Chapter.2

Cost Behavior

Concepts, Terms, and Classifications

What is Costs, Expenses and losses means?

Cost Is :

- A Resource Sacrificed Or Forgone To Achieve A Specific Objective.
- Is Usually Measured As The Monetary amount That Must Be Paid To Acquire Goods Or Services.

Expenses and losses differ in that:

- expenses are intentionally incurred in the process of generating revenues.
 - Cost of goods sold and expired selling.
 - administrative costs are examples of expenses
- **loss** an expired cost that was unintentionally incurred; a cost that does not relate to the generation of revenues:
 - Costs incurred for damage related to fires,
 - abnormal production waste,
 - the sale of a machine at below book value are examples of losses.

Cost Behavior:

An understanding of costs by behavior is very useful:

- 1. For break-even and cost-volume-profit analysis
- 2. To make short-term special decisions such as the make-or-buy decision and the acceptance or rejection of a special order
- 3. For appraisal of managerial performance by means of the contribution approach
- 4. For flexible budgeting

Cost Object

anything to which costs attach or are related

Cost Object Illustration

- Product: A BMW X5 sports activity vehicle
- Service: Telephone hotline providing information and assistance to BMW dealers
- Project: R&D project on enhancing the DVD system in BMW cars
- Customer: Herb Chambers Motors, the BMW dealer that purchases a broad range of BMW vehicles
- Activity: Setting up machines for production or maintaining production equipment
- Department: Environmental, health, and safety department

Cost Driver:

is a variable, such as the level of activity or volume that causally affects costs over a given time span.

The cost driver change causes proportionate changes in the variable cost The level of activity or volume: is a cost driver if there is a cause-andeffect relationship between a change in the level of activity or volume and

a change in the level of total costs.

For example:

- the number of parts is a cost driver of product-design costs.
- the number of miles driven is often a cost driver of distribution costs.
 - **Cost Driver** is anything of interest or useful informational value, such as a product, service, department, division, or territory
 - **Cost Driver** a factor that has a direct cause-effect relationship to a cost; an activity creating a cost

Cost Pool :

a collection of monetary amounts incurred either for the same purpose, at the same organizational level, or as a result of the occurrence of the same cost driver

Cost Center

a responsibility center in which the manager has the authority to incur costs and is evaluated on the basis of how well costs are controlled

Responsibility center where the manager is accountable for costs only

An *activity* is:

an event, task, or unit of work with a specified purpose—for example, designing products, setting up machines, or testing products. **activity** a repetitive action performed in fulfillment of business functions

Cost Terms:

- 1. **Product costs:** are related to making or acquiring the products or providing the services that directly generate the revenues of an entity;
- 2. period costs : are related to other business functions such as selling and administration.
- **3.** inventoriable costs also called Product costs: Are include the cost of direct material, direct labor, and overhead.
- 4. Replacement Cost an amount that a firm would pay to replace an asset or buy a new one that performs the same functions as an asset currently held.
- 5. Differential cost a cost that differs in amount among the alternatives being considered
- 6. Relevant Cost a cost that is logically associated with a specific problem or decision
- 7. Opportunity Cost a potential benefit that is foregone because one course of action is chosen over another

Relevant range:

Is The assumed range of activity that reflects the company's normal operating range, is the band of normal activity level or volume in which there is a specific relationship between the level of activity or volume and the cost in question.

For example:

 a fixed cost is fixed only in relation to a given wide range of total activity or volume (at which the company is expected to operate) and only for a given time span (usually a particular budget period).



Inventoriable costs:

all costs of a product that are considered as assets in the balance sheet when they are incurred and that become cost of goods sold only when the product is sold.

- 1. For manufacturing-sector companies, all manufacturing costs are inventoriable costs.
- 2. For merchandising-sector companies, inventoriable costs are the costs of purchasing the goods that are resold in their same form.
- 3. Service-sector companies provide only services or intangible products. The absence of inventories of tangible products for sale means there are no inventoriable costs.

Period costs:

are all costs in the income statement other than cost of goods sold. Period costs, such as marketing, distribution and customer service costs, are treated as expenses of the accounting period in which they are incurred because they are expected to benefit revenues in that period and are not expected to benefit revenues in future periods.

Cost accumulation:

The approach to product costing that determines which manufacturing costs are recorded as part of product cost

Overhead must be accumulated over a period and allocated to the products manufactured or services rendered during that time

Cost accumulation process is the collection of cost data in some organized way by means of an accounting system.

such as different types of materials, different classifications of labor, and costs incurred for supervision.

Managers and management accountants *assign* these accumulated costs to designated cost objects, such as the different models of cars

Cost Assignment :

a general term that includes gathering accumulated costs to a cost object, this includes:

- 1. tracing accumulated costs with a direct relationship to the cost object and
- 2. allocating accumulated costs with an indirect relationship to a cost object.

Cost allocation :

Refers to the assignment of an indirect cost to one or more cost objects using some reasonable basis

Cost allocation the assignment, using some reasonable basis, of any indirect cost to one or more cost objects

What is cost behavior?

Cost behavior is associated with learning how costs change when there is a change in an organization's level of activity. The costs which vary proportionately with the changes in the level of activity are referred to as <u>variable costs</u>. The costs that are unaffected by changes in the level of activity are classified as <u>fixed costs</u>.

The understanding of cost behavior is very important for management's efforts to plan and control its organization's costs. <u>Budgets</u> and variance reports are more effective when they reflect cost behavior patterns.

The understanding of cost behavior is also necessary for calculating company's <u>break-even point</u> and for any other cost-volume-profit analysis.

Direct And Indirect Costs:

1. Direct Costs: Direct costs of a cost object are related to the particular cost object and can be Conveniently And Economically traced to it in an economically feasible (cost-effective) way.

For example:

The cost of steel or tires is a direct cost of Cars, Parts Assembly ,Line Wages

2. Indirect Costs : a cost object are related to the particular cost object but cannot be Conveniently Or Economically traced to it in an economically feasible (cost-effective) way. Instead Of Being Traced, These Costs Are Allocated To A Cost Object In A Rational And Systematic Manner. For Examples: Electricity, Rent, Property Taxes The Exhibit depicts direct costs and indirect costs and both forms of cost assignment-cost tracing and cost allocation—using the example of the BMW X5.



cost allocation: the assignment of indirect costs to a particular cost object. **Cost assignment:** is a general term that encompasses both:

- 1. tracing direct costs to a cost object
- 2. allocating indirect costs to a cost object.

Examples of Period Costs in Combinations of the Direct/Indirect and Variable/Fixed Cost Classifications at a Bank

		Assignment of Costs to Cost Object	
		Direct Costs	Indirect Costs
Cost- Behavior < Pattern	Variable Costs	• Cost object: Number of mortgage loans Example: Fees paid to property appraisal company for each mortgage loan	• Cost object: Number of mortgage loans Example: Postage paid to deliver mortgage- loan documents to lawyers/ homeowners
	Fixed Costs	 Cost object: Number of mortgage loans Example: Salary paid to executives in mortgage loan department to develop new mortgage-loan products 	• Cost object: Number of mortgage loans Example: Cost to the bank of sponsoring annual golf tournament

Factors Affecting Direct/Indirect Cost Classification:

- 1. Cost Materiality: The Smaller The Amount Of A Cost-that Is, The More Immaterial The Cost Is-the Less Likely That It Is Economically Feasible To Trace That Cost To A Particular Cost Object.
- 2. Availability Of Information-gathering Technology: Improvements In Information-gathering Technology Make It Possible To Consider More And More Costs As Direct Costs
- **3. Operational Design**: Classifying A Cost As Direct Is Easier If A Company's Facility (Or Some Part Of It) Is Used Exclusively For A Specific Cost Object, Such As A Specific Product Or A Particular Customer.

1. <u>Variable Costs</u>: Changes In Total In Proportion To Changes In The Related Level Of Activity Or Volume. They Are Constant On A Per-unit Basis.

If A Product Takes 5 Dollars Of Materials Each, It Stays The Same Per Unit Regardless Of Whether One, Ten, Or A Thousand Units are Produced

2.<u>Fixed Costs</u>: Remain Unchanged In Total Regardless Of Changes In The Related Level Of Activity Or Volume.

Change Inversely With The Level Of Production, As More Units Are Produced, The Same Fixed Cost Is Spread Over More And More Units, Reducing The Cost Per Unit.

3.<u>Mixed Costs</u>: (Sometimes Called Semi-variable Costs) Contain A Fixed And A Variable Cost Element. Total Mixed Costs Are Positive (Like Fixed Costs) When Activity Is Zero, And They Increase In A Linear Fashion (Like Total Variable Costs) As Activity Increases.

The Cost Of Electric Power Is An Example Of A Mixed Cost. Some Electricity Is Required To Provide Basic Lighting, While An Increasing Amount Of Electricity Is Required To Production Served Increases.



Volume or level of activity x

	Total Dollars	Cost per Unit
Variable Costs	Change in proportion with output More output = More cost	Unchanged in relation to output
Fixed Costs	Unchanged in relation to output	Change inversely with output More output = lower cost per unit

<u>Split of semi variable costs :</u>

Mixed costs must be broken down into their fixed and variable elements, the analysis takes the following mathematical form:

Where:

- y = the semi variable cost to be broken up
- x = any given measure of activity, such as production volume, sales volume, or direct labor hours
- a = the fixed cost component
- **b** = the variable rate per unit of **x**

Several methods are available to separate a semi variable expense into its variable and fixed components, including

- 1. The high-low method
- 2. The scatter graph method
- 3. The method of least squares (regression

The High-low Method:

The high-low method, as the name indicates, uses two extreme data points to determine the values of a (the fixed cost portion) and b (the variable rate) in the equation

y = a + bx.

The high-low method is explained, step by step, as follows:

- 1. Step 1 Select the highest pair and the lowest pair.
- 2. *Step2* Compute the variable rate, *b*, using the formula:

 $\frac{\text{Variable costs}}{\text{per unit}} = \frac{\text{Difference in total costs}}{\text{Difference in activity}}$

3. Step 3 Compute the fixed cost portion as:

Fixed costs = Total costs - Variable costs

		Number of Shipments	Packaging Costs
(Low-activity period)	January	6,000	\$17,000
	February	9,000	26,000
(High-activity period)	March	12,000	32,000
	April.	10,000	20,000

Equations for total costs for the packaging department in January and March (the periods of lowest and highest activity) follow:

January: \$17,000 = a + b (6,000 shipments)

March: \$32,000 = a + b (12,000 shipments)

Solving for the estimated variable costs:

$$b = \frac{\text{Difference in total costs}}{\text{Difference in activity}}$$
$$b = \frac{\$32,000 - \$17,000}{12,000 - 6,000}$$
$$= \$2,50$$

Next, the estimated monthly fixed costs are determined by subtracting variable costs from total costs of either the January or March equation: a =Total costs -Variable costs January: a =\$17,000 -(\$2.50 per shipment x 6,000 shipments) =\$2,000 or

March: a =\$32,000 -(\$2.50 per shipment x 12,000 shipments) =\$2,000

Scatter Diagram:

A scatter diagram is a graph of past activity and cost data, with individual observations represented Number of shipments by dots. Plotting historical cost data on a scatter diagram is a useful approach to cost estimations Variable costs Difference in total costs especially when used in conjunction with other cost per unit Difference in activity estimating techniques :



Height (cm)

Examples: Costs in Combinations of the Direct/Indirect and Variable/Fixed Cost Classifications for a Car Manufacturer

		Assignment of Costs to Cost Object		
		Direct Costs	Indirect Costs	
Cost- Behavior « Pattern	Variable Costs	• Cost object: BMW X5s produced Example: Tires used in assembly of automobile	• Cost object: BMW X5s produced Example: Power costs at Spartanburg plant. Power usage is metered only to the plant, where multiple products are assembled.	
	Fixed Costs	• Cost object: BMW X5s produced Example: Salary of supervisor on BMW X5 assembly line	• Cost object: BMW X5s produced Example: Annual lease costs at Spartanburg plant. Lease is for whole plant, where multiple products are produced.	

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What is a sunk cost?

A sunk cost is a cost that was incurred in the past and cannot be undone. Since most transactions cannot be undone, most amounts spent in the past can be described as *sunk*. In other words, a past or sunk cost will be there regardless of what you decide to do today or in the future.

To illustrate a sunk cost, let's assume that a company spent \$100,000 last year to purchase and install a machine. Today, a better machine is available for \$80,000 and it will reduce expenses by \$50,000 in each of the next 10 years. Now the old machine can be sold for just \$10,000. When deciding whether to purchase the new machine, *the \$100,000 that was spent on the old machine is a sunk cost*.

Basically the decision is whether to spend an additional \$70,000 today (\$80,000 minus \$10,000) in order to save \$50,000 each year for 10 years. (Current and future income taxes will also be relevant.) It may be difficult, but we need to exclude sunk costs from our decisions.