

CHAPTER (1)

(Introduction to managerial accounting)

First: Definition of managerial accounting (Management accounting):

There are many definitions of managerial accounting as following:

- Is in activity that provides financial and non-financial information to an organization's manager and other internal decision makers.

Or:

- It is one of the accounting branches that concerned with providing information to managers for use in planning, controlling and decision making.

Or:

- It is one of the accounting branches that use the accounting data to help managers in decision making process.

Second : Comparison of financial and managerial accounting:

The following are the most comparison's points between the (Financial accounting) and (Managerial accounting):

		<i>Financial accounting</i>	<i>managerial accounting</i>
1.	Users of information	Owners, investors, creditors, tax authorities, and other external users.	Internal users such as: Managers, employers, and decision makers.
2.	Purpose of information	Assist external users in making investment, credit, and other decisions.	Assist managers in (Planning, directing, motivating and controlling).
3.	Timeliness of information	Often available only after an audit is complete.	Available quickly without the need to wait for an audit.
4.	Time dimension	Focus on historical information	Depend on predictions and estimates.
5.	Focus of information	Emphasis on whole organization	Emphasis on an organization's projects, process, and segments.
6.	Nature of information	Monetary information	Mostly monetary but also non-monetary information.

CHAPTER (2)

(Cost classification for managerial accounting purpose)

First: Definition of costs:

Costs are a resource sacrificed to accrue future benefits.

Second: Classification of costs:

An organization incurs many different types of costs that are classified differently, depending on management needs (Different costs for different purposes). The most commonly classification to costs (For managerial accounting purpose) are the following:

1. Classification by behavior (According to the activity level change's):

Up to this classification costs can be classified as:

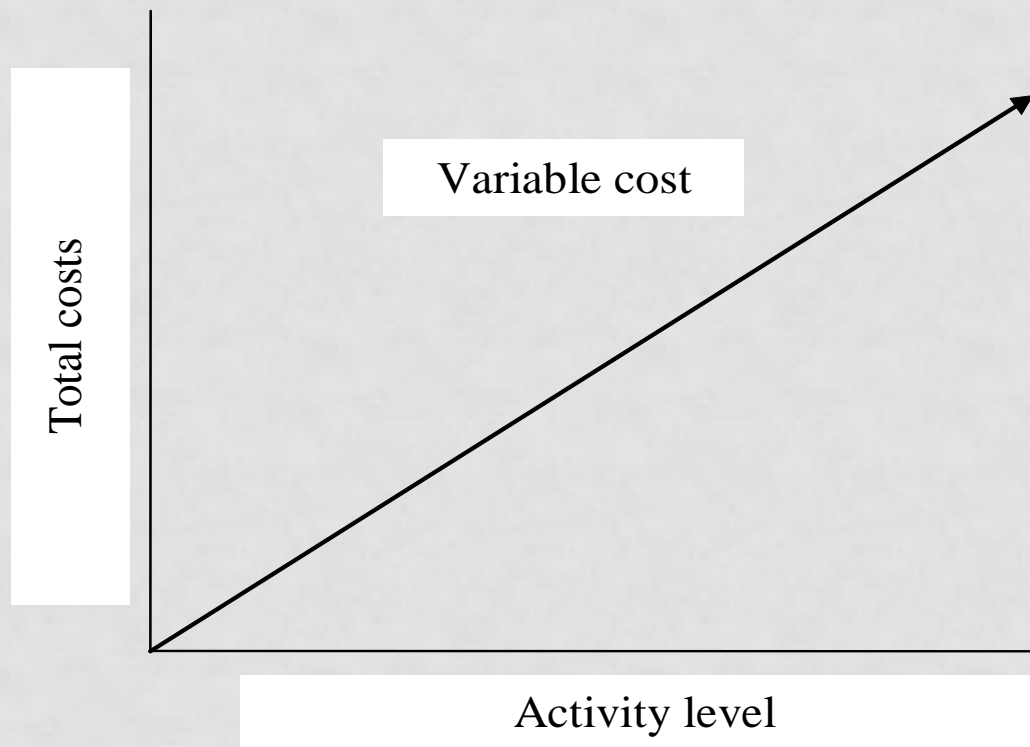
- **Variable costs (V. C.):**

That changes, in total, in direct proportion to change in the level of activity.

The activity can be expressed in many ways, such as units of production, produced, units sold, or miles driven, and hours worked. We must understand that the variable cost per unit is fixed but it variable at total.

Such examples of variable costs are direct materials, and selling commissions.

The concept of a variable cost is shown in the following graphic:



- **Fixed costs (F.C.):**

Are costs that remain constant (Unchanged), in total, regardless of changes in the level of activity within the relevant range. Fixed costs are not affected by changes in activity level in total. The average fixed cost per unit increase or decreases (Inversely) with change in activity's level.

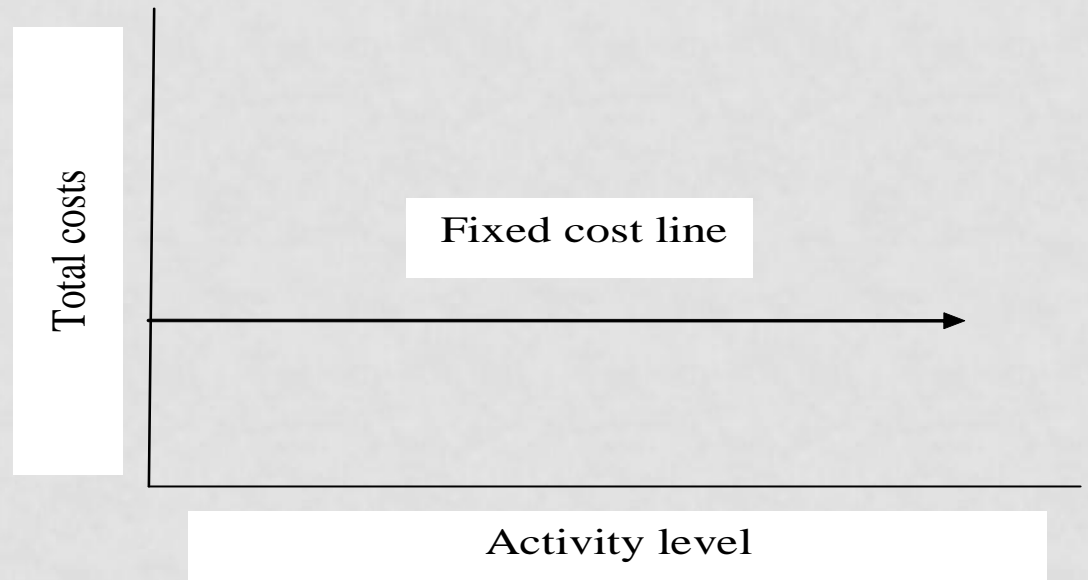
Such examples of these costs (Rent expenses, straight-line depreciation expenses, insurance expenses, property tax expenses, supervisory salaries expenses, and advertising expenses).

Note:

Relevant range:

Is the range of activity with which the assumptions about variable and fixed costs are valid.

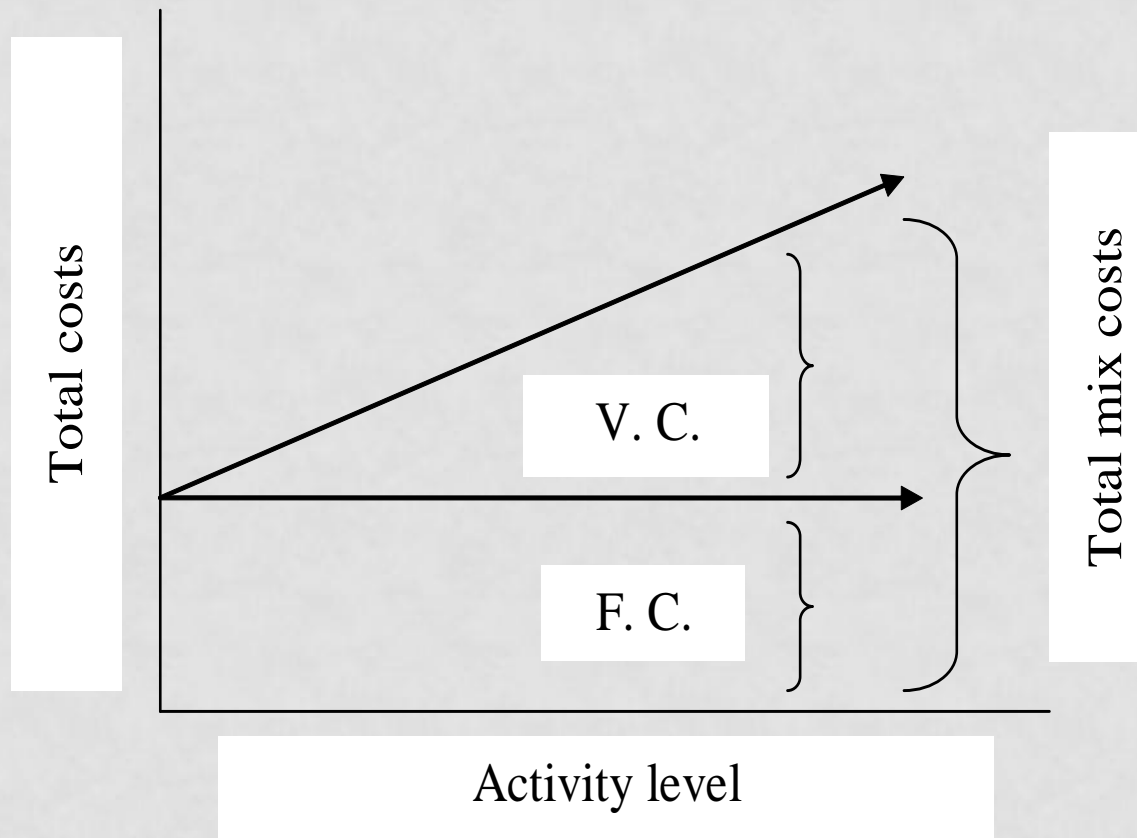
The concept of fixed costs is shown in the following graphic:



- **Mixed costs:**

Are these costs that combination of fixed and variable costs. An example of these costs is (Repairing expenses).

The concept of mixed costs is shown in the following graphic:



1. Classification by relevance (For decision making):

Up to this classification costs can be divided into:

- **Sunk costs:**

That already been incurred and cannot be avoided or changed by any decision made now or in the future. That mean it is irrelevant to future decision so it must be ignored when making a decision. (Cost of office equipment already purchased).

- **Out-of-pocket cost:**

That required a future outlay of cash and is relevant for decision making.

- **Differential cost and revenue (Incremental cost):**

Decisions involve choosing between alternatives. As we know each alternative will have certain costs and benefits that must be compared to the costs and benefits of the other available alternatives so:

Differential costs: as a difference in costs between any two alternatives.

Differential revenues: as a difference in revenues between any two alternatives.

1. Classification by function:

• **Manufacturing costs:**

In the manufacturing companies costs divided into three basic categories that:

1. *Direct material:*

That refers to all material that are used to produce the final product, and that can be physically and conveniently traced to it. (Nearly 45 % from the total cost of production's cost).

2. *Direct labor (Touch labor):*

That refers to those labor costs that can be easily traced to individual units of product. (Wages that paid to carpenters, machine operators, bricklayers) (Nearly 37 % from the total cost of production's cost).

3. *Manufacturing overhead (Factory overhead):*

That includes all costs of manufacturing except direct materials and direct labor. (Indirect material, indirect labor, maintenance and repairs on production equipment, heat and light, property taxes, depreciation, insurance on manufacturing facilities). (Nearly 18 % from the total cost of production's cost)

V. I. N.:

Direct material cost + direct labor cost = prime cost

Direct labor cost + manufacturing overhead cost = conversion costs

- **Non-manufacturing costs:**

Generally non- manufacturing costs are sub classified into (Two) categories:

1. *Marketing or selling costs:*

Include all costs necessary to secure customer orders and get the finished product into the hands of the customers. (Advertising, shipping, sales commission, sales salaries).

2. *Administrative costs:*

Include all costs that connected with an organizational activities and the general managers of the company as a whole. (Manager's salaries, public relations, secretarial salaries).

Second : Analyzing of mixed costs:

In practice, mixed costs are very common. So the question is (How can the management go about actually estimating the variable and fixed components of a mixed cost especially after we know how this subject are important in decision making?).

(Two) methods are commonly used to analyze past mix costs they are:

Example:

If you have these data for one of the manufacturing companies:

Month	Units	Total costs
January	17500	19500
February	27500	21500
March	25000	21000
April	35000	23000
May	47500	25500
June	22500	20500
July	30000	22000
August	32500	22500
September	27500	21500
October	57500	27500
November	62500	28500
December	67500	29500

1. High – low method:

In this method we can compute both variable and fixed costs by connecting the two cost amounts at the highest and lowest unit level.

In our example:

The highest number of units is (67500) units and the lowest number of units is (17500) units.

The costs corresponding to these units level are (29500 \$) and (19500 \$).

The variable cost per unit is determined as the change in cost divided by the change in units as follow:

$$\text{V.C. per unit} = \frac{\text{Highest costs} - \text{lowest costs}}{\text{Highest units} - \text{lowest units}} = \text{Or} = \frac{\text{Change in costs}}{\text{Change in units}}$$

$$\begin{aligned} \text{V.C. per unit} &= \frac{\text{Highest costs} - \text{lowest costs}}{\text{Highest units} - \text{lowest units}} = \text{Or} = \frac{\text{Change in costs}}{\text{Change in units}} \\ &= \frac{29500 - 19500}{67500 - 17500} = \frac{10000}{50000} = 0.2 \quad \text{Per unit} \end{aligned}$$

And as we know that the total cost (Total mixed costs) equal =

Total mixed costs = Fixed costs + (V.C. per unit \times activity level or number of units)

So we can compute fixed costs at any level of production.

For example at highest and lowest production level:

(Highest level):

$$29500 = \text{F.C.} + (0.2 \times 67500)$$

$$29500 = \text{F.C.} + 13500$$

$$\text{F. C.} = 29500 - 13500 = 16000 \$$$

Or:

(Lowest level):

$$19500 = \text{F.C.} + (0.2 \times 17500)$$

$$19500 = \text{F.C.} + 3500$$

$$\text{F. C.} = 19500 - 3500 = 16000 \$$$

•The least – squares regression method:

This method use all of the data in mathematical approach so its seams more logically from the previous methods and up to this method we must use the regression line which are

$$y = a + b x$$

Where:

y = Total costs (Mixed costs)

a = Total fixed costs

b = Variable cost per unit

x = Activity level

This method simply computes the regression line that minimizes the sum of the squared errors which can express by solving these two equations:

$$\sum y = n a + b \sum x \quad \text{-----(1)}$$

$$\sum x y = a \sum x + b \sum x^2 \quad \text{-----(2)}$$

Where:

n = number of observations

Example:

If you have these data about the costs and activity level in one of the manufacturing companies:

Months (n)	Activity level by units (x) (* 1000)	Total costs (Mixed costs) by dollars (y)
1	1	300
2	2	400
3	2.5	440
4	5	680
5	6	770
6	8	1000
7	4	590
8	7	880
9	3	500
10	1.5	350
n = 10	$\sum x = 40$	$\sum y = 5910$

To solve this question we need to find this information:

X y	X ²
300	1
800	4
1100	6.25
3400	25
4620	36
8000	64
2360	16
6160	49
1500	9
525	2.25
$\sum x y = 28769$	$\sum x^2 = 212.5$

$$5910 = 10 a + b 40 \quad (1)$$

$$28769 = 40 a + b 212.5 \quad (2)$$

By multiplying equation (1) \times (-4)

$$\begin{array}{r} - \quad 23640 = - 40 a - 160 b \\ \quad 28769 = 40 a + 212.5 b \\ \hline 5129 = 0 + 52.5 b \end{array}$$

$$b = \frac{5129}{52.5} = 97.6 \$ \quad \text{V. C. per unit}$$

Then

$$\begin{aligned} \sum y &= n a + b \sum x \\ 5910 &= 10 a + (97.6 \times 40) \\ 5910 &= 10 a + 3904 \\ 5910 - 3904 &= 10 a \\ 2006 &= 10 a \end{aligned}$$

$$a = \frac{2006}{10} = 200.6 \approx 200 \$ \quad (\text{F. C.})$$

CHAPTER (3)

(Cost – Volume – Profit analysis)

First: introduction:

After we discuss how to separate all costs as either variable or fixed we can use this costs to make (Cost – Volume – Profit) analysis:

Cost – Volume – Profit analysis is in important tool to help managers predicting how changes in costs and sales levels affect income, and answering very important questions such as these:

- What sales volume is needed to earn a target income?
- What is the change in income if selling prices decline and sales volume increases?
- How much does income increases if we install a new machine to reduce labor costs?
- What is the income effect if we change the sales mix of our products or services?
- Additionally to a wide range of business decisions. (As we will see later in this chapter).

This analysis is require the managers focusing on interaction among the following five elements:

1. Price of products.
2. Volume or level of activity.
3. Variable cost per unit.
4. Total fixed costs.
5. Sales mix of productions.

Second: Assumptions of C. V. P. analysis:

C. V. P. analysis is based on several assumptions that:

1. All the relations can be expressed as simple lines.
2. All costs can be separated into variable costs and fixed costs.
3. Selling price per unit is constant through the analyzing period.
4. Variable costs per unit are still constant through the analyzing period.
5. Total fixed costs are constant (With the relevant range) through the analyzing period.
6. In multiproduct companies, the sales mix is constant through the analyzing period.
7. In manufacturing companies, inventories do not change. That means the number of units produced equal the number of units sold.

V. I. N.:

All the results of C. V. P. analysis are estimates.

Third: Contribution margin statement:

The contribution margin statement depend on the behavior of costs and up to this all the costs that are accrue through the period be classified neither as variable or fixed costs (Not like the traditional income statement).

The contribution margin statement can be prepared by total or ratio as the following:

Contribution margin statement			
	Total	Per unit	Ratio
Sales (Number of units sold)	xxx	xxx	100 %
- Variable costs (Number of units)	(xxx)	(xxx)	(? %)
Contribution margin	xxx	xxx	? %
- Total fixed costs	(xxx)		(? %)
Net income	xxx		? %

Note:

The companies can make the contribution margin statement by segments to be more useful in determining profitability of each segment. (It can made by geographical, individual salespersons, products, or even by customers).

Forth: Computing (Break – even – point) (for single product company)

Break – even – point analysis is one of the important elements on the C. V. P. analysis. The most useful of B. E. P. is to answer the question (What if ?).

We can define the (B. E. P.) as:

- Are the sales (or product) level at which a company neither earns a profit nor incurs loss.

Or:

- The level of sales (or product) at which the company's profit is (Zero).

Or:

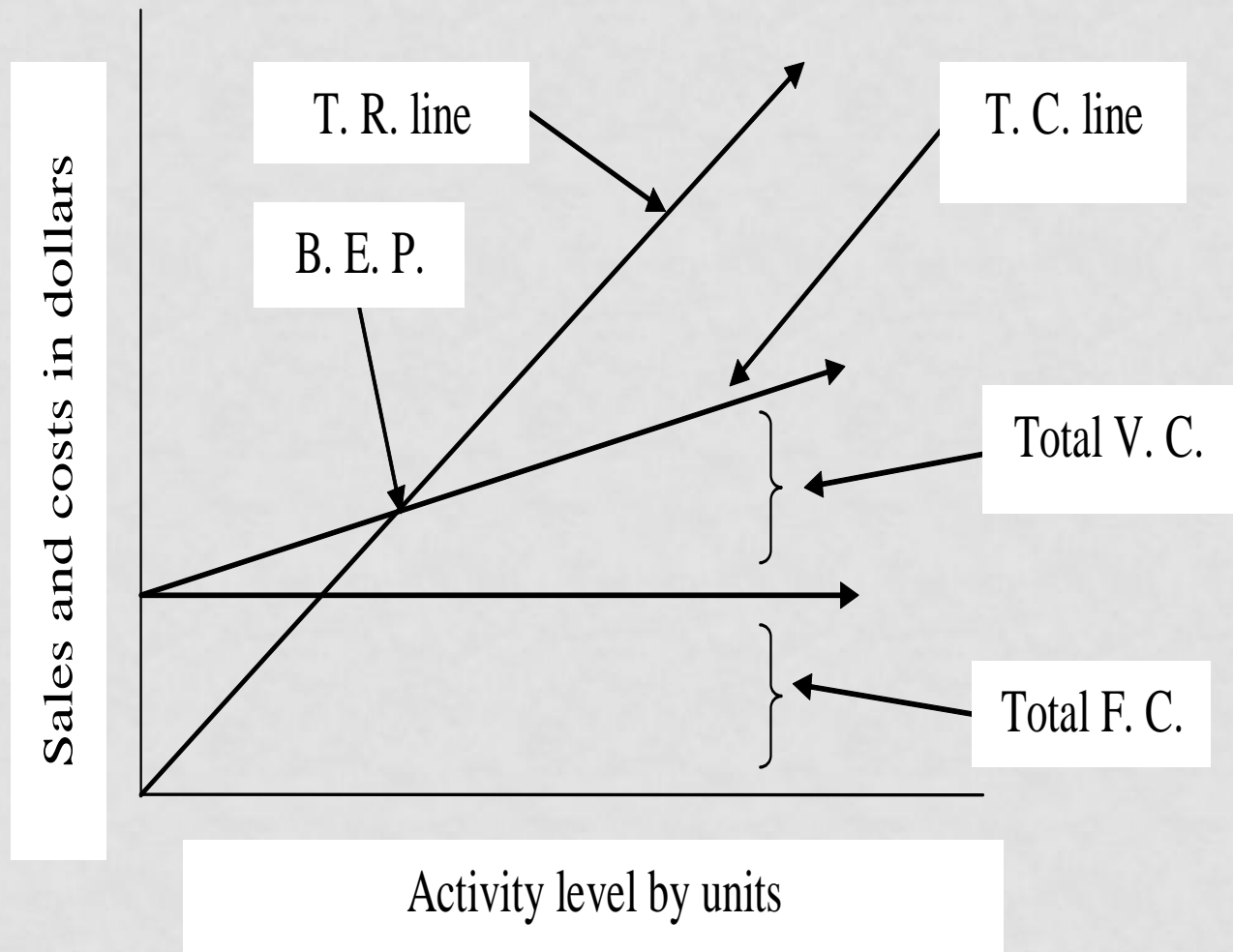
- The level of sales (or product) at which the total revenues are equal to the total costs (T. V. C. + T. F. C.).

The B. E. P. can be expressed in either units or dollars of sales, and the (B. E. P.) can be computed using either (Graph method, or Equation method, or Contribution margin method) as explains bellow:

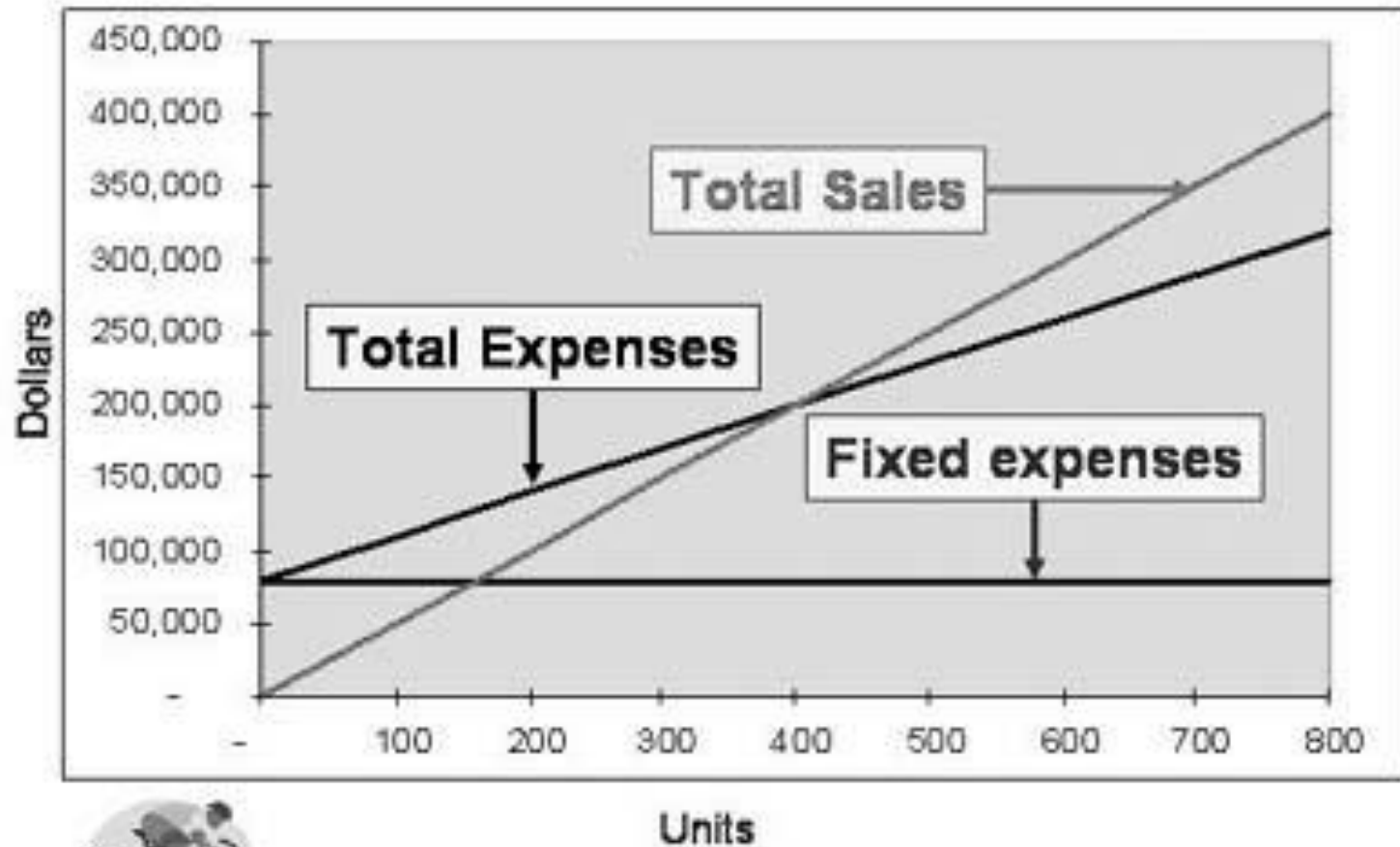
1. Graphic method:

In a C.V.P. graphic (sometimes called a break – even chart). To prepare this chart or graph we must follow these steps:

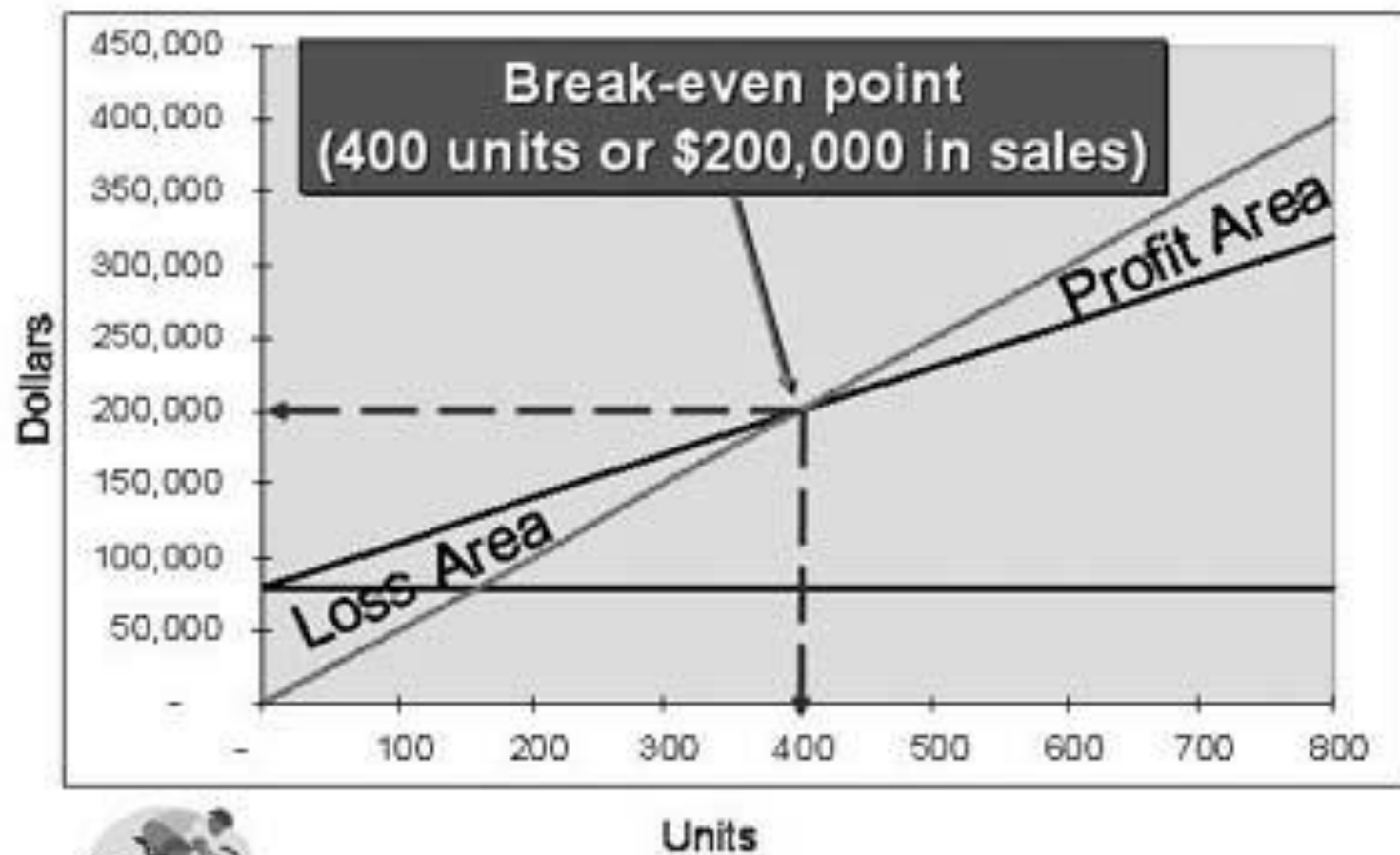
- The horizontal axis (X) is the number of units produced and sold.
- The vertical axis (Y) is dollars of sales and costs.
- Plot fixed costs on the vertical axis. Draw a horizontal line parallel to the (X) axis (That refer fixed costs remain unchanged with the activity level).
- Choose some volume of sales and plot the points representing total costs (V. C.+F. C.) (In dollars). This line must start at the fixed costs level on the vertical axis (Y).
- Again choose some volume of sales and plot the points representing total sales revenues (in dollars). This line must start at the origin (zero units and zero dollars of sales).
- The total costs line and the total sales line will intersect in specific point (units and dollars) which is the B. E. P.
- At volume levels to the left of the B. E. P. is the amount of the expected profit.



CVP Graph



CVP Graph



1. The equation method:

In this method the income statement is expressed as the following equation:

$$\text{Net profit} = \text{sales revenue} - \text{Total costs (V. C. + F. C.)}$$

And as we understand before the profit at the (B. E. P.) are equal to (Zero).
Hence:

$$0 = \text{Sales revenues} - \text{Total costs (F.C. + V. C.)}$$

$$\text{Sales revenue} = \text{Total costs (V. C. + F.C.)}$$

Or:

$$\left(\begin{array}{c} \text{Selling price} \\ \text{per unit} \end{array} \times \text{Activity level} \right) = \left\{ \left(\begin{array}{c} \text{V. C. per} \\ \text{unit} \end{array} \times \text{Activity level} \right) + \text{Total F. C.} \right\}$$

1. Contribution margin method:

This method is actually just a shortcut version of the equation method already described. The approach centers amount of contribution margin that goes toward covering fixed costs. To find how many units must be sold to break even, divided the total fixed costs by the contribution margin per unit:

$$\text{B. E. P. (In units sold)} = \frac{\text{Total Fixed costs}}{\text{Contribution margin per unit}} = ? \text{ Unit}$$

And:

$$\text{B. E. P. (In total sales dollars)} = \frac{\text{Total fixed costs}}{\text{Contribution margin ratio}} = ? \$$$

Fifth: Applying cost – volume – profit analysis:

1. Target profit analysis:

C. V. P. formula can be used to determine the sales unit and dollars needed to achieve a target profit or income (Before and after tax) as following:

A. Unit sales and dollars to attain the target profit (Operating income) (Before tax):

$$\text{Unit sales to attain target profit before tax (Pretax)} = \frac{\text{F.C.} + \text{Target profit (income)}}{\text{C.M. per unit}} = ? \text{ Unit}$$

$$\text{Dollars sales to attain target profit before tax (Pretax)} = \frac{\text{F.C.} + \text{Target profit (income)}}{\text{C.M. ratio}} = ? \$$$

Or:

$$= \text{Units sales to attain target profit before tax} \times \text{Sales price per unit}$$

B. Unit and dollars sales to attain target profit (Income) (After tax):

$$\text{Unit sales to attain target profit after tax} = \frac{\text{F.C.} + \frac{\text{Target profit after tax}}{1 - \text{Tax rate}}}{\text{C.M. per unit}} = ? \text{ Unit}$$

$$\text{Dollars sales to attain target profit after tax} = \frac{\text{F.C.} + \frac{\text{Target profit after tax}}{1 - \text{Tax ratio}}}{\text{C.M. ratio}} = ? \$$$

Or:

$$= \text{Unit sales to attain target profit after tax} \times \text{Selling price per unit}$$

1. Computing margin of safety:

All companies wish to sell more than the B. E. P. number of units. The excess of expected (or actual) sales over the B. E. P. sales level is called a (Margin of safety). The amount of (Units or dollars) that sales drop before the company incurs a losses.

Margin of safety can be expressed in units, dollars or even as a percent of the produced level of sales as the following formulas:

Margin of safety (in units) = Budgeted (or actual) sales unit – B. E. P. sales in units

Margin of safety (in dollars) = Budgeted (or actual) sales revenues - B. E. P. sales (in dollars)

Margin of safety (in percentage) = $\frac{\text{Margin of safety (in units or in dollars)}}{\text{Budgeted (or actual) sales units or revenues}}$ = ? %

1. Computing operating leverage:

Some manufacturing companies have a high level of variable costs in their cost structure where the other has a high level of fixed costs, as the show in the schedule below:

	<u>Company (1)</u>		<u>Company (2)</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
Sales	100,000	100 %	100,000	100 %
- Variable costs	<u>(60,000)</u>	<u>(60 %)</u>	<u>(30,000)</u>	<u>(30 %)</u>
Contribution margin	40,000	40 %	70,000	70 %
- Fixed costs	<u>(30,000)</u>	<u>(30 %)</u>	<u>60,000</u>	<u>(60 %)</u>
Net operating income	10,000	10 %	10,000	10 %

The most important question is “Which one of these two companies has the better cost structure?”, and the answer depends on many factors that we must care about, but the most important factor is a profit and how it can be change.

The analyzing shows that:

- If the revenues increase at the future the company has the higher C. M. ratio will be better. (Company No. 2).
- If the revenues decrease at the future the company has the lower C. M. ratio will be better (Company No. 1).

- **Operating leverage:**

Is a measure of how sensitive net operating income is to percentage changes in sales. If operating leverage is high, a small percentage increase in sales can produce a larger percentage increase in net operating income.

To determine (Degree of operating leverage) at a given level of sales is computed by the following formula:

$$\text{Degree of operating leverage} = \frac{\text{Contribution margin}}{\text{Net operating income}} =$$

Up to this:

The degree of operating leverage is a measure, at a given level of sales, of how a percentage change in sales volume will affect profits.

To show how to compute a (Degree of operating leverage) we can use the data that we have for previous companies (1) and (2).

$$\text{Degree of operating leverage for company (1)} = \frac{40000}{10000} = 4$$

$$\text{Degree of operating leverage for company (2)} = \frac{70000}{10000} = 7$$

That mean if sales increase by 10 % then we can expect the increase of the net operating income for each company:

$$\text{Company (1)} = 10 \% \times 4 = 40 \%$$

$$\text{Company (2)} = 10 \% \times 7 = 70 \%$$

1. Computing shutdown point “Cash B. E. P.”:

We could define the “Cash B. E. P.” to be the level of sales at which the company’s cash profit is zero, or is the level of sales at which cash revenues equals cash costs (V. C. + F. C.).

Note:

For analyzing purpose all revenues are considering cash revenues, and all variable costs considering as cash costs, but the fixed costs must divided into two kinds:

- Cash fixed costs: For example (Rent exp., water and light exp.).
- Non cash fixed costs: For example (Depreciation exp.).

Up to this:

$$\text{Shutdown point or cash B. E. P. (in units)} = \frac{\text{Cash fixed costs}}{\text{Contribution margin per unit}} = ? \text{ Unit}$$

$$\text{Shutdown point or cash B. E. P. (in dollars)} = \frac{\text{Cash fixed costs}}{\text{Contribution margin ratio}} = ? \$$$

Or:

$$\text{Shutdown point (in dollars)} = \text{Shutdown point (in units)} \times \text{Selling price per unit}$$

1. Using sensitivity analysis:

Studying the effects of changing some assumptions of C. V. P. analysis is called (Sensitivity analysis)

We can use C. V. P. analysis to predict income if we can describe how these changes affect a company's fixed costs, variable costs, selling price, and volume of production.

Example:

Assume that the (Royal Co.) is looking into buying a new machine that would increase the monthly fixed costs from 24000 \$ to 30000 \$, and decrease variable costs per unit from 70 \$ to 60 \$.

The new machine expected to increase the unit's product from 1000 unit to 1500 unit per month where selling price per unit will remain unchanged at 100 \$ per unit.

Required:

Compute the following:

1. B. E. P. in units at normal state and after change making.
2. B. E. P. in dollars at normal state and after change making.
3. Prepare C. M. statement B. E. P. at normal state and after change making to show the net profit before tax.

Sixth: Computing multiproduct B. E. P.:

All the previous analysis was only at cases where the company sells a single product or service. Many companies sell multiple products or services. These different products have different selling prices, different costs, different contribution margins, that mean these products are not equally profitable, so we must modify the C. V. P. analysis for use in these cases, and the B. E. P. will depend on the mix in which the various products are sold.

The important assumption must notify that the sales mix of different products is known and remains constant during the planning period.

Sales mix:

Is the ratio (Proportion) of the sales volume for the various products. The idea is to achieve the mix that will yield greatest amount of profits.

For compute B. E. P. by units and dollars as a total, and for each product singly, we can use the following formulas:

$$\text{B.E.P. as a total (for all products)} = \frac{\text{Total fixed costs}}{\text{A. M. average for all products}} = \text{? Units}$$

(in units)

$$\text{C.M. average for the product} = \text{C. M. for each product} \times \text{Sales mix (Ratio)}$$

$$\text{C.M. average for all products} = \text{Sum of the C. M. average for the product.}$$

$$\text{B. E. P. as a total (for all products) (in dollars)} = \frac{\text{Total fixed costs}}{\text{Overall C. M. Ratio}} = \text{? \$}$$

$$\text{Overall C. M. Ratio} = \frac{\text{C.M. average}}{\text{Selling price average}} =$$

$$\text{Selling price average} = \text{Selling price every product} \times \text{Sales mix (Ratio)}$$

Seventh: Some important conclusions from B. E. P. analysis and M. of S.:

From the formulas of B. E. P. analysis and margin of safety we can extracted these following formulas:

1. Net profit = Margin of safety (in units) \times Contribution margin per unit
2. Net profit = Sales revenues \times Net profit ratio (percent)
3. Net profit ratio = Margin of safety ratio \times Contribution margin ratio
4. Net profit = Margin of safety (in dollars) \times Contribution margin ratio
5. V. C. ratio (percent) + Contribution margin ratio (percent) = 100 %
6.
$$\text{Contribution margin per unit} = \frac{\text{Changing in net income}}{\text{Changing in sales revenues}} =$$
7.
$$\text{Contribution margin per unit} = \frac{\text{Changing in net income}}{\text{Changing in sales units}} =$$
8.
$$\text{Margin of safety ratio} = \frac{\text{Net profit ratio}}{\text{Contribution margin ratio}} =$$
9. At the B. E. P. both (Margin of safety) and (Margin of safety ratio) are equal to = Zero
10. Net profit is increase whenever the margin of safety sales increases and vice versa.

Eighth: Computing B. E. P. according to absorption cost approach:

Up to absorption costing

the B. E. P. can be computed by the following rule:

$$X = \frac{\text{T. F. C. for the period} + [(X - \text{Production units}) \times \text{Allocation rate of the F. C.}]}{\text{Contribution margin per unit}} =$$

Where (X) = B. E. P. (in units)

$$\text{Allocation rate of the F. C.} = \frac{\text{Manufacturing fixed costs}}{\text{Production units}} =$$

CAPTER (4)
(Relevance costs for decision making (Short-term decisions))

First: Identifying relevant costs and benefits:

In chapter (2), we discussed four terms of costs that are: (Sunk costs, out-of-pocket costs, opportunity costs, and differential (Incremental) costs), also, we add a term (Differential (incremental) benefits).

The most important idea in this chapter is to identifying the relevant cost from irrelevant cost (For decision-making purpose), so the following basic can be use to determine if the costs and revenues are relevant or irrelevant:

(Only those costs and benefits that differ in total between alternatives are relevant in a decision-making).

That mean:

If a cost will be the same regardless of the alternatives selected, then the decision has no effect on the cost and it can be ignore.

V. I. N.:

▪ ***Avoidable cost:***

Is a cost that can be eliminated in whole or in part by choosing one alternative over another.

- To identify the costs that are avoidable (Differential) in a particular decision situation and are therefore relevant, these steps can be followed:
 1. Eliminate costs and benefits that do not differ between alternatives. These irrelevant costs consist of:
 - a. Sunk costs.
 - b. Future costs that do not differ between alternatives.
 2. Use the remaining costs that do differ between alternatives in making the decision. These cost that remain are the differential or (avoidable costs).
- The costs that are relevant in one decision situation are not necessarily relevant in another.

Identifying Relevant Costs

An avoidable cost can be eliminated (in whole or in part) by choosing one alternative over another. Avoidable costs are relevant costs. Unavoidable costs are irrelevant costs.

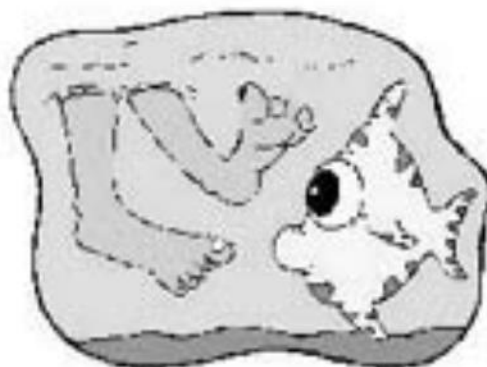
Two broad categories of costs are never relevant in any decision and include:

- ① Sunk costs.
- ② Future costs that **do not differ** between the alternatives.

Relevant Cost Analysis: A Two-Step Process

Step 1 Eliminate costs and benefits that do not differ between alternatives.

Step 2 Use the remaining costs and benefits that do differ between alternatives in making the decision. The costs that remain are the differential, or avoidable, costs.



▪ ***Total and differential analysis approaches:***

There are two approaches we can use to choosing from two or more alternatives they are:

First: Total approach:

Which is take all the data we have (Sales revenues, V. c., and total F. c.) whether they are relevant or irrelevant.

Second: Differential approach:

This is focus only on the relevant costs and benefits.

For getting clear understanding of these two approaches, we will use the following example:

Example:

Manufacturing company considering a new labor-saving machine that rents for 3000 \$ per year. The following data about the company's annual sales and costs with and without the new machine:

	Current situation	Situation with the new machine
Units produced and sold	5000 unit	5000 unit
Selling price per unit	40 \$	40 \$
Direct material cost per unit	14 \$	14 \$
Direct labor cost per unit	8 \$	5 \$
Variable overhead cost per unit	2 \$	2 \$
Fixed costs (Other)	62000 \$	62000 \$
Fixed costs (Rent for new machine)	-----	3000 \$

Required:

Make an analysis show, which is the best alternative by using:

1. Total analysis approach.
2. Differential analysis approach.

First: Total approach:

Up to this approach, the analysis can be as following:

	Current situation	Situation with new machine	Differential costs and benefits
Sales revenues (5000×40)	200000	200000	0
- <u>V. c.:</u>			
Direct material (5000×14)	70000	70000	0
Direct labor (5000×8) (5000×5)	40000	25000	15000
Variable overhead (5000×2)	10000	10000	0
Contribution margin	80000	95000	
- <u>F. c.:</u>			
Fixed costs (Other)	62000	62000	0
Fixed costs (Rent of new machine)	-----	3000	(3000)
Net operating income	18000	30000	12000

V. I. N.:

1. The result (0) in the third column means that this cost element is irrelevant in this case. (That mean is no change in both situations).
2. The (Positive) result in the third column mean that this cost element is favorite in this case (decreasing the V. c.).
3. The (Negative) result in the third column means that this cost element is not favorite in this case (increasing the F. c.).

Second: Differential approach:

If we returned to the data of the previous example, we can see that the only costs that do differ between the alternatives are: (Direct labor costs per unit and the fixed rental costs of the new machine).

Hence:

These are the only relevant costs. The two alternatives can be comparing based on just these relevant costs:

Net advantage from renting the new machine:

Decrease in direct labor costs (5000 units at a cost saving of 3 \$ per unit)	15000
Increase in fixed costs (rent of the new machine)	<u>(3000)</u>
Net annual costs saving from renting the new machine	12000

Note:

We will use both approaches to discuss the next decisions in this chapter:

Second: Kinds of production decisions: (Short-term decisions or operating decisions):

First: Adding or dropping product lines and other segments:

This decision depends on analyzing the impact of it on net operating income, and to assess this impact it is necessary to carefully analyze the costs.

To make clear understanding of this decision we can use the data in the following example:

Example (1):

Manufacturing company work with (Three) major product lines, they are (drugs, cosmetics and house-ware). The sales and cost data for the preceding month for each separate product line and for the company in total are as given bellow: (All amounts in \$)

Data		Product lines			Total
		Drugs	Cosmetics	House-ware	
	Sales revenues	125000	75000	50000	250000
-	Less Variable costs (Expenses)	(50000)	(25000)	(30000)	(105000)
	Contribution margin	75000	50000	20000	145000
-	Less <u>Fixed costs (Expenses)</u>				
	Salaries	29500	12500	8000	50000
	Advertising	1000	7500	6500	15000
	Utilities	500	500	1000	2000
	Depreciation- fixtures	1000	2000	2000	5000
	Rent	10000	6000	4000	20000
	Insurance	2000	500	500	3000
	General administrative	15000	9000	6000	30000
	Total fixed costs	(59000)	(38000)	(28000)	(125000)
	Net operating income (Loss)	16000	12000	(8000)	20000

To show how should proceed in a product-line analysis. Suppose that the management of the company has analyzed the fixed costs of the three product lines and has determined the following:

1. The salaries expenses represent salaries paid to employees working directly on a product. All of the employees working in house wares would be discharged if the product line were dropped.
2. The advertising expenses represent product advertising specific to each product line and is avoidable if the dropped.
3. The utilities expenses represent costs for the entire company. The amount charged to each product line is an allocation based on space occupied and is not avoidable if the product line were dropped.
4. The depreciation expenses represents depreciation on fixtures used for display of the various product lines, and is not avoidable if the product line is dropped.
5. The rent expenses represents rent on the entire building housing the company, it is allocated to the product lines based on sales dollars. The monthly rent of **\$20000** is fixed under a long-term lease agreement.
6. The insurance exp. represents insurance carried on inventories within each of the three product-lines.
7. The general administrative exp. represents the exp. of accounting, purchasing, and general management, which are allocated to the product lines based on sales dollars. Total administrative exp. will not change if the house-wares line is dropped.

Required:

Make an analysis to show what your opinion about (dropping the product line or not)?

V. I. N.:

- Avoidable costs or expense:

Are amounts the company would not incur if it eliminates the segment.

- Unavoidable costs or expenses:

Are amounts that would continue even if the segment were eliminating.

- Our decision in this case will be up to this important rule:

(A segment is a candidate to elimination if its revenues are (Less) than its avoidable expenses).

- Additionally to the analyses based on revenues and costs, the managers may choose to retain an unprofitable line if the line is necessary to the sale of other product or if it serves as a “Magnet” to attract customers.

Example (2):

Naza Co. is considering that has three major departments (Groceries, General merchandise, and Drugs). Management is considering dropping the (Drugs) department, which has consistently shown operating loss. The following table reports the company's annual operating income:

Details	Department			Total
	Groceries	General merchandise	Drugs	
Sales revenue	10000	80000	100000	190000
(-) V.C.	(6000)	(56000)	(80000)	(142000)
T. C. M.	4000	24000	20000	48000
(-) <u>T. F. C.:</u>				
Avoidable	1500	10000	15000	26500
Unavoidable	2000	10000	6000	18000
Total F. C.	(3500)	(20000)	(21000)	(44500)
Net operating income	500	4000	(1000)	3500

Required:

1. What is the management decision, (Continue with three departments or dropping the (Drugs) department?).
2. The company's manager believed that the company can use the empty space available by dropping (Drugs) department to expanding the (General merchandise) department. The suggested project expected to:
(Increase) the sales revenues worth 50000 \$
(Increase) (T. V. C.) worth 35000 \$.
(Increase) (T. F. C.) worth 7000 \$.
What is the decision will be in this case?

Second: The make or buy decision:

This decision concerning whether an item should be produced internally, or to be purchased from an outside supplier.

This kind of decision depends on analyzing the impact of costs for alternatives (Incremental costs).

To make clear understanding of this decision we can use the following example:

Example (1):

Manufacturing company is now producing a main part (Shift) used in its product line of mountain bikes. The company's accounting department reports the following costs of producing 8000 units of the (Shift) internally each year:

	<u>Per unit</u>	<u>8000 units</u>
Direct material	6 \$	48000 \$
Direct labor	4 \$	32000 \$
Variable overhead	1 \$	8000 \$
Supervisor's salary	3 \$	24000 \$
Depreciation of special equipment	2 \$	16000 \$
Allocated general overhead	5 \$	40000 \$
Total costs	<u>21 \$</u>	<u>168000 \$</u>

An outside supplier has offered to sell 8000 \$ (Shift) s a year at a price of only 19 \$ each.

Required:

Should the company stop producing the (Shifts) internally and start purchasing them from the outside supplier?

V. I. N.:

If the avoidable costs are (**Less**) than the outside purchase price, then the company should continue to manufacture its own parts and reject the outside supplier's offer.

Example (2):

Azad manufacturing Co. produces and sold 10000 unit of a product. The following data is about the costs of this product:

D.M. per unit	8 \$	
D.L. per unit	5 \$	
T.M.O.H.	50000 \$	(40 % Variable)
F.S. and A. expenses	28000 \$	

And if you know that:

- From cost analyzing the accountant know that all the fixed costs are unavoidable.
- The manager received an offer from another manufacturer to sell the same number of units by 14 \$ per unit.

Required:

What the decision will be? (Make or buy?)

Third: Special order accepting decision (Only one time order):

Managers must often evaluate whether a special order should be accepted or not, and if the order is accepted what the price that should be charged?

This decision depends on the net profit of the alternatives.

Example (1):

(MGC) company (Which product motor cycles) has just received a request from one of the police department to produce 100 special modified motor bikes at a price of 1790 \$ each. The normal selling price of the bikes is 2490 \$, and its unit product cost is 1820 \$ as shown below:

Direct material	860 \$
Direct labor	450 \$
Manufacturing overhead	510 \$
Unit product cost	<u>1820 \$</u>

The variable overhead costs is 60 \$ per unit. The order would have no effect on the company's total fixed manufacturing overhead costs. The modifications requested would add 170 \$ an incremental variable costs. In addition, the company would have to pay a graphics design 12000 \$ that would be used for painting the bikes in the order. This order should have no effect on the company's other sales.

Required:

What effect would accepting this order have on the company's net operating income?

V. I. N.:

We can accept the special order if:

1. Incremental revenues from the special order exceeds over the incremental costs of the order.
2. There is indeed idle capacity.
3. The special order does not cut into normal sales or undercut normal prices.

Example (2):

One of the manufacturing companies is operating at its normal level of 80 % of full capacity. At this level, it produces and sales nearly 100000 units of product annually. It's per unit and annual total costs are shown in the bellow table:

	<u>Per unit</u>	<u>Annual total</u>
Sales (100000 units)	10.0	1000000
Direct materials	(3.5)	(350000)
Direct labor	(2.2)	(220000)
Overhead (V. + F.)	(1.1)	(110000)
Selling expenses	(1.4)	(140000)
Administrative expenses	(0.8)	(80000)
Total costs and expenses	<u>(9.0)</u>	<u>900000</u>
Operating income	1.0	100000

A current buyer of this company product wants to purchase additional units of its product and export them to another country. This buyer offers to buy 10000 units of the product at 8.5 \$ per unit.

Required:

Determine whether to accept or reject this order if you know:

- The additional units adds 5000 \$ of incremental overhead costs for power, packaging, and indirect labor.
- Incremental commissions and selling expenses from the additional units 2000 \$.
- Incremental administrative expenses of 1000 \$ for clerical efforts are needed with the sale of additional units.

Example (3):

The (N. M.) company has an annual plant capacity of 2400 \$ units. Suppose its predicted operating results for the year are:

- Production and sales of 2000 units.
- Selling price per unit 90 \$.
- V. C. per unit 26 \$.
- F. M. O. H. costs 60000 \$.
- Selling and administrative costs 50000 \$ (Includes 40 % as V. selling expenses).

And if you know that:

One of the costumers is offered to buy 300 units with price 40 \$ per unit, what is the decision of the company's manager will be? (Accepting or rejecting the order)? If you know that:

- The order will have no effect on the regular sales and prices.
- The order yield 2 \$ per unit as a variable transportation expenses if the order is accepted.
- To producing the units of the order the company must rent a machine that will increase the monthly fixed costs worth 1200 \$.

Fourth: Utilization of constraint resources:

In this kind of decisions the managers have to decide how constrained resources are going to be utilized. The course of action that will maximize the company's (Total) contribution margin should ordinarily be selected. The orders that provide the highest unit contribution margin in (Relation to the constrained resources). Limited factors or constraint resources include (Labor hours, machine hours, and square feet of floor space.....eta).

The following formula must be applied in this kind of decision:

$$\text{C.M. per unit of the limiting factor} = \frac{\text{C.M. per unit}}{\text{Limiting factor (Necessary time for product)}} =$$

$$\text{The number of necessary hours for a product (Assigned capacity)} = \text{Demand of product} \times \text{Necessary time per unit}$$

$$\text{Remaining capacity for next product} = \text{Total capacity} - \text{Assigned capacity}$$

Example (1):

A manufacturing company produces two models of the product (M and T). Revenues and costs data for the two models of the products follow:

	Model	
	M	T
Selling price per unit	25 \$	30 \$
- V. C. per unit	10 \$	18 \$
Contribution M. per unit	15 \$	12 \$
Contribution margin ratio	60 %	40 %

And if you have this additional information:

- The company have a machine that can be used at a limited time that is:
The M model requires 2 minutes.
The T model requires 1 minute.

Required:

In this situation, which product is more profitable?

To answer this question the manager should look at the (Contribution margin per unit of the constrained resources).

	Models	
	M	T
Contribution margin per unit	15 \$	12 \$
Time on the machine required to produce (One) unit	2 minute	1 minute
Contribution margin per unit of the constrained resource	7.5 \$/minute	12 \$/minute

Up to above analyzing the (T) model provides the larger contribution margin in relation to the constrained resource.

To verify (proof) that the (T) model is indeed the more profitable product, suppose an (1hour) of additional time is available.

- The additional (Hour) could be used to make 30 unit from (M) model ($60 / 2 = 30$ unit) and the additional contribution margin will be ($30 \times 15 = 450$ \$).
- The additional (Hour) could be used to make 60 unit from (T) model ($60 / 1 = 60$ unit) and the additional contribution margin will be ($60 \times 12 = 720$ \$).

Example (2):

Manufacturing company produced (Two) kinds of products (X and Y) and there are some data about them:

Kind of product	Selling price per unit (\$)	V.C. per unit (\$)	Time needed to produce one unit (Hours)	Expected demand on products (Units)
X	10	4	3	400
Y	20	8	4	150

And if you know that:

- The T. F. C. is (1300 \$).
- The capacity available for the company is (1500 hours).

Required:

Which orders would you recommend that can be achieve the greatest profit for the company?

Example (3):

Banner Co. produces (Three) products (A, B, and C). The selling price, variable costs, and demands on products are follows:

Data	Product A	Product B	Product C
Selling price per unit	60 \$	90 \$	80 \$
Less: V. c. per unit			
D.M.	27 \$	14 \$	40 \$
D.L.	12 \$	32 \$	16 \$
V.M.O.H.	3 \$	8 \$	4 \$
Demand on products of the company	20 unit	30 unit	20 unit
Time needed to produce one unit	1.5 hours	4 hours	2 hours

And if you know:

Demand for the company's product for exceeds its capacity to produce. Management is trying to determine which product to concentrate on next month in filing its backlog of order? If there is only (160 hours) of labor time are available each month.

Required:

1. Which orders would you recommend that the company must produce on next month? (Show computation).
2. Find net operating income, if you know that the T.F.C. are 1250 \$.

Fifth: Selling or process further decision:

In this kind of decision we must to decide whether a joint product should be sold at the split-off point or sold after further processing.

Joint products:

Are two or more items that are produced from a common input.

Joint costs:

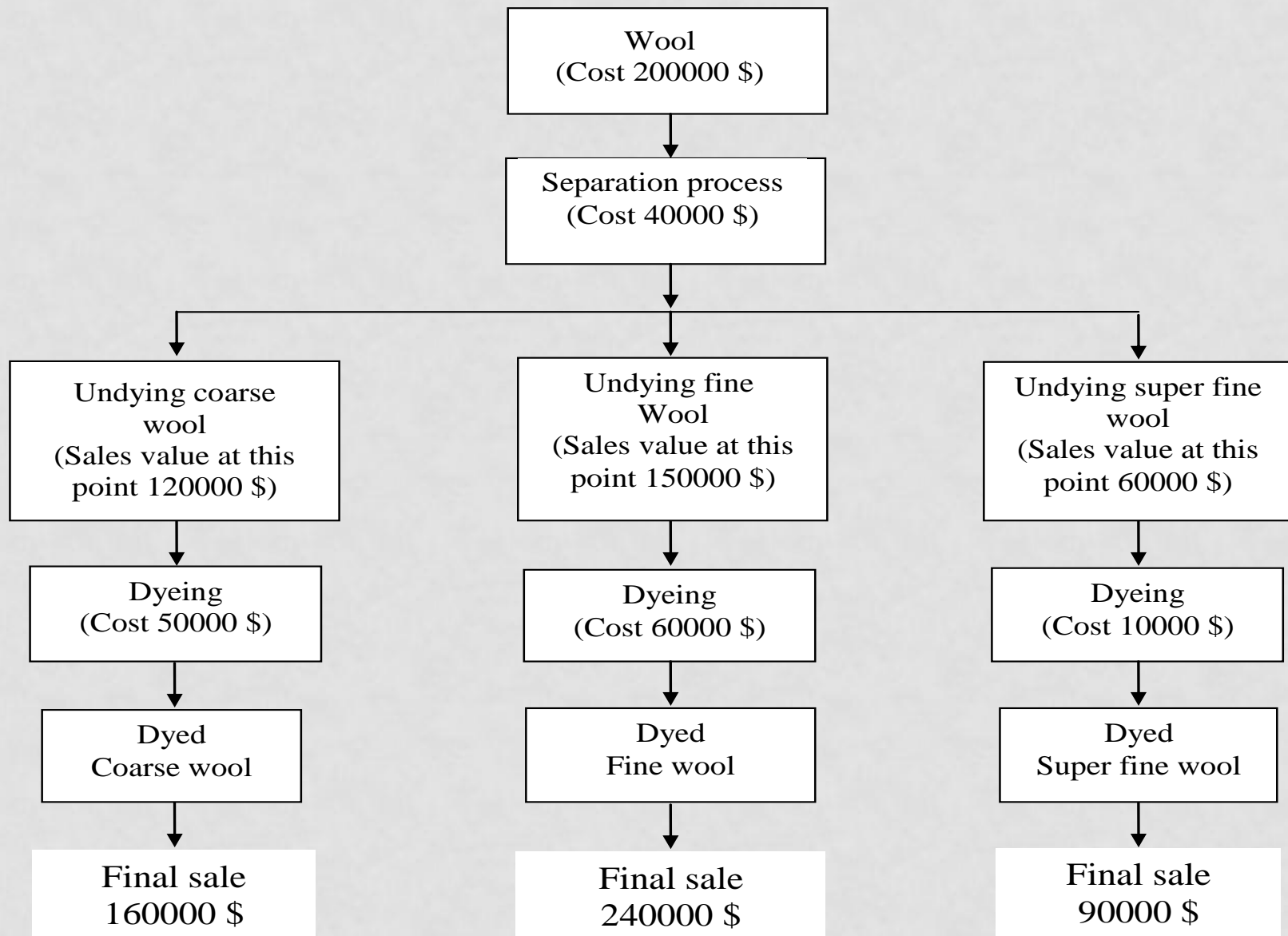
This term is used to describe the costs incurred up to the split- off point.

Split-off point:

Is the point in the manufacturing process at which the joint products can be recognized as separate products.

Note:

Joint costs are (Irrelevant) in decisions regarding what to do with a product from the split-off point forward.



Then:

Analyzing of the profitability of the overall operation is shown below:

- <u>Less:</u>	Combined final sales value: (160000 + 240000 + 90000)		490000
	Costs of producing the end products:		
	Cost of wool	200000	
	Cost of separating wool	40000	
	Combined costs of dyeing (50000 + 60000 + 10000)	120000	
			(360000)
	Overall net income (profit)		130000

The decision that must be discussed will be that the company would be better of selling one or more of the products prior to dyeing to avoid the costs of the dyeing. The appropriate way to make this choice is to compare the incremental revenues to the incremental costs from further processing as follows:

		Coarse wool	Fine wool	Superfine wool
	Final sales value after further processing	160000	240000	90000
(- Less)	Sales value at the split-off point	(120000)	(150000)	(60000)
	Incremental revenue from further processing	40000	90000	30000
(- Less)	Cost of further process (Dyeing)	(50000)	(60000)	(10000)
	Profit or (Loss) from further processing	(10000)	30000	20000

Example (2):

Suppose that F. T. Company has 40000 units of partially finished product (Q). It has already spent 0.75 \$ per unit to manufacture these units at a 30000 \$ total cost. F. T. Company can sell these units to another manufacturer as raw material for 50000 \$. Or. It can process them further and produce finished products X, Y, and Z at an incremental cost of (2 \$) per unit. The added processing yields the products and revenues shown in the following table:

		<u>Price</u>	<u>Units</u>	<u>Revenues</u>
Product	X	4	10000	40000
Product	Y	6	22000	132000
Product	Z	8	6000	48000
Spoilage	----	----	2000	0
Totals			<u>40000</u>	<u>220000</u>

Required: What the decision will be selling or process further?

Example (3):

Arbil company manufactured (Three) kinds of products from common input in a joint processing operation. Joint processing cost up to the split-off point are 150000 \$. These costs are allocated to the joint products on the base of their total sales revenues at the split-off point. The following data is about selling price, costs, and production units of each product:

Products	Production units	Selling price per unit at the split-off point	Selling price per unit after processing further	Additional processing costs
A1	30000 unit	36 \$	40 \$	126000 \$
A2	40000 unit	21 \$	26 \$	160000 \$
A3	8000 unit	57 \$	64 \$	72000 \$

Required:

Which product(s) should be sold at the split-off point, and which product(s) should process further? (Show computation).

Example (4):

Al-Mustafa Co. is now produce one kind of product and sold it (as non-finished product) to another manufacturing company.

And if you know that:

1. Al-Mustafa Co. produce 15000 unit each year and sold it by 20 \$ per unit.
2. Costs data are as follow:
 - V.C. per unit 11 \$.
 - T.F.C. 60000 \$.
3. The company's manager are studying a proposal about the ability to complete manufacturing this product and there are the estimation data about revenues and costs of this proposal:
 - Selling price per unit 28 \$.
 - Additional V.C. per unit 4 \$.
 - Additional F.C. 43000 \$.

Required:

1. What the decision will be? Selling or process further?
2. What the decision will be if the further process leads to (Decrease) the unit's sales from 15000 units to 13000 units?

Qualitative decision factors:

Managers must consider qualitative factors in making managerial decisions, for example:

- The quality of the products.
- Delivery date.
- Reputation of the supplier.
- The effects of a low price on the company's image.

Sixth: Pricing products and services decision:

Setting a price for the company's products or services is one of the important and complex managerial decisions have to make. If the price is set too high, customers will avoid purchasing the company's products. If the price is set too low, the company's costs may not be covered (That mean it may achieve losses).

Cost information from both absorption costing and variable costing can help the managers in pricing decision.

The important fact to understand in pricing decision that the price must be enough to cover all costs, including variable costs and fixed costs and still provide an acceptable return to owners.

V. I. N.:

Over the long run absorption costing approach is useful, but over the short run variable costing approach is more useful.

There are several methods to help managers in setting price. The (Cost-plus) methods are probably the most common, where managers add a (Markup) to cost to reach a target price.

Pricing approaches:

In general and up to cost-plus pricing we can use the following formulas:

Selling price per unit = Cost of product + Markup per unit.

Markup per unit = Cost of product \times Markup percentage.

There are (Four) approaches to setting selling price by using cost-plus basic and these methods (or approaches) are:

1. Full costing approach.
2. Absorption costing approach (Total manufacturing costs).
3. Total variable costing approach.
4. Variable costing approach (Variable manufacturing costs).

1. Full costing approach:

Up to this approach the costs that used as a basic for determining the selling price will be:

Cost of product = Manufacturing costs + Nonmanufacturing costs.

2. Absorption costing approach (Total manufacturing costs):

Up to this approach the costs that used as a basic for determining the selling price will be:

Cost of product = D.M. + D.L. + M.O.H. (Variable and fixed)

3. Total variable costing approach:

Up to this approach the costs that used as a basic for determining the selling price will be:

Cost of product = D.M. + D.L. + V.M.O.H. + V.S. expenses.

4. Variable costing approach (Variable manufacturing costs):

Up to this approach the costs that used as a basic for determining the selling price will be:

Cost of product = D.M. + D.L. + V.M.O.H.

V. I. N.:

1. The markup percentage will be changed up to the approach that we used and we can determine the markup percentage by using the following formula:

$$\text{Markup percentage} = \frac{\text{Target profit} + \text{Total excluded costs}}{\text{Units sold} \times \text{Cost of product per unit}} = ? \%$$

2. Selling price per unit must be (Equal) in all approaches.

Example:

Manufacturing company produces and sold a product. There are the data about it:

- D.M. per unit	4 \$
- D.L. per unit	2.5 \$
- V.M.O.H. per unit	3.5 \$
- F.M.O.H.	5000 \$
- V.S. expenses per unit	1.7 \$
- F.S. and A. expenses	11500 \$

And if you know that:

- The manager expected to produce and selling 5000 unit in the next year.
- The manager is planning to achieve target profit (Before tax) worth 25000 \$.

Required:

1. Compute (Markup percentage) up to each approach.
2. Setting selling price per unit up to each approach.

Setting selling price by using (Return on investments) approach:

R. O. I.:

Is the return that the companies want to make on their investment's capital (Assets). And up to this approach we can use the following formula to determine the selling price per unit:

$$\text{Selling price per unit} = \frac{\text{Total costs} + \text{Target or required R. O. I.}}{\text{Units produced and sold}} =$$

$$\text{Target R. O. I.} = \text{Target R. O. I. ratio} \times \text{Total investment (Total assets)}.$$

$$\text{R. O. I. ratio} = \frac{\text{Target net operating income}}{\text{Total investments (Total assets)}} = ? \%$$

Example:

Manufacturing company produces and sold the product (A) and there are the data about the costs of this product:

- D. M. per unit	4 \$
- D. L. per unit	2 \$
- V. M. O. H. per unit	1 \$
- F. M. O. H.	15000 \$
- S. and A. expenses	10000 \$

And if you have this additional information:

- Expected units produce and sold 5000 unit.
- Target R. O. I. ratio 20 %.
- Total investments in assets 200000 \$.

Required:

Setting selling price per unit by using R. O. I. approach.

CHAPTER (5)

(Master budget and profit planning)

In this chapter we will focus on steps taken by business to achieve their desired levels of profits through a process that can be called (Profit planning). We shall see that profit planning is accomplished through the preparation of numbers of budgets, which, when brought together, from an integrated business plan known as the (Master budget). The master budget is an essential management tool that communication management's plans throughout the organization, allocates resources, and coordinates activities.

First: Theory introduction to budgeting:

- *Definition of budget:*

A (Budget) is a detailed plan for acquiring and using financial and other resources over a specified time period. It represents a plan for the future expressed in monetary terms. All managerial levels in the company should be involved in budgeting process.

- *The budgeting objectives or goals:*

The act of preparing budgets is called (Budgeting).

The budgeting process serves several purposes as follow:

1. Motivating employees and communication with them.
2. Helps coordinate a company's activities toward common goals.
3. Is useful in evaluating results and management performance.
4. It helps in starting and operating company.
5. Such planning gives managers glimpse into the future.
6. It can force managers to (Think about) and then translate the ideas of these managers into actions.
7. It provides a means of (Allocating resources) to those parts of the organization where they can be used most effectively.

- Choosing a budget period:

Operating budgets ordinarily cover a one – year period corresponding to the company's fiscal year. Many companies and to provide specific guidance divide their budget year into four quarters. The quarter budget then can be subdivided into months.

- Evaluation involves comparing actual results against one of two usual alternatives:

1. Past performance.
2. Expected performance.

An evaluation assists management in identifying problems and taking correct actions if necessary.

- Budget reporting:

Managers can compare actual results to budgeted amounts in a report. This report shows actual amounts, budgeted amounts, and their differences. Such differences are called a (Variances).

- The master budget:

Is a summary of a company's plans that sets specific targets for sales, production, and financing activities. It generally culminates in a cash budget, a budgeted income statement, and a budgeted balance sheet.

A master budget consists of a number of separate but interdependent budgets that are linked with each other to form a coordinated plan.

- Master budget components:

The usual number and types of budgets included in a master budget depend on the company's size and complexity. A master budget should include, at a minimum, the budgets listed below:

- **Operating budgets:**

- *Sales budget.*
- For merchandiser add: *Merchandise purchases budget* (units to be purchased).
- For manufacturing add: *Production budget* (units to be produced).
Manufacturing budget (manufacturing costs).
- *Selling, General and administrative expense budget.*

- **Financial budgets:**

- *Cash budget* (Cash receipts and payments).
- *Budgeted income statement.*
- *Budgeted balance sheet.*

- *Preparing the master budget:*

The first step in preparing the master budget is planning the sales budget. The sales budget is the starting point in the budgeting process because plans for most departments are linked to sales. All of the other parts of the master budget are dependent on the sales budgets in same way.

The sales budget will help determine how many units will have to be produced (or to be purchased in merchandiser companies). Thus, the production budget is prepared after the sales budget.

The production budget in turn is used to determine the budgets for manufacturing costs including the direct material budget, the direct labor budget, and the manufacturing overhead budget. These budgets are then combined with data from the sales budget, the selling, general and administrative expenses budget to determine the financial budgets (Cash budget, budgeted income statement, budgeted balance sheet).

The selling, general and administrative expense budgets are both dependent on a determinant of the sales budget.

Second: Operating budgets:

1. Sales budget:

The sales budget is the starting point in preparing master budget. Is a detailed schedule showing the expected sales for the budget period, it is expressed in both units and dollars.

The sales budget can be prepared for many different products, regions, departments, and sales representatives.

The sales budget is constructed by multiplying the budget sales in units by the selling price.

Example:

(H. F. Co.) is going to prepare its own sales budget for the year 2012. The following data can be help in this:

- Budget sales units:
Q1 10000 unit – Q2 30000 unit – Q3 40000 unit – Q4 20000 unit.
- Selling price per unit 20 \$.
- Cash collection:
70 % of sales are collected in the quarter in which the sales made.
30 % of sales are collected in the following quarter.
- Balance of A / R account at 31 / 12 / 2011 are 90000 \$.

Required:

1. Prepare sales budget for the year 2012.
2. Prepare the schedule of expected cash collection for the year 2012.

1. Production budget:

This budget is prepared after sales budget, this budget shows the number of units that must produce during each budget period (month or quarter) to meet sales needs and to provide for the desired ending inventory. A production budget does not show costs, it is always expressed in (units of product).

Production needs can be determined as follows:

Budgeted sales in units	xxxx
+ Desired ending finished inventory in units	xxxx
Total needs	xxxx
- Beginning finished inventory in units	(xxxx)
Required production (in units)	xxx

V. I. N.:

Merchandise companies prepare (Purchases budget) instead of production budget. The purchases budget depends on budgeted sales volume. The general layout for purchases budget can be shown in the following equation:

$$\begin{array}{ccccccc} \text{Inventory to be} & = & \text{Budgeted ending} & + & \text{Budgeted sales} & - & \text{Budgeted beginning} \\ \text{purchased} & & \text{inventory} & & \text{for the period} & & \text{inventory} \end{array}$$

Example:

(H. F. Co.) Management believes that ending finished goods must be equal to 20 % of the next quarter sales.

If you know that the budgeted sales units for the first quarter of the year 2013 are 15000 units.

Required:

Prepare the production budget for the year 2012.

1. Direct materials budget:

After the production requirements have been computed in units, a direct materials budget can be prepared. This budget details the raw materials that must be purchased to fulfill the production budget and to provide for adequate inventories.

The required purchases of raw materials are computed as follows:

Production budget (units)	xxx
× Materials requirements per unit	xxx
Materials needed for production (units)	xxx
+ Budgeted ending inventory (units)	xxx
Total materials requirements (units)	xxx
- Beginning inventory (units)	(xxx)
Materials to be purchased (units)	xxx
× Materials price per unit	xx
Total cost of direct materials to be purchased	xxx

The direct material budget is usually companied with a schedule of expected cash paid for raw materials. This schedule is consisting of payments for purchased on account in the beginning of the period plus any payments for purchases in the current budget period.

Example:

(H. F. Co.) Managers would like to keep ending inventories equal to (10 %) of the following quarters production needs. Each unit of production requires 15 pounds, per pounds is cost 0.2 \$.

The company's policy is to pay 50 % of the payment by cash and the remaining must be pay at the next quarter.

Required:

1. Prepare direct material budget for the year 2012.
2. Prepare the schedule of expected cash payment for the year 2012.

1. Direct labor budget:

This budget is also depending on production budget. In this budget the company determine the time available to meet production needs.

The direct labor budget can be computed as following:

Budgeted production (units)	xxx
× Labor requirements per units (Hours)	xxx
Total labor hours needed	xxx
× Labor rate (per hour)	xxx
Cost of direct labor (dollars)	xxx

Example:

(H. F. Co.) Manager's believes that the requirement time for each unit is 0.40 direct labor-hours, the direct labor rate per hour 15 \$.

Required:

Prepare direct labor budget for the year 2012.

1. Manufacturing overhead costs budget:

This budget provides a schedule of costs of production other than direct materials and direct labor. All costs in this budget can be separated into (Variable and fixed costs).

The variable costs in this budget can be determined by the following formula:

$$\text{V. M. O. H.} = \frac{\text{Variable rate}}{\text{rate}} \times \text{The base used (Number of units production, direct labor-hours, machine hours ...)}$$

Example:

(H. F. Co.) Manager's wanted to prepare its M. O. H. budget. The following data are about it:

- The variable component is 4 \$ per direct labor-hour.
- The fixed component is 60600 \$ per quarter.
- Depreciation expenses is 15000 \$ per quarter.

Required:

1. Prepare M. O. H. budget for the year 2012.
2. Show details about budgeted cash payment for M. O. H. costs.

1. Ending finished goods inventory budget:

In this budget the company computes unit product costs. This computation was needed for two reasons:

1. To determine cost of goods sold on the budgeted income statement.
2. To know what amount to put on the budgeted balance sheet inventory account for unsold units.

To compute production cost per unit we can use the following formula:

$$\text{Unit production cost} = \frac{\text{A. M.} + \text{D. L.} + \text{M. O. H.}}{\text{Budgeted production units}} = \$/\text{unit}$$

$$\begin{array}{ccccc} \text{Cost of ending finished goods} & & \text{Ending finished goods} & & \text{Unit production} \\ \text{inventory} & = & \text{inventory (units)} & \times & \text{cost} \end{array}$$

1. Selling, general and administrative budget:

This budget lists the types and amounts of selling, general and administrative expected expenses during budget period.

The costs in this budget can be divided into variable and fixed costs. This budget depends on the sales budget (by units or by amounts).

This budget can be prepared as following:

	Budgeted sales (Units)
×	Variable selling expenses (per unit)
	Total variable selling expenses
+	Total fixed selling, general and administrative expenses
	Total budgeted selling, general and administrative expenses

Then we can compute the cash part of these expenses to use it in the cash budget as following:

Total budgeted selling, general and administrative expenses	××××
- Non-cash expenses (Depreciation for example)	<u>(×××)</u>
Budgeted cash payment for selling, general and administrative expenses	×××

Example:

If you have this information about (H. F. Co.):

- The variable selling expenses is 1.8 \$ per unit.
- The annual fixed selling, general and administrative expenses are as follow:
 - Advertising 80000 \$
 - Manager's salaries 220000 \$
 - Depreciation 40000 \$
- Insurance expenses for the second quarter 1900 \$, and for the third quarter 37750 \$.
- Property tax in the fourth quarter 18150 \$.

Required:

1. Prepare selling, general and administrative expenses budget for the year 2012.
2. Prepare a schedule showing the cash part of the selling, general and administrative expenses.

Third: Financial budgets:

After preparing the operating budgets, the managers can use the information that includes in these budgets to prepare the financial budgets they are:

First: Cash budget:

This budget shows expected cash inflows and outflows during the budget period. The cash budget is composed of four major sections:

1. The receipts section:

This section consists of a listing of all of the cash inflows (except for financing) during the budget period. (Sales revenues).

2. The disbursements (payments) section:

This section consists of all cash payments that are planned for the budget period. (Raw materials, direct labor, M. O. H. costs, equipment purchases, dividends and so on)

3. The cash excess or deficiency section:

Which computed as follows:

Cash balance (beginning)	xxxx
+ Expected cash receipts	xxxx
Total cash available	xxxx
- Expected cash payments	(xxx)
Excess or deficiency of cash available over payments	xxx

V. I. N.:

1. If the expected ending cash balance is deficiency during any budget period, the company will need to borrow funds (short-term loans).
2. If the expected ending cash balance is excess the desired balance during any budget period, funds that borrowed in previous period can be repaid or can be invested.

1. The financing section:

This section details the borrowing and repayments project to take place during the budget period. It also includes interest payment that will be due on money borrowed.

V. I. N.:

1. Monthly cash budget is most common.
2. Depreciation expenses are not included in cash budget.

Example:

By using all the information you have about the previous budgets of (H. F. Co.) , and by using these additional data:

- The beginning cash balance is 42500 \$.
- Management plans to spend 130000 \$ during the year on equipment purchases:
50000 \$ in the first quarter, 40000 \$ in the second quarter, 20000 \$ in the third quarter, and 20000 \$ quarter.
- The board of directors has approved cash dividend of 80000 \$ per quarter.
- Management would like to have a cash balance of at least 40000 \$ at the beginning of each quarter for contingencies.
- Assume (H. F. Co.) will be able to get agreement from a bank for an open line of credit. This would enable the company to borrow at an interest rate of 10 % per year. All repayments would be at maximum 100000 \$ amounts. All borrowing would occur at the beginning of quarters and all repayments would be made at the end of quarters. Interest would be due when repayments are made and only on the amount of principal that is repaid.

Required:

Prepare cash budget for the year 2012.

Second: Budgeted income statement:

This budget is one of the final steps in preparing the master budget. It shows the company's planned profit for the upcoming period. This budget is a managerial accounting report showing predicted amounts of sales and expenses for the budget period .After prepare this statement for company performance can be measured.

The budgeted income statement can be prepared as following:

Details	Partial	Partial	Total
Budgeted sales revenues			xxx
- <u>Cost of goods sold:</u>			
D.M.	xxx		
D.L.	xxx		
M. O. H.	xxx		-
Total production costs		xxx	
+ Beginning finished goods inventory		xxx	
- Ending finished goods inventory		(xxx)	
Cost of goods sold			(xxx)
Gross profit			xxx
- S., G., and A. expenses			(xxx)
Net operating income			xxx

Example:

By using all the information that available from the previous budgets for (H. F. Co.):

Required:

Prepare budgeted income statement for the year 2012.

Third: Budgeted balance sheet:

The final step in preparing the master budget is summarizing the company's financial position. The budgeted balance sheet shows predicted amounts for the company's assets, liabilities, and owners' equity as of the end of the budget period.

Example:

By using the following balance sheet of (H. F. Co.) for the year ended December 31, 2011 and by using the information from the previous budgets:

H.F. Co.		
Balance sheet		
At December 31, 2011		
<i>Assets</i>		
<u>Current assets:</u>		
Cash	42,500	
Account receivable	90,000	
Raw materials inventory	4,200	
Finished goods	26,000	
Total current assets		162,700
<u>Plant and equipment:</u>		
Lands	80,000	
Buildings and equipment	700,000	
Accumulated depreciation	(292,000)	
Net plant and equipment		488,000
Total assets		<u>650,700</u>
<i>Liabilities and stockholders' equity</i>		
<u>Current liabilities:</u>		
Accounts payable		25,800
Stockholders' equity:		
Common stock	175,000	
Retained earnings	449,900	
Total stockholders' equity		624,900
Total liabilities and stockholders' equity		<u>650,700</u>