

# COST ACCOUNTING



## Basis & Principles

### I. Management accounting

- A. Internal focus
- B. Helps management plan, organize, and direct
- C. Provides guidelines and information for organizational decisions/goals
- D. Provides feedback for control function
- E. Forward-looking
- F. Most important quality is usefulness

### II. Financial accounting

- A. External focus
- B. Reports to outside parties such as shareholders, creditors, and regulators
- C. Reports must follow Generally Accepted Accounting Principles (GAAP)
- D. Key outputs are financial statements
- E. Relies on historical data

### III. Cost accounting

- A. A mixture of management and financial accounting
- B. Derives information from internal sources that aid in the preparation of external reports
- C. Measures cost of resources consumed
- D. Provides data for budgets
- E. Supports decision making to cut a company's costs and improve profitability

## What Is Cost?

### I. Cost

- A. Economic sacrifice (*Source*: Concept Statement No. 6 of the Financial Accounting Standards Board [FASB])
- B. The cash or cash equivalent value required to obtain an objective (*Source*: National Association of Accountants, 1983)

### II. Historical cost

- A. Original monetary value of an economic item
- B. Transactions are recorded at cash or cash equivalent at the time of the transaction

### III. Cost basis

- A. The original value of an asset for tax purposes (usually the purchase price)
- B. Used to determine the capital gain, which is equal to the difference between the asset's cost basis and the current market value

## Origins & Evolution of Cost Accounting

### I. Accounting introduced in 15th century

- A. Pacioli is considered the father of accounting
  1. Codified the system of debits and credits (bookkeeping)
  2. Created systems used to track commerce in Venice, Italy
  3. Didn't invent cost accounting but was interested in variances and budgeting

### II. Cost accounting's first widespread use

- A. Industrial revolution (late 18th and early 19th century)
  1. Complex, large manufacturing leads to recording and tracking of costs
    - a) Cost of materials and labor is main focus for manufacturers
  2. Frederick Taylor's scientific management analysis of mass production puts emphasis on standards for material and labor

### III. Beginning of 20th century: Greater focus on overhead

- A. Absorption costing tracks materials, labor, and overhead in inventories
- B. Standard costing becomes widespread

### IV. 1919: National Association of Cost Accountants (NACA) forms

- A. Promotes study and application of cost accounting
- B. NACA is later renamed Institute of Management Accountants (IMA)
  1. IMA is the professional organization of cost accountants

### V. 1950s: Toyota introduces lean production to focus on cost reductions

### VI. 1970: U.S. Congress creates Cost Accounting Standards Board (CASB)

- A. Promotes consistency in cost accounting practices
- B. Aids in the fair and accurate reporting of actual costs of governmental contracts

### VII. 1987: *Relevance Lost*, book by Johnson and Kaplan, demonstrates shortcomings of traditional overhead cost allocations

- A. Leads to popularity of activity-based cost accounting

### VIII. Recent innovations

- A. Adaption to computer-aided manufacturing
- B. Application of cost concepts by service sector
- C. Tracking cost of quality
- D. Enterprise software and Internet are changing business practices and management accounting

## Cost Classifications

### I. Direct costs

- A. Costs that are directly related to the production of a particular cost object (i.e., direct labor is related to product)
- B. Traced to cost object in an economically feasible manner
- C. Examples
  1. Tires on an automobile
  2. Wages of carpenter building a house
  3. Cost of lawyer in lawsuit

### II. Indirect costs

- A. Costs that are related generally to all cost objects
- B. Cannot be traced to cost object in an economically feasible manner
- C. Examples
  1. Rent on a factory that produces lawn mowers
  2. Secretarial costs of an audit
  3. Heat for a retail outlet selling sporting goods
  4. Overhead

### III. Cost drivers

- A. Any factors that have an effect on cost
- B. Examples
  1. Volume: Cost increases as more units are processed
  2. Time: Cost of activity increases based on the length of time required to complete the activity such as retooling of production equipment

3. Handles: Cost increases as an item is handled by workers or machines
4. Space: Storage cost increases as more space is used to store items
5. Distance: Miles driven increase production or delivery costs
6. Inspections: Cost of quality increases each time an item is inspected

### IV. Variable costs

- A. Costs that change in total due to changes in the cost driver
- B. As cost driver measure increases, total variable cost increases
- C. Variable cost on a per-unit basis remains constant; for example, cost of material is same per unit
- D. Examples
  1. Raw materials, packaging, and labor directly involved in a company's manufacturing process

### V. Fixed costs

- A. Costs that do not change in total as a result of cost driver changes
- B. Examples
  1. Rent, utilities, insurance, salaries, and most forms of depreciation

## Cost Terms

### I. Cost object

- A. Any item for which a cost measurement is needed to help decision making

### II. Cost accumulation

- A. The collection of cost data in some organized way

### III. Cost assignment

- A. Tracing direct costs and allocating indirect costs to cost objects

### IV. Cost management

- A. Techniques and systems to control costs of processes, products, and services used and produced by an organization

- B. Budgeting is part of cost management

### C. Value engineering (VE)

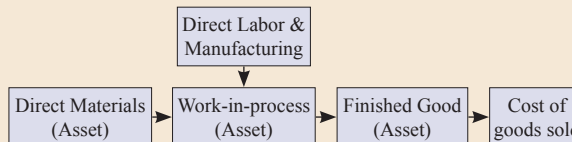
1. Began at General Electric during World War II
2. Faced shortages of labor materials and component parts
3. VE helped managers find acceptable substitutes at reduced costs
  - a) Effort directed at analyzing systems, equipment, facilities, and services to achieve essential functions at lowest cost while meeting performance, reliability, quality, and safety standards
4. Used to reduce costs via functional and design analysis
  - a) Design analysis: How can design reduce costs?
  - b) Functional analysis: What is the balance between functional features, performance, and cost?

## Manufacturing Cost Flows

### I. Manufacturing companies use three inventory accounts

- A. Direct materials
- B. Work-in-process
- C. Finished goods

### II. The use of these accounts follows the flow of production through the company



### III. Cost flows in T accounts

Direct Materials		Work-in-Process		Finished Goods	
Beginning Purchases	DM used → to WIP	Beginning DM used DL incurred OH applied	COGM → to FG	Beginning COGM	COGS → to COGS
Ending		Ending		Ending	

**Legend:** DM = direct materials, DL = direct labor, WIP = work-in-process, OH = overhead, COGM = cost of goods manufactured, FG = finished goods, COGS = cost of goods sold

## Inventory Methods & Types

### I. Inventory

- A. Significant current asset of merchandising and manufacturing firms
- B. Items for sale

### II. Perpetual inventory

- A. Continuous record of changes and fluctuation in direct materials, work-in-process, and finished goods inventories

### III. Periodic inventory

- A. Record is updated periodically
- B. Requires a periodic physical count of items in inventory

### IV. Direct materials inventory

- A. Also known as **raw materials inventory**
- B. Includes materials that are in stock and ready for use in the production of a product

### V. Work-in-process inventory

- A. Goods partially worked on but not yet fully completed

### VI. Finished goods inventory

- A. Products that have been completed and are awaiting sale and shipment

**VII. Inventory and cost of goods sold valuation**

- A. Cost of goods sold
- B. Calculation for merchandising firm:  
Beginning inventory  
+ Net purchases  
– Ending merchandise inventory  
= Cost of goods sold
- C. Calculation for manufacturing firm:  
Beginning finished goods inventory  
+ Cost of goods manufactured  
– Ending finished goods inventory  
= Cost of goods sold
- D. Valuation methods
1. First in, first out (FIFO): Oldest costs are expensed to cost of goods sold, while recent costs are reported in ending inventory
  2. Last in, first out (LIFO): Most recent costs are expensed to cost of goods sold, while oldest costs remain in inventory
  3. Weighted average: An average cost per unit is used to calculate ending inventory and cost of goods sold
  4. Lower of cost or market value: Inventory is reported at the lower of cost or replacement cost
    - a) Replacement cost: The cost to replace through purchase or manufacture

**Costs Classification: Assets vs. Expenses****I. Capitalized costs**

- A. Recorded as assets
- B. Eventually become an expense through depreciation, amortization, etc.
- C. EX: Equipment, building, natural resources

**II. Inventoriable costs**

- A. Costs incurred in purchase of products for resale (merchandise inventory)
- B. Costs incurred in the purchase and modification of materials for final sale (manufacturing inventories)

**III. Period costs**

- A. Reported as expenses
- B. Include costs initially recorded as assets and costs recorded as expenses

**Manufacturing Costs****I. Prime costs**

- A. Direct materials costs
1. Cost of materials used to produce the products
  2. Directly traceable to a specific product
  3. Include freight-in, sales tax, and custom duties
- B. Direct manufacturing labor costs
1. Cost of personnel labor contributed to the product
  2. Directly traceable to the product
  3. Include wages and fringe benefits

**II. Conversion costs**

- A. Manufacturing overhead costs
1. Indirect costs that cannot be traced to the cost objects
  2. Include electricity, fuel, supplies, rent, insurance, etc.
- B. Direct manufacturing labor costs (see I.B.)

**Cost-Volume-Profit Relationships****I. Break-even point**

- A. Net profits at break-even point are equal to zero profits
1. Equation method
    - a)  $n = \text{number of units needed to break even}$
    - b)  $n(\text{Revenues} - \text{Variable costs}) - \text{Fixed costs} = 0$
    - c) Solve for  $n$  to determine break-even point
  2. Contribution margin method
    - a) Contribution margin is a useful financial concept for decision making
    - b) Unit contribution margin = Selling price – Unit variable costs
    - c) Break-even point = Fixed costs/Unit contribution margin

**II. Contribution margin income statement format**

- A. Recasts the income statement to show contribution margin
- B. Example

Revenues	\$100,000
Variable Costs	40,000
Contribution Margin	\$60,000
Fixed Costs	10,000
Operating Income	\$50,000

**Costing Systems****I. Job costing**

- A. Costs are assigned to a particular job
- B. Applies where products are custom-made
- C. Each product produced is considered a job
- D. Costs are tracked by job
- E. Services rendered can also be considered a job
- F. EX: Construction of a home, automobile repair, print shop work, and the preparation of a personal financial plan
- G. Recordkeeping focus is job cost sheet
1. Used to track the job number, customer information, date started, date completed, and date shipped
  2. Used to track individual cost information for materials used, labor, and overhead; a total job cost summary
  3. "Open" or current job cost sheets equal work-in-process
  4. Example

**IV. Normal costing****A. Computation**

1. Actual direct cost rate  $\times$  Actual quantity
2. Budgeted indirect cost rate  $\times$  Actual quantity
  - a) Budgeted indirect cost rate is found as follows:  
Budgeted indirect cost rate = Budgeted indirect costs for the period/Allocation base
3. EX: Manufacturing overhead for a factory is estimated to be \$300,000 for the year; the allocation base is direct labor dollars, which are estimated to be \$250,000  
Budgeted indirect cost rate = \$300,000/\$250,000 = 1.2, or 120% of direct labor cost

**V. Budgeted or standard costing****A. Computation**

1. Budgeted direct cost rate  $\times$  Actual quantity
2. Budgeted indirect cost rate  $\times$  Standard quantity of inputs allowed for actual output achieved

**VI. Peanut-butter costing**

- A. Evenly spreads resource costs to cost objects even though these resources are used unevenly in production
- B. Consequences of peanut-butter costing
1. Product under-costing
    - a) Product with a low cost but a high demand on resources
  2. Product over-costing
    - a) Product with a high cost but a low demand on resources

**VII. Activity-based costing (ABC)**

- A. Approach used in determining costs used in job and process costing systems
- B. Considers activities rather than products as the cost objects

A-1 Printers Job Cost Sheet									
<b>Customer:</b>	Very Good Products Inc.				<b>Job number:</b>	4141			
<b>Address:</b>	1234 Main Street Swansea, MA 02777								
<b>Job description:</b>	3,000 brochures								
<b>Date started:</b>	9/1/10				<b>Date finished:</b>	9/2/10			
<b>Cost Summary</b>									
	Materials		\$50.10						
	Labor		59.67						
	Overhead		89.51						
	Total cost		<u>\$199.28</u>						
	<b>Direct Materials</b>			<b>Direct Labor</b>			<b>Overhead</b>		
	<b>Date</b>	<b>Req. #</b>	<b>Cost</b>	<b>Date</b>	<b>Ticket</b>	<b>Cost</b>	<b>Date</b>	<b>Rate</b>	<b>Cost</b>
	9/1/10	26161	\$40.10	9/1/10	T-110	\$17.00	9/2/10	150%	\$89.51
	9/2/10	26171	10.00	9/1/10	T-111	27.00	of DLS		
				9/2/10	T-112	15.67			
	Total		<u>\$50.10</u>	Total		<u>\$59.67</u>	Total		<u>\$89.51</u>

**II. Process costing**

- A. Costs are assigned to a mass of like products
- B. Costs per unit are computed as an average of total cost

**III. Actual costing**

- A. Computation
1. Actual direct cost rate  $\times$  Actual quantity
  2. Actual indirect cost rate  $\times$  Actual quantity

**VIII. Customer costing**

- A. Based on the use of company resources by customers
- B. Direct relationship between level of attention customer receives from organization and amount that customer contributes to the company's profitability

**Standard Costing****I. Standard cost**

- A. A predetermined budgeted or expected unit cost
- B. The amount that something (i.e., material, labor, service, product) should cost based on reasonable conditions
- C. Sets goals for conditions of efficiency, economic conditions, and other factors

**II. Facilitates planning**

- A. Standard cost variance analysis

**III. Aids in decision making (regarding prices and resource management)**

- A. Benefits not limited to manufacturing, retail, and service

**IV. Focus is on standard cost allowed for actual output**

- A. Output is usually sales or units produced

**V. Output for service sector**

- A. Airlines – passenger miles
- B. Hospital – patient days
- C. Hotel – number of guests
- D. Universities – student credit hours

**VI. Standard settings**

- A. Based on past experience, time and motion studies, and future expectations for prices and labor efficiency
- B. Material standards are influenced by quality of material and price of the material
- C. Standard labor time for producing and labor rate per hour must be considered
- D. Ideal standards
1. Represent a high level of efficiency
  2. Assume that favorable conditions will prevail and management will be at its best
  3. Assume that waste will be minimal and labor will be well trained
- E. Normal standards
1. Set to reflect the conditions that are expected to exist over the long run

**VII. Advantages**

- A. Efficiency measurement
1. The comparison of actual costs with standard costs enables the management to evaluate performance of various cost centers
- B. Calculation of variances
1. Variances are determined by comparing actual costs with standard costs
  2. Management is able to identify inefficiencies and assign responsibility
  3. Variances make possible corrective measures at the earliest point in time
- C. Management by exception
1. Directs the attention of management only when actual performance is less than the budgeted performance
- D. Cost control
1. Standards can be constantly analyzed and an effort made to improve efficiency
  2. The reasons for variance are studied, enabling cost control

**VIII. Limitations**

- A. Tough to implement when custom work is done according to customer or client specifications
- B. Variances are classified into controllable and uncontrollable variances; standard costing is applicable only for controllable variances

## Standard Cost (System) Flows

## I. Direct material costs (purchase)

Debit or Credit	Account	Amount
Debit	Materials inventory	Standard cost
Debit	Direct materials purchase price variance (unfavorable)	Unfavorable variance amount
Credit	Cash or accounts payable	Purchase cost
Credit	Direct materials purchase price variance (favorable)	Favorable variance amount

## II. Direct materials usage

Debit or Credit	Account	Amount
Debit	Work-in-process inventory	Standard cost = Standard quantity × Standard cost
Debit	Direct materials usage variance (unfavorable)	Unfavorable variance amount
Credit	Materials inventory	Materials used at standard cost
Credit	Direct materials usage variance (favorable)	Favorable variance amount

## III. Direct labor cost

Debit or Credit	Account	Amount
Debit	Work-in-process inventory	Standard cost = Standard hours × Standard rate
Debit	Direct rate or efficiency variance (unfavorable)	Unfavorable variance amount
Credit	Accrued payroll	Actual wage expense
Credit	Direct rate or efficiency variance (favorable)	Favorable variance amount

## IV. Completion of output

Debit or Credit	Account	Amount
Debit	Finished goods inventory	Amount previously debited to WIP
Credit	Work-in-process (WIP) inventory	Amount previously debited to WIP

## Activity-Based Cost (ABC)

## I. Goals of ABC

- Improve product cost information to assist pricing and product mix decisions
- Assist in managing indirect costs
- Provide more precise individual product costs than traditional accounting methods

## II. ABC relevance

- Changing cost structure of many contemporary organizations
  - Contemporary, capital-intensive manufacturing companies have a higher percentage (50%–60% vs. 10%–20% of total cost) of manufacturing overhead; indirect costs can be 50%
  - Improper assignment of indirect costs has dramatic impact on individual product costs
    - Results can be disastrous pricing, product profitability, and customer profitability management decisions
- Increasing diversity of products that companies are manufacturing and selling
  - Consumption of indirect costs, including selling and administrative costs, can be considerably different from one product to the next
- Traditional systems risk cross-subsidies; ABC can correct this problem
  - Inequitable assignment of costs to cost objects can lead to under-costing or over-costing and poor management decisions
- Activity-based management (ABM)
  - Made possible by implementation of ABC
  - ABM focuses on management of activities within processes
  - ABM is route to continuous improvement in value experienced by customers and in profits earned
  - ABM uses ABC information to influence management and action

## III. Six-step process of ABC

- Determine all the direct material and direct labor costs associated with each product or service

- Group overhead costs, including selling and administrative costs, into four categories: output unit-level costs, batch-level costs, product-sustaining (service-sustaining) costs, and facility-sustaining costs
- Identify cost drivers (activities) that may have a causal effect on the costs incurred
- Group the costs at each cost level that are affected by the same activity into cost pools
- Determine cost rates per activity
  - Cost rates determined by dividing the total costs in each cost pool by the total number of activity units identified with each cost pool
- Assign the overhead costs to the products or services based on the activity rates determined in step 5 (E) times the amount of activities consumed by each product or service

## IV. ABC assumptions

- Homogeneous cost drivers (activities) drive the costs in each pool
  - Costs assigned to each cost pool are driven by one activity or a group of highly correlated activities
- Costs in each cost pool are strictly proportional to the activity
  - Proportional change in all the costs will result from a change in the activity level

## V. Examples of activities and corresponding cost drivers

Activity	Cost Driver
Repairs, maintenance	Repair hours or machine hours
Cafeteria	Number of employees
Material handling	Pounds of material moved
Personnel management	Number of employees served
Warehouse activities	Pounds or crates handled
Delivery of products	Miles driven
Order entry	Orders processed
Number of customers	Number of products
Billings	Lines typed or bills processed
Selling costs	Units sold or sales in dollars
Receiving department	Number of shipments received
Disbursing	Number of checks issued
Machining	Number of machine hours
Purchase of material	Number of purchase transactions or purchase orders processed

## Disposition of Under- or Over-Applied Overhead

## I. Applied overhead

- Normal costing requires budgeted overhead rate utilized to allocate overhead
- At end of period, comparison is made between applied (allocated) overhead and actual overhead

## II. Under- or over-applied overhead

- If applied overhead (indirect cost) is greater than actual overhead, then overhead is over-applied
- If applied overhead is less than actual overhead, then overhead is under-applied

## III. Two overhead accounts

- Overhead control contains actual cost of overhead of the period
- Overhead applied (or allocated) contains the record of overhead applied to cost objects during the period

## IV. End-of-period adjustment methods

- Proration approach
  - Spread under-applied or over-applied overhead among ending work-in-process, finished goods, and cost of goods sold
  - Relative balances of ending work-in-process, finished goods, and cost of goods sold can be used to prorate
  - Relative balances of overhead contained in the ending work-in-process, finished goods, and cost of goods sold can be used to calculate the proration amounts
- Write-off approach
  - Adjust cost of goods sold by the under- or over-applied amount

## Customer Profitability

## I. Customer profitability analysis

- Identifies customer service costs and profits for customers and groups of customers

## II. Customer service costs include the costs for:

- Advertising, sales calls, delivery, billing, collections, service calls

## III. Customer profitability reports

- Allow managers to:
  - Identify the most and least profitable customers
  - Manage customer costs
  - Discontinue unprofitable customers

## IV. Customer lifetime value (CLV)

- Long-term value of customer
- Net present value of estimated future profits from customer

## V. Customer equity

- Sum of the CLV for all the customers of the company

## Responsibility Accounting

## I. Responsibility centers

- Part, segment, or subunit of an organization
- Cost, revenue, profit, and investment centers
  - Cost center:** Responsible for costs (expenses) only; **EX:** Maintenance department
  - Revenue center:** Responsible for revenues only; **EX:** Sales department of car dealership
  - Profit center:** Responsible for both revenues and expenses; **EX:** Sporting goods department of retail store

## II. Responsibility accounting

- Measures plans and action of each responsibility center
- Traces costs to:
  - The individual who has the best knowledge about why the costs arose
  - The activity that caused the costs

- Investment center:** Responsible for revenues, expenses, and invested capital; **EX:** Branch sales office, such as a rent-a-car regional office where the manager can decide to invest in additional automobiles to be leased to customers

- Performance evaluation is critical
  - Managers have input into goals and standards within responsibility centers
  - Management by exception: Focus on significant variances
  - Heightened awareness of areas needing immediate attention

## III. Management control

- Influencing behavior to increase the chance of reaching goals
- Results controls focus on outcomes
- Action controls seek to ensure beneficial actions are performed
- Goal congruence is agreement by employees on common set of goals and when individual goals align with organizational goals

## Budgeting

## I. Budget

- Plan of action
  - Aids in implementing and evaluating plan of action
  - Process often managed by committee in larger organizations
- Request and collect budget estimates
  - Review and evaluate budget estimates and assumptions
  - Suggest modifications to estimates and assumptions
  - Approve budgets

- Budgeting begins with estimate of revenues (or sales)

## II. Master budget

- Summary of financial projection
- Includes projections of all budgets of all company divisions
- Master budget for manufacturer:
  - Revenue (sales budget)

- Production budget (including budgets for materials, labor, and overhead)
- Cost of goods sold budget
- Research and design budget
- Capital budget
- Cash budget

7. Pro forma income, balance sheet, and statement of cash flows  
a) **Pro forma** means projected financial statement
- III. Budget period**  
A. Tied directly to the type of planning required  
B. Typical: One year, but some organizations prepare two-year budgets  
C. Long-term vs. short-term needs  
1. One-year budget broken down into monthly budgets or quarterly budgets
- IV. Types of budgets**  
**A. Rolling budget**  
1. Plan that is available for a continuous period of time  
2. As time lapses, a corresponding time period is added in the future
- B. Operating budget:** Budget of expected operation of unit or entire entity or both, which includes the following:  
1. Budgeted income statement  
2. Accompanying schedules
- C. Financial budget:** Part of master budget that comprises the following:  
1. Capital budget: A preliminary plan for long-term investment decisions  
2. Cash budget: Schedule of expected cash receipts and disbursements  
3. Budgeted balance sheet: Schedule of expected balance sheet figures for the budget period
- D. Activity-based budget**  
1. Focuses on activity costs needed to produce and sell products or services  
2. Separates indirect costs into separate activity cost pools
- E. Kaizen budget**  
1. Based on future improvements  
2. Costs include product or service process improvements that are yet to be implemented
- F. Sales or revenue budget**  
1. First budget to be prepared  
2. Driver of other budgets  
3. Based on sales or revenue forecast
- a) Considers current sales (revenues) and trends, economic and industry conditions, and pricing policies
- V. Behavior aspects of budgeting**  
A. Budgetary slack (a.k.a., padding the budget)  
B. Goal congruence  
1. Consistency between budget and goals of employees  
2. Participative budget promotes goal congruence  
C. Compensation linked to budgetary performance  
1. Bonuses and promotions tied to achievement of:  
a) Sales quotas  
b) Target operating profit  
c) Earnings per share targets

## Variance & Management Control

### I. Performance gap

- A. Difference between actual performance and best level of performance that can be attained  
B. Variances help managers control operations

### II. Variances

- A. Differences between actual performance and best performance for financial variables  
B. Types of variances  
1. Favorable: Increase in operating income relative to budget  
2. Unfavorable: Decrease in operating income relative to budget  
a) Summary

	Net Income	Revenue	Expenses
Actual greater than budgeted	Favorable variance	Favorable variance	Unfavorable variance
Actual less than budgeted	Unfavorable variance	Unfavorable variance	Favorable variance

3. Sales volume variance: Difference between flexible budget amount and static budget amount

4. Price variance: Difference between actual and budgeted unit prices  $\times$  Actual quantity  
5. Efficiency variance: Difference between quantity of actual input used and input allowed  $\times$  Budgeted price  
6. Overhead cost variances  
a) Variable spending variance: Difference between actual and budgeted costs per unit of cost allocation base  $\times$  Actual quantity of cost allocation base  
b) Fixed spending variance: Difference between actual amount of overhead incurred and the budgeted amount  
c) Efficiency variance (variable only): Difference between actual and allowed quantity of cost allocation base  $\times$  Budgeted cost allocation rate  
d) Production volume (output level) variance (fixed only): Difference between budgeted fixed overhead and applied fixed overhead

### III. Purposes of variance analysis

- A. Understand why variances arise  
B. Evaluate the activity  
C. Promote learning and improvement  
D. Take corrective action

## Inventory Costing Methods

### I. Variable costing

- A. Includes direct manufacturing costs and variable manufacturing overhead costs in inventory  
B. Fixed manufacturing overhead costs are period costs  
C. Costs included in inventory are recorded as assets and expensed as products are sold  
D. Used for internal purposes only; not acceptable for income tax or GAAP reporting

### II. Absorption costing

- A. All the manufacturing costs are absorbed by the units produced  
B. All direct and overhead manufacturing costs are included in inventory along with material and labor costs  
C. The only costing approach acceptable for GAAP reporting and for income tax purposes

## Cost Behavior

### I. Cost predictions

- A. Attempt to measure or plan for future costs

### II. Cost estimation

- A. Attempts to measure past cost relationships

### III. Approaches

- A. Industrial engineering method  
1. Engineers study the process to determine cost behavior  
B. Conference method  
1. Managers and staff define cost behavior  
C. Account analysis method  
1. Accounts are analyzed to determine cost behavior  
D. Quantitative analysis, such as high-low method  
1. Formulas are used to estimate the variable cost per unit vs. the fixed costs

### IV. Estimating a cost function

- A. High-low method  
1. Cost function is the data between highest and lowest observed cost driver values  
2. **EX:** Cost data for 12 months of a particular mixed overhead item shows that the most costly month was January at \$3,105 with the lowest cost month being June at \$1,896; the cost driver is machine hours (mhr); for January and June, the total machine hours were 142 and 50, respectively; what would be the cost estimate if the machines were run for 115 hours?

The **variable cost (VC)** can be calculated as follows:

$$VC = \frac{\$3,105 - \$1,896}{142 \text{ mhr} - 50 \text{ mhr}}$$

$$VC = \frac{\$1,209}{92 \text{ mhr}}$$

$$VC = \$13.14/\text{mhr}$$

**Fixed costs (FC)** are estimated as follows:

$$FC = \$3,105 - (\$13.14 \times 142 \text{ mhr}) = \$1,239$$

Here's how to estimate the cost for a month with 115 machine hours:

$$\begin{aligned} TC &= FC + (VC \times 115 \text{ mhr}) \\ TC &= \$1,239 + (\$13.14 \times 115 \text{ mhr}) \\ TC &= \$2,750 \end{aligned}$$

### B. Regression analysis method

1. Regression analysis is the mathematical nature of the association between two variables  
2. The association is determined in the form of a mathematical equation—in this case, a cost function  
3. Cost function provides the ability to predict one variable (cost) on the basis of the knowledge of the other variable (quantity of a cost driver)

- a) It is used to measure the average amount of change in a dependent variable, such as electricity, that is associated with unit increases in the amounts of one or more independent variables, such as machine hours

4. The variable whose value is to be predicted (such as electricity) is called the dependent variable  
5. The variable about which knowledge is available or can be obtained is called the independent variable (such as machine hours)  
6. The relationships between variables are assumed to be linear; the functional relationship can be described graphically (on a common x-y coordinate system) by a straight line

### V. Hierarchy of costs and cost drivers

- A. Output unit-level costs  
1. Cost of activities performed on each individual unit of a product or service  
B. Batch-level costs  
1. Cost of activities related to a group of units of products or services  
C. Product-sustaining costs  
1. Cost of activities undertaken to support individual products regardless of the number of units or batches produced  
D. Facility-sustaining costs  
1. Cost of activities that cannot be traced to individual products or services but support the organization as a whole

## Relevance

### I. Relevant costs

- A. Expected future costs  
B. Costs differ based on action taken  
C. Influences on nonroutine decisions

### II. Outsourcing

- A. Purchasing goods/services from vendors outside the organization

### III. Insourcing

- A. Producing goods/services rather than buying them from outside sources

### IV. Irrelevant costs

- A. Past costs that cannot be changed and/or future costs that will not differ between alternatives  
1. **EX:** Book value, sunk costs

### V. Relevant range

- A. Activity levels within which a cost estimate is valid  
B. Fixed costs are constant within a relevant range of activity such as sales volume  
C. Variable costs are constant on a per-unit basis within a relevant range of activity

## Pricing

### I. Approaches

- A. Market-based  
1. Customer demand or competitor actions and reactions  
B. Cost-based  
1. Based on cost to manufacture product  
2. Modified to take into account customer reactions  
3. Cost-plus pricing formula:

Cost base + Markup = Selling price

- a) **EX:** Item costs \$300 with a 20% markup; the markup is \$60, so the selling price is \$360

### C. Cost-plus pricing and target profit

1. Markup is a function of target profit
2. Markup is calculated to earn a target return on investment
3. **EX:** The target return on investment is 15% with \$10,000,000 capital invested; the target profit is \$1,500,000 ( $\$10,000,000 \times .15$ ); the expected sales are assumed to be 25,000 units; therefore, the target profit per unit is \$60 ( $\$1,500,000/25,000$ ); with a cost per unit of \$300 plus a target profit of \$60 per unit, the selling price is \$360; the markup is 20% ( $\$60/\$300$ )

## II. Other pricing considerations

- A. Price discrimination: Charging some customers more than others
- B. Peak-load pricing: Charging higher prices during busier times
- C. Predatory pricing: Pricing below cost for a short time in order to outsell competitors and gain market share
- D. Dumping: Sale of products in another country for less than their market value in the country of creation
- E. Collusive pricing: Companies pool their pricing and output efforts in order to maintain a higher price than the competition

## Transfer Pricing

### I. Transfer price

- A. The price one department or division charges for the product or service supplied by another department or division of the same organization
- B. Transfer prices create revenue for the selling unit and purchase costs for the buying unit

### II. Transfer price approaches

- A. Market-based: Prices of similar products on the market or external prices charged by the company for the same product or service are considered
- B. Cost-based: Management chooses a transfer price based on cost of producing
- C. Negotiated transfer prices: Departments or divisions negotiate a transfer price between themselves

## Cost Pools & Allocations

### I. Cost allocation between departments

- A. Single-rate method: Costs are gathered in one pool and allocated to cost objects using the same rate of the single allocation base
- B. Dual-rate method: Costs grouped in two pools
  1. One pool usually contains fixed costs, and the other pool contains variable costs

### II. Cost allocation to service departments

- A. Methods
  1. Direct allocation: Most popular but does not take into account services rendered by one service department to another
  2. Step-down allocation: Complex, with partial recognition of services rendered between departments
  3. Reciprocal allocation: Used specifically when departments render services to one another and most accurately account for such exchange of services

### III. Common costs

- A. Costs shared by two or more users
- B. Methods of allocation:
  1. Incremental common cost allocation
    - a) One user is viewed as primary user
    - b) Primary user is allocated costs that would occur if there was only one user
    - c) Secondary user is allocated the balance
  2. Stand-alone common cost allocation
    - a) Allocates costs based on percentage of costs incurred by each user
    - b) More equally allocates costs

## Joint Products & By-Products

### I. Joint (main) products

- A. Cannot be individually identified until a split-off has been made
- B. Have relatively high sales values

### II. Joint costs

- A. Cost of a single process that creates a number of different products
- B. Outputs of joint process are called joint products
- C. Split-off point
  1. Point where products are separately identifiable
  2. Costs incurred beyond split-off point are called separable costs
- D. Methods of allocation
  1. Physical unit method
    - a) Based on physical measures such as volume, weight, or linear measure
  2. Relative sales value method
    - a) Based on relative sales value of the separate products at the split-off point
    - b) Most frequently used method
  3. Estimated net realizable value (NRV) method
    - a) Similar to relative sales value method
    - b) Allocation based on final sales value less separable costs

4. Constant gross-margin percentage NRV method
  - a) Allocation based on a gross margin percentage that is constant among products
  - b) Gross margin is deducted from final sales value to derive cost and then deduct separable cost

- E. Joint costs are allocated to joint products, not by-products

### III. By-products

- A. Have significantly lower sales value than the main product
- B. Produced simultaneously from a common process
- C. Most cost-effective way to account for by-products is at time of sale as a reduction in cost of goods sold or as revenue

### IV. Scrap

- A. The remaining items that have a minimal value or very low sales value when compared to main product(s)

### V. Purposes of joint cost allocation

- A. To determine inventory cost and cost of goods sold for external and internal reporting
- B. To determine cost reimbursement under contracts for a portion of products or services
- C. To compute damages when insurance claims are filed
- D. To regulate rates charged

## Process Costing Systems

### I. Process costing

- A. Used to cost like products
- B. Usually applies where products are mass-produced

### II. Process costing steps

- A. Track flow of output
- B. Compute output in equivalent units (EUs) of production
- C. Summarize total cost charged to work-in-process
- D. Compute equivalent costs per unit (step C, step B)
- E. Assign total costs to completed units and units in ending work-in-process

### III. Methods available for process costing

- A. Weighted-average method
  1. Focuses on total costs and total equivalent completed to date
    - a) Work-in-process costs + Current period costs/Work-in-process EU
- B. First in, first out (FIFO) method
  1. Compute unit costs by dividing current costs only by EUs of work done during the current period

### IV. Equivalent units calculation

- A. **EX:** 96,000 units were completed during the period; another 16,000 units remain in work-in-process; the work-in-process is 100% complete with respect to materials but only 30% complete with respect to conversion costs; the EUs for materials would be 112,000 (96,000 + 16,000) and 100,800 (96,000 + 4,800) for conversion costs

## Spoilage & Scrap

### I. Normal spoilage

- A. Spoilage that arises under normal, efficient conditions

- B. Somewhat unavoidable result of the normal production process
- C. Typically included in the cost of good output units

### II. Abnormal spoilage

- A. Spoilage that arises under other than normal and efficient conditions
- B. Can generally be controlled
- C. Recorded as period cost

### III. Approaches to process costing and spoilage

- A. Approach #1: Recognize spoilage as a part of the unit output computation and make spoilage costs visible
- B. Approach #2: Do not include spoilage as a part of unit output computation
  1. Spreads normal spoilage costs over good units
  2. Results in product costs that are less adequate

## Capital Budgeting

### I. Capital budget

- A. Long-term plan for future investments/projects
- B. Requires significant investment

### II. Steps of capital budgeting

- A. Identify potential capital expenditure projects
- B. Gather information, including expected costs and benefits of alternative projects
- C. Evaluate projects based on financial and nonfinancial considerations
- D. Select projects for implementation
  1. Choose projects that have expected benefits in excess of costs
- E. Obtain project financing, considering both internal and external sources
- F. Implement projects
- G. Control projects by monitoring budgets and performance

### III. Evaluation methods

- A. Discounted cash flow method
  1. Looks at cash flow at a particular point in time
  2. Recognizes time value of money
  3. Types
    - a) Net present value (NPV): Expected gain or loss from a project is determined by discounting all expected cash inflows and outflows to current dollars using a required rate of return
      - 1) Considers the timing of cash flows utilizing time value of money/present value calculations
      - 2) Easy to calculate using the NPV function in Excel® or by utilizing a financial calculator's NPV function

- b) Internal rate of return (IRR)
  - 1) IRR: Rate of return at which the present value of cash outflows = present value of cash inflows
  - 2) IRR method: Trial-and-error method to determine rate of return that makes the NPV of the project = 0
  - 3) Easy to calculate using the IRR function in Excel® or by utilizing a financial calculator's IRR function

- B. Payback method: Time it takes to recoup money invested in project
- C. Accrual accounting rate-of-return method: Decisions based on value of accounting rate of return

### IV. Investment cash flows

- A. Asset acquisition costs (outflow), including:
  1. Purchase price, cost to build (outflow)
  2. Installation costs (outflow)
  3. Proceeds of sale of existing assets (inflow)
  4. Tax effects of gain or loss (outflow or inflow)
- B. Working capital requirements
- C. Investment tax credit

### V. Periodic cash flows

- A. Incremental revenues less incremental costs
- B. Depreciation tax shield

### VI. Terminal cash flows

- A. Return of working capital
- B. Disposition of assets

**Hybrid Costing Systems**

**I. Hybrid costing**

- A. A blend between job costing and process costing systems
- B. Applies to manufacturing organizations involved in both custom-order manufacturing and mass production
- C. Types
  - 1. Operation costing
    - a) Applies to groups of similar products
    - b) Direct materials are traced to each batch (like job costing)
    - c) Conversion costs are allocated to all units passing through the operation (like process costing)
  - 2. Backflush costing
    - a) Records transactions only after good units have been completed
    - b) Tracing is done backward, since it occurs after the product is already completed
    - c) Often accompanies just-in-time (JIT) production systems

**Quality**

**I. Aspects of quality**

- A. Design quality: How closely products meet wants and needs of consumers
  - B. Conformance quality: Accuracy of a product to design, engineering, and manufacturing specifications
- II. Costs of quality**
- A. Prevention costs: Costs to prevent production of products that do not conform to specifications
    - 1. **EX:** Design engineering, supplier evaluations, preventative maintenance, and quality training
  - B. Appraisal costs: Costs of detecting which products are not made according to specifications
    - 1. **EX:** Inspections and product testing
  - C. Internal failure costs: Costs of detecting faulty product before customer receives it

- 1. **EX:** Spoilage, rework, scrap, and process breakdowns
  - D. External failure costs: Costs of detecting faulty product after shipped to customer
    - 1. **EX:** Customer service, warranty repair costs, and liability claims
- III. Methods to control quality**
- A. Control charts: Track observations made of a particular process
    - 1. Means of distinguishing between random and nonrandom variations in a process
  - B. Pareto diagram: Tracks frequency of defects
    - 1. Ordered from most frequent to least frequent
  - C. Cause-and-effect diagram: Develops relationships that help identify possible future defects
- IV. Cost of quality report**
- A. Shows the cost of prevention, appraisal, internal, and external failures

**Inventory Management**

**I. Retail organizations**

- A. Costs
  - 1. Purchase costs: Costs of goods acquired from suppliers (includes shipping charges)
  - 2. Ordering costs: Costs of preparing and issuing a purchase order
  - 3. Carrying costs: Costs associated with holding inventory
  - 4. Stock-out costs: Costs associated with shortage of products in relation to consumer demand
  - 5. Quality costs: Costs of ensuring that products are free of defects
- B. Methods for achieving optimal inventory levels
  - 1. Economic order quantity (EOQ) method
    - a) Based on carrying costs and ordering costs
    - b) Optimal inventory amount is calculated by choosing a level at which carrying costs equal ordering costs
    - c) EOQ formula:  $\sqrt{2aD/k}$  where:
      - $a$  = variable cost per order
      - $D$  = periodic demand for units
      - $k$  = periodic carry costs
  - 2. Just-in-time (JIT) ordering
    - a) Matches demand and delivery of goods
    - b) Low levels of inventory are held (possibly none at all)

**II. Manufacturing organizations**

- A. Methods
  - 1. Materials requirement planning (MRP) system: Focuses on forecasted amount of demand for goods and then determines demand for materials at each stage of production
  - 2. JIT production system: Produces product just in time to meet customer demand

**Organization Structure & Decentralization**

**I. Decentralization**

- A. Management personnel at all levels are able to make decisions
- B. Benefits (advantages)
  - 1. Greater responsiveness to needs
  - 2. Quicker decision making
  - 3. Increased motivation
  - 4. Increased management development and learning
  - 5. Narrows managers' focus
- C. Costs (disadvantages)
  - 1. Suboptimal decisions: Decision favors one unit but not the firm as a whole
  - 2. Duplication of activities
  - 3. Decreased organizational loyalty
  - 4. Higher costs of gathering information

**Balanced Scorecard**

**I. Balanced scorecard highlights four perspectives of performance**

- A. Financial: Evaluates profits and return on investment
- B. Customer: Evaluates growth in market segments, market share, number of new customers, and satisfaction
- C. Internal business processes: Evaluates internal operations including innovation, producing and delivering products and services, and post-sales service
- D. Learning and growth: Evaluates such things as employee satisfaction, employee capabilities, development and skill levels, and real-time feedback systems

**II. Well-designed scorecards**

- A. Link the perspectives to company strategy
- B. Communicate goals with understandable and measurable operational targets
- C. Place strong emphasis on financial objectives and measures
- D. Connect nonfinancial measures to financial goals
- E. Limit the number of measures, identifying only the critical ones that management can focus on

**Performance Measurement**

**I. Return on investment**

- A. Return on sales  $\times$  Asset turnover
- B. (Profit/Sales)  $\times$  (Sales/Assets)

**II. Residual income**

- A. Income of a business less imputed charge for investment in the business
- B. Imputed charge = Required return  $\times$  Investment

**III. Economic value added**

- A. Sales - Operating expenses - Financing expenses
- B. Financing expenses = Cost of capital  $\times$  Invested capital

**IV. Return on sales**

- A. Sales/Assets

**Professional Environment**

**I. Job of cost accountant**

- A. Responsibilities include tracking costs, managing cost accounting system, budgeting, performance evaluation, cost management, fixed asset management, and property tax support
- B. Cost accounting manager has technical understanding of cost accounting, as well as analytical, team, and communication skills

**II. Institute of Management Accountants (IMA)**

- A. Principal group dedicated to the practice of cost accounting and management accounting
- B. Publishes journals, newsletters, research reports, and Statements on Management Accounting (SMAs)
- C. SMAs
  - 1. 35 SMAs cover broad range of practice areas, including cost management

**III. Certified management accountant (CMA)**

- A. Main professional certification of cost accountants and management accountants
- B. Awarded by IMA
- C. CMA has education, experience, membership, and testing requirements
  - 1. Bachelor's degree, 2 years of work experience in management accounting, IMA membership, pass 2-part exam
    - a) Part I - Financial planning, performance, and control
      - 1) Planning, budgeting, and forecasting
      - 2) Performance management
      - 3) Cost management
      - 4) Internal controls
      - 5) Professional ethics
    - b) Part II - Financial decision making
      - 1) Financial statement analysis
      - 2) Corporate finance
      - 3) Decision analysis and risk management
      - 4) Investment decisions
      - 5) Professional ethics

**Cost Accounting & Ethics**

**I. IMA's Statement of Ethical Professional Practice**

- A. Four principles
  - 1. Honesty
  - 2. Fairness
  - 3. Objectivity
  - 4. Responsibility
- B. Four standards
  - 1. Competence
  - 2. Confidentiality
  - 3. Integrity
  - 4. Credibility
- C. Resolution of ethical conflict
  - 1. Discuss conflict with immediate supervisor
    - a) If supervisor is involved in ethical conflict, go to next supervisory level
    - b) Clarify ethical issues with impartial advisor to gain better understanding of courses of action
    - c) Consult with attorney as to legal obligations and rights

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