two points.

$$\text{Variable Cost} = \frac{High\ activity\ level\ cost - Low\ activity\ level\ cost}{high\ activity - low\ activity}$$

3. Least-squares regression Method

$$Y = a + bX$$

Least-squares regression method is a method that separates semivariable costs into components of fixed costs and variable costs using all data. The least-squares regression method calculates the regression line that minimizes the sum of the squared errors and the residual squared errors. In the least-squares regression method to estimate a linear relationship based on a linear equation.

The following formula is used to calculate the value of the intersection point on the X axis (a) and slope (b) which minimizes the square of the residual.

$$b = \frac{n\left(\sum XY\right) - \left(\sum X\right)\left(\sum Y\right)}{n\left(\sum X^2\right) - \left(\sum X\right)^2}$$

$$a = \frac{\left(\sum Y\right) - b\left(\sum X\right)}{n}$$

Instruction:
X = Activity Level (*variable independent*)
Y = Mixed Cost Total (*variable dependent*)
a = Fixed Cost Total
b = Activity variable cost each unit
n = Number Of Observation
Σ = Number Of Total Observation

Definition Cost – Volume – Profit (CVP)
According to Mulyadi (2010: 223), "cost profit volume analysis is a technique for calculating the impact of changes in selling prices, sales volume, and costs on profits, to assist management in planning short-term profits".
According to Samryn (2013: 172) the main elements in this analysis include the following:
1. Product Selling Price
2. Sales Volume and Activity Level
3. Variable Cost Each Unit
4. Fixed Cost Total

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3130

5. The composition of the combination of products sold
6. Cost drivers and their rates

To analyze the cost, volume and profit, break even point analysis (BEP) can be used, which links costs, sales volume and expected profit. Based on the BEP, it will be known at what volume level the company can make a profit. According to Garrison (2006: 334), there are two ways to determine the breakeven point, namely by using the equation method approach and the graphical approach.Perhitungan impas dengan metode grafik
Break even calculations can also be performed by determining the meeting point between the sales revenue line and the cost line in a graph. To be able to determine the breakeven point, a graph must be made with the flat axis showing sales volume, while the vertical axis shows costs and revenues.
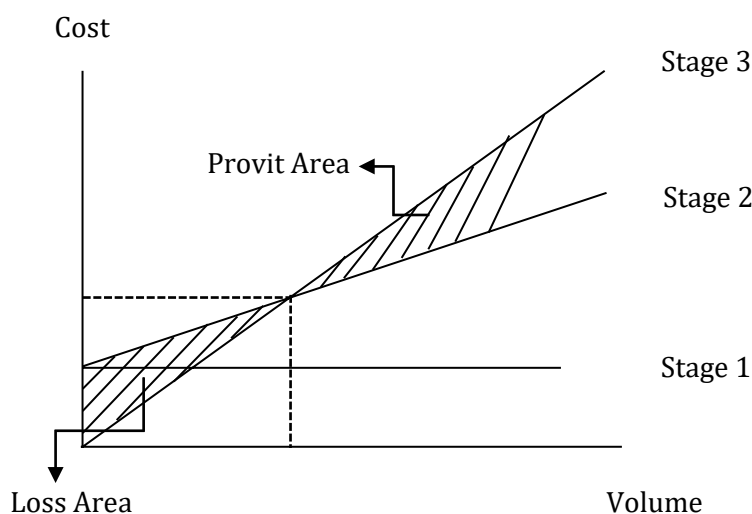
Picture 1
Break Event Point Chart

Instruction:
Stage 1 is the Fixed Cost line
Stage 2 is the total cost line
Stage 3 is the sales revenue line

1. Equality Method
   In the equation method, there are two approaches that can be used in calculating the breakeven point both in units and rupiah, as follows:
   a. The operating equation approach
      The operating equation approach focuses on the income statement as a useful tool in organizing a company's expenses into fixed and variable expense categories. The income statement can be expressed in a narrative equation.

$$I = (S - VC) - FC$$

   The equation is changed to:

$$S = VC + FC + I$$

   b. The contribution margin approach
      Contribution margin is sales revenue minus total variable costs. At the break-even point, the total contribution margin is equivalent to fixed expenses.

$$BEP\ (\text{unit}) = \frac{(FC)}{(P) - (V)}$$

Or:

$$BEP\ (\text{rupiah}) = \frac{FC}{1 - \frac{VC}{S}}$$

Multi Product Analysis
The analysis of a single product is very simple by applying the formulas presented in the discussion above. But in the case of calculating multi-product break even points, the company must use the sales mix as an analysis tool. According to Hansen (20011: 286) "sales mix is a relative combination of the various products sold by the company". For calculations with multiple products, the same formula is used as for the case of a single product.

Contribution Margin
The contribution margin is the difference between the selling price per unit and the variable cost per unit or also called the total contribution margin, which is the difference between total sales and total variable costs. Contribution margin is the amount left over to cover fixed costs and provide a profit. According to Samryn (2013), to determine the contribution margin, the following formula can be used:

Contribution Margin = Sale – Variable Cost

Contribution Margin Ratio
The contribution margin ratio is the comparison between the contribution margin (total income minus variable costs and total income/sales). According to Krismiaji and Aryani (2011:171), the formula for the contribution margin ratio is as follows:

$$\text{Contribution Margin Ratio} = \frac{\text{Contribution Margin}}{Sale}$$

Margin Of Safety
According to Samryn (2013), to determine the Margin Of Safety (Safety Point) can be calculated using the following formula:

Magin of safety = Sale Total – Break Event Point

Meanwhile, according to Garrison (2006: 338), the margin of safety is the excess of budgeted (actual) sales above the sales volume break-even point. The safety margin can also be expressed as a percentage of sales which is referred to as the margin of safety ratio (M/S) which can be calculated as follows:

$$\text{Safety Margin Ratio} = \frac{\text{Margin Of Safety}}{\text{Sales Budget Total}} \text{ x } 100\%$$

PREVIOUS RESEARCH
Satriani, et al (2015) Cost-Volume-Profit Analysis as a Short Term Profit Planning Tool at CV. Mentari Dempo Indah Pangkalpinang (Case Study at CV. Mentari Dempo Indah, Pangkalpinang). The method of determining the sample by way of sample random sampling. The results showed that

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3132

the contribution margin in 2009 was IDR 544,891,146, in 2010 it was IDR 604,205,492, in 2011 it was IDR 685,316,892, in 2012 it was IDR 591,726,003 and in 2013 it was IDR 695,180,072. BEP in 2009 IDR 1,218,057,805.56. Year 2010 IDR 1,368,026,836.11. In 2011 amounted to IDR 1,284,557,907.69. In 2012 it was IDR 1,581,844,165.62 and in 2013 it was IDR 1,517,071,627.03. The margin of safety in 2009 was 19.90%, in 2010 it was 19.40%, in 2011 it was 26.48%, in 2012 it was 13.33% and in 2013 it was 19.00%. Operating leverage, it can be seen that if the company increases sales by 1%, the company will get an increase in profit percentage in 2009 of 8.56%, in 2010 of 9.82%, in 2011 of 8.15%, in 2012 of 8.06 %, and in 2013 it was 8.57%.

Pangemanan (2016), Analysis of Corporate Profit Planning by Implementing Break Even Points at PT. Kharisma Sentosa Manado. The analytical method used is descriptive analysis. The results of the research show that in general the sales performance and management of costs carried out by PT. Kharisma Sentosa Manado has been efficient. During 2013-2015 PT. Kharisma Sentosa Manado was able to sell the Xenia Sporty 1.3 (MT) car above the breakeven point, in other words, PT. Kharisma Sentosa Manado was able to make a profit, and this profit moved quite significantly from the sales and this means that PT. Kharisma Sentosa Manado has been able to plan profit well.

Pratama (2016), Cost Analysis, Sales Volume and Profits as a Tool for Profit Planning at the Pure Jaya Soy Sauce Company, Kediri City. This study aims to determine: contribution margin, break even point, level of margin of safety. and the degree of Operating Leverage at the Pure Jaya Soy Sauce Company. The conclusions of this study are:
1. In 2015, a contribution margin ratio of 22.65% was obtained and in 2016 profit planning was obtained at 30.72%.
2. In 2015 the company's breakeven point was Rp. 6,615,326,580.00 . As for the 2016 profit planning, the company will reach a breakeven point if it has achieved sales of Rp. 5,023,836,636.00.
3. In 2015 the company's margin of safety was IDR 19,583,151,420.00 and in the 2016 profit planning it was IDR. 25,104,413,064.00.
4. In 2015 the degree of operating leverage was achieved at 1.34 while in the 2016 profit planning it was 1.2.

METODE PENELITIAN
In this research, we try to calculate the amount of break even point as the basis for determining the profit planning of Pia Latief's company. In analyzing using a quantitative approach. According to Sugiyono (2013: 12), "a quantitative approach is a research approach that uses data in the form of numbers or data that can be counted and can be analyzed systematically using statistics". While the type of research is descriptive. The data used is secondary data, where the data is taken from the company in the form of historical data in the form of production or sales results, production costs.
The research analysis steps are the first to collect data in the form of the amount of production or sales as well as costs, the second to separate semi-variable costs using the highest point and lowest point method, the third to calculate the break even point, the contribution margin, the margin of safety, and finally to plan the next year's profit. will come based on the planned targets.

Analysis Results
To calculate BEP with more than one type of product, data in the form of a sales mix is needed, namely sales data for each product. In this Pia Latief company, the amount of production is the same as the number of sales because sales are based on an order system. Then sales in 2017 from the data above can be seen, wet pia of IDR 282,150 units (boxes) and dry pia of 163,800 units. Thus the sales mix of the two products is 2.82 : 1.64, the selling price of wet pia per unit is IDR 8,000 and dry pia is IDR 7,000 per unit. So that BEP can be calculated as follows:

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3133

$$\text{Variable Cost} = \frac{\text{Fixed Cost}}{\text{Selling price each unit} - \text{Variable Cost each unit}}$$

$$\text{Variable Cost} = \frac{71.114.365}{[(8.000 \ x \ 2,82) \ + \ (7.000 \ x \ 1,64)] \ - \ [(3.434,57 \ x \ 2,82) \ + \ (3,429,336 \ x \ 1,64)]}$$

$$\text{Variable Cost} = \frac{71.114.365}{34.040 - 15.309,6}$$

$$\text{Variable Cost} = \frac{71.114.365}{18.730,4}$$

$$\text{BEP} = 3.796,73 \ unit$$

Based on the results of these calculations, the BEP for each type of product can be calculated as follows
- BEP wet pia = 3.796,73 x 2,82 = 10.706,78 unit and rounded to 10.707 unit.
- BEP dry pia = 3.796,73 x 1,64 = 6.226,64 unit and rounded to 6.227unit.

1. **Contribution Margin Analyst**
    a. **Contribution Margin**
 Contribution margin company Pia LATIEF in 2017 can be calculated as follows:
 Sale:

$$\text{CM} = \text{Sale} - \text{Variable Cost}$$

Sale wet pia (8.000 x 282.150)	Rp 2.257.200.000
Sale dry pia (7.000 x 163.800)	Rp 1.146.600.000
Sale Total	**Rp 3.403.800.000**
Variable Cost :	
Wet Pia (3.434,57 x 282.150)	Rp 969.063.926
Dry Pia (3.429,336 x 163.800)	Rp 561.725.237
Variable Cost Total	**Rp 1.530.789.163**
Margin Contribution	**Rp 1.873.010.837**

So Pia Latief company margin contribution in 2017 is Rp 1.873.010.837,-

   b. **Margin Contribution Ratio**
       The contribution margin ratio formula is as follows:

$$\text{Margin Contribution Ratio} = \frac{Margin\ Contribution}{Sale}$$

$$\text{Margin Contribution Ratio} = \frac{\text{Rp. 1.873.010.837}}{\text{Rp 3.403.800.000}} \ x \ 100\% = 55,03\%$$

So the contribution margin ratio of pia LATIEF company in 2017 is 55.04%.

2. *Margin Of Safety*
    The margin of safety is the safety limit for a company when it experiences a decline in sales, regardless of the decline in sales that occurs as long as it is within these limits the company will

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3134

not experience a loss.

The margin of safety (security level) at the LATIEF pia company based on the data that has been obtained is as follows:
Wet pia safety margin:
Safety Margin = Total Sales – Break Even Point

Sale wet pia (8.000 x 282.150)	Rp 2.257.200.000
BEP wet pia (8.000 x 10.707)	Rp 85.656.000
Margin of safety wet pia	**Rp 2.171.544.000**
Margin of safety dry pia :	
Sale dry pia (7.000 x 163.800)	Rp 1.146.600.000
BEP dry pia (7.000 x 6.227)	Rp 43.589.000
Margin of safety dry pia	**Rp 1.103.011000**

With the following percentages:

$$\text{Margin Of Safety Ratio} = \frac{\text{Margin Of Safety}}{\text{Sale Total}}$$

The wet pia safety margin ratio is:

$$\frac{2.171.544.000}{2.257.200.000} \text{ x } 100\%$$

Margin of safety ratio = 96,21%

The dry pia safety margin ratio is:

$$\frac{1.103.011.000}{1.146.600.000} \text{ x } 100\%$$

Margin of safety ratio = 96,2%

From the results of the calculation above, it can be concluded that the margin of safety for the LATIEF company in 2017 for wet pia products was 96.21% and dry pia was 96.2%.

3. **Analysis of Profit Planning**
   Good profit planning will have an impact on increasing the desired profit and the survival of a company. For 2018 it is expected that profits will increase by 5% from 2017 profits. Then the desired profit in 2018 is Rp. 1,895,390,648, - comes from IDR 1,805,133,950 x 105%. With this profit target, the sales to be achieved can be calculated as follows:

$$Sale = \frac{Fixed\ cost + Profit}{Selling\ price\ each\ unit - Variable\ cost\ each\ unit}$$

$$Sale = \frac{71.114.365\ + 1.895.390.648}{18.730,4}$$

$$Sale = 104.990\ unit$$

From these results, each product can be specified as follows:

Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3135

- Sale in 2018 wet pia (2.82 x 104,990) = 296,072 rounded up.
- Sale in 2018 sales of dry pia (1.64 x 104,990) = 172,184 rounded up.

Conclusion

Based on data analysis, it can be concluded that the results of the study are as follows:

1. The break even point for wet pia products in 2017 was 10,707 units (boxes) where each box contained 10 seeds with a price per unit of Rp. 8,000, - so that the total BEP achieved was Rp. 85,656,000, -
2. The break even point for dry pia products in 2017 was 6,227 units (boxes) where each box contained 10 seeds with a price per unit of Rp. 7,000, - so that the total BEP achieved was Rp. 43,589,000, -
3. Of the two types of products, the company's breakeven point was reached at the time of sales of IDR 129,245,000.-
4. The contribution margin of the two products is IDR 1,873,010,837
5. The margin of safety for wet pia products is IDR 2,171,544,000 and for dry pia products is IDR 1,103,011,000.
6. To achieve a profit increase of 5% from the previous year, the company must sell 296,072 units of wet pia products and 172,184 dry pia products.

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3136

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Eur. Chem. Bull. 2023, 12(Special Issue 8),3128-3137

3137