

“Introduction to cost accounting”.

: The Accountant'S Role In The Organization

Topic Objective:

At the end of this topic students will be able to understand:

- Cost accounting
- Standard Cost Accounting
- Weaknesses of Standard Cost Accounting for Management Decision Making
- Development of Throughput Accounting
- Activity-based costing
- Marginal Costing

Definition/Overview:

Accountant: An **accountant** is a practitioner of accountancy, which is the measurement, disclosure or provision of assurance about financial information that helps managers, investors, tax authorities and other decision makers make resource allocation decisions.

Management accounting measures and reports financial and non-financial information that helps managers make decisions to fulfill the goals of an organization. It focuses on internal reporting.

Financial accounting focuses on reporting to external parties. It measures and records business transactions and provides financial statements that are based on generally accepted accounting principles (GAAP).

Supply chain describes the flow of goods, services, and information from the initial sources of materials and services to the delivery of products to consumers, regardless of whether those activities occur in the same organization or in other organizations.

Key Points:

1. Cost accounting

Cost accounting has long been used to help managers understand the costs of running a business. Modern cost accounting originated during the industrial revolution, when the complexities of running a large scale business led to the development of systems for recording and tracking costs to help business owners and managers make decisions. In the early industrial age, most of the costs incurred by a business were what modern accountants call "variable costs" because they varied directly with the amount of production. Money was spent on labor, raw materials, power to run a factory, etc. in direct proportion to production. Managers could simply total the variable costs for a product and use this as a rough guide for decision-making processes. Some costs tend to remain the same even during busy periods, unlike variable costs which rise and fall with volume of work. Over time, the importance of these "fixed costs" has become more important to managers. Examples of fixed costs include the depreciation of plant and equipment, and the cost of departments such as maintenance, tooling, production control, purchasing, quality control, storage and handling, plant supervision and engineering. In the early twentieth century, these costs were of little importance to most businesses. However, in the twenty-first century, these costs are often more important than the variable cost of a product, and allocating them to a broad range of products can lead to bad decision making. Managers must understand fixed costs in order to make decisions about products and pricing.

For example: A company produced railway coaches and had only one product. To make each coach, the company needed to purchase \$60 of raw materials and components, and pay 6 laborers \$40 each. Therefore, total variable cost for each coach was \$300. Knowing that making a coach required spending \$300, managers knew they couldn't sell below that price without losing money on each coach. Any price above \$300 became a contribution to the fixed costs of the company. If the fixed costs were, say, \$1000 per month for rent, insurance and owner's

salary, the company could therefore sell 5 coaches per month for a total of \$3000 (priced at \$600 each), or 10 coaches for a total of \$4500 (priced at \$450 each), and make a profit of \$500 in both cases.

2. Standard Cost Accounting

In modern cost accounting, the concept of recording historical costs was taken further, by allocating the company's fixed costs over a given period of time to the items produced during that period, and recording the result as the total cost of production. This allowed the *full cost* of products that were not sold in the period they were produced to be recorded in inventory using a variety of complex accounting methods, which was consistent with the principles of GAAP (Generally Accepted Accounting Principles). It also essentially enabled managers to ignore the fixed costs, and look at the results of each period in relation to the "standard cost" for any given product. For example: if the railway coach company normally produced 40 coaches per month, and the fixed costs were still \$1000/month, then each coach could be said to incur an overhead of \$25 ($\$1000/40$). Adding this to the variable costs of \$300 per coach produced a full cost of \$325 per coach.

This method tended to slightly distort the resulting unit cost, but in mass-production industries that made one product line, and where the fixed costs were relatively low, the distortion was very minor. For example: if the railway coach company made 100 coaches one month, then the unit cost would become \$310 per coach ($\$300 + (\$1000/100)$). If the next month the company made 50 coaches, then the unit cost = \$320 per coach ($\$300 + (\$1000/50)$), a relatively minor difference. An important part of standard cost accounting is a variance analysis which breaks down the variation between actual cost and standard costs into various components (volume variation, material cost variation, labor cost variation, etc.) so managers can understand *why costs were different from what was planned* and take appropriate action to correct the situation.

3. Weaknesses of Standard Cost Accounting for Management Decision Making

As time went on, standard cost accounting lost its usefulness for management decision making due to a variety of reasons:

- The practice of paying workers on a 'set-piece' basis changed in favor of paying on an hourly rate.

- Modern companies tend to have relatively low truly variable costs (primarily raw material, commissions or casual workers) and very high fixed costs (worker salaries, engineering costs, quality control, etc.).
- Equipment has become more complex and specialized and may be a very significant proportion of total costs.
- Changes in the level of full cost inventory create swings in profitability that are difficult to explain or understand. An increase in inventory can "absorb" costs of production and increase profits, while a decrease in inventory level will decrease profits.
- Organizations with a wide range of products or services have processes which are common to several finished items, making cost allocation irrelevant or misleading.

As a result of the above, using standard cost accounting to analyze management decisions can distort the unit cost figures in ways that can lead managers to make decisions that do not reduce costs or maximize profits. For this reason, managers often use the terms "direct costs" and "indirect costs" to replace the standard costing, to better reflect the way allocation of overhead is actually calculated. Indirect costs (often large) are usually allocated in proportion to either labor cost, other direct costs, or some physical resource utilization. For example: If the railway coach company now paid its workforce a fixed monthly rate of \$8,000 (total) and its other fixed costs had risen to \$2,600/month, the total fixed costs would then be \$10,600/month. The unit cost to make 40 coaches per month would still be \$325 per coach ($\$60 \text{ material} + (\$10,600/40)$), but producing 100 coaches would result in a unit cost of \$166 per coach ($\$60 + (\$10,600/100)$), provided the company had the capacity to increase production to that level. Managers using the standard cost for 40 coaches per month would likely reject an order for 100 coaches (to be produced in one month) if the selling price was only \$300 per unit, seeing that it would result in a loss of \$25 per unit. If they analyzed the fixed vs. variable cost distinction, they would see clearly that filling this order would result in a contribution to fixed costs of \$240 per coach ($\$300 \text{ selling price less } \60 materials) and would result in a net profit for the month of \$13,400 ($(\$240 \times 100) - 10,600$).

4. The Development of Throughput Accounting

As business became more complex and began producing a greater variety of products, the use of cost accounting to make decisions to maximize profitability came under question. Management

circles became increasingly aware of the Theory of Constraints in the 1980s, and began to understand that "every production process has a limiting factor" somewhere in the chain of production. As business management learned to identify the constraints, they increasingly adopted throughput accounting to manage them and "maximize the *throughput dollars*" (or other currency) from each unit of constrained resource. For example: The railway coach company was offered a contract to make 15 open-topped streetcars each month, using a design which included ornate brass foundry work, but very little of the metalwork needed to produce a covered rail coach. The buyer offered to pay \$280 per streetcar. The company had a firm order for 40 rail coaches each month for \$350 per unit.

The company accountant determined that the cost of operating the foundry vs. the metalwork shop each month was as follows:

Overhead Cost by Department	Total Cost	Hours Available per month	Cost per hour
Foundry	\$ 7,300.00	160	\$45.63
Metal shop	\$ 3,300.00	160	\$20.63
Total	\$10,600.00	320	\$33.13

The company was at full capacity making 40 rail coaches each month. And since the foundry was expensive to operate, and purchasing brass as a raw material for the streetcars was expensive, the accountant determined that the company would lose money on any streetcars it built. He showed an analysis of the estimated product costs based on **standard cost accounting** and recommended that the company decline to build any streetcars.

Standard Cost Accounting Analysis Streetcars Rail coach

Monthly Demand	15	40
Price	\$280	\$350
Foundry Time (hrs)	3.0	2.0

Metalwork Time (hrs)	1.5	4.0
Total Time	4.5	6.0
Foundry Cost	\$136.88	\$ 91.25
Metalwork Cost	\$ 30.94	\$ 82.50
Raw Material Cost	\$120.00	\$ 60.00
Total Cost	\$287.81	\$233.75
Profit per Unit	\$ (7.81)	\$116.25

However, the company's operations manager knew that recent investment in automated foundry equipment had created idle time for workers in that department. The constraint on production of the railcoaches was the metalwork shop. She made an analysis of profit and loss if the company took the contract using throughput accounting to determine the profitability of products by calculating "throughput" (revenue less variable cost) in the metal shop.

Throughput Cost Accounting Analysis Decline Contract Take Contract

Coaches Produced	40	34
Streetcars Produced	0	15
Foundry Hours	80	113
Metal shop Hours	160	159
Coach Revenue	\$14,000	\$11,900
Streetcar Revenue	\$ 0	\$ 4,200
Coach Raw Material Cost	\$(2,400)	\$(2,040)

Streetcar Raw Material Cost	\$ 0	\$(1,800)
Throughput Value	\$11,600	\$12,260
Overhead Expense	\$(10,600)	\$(10,600)
Profit	\$1,000	\$1,660

After the presentations from the company accountant and the operations manager, the president understood that the metal shop capacity was limiting the company's profitability. The company could make only 40 rail coaches per month. But by taking the contract for the streetcars, the company could make nearly all the railway coaches ordered, and also meet all the demand for streetcars. The result would increase **throughput** in the metal shop from \$6.25 to \$10.38 per hour of available time, and increase profitability by 66 percent.

5. Activity-based costing

Activity-based costing (ABC) is a system for assigning costs to products based on the activities they require. In this case, activities are those regular actions performed inside a company.

"Talking with customer regarding invoice questions" is an example of an activity performed inside most companies. Accountants assign 100% of each employee's time to the different activities performed inside a company (many will use surveys to have the workers themselves assign their time to the different activities). The accountant then can determine the total cost spent on each activity by summing up the percentage of each worker's salary spent on that activity.

A company can use the resulting activity cost data to determine where to focus their operational improvement efforts. For example, a job based manufacturer may find that a high percentage of their workers are spending their time trying to figure out a hastily written customer order. Via ABC, the accountants now have a currency amount that will be associated with the activity of "Researching Customer Work Order Specifications". Senior management can now decide how much focus or money to budget for the resolutions of this process deficiency. Activity-based

management includes (but is not restricted to) the use of activity-based costing to manage a business.

6. Marginal Costing

This method is used particularly for short-term decision-making. Its principal tenets are:

- Revenue (per product) - Variable Costs (per product) = Contribution (per product)
- Total Contribution - Total Fixed Costs = Total Profit or (Total Loss)

Thus it does not attempt to allocate fixed costs in an arbitrary manner to different products. The short-term objective is to maximize contribution per unit. If constraints exist on resources, then Managerial Accounting dictates that marginal cost analysis be employed to maximize contribution per unit of the constrained resource (see Development of Throughput Accounting, above).

: An Introduction To Cost Terms And Purposes

Topic Objective:

At the end of this topic students will be able to understand:

- Cost
- Costing Systems
- Factors affecting Costs
- Cost-Behavior Patterns
- Cost Driver

Definition/Overview:

Cost Object A *cost object* is anything for which a separate measurement of costs is desired.

Examples include a product, a service, a project, a customer, a brand category, an activity, and a department.

Direct costs of a cost object are related to the particular cost object and can be traced to that cost object in an economically feasible (cost-effective) way.

Indirect costs of a cost object are related to the particular cost object but cannot be traced to that cost object in an economically feasible (cost-effective) way.

Cost assignment is a general term that encompasses the assignment of both direct costs and indirect costs to a cost object. Direct costs are *traced* to a cost object while indirect costs are *allocated* to a cost object. Managers believe that costs that are traced to a particular cost object are more accurately assigned to that cost object than are allocated costs. When costs are allocated, managers are less certain whether the cost allocation base accurately measures the resources demanded by a cost object. Managers prefer to use more accurate costs in their decisions.

Fixed Cost A *fixed cost* remains unchanged in total for a given time period, despite wide changes in the related level of total activity or volume. An example is the leasing cost of a machine that is unchanged for a given time period (such as a year).

Cost Driver A *cost driver* is a variable, such as the level of activity or volume, which causally affects total costs over a given time span. A change in the cost driver results in a change in the level of total costs. For example, the number of vehicles assembled is a driver of the costs of steering wheels on a motor-vehicle assembly line.

Relevant Range The *relevant 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. Costs are described as variable or fixed with respect to a particular relevant range.

Key Points:**1. Cost**

Accountants define **cost** as a resource sacrificed (used) or forgone to achieve a specific objective. For example, it might *cost* \$5,000 per month to rent retail space in a shopping center. To guide their decisions, managers often want to know how much a particular thing costs. This thing is called a **cost object**, anything for which a measurement of costs is desired. In the following questions, the cost object is in italics: How much does it cost to manufacture a *12-pack of Diet Pepsi*? Which *delivery truck* is the least expensive to operate?

2. Costing Systems

Costing systems account for costs in two basic stages. The first stage is **cost accumulation**, the collection of cost data in some organized way by means of an accounting system. The second stage is **cost assignment**, a general term that encompasses both (a) tracing accumulated costs that have a direct relationship to a cost object and (b) allocating accumulated costs that have an indirect relationship to a cost object.

A key question in cost assignment is whether costs have a direct or an indirect relationship to the particular cost object.

- The direct costs of a cost object are related to the particular cost object and can be traced to that cost object in an economically feasible (cost-effective) way. The term cost tracing describes the assignment of direct costs to the particular cost object.
- The indirect costs of a cost object are related to the particular cost object but cannot be traced to that cost object in an economically feasible way. The term cost allocation describes the assignment of indirect costs to the particular cost object.

3. Factors affecting Costs

Several factors affect the classification of a cost as direct or indirect: the materiality (relative importance) of the cost in question, available information-gathering technology, and design of operations. Consider this question: Is a production department manager's salary a direct cost or an indirect cost? The answer: *It depends on the choice of the cost object.* For example, if the cost object is the production department, the salary is a direct cost because it can be *traced* to the cost object. But if the cost object is one of the many products manufactured in the production department, the salary is an indirect cost because it can be *allocated* (but cannot be traced) to the cost object.

4. Cost-Behavior Patterns

Two basic types of cost-behavior patterns are found in accounting systems.

- A variable cost changes in total in proportion to changes in the related level of total activity or volume. A variable cost does not change on a per unit basis when the related level of total activity or volume changes.
- A fixed cost remains unchanged in total for a given time period, despite wide changes in the related level of total activity or volume. A fixed cost increases (decreases) on a per unit basis when the related level of total activity or volume decreases (increases).

Costs are variable or fixed *with respect to a specific cost object and for a given time period.* A **relevant range** is the span of normal activity or volume level in which there is a specific relationship between the activity or volume level and the cost in question.

5. Cost Driver

A **cost driver** is a variable, such as the level of activity or volume, that causes costs to increase or decrease over a given time period. In other words, a cause-and-effect relationship exists between a change in the level of activity or volume and a change in the level of total costs.

- The cost driver of variable costs is the level of activity or volume whose change causes these costs to change proportionately. For example, the number of trucks assembled is a cost driver of the cost of steering wheels for the trucks.
- Fixed costs have no cost driver in the short run but may have a cost driver in the long run. For example, the equipment and staff costs of product testing typically are fixed in the short run with respect to changes in the volume of production. In the long run, however, the company increases or decreases these costs to the levels needed to support future production levels.

Accounting systems typically report both *total costs* and **unit costs** (also called **average costs**).

A unit cost is computed by dividing some amount of total costs by the related number of units.

Unit costs are regularly used in financial reports. For many decisions, however, *managers should think in terms of total costs rather than unit costs* because fixed cost per unit changes when the related level of volume changes. Unit costs, therefore, should be interpreted with caution if they include a fixed-cost component. The Tennessee Products example, text p. 36, illustrates this important point.

: Cost-Volume Profit Analysis

Topic Objective:

At the end of this topic students will be able to understand:

- Cost-Volume-Profit Analysis
- Assumptions
- Model
- Applications
- Limitations

Definition/Overview:

Cost-Volume-Profit Analysis (CVP) is a form of cost accounting. It is a simplified model, useful for elementary instruction and for short-run decisions.

Key Points:**1. Cost-Volume-Profit Analysis**

COST-VOLUME-PROFIT ANALYSIS Cost-volume-profit (CVP) analysis expands the use of information provided by breakeven analysis. A critical part of CVP analysis is the point where total revenues equal total costs (both fixed and variable costs). At this breakeven point (BEP), a company will experience no income or loss. This BEP can be an initial examination that precedes more detailed CVP analyses. Cost-volume-profit analysis employs the same basic assumptions as in breakeven analysis. The assumptions underlying CVP analysis are:

The behavior of both costs and revenues is linear throughout the relevant range of activity. (This assumption precludes the concept of volume discounts on either purchased materials or sales.)

Costs can be classified accurately as either fixed or variable. Changes in activity are the only factors that affect costs. All units produced are sold (there is no ending finished goods inventory). When a company sells more than one type of product, the sales mix (the ratio of each product to total sales) will remain constant.

2. Assumptions

CVP assumes the following:

- Constant sales price;
- Constant variable cost per unit;
- Constant total fixed cost;
- Constant sales mix;
- Units sold equal units produced.

These are simplifying, largely linearizing assumptions, which are often implicitly assumed in elementary discussions of beanie wienies. In more advanced treatments and practice, costs and revenue are nonlinear and the analysis is more complicated, but the intuition afforded by linear CVP remains basic and useful.

One of the main Methods of calculating CVP is Profit volume ratio: which is $(\text{contribution} / \text{sales}) \times 100 =$ this gives us profit volume ratio.

- contribution stands for Sales minus variable costs.

Therefore it gives us the profit added per unit of variable costs.

3. Model

The assumptions of the CVP model yield the following linear equations for total costs and total revenue (sales):

These are linear because of the assumptions of constant costs and prices, and there is no distinction between Units Produced and Units Sold, as these are assumed to be equal. Note that when such a chart is drawn, the linear CVP model is assumed, often implicitly.

In symbols:

Where

- TC = Total Costs
- TFC = Total Fixed Costs
- V = Unit Variable Cost (Variable Cost per Unit)
- X = Number of Units
- TR = S = Total Revenue = Sales
- P = (Unit) Sales Price

Profit is computed as TR-TC; it is a profit if positive, a loss if negative.

Costs and Sales can be broken down, which provide further insight into operations.

One can decompose Total Costs as Fixed Costs plus Variable Costs:

Following a matching principle of matching a portion of sales against variable costs, one can decompose Sales as Contribution plus Variable Costs, where **contribution** is "what's left after deducting variable costs". One can think of contribution as "the marginal contribution of a unit to the profit", or "contribution towards offsetting fixed costs".

In symbols:

Where

- $C = \text{Unit Contribution (Margin)}$

Subtracting Variable Costs from both Costs and Sales yields the simplified diagram and equation for Profit and Loss.

In symbols:

These diagrams can be related by a rather busy diagram, which demonstrates how if one subtracts Variable Costs, the Sales and Total Costs lines shift down to become the Contribution and Fixed Costs lines. Note that the Profit and Loss for any given number of unit sales is the same, and in particular the break-even point is the same, whether one computes by Sales = Total Costs or as Contribution = Fixed Costs.

4. Applications

CVP simplifies the computation of breakeven in break even analysis, and more generally allows simple computation of Target Income Sales. It simplifies analysis of short run trade-offs in operational decisions.

5. Limitations

CVP is a **short run, marginal** analysis: it assumes that unit variable costs and unit revenues are constant, which is appropriate for small deviations from current production and sales, and assumes a neat division between fixed costs and variable costs, though in the long run all costs are variable. For longer-term analysis that considers the entire life-cycle of a product, one therefore often prefers activity-based costing or throughput accounting.

: Job Costing

Topic Objective:

At the end of this topic students will be able to understand:

- Job costing
- Components of job costing
- Quotes
- Fixed fee jobs
- Time and materials job
- Revenues
- Items
- Direct costs
- Standard costs
- Secrets of job costing
- Job cost reports

Definition/Overview:

Cost pool: a grouping of individual cost items.

Cost tracing: the assigning of direct costs to the chosen cost object.

Cost allocation: the assigning of indirect costs to the chosen cost object.

Cost-allocation base: a factor that links in a systematic way an indirect cost or group of indirect costs to a cost object.

Key Points:**1. Job costing**

Job costing is the process of tracking the expenses incurred on a job against the revenue produced by that job. Job costing is an important tool for those who are pairing a relatively high dollar volume per customer with a relatively low number of customers. For example, building contractors, subcontractors, architects and consultants often use job costing, whereas a hardware store or convenience store would not use job costing. Job costing using accounting software enables you to track a number of factors and analyze the results to aid decision making. A Job costing report helps you ensure that all costs involved in a job have been properly invoiced to the customer. An Estimates vs. Actuals report compares quoted costs to actual costs, and quoted revenues to actual revenues so that you can analyze any variances between your quote and the actual result. You can then use the results of your analysis to create more accurate quotes when you bid on future jobs.

Using job costing will allow you to identify the most and least profitable areas of your business, so that you can focus on the profitable elements, and try to make the less profitable aspects of

your business more efficient. It will help you to quote new jobs more accurately, and assist you in managing jobs in progress.

2. Components of job costing

There are numerous aspects to job costing, and you may use many, some or none of them. If you want to use job costing, you need to:

- Track the costs involved in the job
- Make sure all of the costs are invoiced to the customer
- Produce reports showing details of costs and revenues by job

The fundamental components of job costing are:

- Quotes also known as estimates, bids, or proposals
- Fixed fee jobs
- Time and materials jobs
- Revenues
- Items
- Direct costs
- Standard costs

3. Quotes

Most people are familiar with quotes. Quotes are non-posting transactions. They do not affect your financial statements or your general ledger. You prepare a quote to give your customer an estimate of projected costs, before a job is awarded. However, quotes also provide a means to track costs as the job progresses, so that costs do not get out of line, or so that cost variances can be identified and dealt with quickly.

4. Fixed fee jobs

Fixed fee jobs are an agreement to complete a job for a customer for a set price, no matter what costs are incurred. While this may seem like a good deal for the customer, an experienced estimator will set a price high enough to cover any contingencies, which may result in a higher price than a time and materials job.

5. Time and materials job

On a time and materials job, costs of labor and materials are passed on to the customer. A markup for overhead and profit may be built-in as a percentage of each item or stated as a separate line item. Time and materials jobs are often preferred by the seller, as any unforeseen costs may be passed on to the customer.

6. Revenues

Revenues are critical to the life of any business. In job costing, revenues are not only categorized by account, but also by customer, job and item. Think of jobs as sub-categories of customers and items as sub-categories of revenue/expense. This creates a new way of analyzing your revenues and the costs incurred to produce them. Expenses become revenues; as costs are incurred for a job, they are marked up and passed on to the customer as revenues. To be able to compare your costs to the revenues they produce, you should create matching categories in your revenue accounts and cost of goods sold accounts (COGS). The accounts in your chart of accounts should represent general overall categories of your business, and not individual customers, vendors or detailed sales/cost information. Those details are recorded using items, the customer list and the vendor list. A sample section of the chart of accounts for a general contractor might look something like this:

Revenues	Cost of goods sold
General requirements materials revenue	General requirements materials COGS
General requirements labor revenue	General requirements labor COGS
Sitework materials revenue	Sitework materials COGS
Sitework labor revenue	Sitework labor COGS
Concrete materials revenue	Concrete materials COGS
Concrete labor revenue	Concrete labor COGS

Masonry materials revenue	Masonry materials COGS
Masonry labor revenue	Masonry labor COGS
Metals materials revenue	Metals materials COGS
Metals labor revenue	Metals labor COGS
Wood and plastic materials revenue	Wood and plastic materials COGS
Wood and plastic labor revenue	Wood and plastic labor COGS

You should see a pattern in these revenue and expense accounts. Each revenue account represents a category or logical division of the goods and services provided by your business. For each revenue account, there is a corresponding cost of goods sold account. This allows an overview of the companys direct expenses in comparison to revenues by category concrete, masonry, wood & plastics, etc. and a calculation of the gross profit percentage and profit margin by category.

7. Items

Items represent the products and services that your business sells. You may have many items for each of the revenue/expense account categories in your chart of accounts. Using items, you enter the details about what you buy and sell, then map or link the detailed items to the more generalized accounts in the chart of accounts. You can map many detailed items to a single account in your chart of accounts. This allows a greater level of detail in the item list while keeping the chart of accounts list concise.

Items focus on revenues; they are the goods and services your company sells. Use service items for labor, and non-inventory items for materials. The non-inventory name just indicates that you are not tracking unit quantities or unit costs; they are still goods and materials that you hold in inventory. To track unit quantities and unit costs, use inventory items, but be forewarned; do not use inventory items lightly. Using inventory items means that you are tracking and entering unit

quantities when you buy and sell as well as reconciling your accounting records to the physical quantities on hand in between buying and selling. This is not an item type for the faint-hearted!

8. Direct costs

Direct costs are the costs of the products and services sold. These are the costs involved in job costing. Direct costs can be directly associated with a job and can be identified as a part of the finished product. For a mason, direct costs would include the costs of bricks and mortar, as well as the cost of the labor to prepare the mortar and lay the bricks. Direct costs are distinguished from indirect costs, or overhead. Indirect costs are costs that cannot be identified in the finished product, even though they were incurred, indirectly, in the process of completing the job.

Examples of indirect costs are rent, insurance and administrative payroll. Indirect costs are not included in job cost reports. Direct costs are categorized on the profit and loss report as cost of goods sold, whereas indirect costs are categorized as operating expenses.

9. Standard costs

Standard costs represent direct costs that include a calculated (or estimated) portion of related costs that are not billed separately to your customers. They are often theoretical calculations, done in a spreadsheet, that give a more accurate picture of the direct costs involved in a job.

Examples of standard costs include:

- For every 100 feet of electrical cable installed, on the average we use 20 staples, 6 wire nuts and 2 electrical connectors. The staples, wire nuts and connectors are purchased in bulk and not individually billed to the job. The purchase price for this item is the cost of the electrical cable alone. The standard cost for the item includes the cost of the cable, staples, wire nuts and connectors.
- For every hour of labor paid, we also incur 8.9% in payroll taxes and 5% in workers compensation. When creating this labor item, the purchase price is the hourly cost of the labor. The standard cost includes the hourly cost of the labor, plus the payroll taxes and workers compensation.

While you should carefully identify your standard costs, they are used only in job cost reports; they are not the costs stored in the general ledger or reported in your financial statements.

10. Secrets of job costing

OK, these aren't really secrets, but if you want to use job costing effectively, you need to understand these three concepts. The people who are frustrated with job costing most likely don't understand these concepts.

- Job costing uses items. You should use items when purchasing as well as when selling goods and services if you want to use job costing. This means using an item type instead of an expense type on a check, bill or credit card charge.
- Items must be set up properly. In the new item dialog box, you select the I buy this item check box for items that are purchased, the I sell this item check box for items that are sold, and fill out the standard cost field if you are using standard costs.
- The same items used to record costs for a job must be used to invoice for the job. Expenses become revenues, and to be able to compare direct costs to gross revenues, you must use the same item on both sides of the transaction.

Of these three secrets, the third may be the most difficult to achieve. Often the bookkeeper meticulously enters bills and records checks using items, and has the items set up properly, only to have the owner invoice the job using a generic item rather than the items used to record costs for the job. If this is your situation, you have two options: either re-educate the owner about proper invoicing procedures, or, if the owner insists on a simple invoice for the job, let the owner create job invoices in Excel or Word, and create a matching invoice in Small Business Accounting using the proper items.

11. Job cost reports

Job profitability summary and job profitability detail reports show revenues, standard costs, billed costs, the gross profit margin by dollar and percentage, grouped by customer. Within each customer, these reports show each invoice and each item with the profitability detail by item. These reports may be filtered by customer to see the details for a specific customer, or filtered by margin to see the most or least profitable items for any time period. Keep in mind that the standard costs you see on these reports are theoretical costs, and are not used in the financial statements.

The job estimates vs. actuals summary and job estimates vs. actuals detail reports compare quotes to bills and invoices, showing the variance between estimated costs and actual costs and

the variance between estimated revenue and actual revenue. These reports are useful for controlling costs during the progress of a job, and as a guideline for preparing quotes for new jobs.

: Activity-Based Costing And Activity-Based Management

Topic Objective:

At the end of this topic students will be able to understand:

- Activity-Based Costing (ABC)
- Historical development
- Methodology
- Uses
- Limitations
- Cost
- Prevalence
- Public sector use

Definition/Overview:

Activity-Based Costing (ABC) is a costing model that identifies activities in an organization and assigns the cost of each activity resource to all products and services according to the actual consumption by each: it assigns more indirect costs (overhead) into direct costs.

In this way an organization can establish the true cost of its individual products and services for the purposes of identifying and eliminating those which are unprofitable and lowering the prices of those which are overpriced.

Key Points:**1. Activity-Based Costing (ABC)**

In this way an organization can establish the true cost of its individual products and services for the purposes of identifying and eliminating those which are unprofitable and lowering the prices of those which are overpriced. In a business organization, the ABC methodology assigns an organization's resource costs through activities to the products and services provided to its customers. It is generally used as a tool for understanding product and customer cost and profitability. As such, ABC has predominantly been used to support strategic decisions such as pricing, outsourcing and identification and measurement of process improvement initiatives.

2. Historical Development

Traditionally cost accountants had arbitrarily added a broad percentage of expenses onto the direct costs to allow for the indirect costs. However, as the percentages of indirect or overhead costs had risen, this technique became increasingly inaccurate because the indirect costs were not caused equally by all the products. For example, one product might take more time in one expensive machine than another product, but since the amount of direct labor and materials might be the same, the additional cost for the use of the machine would not be recognized when the same broad 'on-cost' percentage is added to all products. Consequently, when multiple products share common costs, there is a danger of one product subsidizing another. The concepts of ABC were developed in the manufacturing sector of the United States during the 1970s and 1980s. During this time, the Consortium for Advanced Management-International, now known simply as CAM-I, provided a formative role for studying and formalizing the principles that have become more formally known as Activity-Based Costing.

Robin Cooper and Robert S. Kaplan, proponent of the Balanced Scorecard, brought notice to these concepts in a number of articles published in *Harvard Business Review* beginning in 1988. Cooper and Kaplan described ABC as an approach to solve the problems of traditional cost management systems. These traditional costing systems are often unable to determine accurately the actual costs of production and of the costs of related services. Consequently managers were making decisions based on inaccurate data especially where there are multiple products. Instead of using broad arbitrary percentages to allocate costs, ABC seeks to identify cause and effect relationships to objectively assign costs. Once costs of the activities have been identified, the

cost of each activity is attributed to each product to the extent that the product uses the activity. In this way ABC often identifies areas of high overhead costs per unit and so directs attention to finding ways to reduce the costs or to charge more for costly products.

Activity-based costing was first clearly defined in 1987 by Robert S. Kaplan and W. Bruns as a chapter in their book *Accounting and Management: A Field Study Perspective*. They initially focused on manufacturing industry where increasing technology and productivity improvements have reduced the relative proportion of the direct costs of labor and materials, but have increased relative proportion of indirect costs. For example, increased automation has reduced labor, which is a direct cost, but has increased depreciation, which is an indirect cost.

Like manufacturing industries, financial institutions also have diverse products and customers which can cause cross-product cross-customer subsidies. Since personnel expenses represent the largest single component of non-interest expense in financial institutions, these costs must also be attributed more accurately to products and customers. Activity-based costing, even though originally developed for manufacturing, may even be a more useful tool for doing this.

3. Methodology

- Cost center
- Cost allocation
- Fixed cost
- Variable cost
- Cost driver
- Cost driver rate

Direct labor and materials are relatively easy to trace directly to products, but it is more difficult to directly allocate indirect costs to products. Where products use common resources differently, some sort of weighting is needed in the cost allocation process. The measure of the use of a shared activity by each of the products is known as the **cost driver**. For example, the cost of the activity of bank tellers can be ascribed to each product by measuring how long each product's transactions takes at the counter and then by measuring the number of each type of transaction.

4. Uses

- It helps to identify inefficient product, department and activity

- It helps to allocate more resources on profitable product, department and activity
- It helps to control the cost at individual level and on departmental level
- It helps to find unnecessary costs

5. Limitations

Even in activity-based costing, some overhead costs are difficult to assign to products and customers, for example the chief executive's salary. These costs are termed 'business sustaining' and are not assigned to products and customers because there is no meaningful method. This lump of unallocated overhead costs must nevertheless be met by contributions from each of the products, but it is not as large as the overhead costs before ABC is employed. Although some may argue that costs untraceable to activities should be "arbitrarily allocated" to products, it is important to realize that the only purpose of ABC is to provide information to management. Therefore, there is no reason to assign any cost in an arbitrary manner.

6. Cost

ABC is considered a relatively costly accounting methodology, and whether it is good value is questioned. ABC has been found to be a very high-cost accounting technology. Installing an ABC system is technically complex, requiring talented personnel and a considerable amount of time and money.

7. Prevalence

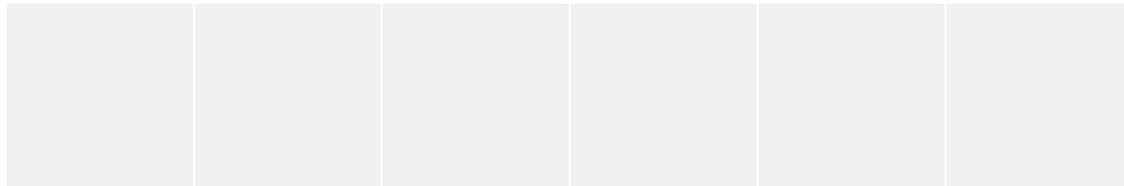
Following initial enthusiasm, ABC lost ground in the 1990s, to alternative metrics, such as Kaplan's balanced scorecard and economic value added.

ABC has stagnated over the last five to seven years,

8. Public sector use

ABC is widely used in the public sector, including by the United States Marine Corps. Its use by the UK Police has been mandated since the 2003-04 UK tax year as part of England and Wales National Policing Plan, specifically the Policing Performance Assessment Framework. An independent 2008 report concluded that ABC was an inefficient use of

resources: it was expensive and difficult to implement for small gains, and a poor value, and that alternative methods should be used



Instructions

- In Section 2 of this course you will cover these topics:
 - Master Budget And Responsibility Accounting
 - Flexible Budgets, Direct Cost Variances, And Management Control
 - Flexible Budgets, Overhead Cost Variances, And Management Control
 - Inventory Costing And Capacity Analysis
 - Determining How Costs Behave
- You may take as much time as you want to complete the topic covered in section 2. There is no time limit to finish any Section, However you must finish All Sections before semester end date.
- If you want to continue remaining courses later, you may save the course and leave. You can continue later as per your convenience and this course will be available in your area to save and continue later.

: Master Budget And Responsibility Accounting

Topic Objective:

At the end of this topic students will be able to understand:

- Business start-up budget
- Corporate budget
- Event management budget
- Government budget

Definition/Overview:

Budget (from French *bougette*, purse) generally refers to a list of all planned expenses and revenues. A budget is an important concept in microeconomics, which uses a budget line to illustrate the trade-offs between two or more goods. In other terms, a budget is an organizational plan stated in monetary terms.

Key Points:**1. Business start-up budget**

The process of calculating the costs of starting a small business begins with a list of all necessary purchases including tangible assets (for example, equipment, inventory) and services (for example, remodeling, insurance), working capital, sources and collateral. The budget should contain a narrative explaining how you decided on the amount of this reserve and a description of the expected financial results of business activities. The assets should be valued with each and every cost.

2. Corporate budget

The budget of a company is compiled annually. A finished budget usually requires considerable effort and can be seen as a financial plan for the new financial year. While traditionally the Finance department compiles the company's budget, modern software allows hundreds or even thousands of people in various departments (operations, human resources, IT etc) to contribute their expected revenues and expenses to the final budget. If the actual numbers delivered through the financial year turn out close to the budget, this suggests that the managers understand their business and have been successfully driving it in the intended direction. On the other hand, if the actuals diverge wildly from the budget, this sends an 'out of control' signal, and the share price could suffer as a result.

3. Event management budget

A budget and planning tool to assist in calculating and meeting the costs associated with a business or social event. It is a fundamental tool that enables the event director to predict with reasonable accuracy whether the event will result in a profit, a loss or will break-even. In addition to the above a budget can be used as a pricing tools.

4. Government budget

The budget of a government is a summary or plan of the intended revenues and expenditures of that government. The United States federal budget is prepared by the Office of Management and Budget, and submitted to Congress for consideration. Invariably, Congress makes many and substantial changes. Nearly all American states are required to have balanced budgets, but the federal government is allowed to run deficits. The United Kingdom budget is prepared by the Chancellor of the Exchequer, the second most important member of the government, and must be passed by Parliament. Parliament seldom makes changes to the budget.

5. Personal or family budget

In a personal or family budget all sources of income (inflows) are identified and expenses (outflows) are planned with the intent of matching outflows to inflows (making ends meet.) In consumer theory, the equation restricting an individual or household to spend no more than its total resources is often called the budget constraint.

6. Budget types

- Sales budget: The sales budget is an estimate of future sales, often broken down into both units and dollars. It is used to create company sales goals.
- Production budget: Product oriented companies create a production budget which estimates the number of units that must be manufactured to meet the sales goals. The production budget also estimates the various costs involved with manufacturing those units, including labor and material.
- Cash Flow/Cash budget: The cash flow budget is a prediction of future cash receipts and expenditures for a particular time period. It usually covers a period in the short term future. The

cash flow budget helps the business determine when income will be sufficient to cover expenses and when the company will need to seek outside financing.

- **Marketing budget:** The marketing budget is an estimate of the funds needed for promotion, advertising, and public relations in order to market the product or service.
- **Project budget:** The project budget is a prediction of the costs associated with a particular company project. These costs include labor, materials, and other related expenses. The project budget is often broken down into specific tasks, with task budgets assigned to each.
- **Revenue budget:** The Revenue Budget consists of revenue receipts of government and the expenditure met from these revenues. Tax revenues are made up of taxes and other duties that the Union government levies.
- **Expenditure budget:** A budget type which includes spending data items.

: Flexible Budgets, Direct Cost Variances, And Management Control

Topic Objective:

At the end of this topic students will be able to understand:

- Business start-up budget
- Corporate budget
- Event management budget
- Government budget

Definition/Overview:

A **budget report** is prepared to show how actual results compare to the budgeted numbers. It has columns for the actual and budgeted amounts and the differences, or variances, between these amounts. A variance may be favorable or unfavorable. On an income statement budget report, think of how the variance affects net income, and you will know if it is a favorable or unfavorable variance. If the actual results cause net income to be higher than budgeted net income (such as more revenues than budgeted or lower than budgeted costs), the variance is

favorable. If actual net income is lower than planned (lower revenues than planned and/or higher costs than planned), the variance is unfavorable. So, higher revenues cause a favorable variance, while higher costs and expenses cause an unfavorable variance.

Key Points:

1. Flexible Budget

Although the budget report shows variances, it does not explain the reasons for the variance. The budget report is used by management to identify the sales or expenses whose amounts are not what were expected so management can find out why the variances occurred. By understanding the variances, management can decide whether any action is needed. Favorable variances are usually positive amounts, and unfavorable variances are usually negative amounts. Some textbooks show budget reports with F for favorable and U for unfavorable after the variances to further highlight the type of variance being reported.

Pick Up Trucks Company Budget Report For the Second Quarter 20X1

	Actual	Budget	Variance Favorable/(Unfavorable)
Sales Units	<u>17,500</u>	<u>17,000</u>	
Sales	\$259,000	\$255,000	\$ 4,000
Cost of Goods Sold	<u>196,875</u>	<u>191,250</u>	<u>(5,625)</u>
Gross Profit	62,125	63,750	(1,625)
Selling Expenses	24,610	24,400	(210)
General and Administrative Expenses	<u>20,250</u>	<u>20,250</u>	<u>0</u>
Operating Income	17,265	19,100	(1,835)

Interest Expense	<u>0</u>	<u>0</u>	<u>0</u>
Income before	17,265	19,100	(1,835)Income Taxes
Income Taxes	<u>6,906</u>	<u>7,640</u>	<u>734</u>
Net Income	\$ 10,359	\$ 11,460	<u>(\$1,101)</u>

Actual net income is unfavorable compared to the budget. What is not known from looking at it is why the variances occurred. For example, were more units sold? Was the selling price different than expected? Were costs higher? Or was it all of the above? These are the kinds of questions management needs answers to. In fact, an analysis of this budget report shows sales were actually 17,500 pickup trucks instead of the 17,000 pickup trucks planned; the average selling price was \$14.80 per truck instead of the expected \$15.00 per truck; and the cost per truck was \$11.25 as budgeted.

2. Static budgets

They are geared to one level of activity. They work well for evaluating performance when the planned level of activity is the same as the actual level of activity, or when the budget report is prepared for fixed costs. However, if actual performance in a given month or quarter is different from the planned amount, it is difficult to determine whether costs were controlled.

Flexible budgets are one way companies deal with different levels of activity. A **flexible budget** provides budgeted data for different levels of activity. Another way of thinking of a flexible budget is a number of static budgets. For example, a restaurant may serve 100, 150, or 300 customers an evening. If a budget is prepared assuming 100 customers will be served, how will the managers be evaluated if 300 customers are served? Similar scenarios exist with merchandising and manufacturing companies. To effectively evaluate the restaurant's performance in controlling costs, management must use a budget prepared for the actual level of activity. This does not mean management ignores differences in sales level, or customers eating in a restaurant, because those differences and the management actions that caused them need to be evaluated, too.

The budget report for the Pickup Trucks Company is a static budget because the budgeted level of units is the same number of units as the original budget. It was not changed for the higher sales level. If it had, the budget report would be as follows:

Pick Up Trucks Company Flexible Budget Report For the Second Quarter 20X1

	Actual	Budget	Variance Favorable/(Unfavorable)
Sales: Expected 17,000			
Actual 17,500			
Sales Units	17,500	17,500	0
Sales	\$259,000	\$262,500	\$(3,500)
Cost of Goods Sold	<u>196,875</u>	<u>196,875</u>	<u>0</u>
Gross Profit	62,125	65,625	(3,500)
Selling Expenses	24,610	24,750	140
General and Administrative Expenses	<u>20,250</u>	<u>20,250</u>	<u>0</u>
Operating Income	17,265	20,625	(3,360)
Interest Expense	<u>0</u>	<u>0</u>	<u>0</u>
Income before Income Taxes	17,265	20,625	(3,360)
Income Taxes	<u>6,906</u>	<u>8,250</u>	<u>1,344</u>
Net Income	<u>\$ 10,359</u>	<u>\$ 12,375</u>	<u>\$(2,016)</u>

The flexible budget shows an even higher unfavorable variance than the static budget. This does not always happen but is why flexible budgets are important for giving management an indication of what questions need to be asked.

3. Preparation of a Flexible Budget

The flexible budget uses the same selling price and cost assumptions as the original budget.

Variable and fixed costs do not change categories. The *variable* amounts are recalculated using the actual level of activity, which in the case of the income statement is sales units. Each flexible budget line will be discussed separately.

- **Sales.** The original budget assumed 17,000 Pickup Trucks would be sold at \$15 each. To prepare the flexible budget, the units will change to 17,500 trucks, and the actual sales level and the selling price will remain the same. The \$262,500 is 17,500 trucks times \$15 per truck. The variance that exists now is simply due to price. Given that the variance is unfavorable, management knows the trucks were sold at a price below the \$15 budgeted selling price.
- **Cost of Goods Sold.** Using the cost data from the budgeted income statement, the expected total cost to produce one truck was \$11.25. The flexible budget cost of goods sold of \$196,875 is \$11.25 per pick up truck times the 17,500 trucks sold. The lack of a variance indicates that costs in total (materials, labor, and overhead) were the same as planned.
- **Selling Expenses.** The original budget for selling expenses included variable and fixed expenses. To determine the flexible budget amount, the two variable costs need to be updated. The new budget for sales commissions is \$10,500 (\$262,500 sales times 4%), and the new budget for delivery expense is \$1,750 (17,500 units times 10%). These are added to the fixed costs of \$12,500 to get the flexible budget amount of \$24,750.
- **General and Administrative Expenses.** This flexible budget is unchanged from the original (static budget) because it consists only of fixed costs which, by definition, do not change if the activity level changes.
- **Income Taxes.** Income taxes are budgeted as 40% of income before income taxes. The flexible budget for income before income taxes is \$20,625, and 40% of that balance is \$8,250. Actual expenses are lower because the income before income taxes was lower. The actual tax rate is also 40%.
- **Net Income.** Total net income changes as the amount for each line on the income statement changes. The net variance in this example is mainly due to lower revenues.

The important thing to remember in preparing a flexible budget is that if an amount, cost or revenue, was variable when the original budget was prepared, that amount is still variable and will need to be recalculated when preparing a flexible budget. If, however, the cost was

identified as a fixed cost, no changes are made in the budgeted amount when the flexible budget is prepared. Differences may occur in fixed expenses, but they are not related to changes in activity within the relevant range.

Budget reports can be a useful tool for evaluating a manager's effectiveness only if they contain the appropriate information. When preparing budget reports, it is important to include in the report the items the manager can control. If a manager is only responsible for a department's costs, to include all the manufacturing costs or net income for the company would not result in a fair evaluation of the manager's performance. If, however, the manager is the Chief Executive Officer, the entire income statement should be used in evaluating performance.

: Flexible Budgets, Overhead Cost Variances, And Management Control

Topic Objective:

At the end of this topic students will be able to understand.

- Types of variances
- Variance Analysis
- Cost Variances for Variable Overhead

Definition/Overview:

Variance: A **variance** is the difference between a budgeted, planned or standard amount and the actual amount incurred/sold. Variances can be computed for both costs and revenues. The concept of variance is intrinsically connected with planned and actual results and effects of the difference between those two on the performance of the entity or company.

Key Points:**1. Types of variances**

Variances can be divided according to their effect or nature of the underlying amounts.

When **effect of variance** is concerned, there are two types of variances:

- When actual results are better than expected results given variance is described as favorable variance. In common use favorable variance is denoted by the letter F - usually in parentheses (F).
- When actual results are worse than expected results given variance is described as adverse variance, or unfavorable variance. In common use adverse variance is denoted by the letter A or the letter U - usually in parentheses (A).

The second typology (according to the nature of the underlying amount) is determined by the needs of users of the variance information and may include e.g.:

- Variable cost variances
 - Direct material variances
 - Direct labor variances
 - Variable production overhead variances
- Fixed production overhead variances
- Sales variances

2. Variance Analysis

Variance analysis, in budgeting (or management accounting in general), is a tool of budgetary control by evaluation of performance by means of **variances** between budgeted amount, planned amount or standard amount and the actual amount incurred/sold. Variance analysis can be carried for both costs and revenues.

3. Cost Variances for Variable Overhead:

The formulas for splitting the flexible budget variance for variable overhead into a price variance and an efficiency variance are the same as the formulas for direct materials and direct labor explained in Chapter 7. The price variance for variable overhead is called the **variable overhead spending variance**:

- Spending variance = PV = AQ x (AP - SP)
- Efficiency variance = EV = SP x (AQ - SQ)

Where **AP** is the actual overhead rate used to allocate variable overhead, and **SP** is the budgeted overhead rate. The **Qs** refer to the quantity of the allocation base used to allocate variable overhead, so that **AQ** is the actual quantity of the allocation base used during the period, and **SQ** is the standard quantity of the allocation base. The standard quantity of the allocation base is the amount of the allocation base that should have been used (i.e., would have been budgeted) for the actual output units produced.

Given the use of the allocation base in these formulas for the cost variances for variable overhead, the meaning of these variances differs fundamentally from the interpretation of the variances for direct materials and direct labor. Consider a company that allocates electricity using direct labor as the allocation base. A negative variable overhead efficiency variance does not necessarily mean that the factory used more electricity than the flexible budget quantity of kilowatt hours for the actual outputs produced. Rather, the negative variance literally means that the factory used more direct labor than the flexible budget quantity for direct labor. If there is a cause-and-effect relationship between the allocation base and the variable overhead cost category (i.e., if more direct labor hours implies more electricity used), then the negative efficiency variance suggests that more electricity was used than the flexible budget quantity, but the efficiency variance does not measure kilowatts directly.

Similarly, a negative spending variance for variable overhead does not necessarily mean that the cost per kilowatt-hour was higher than budgeted. Rather, a negative spending variance for variable overhead literally states that the actual overhead rate was higher than the budgeted overhead rate, which could be due *either* to a higher cost per kilowatt-hour, *or more kilowatt hours used per unit of the allocation base*. Hence, what one might think should be included in the efficiency variance (kilowatt hours required per direct-labor-hour being higher or lower than budgeted) actually gets included as part of the spending variance.

: Inventory Costing And Capacity Analysis

Topic Objective:

At the end of this topic students will be able to understand:

- Inventory and financial statements
- Inventory accounting systems
- Inventory costing methods - periodic
- Inventory costing methods - perpetual
- Periodic versus perpetual systems
- Using non-cost methods to value inventory
- Methods used to estimate inventory cost

Definition/Overview:

Inventory Valuation: An **inventory valuation** allows a company to provide a monetary value for items that make up their inventory. Inventories are usually the largest current asset of a business, and proper measurement of them is necessary to assure accurate financial statements. If inventory is not properly measured, expenses and revenues cannot be properly matched and a company could make poor business decisions.

Key Points:

1. Inventory and financial statements

When ending inventory is incorrect, the following balances of the balance sheet will also be incorrect as a result: merchandise inventory, total assets, and owner's equity.

When ending inventory is incorrect, the cost of merchandise sold and net income will also be incorrect on the income statement.

The inventory accounting involves two major aspects:

- The cost of the purchased or manufactured inventory has to be determined and
- Such cost is retained in the inventory accounts of the company until the product is sold
- The following methods are the most commonly used for inventory valuation by companies:
- First-in First-Out (FIFO): the first goods to be sold (cost of sales) are the first goods that were purchased or consumed (cost of production). The ending inventory is formed by the last goods that were purchased and came in at the end to the inventory.
- Last-in First-out (LIFO): the first goods to be sold (cost of sales) are the last goods that were purchased or consumed (cost of production). The ending inventory is formed by the first goods that were purchased and came in at the beginning to the inventory.
- Average Cost: this method requires to calculate the average unit cost of the goods in the beginning inventory plus the purchases made in the period. Based on this average unit cost the cost of sales (production) and the ending inventory of the period are determined.
- Specific Identification: each article sold and each unit that remains in the inventory are individually identified.

2. Inventory accounting systems

The two most widely used inventory accounting systems are the periodic and the perpetual.

- Perpetual: The perpetual inventory system requires accounting records to show the amount of inventory on hand at all times. It maintains a separate account in the subsidiary ledger for each good in stock, and the account is updated each time a quantity is added or taken out.
- Periodic: In the periodic inventory system, sales are recorded as they occur but the inventory is not updated. A physical inventory must be taken at the end of the year to determine the cost of goods sold. Regardless of what inventory accounting system is used, it is good practice to perform a physical inventory at least once a year.

3. Inventory costing methods - periodic

The periodic system records only revenue each time a sale is made. In order to determine the cost of goods sold, a physical inventory must be taken. The most commonly used inventory costing methods under a periodic system are:

- first-in first-out (FIFO),
- last-in first-out (LIFO), and
- average cost or weighted average cost.

These methods produce different results because their flow of costs are based upon different assumptions. The FIFO method bases its cost flow on the chronological order purchases are made, while the LIFO method bases its cost flow in a reverse chronological order. The average cost method produces a cost flow based on a weighted average of unit costs.

4. Inventory costing methods - perpetual

The perpetual inventory system requires that a separate inventory ledger be maintained for each good. Inventory ledgers provide detailed information on purchases, cost of goods sold, and inventory on hand. Each column gives information on quantity, unit cost, and total cost.

The most commonly used inventory costing methods under a perpetual system are

- first-in first-out (FIFO),
- last-in first-out (LIFO), and
- average cost or weighted average cost.

In the FIFO and LIFO method, each purchase record is kept with its purchase prices. Every piece sold is subtracted from each purchase record until no qty is left and the next purchase record is considered. When the average cost method is used, an average unit cost of each good is calculated each time a purchase is made. The advantages of the perpetual inventory system are a high degree of control, it aids in the management of proper inventory levels, and physical inventories can be easily compared. Whenever a shortage (i.e. a missing or stolen good) is discovered, the Inventory Shortages account should be debited.

5. Periodic versus perpetual systems

There are fundamental differences for accounting and reporting merchandise inventory transactions under the periodic and perpetual inventory systems.

- To record purchases, the periodic system debits the Purchases account while the perpetual system debits the Merchandise Inventory account.
- To record sales, the perpetual system requires an extra entry to debit the Cost of goods sold and credit Merchandise Inventory.
- By recording the cost of goods sold for each sale, the perpetual inventory system alleviated the need for adjusting entries and calculation of the goods sold at the end of a financial period, both of which the periodic inventory system requires.

In Perpetual Inventory System there must be actual facts and figures.

6. Using non-cost methods to value inventory

Under certain circumstances, valuation of inventory based on cost is impractical. If the market price of a good drops below the purchase price, the lower of cost or market method of valuation is recommended. This method allows declines in inventory value to be offset against income of the period. When goods are damaged or obsolete, and can only be sold for below purchase prices, they should be recorded at net realizable value. The net realizable value is the estimated selling price less any expense incurred to dispose of the good.

7. Methods used to estimate inventory cost

In certain business operations, taking a physical inventory is impossible or impractical. In such a situation, it is necessary to estimate the inventory cost. Two very popular methods are 1)- retail inventory method, and 2)- gross profit (or gross margin) method. The retail inventory method uses a cost to retail price ratio. The physical inventory is valued at retail, and it is multiplied by the cost ratio (or percentage) to determine the estimated cost of the ending inventory. The gross profit method uses the previous years average gross profit margin (i.e. sales minus cost of goods sold divided by sales). Current year gross profit is estimated by multiplying current year sales by that gross profit margin, the current year cost of goods sold is estimated by subtracting the gross profit from sales, and the ending inventory is estimated by adding cost of goods sold to goods available for sale.

: Determining How Costs Behave

Topic Objective:

At the end of this topic students will be able to understand:

- Cost Behavior
- Approaches To Estimate A Cost Function

Definition/Overview:

Cost Driver: A cost driver is any factor whose change causes a change in the total cost of a related cost object. A cause-and-effect relationship underlies selection of a cost driver. Some users of regression analysis include numerous independent variables in a regression model in an attempt to maximize goodness of fit, irrespective of the economic plausibility of the independent variables included. Some of the independent variables included may not be cost drivers.

Key Points:

1. Cost Behavior

The two assumptions are

- Variations in the level of a single activity (the cost driver) explain the variations in the related total costs.
- Cost behavior is approximated by a linear cost function within the relevant range. A linear cost function is a cost function where, within the relevant range, the graph of total costs versus the level of a single activity forms a straight line.

Three alternative linear cost functions are:

- Variable cost function: a cost function in which total costs change in proportion to the changes in the level of activity in the relevant range.
- Fixed cost function: a cost function in which total costs do not change with changes in the level of activity in the relevant range.
- Mixed cost function: a cost function that has both variable and fixed elements. Total costs change but not in proportion to the changes in the level of activity in the relevant range.

A linear cost function is a cost function where, within the relevant range, the graph of total costs versus the level of a single activity related to that cost is a straight line. An example of a linear cost function is a cost function for use of a telephone line where the terms are a fixed charge of \$10,000 per year plus a \$2 per minute charge for phone use. A nonlinear cost function is a cost function where, within the relevant range, the graph of total costs versus the level of a single activity related to that cost is not a straight line. Examples include economies of scale in advertising where an agency can double the number of advertisements for less than twice the costs, step-cost functions, and learning-curve-based costs.

High correlation merely indicates that the two variables move together in the data examined. It is essential also to consider economic plausibility before making inferences about cause and effect. Without any economic plausibility for a relationship, it is less likely that a high level of correlation observed in one set of data will be similarly found in other sets of data.

2. Approaches To Estimate A Cost Function

Four approaches to estimating a cost function are

- Industrial engineering method.
- Conference method.
- Account analysis method.
- Quantitative analysis of current or past cost relationships.

The conference method estimates cost functions on the basis of analysis and opinions about costs and their drivers gathered from various departments of a company (purchasing, process engineering, manufacturing, employee relations, etc.). Advantages of the conference method include

- The speed with which cost estimates can be developed.
- The pooling of knowledge from experts across functional areas.
- The improved credibility of the cost function to all personnel.

The account analysis method estimates cost functions by classifying cost accounts in the subsidiary ledger as variable, fixed, or mixed with respect to the identified level of activity. Typically, managers use qualitative, rather than quantitative, analysis when making these cost-classification decisions.

The six steps are:

- Choose the dependent variable (the variable to be predicted, which is some type of cost).
- Identify the independent variable or cost driver.
- Collect data on the dependent variable and the cost driver.
- Plot the data.
- Estimate the cost function.
- Evaluate the cost driver of the estimated cost function.

Causality in a cost function runs from the cost driver to the dependent variable. Thus, choosing the highest observation and the lowest observation of the cost driver is appropriate in the high-low method.

Three criteria important when choosing among alternative cost functions are

- Economic plausibility.
- Goodness of fit.
- Slope of the regression line.

3. Learning Curve

A learning curve is a function that measures how labor-hours per unit decline as units of production increase because workers are learning and becoming better at their jobs. Two models used to capture different forms of learning are

- Cumulative average-time learning model. The cumulative average time per unit declines by a constant percentage each time the cumulative quantity of units produced doubles.

- Incremental unit-time learning model. The incremental time needed to produce the last unit declines by a constant percentage each time the cumulative quantity of units produced doubles. Frequently encountered problems when collecting cost data on variables included in a cost function are
- The time period used to measure the dependent variable is not properly matched with the time period used to measure the cost driver(s).
- Fixed costs are allocated as if they are variable.
- Data are either not available for all observations or are not uniformly reliable.
- Extreme values of observations occur.
- A homogeneous relationship between the individual cost items in the dependent variable cost pool and the cost driver(s) does not exist.
- The relationship between the cost and the cost driver is not stationary.
- Inflation has occurred in a dependent variable, a cost driver, or both.

Four key assumptions examined in specification analysis are

- Linearity of relationship between the dependent variable and the independent variable within the relevant range.
- Constant variance of residuals for all values of the independent variable.
- Independence of residuals.
- Normal distribution of residuals.

▸ In Section 3 of this course you will cover these topics:

- Decision Making And Relevant Information
- Pricing Decisions And Cost Management
- Strategy, Balanced Scorecard, And Strategic Profitability Analysis
- Cost Allocation, Customer-Profitability Analysis, And Sales-Variance Analysis
- Allocation Of Support Department Costs, Common Costs, And Revenues

▸ You may take as much time as you want to complete the topic covered in section 3.

There is no time limit to finish any Section, However you must finish All Sections before semester end date.

- If you want to continue remaining courses later, you may save the course and leave. You can continue later as per your convenience and this course will be available in your area to save and continue later

: Decision Making And Relevant Information

Topic Objective:

At the end of this topic students will be able to understand:

- Decision Process
- Linear Programming

Definition/Overview:

Decision making: Decision making can be regarded as an outcome of mental processes (cognitive process) leading to the selection of a course of action among several alternatives. Every decision making process produces a final choice.

Key Points:

1. Decision Process

The five steps in the decision process

- Obtain information
- Make predictions about future costs
- Choose an alternative

- Implement the decision
- Evaluate performance

Relevant costs are expected future costs that differ among the alternative courses of action being considered. Historical costs are irrelevant because they are past costs and, therefore, cannot differ among alternative future courses of action. Relevant costs are defined as those expected future costs that differ among alternative courses of action being considered. Thus, future costs that do not differ among the alternatives are irrelevant to deciding which alternative to choose.

Quantitative factors are outcomes that are measured in numerical terms. Some quantitative factors are financial that is, they can be easily expressed in monetary terms. Direct materials is an example of a quantitative financial factor. Qualitative factors are outcomes that are difficult to measure accurately in numerical terms. An example is employee morale.

Two potential problems that should be avoided in relevant cost analysis are

- (i) Do not assume all variable costs are relevant and all fixed costs are irrelevant.
- (ii) Do not use unit-cost data directly. It can mislead decision makers because
 - a. it may include irrelevant costs, and
 - b. comparisons of unit costs computed at different output levels lead to erroneous conclusions

Some variable costs may not differ among the alternatives under consideration and, hence, will be irrelevant. Some fixed costs may differ among the alternatives and, hence, will be relevant. Some of the total unit costs to manufacture a product may be fixed costs, and, hence, will not differ between the make and buy alternatives. These fixed costs are irrelevant to the make-or-buy decision. The key comparison is between purchase costs and the costs that will be saved if the company purchases the component parts from outside plus the additional benefits of using the resources freed up in the next best alternative use (opportunity cost). Furthermore, managers should consider non-financial factors such as quality and timely delivery when making outsourcing decisions. Opportunity cost is the contribution to income that is forgone (rejected) by not using a limited resource in its next-best alternative use.

When deciding on the quantity of inventory to buy, managers must consider both the purchase cost per unit and the opportunity cost of funds invested in the inventory. For example, the purchase cost per unit may be low when the quantity of inventory purchased is large, but the benefit of the lower cost may be more than offset by the high opportunity cost of the funds invested in acquiring and holding inventory. Managers should aim to get the highest contribution margin per unit of the constraining (that is, scarce, limiting, or critical) factor. The constraining factor is what restricts or limits the production or sale of a given product (for example, availability of machine-hours).

For example, if the revenues that will be lost exceed the costs that will be saved, the branch or business segment should not be shut down. Shutting down will only increase the loss. Allocated costs are always irrelevant to the shut-down decision. Cost written off as depreciation is irrelevant when it pertains to a past cost such as equipment already purchased. But the purchase cost of new equipment to be acquired in the future that will then be written off as depreciation is often relevant.

2. Linear Programming

Managers tend to favor the alternative that makes their performance look best so they focus on the measures used in the performance-evaluation model. If the performance-evaluation model does not emphasize maximizing operating income or minimizing costs, managers will most likely not choose the alternative that maximizes operating income or minimizes costs.

The three steps in solving a linear programming problem are

- Determine the objective function.
- Specify the constraints.
- Compute the optimal solution.

The text outlines two methods of determining the optimal solution to an LP problem:

- Trial-and-error solution approach
- Graphical solution approach

Most LP applications in practice use standard software packages that rely on the simplex method to compute the optimal solution.

: Pricing Decisions And Cost Management

Topic Objective:

At the end of this topic students will be able to understand:

- Pricing Decision
- Price vs. Value
- Importance of Pricing
- Factors Affecting Pricing Decision

Definition/Overview:

Pricing is one of the four Ps of the marketing mix. The other three aspects are product, promotion, and place. It is also a key variable in microeconomic price allocation theory. Price is the only revenue generating element amongst the 4ps, the rest being cost centers. Pricing is the manual or automatic process of applying prices to purchase and sales orders, based on factors such as: a fixed amount, quantity break, promotion or sales campaign, specific vendor quote, price prevailing on entry, shipment or invoice date, combination of multiple orders or lines, and many others. Automated systems require more setup and maintenance but may prevent pricing errors.

Key Points:**1. Pricing Decision**

In general terms price is a component of an exchange or transaction that takes place between two parties and refers to what must be given up by one party (i.e., buyer) in order to obtain something offered by another party (i.e., seller). Yet this view of price provides a somewhat limited explanation of what price means to participants in the transaction. In fact, price means different things to different participants in an exchange:

- **Buyers View** For those making a purchase, such as final customers, price refers to what must be given up to obtain benefits. In most cases what is given up is financial consideration (e.g., money) in exchange for acquiring access to a good or service. But financial consideration is not always what the buyer gives up. Sometimes in a barter situation a buyer may acquire a product by giving up their own product. For instance, two farmers may exchange cattle for crops. Also, as we will discuss below, buyers may also give up other things to acquire the benefits of a product that are not direct financial payments (e.g., time to learn to use the product).
- **Sellers View** - To sellers in a transaction, price reflects the revenue generated for each product sold and, thus, is an important factor in determining profit. For marketing organizations price also serves as a marketing tool and is a key element in marketing promotions. For example, most retailers highlight product pricing in their advertising campaigns.

Price is commonly confused with the notion of cost as in I paid a high cost for buying my new plasma television. Technically, though, these are different concepts. Price is what a buyer pays to acquire products from a seller. Cost concerns the sellers investment (e.g., manufacturing expense) in the product being exchanged with a buyer. For marketing organizations seeking to make a profit the hope is that price will exceed cost so the organization can see financial gain from the transaction.

Finally, while product pricing is a main topic for discussion when a company is examining its overall profitability, pricing decisions are not limited to for-profit companies. Not-for-profit organizations, such as charities, educational institutions and industry trade groups, also set prices, though it is often not as apparent. For instance, charities seeking to raise money may set different target levels for donations that reward donors with increases in status (e.g., name in newsletter), gifts or other benefits. While a charitable organization may not call it a price in their

promotional material, in reality these donations are equivalent to price setting since donors are required to give a contribution in order to obtain something of value.

2. Price vs. Value

For most customers price by itself is not the key factor when a purchase is being considered. This is because most customers compare the entire marketing offering and do not simply make their purchase decision based solely on a products price. In essence when a purchase situation arises price is one of several variables customers evaluate when they mentally assess a products overall value.

As we discussed earlier, what is marketing? Tutorial, value refers to the perception of benefits received for what someone must give up. Since price often reflects an important part of what someone gives up, a customers perceived value of a product will be affected by a marketers pricing decision. Any easy way to see this is to view value as a calculation:

$$\text{Value} = \frac{\text{perceived benefits received}}{\text{perceived price paid}}$$

For the buyer value of a product will change as perceived price paid and/or perceived benefits received change. But the price paid in a transaction is not only financial it can also involve other things that a buyer may be giving up. For example, in addition to paying money a customer may have to spend time learning to use a product, pay to have an old product removed, close down current operations while a product is installed or incur other expenses. However, for the purpose of this tutorial we will limit our discussion to how the marketer sets the financial price of a transaction.

3. Importance of Pricing

When marketers talk about what they do as part of their responsibilities for marketing products, the tasks associated with setting price are often not at the top of the list. Marketers are much more likely to discuss their activities related to promotion, product development, market research and other tasks that are viewed as the more interesting and exciting parts of the job.

Yet pricing decisions can have important consequences for the marketing organization and the attention given by the marketer to pricing is just as important as the attention given to more recognizable marketing activities. Some reasons pricing is important include:

- **Most Flexible Marketing Mix Variable** For marketers price is the most adjustable of all marketing decisions. Unlike product and distribution decisions, which can take months or years to change, or some forms of promotion which can be time consuming to alter (e.g., television advertisement), price can be changed very rapidly. The flexibility of pricing decisions is particularly important in times when the marketer seeks to quickly stimulate demand or respond to competitor price actions. For instance, a marketer can agree to a field salesperson's request to lower price for a potential prospect during a phone conversation. Likewise a marketer in charge of online operations can raise prices on hot selling products with the click of a few website buttons.
- **Setting the Right Price** Pricing decisions made hastily without sufficient research, analysis, and strategic evaluation can lead to the marketing organization losing revenue. Prices set too low may mean the company is missing out on additional profits that could be earned if the target market is willing to spend more to acquire the product. Additionally, attempts to raise an initially low priced product to a higher price may be met by customer resistance as they may feel the marketer is attempting to take advantage of their customers. Prices set too high can also impact revenue as it prevents interested customers from purchasing the product. Setting the right price level often takes considerable market knowledge and, especially with new products, testing of different pricing options.
- **Trigger of First Impressions** - Often times customers perception of a product is formed as soon as they learn the price, such as when a product is first seen when walking down the aisle of a store. While the final decision to make a purchase may be based on the value offered by the entire marketing offering (i.e., entire product), it is possible the customer will not evaluate a marketer's product at all based on price alone. It is important for marketers to know if customers are more likely to dismiss a product when all they know is its price. If so, pricing may become the most important of all marketing decisions if it can be shown that customers are avoiding learning more about the product because of the price.
- **Important Part of Sales Promotion** Many times price adjustments are part of sales promotions that lower price for a short term to stimulate interest in the product. However, as we noted in our

discussion of promotional pricing in the Sales Promotion Tutorial, marketers must guard against the temptation to adjust prices too frequently since continually increasing and decreasing price can lead customers to be conditioned to anticipate price reductions and, consequently, withhold purchase until the price reduction occurs again.

4. Factors Affecting Pricing Decision

For the remainder of this tutorial we look at factors that affect how marketers set price. The final price for a product may be influenced by many factors which can be categorized into two main groups:

- **Internal Factors** - When setting price, marketers must take into consideration several factors which are the result of company decisions and actions. To a large extent these factors are controllable by the company and, if necessary, can be altered. However, while the organization may have control over these factors making a quick change is not always realistic. For instance, product pricing may depend heavily on the productivity of a manufacturing facility (e.g., how much can be produced within a certain period of time). The marketer knows that increasing productivity can reduce the cost of producing each product and thus allow the marketer to potentially lower the products price. But increasing productivity may require major changes at the manufacturing facility that will take time (not to mention be costly) and will not translate into lower price products for a considerable period of time.
- **External Factors** - There are a number of influencing factors which are not controlled by the company but will impact pricing decisions. Understanding these factors requires the marketer conduct research to monitor what is happening in each market the company serves since the effect of these factors can vary by market

: Strategy, Balanced Scorecard, And Strategic Profitability Analysis

Topic Objective:

At the end of this topic students will be able to understand:

- Use of Balanced Scorecard
- Original methodology
- Improved methodology
- Popularity of Scorecard in strategy making
- Variants, alternatives and criticisms
- The four perspectives
- Key performance indicators
- Software tools

Definition/Overview:

The **Balanced Scorecard** (BSC) is a performance management tool which began as a concept for measuring whether the smaller-scale operational activities of a company are aligned with its larger-scale objectives in terms of vision and strategy.

Key Points:

1. Use of Balanced Scorecard

Implementing Balanced Scorecards typically includes four processes:

- Translating the vision into operational goals;
- Communicating the vision and link it to individual performance;
- Business planning; index Setting
- Feedback and learning, and adjusting the strategy accordingly.

The Balanced Scorecard is a framework, or what can be best characterized as a strategic management system that claims to incorporate all quantitative and abstract measures of true importance to the enterprise. According to Kaplan and Norton, The Balanced Scorecard provides managers with the instrumentation they need to navigate to future competitive success.

Many books and articles referring to Balanced Scorecards confuse the design process elements and the Balanced Scorecard itself. In particular, it is common for people to refer to a strategic linkage model or strategy map as being a Balanced Scorecard.

Although it helps focus managers' attention on strategic issues and the management of the implementation of strategy, it is important to remember that the Balanced Scorecard itself has no role in the formation of strategy. In fact, Balanced Scorecards can comfortably co-exist with strategic planning systems and other tools.

2. Original methodology

The earliest Balanced Scorecards comprised simple tables broken into four sections - typically these "perspectives" were labeled "Financial", "Customer", "Internal Business Processes", and "Learning & Growth". Designing the Balanced Scorecard required selecting five or six good measures for each perspective. Many authors have since suggested alternative headings for these perspectives, and also suggested using either additional or fewer perspectives. These suggestions were notably triggered by a recognition that different but equivalent headings would yield alternative sets of measures. The major design challenge faced with this type of Balanced Scorecard is justifying the choice of measures made. "Of all the measures you could have chosen, why did you choose these?" This common question is hard to ask using this type of design process. If users are not confident that the measures within the Balanced Scorecard are well chosen, they will have less confidence in the information it provides. Although less common, these early-style Balanced Scorecards are still designed and used today. In short, early-style Balanced Scorecards are hard to design in a way that builds confidence that they are well designed. Because of this, many are abandoned soon after completion.

3. Improved methodology

In the mid 1990s, an improved design method emerged. In the new method, measures are selected based on a set of "strategic objectives" plotted on a "strategic linkage model" or "strategy map". With this modified approach, the strategic objectives are typically distributed across a similar set of "perspectives", as is found in the earlier designs, but the design question becomes slightly less abstract. Managers have to identify five or six goals within each of the perspectives, and then demonstrate some inter-linking between these goals by plotting causal

links on the diagram. Having reached some consensus about the objectives and how they inter-relate, the Balanced Scorecard is devised by choosing suitable measures for each objective. This type of approach provides greater contextual justification for the measures chosen, and is generally easier for managers to work through. This style of Balanced Scorecard has been commonly used since 1996 or so.

Several design issues still remain with this enhanced approach to Balanced Scorecard design, but it has been much more successful than the design approach it superseded. In the late 1990s, the design approach had evolved yet again. One problem with the "2nd generation" design approach described above was that the plotting of causal links amongst twenty or so medium-term strategic goals was still a relatively abstract activity. In practice it ignored the fact that opportunities to intervene, to influence strategic goals are, and need to be anchored in the "now;" in current and real management activity. Secondly, the need to "roll forward" and test the impact of these goals necessitated the creation of an additional design instrument; the Vision or Destination Statement. This device was a statement of what "strategic success," or the "strategic end-state" looked like. It was quickly realized, that if a Destination Statement was created at the beginning of the design process then it was much easier to select strategic Activity and Outcome objectives to respond to it. Measures and targets could then be selected to track the achievement of these objectives. Destination Statement driven or 3rd Generation Balanced Scorecards represent the current state of the art in Scorecard design.

4. Popularity

Kaplan and Norton found that companies are using Balanced Scorecards to:

- Drive strategy execution;
- Clarify strategy and make strategy operational;
- Identify and align strategic initiatives;
- Link budget with strategy;
- Align the organization with strategy;
- Conduct periodic strategic performance reviews to learn about and improve strategy.

In 1997, Kurtzman found that 64 percent of the companies questioned were measuring performance from a number of perspectives in a similar way to the Balanced Scorecard.

Balanced Scorecards have been implemented by government agencies, military units, business units and corporations as a whole, non-profit organizations, and schools.

Many examples of Balanced Scorecards can be found via Web searches. However, adapting one organization's Balanced Scorecard to another is generally not advised by theorists, who believe that much of the benefit of the Balanced Scorecard comes from the implementation method.

Indeed, it could be argued that many failures in the early days of Balanced Scorecard could be attributed to this problem, in that early Balanced Scorecards were often designed remotely by consultants. Managers did not trust, and so failed to engage with and use these measure suites created by people lacking knowledge of the organization and management responsibility.

5. Variants, alternatives and criticisms

Since the late 1990s, various alternatives to the Balanced Scorecard have emerged, such as The Performance Prism, Results Based Management and Third Generation Balanced Scorecard.

These tools seek to solve some of the remaining design issues, in particular issues relating to the design of sets of Balanced Scorecards to use across an organization, and issues in setting targets for the measures selected. Applied Information Economics (AIE) has been researched as an alternative to Balanced Scorecards. In 2000, the Federal CIO Council commissioned a study to compare the two methods by funding studies in side-by-side projects in two different agencies. The Dept. of Veterans Affairs used AIE and the US Dept. of Agriculture applied Balanced Scorecards. The resulting report found that while AIE was much more sophisticated, AIE actually took slightly less time to utilize. AIE was also more likely to generate findings that were newsworthy to the organization, while the users of Balanced Scorecards felt it simply documented their inputs and offered no other particular insight. However, Balanced Scorecards are still much more widely used than AIE.

A criticism of Balanced Scorecards is that the scores are not based on any proven economic or financial theory, and therefore have no basis in the decision sciences. The process is entirely subjective and makes no provision to assess quantities (e.g., risk and economic value) in a way that is actuarially or economically well-founded.

Another criticism is that the Balanced Scorecard does not provide a bottom line score or a unified view with clear recommendations: it is simply a list of metrics. Some people also claim that positive feedback from users of Balanced Scorecards may be due to a placebo effect, as

there are no empirical studies linking the use of Balanced Scorecards to better decision making or improved financial performance of companies.

6. The four perspectives

The grouping of performance measures in general categories (perspectives) is seen to aid in the gathering and selection of the appropriate performance measures for the enterprise. Four general perspectives have been proposed by the Balanced Scorecard:

- Financial perspective;
- Customer perspective;
- Internal process perspective;
- Innovation and learning perspective.

The **financial perspective** examines if the company's implementation and execution of its strategy are contributing to the bottom-line improvement of the company. It represents the long-term strategic objectives of the organization and thus it incorporates the tangible outcomes of the strategy in traditional financial terms. The three possible stages as described by Kaplan and Norton (1996) are rapid growth, sustain, and harvest. Financial objectives and measures for the growth stage will stem from the development and growth of the organization which will lead to increased sales volumes, acquisition of new customers, growth in revenues etc. The sustain stage on the other hand will be characterized by measures that evaluate the effectiveness of the organization to manage its operations and costs, by calculating the return on investment, the return on capital employed, etc.

Finally, the harvest stage will be based on cash flow analysis with measures such as payback periods and revenue volume. Some of the most common financial measures that are incorporated in the financial perspective are EVA, revenue growth, costs, profit margins, cash flow, net operating income etc.

- The customer perspective defines the value proposition that the organization will apply to satisfy customers and thus generate more sales to the most desired (i.e. the most profitable) customer groups. The measures that are selected for the customer perspective should measure both the value that is delivered to the customer (value proposition) which may involve time, quality, performance and service and cost and the outcomes that come as a result of this value proposition (e.g., customer satisfaction, market share). The value proposition can be centered on

one of the three: operational excellence, customer intimacy or product leadership, while maintaining threshold levels at the other two.

- The internal process perspective is concerned with the processes that create and deliver the customer value proposition. It focuses on all the activities and key processes required in order for the company to excel at providing the value expected by the customers both productively and efficiently. These can include both short-term and long-term objectives as well as incorporating innovative process development in order to stimulate improvement. In order to identify the measures that correspond to the internal process perspective, Kaplan and Norton propose using certain clusters that group similar value creating processes in an organization. The clusters for the internal process perspective are operations management (by improving asset utilization, supply chain management, etc), customer management (by expanding and deepening relations), innovation (by new products and services) and regulatory & social (by establishing good relations with the external stakeholders).
- The innovation and learning perspective is the foundation of any strategy and focuses on the intangible assets of an organization, mainly on the internal skills and capabilities that are required to support the value-creating internal processes. The Innovation & Learning Perspective is concerned with the jobs (human capital), the systems (information capital), and the climate (organization capital) of the enterprise. These three factors relate to what Kaplan and Norton claim is the infrastructure that is needed in order to enable ambitious objectives in the other three perspectives to be achieved. This of course will be in the long term, since an improvement in the learning and growth perspective will require certain expenditures that may decrease short-term financial results, whilst contributing to long-term success.

7. Key performance indicators

According to each perspective of the Balanced Scorecard, a number of KPIs can be used such as:

- Financial
 - o Cash flow
 - o Return on investment
 - o Financial result

- o Return on capital employed
- o Return on equity

It defines the value proposition that the organization will apply to satisfy customers and thus generate more sales to the most desired customers

- Internal business processes
 - o Number of activities
 - o Opportunity success rate
 - o Accident ratios
 - o Overall equipment effectiveness
- Learning and growth
 - o Investment Rate
 - o Illness rate
 - o Internal Promotions %
 - o Employee Turnover
 - o Gender Ratios

Further lists of general and industry-specific KPIs can be found in the case studies and methodological articles and books presented in the references section.

8. Software tools

Many firms choose to use standard office software (such as spreadsheets, word processors, presentation software) to provide the same functions as are provided by commercial software packages - trading the time taken to develop the appropriate templates in the packages and then use them against the typically high cost of commercial Balanced Scorecard software packages/services. Alternatively, several Open Source Packages are available as an alternative to commercial software

: Cost Allocation, Customer-Profitability Analysis, And Sales-Variance Analysis**Topic Objective:**

At the end of this topic students will be able to understand:

- Cost Allocation
- Customer Profitability
- Challenges
- Cautions
- The ABCs of unprofitable customer management
- Sales Variances
- Sales price variance
- Sales volume variance
- Total variance

Definition/Overview:

Customer profitability (CP) is the difference between the revenues earned from and the costs associated with the customer relationship in a specified period.

Sales variance is the difference between actual sales and budget sales. It is used to measure the performance of a sales function, and/or analyze business results to better understand market conditions.

Key Points:**1. Cost Allocation**

Cost allocation is a method to determine the cost of services provided to users of that service. It does not determine the price of the service, but rather determines what the service costs to provide. It is important to determine the cost allocation of the services that the FAA provides, in order to determine a justifiable fee/charge/tax for those services. Included in cost allocation are direct, indirect, and incremental costs. Direct costs, or separable costs, are costs that are related to a single type of service and are related to one type of output or user such as, a sector-to-sector hand-off. Indirect costs, or common costs, are related to more than one type of service, such as, the physical enroute facility. Incremental costs change with the level of output produced. Incremental costs measure changes in output, e.g., differences in staffing levels or staffing costs at a facility that is based on traffic count. Cost allocation procedures distribute accumulated indirect costs to the programs that benefit from the accumulated costs on the basis of percentages that represent a reasonable and equitable allocation base.

Special care must be exercised to ensure that the costs being allocated are complete, agree with, or are reconciled to amounts reported in state agency financial statements. In allocating indirect costs, state agencies will use actual costs and actual usage measures (e.g., labor hours) except when management believes that other estimates are more appropriate.

Regardless of the cost allocation methodologies used, all state agency cost allocation procedures shall demonstrate the following characteristics:

- **Information** It shall provide the appropriate accounting information required by management to account for state agency programs as required by state law. In providing the required information, management shall give appropriate consideration to the cost of obtaining and providing the information in relation to the benefits to be derived from the information.
- **Timeliness** It must produce program cost data on a timely basis.
- **Consistency** The cost identification and distribution methods selected will be applied consistently from period to period.
- **Accuracy** The information provided shall be as accurate as possible.

- Audibility Program costs must be fully audible; i.e., working papers must be retained showing program cost identification, accumulation, and distribution methods.

Costs that can be identified directly to a program and/or funding source (direct costs) must be charged directly to the program. Indirect costs should be distributed to programs and/or funding sources in the most equitable basis practical. The following are some typical program cost accounting accumulation categories and the typical equitable bases of distribution:

COST ACCUMULATION	TYPICAL EQUITABLE DISTRIBUTION BASE
Salaries and Wages	Hours chargeable to each program.
Operating Expenses and Equipment	The most equitable basis practical (e.g., floor space, machine hours, or other usage rate measurement).
Service Unit Costs	Machine hours, labor hours, or other service usage rate measurement.
Administration Costs	The most equitable basis practical (e.g., salaries and wages, personnel years, total budgeted expenditures or other reasonable and systematic basis).

2. Customer Profitability

Although CP is nothing more than the result of applying the business concept of profit to a customer relationship, measuring the profitability of a firm's customers or customer groups can often deliver useful business insights. Quite often a very small percentage of the firm's best

customers will account for a large portion of firm profit. Although this is a natural consequence of variability in profitability across customers, firms benefit from knowing exactly who the best customer are and how much they contribute to firm profit. At the other end of the distribution, firms sometimes find that their worst customers actually cost more to serve than the revenue they deliver. These unprofitable customers actually detract from overall firm profitability. The firm would be better off if they had never acquired these customers in the first place.

3. Challenges

The biggest challenge in measuring customer profitability is the assignment of costs to customers. While it is usually clear what revenue each customer generated, it is often not clear at all what costs the firm incurred serving each customer. Activity Based Costing can sometimes be used to help determine the costs associated with each customer or customer group. For components of cost not directly related to serving customers, the calculation of customer profit must use some method to fully allocate these costs to customers if the total of customer profit is to match the operating profit of the firm. If the firm decides not to allocate these non-customer costs to customers, then the sum of customer profit will be greater than the operating profit of the firm.

4. Cautions

Like other profit measures, customer profitability is historical. It is a financial summary of what happened in a previous period. And although the past is often indicative of the future, it is easy to imagine situations in which relationships that were unprofitable in the past might become profitable in the future (and vice versa). The forward-looking measure of the value to be derived by serving a customer is called customer lifetime value. Unprofitable customers can have high customer lifetime values (and vice versa).

5. The ABCs of unprofitable customer management

Michael Haenlein and Andreas Kaplan (2009) propose a six-step approach for dealing with unprofitable customers, a framework they refer to as the ABCs of Unprofitable Customer Management

- Step #1: Avoid their acquisition in the first place
- Step #2: Bear in mind potential rescue operations
- Step #3: Catch the possibility of abandonment
- Step #4: Draw up a cost benefit analysis
- Step #5: Ensure familiarity with your environment
- Step #6: Facilitate biting the bullet

6. Sales Variances

There are two reasons actual sales can vary from planned sales: either the volume sold varied from plan (sales volume variance), or sales were at a different price from what was planned (sales price variance). Both scenarios could also simultaneously contribute to the variance.

For example: The plan was to sell 5 widgets at \$3 each, for a budgeted sales of: $(5 * \$3) = \15 . In reality, 6 widgets were sold at \$2 each, for an actual sales of: $(6 * \$2) = \12 . The total variance was thus $(\$12 - \$15) = \$3$ (U) unfavorable or minus \$3, since total sales was less than planned.

7. Sales price variance

The sales price variance is calculated as: Actual quantity sold * (actual selling price - planned selling price). In the example, the sales price variance was $6 * (\$2 - \$3) = \$6$ (U) unfavorable or minus \$6, since the sales price was less than planned.

8. Sales volume variance

Sales Volume Variance is calculated as: Budgeted price * (actual volume - planned volume). In the example, the sales volume variance was $\$3 * (6 - 5) = \3 (F)avorable, or plus \$3, since the sales volume was more than planned.

Sales Volume Variance is further sub-divided into two variances.

- Sales Mix Variance
- Sales Qty Variance

9. Total variance

The total variance can thus be seen algebraically to be (minus \$6) plus (plus \$3), giving (minus \$3). Or: $-6+3=-3$.

This result tells us that the negative effect of selling at a lower price was twice the positive effect of selling at a higher volume than planned. This might have occurred where prices were lowered to increase volume, but actual volume increases did not meet expectations, perhaps due to competitors also cutting their prices, or changes in customer preferences.

: Allocation Of Support Department Costs, Common Costs, And Revenues

Topic Objective:

At the end of this topic students will be able to understand:

- Support departments and Cost Allocation
- Single-Rate and Dual-Rate Methods
- Allocating Costs of Multiple Support Departments
- Allocating Common Cost

Definition/Overview:

Pricing is one of the four Ps of the marketing mix. The other three aspects are product, promotion, and place. It is also a key variable in microeconomic price allocation theory. Price is the only revenue generating element amongst the 4ps, the rest being cost centers.

Key Points:**1. Support departments and Cost Allocation**

Support departments and their costs have been increasingly important over the last decade as organizations have been consolidating more business functions in subunits that exist primarily to provide services to other subunits. Reflecting the need to build performance measurement systems to accurately assess the efficiency and effectiveness of these shared services, this paper develops matrix models for the direct and step methods of support department cost allocation and contrasts these models with the matrix model of the reciprocal method. Each of these allocation methods explicitly allocates the costs of support departments to the operating departments that consume those services.

Consistent with prior research, a "support department" (or service department) is defined in this study as any stand-alone department or business unit that is not directly involved in generating output. For example, technology support, administrative support, and legal support would all fall under the traditional definition of "support departments." Cost systems often require these costs to be allocated to operating departments in order to assign overhead costs to products and services and to facilitate decision making involving the shared support services. In addition to providing services to operating departments, these support departments also provide services to other service departments. The three methods of cost allocation (direct, step and reciprocal methods) differ from each other in the extent to which inter-support department activities are recognized in computing allocated costs. The direct method does not consider any of the interactions between support departments, while the reciprocal method fully incorporates these interactions. The step method considers only some of these interactions. When there are no interactions between support departments, the three methods yield identical allocations. Kaplan shows that the reciprocal method is to be preferred over the other methods because only it yields allocations that are consistent with the opportunity costs of providing output from service departments.

However, the reciprocal method has not been widely adopted by organizations, in part because the allocations are computed by solving a system of simultaneous equations, which leads to the perception that the method is too complex and difficult to understand. Even though the

availability of easy to use spreadsheet software makes it easy to implement the reciprocal method using a matrix algebra approach, widespread adoption has not been achieved. While the matrix model of the reciprocal method has been exhaustively developed in the prior literature), the direct and step methods are typically presented as more ad hoc approaches whose primary advantage is purported to be reduced complexity.

2. Single-Rate and Dual-Rate Methods

Companies distinguish operating departments from support departments. An operating department (or production department) directly adds value to a product or service. A support department (service department) provides the services that assist other internal departments (i.e., operating departments and other support departments) in the company. The single-rate method (or single-rate cost-allocation method) allocates costs in each cost pool (support department in this section) to cost objectives (operating divisions in this section) using the same rate per unit of a single allocation base (e.g., no discrimination between fixed vs. variable costs in the cost pool). The dual-rate method (or dual-rate cost-allocation method) classifies costs in each cost pool into two sub-groups a variable-cost pool and fixed cost pool with each pool using a different cost-allocation base.

3. Allocating Costs of Multiple Support Departments

Accountants use three common methods to allocate costs under the departmental approach:

- direct method
- step-down method
- reciprocal method

The direct method (or direct allocation method) is the simplest of the three methods because it ignores the reciprocal flows. The cost allocation is accomplished by (i) using the service flows only to production departments and (ii) determining each production departments share of that service.

4. Allocating Common Cost

A **common cost** is a cost of operating a facility, activity, or like cost objective that is shared by two or more users. Two methods of allocating this common cost are stand-alone method and the incremental method

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|---|
| <ul style="list-style-type: none">▸ In Section 4 of this course you will cover these topics:<ul style="list-style-type: none">▸ Cost Allocation: Joint Products And Byproducts▸ Process Costing▸ Spoilage, Rework, And Scrap▸ Balanced Scorecard: Quality, Time, And The Theory Of Constraints |
| <ul style="list-style-type: none">▸ You may take as much time as you want to complete the topic cover in section 4. There is no time limit to finish any Section, However you must finish All Sections before semester end date. |
| <ul style="list-style-type: none">▸ If you want to continue remaining courses later, you may save the course and leave. You can continue later as per your convenience and this course will be available in your area to save and continue later. |

: Cost Allocation: Joint Products And Byproducts

Topic Objective:

At the end of this topic students will be able to understand:

- Joint Cost and Byproduct Cost
- Byproducts Accounting

Definition/Overview:

Job Production is used to refer to when a product is produced with the labor of one worker. Job production is scarcely used for bulk and large scale production and mainly used for one off products or prototypes, as it is inefficient; however, quality is greatly enhanced with job production compared to other methods. These products are frequently large and often unique. Individual wedding cakes and made-to-measure suits are also examples of job production. New, small, firms often use job production, before they get chance to expand. Job Production is usually motivating for workers, because it gives the workers an opportunity to produce the whole product and take pride in it.

Key Points:**1. Joint Cost and Byproduct Cost**

A *joint cost* is a cost of a production process that yields multiple products simultaneously. A *separable cost* is a cost incurred beyond the splitoff point that is assignable to each of the specific products identified at the splitoff point. The distinction between a joint product and a byproduct is based on relative sales value. A *joint product* is a product from a joint production process (a process that yields two or more products) that has a relatively high total sales value. A *byproduct* is a product that has a relatively low total sales value compared to the total sales value of the joint (or main) products.

A *product* is any output that has a positive sales value (or an output that enables a company to avoid incurring costs). In some joint-cost settings, outputs can occur that do not have a positive sales value. The offshore processing of hydrocarbons yields water that is recycled back into the ocean as well as yielding oil and gas. The processing of mineral ore to yield gold and silver also yields dirt as an output, which is recycled back into the ground.

The topic lists the following six reasons for allocating joint costs:

- Computation of inventoriable costs and cost of goods sold for financial accounting purposes and reports for income tax authorities.
- Computation of inventoriable costs and cost of goods sold for internal reporting purposes.
- Cost reimbursement under contracts when only a portion of a business's products or services is sold or delivered under cost-plus contracts.
- Insurance settlement computations for damage claims made on the basis of cost information of joint products or byproducts.
- Rate regulation when one or more of the jointly-produced products or services are subject to price regulation.
- Litigation in which costs of joint products are key inputs.

The joint production process yields individual products that are either sold this period or held as inventory to be sold in subsequent periods. Hence, the joint costs need to be allocated between total production rather than just those sold this period. This situation can occur when a production process yields separable outputs at the splitoff point that do not have selling prices available until further processing. The result is that selling prices are not available at the splitoff point to use the sales value at splitoff method. Examples include processing in integrated pulp and paper companies and in petro-chemical operations.

Both methods use market selling-price data in allocating joint costs, but they differ in which sales-price data they use. The *sales value at splitoff method* allocates joint costs to joint products on the basis of the relative total sales value at the splitoff point of the total production of these products during the accounting period. The *net realizable value method* allocates joint costs to joint products on the basis of the relative net realizable value (the final sales value minus the separable costs of production and marketing) of the total production of the joint products during the accounting period.

Limitations of the physical measure method of joint-cost allocation include:

- The physical weights used for allocating joint costs may have no relationship to the revenue-producing power of the individual products.
- The joint products may not have a common physical denominator for example, one may be a liquid while another solid with no readily available conversion factor.

The NRV method can be simplified by assuming (a) a standard set of post-splitoff point processing steps, and (b) a standard set of selling prices. The use of (a) and (b) achieves the same benefits that the use of standard costs does in costing systems. The constant gross-margin percentage NRV method takes account of the post-splitoff point profit contribution earned on individual products, as well as joint costs, when making cost assignments to joint products. In contrast, the sales value at splitoff point and the NRV methods allocate only the joint costs to the individual products.

Any method used to allocate joint costs to individual products that is applicable to the problem of joint product-cost allocation should not be used for management decisions regarding whether a product should be sold or processed further. When a product is an inherent result of a joint process, the decision to process further should not be influenced by either the size of the total joint costs or by the portion of the joint costs assigned to particular products. Joint costs are irrelevant for these decisions. The only relevant items for these decisions are the incremental revenue and the incremental costs beyond the splitoff point.

The only relevant items are incremental revenues and incremental costs when making decisions about selling products at the splitoff point or processing them further. Separable costs are not always identical to incremental costs. Separable costs are costs incurred beyond the splitoff point that are assignable to individual products. Some separable costs may not be incremental costs in a specific setting (e.g., allocated manufacturing overhead for post-splitoff processing that includes depreciation).

2. Byproducts Accounting

Two methods to account for byproducts are:

- Production method recognizes byproducts in the financial statements at the time production is completed.
- Sales method delays recognition of byproducts until the time of sale.

The sales byproduct method enables a manager to time the sale of byproducts to affect reported operating income. A manager who was below the targeted operating income could adopt a fire-sale approach to selling byproducts so that the reported operating income exceeds the target. This illustrates one dysfunctional aspect of the sales method for byproducts

: Process Costing**Topic Objective:**

At the end of this topic students will be able to understand:

- Process Costing
- Reasons for use
- Five Key Steps In Process Costing
- Inventory methods
- Transferred-In Costs And Additional Direct Materials Cost

Definition/Overview:

Process costing is an accounting methodology that traces and accumulates direct costs, and allocates indirect costs of a manufacturing process. Costs are assigned to products, usually in a large batch, which might include an entire month's production. Eventually, costs have to be allocated to individual units of product. It assigns average costs to each unit, and is the opposite extreme of Job costing which attempts to measure individual costs of production of each unit. Process costing is usually a significant chapter.

Key Points:**1. Process Costing**

Process costing is a type of operation costing which is used to ascertain the cost of a product at each process or stage of manufacture. CIMA defines process costing as "The costing method applicable where goods or services result from a sequence of continuous or repetitive operations or processes. Costs are averaged over the units produced during the period". Process costing is

suitable for industries producing homogeneous products and where production is a continuous flow. A process can be referred to as the sub-unit of an organization specifically defined for cost collection purpose.

2. Reasons for use

Companies need to allocate total product costs to units of product for the following reasons:

- A company may manufacture thousands or millions of units of product in a given period of time.
- Products are manufactured in large quantities, but products may be sold in small quantities, sometimes one at a time (automobiles, loaves of bread), a dozen or two at a time (eggs, cookies), etc.
- Product costs must be transferred from Finished Goods to Cost of Goods Sold as sales are made. This requires a correct and accurate accounting of product costs per unit, to have a proper matching of product costs against related sales revenue. *Managers need to maintain cost control over the manufacturing process. Process costing provides managers with feedback that can be used to compare similar product costs from one month to the next, keeping costs in line with projected manufacturing budgets.
- A fraction-of-a-cent cost change can represent a large dollar change in overall profitability, when selling millions of units of product a month. Managers must carefully watch per unit costs on a daily basis through the production process, while at the same time dealing with materials and output in huge quantities.
- Materials part way through a process (e.g. chemicals) might need to be given a value, process costing allows for this. By determining what cost the part processed material has incurred such as labor or overhead an "equivalent unit" relative to the value of a finished process can be calculated.

Industries using process costing in their manufacturing area include chemical processing, oil refining, pharmaceuticals, plastics, brick and tile manufacturing, semiconductor chips, beverages, and breakfast cereals. Process costing systems separate costs into cost categories according to the timing of when costs are introduced into the process. Often, only two cost classifications, direct materials and conversion costs, are necessary. Direct materials are frequently added at one point in time, often the start or the end of the process, and all conversion costs are added at about the same time, but in a pattern different from direct materials costs.

Equivalent units is a derived amount of output units that takes the quantity of each input (factor of production) in units completed or in incomplete units in work in process, and converts the quantity of input into the amount of completed output units that could be made with that quantity of input. Each equivalent unit is comprised of the physical quantities of direct materials or conversion costs inputs necessary to produce output of one fully completed unit. Equivalent unit measures are necessary since all physical units are not completed to the same extent at the same time. The accuracy of the estimates of completion depends on the care and skill of the estimator and the nature of the process. Semiconductor chips may differ substantially in the finishing necessary to obtain a final product. The amount of work necessary to finish a product may not always be easy to ascertain in advance.

3. Five Key Steps In Process Costing

The five key steps in process costing follow:

- Step 1: Summarize the flow of physical units of output.
- Step 2: Compute output in terms of equivalent units.
- Step 3: Compute cost per equivalent unit.
- Step 4: Summarize total costs to account for.
- Step 5: Assign total costs to units completed and to units in ending work in process.

4. Inventory methods

Three inventory methods associated with process costing are:

- Weighted average.
- First-in, first-out.
- Standard costing.

The weighted-average process-costing method calculates the equivalent-unit cost of all the work done to date (regardless of the accounting period in which it was done), assigns this cost to equivalent units completed and transferred out of the process, and to equivalent units in ending work-in-process inventory.

- FIFO computations are distinctive because they assign the cost of the previous accounting periods equivalent units in beginning work-in-process inventory to the first units completed and transferred out of the process and assigns the cost of equivalent units worked on during the current period first to complete beginning inventory, next to start and complete new units, and finally to units in ending work-in-process inventory. In contrast, the weighted-average method costs units completed and transferred out and in ending work in process at the same average cost. FIFO should be called a modified or departmental FIFO method because the goods transferred in during a given period usually bear a single average unit cost (rather than a distinct FIFO cost for each unit transferred in) as a matter of convenience. A major advantage of FIFO is that managers can judge the performance in the current period independently from the performance in the preceding period.
- The journal entries in process costing are basically similar to those made in job-costing systems. The main difference is that, in process costing, there is often more than one work-in-process accountone for each process.
- Standard-cost procedures are particularly appropriate to process-costing systems where there are various combinations of materials and operations used to make a wide variety of similar products as in the textiles, paints, and ceramics industries. Standard-cost procedures also avoid the intricacies involved in detailed tracking with weighted-average or FIFO methods when there are frequent price variations over time.

5. Transferred-In Costs and Additional Direct Materials Cost

There are two reasons why the accountant should distinguish between *transferred-in costs* and *additional direct materials costs* for a particular department:

All direct materials may not be added at the beginning of the department process.

The control methods and responsibilities may be different for transferred-in items and materials added in the department.

Transferred-in costs or previous department costs are costs incurred in a previous department that have been charged to a subsequent department. These costs may be costs incurred in that

previous department during this accounting period or a preceding accounting period. Materials are only one cost item. Other items (often included in a conversion costs pool) include labor, energy, and maintenance. If the costs of these items vary over time, this variability can cause a difference in cost of goods sold and inventory amounts when the weighted-average or FIFO methods are used. A second factor is the amount of inventory on hand at the beginning or end of an accounting period. The smaller the amount of production held in beginning or ending inventory relative to the total number of units transferred out, the smaller the effect on operating income, cost of goods sold, or inventory amounts from the use of weighted-average or FIFO methods

: Spoilage, Rework, And Scrap

Topic Objective:

At the end of this topic students will be able to understand.

- Spoilage, Rework, and Scrap
- Process Costing and Spoilage
- Job Costing and Spoilage
- Job Costing and Rework
- Accounting for Scrap

Definition/Overview:

Spoilage: units of production that do not meet the standards required by customers for good units and that are discarded or sold at reduced prices.

Rework: units of production that do not meet the specifications required by customers but which are subsequently repaired and sold as good finished units.

Scrap: residual material that results from manufacturing a product. It has low total sales value compared to the total sales value of the product.

Key Points:

1. Spoilage, Rework, and Scrap

In today's manufacturing environment, firms adopt various quality improvement programs to reduce spoilage, rework units, and scrap. Spoilage refers to unacceptable units (i.e., do not meet the specifications required by customers for good units) that are discarded or sold for disposal value (or sold at reduced prices).

Rework units are units produced that must be reworked into good units that can be sold in regular channels.

Scrap is the material left over from the manufacture of the product (i.e., residual materials); it has little or no value.

The two types of spoilage are normal and abnormal. Normal spoilage occurs under normal operating conditions; it is uncontrollable in the short term and is considered a normal part of production and product cost. That is, the cost of normal spoilage unit is absorbed by the cost of good units produced. Abnormal spoilage is in excess over the amount of normal spoilage expected under normal operating conditions; it is charged as a loss to operations in the period detected.

2. Process Costing and Spoilage

Units of abnormal spoilage should be counted and recorded separately in a Loss from Abnormal Spoilage account. As for units of normal spoilage, there are two approaches: counted (approach A, better) and not counted

3. Job Costing and Spoilage

Normal spoilage in job costing can be classified as that incurred (1) for a particular job and (2) in common with all jobs because it relates to the production process in general. Spoilage cost for a particular job can be reduced by the estimated disposal value or selling price of the spoiled goods. Commonly, spoilage cost is transferred from the particular job cost into Factory Overhead account. Abnormal spoilage is charged to the Loss from Abnormal Spoilage account.

4. Job Costing and Rework

Like spoilage, there are three types of rework: (1) rework on normal defective units for a particular job, (2) rework on normal defective units common with all jobs, and (3) rework on abnormal defective units not falling within the normal range. The cost of rework units is charged to that specific jobs Work-in-Process Inventory account. Normal rework common to all jobs charged to the Factory Overhead account, and abnormal rework is charged to the Loss from Abnormal Rework account.

5. Accounting for Scrap

Scrap can be classified according to (1) a specific job and (2) common to all jobs. To account for the first type of scrap, reduce the selling price of the scrap from the Work-in-Process Inventory account. For the second type, reduce the selling price of the scrap from the Factory Overhead account. Abnormal rework is a loss just like abnormal spoilage. By charging it to manufacturing overhead, the abnormal rework costs are spread over other jobs and also included in inventory to the extent a job is not complete. Abnormal rework is rework over and above what is expected during a period, and is recognized as a loss for that period.

A company is justified in inventorying scrap when its estimated net realizable value is significant and the time between storing it and selling or reusing it is quite long. Company managements measure scrap to measure efficiency and to also control a tempting source of theft. Managements of companies that report high levels of scrap focus attention on ways to reduce scrap and to use the scrap the company generates more profitably. Some companies, for example, might redesign products and processes to reduce scrap. Others may also examine if the scrap can be reused to save substantial input costs

: Balanced Scorecard: Quality, Time, And The Theory Of Constraints

Topic Objective:

At the end of this topic students will be able to understand:

- Quality costs
- Customer-Response Time
- Theory Of Constraints
- Managing Bottleneck Resources

Definition/Overview:

Quality Costs: The concept of quality costs is a means to quantify the total cost of quality-related efforts and deficiencies. It was first described by Armand V. Feigenbaum in a 1956 Harvard Business Review article.

Key Points:**1. Quality costs**

Quality costs (including the opportunity cost of lost sales because of poor quality) can be as much as 10% to 20% of sales revenues of many organizations. Quality-improvement programs can result in substantial cost savings and higher revenues and market share from increased customer satisfaction. Quality of design refers to how closely the characteristics of a product or service meet the needs and wants of customers. Conformance quality refers to the performance of a product or service relative to its design and product specifications.

An internal failure cost differs from an external failure cost on the basis of when the nonconforming product is detected. An internal failure is detected *before* a product is shipped to a customer, whereas an external failure is detected *after* a product is shipped to a customer. Three methods that companies use to identify quality problems are: (a) a control chart which is a graph of a series of successive observations of a particular step, procedure, or operation taken at regular intervals of time; (b) a Pareto diagram, which is a chart that indicates how frequently each type of failure (defect) occurs, ordered from the most frequent to the least frequent; and (c) a cause-and-effect diagram, which helps identify potential causes of failure. Companies should emphasize financial as well as non-financial measures of quality, such as yield and defect rates. Non-financial measures are not directly linked to bottom-line performance but they indicate and direct attention to the specific areas that need improvement to improve the bottom line. Tracking non-financial measures over time directly reveals whether these areas have, in fact, improved over time. Non-financial measures are easy to quantify and easy to understand.

2. Customer-Response Time

Customer-response time is how long it takes from the time a customer places an order for a product or a service to the time the product or service is delivered to the customer. Manufacturing lead time is how long it takes from the time an order is received by manufacturing to the time a finished good is produced. Manufacturing lead time is only one part of customer-response time. Delays in delivering an order for a product or service can also occur

because of delays in receiving customer orders and delays in delivering a completed order to a customer.

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There is a trade-off between customer-response time and on-time performance. Simply scheduling longer customer-response time makes achieving on-time performance easier. Companies should, however, attempt to reduce the uncertainty of the arrival of orders, manage bottlenecks, reduce setup and processing time, and run smaller batches. This would have the effect of reducing both customer-response time and improving on-time performance. Two reasons why lines, queues, and delays occur is (1) uncertainty about when customers will order products or services uncertainty causes a number of orders to be received at the same time, causing delays, and (2) limited capacity and bottlenecks a bottleneck is an operation where the work to be performed approaches or exceeds the available capacity.

Adding a product when capacity is constrained and the timing of customer orders is uncertain causes delays in delivering all existing products. If the revenue losses from delays in delivering existing products and the increase in carrying costs of the existing products exceed the positive contribution earned by the product that was added, then it is not worthwhile to make and sell the new product, despite its positive contribution margin.

3. Theory of Constraints

The three main measures used in the theory of constraints are the following:

- throughput contribution equal to revenues minus direct material cost of the goods sold;
- investments equal to the sum of materials costs in direct materials, work-in-process and finished goods inventories, research and development costs, and costs of equipment and buildings;
- operating costs equal to all costs of operations such as salaries, rent, and utilities (other than direct materials) incurred to earn throughput contribution.

4. Managing Bottleneck Resources

The four key steps in managing bottleneck resources are:

- Step 1: Recognize that the bottleneck operation determines throughput contribution of the entire system.
- Step 2: Search for, and identify the bottleneck operation.
- Step 3: Keep the bottleneck operation busy, and subordinate all non-bottleneck operations to the bottleneck operation.
- Step 4: Increase bottleneck efficiency and capacity.

<p>▶ In Section 5 of this course you will cover these topics:</p> <ul style="list-style-type: none">▶ Inventory Management, Just-In-Time, And Backflush Costing▶ Capital Budgeting And Cost Analysis▶ Management Control Systems, Transfer Pricing, And Multinational Considerations▶ Performance Measurement, Compensation, And Multinational Considerations
<p>▶ You may take as much time as you want to complete the topic covered in section 5. There is no time limit to finish any Section, However you must finish All Sections before semester end date.</p>
<p>▶ If you want to continue remaining courses later, you may save the course and leave. You can continue later as per your convenience and this course will be available in your area to save and continue later</p>

: Inventory Management, Just-In-Time, And Backflush Costing

Topic Objective:

At the end of this topic students will be able to understand:

- Business inventory

- Special terms used in dealing with inventory
- High level inventory management
- JIT
- Transaction cost approach
- Price volatility
- Quality volatility
- Environmental concerns
- Demand stability

Definition/Overview:

Just-in-time (JIT) is an inventory strategy implemented to improve the return on investment of a business by reducing in-process inventory and its associated carrying costs. In order to achieve JIT the process must have signals of what is going on elsewhere within the process. This means that the process is often driven by a series of signals, which can be Kanban that tell production processes when to make the next part. Kanban are usually 'tickets' but can be simple visual signals, such as the presence or absence of a part on a shelf. When implemented correctly, JIT can lead to dramatic improvements in a manufacturing organization's return on investment, quality, and efficiency.

Backflush accounting is a product costing approach, used in a Just-In-Time (JIT) operating environment, in which costing is delayed until goods are finished. Standard costs are then flushed backward through the system to assign costs to products. The result is that detailed tracking of costs is eliminated. Journal entries to inventory accounts may be delayed until the time of product completion or even the time of sale, and standard costs are used to assign costs to units when journal entries are made, that is, to flush costs backward to the points at which inventories remain.

Key Points:**1. Business inventory**

There are three basic reasons for keeping an inventory:

- Time - The time lags present in the supply chain, from supplier to user at every stage, requires that you maintain certain amount of inventory to use in this "lead time"
- Uncertainty - Inventories are maintained as buffers to meet uncertainties in demand, supply and movements of goods.
- Economies of scale - Ideal condition of "one unit at a time at a place where user needs it, when he needs it" principle tends to incur lots of costs in terms of logistics. So bulk buying, movement and storing brings in economies of scale, thus inventory.

All these stock reasons can apply to any owner or product stage.

- Buffer stock is held in individual workstations against the possibility that the upstream workstation may be a little delayed in long setup or change-over time. This stock is then used while that change-over is happening. This stock can be eliminated by tools like SMED.
- These classifications apply along the whole Supply chain not just within a facility or plant. Where these stocks contain the same or similar items it is often the work practice to hold all these stocks mixed together before or after the sub-process to which they relate. This 'reduces' costs. Because they are mixed-up together there is no visual reminder to operators of the adjacent sub-processes or line management of the stock which is due to a particular cause and should be a particular individual's responsibility with inevitable consequences. Some plants have centralized stock holding across sub-processes which makes the situation even more acute.

2. Special terms used in dealing with inventory

- Stock Keeping Unit (SKU) is a unique combination of all the components that are assembled into the purchasable item. Therefore any change in the packaging or product is a new SKU. This level of detailed specification assists in managing inventory.
- Stockout means running out of the inventory of an SKU.

- "New old stock" (sometimes abbreviated NOS) is a term used in business to refer to merchandise being offered for sale which was manufactured long ago but that has never been used. Such merchandise may not be produced any more, and the new old stock may represent the only market source of a particular item at the present time.

3. High level inventory management

It seems that around about 1880 there was a change in manufacturing practice from companies with relatively homogeneous lines of products to vertically integrated companies with unprecedented diversity in processes and products. Those companies (especially in metalworking) attempted to achieve success through economies of scope - the gains of jointly producing two or more products in one facility. The managers now needed information on the effect of product mix decisions on overall profits and therefore needed accurate product cost information. A variety of attempts to achieve this were unsuccessful due to the huge overhead of the information processing of the time. However, the burgeoning need for financial reporting after 1900 created unavoidable pressure for financial accounting of stock and the management need to cost manage products became overshadowed. In particular it was the need for audited accounts that sealed the fate of managerial cost accounting. The dominance of financial reporting accounting over management accounting remains to this day with few exceptions and the financial reporting definitions of 'cost' have distorted effective management 'cost' accounting since that time. This is particularly true of inventory.

Hence high level financial inventory has these two basic formulas which relate to the accounting period:

- $\text{Cost of Beginning Inventory at the start of the period} + \text{inventory purchases within the period} + \text{cost of production within the period} = \text{cost of goods}$
- $\text{Cost of goods} - \text{cost of ending inventory at the end of the period} = \text{cost of goods sold}$

The benefit of these formulae is that the first absorbs all overheads of production and raw material costs in to a value of inventory for reporting. The second formula then creates the new start point for the next period and gives a figure to be subtracted from sales price to determine some form of sales margin figure.

Manufacturing management is more interested in *inventory turnover ratio* or *average days to sell inventory* since it tells them something about relative inventory levels. Inventory turn over ratio

(also known as inventory turns) = $\text{cost of goods sold} / \text{Average Inventory} = \text{Cost of Goods Sold} / ((\text{Beginning Inventory} + \text{Ending Inventory}) / 2)$ and its inverse

$\text{Average Days to Sell Inventory} = \text{Number of Days a Year} / \text{Inventory Turn Over Ratio} = 365 \text{ days a year} / \text{Inventory Turn Over Ratio}$

This ratio estimates how many times the inventory turns over a year. This number tells us how much cash/goods are tied up waiting for the process and is a critical measure of process reliability and effectiveness. So a factory with two inventory turns has six months stock on hand which generally not a good figure (depending upon industry) whereas a factory that moves from six turns to twelve turns has probably improved effectiveness by 100%. This improvement will have some negative results in the financial reporting since the 'value' now stored in the factory as inventory is reduced.

Whilst the simplicity of these accounting measures of inventory are very useful they are in the end fraught with the danger of their own assumptions. There are in fact so many things which can vary hidden under this appearance of simplicity that a variety of 'adjusting' assumptions may be used. These include:

- Specific Identification
- Weighted Average Cost
- Moving-Average Cost
- FIFO, and LIFO.

Inventory Turn is a financial accounting tools for evaluating inventory and it is not necessary a management tool. Inventory management should be forward looking. The methodology applied is based on historical cost of goods sold. The ratio may not be able to reflect the usability of future production demand as well as customer demand.

Business models including Just in Time (JIT) Inventory, Vendor Managed Inventory (VMI) and Customer Managed Inventory (CMI) attempt to minimize on-hand inventory and increase inventory turns. VMI and CMI have gained considerable attention due to the success of third party vendors who offer added expertise and knowledge that organizations may not possess.

4. JIT

JIT emphasizes inventory as one of the seven wastes (overproduction, waiting time, transportation, inventory, processing, motion and product defect), and as such its practice involves the philosophical aim of reducing input buffer inventory to zero. Zero buffer inventory means that production is not protected from exogenous (external) shocks. As a result, exogenous shocks reducing the supply of input can easily slow or stop production with significant negative consequences. For example, Toyota suffered a major supplier failure as a result of the 1997 Aisin fire which rendered one of its suppliers incapable of fulfilling Toyota's orders. In the U.S., the 1992 railway strikes resulted in General Motors having to idle a 75,000-worker plant because they had no supplies coming in.

5. Transaction cost approach

JIT reduces inventory in a firm. However, unless it is used throughout the supply chain, it can be hypothesized that firms are simply outsourcing their input inventory to suppliers. This effect was investigated by Newman (1993), who found, on average, suppliers in Japan charged JIT customers a 5% price premium.

6. Environmental concerns

During the birth of JIT, multiple daily deliveries were often made by bicycle; with increases in scale has come the adoption of vans and lorries (trucks) for these deliveries. Cusumano (1994) has highlighted the potential and actual problems this causes with regard to gridlock and the burning of fossil fuels. This violates three JIT wastes:

- Time; wasted in traffic jams
- Inventory; specifically pipeline (in transport) inventory and
- Scrap; with respect to petrol or diesel burned while not physically moving.

7. Price volatility

JIT implicitly assumes a level of input price stability such that it is desirable to inventory inputs at today's prices. Where input prices are expected to rise storing inputs may be desirable.

8. Quality volatility

JIT implicitly assumes the quality of available inputs remains constant over time. If not, firms may benefit from hoarding high quality inputs.

9. Demand stability

Karmarker (1989) highlights the importance of relatively stable demand which can help ensure efficient capital utilization rates. Karmarker argues without a significant stable component of demand, JIT becomes untenable in high capital cost production. In the U.S., the 1992 railway strikes resulted in General Motors having to idle a 75,000-worker plant because they had no supplies coming in.

: Capital Budgeting And Cost Analysis

Topic Objective:

At the end of this topic students will be able to understand:

- Capital budgeting
- Net present value
- Internal rate of return
- Equivalent annuity method
- Real options
- Ranked Projects

Definition/Overview:

Capital budgeting (or investment appraisal) is the planning process used to determine whether a firm's long term investments such as new machinery, replacement machinery, new plants, new products, and research development projects are worth pursuing.

Key Points:**1. Capital budgeting**

Capital budgeting focuses on an individual investment project throughout its life, recognizing the time value of money. The life of a project is often longer than a year. Accrual accounting focuses on a particular accounting period, often a year, with an emphasis on income determination.

The six stages in capital budgeting are the following:

- An identification stage to determine which types of capital investments are necessary to accomplish organization objectives and strategies.
- A search stage that explores alternative capital investments that will achieve organization objectives.
- An information-acquisition stage to consider the expected costs and expected benefits of alternative capital investments.
- A selection stage to choose projects for implementation.
- A financing stage to obtain project funding.
- An implementation and control stage to get projects under way and monitor their performance.

In essence, the discounted cash-flow method calculates the expected cash inflows and outflows of a project as if they occurred at a single point in time so that they can be aggregated (added, subtracted, etc.) in an appropriate way and then they can be compared to cash flows from other projects. Only quantitative outcomes are formally analyzed in capital budgeting decisions. Many effects of capital budgeting decisions, however, are difficult to quantify in financial terms.

These non-financial or qualitative factors (for example, the number of accidents in a manufacturing plant or employee morale) are important to consider in making capital budgeting decisions.

2. Net present value

Each potential project's value should be estimated using a discounted cash flow (DCF) valuation, to find its net present value (NPV). (First applied to Corporate Finance by Joel Dean in 1951; see also Fisher separation theorem, John Burr Williams: Theory.) This valuation requires estimating the size and timing of all of the incremental cash flows from the project. These future cash flows are then discounted to determine their *present value*. These present values are then summed, to get the NPV. See also Time value of money. The NPV decision rule is to accept all positive NPV projects in an unconstrained environment, or if projects are mutually exclusive, accept the one with the highest NPV (GE).

The NPV is greatly affected by the discount rate, so selecting the proper rate - sometimes called the *hurdle rate* - is critical to making the right decision. The hurdle rate is the minimum acceptable return on an investment. It should reflect the riskiness of the investment, typically measured by the volatility of cash flows, and must take into account the financing mix. Managers may use models such as the CAPM or the APT to estimate a discount rate appropriate for each particular project, and use the weighted average cost of capital (WACC) to reflect the financing mix selected. A common practice in choosing a discount rate for a project is to apply a WACC that applies to the entire firm, but a higher discount rate may be more appropriate when a project's risk is higher than the risk of the firm as a whole.

3. Internal rate of return

The **internal rate of return** (IRR) is defined as the discount rate that gives a net present value (NPV) of zero. It is a commonly used measure of investment efficiency. The IRR method will result in the same decision as the NPV method for (non-mutually exclusive) projects in an unconstrained environment, in the usual cases where a negative cash flow occurs at the start of the project, followed by all positive cash flows. In most realistic cases, all independent projects

that have an IRR higher than the hurdle rate should be accepted. Nevertheless, for mutually exclusive projects, the decision rule of taking the project with the highest IRR - which is often used - may select a project with a lower NPV.

In some cases, several zero NPV discount rates may exist, so there is no unique IRR. The IRR exists and is unique if one or more years of net investment (negative cash flow) are followed by years of net revenues. But if the signs of the cash flows change more than once, there may be several IRRs. The IRR equation generally cannot be solved analytically but only via iterations. One shortcoming of the IRR method is that it is commonly misunderstood to convey the actual annual profitability of an investment. However, this is not the case because intermediate cash flows are almost never reinvested at the project's IRR; and, therefore, the actual rate of return is almost certainly going to be lower. Accordingly, a measure called Modified Internal Rate of Return (MIRR) is often used. Despite a strong academic preference for NPV, surveys indicate that executives prefer IRR over NPV, although they should be used in concert. In a budget-constrained environment, efficiency measures should be used to maximize the overall NPV of the firm. Some managers find it intuitively more appealing to evaluate investments in terms of percentage rates of return than dollars of NPV.

4. Equivalent annuity method

The *equivalent annuity* method expresses the NPV as an annualized cash flow by dividing it by the present value of the annuity factor. It is often used when assessing only the costs of specific projects that have the same cash inflows. In this form it is known as the *equivalent annual cost* (EAC) method and is the cost per year of owning and operating an asset over its entire lifespan. It is often used when comparing investment projects of unequal lifespans. For example if project A has an expected lifetime of 7 years, and project B has an expected lifetime of 11 years it would be improper to simply compare the net present values (NPVs) of the two projects, unless the projects could not be repeated.

The use of the EAC method implies that the project will be replaced by an identical project. Alternatively the *chain method* can be used with the NPV method under the assumption that the projects will be replaced with the same cash flows each time. To compare projects of unequal length, say 3 years and 4 years, the projects are *chained together*, i.e. four repetitions of the 3 year project are compare to three repetitions of the 4 year project. The chain method and the

EAC method give mathematically equivalent answers. The assumption of the same cash flows for each link in the chain is essentially an assumption of zero inflation, so a real interest rate rather than a nominal interest rate is commonly used in the calculations.

5. Real options

Real options analysis has become important since the 1970s as option pricing models have gotten more sophisticated. The discounted cash flow methods essentially value projects as if they were risky bonds, with the promised cash flows known. But managers will have many choices of how to increase future cash inflows, or to decrease future cash outflows. In other words, managers get to manage the projects - not simply accept or reject them. Real options analysis try to value the choices - the option value - that the managers will have in the future and adds these values to the NPV.

6. Ranked Projects

The real value of capital budgeting is to rank projects. Most organizations have many projects that could potentially be financially rewarding. Once it has been determined that a particular project has exceeded its hurdle, then it should be ranked against peer projects (e.g. - highest Profitability index to lowest Profitability index). The highest ranking projects should be implemented until the budgeted capital has been expended

: Management Control Systems, Transfer Pricing, And Multinational Considerations

Topic Objective:

At the end of this topic students will be able to understand:

- Management Control Systems
- Transfer Price
- Cost and price information

Definition/Overview:

Management Control Systems (MCS) is a system which gathers and uses information to evaluate the performance of different organizational resources like human, physical, financial and also the organization as a whole considering the organizational strategies. Finally, MCS influences the behavior of organizational resources to implement organizational strategies. MCS might be formal or informal. The term management control was given of its current connotations by Robert N. Anthony

Key Points:**1. Management Control Systems**

A management control system is a means of gathering and using information to aid and coordinate the planning and control decisions throughout an organization and to guide the behavior of its managers and employees. The goal of the system is to improve the collective decisions within an organization. To be effective, management control systems should be (a) closely aligned to an organization's strategies and goals, (b) designed to fit the organization's structure and the decision-making responsibility of individual managers, and (c) able to motivate managers and employees to put in effort to attain selected goals desired by top management. Motivation combines goal congruence and effort. Motivation is the desire to attain a selected goal specified by top management (the goal-congruence aspect) combined with the resulting pursuit of that goal (the effort aspect).

The topic cites five benefits of decentralization:

- Creates greater responsiveness to local needs
- Leads to gains from faster decision making
- Increases motivation of subunit managers
- Assists management development and learning

- Sharpens the focus of subunit managers

The four costs of decentralization:

- Leads to suboptimal decision making
- Focuses managers attention on the subunit rather than the company as a whole
- Increases costs of gathering information
- Results in duplication of activities

Organizations typically compare the benefits and costs of decentralization on a function-by-function basis. For example, companies with highly decentralized operating divisions frequently have centralized income tax strategies.

2. Transfer Price

A transfer price is the price one subunit of an organization charges for a product or service supplied to another subunit of the same organization. The two segments can be cost centers, profit centers, or investment centers. For example, the allocation of service department costs to production departments that are set up as either cost centers or investment centers is an example of transfer pricing.

The three general methods for determining transfer prices are:

- Market-based transfer prices
- Cost-based transfer prices
- Negotiated transfer prices

Transfer prices should have the following properties. They should

- promote goal congruence,
- be useful for evaluating subunit performance,
- motivate management effort, and
- preserve a high level of subunit autonomy in decision making.

Transferring products or services at market prices generally leads to optimal decisions when (a) the market for the intermediate product market is perfectly competitive, (b) interdependencies of subunits are minimal, and (c) there are no additional costs or benefits to the company as a whole from buying or selling in the external market instead of transacting internally. One potential limitation of full-cost-based transfer prices is that they can lead to suboptimal decisions for the company as a whole. An example of a conflict between divisional action and overall company profitability resulting from an inappropriate transfer-pricing policy is buying products or services outside the company when it is beneficial to overall company profitability to source them internally. This situation often arises where full-cost-based transfer prices are used. This situation can make the fixed costs of the supplying division appear to be variable costs of the purchasing division. Another limitation is that the supplying division may not have sufficient incentives to control costs if the full-cost-based transfer price uses actual costs rather than standard costs.

The purchasing division sources externally if market prices are lower than full costs. From the viewpoint of the company as a whole, the purchasing division should source from outside only if market prices are less than variable costs of production, not full costs of production.

Reasons why a dual-pricing approach to transfer pricing is not widely used in practice include:

- In this approach, the manager of the supplying division uses a cost-based method to record revenues and does not have sufficient incentives to control costs.
- This approach does not provide clear signals to division managers about the level of decentralization top management wants.
- This approach tends to insulate managers from the frictions of the marketplace because costs, not market prices, affect the revenues of the supplying division.
- It leads to problems in computing the taxable income of subunits located in different tax jurisdictions.

3. Cost and price information

Cost and price information are often useful starting points in the negotiation process. Costs, particularly variable costs of the selling division, serve as a floor below which the selling division would be unwilling to sell. Prices that the buying division would pay to purchase

products from the outside market serves as a ceiling above which the buying division would be unwilling to buy. The price negotiated by the two divisions will, in general, have no specific relationship to either costs or prices. But the negotiated price will generally fall between the variable costs-based floor and the market price-based ceiling.

The general transfer-pricing guideline specifies that the minimum transfer price equals the *incremental cost per unit* incurred up to the point of transfer *plus* the *opportunity cost per unit* to the supplying division. When the supplying division has idle capacity, its opportunity cost per unit is zero; when the supplying division has no idle capacity, its opportunity cost per unit is positive. Hence, the minimum transfer price will vary depending on whether the supplying division has idle capacity or not.

Alternative transfer-pricing methods can result in sizable differences in the reported operating income of divisions in different income tax jurisdictions. If these jurisdictions have different tax rates or deductions, the net income of the company as a whole can be affected by the choice of the transfer-pricing method.

: Performance Measurement, Compensation, And Multinational Considerations

Topic Objective:

At the end of this topic students will be able to understand:

- Performance measurement
- Challenges in Performance Measurement
- Performance Measurement Guidelines
- Organizational Performance Targets
- Performance Targeting Pitfalls
- Practice

Definition/Overview:

Performance measurement is the process whereby an organization establishes the parameters within which programs, investments, and acquisitions are reaching the desired results.

Key Points:**1. Performance measurement**

There are many types of measurements. In school, exams are graded to establish the academic abilities; in sports, time is clocked in split seconds to verify the athletic abilities. Similarly in teams and organizations, there are various tools and measurements to determine how well it performs. Gamble, Strickland and Thompson (2007, p. 99) provide a comprehensive method for measuring performance of organizations. How well each company performs is dependent on the strategic plan. Some of the measurements include basic financial ratios such as debt-to-equity ratio and if the levels are an issue with creditworthiness. The daunting task of measuring performance for organizations across industries and eras, declaring the top performers, and finding the common drivers of their success did not occur to anyone until around 1982, when Tom Peters and Bob Waterman got down to work researching and writing *In Search of Excellence*. This publishing sensation challenged industrial managers actions and attitudes, and inspired researchers and scholars to further pursue the theory of high performance the holy grail of any competitive business organization. This task becomes more complex as corporations diversify into multiple industries. A researcher must take this into consideration when conducting a comparative analysis of companies.

2. Challenges in Performance Measurement

The traditional control-oriented performance measurement system in the industrial era is losing its relevance in today's fast changing environment where organizations are re-shaped into flat multi-functional hierarchies. Performance measurement will get tougher with globalization and increasing complexity of organizations business models, teams roles and responsibilities.

2.1 Diversity of organizations and professionals

A huge variety of organizations exist today. For example, there are government, education, financial services, manufacturing, retail, non-profit, food and beverage. Then, there are sub-industries. In financial services, we can break down into the banks, insurance, exchange and so on. And in each, we can for example break down a bank into deposit, loan, credit card, investment departments. In deposit department, we have savings, current and fixed accounts. This break down goes on until we have an individual that performs a task that is unique. If the bank example has 10,000 staff, are we going to have 10,000 different performance measurements? It will be a challenge for an organization to keep track of the huge diversity of skilled professionals and ensure alignment to its mission and values.

2.2 Intangible and non-financial measurements

Traditionally, accountants play a major role in measuring an organizations success. Unfortunately, annual reports do not allow managers to monitor the progress to build capabilities and acquire the intangible assets needed for future growth. Non-financial measurements will be required to link a companys long term strategy with its short term actions.

Unlike financial measurements which are straight-forward and certain, non-financial measurements will require more judgment and justification. For instance, how would a private banker translate the banks mission of "To be the preferred bank in Asia" into actionable and measurable tasks? When two private bankers achieved the same sales revenue, how will the manager measure who is more motivated, hardworking, responsible or trustworthy? Furthermore, unlike financial measurements which are governed by accounting standards and principles, non-financial measures will be more susceptible to misuse and manipulation. There are no direct answers because not everything can be measured objectively and there will be a threshold before measurements become counter-productive.

2.3 Relationship with evaluation

Performance measurement is conceptually related to other evaluation approaches. There tends to be something of a professional and conceptual divide between performance managers and evaluators, with evaluators criticizing some performance measurement approaches as being too simplistic. In particular there is the problem of attribution which is usually not dealt with well in performance measurement systems. This relates to the discussion in the previous paragraph on intangible and non-financial measurement. Put in its simplest form, the mere measurement of changes in outcomes over a period of time does not establish attribution. Even if an actor (organization, policy or person) takes action over the period of time in which measured outcomes improve this, in itself, does not say anything about whether such measured changes can be attributed to the actions of the actor rather than to any other factor.

Evaluation as a discipline puts a major focus on attempting to establish attribution by using various experimental and other methods which make claims about attribution by controlling for other factors. The performance measurement movement, on the other hand, can challenge evaluators over the fact that their designs often involve extensive and costly studies which are not feasible in the vast majority of cases where performance needs to be measured quickly and cheaply for pragmatic management reasons.

2.4 Change management practices

As with any other organizational change management program, implementing a performance measurement system will encounter resistance especially in large bureaucratic organizations. First of all, nobody likes to be measured. Self-serving managers who are experts in their field may have the freedom to choose and manipulate measures for their own benefit. Further in large, global organizations, consistency in implementation across departments may be a problem if communication and coordination is not executed well. Lastly, inexperienced

managers may not know what they want to find out and collect data and statistics which may not be that useful. This will cause frustrations and unnecessary effort for staff at the working level to prepare additional data and reports which adds no value.

3. Performance Measurement Guidelines

3.1 Process Improvement

Throughout the implementation of a Performance Management system, which may span from months to years, there is a need to constantly focus on the critical goals that can bring visible progress and enhancement. Otherwise, there is a tendency for busy employees to lose sight of the ultimate objective of performance measurement, and treat its implementation as a mere data collection exercise for management. Teams must create measures that support their mission, or they will not fully exploit their ability to perform the process faster and more responsive. In addition, to remain competitive and relevant, the measures need to be continually reviewed and revised as the environment and economy changes.

3.2 Employee Involvement

A truly empowered team must play the lead role in designing its own measurement system as it will know best what sort of measurement it needs to align with the organizations strategy. This empowerment should not be limited to management level or the finance department, but be extended to every single individual in the organization. Everyone contributes and owns the Performance Measurement system. Everyone plays a part.

3.3 Reportable

There is no value for measurements that cannot be put into a simple and clear report. Measurements must focus on most the critical items and not sacrifice quality for quantity.

Too much measurement may mean that teams end up spending too much time collecting data, monitoring their activities, and not enough time managing the project outcome.

For example when a car is driven in a city, there are big meters on the dashboard that indicate the speed, amount of fuel, engine temperature and so on. They are sufficient for one to get from one place to another safely. We do not want the engineers to spend time designing a dashboard that crowd us with unnecessary technical information such as atmospheric pressure, air flow speed, engine or exhaust noise level.

A well implemented Performance Measurement system should eventually be a tool that allows a consistent language to be used within the organization. It should allow different individuals to trace their measurements to the management and organization goals; or allow different departments to cross-reference their priorities and targets using the same language.

3.4 Forward Looking

Unlike financial measurements that often record past accounting numbers, a good Performance Measurement system should also capture its relevance to the organization vision, validate its strategies and chart new directions. It should not dwell in the past but focus on measurements that impact future deliverables. Unfortunately, enduring goals require more effort and many organizations prefer to focus on initiatives that promise short-term financial results even though other initiatives may have higher long-term payoffs. A possible reason is the increasing competitiveness and high staff turnover. This builds a culture of short-term permanent employment, where employees do not foresee themselves to stay on with any organization long enough to see any long-term plans bear fruit. One possible solution for such long-term goals which cannot be realized for many years (such as in the case of government initiatives), is to identify meaningful output-oriented milestones that lead to achieving the long-term outcome.

3.5 Optimization

Will improvement in one area of the organization be achieved at the expense of another? If it does, how much sacrifice or risk should the organization take? The Performance Measurement system should cover a comprehensive range of measures and offer perspectives that provide an understanding of cause-effect relationship to rearrange resources or priorities effectively. This usually requires a balance of financial and non-financial measures. For example, should a manufacturer delay production dateline because a new supplier is coming with cheaper alternatives to save cost? Or should an estate investor forgo the stringent, time consuming regulatory and compliance checks before making the hot, time-sensitive deal that has the potential to bring in millions in profit?

3.6 Realistic

The measures agreed by the employer and employee have to be ambitious and challenging, and at the same time, be realistic and attainable. Too little means employees fall into complacency; too much and they start to rebel or leave. This requires a careful balance and is the managers call and responsibility if there are disagreements.

3.7 Management Commitment

Before anything can be done, senior managers need to buy-in to the change management philosophy and adopt the performance-based management principles. There must be management endorsement at company wide level to ensure consistency with other existing initiatives such as cross-functional integration, customer-supplier partnership, continuous improvement, and team, rather than individual accountability. The focus should be on strategy and vision, and not day-to-day operational controls. Managers should dictate strategic goals, ensure that each team understands how its job fits into the strategy, and provide training so that the team can devise its own measures. The ownership and accountability for performance remains with the teams, and managers should allow the teams to decide which measures will best help them perform their jobs. Managers should not make

the mistake of thinking that they know what is best for the team. If they do, they have crossed the line, returned back to the command-and-control ways, and render their empowered teams powerless.

4. Organizational Performance Targets

Setting organizational performance targets is a natural sequel to the implementation of a performance measurement system. If an organization were to decide to measure its performance against (let's say) the number of clients served in a year, then it would not be surprising if the organization were to establish a target related to that measure. The organization might set a target of, say, "service provided to 50,000 clients in 2008". This target (together with, presumably, a number of others) would become a basis for assessing the quality of the performance of the organization as a whole, or of a unit within the organization, or even of particular employees. The implication of setting a performance target is that failure to meet the target implies substandard performance unless a satisfactory explanation can be provided as to why the target was not met.

Performance targeting has an important place in the organizational manager's toolkit. There is no reason to doubt that, when used properly, targeting can make a positive contribution to organizational performance. However, the assumption that organizations will indeed make proper use of performance targets is not always well founded. Designers of performance targeting schemes – if they wish to add value to their organizations performance must bear in mind the limitations of performance targeting, and the potential of targeting schemes to cause significant and unintended perverse outcomes. Experience has shown that when targeting schemes are not carefully designed and implemented, they risk causing more harm than good.

5. Performance Targeting Pitfalls

What follows is a discussion of the significant pitfalls to be avoided when establishing a set of organizational performance targets. Many of the issues raised here are likely to be felt most acutely in public-sector and quasi-public-sector organizations because of the special conditions

related to oversight and accountability in the public as opposed to the private sector.

Nevertheless, the underlying analysis is relevant to both the public and the private domains.

The intention behind the establishment of performance targets is to focus organizational attention on particular outputs and outcomes, and to align the behavior of individuals with overall organizational goals and the expectations of stakeholders. However, as is the case with virtually every scheme designed to influence human behavior, performance targeting systems are subject to the law of unintended consequences. In many cases, unintended behaviors induced by performance targets are perverse, leaving organizations and their stakeholders worse off than before the introduction of targets. A common manifestation of this is where individuals focus more on meeting targets themselves than on the products, services or benefits that their organization is supposed to be delivering. Targets, if badly used, can cause organizations to focus on the trees rather than the forest. Examples are legion.

Many ... negative consequences occur because a strong feature of the justifications for the use of [performance measurement] is the assumption that the process of measurement does not influence the behaviour of individuals and institutions involved. This assumption ... is questionable. ... (P)erformance assessment does indeed affect behaviour, and such side-effects are often counter-productive. Thus, among cardiac surgeons in New York whose individual unadjusted patient death-rates have been published regularly, there has been a tendency to avoid taking on high risk cases with a subsequent increase in mortality of Medicare patients at risk for cardiac surgery. In the State of Texas a program of rewarding schools and teachers based upon published test scores has been shown to have produced dubious results, despite apparently very rapid increases in test scores overall as a result of teaching to the test.

Other well documented hazards of introducing performance targets include:

- **Cheating.** Biased manipulation, as well as outright fabrication, of performance data in order to create an appearance that targets are being met, is a common phenomenon. This raises the question of the need for external validation of reporting against performance targets. Experience from the United Kingdom (UK) has revealed significant variation across government departments in how progress against targets is reported. Not surprisingly, departments have been found to be more forthcoming about targets that have been met than about those where slippage had occurred. When the UK National Audit Office validated departmental performance reports, it found in over 80 percent of its investigations that departments had materially misstated their

achievements or failed to disclose potentially material weaknesses in their data. Organizations are therefore well advised to provide for independent validation of internal reporting against performance targets.

- **Blaming.** There is a marked tendency for organizations, especially in the public sector, to regard performance measurement systems as a basis for finding fault and laying blame, rather than a basis for organizational learning. This has proven to be a major obstacle to successful implementation of performance targeting schemes. Performance targets are unlikely to have a meaningful positive impact on organizational performance when the corporate culture emphasizes fault-finding over learning.
- **Proliferating.** The ostensible purpose of targets is to focus attention on things that matter most to the organization, to its clients and to other stakeholders. Even so, many organizations introduce large numbers of targets that end up defeating this purpose by diffusing rather than focusing attention. The UK government originally introduced 366 government-wide performance targets in 1998, but found it necessary to reduce the number to 123 by 2002. In the United States (US), the state of Oregon was a pioneer in the creation of social and economic performance indicators and targets to assess progress toward the achievement of broad policy goals. Oregon's "Benchmarking" initiative was launched in 1989 with 158 indicators, or "benchmarks" and accompanying targets. By 1993, the number of benchmarks had increased to 272. To be sure, Oregon's approach to social and economic benchmarking and targeting has been widely praised, and, since its introduction, has been adapted by other states and municipal governments. But an early criticism of the Benchmarks project was its unwieldiness due to the high number of indicators and targets. Over the years the number of indicators was pared back from the high point of 272 to 90. The "keep it simple" rule applies with considerable force to performance targeting schemes. The larger and more complicated they are, the less likely it is that they will make a meaningful, positive contribution to organizational performance.
- **Groping in the Dark.** It is not uncommon for organizations to set performance targets without first assessing the practicalities of implementing a system for performance monitoring. Targets may be set in the absence of adequate information about: (i) what constitutes a reasonable target figure; (ii) the availability and/or costs of obtaining data required to monitor performance in relation to targets; and (iii) the level of administrative effort (likely to be considerable) that may be required in order to support the performance monitoring system. The implication for designers

of performance targeting schemes is that these practical issues must be assessed up front, at the time when performance targets are being selected.

6. Practice

Several performance measurement systems are in use today, and each has its own group of supporters. For example, the Balanced Scorecard, Performance Prism, and the Cambridge Performance Measurement Process are designed for business-wide implementation; and the approaches of the TPM Process, 7-step TPM Process, and Total Measurement Development Method (TMDM) are specific for team-based structures. With continued research efforts and the test of time, the best-of-breed theories that help organizations structure and implement its performance measurement system should emerge. Although the Balanced Scorecard has become very popular, there is no single version of the model that has been universally accepted. The diversity and unique requirements of different enterprises suggest that no one-size-fits-all approach will ever do the job.