Chapter 9 revision notes

Cost management

Cost/volume/profit (CVP) relationships and break-even analysis

Cost-volume-profit (CVP) analysis studies the effects on future profit of changes in fixed costs, variable costs, volume, sales mix and selling price. Break-even (B/E) analysis is one application of CVP, which can be useful for profit planning, sales mix decisions, production capacity decisions and pricing decisions.

There are three fundamental cost/revenue relationships that form the basis of CVP analysis:

total costs = variable costs + fixed costs

contribution = total revenue - variable costs

profit (or operating income) = total revenue - total costs

The break-even point is the level of activity at which there is neither profit nor loss. It can be ascertained by using a break-even chart or by calculation. The break-even chart indicates approximate profit or loss at different levels of sales volume within a limited range. Break-even charts may be used to represent different cost structures and also to show contribution break-even positions and profit-volume relationships.

contribution = fixed costs

$$\text{number of units at break-even point} = \frac{\text{fixed costs}}{\text{contribution per unit}}$$

$$\text{£ sales value at break-even point} = \frac{\text{fixed costs}}{\text{contribution to sales ratio \%}}$$

The term 'margin of safety' is used to define the difference between the break-even point and an anticipated or existing level of activity above that point.

In other words, the margin of safety measures the extent to which anticipated or existing activity can fall before a profitable operation turns into a loss-making one.

The CVP technique may also be used to derive a target cost estimate, by subtracting a desired margin or target profit from a competitive market price. This cost may be less than the planned initial product cost, but will be a cost that is expected to be achieved by the time the product reaches the mature production stage. Sales volumes or sales values may be calculated that are required to achieve a range of profit targets.

Sensitivity analysis may consider the sensitivity of the break-even point against expected volumes of activity, and changes to fixed costs and variable costs. Sales price sensitivity may be considered in terms of volume through analysis of fixed labour and overhead costs, and variable material, labour and overhead costs.

Limitations of CVP analysis

CVP analysis relies on a number of assumptions:

- that output is the only factor affecting costs - there may be others including inflation, efficiency, economic and political factors
- the simplistic approach to cost relationships: that total costs are divided into fixed and variable costs – in reality costs cannot be split easily, even into variable and fixed costs
- the likelihood that fixed costs do not remain constant beyond certain ranges
- the behaviour of both costs and revenue is a linear - linearity is rare with regard to costs and revenue
- there is no uncertainty - there is much uncertainty involved in the prediction of costs and sales
- there is a single product – business usually provide more than one product and sales mix is not constant but continually changes due to changes in demand
- that stock levels do not change
- the time value of money is ignored
- that these assumptions hold over the relevant range (the activity levels within which assumptions about cost behaviour in break-even analysis remain valid)

In real life situations the above assumptions clearly do not hold because cost relationships are not simple and straightforward.

Activity based costing (ABC)

Activity based costing (ABC) provides an alternative approach to the costing of products in response to some of the criticisms that have been aimed at the more traditional approaches.

Traditional decision-making and control has looked at cost/volume relationships and the splitting of fixed and variable costs. The consideration of 'other characteristics' has not been emphasised. Activity based costing (ABC) was developed by Kaplan and Cooper in 1984 and was aimed to get accountants to consider 'other characteristics' in terms of the causes of cost, or what are defined as the cost drivers.

An activity driver is defined as a measure of the frequency and intensity of the demands placed on activities by cost objects. A cost driver is defined as an factor which causes a change in the cost of an activity. An activity may have multiple cost drivers associated with it.

Traditional cost allocation approaches allocate overheads, for example on the basis of direct labour hours, or units produced. They are therefore volume driven, based on a scientific management basis of mass production with standard design, a high labour content of total costs, large volumes, low fixed costs, and with demand greater than supply.

ABC starts by considering four different groups of activities giving rise to overheads: movement; production demands; quality; design, rather than the volume of production.

The bases of ABC are:

- it is activities that cause costs, not products
- it is activities and not costs that can be managed
- control of costs is best achieved through the management of activities
- each cost driver, or activity, is evaluated by setting up its own individual cost centre, to see if it is worth undertaking or buying in, and to see how it may be managed, reported on and evaluated

The ABC methodology requires all cost types to be identified and classified into those that are volume based, those that are activity based, and those that may have some other basis.

The ABC accounting system may be used to develop an activity based management (ABM) system. This is a system of management which uses activity based information for a variety of purposes including cost reduction, cost modelling and customer profitability analysis. The system involves four key operations: activity analysis; activit costings; activity costs per product; activity performance measurement and management. A good ABM system should promote more effective cross-function management.

There are benefits to be gained from the use of ABC: it facilitates improved understanding of costs; it enables improvements and overhead savings to be made; it focuses on activities and not production volumes; it examines the profitability of products; it identifies loss making products; it leads to development of activity based management systems.

There are also many problems associated with the implementation and use of an ABC system:

- it does not comply with statutory stock valuation requirements
- it is as subjective as absorption costing
- it is historical
- it uses cost pooling (points of focus for the costs relating to particular activities), but also requires the use of apportionment, which involves the same problems of subjectivity identified in the use of absorption costing
- it requires identification of cost drivers, the right ones; it requires the measurement of cost drivers and activity costs
- it requires the relating of activities to products
- it requires the measurement of cross-product drivers, which are factors that cause changes in costs of a number of activities and products
- there are always other consequences that ABC does not address
- there is a novelty, or flavour of the month factor associated with ABC which is questionable
- it is an expensive and time-consuming exercise

Throughput accounting (TA)

Another recent development in management accounting has been the introduction of throughput accounting (TA). It has its root in the development of the production scheduling software: optimised production technology (OPT), from the mid-1970s. Through the 1980s and 1990s Eli Goldratt further developed and refined these ideas to construct the theory of constraints (TOC), which was outlined in 1984 b Goldratt and Cox in their book *The Goal*.

As part of the OPT approach, TA, developed fro Goldratt's TOC, provides a new measurement system. This approach takes labour and overhead costs as given and concentrates on the flow of production through the factory. TA recognises that maybe only one or two variables limit the ability of the organisation to achieve its goal to make money. Concentration only on those specific variables, and putting the efforts where the problems are, can result in huge overall gains.

TA is similar to the approach of contribution per unit of scarce resource, but whereas

contribution = sales revenue - total variable costs

Throughput is defined as

throughput = sales revenue - direct materials cost

An advantage of TA over traditional methods is that decisions made on standard costing 'efficiencies' are thus avoided. An example of such decisions are those based on apparent improvements in labour productivity gained from manufacturing increased volumes (and build-ups of unnecessary stocks), not supported by increased customer orders. TA concentrates on identification and management of bottlenecks (which is in itself a process of continuous improvement) and so priority may be given to investment in bottlenecks.

TA is an extreme form of marginal costing that focuses on some key activities:

- identification of bottlenecks and constraints, through profiling of processes and identification of buffer stocks
- close attention to decision making on new capital equipment investments
- project teams investigating and implementing reductions in lead times, set-up times and waiting times

Along with its inventive approach to performance measurement and control, the overriding benefit of TA is that it forces everyone, and management in particular, to pay particular attention to what is actually happening where the products and services are being provided, and to appreciate the critical need for adherence to customer schedules.

Life cycle costing

Life cycle costing uses maintenance of cost records over entire asset lives so that decisions regarding acquisition or disposal may be made in a way that optimises asset usage at the lowest cost to the business.

Life cycle costing has an ultimate aim of minimising total expenditure over the lifetime of a product, or over the lifetime of an item of a fixed asset.

With a focus on maximising reliability and minimising maintenance and repair costs, acquisition of machinery or equipment involves an examination of the original cost and the support cost of the asset over the number of years of its expected lifetime. Depending on the type of equipment, support costs may range from ten to one hundred times the cost of acquisition. The approach may be applied to smaller items such as computer hardware and software, and vehicles, to very large equipment like buildings and aircraft.

Life cycle costing may be applied to the profiling of cost over a product's life, including the prototyping and pre-production stages and in terms of the life cycles of both the business and the industry.

Target costing

Traditionally, pricing decisions were based on, for example, the calculation of the selling price required to be charged for a product or service that covered total costs plus a margin for profit for the business. Such an approach takes no account of the price which the market might accept for the particular product or service. This approach does not encourage the objective of total cost minimisation. In fact, one could argue that such an approach encouraged costs to be increased since the higher the cost, the higher was the level of total profit.

A target cost is a product cost estimate (that may be less than the planned initial product cost but which will be expected to be achieved by the time the product reaches the mature production stage through continuous improvement and replacement of technologies and processes), derived by subtracting a desired profit margin from a competitive market price, determined through customer analysis and market research.

Target costing has also been described as a structured approach to determining the cost at which a proposed product with specified functionality and quality must be produced in order to generate the desired level of profitability at the product's anticipated selling price. Target costing focuses on reducing the cost of a product through design changes.
There are three factors that affect the structure of a target costing system:

- type of product
- the market
- influence over suppliers

Benchmarking

Benchmarking processes of the best performing organisations within the industry, or within any other industry, can identify best practice, the adoption of may improve performance.
The performance of other companies should be continually benchmarked. This should look at, for example, design, quality, cost, and delivery, and is known as internal benchmarking, which is a method of comparing one operating unit or function with another within the same industry.
Benchmarking need not be restricted to companies with similar products or companies in the same industry. Lessons may be learned and costs reduced by comparing the company's processes with processes in other non-related companies or industries. Functional benchmarking (also known as operational, or generic benchmarking), compares internal functions with those of the best external practitioners of those functions, regardless of the industry they are in.
Competitive benchmarking compares performance from information gathered about direct competitors.
Strategic benchmarking is aimed at strategic action and organisational change.

Kaizen

Kaizen, an 'umbrella' concept covering most of the 'uniquely Japanese' practices, is a technique used for continuous improvement of all aspects of business performance.
The tools of *kaizen* were introduced to Japan in the 1950s from the USA by Deming and Juran. However, the concept continued to be rejected for a long time in the West until the Japanese postwar 'economic miracle' began to be studied more seriously and the techniques applied to achieve the same improvements in productivity.
Kaizen means ongoing improvement involving everyone, including both managers and operators – the people actually doing things. *Kaizen* signifies small ongoing improvements to the *status quo* as a result of ongoing efforts rather than drastic investment/improvement programmes. *Kaizen* teams are small multi-disciplined groups that are brought together to brainstorm and develop improvement ideas. It is always beneficial for a business to have at least one continuous improvement team running at any one time to look at:

- products
- materials
- processes
- purchasing
- logistics
- any of the support functions

The make up of the *kaizen* teams should be changed frequently and the process should ensure that employees are involved in assessing, and auditing, departments and tasks other than their own departments.

Cost of quality (COQ)

Cost of quality (COQ) is used to identify areas for improvement and cost reduction within each of the processes throughout the business.
Quality, once a deviation from the 'normal' product by providing extra 'luxury' and more features, is now a given. Quality means doing what the customer wants every time at the lowest internal cost. It involves:

- getting it right
- getting it right first time
- only doing the right things and doing them right
- doing the right things better

In many businesses that have no quality systems, or neglected quality systems, the cost of quality is usually in excess of 20% of turnover. Within service industries this cost may be 40% or more! Organisations that have implemented well-developed quality systems may be able to reduce the cost of quality down to below 20% and perhaps as low as 2% of turnover.

In the UK, the Department of Trade and Industry (DTI) quality standard BS6143 (1990) defines quality costs using four categories:

- two types of costs of achieving quality:
    - prevention costs
    - appraisal costs
- two costs of not achieving quality:
    - internal failure costs
    - external failure costs

In addition, there are two further important categories, which are the costs of exceeding requirements, and the cost of lost opportunities.

The traditional view was to consider quality as a cost. A certain percentage of defects was established as the accepted level of the cost of quality.

The total quality view considers cost of quality as a cost to be minimised with an aim of zero defects. This represents a total quality management (TQM) approach to company performance by raising quality awareness and reducing the costs of quality through implementation of improvement actions.