

# BUDGETING

A **budget** is a detailed plan of actions for future periods that has the objective of coordinating the various activities within an entity.

**Budgeting** is short-term planning (usually for the next month or year) – it is not long-term or strategic planning.

The **link to strategy**: The focus of budgeting is on the implementation of a company's long-term plans (strategies), usually for the year ahead i.e., budgets and budgeting fall into stages 5, 6 and 7 of the conventional planning process outlined below. Budgets are therefore based on a shorter planning horizon and therefore more precise and detailed.

## **Stages in the conventional planning process:**

1. Establish objectives
2. Identify potential strategies
3. Evaluate strategic options
4. Select a course of action
5. Implement the long-term plans
6. Monitor actual outcomes
7. Respond to deviations from planned outcomes

Budgets can have a number of **functions or purposes**, these include:

- Planning future operations
- Coordinating various activities
- Communicating plans
- Controlling activities (cost awareness)
- Motivating managers
- Evaluating performance

The above functions assist with goal congruence such that the division/ manager has the same goals as the company as a whole. However, conflicts can arise between some of these functions e.g., a demanding budget may be suitable for motivating a manager but will not be suitable for planning purposes.

A key activity in the **budgeting process** is establishing the factor(s) that restrict output (either sales demand or production capacity) as this will determine the sales budget which informs other operational budgets. A company can thus prepare the following **types of budgets**:

- Sales budget
- Production budget
- Direct material usage budget
- Direct material purchase budget
- Direct labour budget
- Production overhead budget
- Selling and administration budget
- Cash budget

These budgets are then prioritized into a **master budget** which consists of a budgeted profit statement, balance sheet and cash flow statement.

The budgeting process sadly too often only follows a **top-down approach** where senior management communicates the budget that is to be adopted and adhered to, and this is sometimes done in a dictatorial manner without any input from lower-level management. There are obvious negative consequences when this is done, such as a lack of motivation and unhappiness amongst staff, which we will discuss in a later lesson.

Therefore, a **bottom-up approach** is often advocated which involves the input of lower-level management – this implies participation in the budget setting process. A bottom-up approach does not imply that managers who are to be evaluated will be setting their own budgets which would have obvious disadvantages such as easily achievable budgets being set. It makes sense that participation of managers who are ‘at the rock face of daily operations’ be involved in the budget setting process as opposed to being excluded when a top-down approach is followed. This will be discussed in a later lesson dealing with control systems.

## Budgeting techniques

Traditional budgeting generally involves the compilation of detailed budgets prepared for the year ahead, broken down into quarters, months or weeks.

Traditional budgeting often follows an incremental and/or line-item approach:

- Incremental budgeting occurs when the current budget is taken as a starting point for preparing the next year’s budget and then adjusted for changes expected to occur. The major disadvantage is that past inefficiencies and waste can easily be perpetuated.
- Line-item budgeting occurs when line items in financial reports are identified and budgeted rather than activities.

Rolling or continuous budgeting is when the annual budget is prepared and broken down by months for e.g., the first three months and by quarters for the remaining nine months as illustrated below:

Jan	Feb	Mar	Quarter 2 (Apr, May & Jun)	Quarter 3 (Jul, Aug & Sep)	Quarter 4 (Oct, Nov & Dec)

The budget is then reviewed and further prepared as the year progresses e.g. the second quarter is broken down into months during the first quarter and a new quarter (Quarter 1 of the next year) is added after the first quarter has ended etc. This ensures that planning does not take place once a year and actual performance is compared to more realistic targets. A disadvantage is that it creates uncertainty for managers as the budget is constantly changing.

Activity-based budgeting (ABB) identifies resources that are needed to perform activities required to meet the budgeted production and sales volume. By comparing the amount of resources that are required to the amount of resources that are in place, upwards or downwards adjustments can be made during the budget setting process. Many firms that have adopted activity-based costing (ABC) have also implemented ABB.

Budgeting for non-profit-making organizations (NPO) normally begins with the expected costs of maintaining current ongoing activities and then adding any further costs considered desirable. Precise objectives are difficult to define for NPO's and their accomplishments are difficult to measure. Budgets in NPO's are therefore mainly concerned with the input of resources (expenditure) whereas budgets in profit organisations focus on the relationship between inputs (expenditure) and outputs (sales revenue). The traditional format for NPO's is the line-item budget where expenditures are expressed in considerable detail but activities undertaken are given little attention. These budgets fail to provide NPO's with information relating to planned and actual accomplishments (activities). An improved budgeting approach for NPO's is to group expenditure according to major activities/ programmes, similar to ABB. This ensures NPOs focus on activities/ programmes that will achieve their overall objectives and enables management to make more informed decisions about the allocation of resources to those activities.

Zero-based budgeting (ZBB) occurs when all activities are to be justified and prioritised before decisions are taken relating to the amount of resources allocated to each activity. This requires that a zero base is started with, and each year's budget is compiled as if the company's activities were being launched for the first time. ZBB therefore does not extrapolate the past, it creates a questioning attitude, and it focuses on outputs in relation to value for money (advantages). The disadvantages of ZBB include that it is time consuming and costly to implement resulting in many firms not adopting this form of budgeting

[Click here to read a short article published in Accountancy SA entitled: "The case for zero-based budgeting".](#)

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With budgeting now being done electronically in the digital age, it has made the budgeting process easier and quicker. However, the major benefit is the ability to perform "**what-if**" **analysis** e.g., a firm could easily determine what would happen if sales decreased by 25% or payroll costs increased by 10%.

## Criticisms of the budgeting process

- Budgets are time-consuming and costly to put together.
- Budgets constrain responsiveness and flexibility and are often a barrier to change.
- Budgets are rarely strategically focused and are often contradictory.
- Budgets add little value, especially given the time required to prepare them.
- Budgets concentrate on cost reduction and not on value creation.
- Budgets strengthen vertical command and control.
- Budgets do not reflect the emerging network structures that organisations are adopting.
- Budgets encourage 'gaming' and perverse behaviours.
- Budgets are developed and updated too infrequently, usually annually.
- Budgets are based on unsupported assumptions and guesswork.
- Budgets reinforce departmental barriers rather than encourage knowledge sharing.
- Budgets make people feel undervalued.

## **Beyond budgeting – principles for adaptive performance management**

### **Process principles**

1. Goals Set aspirational goals aimed at continuous improvement, not fixed annual targets.
2. Rewards Reward shared success based on relative performance, not on meeting fixed annual targets.
3. Planning Make planning a continuous and inclusive process, not an annual event.
4. Controls Base controls on relative key performance indicators (KPIs) and performance trends, not variances against a plan.
5. Resources Make resources available as needed, not through annual budget allocations.
6. Co-ordination Co-ordinate cross-company interactions dynamically, not through annual planning cycles.

### **Leadership principles**

1. Customer Focus everyone on improving customer outcomes, not on meeting internal targets.
2. Accountability Create a network of teams accountable for results, not centralised hierarchies.
3. Performance Champion success as winning in the marketplace, not on meeting internal targets.
4. Freedom to act Give teams the freedom and capability to act, don't merely require adherence to plan.
5. Governance Base governance on clear values and boundaries, not detailed rules and budgets.
6. Information Promote open and shared information, don't restrict it to those who 'need to know'.

## CONTROL SYSTEMS AND FLEXING THE BUDGET

### CONTROL SYSTEMS

**Strategic controls** have an external focus with the emphasis being on how a company competes with other firms in the same industry. However, **management control systems** have an internal focus with the aim thereof being to influence employee behaviour in a desirable way in order to increase the probability that a company's objectives will be achieved. Companies use many different control mechanisms to do this. We will consider two of them:

1. Action (or behavioural) controls; and
2. Results (or output) controls.

**Action controls** involve observing the actions of individuals to determine a cause-and-effect relationship between the type of actions that results in a desired outcome. Action controls that are designed to prevent undesirable behaviour are the ideal form of control because their aim is to prevent the behaviour from occurring. They are preferable to detection controls that are applied after the occurrence of the actions because they avoid the cost of undesirable behaviour.

**Results controls** involve collecting and reporting about the outcomes of the work performed. Management accounting control systems are a form of output controls. Results measures are both financial (revenues, costs, profits, ratios etc.) and non-financial (number of defects, number of applications processed etc.). Results controls involve the following four stages:

1. establishing performance measures that the company wishes to monitor;
2. establishing performance targets;
3. measuring performance; and
4. providing rewards or punishment.

**Harmful side-effects** occur when controls motivate employees to engage in behaviour that is organisationally not desirable as this leads to a lack of goal congruence in that the goals of the employee are not aligned to the goals of the company. Another harmful side effect of controls is that they often can cause negative attitudes towards the control system. Controls in the form of standard operating procedures and the imposition of work rules can also encourage employees to routinise their jobs rather than be creative. This is sometimes needed when it is known precisely what an employee should and should not do but it is undesirable when employees are not encouraged to think creatively for the benefit of the company as a whole.

### Conditions for controls to be effective include:

- Objectives for the process being controlled must exist
- Output from the process must be measurable
- Must be capable of taking action so that deviations from set objectives can be reduced

### MACS

**Management accounting control systems (MACS)** comprise the accounting controls within an entity which are often the predominant controls because of the need to account for processes and transactions, the importance of profitability and liquidity etc.

MACS have two core elements:

- **Formal planning** which includes long-term (strategic) planning and short-term planning (budgeting)
- **Responsibility accounting** which involves the establishment of responsibility centres. This enables employees/managers within the entity to be held accountable for financial results and outcomes allocated to them.

Types of **responsibility centres**:

**Cost centres:** Managers are accountable for only those costs under their control. *Standard cost centres* are found where the input required to produce each unit of output (standard) can be specified and the output can be measured (such as direct material and labour used in production). *Discretionary expense centres* are found where output cannot be measured in financial terms and there is no observable relationship between inputs and outputs (such as marketing or training).

**Revenue centres:** Managers are accountable only for outputs in terms of sales revenue as well as selling expenses such as commission.

**Profit centres:** Managers are accountable for both sales revenues and costs i.e., profit.

**Investment centres:** Managers are responsible for both sales revenues and costs (profit), and they also have authority to make working capital and investment decisions. Investment centres represent the highest level of management autonomy - all companies are effectively investment centres.

Furthermore, responsibility accounting involves the following:

- Application of the controllability principle



- Setting financial performance targets and
- Determining the level of participation in the budgeting and target setting process.

The **controllability principle** implies that it is only appropriate to charge to an area of responsibility those costs that are significantly influenced by the manager of that responsibility centre. Applying the principle is difficult in practice because many factors and costs do not fit neatly into either being controllable or uncontrollable.

Types of uncontrollable factors include economic factors, competitive factors, acts of nature and interdependence where outcomes are affected by other operating units within the entity.

**Before** the measurement period, identified uncontrollable factors should either be excluded from performance reports or shown in a separate section within the performance report. A general rule is to “hold employees accountable for the performance areas you want them to pay attention to”. Applying this rule explains why some companies assign pooled costs (e.g. IT support department) to responsibility centres as it forces managers who use the service to question the costs allocated to their responsibility centres.

**After** the measurement period, uncontrollable events that occurred can be dealt with in various ways when assessing performance:

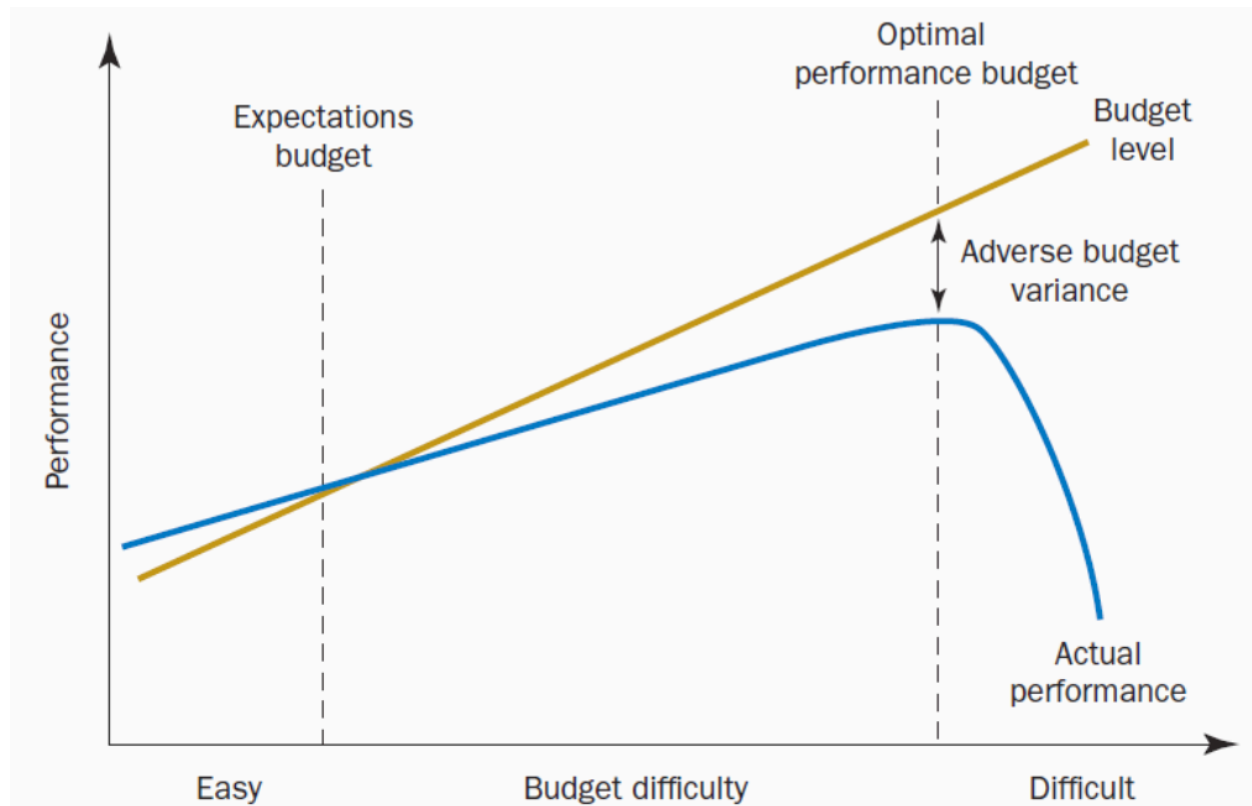
1. **Variance analysis** (covered in more detail in the Standard Costing topic).
2. **Flexible performance standards** using **flexible budgets** (covered in the next part of this lesson).
3. **Relative performance evaluations** where the performance of a responsibility centre is evaluated relative to the performance of similar centres.
4. **Subjective performance evaluations** where subjective judgements are made in the evaluation process based on the knowledge of the outcome measures and the circumstances faced by the responsibility heads.

There is substantial evidence from many research studies conducted that the existence of a target is more likely to motivate higher levels of performance than when no target is stated i.e. people perform better when they have a clearly defined goal to aim for and are aware of the targets that will be used to evaluate their performance.

However, when **setting financial performance targets**, it is important to bear in mind that targets can vary in their level of difficulty and the chosen level of difficulty has a significant effect on motivation and performance. Research suggests that setting difficult budget targets leads to higher task performance than setting moderate or easy

targets (only up to a point!). Targets must be accepted if the managers are to be motivated to achieve higher levels of performance. *Within the context of a demanding target, small adverse variances should actually be seen as a 'healthy' sign.*

The graph below nicely illustrates the likely level of performance in relation to the level of budget difficulty, and what is expected from a performance perspective when budgets are too demanding:



Nonetheless, there are *arguments in favour of setting highly achievable budgets*. When managers fail to achieve their budget targets, they live with failure for an entire year resulting discouragement and depression that can be costly to the company. In contrast, highly achievable budgets provide managers with a sense of self-esteem which can be beneficial to the company through increased levels of commitment and aspiration. Bonuses and promotion are also generally linked to budget performance so the greater the possibility of failure the greater the probability that managers will distort performance, such as the manipulation of data.

Some conclusions concerning budget difficulty:

- Budgets have no motivational effect unless they are accepted by managers as their own personal targets.
- Up to the point where the budget is no longer accepted, the more demanding the budget target the better the results achieved.
- Demanding budgets are also seen as more relevant than less difficult targets, but negative attitudes result if they are seen as too difficult.
- Acceptance of budgets is facilitated when good upward communication exists (a 'bottom-up' approach - discussed below).
- Managers' reactions to budget targets are affected both by their own personality and other general cultural and organisational norms.

To motivate the best level of actual performance, demanding budgets should be set, and small adverse variances should be regarded as a healthy sign. If budgets are always achieved, this indicates that the standards are too loose to motivate the best possible results.

**Participation in the budgeting and target setting process** is often referred to as '**bottom-up**' budget setting which has several advantages, including:

- individuals are more likely to accept the targets and be committed to achieving them
- participation can reduce the information asymmetry gap that applies when standards are set from above (i.e., knowing what to do and doing the right thing); and
- imposed standards can encourage negative attitudes and result in demotivation, alienation and manipulation.

However, in highly programmed, environmentally and technologically constrained areas, where speed and detailed control are essential for efficiency, participative approaches are less valuable. In contrast, in areas where flexibility and innovation are a pre-requisite, participation may offer an economic payoff. Participation by itself does not ensure commitment to standards as the manager must also believe that he/she can significantly influence the results.

The following are circumstances where '**top-down**' budget setting is preferable:

- Performance is measured by precisely the same standard that the budgetee has been involved in setting.
- Personality traits of the participants limit the benefits of participation.
- The process is highly programmable.

- A uniform policy is established for setting the standards of a large number of similar units operating in a stable environment where relative comparisons of the units is to be made for performance evaluation.

## FLEXING THE BUDGET

**Flexing the budget (or a flexed budget)** is a common example of flexible performance standards which adjust for and remove uncontrollable volume effects from a manager's performance reports (linking with the *controllability principle* previously covered in this lesson under *management accounting control systems*).

Within the context of standard costing, *a flexed budget essentially adjusts the original budget for actual output.*

## COST MANAGEMENT

### Overview of Cost Management

Cost management falls within the domain of "control". Traditional cost systems emphasize cost containment (i.e., ensuring costs do not exceed budget) rather than cost reduction. Cost management however focuses on cost reduction and continuous improvement rather than only cost containment.

Managing/reducing costs is one of the three overarching ways in which a company can increase profitability, which are:

- Increase selling prices
- Increase volumes sold
- Decrease costs.

The reason why "cost management" is so important should therefore be self-evident.

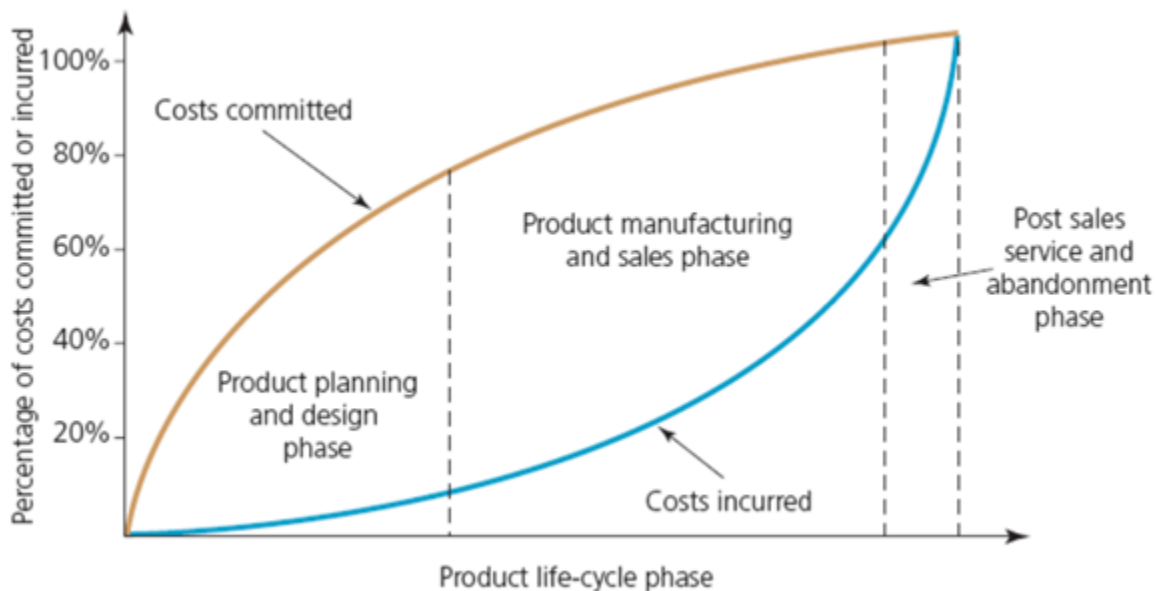
We will now look at common methods used to manage costs, starting with life-cycle cost management.

### Life-Cycle Cost Management

**Life-cycle costing** estimates and accumulates costs over a product's entire life cycle in order to determine whether profits earned during the manufacturing phase will cover the costs incurred during the pre- and post-manufacturing stages. Focusing on costs after the product enters production results in only a small proportion of life cycle costs being

manageable. This has created a need to ensure that the tightest cost controls are at the planning and design stage, because most costs are “locked in” at this point.

The graph below nicely illustrates the relationship between committed costs and incurred costs over the life-cycle of a product:



## Target Costing and Kaizen Costing

**Target costing** involves the following stages:

1. Determine the target price which customers will be prepared to pay for the product.
2. Deduct a target profit margin from the target price to determine the target cost.
3. Estimate the actual cost of the product.
4. If estimated actual cost exceeds the target cost investigate ways of driving down the actual cost to the target cost.

The aim of target costing is to design a product with an expected cost that does not exceed target cost and that also meets the target level of functionality. This can be achieved by using [reverse engineering \(tear-down analysis\)](#)

[Links to an external site.](#)

or [value analysis \(value engineering\)](#).

[Links to an external site.](#)

**Kaizen costing** is similar to target costing. The major difference is that kaizen costing is applied during the manufacturing stage of the product life cycle while *target costing* is applied during the design stage. Cost reductions are therefore primarily achieved through increasing the efficiency of the production process.

## Activity-Based Management (ABM) and the Value Chain

**Activity-Based Management (ABM)** is the “cost management application” of Activity-Based Costing (ABC). This concept was covered previously under Costing Systems when we dealt with activity-based costing. Additional notes on ABM are included below to recap this idea and also provide a better understanding thereof (and related concepts) within the context of cost management.

The first 3 stages of the 4 ABC stages are required for ABM, namely:

1. Identify the major activities in an organisation
2. Assign costs to cost pools/cost centres for each activity
3. Determine the cost driver for each major activity

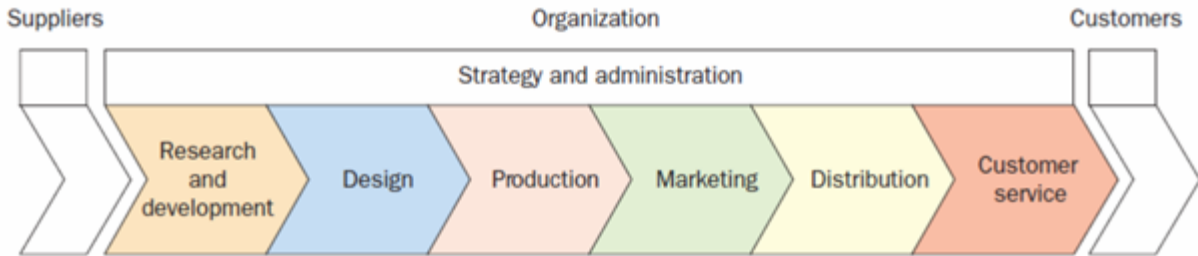
ABM focuses on managing the business on the basis of the activities that make up the company i.e., by managing activities, costs will be managed in the long run. The aim of ABM is therefore to enable the customer’s needs to be satisfied while making fewer demands on organisational resources.

Traditional reports analyse costs by types of expense (or department). ABM analyses costs by activities and thus provides management with information as to why costs are incurred. To identify the potential for cost reduction it is useful to classify activities as either value adding activities or non-value adding activities:

VALUE ADDING = an activity that customers perceive as adding usefulness to the product or service. *Example:* painting and packaging the finished product.

NON VALUE-ADDING = an activity where there is an opportunity for cost reduction without reducing the usefulness of the product or service to the customer. *Example:* inspecting, storing and moving raw materials.

The **value chain** is the linked set of value-creating activities from raw materials sourced from suppliers through to the ultimate product or service delivered to the customer. These linked activities are graphically indicated below:



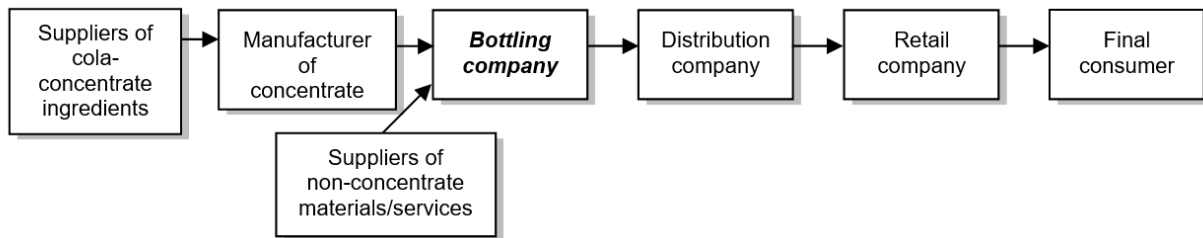
A company that performs the value chain activities more efficiently, and at a lower cost, than its competitors will gain competitive advantage. It is therefore important to understand how value chain activities are performed and how they interact with each other in order to increase customer satisfaction and manage costs more effectively (this is referred to as **value-chain analysis**).

The value chain should be viewed from the customer's perspective, with each link being seen as the customer of the previous link i.e., if each link in the value chain is designed to meet the needs of its customer, then ultimately the end-customer will be satisfied. It is also suggested that companies evaluate their value chains relative to the value chains of their competitors and/or industry.

The **supply chain** describes the flow of goods, services and information from 'cradle to grave', irrespective of whether those activities occur in the same company or different companies. **Supply chain management** involves examining potential linkages with suppliers and understanding supplier costs in to determine if it is possible for the company to change its activities in order to reduce the supplier's costs.

Consider the beverage products of a cola bottling company. Many companies play a role in bringing these products to the final consumers. The diagram below presents an overview of the supply chain. Cost management emphasizes integrating and co-ordinating activities across all companies in the supply chain as well as across each business function in an individual company's value chain. As an example of this: a cola bottling company may work with its suppliers (such as glass and can companies and sugar manufacturers) to reduce their materials-handling costs.

### ***Supply chain for a cola bottling company***



## Benchmarking

**Benchmarking** involves comparing key activities with world-class best practices. This enables steps to be taken to improve the performance of the firm, resulting in lower costs and better quality.

Benchmarking is less a source of innovation but rather a good way of changing existing ways of doing things in order to match the practices and performance of industry leaders.

Benchmarking can be categorised as follows:

- Historical benchmarking involves comparing current performance of the entity to its own past performance.
- Internal benchmarking involves comparing one business unit or function to another within the same entity.
- Functional benchmarking involves comparing internal functions with those of the best external entities, regardless of industry.
- Competitive benchmarking involves gathering information about and comparison to direct competitors. *Reverse engineering* could then be used whereby a competitor's product is purchased and dismantled in order to understand its content and design.
- Strategic benchmarking involves competitive benchmarking aimed at strategic action and organisational change.

If a competitor is a listed company, then financial information is easy to obtain. Non-financial information is tougher to obtain but is available from product literature, media comment and trade associations. Information on the internal processes of competitors is extremely difficult to find.



Benchmarking has the following advantages and disadvantages:

#### Advantages

- Assists with assessing an entity's current position and a providing a basis for establishing standards of performance
- An effective way of implementing change – usually performed by management who must live with the changes implemented
- Focuses on improvement in key areas
- Can be a base that starts further innovation
- Results in improved performance, especially in cost control and increasing value
- Flexible – can be used by all entities
- Provides an early warning of competitive advantage
- Provides a focus on planning and leads to more teamwork

#### Disadvantages

- Blurs the boundary between efficiency and effectiveness – places too much emphasis on doing things right rather than doing the right thing (i.e., there is seldom only one best way of doing business)
- May be yesterday's solution to tomorrow's problem
- Does not identify why performance (good or bad) is at a particular level
- Catching up exercise
- Success is dependent on accuracy of information (perfect information on competitors is hard to obtain)
- Can be costly and possibly divert management attention
- Can be a hindrance or a threat, especially if information is shared with other entities (security risk)
- Can be a challenge to identify which activities to benchmark

## Business Process Re-Engineering (BPR)

The aim of **business process re-engineering (BPR)** is to improve a company's key business processes by focusing on simplification, cost reduction, improved quality and enhanced customer satisfaction. It involves examining business processes and making substantial changes as to how a company currently operates, and this can be done in many different ways which is beyond the scope of this course.

## Just in Time (JIT)

The **Just-In-Time (JIT)** approach to cost management involves a continuous commitment to the pursuit of excellence in all phases of manufacturing systems design

and operations. The aim is to produce the required items, at the required quality and in the required quantities, at the precise time they are required. This assists with reducing non-value added costs and long-run costs.

The goals of this approach are:

- Elimination of non-value added activities
- Zero inventory
- Zero defects
- Batch sizes of one
- Zero breakdowns
- A 100% on-time delivery service

These goals represent perfection and are unlikely to be achieved in practice, but they offer targets and encourage continuous improvement and excellence.

The financial benefits of JIT systems include:

- lower investment in inventory,
- reduction in carrying and handling costs,
- reduction in obsolescence,
- lower space requirements,
- reduction in setup costs,
- higher revenues due to quicker response times,
- reduced paperwork,
- reduction in spoilage due to improved quality, and
- lower audit costs.

## Quality Cost Management

**Total quality management (TQM)** describes a situation where all business functions are involved in a process of continuous quality improvement that focuses on delivering products or services of consistent high quality in a timely fashion. The emphasis of TQM is to design and build quality in, rather than inspecting it afterwards, by focusing on the causes rather than the symptoms of poor quality.

A **cost of quality report** should be prepared to indicate the total cost to the organisation of producing sub-optimal products. The following four categories of **costs of quality** should be reported:

1. Prevention costs: Costs incurred in preventing the production of products that do not conform to specification.

2. Appraisal costs: Costs incurred to ensure that materials and products meet quality conformance standards.
3. Internal failure costs: Costs associated with materials and products that fail to meet quality standards and include costs incurred before the product is dispatched to the customer.
4. External failure costs: Costs incurred when products or services fail to meet customer needs or requirements after they have been delivered. These costs are generally the most significant as they have a dramatic impact on future sales.

Prevention and appraisal costs are sometimes called the costs of quality conformance or compliance while internal and external failure costs are referred to as costs of non-conformance or non-compliance. Costs of conformance are incurred to eliminate costs of failure and are discretionary. Costs of non-conformance are the result of production imperfections and can only be reduced by increasing conformance expenditure.

Cost of quality reports provide useful information for top management, but **non-financial quality measures** provide better information for lower level management. Such as

- Defects as a percentage of completed products
- Number of reworked units
- Number of customer complaints

**Statistical quality control charts** are also used as a mechanism for distinguishing between random and non-random variations in operating processes. A control chart is graph of a series of successive observations of a process taken at regular intervals to test whether a batch of produced items is within pre-set tolerance limits. Only observations beyond specified pre-set limits are regarded as worthy of investigation.

**Six Sigma** is a quality management system that grew out of statistical quality techniques. The overall aim of Six Sigma is a very high and consistent standard of quality output. It tends to take the form of specific improvement projects that follow a standard 5 phase pattern:

1. Define requirements
2. Measure performance
3. Analyse process
4. Improve process
5. Control the new process

The goal of Six Sigma is to reduce failures to a rate less than 3.4 defects per million opportunities for each product or service transaction. Six Sigma is a systematic methodology utilising tools, training and measurements to facilitate the design of products and processes that meet customer expectations. The central idea behind Six Sigma is that if you can measure how many defects you have in a process, you can systematically figure out how to eliminate them and get to as close to 'zero defects' as possible.

Six Sigma means that the expectation is a near zero defect environment – non-essential wastage and defective products are practically eliminated resulting in a fundamental change in the deployment of cost and management accounting resources away from the production process to the pre-production process adding further impetus to the need for life-cycle costing (previously covered).