



Lecture Notes about Management Accounting, Financial Accounting and Cost Accounting.pdf

Cost Management (University of Melbourne)

Management accounting, financial accounting and cost accounting

Management accounting (practical science of value creation) measures and reports financial information as well as other types of information that are intended primarily to assist managers in fulfilling the goals of the organisation. Additionally, a **management accounting system** is an important facet of overall organisational control. CIMA considers MA to be the application of principles to create, protect, preserve and increase value for shareholders and it requires the identification, generation, presentation, interpretation and use of relevant information relevant to:

- Inform strategic decisions and formulate business strategy;
- Plan long, medium and short-term operations;
- Determine capital structure and fund that structure;
- Design reward strategies for executives and shareholders;
- Inform operational decisions;
- Control operations and ensure the efficient use of resources;
- Measure and report financial and non-financial performance to management and other stakeholders;
- Implement corporate governance procedures, risk management and internal controls.

Financial accounting focuses on external reporting that is directed by authoritative guidelines. **Cost accounting** measures and reports financial and non-financial information related to the organisation's acquisition and consumption of resources. It provides information for both MA and FA. Some broad differences between MA and FA:

- Regulations
- Range and detail of information – MA may encompass financial, non-financial and qualitative information which may be very detailed or highly aggregated. FA is usually broad based, lacking in detail and intended to provide an overview of the position and performance of an organisation over a period of time and tends to focus on financial information.
- Reporting interval
- Time period – MA may include historical and current values and expected future performance and activities while FA tends to be backward-looking.

Cost Management and accounting systems

Cost management is used to describe the actions that managers undertake in the short-run and long-run planning and control of costs that increase value for customers and lower the costs of products and services. CM is the recognition that prior management decisions often commit the organization to the subsequent incurrence of costs. It typically includes the continuous reduction of costs and encompasses the whole life cycle of the product from conception to deletion. CM is often carried as a key part of general management strategies and their implementation. Examples include enhanced customer satisfaction programmes, quality initiatives and more efficient supplier relationships via the internet. Hybrid accountants are those who combine the skills of business managers with those of accountant.

Strategic decisions and management accounting

Studies reveal that companies that emphasis creating long-term value for shareholders are likely to outperform those that focus on preserving shareholder value in the short-term. The shift towards managerial and strategic engagement rather than just acting as providers of large financial information about enterprises allows management accountants to align their work to the changing business and organisational landscape.

Accounting systems and management control

The accounting system (differ from organisation to organisation) aims to provide information for 5 broad purposes:

- Formulating overall strategies and long-range plans (new product development and investment in both tangible and intangible assets.
- Resource allocation decisions such as product and customer emphasis and pricing (reports on profitability of products)
- Cost planning and cost control of operations and activities
- Performance measurement and evaluation of people (comparison of actual with budgeted)
- Meeting external regulatory and legal reporting requirements where they exist

Planning and control – Management control system

We define **planning** as choosing goals, predicting results under various ways of achieving those goals and then deciding how to attain the desired goals. **Control** covers both the action that implements the planning decision and deciding on performance evaluation and the related feedback that will help future decision making.

Budget is a quantitative expression of a plan of action and an aid to the coordination and implementation of the plan.

Understanding the reasons for any difference between actual results and budgeted results is an important part of **management by exception**.

Feedback: A major key

It involves managers examining past performance and systematically exploring alternative ways to improve future performance. It can lead to a variety of responses such as:

- Tracking growth
- Searching for alternative means of operating
- Changing methods for making decisions
- Making predictions
- Changing operations
- Changing the reward system

Important functions of management accountants

Scorekeeping refers to the accumulation of data and the reporting of reliable results to all levels of management such as recording of sales and purchases of materials. **Attention-directing** is about the attempts to make visible both opportunities and problems on which managers need to focus. **Problem-solving** refers to comparative analysis undertaken to identify the best alternatives in relation to the organisation's goals. The first function emphasises the importance of the integrity of the information and the other two emphasise the helper role of the accountant.

Themes in the design of management accounting systems

The design of a management accounting system should be guided by the challenges facing managers.

1. Customer focus - because they are pivotal to the success of an organisation.
2. Value-chain and supply-chain analysis – **VC** is the sequence of business functions in which utility is added to the products or services. There are important gains to be realised from having the individual parts of the value chain work concurrently. Senior managers are responsible for deciding the firm's overall strategy, how resources are to be obtained and used and how rewards are to be given. **SC** describes the flow of goods, services and information from cradle to grave regardless of whether occur in the same firm or other firms. **CM** emphasises integrating and coordinating activities across all companies in the **SC** as well as across each business unit in an individual firm's **VC**.
3. Key success factors – These operational factors directly affect the economic viability of the organisation (cost, quality, time and innovation).
4. Continuous improvement and benchmarking.

Costs in general

Cost is a resource sacrificed or foregone to achieve a specific objective. To guide their decisions, managers often want to know how much a certain thing costs and this “thing” is called a **cost object**, which is anything for which a separate measurement of costs is desired.

A costing system typically accounts for costs in 2 basic stages (may occur simultaneously due to information-gathering advances such as barcodes or separately) namely:

- **Cost accumulation:** This is the accumulation of costs by some ‘natural’ often self-descriptive classification such as material or fuel. It is the collection of cost data in an organised way through an accounting system
- **Cost assignment:** This is the general term that encompasses both 1) **tracing** accumulated **direct costs** to a cost object and 2) **allocating** accumulated **indirect costs** to a cost object. Many accounting system accumulate actual costs which are the costs incurred (historical costs), as distinguished from budgeted or forecasted costs.

Direct costs of a cost object are those that are related to the particular cost object and that can be traced to it in as economically feasible way. **Indirect costs of a cost object** are those costs that are related to the particular cost object but cannot be traced in a cost-effective way; hence they are allocated using a cost allocation method.

Factors affecting direct/indirect cost classifications

- The materiality of the cost in question. Tracing insignificant costs do not justify the costs of money and time spent in tracing them.
- Available information-gathering technology improvement is enabling an increasing percentage of costs to be classified as direct costs.
- Design of operation.

The direct/indirect classification depends on the choice of the cost object.

Cost drivers and cost management

Cost reduction efforts frequently identify two key areas:

1. Focusing on value-added activities.
2. Efficiently managing the use of the cost drivers in those value-added activities.

A **cost driver**, also called a cost generator or cost determinant, is any factor that affects total costs. That is, a change in the level of the cost driver will cause a change in the level of total cost of a related cost object. Costs that do not vary in the SR and have no identifiable cost driver in the SR may have a cost driver in the LR. Some CDs are financial measures found in accounting systems such as direct manufacturing labour costs and sales while other are non-financial measures such as the number of parts per products. Changes in a particular CD do not automatically lead to changes in overall costs.

Cost behaviour pattern

Costs are defined as **variable** or **fixed** with respect to a specific cost object and for a given period of time.

The major assumptions underlying VCs and FCs are:

- Costs are defined as variable or fixed with respect to a specific cost object.
- The time span must be specified.
- Total costs are linear.
- There is only one cost driver and the influence of other possible cost drivers on total costs are held constant or deemed insignificant.
- Variations in the level of the cost driver are within a relevant range.

Relevant range

It is the range of the CD in which a specific relationship between cost and the level of activity or volume is valid. A FC is fixed only in relation to a given relevant range (usually wide) of the cost driver and a given time span (usually a particular budget period).

*For decision making, it is best to think in terms of TCs rather than unit costs.

Types of companies

Service-sector companies provide services or intangible products to their customers and they do not have any stock of tangible product at the end of the accounting period.

Merchandising-sector companies provide tangible products they have previously purchased in the same basic form from suppliers. **Manufacturing-sector companies** provide tangible

products that have been converted to a different form from that of the products purchased from suppliers. **Stock-related costs**, also called **inventoriable costs** are those costs associated with the purchase of goods for resale (merchandise) or costs associated with the acquisition and conversion of materials and other manufacturing inputs into goods for sale (manufacturing). Inventoriable costs become part of COGS in the period which the stock item is sold. **Operating costs** are all costs associated with generating revenues, other than COGS.

The term **absorption costing** is used to describe the method in which all manufacturing costs are inventoriable. **Variable costing** is the method whereby only variable manufacturing costs

are inventoriable and fixed manufacturing costs are treated as **period costs**, that is, they are treated as expenses in the period they are incurred rather than being inventoried. **Prime costs**

are all direct manufacturing costs. **Conversion costs** are all manufacturing costs other than direct material costs. These costs are for transforming DMs into finished goods. COGM

refers to the COG brought to completion whether they were started before or during the current accounting period. The MCs of the FGs include DMs, other DMCs and IMCs. All

these are inventoriable costs; they are assigned to WIP stock or FGs stocks until the goods are sold. Inventoriable costs include the costs of assets that facilitate the manufacturing process

and (typically) become part of IMCs. A **product cost** is the sum of the costs assigned to a product for specific purposes.

Job-costing systems

How much does it cost E&Y to audit Yamaha? Managers ask these questions for many purposes, including formulating overall strategies, determining product and service emphasis and pricing, engaging in cost control and meeting external reporting obligations. **Costing systems** aim to report cost numbers that reflect the way chosen cost objects use resources of an organisation. The systems tend to be tailored to the underlying operations and not vice-versa. Costing systems are only one source of information for managers. Generally, managers combine cost information with non-financial metrics and qualitative information when making decision.

A **cost pool** is a grouping of individual cost items and they can range from the very broad to the very narrow. **Cost-allocation base** is a factor that is the common denominator for systematically linking an indirect cost or group of ICs to a cost object. It can be financial or non-financial. Companies often seek to use the cost driver of the ICs as the CAB.

Job-costing system:

- Costs assigned to a distinct unit, batch or lot of a product or service.
- A job is a task for which resources are expended in bringing a distinct product or service to market.
- The product is usually custom-made.

Process-costing system:

- Cost object is masses of identical or similar units.
- Cost of a product is obtained by using broad averages to assign costs.
- Customers receive identical products.

Actual costing is a costing method that traces direct costs to a cost object by using the actual direct-cost rate(s) X the actual quantity of the direct-cost input(s) and allocates indirect costs based on the actual indirect-cost rate(s) X actual quantity of the CAB.

The general approach to job costing:

Step 1: Identify the job that is the chosen cost object.

Step 2: Identify the DCs for the job.

Step 3: Identify the IC pools associated with the job.

Step 4: Select the CAB to use in allocating each IC pool to the job.

Step 5: Develop the rate per unit of the CAB used to allocate ICs to the job.

Step 6: Assign the costs to the cost object by adding all the DCs and all ICs.

Managers and accountants gather the information that goes into their costing system through **source documents**, which are the original records that support journal entries in an accounting system. The 3 key source documents are **job cost record/sheet**, **materials requisition record** and **labour time record**.

Normal costing

Managers often want more timely information about actual job costs and hence we can use normal costing, whereby budgeted rather than actual amounts are used to calculate IC rates. Both AC and NC trace DCs to jobs in the same way, however it uses a predetermined/budgeted rate for allocating ICs.

General ledger and subsidiary ledgers

As we have noted, a job-costing system has a separate job cost record for each job. This is typically found in a subsidiary ledger. The general ledger section gives a 'bird's-eye view' of the costing system; the amounts are based on the illustration that follows. The subsidiary ledgers and the basic source documents contain the underlying details – the 'worm's-eye view'. General ledger accounts with the word *control* in their title are supported by underlying subsidiary ledgers.

Budgeted ICs and end-of-period adjustments

Advantage of budgeted ICs: more timely than actual IC rates

Disadvantage: Probably inaccurate and this gives rise to under/over allocated ICs

Under/Over allocated ICs = ICs incurred – ICs allocated

Manufacturing overhead control is the record of actual costs in all the individual overhead categories whereas **manufacturing overhead allocated** is the record of the manufacturing overhead allocated to individual jobs on the basis of budgeted rate multiplied by actual machine hours.

The **adjusted allocation rate approach** restates all entries in the GL by using actual cost rates rather than budgeted cost rates. The result is that every single job cost record – as well as the closing stock and COGS accounts – accurately represents actual ICs incurred. This approach increases accuracy and provide managers with useful insights for future decisions about product pricing and about which product to emphasis. **Proration** is the term we use to refer to the spreading the difference among closing stocks and COGS. There are **3 methods** under this approach.

If managers wish to develop the most accurate record of individual job costs for profitability analysis purposes, the adjusted allocation rate is preferred. The proration approaches do not make any adjustment to individual job cost records. If the purpose is confined to reporting the most accurate stock and COGS figures, either the adjusted allocation rate or the Method 1 proration should be used. Both give the same ending balances of WIP, FG and COGS that would have been reported had an actual IC rate been used. Method 2 is frequently justified as being a lower-cost way of approximating the results from Method 1. The implicit assumption is Method 2 is that the ratio of manufacturing overhead costs allocated to total manufacturing costs is similar in WIP, FG and COGS. Where this assumption does not hold, Method 2 can yield very different figures compare to Method 1. Many companies use Method 3 for several reasons. First it is the simplest. Second, the 2 methods often result in similar amounts for ending WIP, FG and COGS.

Process-costing systems

The principal difference between PC and JC is the extent of averaging used to calculate unit costs of products or services. Knowing what products cost is important information for stock valuation, pricing decisions and product profitability analysis. In a manufacturing PC setting, each unit is assumed to receive the same amount of DMCs, DMLCs and IMCs. Conversion costs are all manufacturing costs other than DMCs. These include manufacturing labour, indirect materials, energy, and plant depreciation and so on. PC systems separate costs into cost categories according to the timing of when costs are introduced into the process.

Steps:

1. Summarise the flow of physical units of output.
2. Compute output in terms of equivalent units. And focus on quantities here.
3. Compute equivalent units.
4. Summarise total costs to account for.
5. Assign total costs to units completed and to units in closing WIP.

Equivalent units is a derived amount of output units that takes the quantity of each input in units completed or in WIP, and converts it into the amount of completed output units that could be made with that quantity of input.

Weighted-average process-costing method calculates the equivalent unit cost of the work done to date regardless of the period in which it was done and assigns this cost to EUs completed and transferred out of the process and to EUs in closing WIP stock. The WAM is the total of all costs entering the WIP account regardless of whether it is from opening WIP or from work started during the period divided by total EUs of work done to date.

EUs in opening WIP + EUs of work done in current period = EUs completed and transferred out in current period + EUs in WIP.

First-in, first-out (FIFO) process-costing method assigns the cost of the previous period's equivalent units in opening WIP stock to the first units completed and transferred out of the process, and assigns the cost of EUs worked on during the current period first to complete beginning stock, then to start and complete new units, and finally to units in closing WIP stock. This method assumes that the earliest equivalent units in WIP – Assembly account are completed first. A distinctive feature of this method is work done on the opening stock before the current period is kept separate from work done in the current period.

The major advantage of FIFO is that it provides managers with information about changes in the costs per unit from one period to the next. They can use this information to evaluate their performance in the current compared with a benchmark. The major advantages of WAM, however, are its computational simplicity and its reporting of a more representative average unit cost when input prices fluctuate markedly from month to month.

Transferred-in costs in process costing

Many process-costing systems have two or more departments or processes in the production cycle. As units move from department to department, the related costs are also transferred by monthly journal entries. Here, the units receive additional DMs at the end of the process and conversion costs are added evenly.

Transferred-in costs, also known as previous department costs, are the costs incurred in a previous department that are carried forward as the product's cost when it moves to a subsequent process in the production cycle. Transferred-in costs are treated as if they are a separate type of DM added at the opening of the process. In other words, when successive departments are involved, transferred units from one department become all or a part of the direct materials of the next department; however, they are called transferred-in costs, not DMCs.

Remember:

- To include transferred-in costs from previous departments in your calculation.
- In calculating costs to be transferred on a FIFO basis, do not overlook the costs assigned at the opening of the period too units that were in process but are now included in the units transferred.
- When units are transferred, they are costed at one average unit cost.
- Their measurements must be converted to the actual department's measurement unit.

Hybrid and operating costing systems

A hybrid-costing system blends characteristics from both JC and PC systems.

An operation is a standardised method or technique that is performed repetitively regardless of the distinguished features of the finished good. Operations are usually conducted within departments.

Operation costing is a hybrid-costing system applied to batches of similar products. Each batch of products is often a variation of a single design and proceeds through a sequence of selected activities or operations. Within each operation, all product units are treated exactly alike, using identical amounts of the operation's resources. Batches are also termed production runs. An OC system uses work orders that specify the needed DMs and step-by-step operations. Product costs are compiled for each work order. DMs that are unique to different work orders are specifically identified with the appropriate work order as in JC systems. The conversion cost for each unit passing through a given operation is the same regardless of the work order. Why? Because each unit passing through an operation uses identical amounts of that operation's resources.

Managers often find OC useful in Cm because it focuses on physical processes, or operations, of a given production system. OC captures the financial impact of the control of physical processes. Feedback from an OC can therefore provide essential insight into the control of physical processes and the management of operation costs.

Indirect cost pools and cost allocation

A **homogeneous cost pool** is one in which all activities whose costs are included in the pool have same or a similar cause-and-effect relationship or benefits-received relationship between the cost allocator and the costs of the activity. Why is homogeneity important? Because using homogeneous indirect-cost pools enables more accurate product, service and customer costs to be obtained. A consequence of using a homogeneous cost pool is that the cost allocations using that pool will be the same as would be made if costs of each individual activity in that pool were allocated separately. The greater the degree of homogeneity, the fewer cost pools required to explain accurately the differences in how products use resources of the organisation.

Three key issues that arise when allocating costs from one department to another are:

1. Whether to use single-rate or dual-rate method.
2. Whether to use budgeted rates of actual rates.
3. Whether to use budgeted quantities or actual quantities.

A **single-rate cost-allocation method** pools all costs in one cost pool and allocates them to cost objects using the same rate per unit of the single allocation base. In the **dual-rate method**, costs are grouped into two separate pools, each of which has a different allocation rate and which may have a different allocation base.

One obvious benefit of the single method is the low cost of implementation. However, it leads divisions to take actions that appear to be in their best interest but are not in the best interest of the organisation as a whole. One important benefit of the dual method is that it signals to division managers how VCs and FCs behave differently and this could steer managers into making decisions that benefit the corporation as well as each division.

When cost allocations are made using **budgeted rates**, managers of divisions to which costs are allocated face no uncertainty about the rates to be used in that period. In contrast, when **actual rates** are used, managers do not know the rates to be used until the end of the accounting period. When **budgeted usage** is the allocation base, user divisions will know their allocated costs in advance. This helps them with SR and LR planning. The main justification given for use of budgeted usage to allocate FCs relates to long-range planning.

An **operation department**, also known as production department, add value to a product or service that is observable by the customer. A **support department**, also called a service department, provides services that maintain the other internal departments.

The 3 main methods of allocating support department costs to operating departments are direct, step-down (step-allocation or sequential-allocation) and reciprocal. The **direct method** ignores any reciprocal support among support departments. The **step-down method** allows for partial recognition while the **reciprocal method** provides full recognition of support among support departments. The figures obtained under the reciprocal method differ little from the first two methods.

Activity-based Costing

We might use the term **cost smoothing** to describe a costing approach that uses broad averages to uniformly assign the cost of resource to cost objects (such as products, services or customers) when the individual products, services or customers in fact use those resources in a non-uniform way. This leads to **undercosting** whereby a product consumes a relatively high level of resources but is reported to have a relatively low total cost and vice-versa for **overcosting**. **Product-cost cross-subsidisation** means that at least one miscosted product is resulting in the miscosting of other products in the organisation. Remember the restaurant bill example here!

A **refined costing system** reduces the use of broad averages for assigning the cost of resources to cost objects and provides better measurement of the costs of indirect resources used by different cost objects – no matter how differently the different cost objects use indirect resources. It means making changes that result in cost numbers that better measure the way cost objects differentially use the resources of the organisation. **Why is it used though?**

1. Increase in product diversity (more customised products to differentiate from competitors).
2. Increase in ICs (advances in product and process technology have led to increases in ICs and decreases in DCs, for e.g. plant automation).
3. Advances in IT (improvement have led to a decrease in the cost of tracking data and hence it is more cost-effective to refine the costing system).
4. Competition in product markets (making correct pricing and product mix is critical in competitive markets because competitors quickly capitalise on company's mistakes).

Guidelines for refining a costing system:

1. DCs tracing – Aim to reduce the amount of costs classified as ICs.
2. ICs pools – Each IC pool would now be homogeneous, which means that within each cost pool, all costs have same cause-and-effect relationship with their respective CAB.
3. CABs – Use the C-A-E criterion, when possible, to identify the CAB (the cause) for each IC pool (the effect).

ABC systems refine costing systems by focusing on individual activities as the fundamental cost objects. An activity is an event, task, or unit of work with a specified purpose, for example, designing products, setting up machines, operating machines and distribution products. ABC systems calculate the costs of individual activities and assign costs to cost objects such as products and services on the basis of the activities undertaken to produce each product or service. The focus of ABC is on longer-run decisions when more costs can be managed and fewer costs are regarded as FCs and given, hence it identify all costs used by products, whether the costs are variable or fixed in the SR. **Keep in mind these 3 features:**

- ABC creates smaller cost pools linked to the different activities.
- For each activity-cost pool, a measure of the activity performed serves as the CAB.
- In some cases, costs in a cost pool can be traced directly to the products.

The logic of ABC is that more finely structured activity cost-pools with activity specific CABs, which are the cost drivers for the cost pool, are considered to lead to more accurate costing of activities.

A **cost hierarchy** categorises costs into different pools on the basis of the different types of cost driver or CAB or different degree of difficulty in determining the C-A-E relationships.

1. **Output-unit-level costs** are resources sacrificed on activities performed on each individual unit of a product or service. This depends on the quantity of each type produced.
2. **Batch-level costs** - --- - that are related to a group of units of product(s) rather than to each individual unit of product or service. This depends on the total set-up hours required by each type produced regardless of the number produced in each type.
3. **Product/Service-sustaining costs** - --- - undertaken to support individual products or services, for e.g., design costs. The total design costs allocated to Type A and Type B depend on the complexity of the design requirements regardless of the number of units or batches in which the units are produced. Design costs cannot be linked in any cause-and-effect way to individual units of products or to individual batches of products.
4. **Facility-sustaining costs** - --- - that cannot be traced to individual products or services but which support the organisation as a whole, for e.g., general administration costs.

Steps to implement ABC system:

1. Identify the chosen cost objects.
2. Identify the DCs of the products.
3. Select the CAB to use for allocating the ICs to the products.
4. Identify the ICs associated with each CAB.
5. Compute the rate per unit of each CAB used to allocate ICs to the products.
6. Compute the ICs allocated to the products
7. Compute the TCs of the products by adding all the DCs and ICs assigned to them.

Compared to the single indirect-cost pool system, the ABC system trace more costs as DCs; create more cost pools linked to different activities; and for each activity-cost pool, it seek a CAB that has a C-A-E relationship in the cost pool.

Using activity-based costing system for cost and profit management

Activity-based management describes management decisions that use ABC information to satisfy customers and manage profitability.

Pricing and product-mix decisions.

ABC gives management useful insights into the cost structures for making and selling diverse products.

Cost reduction and process improvement decisions.

Manufacturing and distribution personnel use ABC systems to focus cost reduction efforts. Managers set cost reduction targets in terms of reducing the cost per unit of the CAB in different activity areas. Doing an analysis of the cost of important activities (activity cost pools) and the factors that cause these costs to be incurred (cost drivers and CABs) reveals many opportunities for improving efficiency. Management can evaluate whether particular

activities can be reduced or eliminated by improving processes. Each of the indirect-cost allocation bases in the ABC system is a non-financial variable.

Design decisions.

Management can identify and evaluate new designs to improve performance by evaluating how product and process designs affect activities and costs. Companies can then work with their customers to evaluate the costs and prices of alternative design choices.

Planning and managing activities.

They specify budgeted costs for activities and use budgeted cost rates to cost products using normal costing. At year-end, they compare actual with budgeted to provide feedback on how well activities were managed.

Cost-volume-profit relationships

CVP analysis examines the behaviour of TRs, TCs and operating profit as changes occur in the output level, selling price, VCs and FCs.

A **revenue driver** is a factor that affects revenues. The most detailed way of predicting TRs and TCs is to consider multiple revenue drivers and multiple cost drivers within various time spans for decisions. We call this the general case. For now, we focus on a **special case** where we assume a single revenue driver and a single cost driver. Our restrictions to units of output as the sole revenue or cost driver mean that changes in the level of revenues and costs arise only because the output level changes.

Net profit = Operating profit – Income taxes

CVP assumptions:

1. $TC = VC + FC$
2. The behaviour of TRs and TCs is linear in relation to output units within the relevant range.
3. The USP, UVCs and FCs are known and are constant.
4. The analysis either covers a single product or assumes that the proportion of different products when multiple products are sold will remain constant as the level of total units sold changes.
5. All revenues and costs arise only because of changes in the number of products produced and sold. The number of output units is the only revenue and cost driver.

The **breakeven point** is that quantity of output where TRs and TCs are equal and operating profit is zero.

- **Equation method:** Revenues – VCs – FCs = Operating profit.
- **Contribution margin method:** $BEP \text{ (units)} = FC/UCM$.
- **Graph method.**

Revenues – VCs – FCs = Target operating profit

Number of units sold to earn TOP = $(FC + TOP)/UCM$

A **profit-volume graph** shows the impact on operating profit of changes in the output level. It has a steeper slope for its operating profit line, which means that the operating profit increases at a faster rate as the level of output increases.

Taking **income taxes** into account:

Revenues – VCs – FCs = $TOP/1 - \text{Tax Rate}$

The presence of income taxes will not change the BEP. Why? Because, by definition, operating profit at the BEP = 0, thus no income taxes will be paid.

Sensitivity analysis is a what-if technique that examines how a result will change if the original predicted data are not achieved or if an underlying assumption changes. One aspect of the sensitivity analysis is the **margin of safety**, which is the excess of budgeted revenues

over the breakeven revenues. The margin of safety is the answer to the what-if question: If budgeted revenues are above breakeven and drop, how far they can fall below budget before the BEP is reached. Sensitivity analysis is one approach to recognising uncertainty.

NOTE: When there are no FCs, BEP are zero units.

The risk-return trade-off across alternative cost structures is usefully summarised in a measure called **operating leverage**. It describes the effects that FCs have on changes in operating profits as changes occur in units sold and hence in contribution margin.

Organisations with a high proportion of FCs in their cost structures have high operating leverage. As a result, small changes in sales lead to large changes in operating profits. At any given level of sales, operating leverage equals CM/Operating Profit. The shorter the time horizon we consider, the higher the percentage of TCs we may view as fixed.

Revenue mix or **sales mix** is the relative combination of quantities of products or services that constitute TRs.

For **not-for-profit organisations** we can use CVP analysis here by assuming zero operating profit. $TRs - VCs - FCs = 0$.

CM = Revenues – All VCs

Gross Margin = Revenues – COGS

GM is only for merchandising and manufacturing sectors. Service-sector companies can calculate CM but not a GM figure as they do not have COGS in their income statement. In the merchandising sector, CM is calculated after all VCs have been deducted whereas GM is calculated only by deducting COGS from revenues. For the manufacturing sector, fixed manufacturing costs are not deducted from revenues when computing CM but are deducted from GM. COGS in a manufacturing company includes entirely manufacturing costs.

Variable non-manufacturing costs are deducted from CM but not from GM.

Determining how costs behave

This chapter focuses on how costs change with changes in activity levels, units produced and so on. A **cost function** is a mathematical function describing cost behaviour patterns – how costs change with changes in the cost driver. Cost functions can be plotted on graph paper by measuring the cost driver on the x-axis and the corresponding amount of total costs on the y-axis. Two assumptions are made when estimating cost functions:

1. Variations in the TCs of a cost object are explained by variations in a single cost driver.
2. Cost behaviour is adequately approximated by a linear cost function of the cost driver within the relevant range. A linear cost function is one that within the relevant range, the graph of TCs versus a single cost driver forms a straight line.

Example:

- Every additional minute add \$5 to TCs. \$5 is the slope coefficient, the amount by which TCs change for a unit change in the cost driver within the relevant range. $Y = \$5X$.
- Fixed cost of \$10,000 is a constant or intercept and since there are no VCs, the slope is zero.

Y = \$10,000.

- \$3000 per month + \$2 per minute of phone use is an example of mixed or semivariable cost which is a cost that has both FC and VC. **Y = \$3000 + \$2X.**

Note: TCs do not change in proportion to the change in the number of phone minutes used in the relevant range. **Y = a + bX.**

Cost estimation is the attempt to measure past cost relationships between TCs and the drivers of those costs. Managers are interested in estimating past cost behaviour patterns primarily because these estimates can help them make more accurate cost predictions, or forecasts, about future costs.

The cause-and-effect criterion in choosing cost drivers

The most important issue in estimating a cost function is to determine whether a cause-and-effect relationship exists between the cost driver and the resulting costs. This relationship might arise in many ways:

- It may be due to a physical relationship between costs and the cost driver. E.g. More units = More materials.
- It can arise from a contractual arrangement.
- It can be implicitly established by logic and knowledge of operations. E.g. A complex product design with many component parts will incur higher design costs than a simple product.

Be careful not to interpret high correlation, or connection, between two variables to mean that either variable causes the other. Only a true cause-and-effect relationship, not merely correlation, establishes an economically plausible relationship between costs and their costs drivers. Economic plausibility gives analyst confidence that the estimated relationship will appear again and again in other similar sets of data. Establishing economic plausibility is a vital aspect of cost estimation.

Cost estimation approaches

The **industrial engineering** method, also known as the work measurement method, estimates cost functions by analysing the relationship between inputs and outputs in physical terms.

The **conference method** estimates cost functions on the basis of analysis and opinions about costs and their drivers gathered from various departments of an organisation.

The **account analysis** method estimates cost functions by classifying cost accounts in the ledger as variable, fixed or mixed with respect to the identified cost driver.

Quantitative analyses of cost relationships are formal method to fit linear cost functions to past data observation.

Visual fit

There are six steps in estimating a cost function on the basis of an analysis of the current or past cost relationships.

1. Choose the dependent variable (the cost variable to be predicted).
2. Identify the independent variable or the cost driver(s).
3. Collect data on the dependent variable and cost driver(s).
4. Plot the data.
5. Estimate the cost function.
6. Evaluate the estimated cost function.

High-low method

This method entails using only the highest and lowest observed values of the cost driver within the relevant range. The line connecting these two points becomes the estimated cost function.

Slope b = Diff between costs assoc. with highest and lowest obs. of the cost driver/ diff between the highest and lowest observations of the cost driver.

Since $y = a + bX$, $a = y - bX$.

The intercept term is the constant component of the equation that provides the best linear approximation of how a cost behaves within the relevant range.

Regression analysis method

It uses all the available data to estimate the cost function. It is a statistical method that measures the average amount of change in the dependent variable that is associated with a unit change in one or more independent variable.

Cost drivers and ABC

In ABC systems, operations managers and cost analysts identify key activities and the cost drivers and costs of each activity at the out unit level, batch-level or product-sustaining level. Generally, ABC systems emphasis long-run relationships between the cost driver (level of activity) and cost. The long-run focus means that more costs are variable, which leads to a stronger cause-and-effect relationship between the cost driver and the corresponding cost.

Non-linearity

A **non-linear cost function** is one where, within the relevant range, the graph of TCs versus the level of a single activity is not a straight line. A step-cost function is a cost function in which the cost is constant over various ranges of the cost driver, but the cost increases by discrete amounts as the cost driver moves from one range to another.

Learning curves also result in CFs being non-linear. A learning curve is a function that shows how labour-hours per unit decrease as units of production increase and workers learn and become better at what they do. An **experience curve** is a function that shows how full product costs per unit; including manufacturing, marketing, and distribution and so on, decline as units of output increase. In the **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. In the **incremental unit-time model**, the incremental unit-time (the time needed to produce the last unit) declines by a constant percentage each time the cumulative quantity or units produced doubles.

There are **3 criteria for evaluating and choosing cost drivers**: economic plausibility, goodness of fit and slope of the regression line.

Motivation, budgets, and responsibility accounting

Budgets are one of the most widely used tools for planning, controlling and coordination organizations. Budgeting systems that managers' perspectives forward. A forward-looking perspective enables managers to be in a better position to exploit opportunities. It also enables them to anticipate problems and take steps to eliminate or reduce their severity.

Definition and roles of budget

A budget is a quantitative expression of a proposed plan of action by management for a future time period and is an aid to the coordination and implementation of the plan. It can cover both financial (budgeted income statement) and non-financial aspects (number of new products introduced to the market) of these plans and acts as a blueprint for the company to follow in the forthcoming period.

A master budget coordinates all the financial projections in the organization's individual projects in a comprehensive, single organisation-wide set of budgets for a given time period. It embraces impact of both operating decisions and financing decisions.

Roles of budgets

Budgets are a major management control systems in general. They can (1) compel strategic planning including implementation of plans, (2) provided performance criteria (3) promote communication and coordination within the organisation and (4) affect motivating and wider organizational aspects.

Strategy and plans

Budgeting is most useful when done as an integral part of an organization's strategic analysis. Strategy can be viewed as describing how an organization matches its own capabilities with the opportunities in the marketplace to accomplish its overall objectives. Strategic analysis underlies both the long run and short-run planning. Strategy, plans and budgets are interrelated and affect one another. Budgets provide feedback to managers about the likely effects of their strategy plans. Managers then use this feedback to revise their plans.

A framework for judging performance

Budgeted performance can overcome to key limitations of using past performance as a basis for judging actual results. One limitation is that past results incorporate past miscues and substandard performance. A second limitation of past performance is that the future may be expected to be very different from the past.

Coordination and communication

Coordination is the meshing and balancing on all factors of production or service and all of the departments and business functions so that the company meet its objectives.

Communication is getting those objectives understood and accepted by all department and functions. Having a formal document such as the budget is an effective way to communicate a consistent set of plans to the organisation as a whole.

Motivation and wider organisational issues

Top management has the ultimate responsibility for the budgets of the organisation they manage. Management at all level, however, should understand and support the budget and all aspects of the management control system. The manner in which a budget is administered can adversely impact on the managers' behaviour. Budgets should not be administered rigidly. The expectation may be that the budget target set to motivate high from employees will not be attained. An alternative budget for financial planning purposes may therefore have to be established based on what is expected to be achieved. Such alternative uses of the budgets sometimes require a 'write-down' to be determined.

There are even times when both what is to be aimed for and what consequences may follow from particular actions are uncertain. Budgets can in such circumstances help rationalise and justify courses of action over which there is already commitment. In other words, budgetary activities do not enhance the quality of decisions but simply provide legitimation for what has been decided beforehand. Although managers often prefer to acknowledge ways in which budgets are useful in providing answers or in helping them to probe and learn, it is clear that budgets also exist in organisations as ammunition and rationalisation means. Design and functioning of budgetary control systems will reflect the realities of organisational processes. Conflict is part of managerial affairs and can be valuable. high conflict situations can you do the considerations of more alternatives, better understanding of choices and more effective decision making.

Time coverage

The purposes for budgeting should guide the time period chosen for the budget. A **rolling budget** is a budget or plan that is always available for a specified period by adding a month, quarter or year in the future as the month, quarter or year just ended is dropped. Rolling budgets constantly force management to think concretely about the forthcoming 12 months, regardless of the month at hand.

Master Budget

See printed page.

Budgeting is also known as targeting or a profit plan. Budgeted financial statements are sometimes also called pro forma statements.

Steps in preparing an operating budget

1. Revenue budget
2. Production budget – $B_{\text{production}} (\text{units}) = B_{\text{Sales}} + \text{Target closing FG} - \text{Op FG stock}$
3. Direct materials usage budget and direct materials purchases budget (2 schedules)
 $\text{Purchases DM} = \text{Usage of DM} + \text{Target closing DM} - \text{Opening DM}$

4. Direct manufacturing labour budget
5. Manufacturing overhead budget
6. Closing stock budget
7. Cost of goods sold budget – $\text{COGS} = \text{Op FG} + \text{COGM} - \text{Closing FG}$
8. Other non-production costs budget
9. Budgeted operating profit statement

Organisational structure and Responsibility

Organisational structure is an arrangement of lines of responsibility within the entity. To attain the goals described in the master budget, an organisation must coordinate the efforts of all its employees - from top executive through all the levels of management to every supervised worker. Coordinating the organisation's effort means assigning responsibility to managers who are accountable for their actions in planning and controlling human and physical resources. Management is in essence a human activity. Budgets exist not for their own sake, but to help managers achieve their own pursuits and thereby contribute to meeting those of the organisation. Each manager, regardless of level, is in charge of a responsibility centre. A responsibility centre is a part, segment or subunit of an organisation whose manager is accountable for a specific set of activities. The higher the manager's level, the broader the responsibility centre is and the larger the number of subordinates report to him or her. Responsibility accounting is a system that measures the plans (by budgets) and actions (by results) of each responsibility centre. Responsibility accounting affects behaviour. The responsibility accounting approach traces costs to either the individual who has the best knowledge about why the costs arose or the activity that cause the costs.

Feedback

Budgets coupled with responsibility accounting provide systematic help for managers, particularly if managers interpret the feedback carefully. Managers, accountants and students of management accounting sometimes use variances appearing in the responsibility accounting system to pinpoint fault for operating problems. In looking at variances, managers should focus on whom they should ask and not whom they should blame. Variances only suggest questions or direct attention to persons who should have the relevant information. Nevertheless, variances, properly used, can be helpful in 4 ways: early warning; performance valuation; evaluating strategy and communicating the goals of the organisation.

Relevant information for decision making

Information and the decision process

A decision model is here taken to signify a formal method for making a choice, frequently involving quantitative and qualitative analyses. The steps managers should take in the decision process are: 1) Gathering information, 2) Making predictions, 3) Choosing an alternative, 4) Implementing the decision and 5) Evaluating performance.

The concept of relevance

Relevance costs are those expected future costs that differ among alternative courses of action. The costs must occur in the future and that they must differ among the alternative courses of action. Relevant revenues are those expected future revenues that differ among alternative courses of action. Although historical costs may be a useful basis for making informed judgements for predicting expected future costs, they in themselves are irrelevant to a decision because they deal strictly with the past.

The difference in total cost between two alternatives is a **differential cost**.

Quantitative factors are outcomes measured in numerical terms and they can be financial (costs of DMs) and non-financial (reduction in page download). Qualitative factors are outcomes that cannot be measured in numerical terms such as employee morale.

One-off special orders

Accept or reject if there is idle production capacity and no long-run implications. Assume all costs can be classified as either variable with respect to a single driver or fixed. Incremental costs are additional costs to obtain an additional quantity, over and above existing or planned quantities, of a cost object.

Potential problems in relevant-cost analysis

It is important in relevant-cost analysis not to assume all costs are relevant. Note also that unit-cost data mislead decision makers in two major ways: 1) when costs that are irrelevant to a particular decision are included in unit costs, and 2) when unit costs that are calculated at different output levels are used to choose among alternatives. Unitised fixed costs are often erroneously interpreted as if they behave like unit variable costs. Generally, use total costs rather than unit costs in relevant-cost analysis.

Outsourcing or make-or-buy decisions

See slides.

Opportunity costs, outsourcing and capacity constraints

There are two approaches to make-or-buy decisions namely the total-alternatives approach and opportunity-costs approach. Deciding to use a resource in a particular way causes a manager to give up the opportunity to use the resource in alternative ways. The lost opportunity cost is a cost that the manager must take into account when making a decision. Opportunity cost is the contribution to income that is forgone (rejected) by not using a limited

resource in its next-best alternative use. The total-alternatives approach includes only incremental costs and benefits and no opportunity costs. The second one does not explicitly consider the incremental benefits from selling another new product. Instead, it factors in the forgone benefit as a cost of the make alternative. It highlights the idea that when capacity is constrained, relevant costs equal the incremental costs plus the opportunity costs.

Product-mix decisions under capacity constraints

Companies with capacity constraints must also often decide which products to make and in what quantities. When a multiple-product plant operates at full capacity, managers must often make decisions regarding which products to emphasise. These decisions frequently have short-run focus. Managers should aim for the highest contribution margin per unit of the constraining factor.

Customer profitability and relevant costs

In addition to making choices among products, companies must often decide whether they should add some customers and drop others.

Irrelevance of past costs and equipment-replacement decisions

Book value is irrelevant; however, current disposal price and cost of new machine are relevant.

Income effects of alternative stock-costing methods

Variable and absorption costing

Variable costing is a method of stock costing in which all variable manufacturing costs are included as inventoriable costs and all fixed manufacturing costs are excluded, they are expensed a period costs. Absorption costing (GAAP requirement) is a method of stock costing in which all variable fixed manufacturing costs are included as inventoriable cost, that is the stock absorbs all the manufacturing costs.

For stock valuation under both methods, all variable manufacturing costs (both direct and indirect) are costs which remain unexpired until the stock is sold. That is, they are first recorded as an asset when they are incurred. Under variable costing, fixed manufacturing costs (both D and I) are deducted as a period costs in the period in which they are incurred. Under absorption costing, FMCs are initially treated as stock-based costs. They then become expenses in the form of COGS when sales occur.

The distinction between variable and FCs is central to marginal costing and hence the contribution format highlights this. The distinction between manufacturing and non-manufacturing costs is central to absorption costing; the gross margin format highlights this.

If stock levels change, OP will differ between the 2 methods because of the difference in accounting for FMCs.

How to explain these differences?

If the stock level increases during an accounting period, MC will generally report less OP than AC and if stock level decreases, MC will generally report more OP than AC. These differences in OP are due solely to moving FMCs into stock as stock increase and out of stock as they decrease.

Formula 1:

AC's Operation P – MC's Operating P = FMCs in closing stock – FMCs in opening stock.

FMCs in closing stock are current-period expense under MC that AC defers to future period. Two alternative formulae can be used if we assume that all manufacturing variances are written off as period costs are no change occurs in WIP and no change occurs in the budgeted FMC rate between accounting periods.

Formula 2:

AC's Operation Inc – VC's Operating Inc = (units produced - Units sold) X Budgeted FMC rate.

Formula 3:

AC's operation Inc – VC's operating Inc = (CS in units – OS in units) X Budgeted FMC rate.

Effect of sales and production on operating profit

The period-to-period change in OP under MC is driven solely by changes in the unit level of sales given a constant contribution margin per unit. Under AC, however, period-to-period change in OP is driven by variations in both the unit level of sales and the unit level of production.

Undesirable stockbuilding

AC enables managers to increase OP in the SR by increasing the production schedule independent of customer demand. Each additional unit produced absorbs FMCs that would otherwise have been written off as a period cost.

How do they do this?

1. Plant manager may switch production to those orders that absorb the highest amount of FMC.
2. A plant manager may accept a particular order to increase production even though another plant in the same company may be better suited to complete that order.
3. To meet increased production, a manager may defer maintenance beyond the current accounting period.

Proposals to revise performance evaluation of managers

1. Change the accounting system.
2. Change the time period used to evaluate performance (more towards LR).
3. Careful budgeting and stock planning to reduce management's freedom to build excess stock.
4. Include non-financial as well as financial variables in the measures used to evaluate performance. Example: 1) CS in units this period/CS in units last period 2) Sales in units this period/CS in units this period.