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Video Transcription: Cost Volume Profit

Hi everyone, my name is Jacqui. This video will be looking at Cost Volume Profit analysis or CVP.

CVP is used as both a decision-making and risk-management tool. CVP demonstrates or shows the relationship between a company's costs, revenue, profit and volume of units sold. So, before trying to understand CVP, make sure you have a good understanding of cost behaviour. Cost Volume Profit analysis is an important tool that companies use to answer various questions relating to the profit of their business.

Let's imagine that we would like to start a shop that sells milkshakes. How could we use CVP in deciding whether to start a business and identify risks we would need to manage, if we started this business?

For instance:

- How many milkshakes do I need to sell to cover all my costs?
- How many milkshakes do I need to sell in order to make a specific profit?
- How close am I to making a loss?
- What price should I charge per milkshake, and if I change this price how will it affect my demand?
- Can I offer customers a discount and how will this affect my profits?

All these questions can be addressed by using CVP as a decision-making tool. So, where do we start? Well, what affects the profit for our shop?

- Profit = revenue – total costs and we know that
- Total costs = variable costs + fixed costs so we could say that
- Revenue – variable costs – fixed costs = profit
OR that the (selling price x number of units) – (variable costs x number of units) – fixed costs = profit

Back to our shop that sells milkshakes. Let's assume that per milkshake:

- The selling price is R15 and the variable costs are R5
- Total fixed costs for the month amount to R7 000

Let's use a graph to look at this information. We can see that both revenue and variable costs vary with the number of units sold. Fixed costs however remain constant, regardless of the number of units sold. The break-even point indicates the amount at which the total costs (variable costs + fixed costs) is equal to the total revenue, and indicates the quantity at which no profit or loss is made by the business. If fewer items than the break-even quantity are sold, total costs are higher than total revenue and the business will make a loss. If more items than the break-even quantity are sold, the total cost is less than the total revenue and the business will make a profit.

So, let's look at the questions that will assist our decision-making. How many milkshakes do I need to sell in order to cover my total costs? This is the break-even point or where revenue = total costs. Let's look at this a little closer. Remember every time you sell a milkshake you will earn R15 revenue but you will need to incur R5 to make that milkshake. So you have actually made R10 per milkshake. Although we have made R10 per milkshake, we still have to cover the monthly fixed costs of R7 000. Remember we only make a profit in our business once we have covered all our costs.

We know that we make R10 every time we sell a milkshake so let's think of the fixed costs as a wall of R7 000. Every time we sell a milkshake, it takes a small bite of R10 out of the R7 000 wall. So how many bites do we need to take to make that wall disappear?

$R7\ 000 \div R10 = 700 \text{ bites} = 700 \text{ milkshakes!}$ **OR**

Fixed Costs

Contribution Margin per Unit = Break-Even Quantity

What does this mean? It means we have to sell 700 milkshakes to be able to cover our total costs. So in deciding whether to start the business, we would compare the break-even quantity (700 milkshakes) to what our market research indicates we are likely to sell each month. This will allow us to see if the business is likely to be a viable option.

So back to the R10. Every time you sell a milkshake the R10 is contributing towards covering the fixed costs. So this amount is known as the contribution margin. Your contribution margin is simply: The selling price per unit (R15) – Variable cost per unit (R5) = Contribution Margin (R10). Your contribution margin can be expressed as a Rand value (R10) or as a percentage. When you express your contribution margin as a percentage we refer to it as a contribution margin ratio. This would be:

$$\frac{\text{Sales} - \text{Variable Expense}}{\text{Sales}} \times 100 \quad \text{OR} \quad \frac{R15 - R5}{R15} \times 100 = 66.67\%$$

In our example the business has a contribution margin ratio of 66.7% or we can say that 66.7% of the selling price per unit will contribute towards covering fixed costs.

We have seen that the break-even point is where:

$$(\text{Sales} - \text{Variable Cost or your Contribution Margin}) \times \text{Number of Units} - \text{Fixed Costs} = 0$$

Let's use the equation to solve our break-even formula:

$$(R15 - R5) \times \text{Number of Units} - R7\ 000 = 0$$

Rearranging this, you will get:

$$\frac{\text{Fixed Costs}}{\text{Contribution Margin per Unit}} = \frac{\text{R7 000}}{(\text{R15} - \text{R5})}$$

= Break-Even Units: 700 Units

Once you have sold enough milkshakes to cover the fixed costs all your costs have been covered. Every milkshake you sell above the break-even quantity, the R10 per milkshake or contribution margin will be profit for the business.

So how many units do I need to sell to make a profit of R5000? This is referred to as the target profit as you will be setting yourself a target.

For example: Sales – Variable Cost – Fixed Costs = Target Profit

So, (R15 – R5, which is your Contribution Margin) x Number of Units – R7000 = R5000

So, $\frac{\text{Fixed Costs R7000} + \text{R5000 Target Profit}}{\text{Contribution Margin per Unit (R15} - \text{R5)}} = \text{Target Profit Units of 1200 Milkshakes}$

In order to make our targeted profit, our required budgeted sales would be 1200 units.

If your budgeted sales target is 701 you are only 1 milkshake above the break-even quantity. However, if your budgeted target is to sell 1000 milkshakes, you are 300 milkshakes above break-even. The closer your sales are to the break-even quantity, the more risky it becomes that you may not sell enough units to cover your costs.

This is referred to as the margin of safety, which is the extent to which actual or projected sales exceed the break-even sales. Margin of Safety = Budgeted Sales – Break-Even Sales.

In this example, CVP is being used as a risk-management tool as it allows us to monitor how close to a loss-making level our budgeted or actual sales are. You can also use CVP to set a selling price for your milkshakes and, if you want to, you can incorporate the effects of giving a discount on your product.

For example, what selling price would allow me to earn a target profit of R5 000, assuming I sell 800 milkshakes?

So, (Selling Price – R5, which is your Contribution Margin) x 800 Units – R7 000 = R5 000

We can see that at a selling price of R20 per milkshake we would make a target profit of R5 000 if we sold 800 milkshakes.

$$SP = \frac{(\text{R5 000} + \text{R7 000})}{800} + \text{R5} = \text{R20}$$



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What if we offered a 5% discount on your milkshakes? How would this change the number of units we need to sell to still make a profit of R5000?

If we offer a 5% discount our new selling price is R20 less ($R20 \times 5\%$) = R19

So $(R19 - R5) \times \text{Units} - R7000 = R5000$

$$\frac{R7000 + R5000}{(R19 - R5)} = 858 \text{ Units}$$

We will need to sell 858 units to make a profit of R5 000. We cannot sell 0.14 of a milkshake so we need to sell 858 milkshakes.

Hope you enjoyed the video and can see how powerful CVP is as a decision-making tool.