



PIPSO

Pacific Islands Private Sector Organisation

**BUSINESS
COSTS &
PRICING**

January 1

2014

This Module highlights the use of historic financial information for as a basis for management accounting purposes. It teaches the use of cost/volume/profit analysis & product costing & pricing using examples of each.

**MODULE
3.2**



Contents

PURPOSE	3
COST RELATIONSHIPS & BEHAVIOUR	4
BREAK-EVEN ANALYSIS	7
USES OF BREAK-EVEN ANALYSIS	12
PRODUCT COSTING	14
MARK-UP & MARGIN	17
METHODS OF PRICING	19
USING PRODUCT COST IN THE MARKET PLACE	22
PRICING MULTIPLE PRODUCTS	25
ANSWERS TO ACTIVITIES	26
ASSESSMENT QUESTIONS	Error! Bookmark not defined.

PURPOSE

Small business often does not recognise the value of information it produces for external parties. This Module is designed to open the eyes of participants to the world of financial information that can be derived from financial reports & budgets. The information is at the fingertips of management/owners to assist them to analyse their financial performance, costs & forecast future trends.

The Module initially establishes the links between business costs compiled at different levels in a business. This is akin to the economic concepts of micro & macro level information, i.e. from the small picture, i.e. cost of a product, to the large, i.e. profitability of the whole business.

Initially participants are introduced to cost/volume/profit analysis by splitting costs into fixed & variable in order to calculate a business's break-even point. For a small or new business this provides an insight into the point at which the business can expect to break even & begin to make a profit.

A review of product costing & pricing methods follows. We begin with pricing. While there appear to be many, there are essentially only three ways to price a product. Pricing & costing are next considered together via a simple example that requires participants to do some product costing calculations & then consider consequences of difference market prices.


On completion of this Module, participants should be capable of doing calculations of fixed & variable costs, break-even analysis & profit forecasting as well as product costing & pricing calculations for their own business.

COST RELATIONSHIPS & BEHAVIOUR

COST RELATIONSHIPS

There are a variety of cost relationships that managers may use to forecast business activity.

Analysis of the relationship between costs, volume of sales & business profits (CVP analysis) is an often used, simple, yet powerful tool.



There are a range of relationships between costs & profit & pricing that are worth exploring. We will look at two.

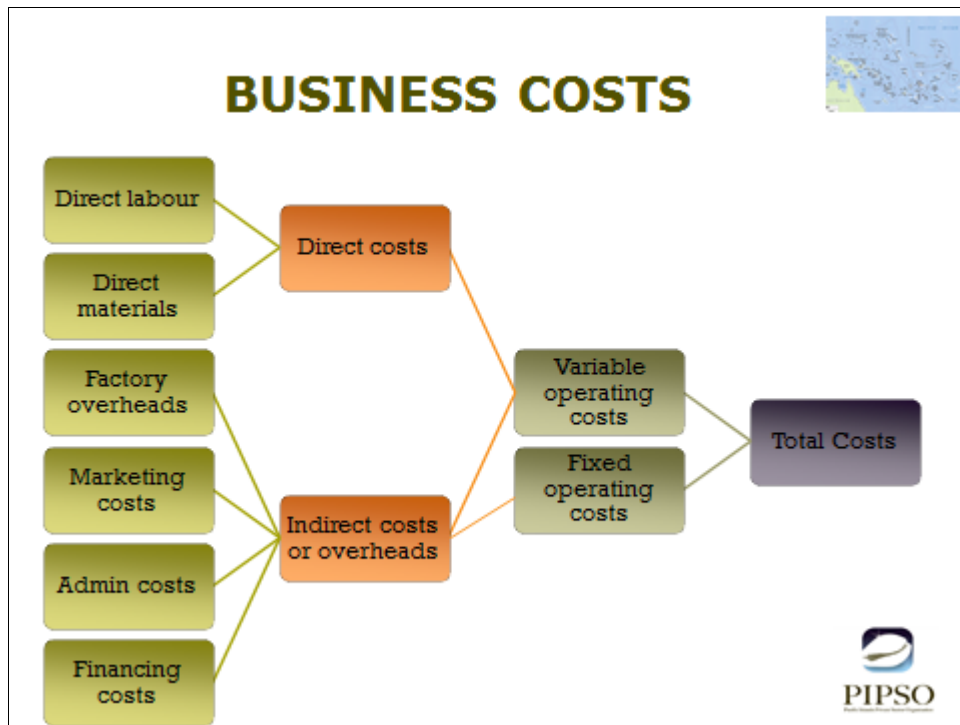
While preparing financial information for outside interests is important, there is a wealth of information available for the benefit of an owner or management by applying some simple analytical techniques: simple but powerful.

The following diagram shows several simple relationships between costs.

Some simple but important relationships are:

1. Direct materials + Direct labour = Direct costs (important for product costing)
2. Direct costs + Indirect costs = Total costs
3. Fixed costs + Variable costs = Total costs

2. & 3. above separate costs in different ways for different purposes. This Module looks at costs from both of these perspectives.



So how can a business owner or manager use the above structure for costs to gain some insights to their business that can assist them to make decisions?

We are going to look at two techniques:

- First using fixed & variable costs to assess profitability of the business
- Second using direct & indirect costs to derive the cost of production of individual, or a range of like, products.

COST BEHAVIOUR

We are going to look at cost behaviour from two perspectives

1. Fixed & variable – used to illustrate what happens to profitability over a range of levels of sales (break-even analysis).
2. Direct, indirect & overheads – used to determine product costs & as a basis for pricing (product costing).

We begin with a technique called cost/volume/profit (CVP) analysis, often called break-even analysis, to:

- Split our business costs into their fixed &/or variable components for a given range of production or sales during a period of time
- Use this dissection of costs can be used to calculate the:
 - Sales required, in units of production or currency, for a business to break-even during the period of time
 - Sales volume required to achieve a target profit
 - Profit or loss that may result from any forecast sales volume

CVP analysis while simple to use can provide very useful management information for operational & strategic planning.

The other way we shall look at costs is for the specific purpose of:

- Calculating the cost to make a product or create a service to be offered for sale
- Pricing that product or service based on cost if a new one or for comparison with others in the marketplace, if an existing one

This latter technique may become somewhat more complicated depending on the complexity of making the product or creating the service. It is, however, extremely powerful & useful. It rewards the time & effort put in.

Costs are broken down into direct & indirect & indirect are further split into manufacturing overheads & other (selling, administration & financial) costs. The purpose for doing this is to allocate costs to products or services delivered in order to ensure that the price that the products may sell at generate profits for the business. It also can reveal which products are more profitable.

Finally, we can, by combine both techniques to look at business viability under a variety of different market conditions.

BREAK-EVEN ANALYSIS

First let's explore the relationship between sales volume & costs, fixed & variable.

COST BEHAVIOUR



From the diagram:

Fixed costs + Variable costs = Total costs

Where:

1. Fixed costs remain the same regardless of the sales level
2. Variable costs change directly in proportion to changes in sales



The splitting of costs into fixed & variable is the critical issue. In the long run all costs are variable as sales volume grows. But, for a specific range of production, sales or during a specific period it is possible to split all costs into either fixed or variable. Some costs may have both a fixed & variable component, e.g. power may light a building (fixed) including manufacturing requiring equipment to make product (variable). These should be separated in the process. This split will only be true for a range of production or sales. It is based on some assumptions as follows:

- All costs can be separated, or split, into fixed or variable
- Fixed costs remain constant over the forecast range of business activity (sales).
- The business is operating within its maximum capacity throughout the period
- Product mix remains constant
- Inventory levels remain constant
- Prices paid for inputs remains constant
- Labour cost & productivity remains constant
- Prices remain the same

This technique can provide useful information for doing a profit plan or budget. It is especially useful for targeting a profit level.

So what costs are fixed & what costs are variable?

Some costs are clearly one or other, while some are a mix or both. The decision on what is fixed & what is variable is for the business owner or manager to decide. Remember that the results of the analysis will only be as good as the assumptions behind the assumptions implied when splitting the costs.

The following indicates the nature of some business costs.

COST BEHAVIOUR



Fixed costs include?

Depreciation	Insurance premiums
Rent	Stationery
Interest payments	Accounting fees
Lease payments	Licence fees

Variable costs include?

Material purchases	Delivery costs
Stock purchases	Vehicle running costs
Sales commissions	direct labour wages
Advertising & promotions	packaging costs


PIPSO

Having split costs between fixed & variable, we are ready to consider the cost/volume/profit relationship.

There are a number of steps in the process designed to determine the break-even point for a business

Remember that the dollar sales value equal the dollar sum of fixed costs plus variable costs at the breakeven point.

BREAK-EVEN ANALYSIS



Break-even sales is that level where:

$$\text{Sales}(\$) = \text{Variable costs}(\$) + \text{Fixed costs}(\$)$$

Steps to do a break-even analysis

1. Estimate business costs
2. Split costs into fixed or variable
3. Calculate contribution margin
4. Calculate break-even point



Firstly we calculate contribution margin, defined as total sales minus variable costs divided by total sales.

This relationship is usually recorded as a ratio or percentage & will be a number between 1% & 100%. The higher the variable costs relative to the sales the lower the contribution margin, i.e. the lower the amount available to contribute towards dollar value of fixed costs as the dollar value of sales, or per units sold, rises. In short, a lower contribution margin requires higher sales to cover fixed costs.

We can then calculate the break-even point for sales or production. This sales value is calculated by dividing the fixed costs by the contribution margin. Divide the dollar value to determine the sales volume.

BREAK-EVEN ANALYSIS



$$\text{Break Even Sales} = \frac{\text{Fixed Costs (\$)}}{\text{Contribution Margin}}$$

Where:

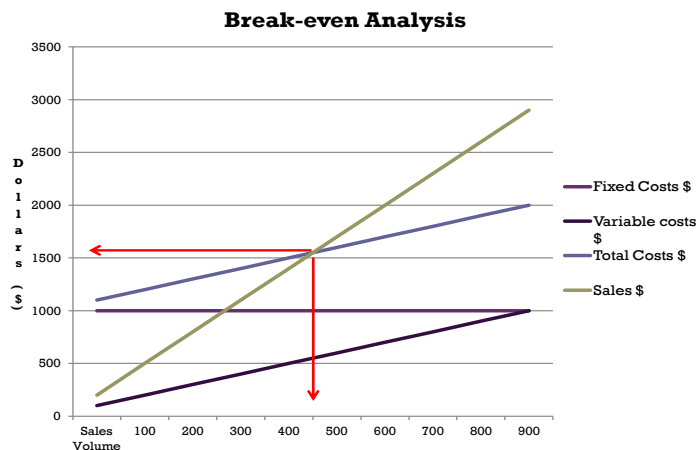
$$\text{Contribution Margin} = \frac{\text{Total Sales (\$)} - \text{Variable Costs (\$)}}{\text{Total Sales (\%)}}$$

Expressed as a %



The following graphs explore this relationship.

FIXED & VARIABLE COSTS



NOTE:

- Horizontal axis measure may represent the volume in units or currency
- Vertical axis measure is currency

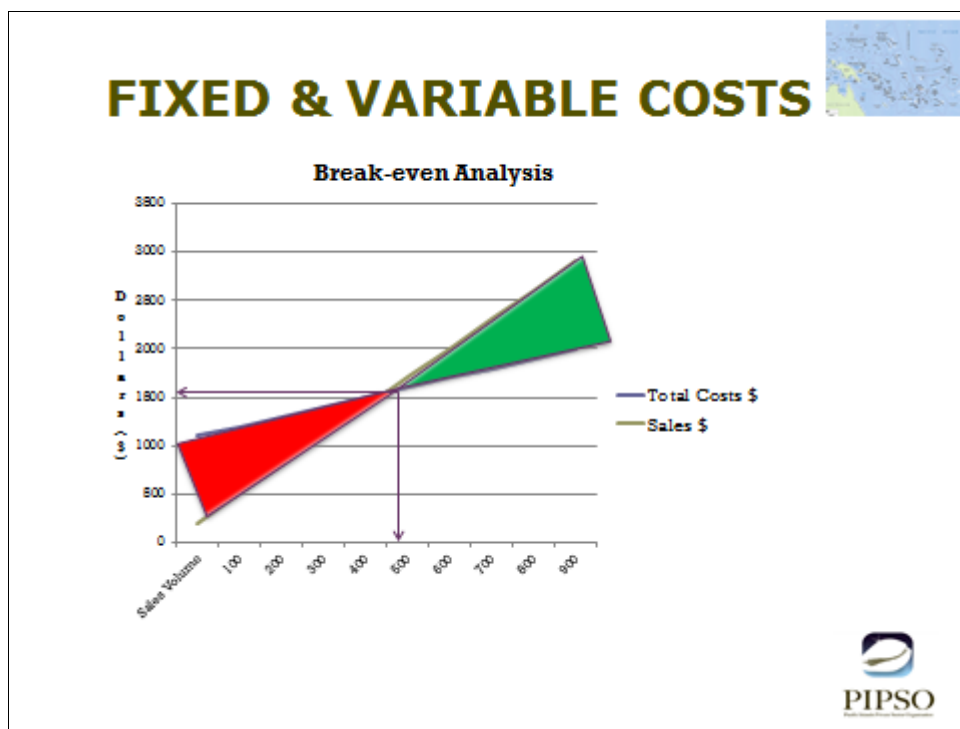
The fixed costs are represented by a horizontal straight line.

Variable costs are represented by an upward sloping straight line, which at the left hand end would pass through zero simultaneously on both scales if extended.

Sales value is represented by an upward sloping line that is steeper than variable costs, but also passes through zero if extended

When the fixed costs are added to the variable costs the combined value of the total costs line will exceed sales for lower levels of sales, but will be parallel to the variable costs line for all values. Due to the total costs line having a lesser slope than the sales value line there will be a point at which the sales line intersects the total costs line. This is the break-even point; the sales level at which total costs equals total revenue from sales.

Beyond this point the business makes a profit & before it a loss.



The area in green in the graph beyond the break-even point highlights the area where the business makes a profit, while the red area before this point highlights the area where the business can expect to make a loss.


USES OF BREAK-EVEN ANALYSIS

PRACTICAL EXAMPLES

Individually answer the questions provided in Activity 3.2.1.

Group discussion is encouraged.

Discuss answers.



ACTIVITY 3.2.1

BREAK-EVEN ANALYSIS

QUESTION 1

Mere has estimated her sales for the year ended 31 December 2014 at \$325,000, of which variable costs are expected to be \$201,000 & profit \$25,000.

What is Mere's contribution margin?

What is Mere's break-even sales level?

QUESTION 2

Jone provides the following forecast for next year:

Sales	\$420,000
Selling price per unit	\$20
Fixed costs	\$153,000
Variable costs	\$105,000
Variable costs per unit	\$5
Net profit (before tax)	\$164,000

What is Jone's contribution margin?

What is Jone's break-even sales level?

What is Jone's break-even sales level expressed in units?

QUESTION 3

Ana has just estimated her new year's budget as follows:

Sales	\$186,000
Fixed costs	\$118,000
Variable costs	\$ 93,000
Net profit (before tax)	\$ 25,000

What is Ana's break-even sales volume?

If Ana wishes to set herself a profit target \$44,000, what \$ level of sales will achieve this outcome?

PRODUCT COSTING

Now let's look at the other way to group costs, direct & indirect, in order to obtain information for product costing & pricing.

COSTING & PRICING




To price a product or service, we need to know the cost to make it. A handy way to do this is to split costs as follows:

- Direct costs
- Indirect costs




PIPSO
Public Health Program Support Organization

DIRECT COSTS



Direct costs are:

- The monetary cost of materials, plus
- labour (measured as units of time multiplied by monetary cost per unit)
- involved in producing/providing a product/service



PIPSO
Public Health Program Support Organization

Direct materials may include material inputs at the beginning & at any stage during manufacture, processing & packaging phases but not delivery costs afterwards.

Direct labour costs include only those workers actually involved with the manufacture, production or creation of the product & not any that are related to or are shared by a range of products. The latter are indirect costs, but should be split amongst the related products, e.g. the cost of cutters who cut a range of apparel from the same material must be spread over the various products in a practical way. These latter costs are production overheads.

INDIRECT COSTS



Indirect costs may split into:

1. Costs to make a range of specific products or offer specific services.
These may include packaging & quality assurance costs.
2. Costs to run the overall business or market & sell products (overheads).
Overhead costs will include marketing, admin & financial costs.



Costs that are indirect, but not overheads, include labour to cut material into different shapes for different products, packaging purchased in bulk for two or more products of similar size. There are not normally a large number of indirect costs set against a small group of products. Most indirect costs are overheads for all production or sales. Overhead costs will, therefore, include costs like, cleaners of the factory or warehouse, shared warehouse facilities, electricity & other marketing & general business costs.

NOTE FOR FACILITATOR

Ask participants for examples of each type in their business to clarify their understanding of the difference.

THE COSTING PROCESS



The process of costing involves two steps to determine the cost of each unit of product/service provided:

1. Adding up your direct business costs attributable to the products/services,
2. Allocating a share of indirect costs to your products/services.



The basis of sharing production overheads & general costs can vary widely & depends on the judgement of the owner/manager. Examples include:

- For factory overheads
 - Floor space for shares factory production
 - Time taken to make; e.g. by a cutter to cut various apparel products from the same cloth
 - Volume of packaging for each product that uses shared packaging
 - By-products may incur zero factory overheads
- Other general overheads
 - Production volume or value
 - Sales volume or value
 - An even spread across all products or services
 - Area taken up on salesroom floor or shelf

MARK-UP & MARGIN


Before we consider pricing product it is appropriate to make a slight diversion & look at mark-up & margin. Both are ways to look at the relationship between the cost, selling price & profit margin of a product, but the difference is an important one, particularly when negotiating with a supplier or are retailer that the business is supplying.

PRICING STRUCTURES

A brief, but important, diversion.

The terms **mark-up** and **margin** are commonly referred to. They are different measures of the cost/price relationship:

- **mark-up** relate to the **cost price**, and
- **margin** relates to the **selling price**.


PIPSO

Mark-up is the amount of dollar profit achieved or expected on sale of an item divided by its dollar cost. Margin is the amount of dollar profit achieved or expected on the sales of an item divided by its selling price.

Both calculations measure that same gap between cost & selling price, i.e. profit contribution of the product, but from a different perspective.

Both calculations can be expressed as a ratio or a percentage.

However, the result of the calculation is significantly different for each. For a particular cost & price, the margin always will be lower than the mark-up because it uses a higher value as its base, or denominator.

So be sure, when negotiating, that both parties are talking about the measure, margin or mark-up.

PRICING STRUCTURES



If I buy at/make for 10 & sell at 12:

My **mark-up** is $2/10$ or 20%

My **margin** is $2/12$ or 16.7%



A few calculations follow to bring home the difference.

CALCULATE MARK-UP & MARGIN



Express all answers as percentages to one decimal place.

1. If I buy at 100 and sell at 200, what is my mark-up? What is my margin?
2. If I buy at 30 and sell at 50, what is my mark-up? What is my margin?
3. If I buy at 95 and sell at 300, what is my mark-up? What is my margin?



- 1 Mark-up=100%, Margin=50%
2 Mark-up=66.7%, Margin=40%
3 Mark-up=215.8%, Margin=68.3%



Simple enough? Yes, let's move on.

METHODS OF PRICING

PRICING

There are many influences which impact on pricing, including:

- your target market
- your business objectives
- your marketing mix
- competitors' prices
- products/services costs
- demand for the products/services
- general market trends.

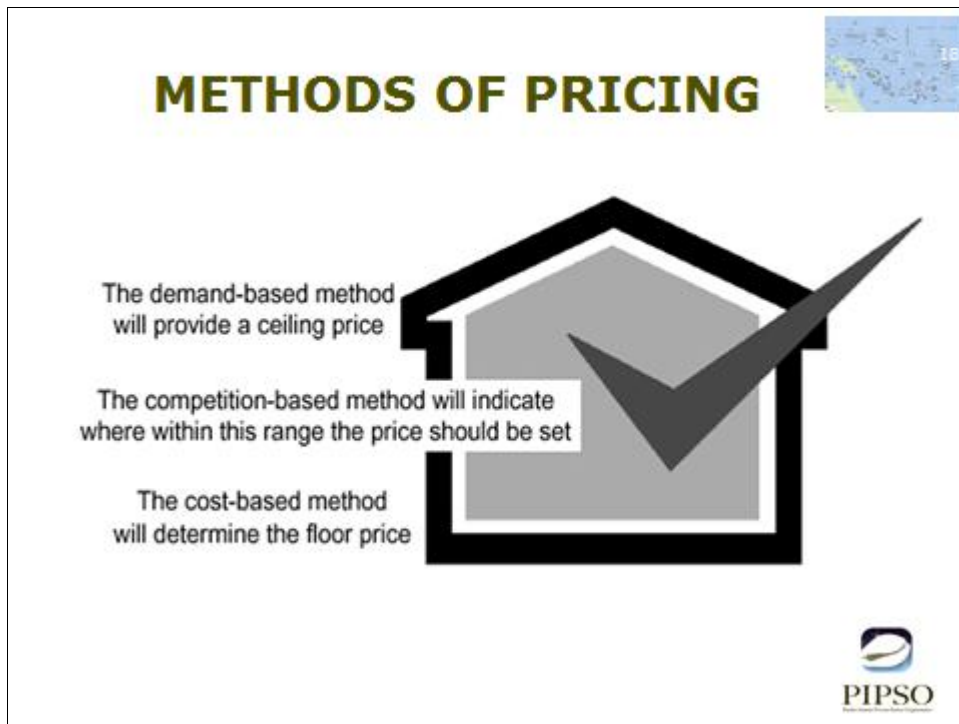


There are a number of considerations that a business owner/ manager has to be aware of when pricing a product.

The list considers some of the influences that directly affect the decision:

- Your target market
Pricing will be different if there is already completion in the market you are in or entering. Higher pricing is possible in a new market if there is demand. Quality also will influence price.
- Your business objectives
Do you want to maximise profit or do you satisfied with a particular profit margin & prepared to price using it (assuming it is less than the competition) while attempting to grow sales?
- Your marketing mix
From your primary product(s) or service(s) you expect a good profit margin, but for a minor, or by-product, you may not require any profit. You may also use one line to attract customers to sell others to & therefore price one as a loss leader.
- Competitors' prices
Whilst pricing above competitors may be acceptable due to perceived quality or customer service advantages, there is a limit beyond which the consumer will balk. For homogeneous (like) products you may aim to under-price the competition.
- Products/services costs
You cannot price below cost for long before ceasing production/sales. When you earn more working for someone else that you do selling your products/services, it's time to reconsider the business.

- Demand for the products/services
In a new market there is a clear trade-off between volume of sales & price. An increase in price will lead to a likely drop in sales. The trick is to find the sales/ price balance that is most profitable.
- General market trends
Are prices on the move – up or down? You cannot swim against the tide.



Notwithstanding the apparent variety in influences, there are essentially only three methods to determine the price at which to sell a product in the medium term.

The three pricing methods are:

1. Cost based pricing

This is the minimum price required to recover costs & therefore is the lowest level sustainable in the medium term. Sufficient profit above this price is needed if the business is to continue.

2. Competition based pricing

Usually the range of prices offered by business competitors set boundaries within which a business must maintain its price unless it has very specific quality, service or brand advantages

3. Demand based pricing

Demand based pricing is the highest level achievable as it is set by the interaction of supply & demand without any other downward pressure on pricing.

In these circumstances a premium may be commanded by a product due to:

- a. No, or little, competition in a new or existing market
- b. Strong brand advantages of being the major player
- c. Being the first to market with a new product or service e.g. drug companies will price high until generic substitutes enter the market to drive prices down.
- d. The need to recover significant research & development costs, e.g. motor vehicles price new models high initially & reduce the price slowly until the model is replaced.

In the short term, there are as many ways to price as the imagination allows, based on the marketing strategy of the business, see below. Yet in the final analysis, there remains only three ways to price in the longer term.

INITIAL PRICING STRATEGIES



- market skimming pricing
- image pricing
- market penetration pricing
- product line pricing
- target return pricing
- psychological pricing
- going rate pricing
- loss leader pricing
- perceived value pricing
- discount pricing
- distress pricing
- differential pricing

Initially, you may adopt a pricing strategy that you will change at some future time.

What strategies might apply?




USING PRODUCT COST IN THE MARKET PLACE

PRICING IN PRACTICE

Let's have a look at an example
(Activity 3.2.2) & calculate:

1. Product costs
2. Mark-up, &
3. The impact of a price change



ACTIVITY 3.2.2

Costing a product – A practical example (Part 1)

A Palau exporter of coconut related products, Coco-Nut Inc., is a major producer of coconut oil for export. It does so in boxes containing plastic bladders in batches of 3,000 litres. Coco-Nut Inc. incurs the following costs in making and preparing this product for sale.

Each batch starts with a quantity of fresh raw coconuts costing \$2,500. Each package consists of plastic bladders and strong cardboard cartons that cost a further \$2,500.

The factory produces two batches a day, each taking 3.5 hours with 25 factory workers per shift at a cost of \$18.40 per hour per employee. A factory manager controls operations working an 8 hour day to do paperwork & close up. His wage is \$55.20 per hour.

Other factory costs include \$4,000 per day for power to run the lighting and equipment and depreciation of the plant and equipment of \$10,000 per month. For simplicity, assume there are 20 working days per month.

Questions

1. What is the cost per litre of coconut oil packaged and ready for export?
2. If the Coco-Nut Inc. targets a mark-up on costs for its products of 25% what is its target price?
3. Based on demand for this product over the past year, the market price has averaged \$3.45 per litre. At this price, what is their profit margin?
4. Based on demand for this product over the past year, the market price has averaged \$3.45 per litre. Is it worthwhile Coco-Nut Inc. selling this product at this price?

Costing a product – A practical example (Part 2)

ADDITIONAL INFORMATION

In the event that Coco-Nut Inc. ceased production of coconut oil, it would still incur the following costs:

- **Workers (5) daily for one 3.5 hour shift to keep equipment clean & ready for future use.**
- **The manager would be retained as it is very difficult to get skilled managers in the event of an upturn. He would be occupied with relief duties & other support.**
- **Power costs of \$400 per day would continue as equipment is cleaned & building lit.**
- **Plant depreciation is unavoidable.**

Questions

5. Due to an immediate glut of coconut oil on the market over the past month the current market price is \$3.00 per litre. Should Coco-Nut Inc. continue to make and sell this product?
6. What is the theoretical lowest sales price at which Coco-Nut Inc. should continue to produce coconut oil?
7. In practice, what do you think is the lowest acceptable selling price?

PRICING MULTIPLE PRODUCTS

MULTIPLE PRODUCTS OR SERVICES



How many products or services (or groups of like products/services) are you selling?

- For each separately, you must cost and price the product/service.
- Simply repeat the process as many times as necessary.



The above slide is the last in this Module.

ANSWERS TO ACTIVITIES

ACTIVITY 3.2.1

BREAK-EVEN ANALYSIS			
1	Mere's B/E Analysis		
	Contribution margin	$= (325,000 - 201,000) / 325,000 * 100$	
		$=$	38.15%
	Break-even sales	$= 99,000 / 0.382$	
		$=$	\$ 259,476
2	Jone's B/E Analysis		
	Contribution margin	$= (420,000 - 105,000) / 420,000 * 100$	
		$=$	75.0%
	Break-even sales	$= 153,000 / 0.382$	
		$=$	\$ 204,000
	Break-even sales units	$= 153,000 / (20 - 5)$	
		$=$	10,200
3	Ana's B/E Analysis		
	Contribution margin	$= (186,000 - 93,000) / 186,000 * 100$	
		$=$	50.0%
	Break-even sales	$= 118,000 / 0.5$	
		$=$	\$ 236,000
	Profit \$44,000 sales	$= 118,000 + 44,000 / 0.5$	
		$=$	\$ 324,000

ACTIVITY 3.2.2

Part 1

Costing a product – A practical example

Coco-Nut Inc. - Product costing & pricing

1	What is the cost per litre of coconut oil packaged and ready for export?				
					\$
	Raw materials				
	Raw Kernels		0.83	27.5%	2,500.00
	Bladders & boxes		0.83	27.5%	2,500.00
	Labour				
	Workers (25 x \$18.40 x 3.5 hours)		0.54	17.7%	1,610.00
	Manager (\$55.20 x 4 hours)		0.07	2.4%	220.80
	Overheads				
	Power (\$4,000 per day / 2 shifts)		0.67	22.0%	2,000.00
	Plant Depreciation (\$10,000 / 4 weeks / 5days / 2 shifts)		0.08	2.8%	250.00
			3.03	100.0%	9,080.80
	Litres produced				3,000
	Cost per litre				3.03
2	If the Coco-Nut Inc targets a mark-up for its products of 25% what is its target price?				
	Cost per litre to produce				3.03
	Mark-up (25%)				0.76
	Target price				3.78
3	Based on demand for this product over the past year, the market price has averaged \$3.45 per litre. Is it worthwhile Coco-Nut Inc. selling this product at this price?				
	Cost				3.03
	Selling price				3.45
	Profit				0.42
	Margin				12%
	Mark-up				14%
4	There is a profit margin. Why would you stop. The change is temporary, yes?				

Part 2

5	Due to an immediate glut of coconut oil on the market over the past month the current market price is \$3.00 per litre. Should Coco-Nut Inc. continue to make and sell this						
	Cost						3.03
	Selling price						3.00
	Loss						0.03
	Variable costs						
	Materials						5,000.00
	Labour (Workers)						1,449.00
	Overheads						1,800.00
							<u>8,249.00</u>
	Fixed costs						
	Labour (Workers +Manager)			(5 x \$18.40 x 3.5 / 2 + \$220.80)			381.80
	Overheads			(\$400 / 2 + \$250)			450.00
							<u>831.80</u>
							9,080.80
	Variable costs per litre (\$8,249 / 3,000)						2.75
	Keep producing - variable costs are covered plus a 25 cents contribution towards fixed costs.						
6	What is the theoretical lowest sales price at which Coco-Nut Inc. should continue to produce coconut oil?						
	Theoretical lowest selling price = variable costs per litre (\$8,249 / 3,000)						2.75
	At any price above this some contribution is made towards fixed costs						
7	In practice, what do you think is the lowest acceptable selling price?						
	There is no single answer to this question, but is almost certainly below \$2.75.						
	Individual answers may consider the issues listed.						
	The profitability of other product line & their capacity to carry this one & how long for.						
	Expectations for future prices.						
	Possible permanent loss of market if supply is cut.						
	Actions to improve productivity.						