



# OPERATIONS

## NATIONAL 6

HIGHER BUSINESS MANAGEMENT

## **Just-in-Time Manufacturing**

Originated in Japan during the 1960s and involves keeping stock levels to a minimum. Stocks arrive just-in-time to satisfy production needs. Raw materials are not purchased until they are required and finished goods are not produced unless firm orders have been received.

To be successful JIT techniques depend upon the reliability of an organisation's suppliers, access to a supply of highly skilled workers and good quality control procedures.

### **Advantages**

- It improves cash flow since money is not tied up in stocks
- The system reduces waste, obsolete and damaged stock.
- More factory space is made available for productive use.
- The costs of stock holding are reduced significantly.
- Links with and the control of suppliers are improved.

### **Disadvantages**

- A lot of faith is placed in the reliability and flexibility of suppliers
- Increased ordering and admin costs
- Advantages of bulk buying lost
- Vulnerable to a break in supply and machinery breakdowns
- Difficult to cope with sharp increase in demand
- Possible loss of reputation if customers are let down by late deliveries

## Storage of stock

Traditionally there are two ways of storing stocks – either in one central area (**centralised storage**) or in different locations throughout the organisation depending on where the items are to be used (**decentralised storage**).

A number of companies are moving away from these traditional methods to the Japanese production process **Just-in-time** which uses the **Kanban system**. Raw materials intake, work in progress and goods dispatch are kept to a minimum to match exactly the quantities demanded by customers. This stock control system uses cards to inform operators how much is to be produced at each stage in the process and the precise quantity of stock each process should withdraw from the previous stage. The previous stage may be another process, a stores area or even a supplier.

Just-in-time aims to get the highest volume of output at the lowest unit cost. It is really a method of **production control**. Using a 'pull-through' approach the advantages claimed for this system include:

- a smoothing out of production flows;
- a reduction in inventory levels;
- a reduction in unit costs of production;
- much easier production planning for management;
- ease in meeting delivery deadlines;
- elimination of waste;
- no over-production.

The concept is very simple. If there is no demand for the product there is no production. It is the anticipated or planned consumer demand – often initiated by the sales or marketing department – that triggers the production process. Finished goods are produced just in time to be sold to the customer. Component parts are assembled just in time to become finished goods. Materials are purchased just in time to make component parts.

Each system of stock control has both advantages and disadvantages. And, as with all management decisions, each organisation must choose the storage system most appropriate to its needs.

## Centralised storage

### **Advantages:**

- improved security
- supervised by specialist staff
- agreed procedures for issue/receipt
- agreed procedures for ordering
- bulk ordering/storage may be cheaper
- increased efficiency in distribution

### **Disadvantages:**

- time wasting going to and from stores
- cost of specialist staff
- cost of dedicated storage area

## Decentralised storage

### **Advantages:**

- stock always 'on hand' when required
- orders of stock will reflect actual usage
- faster turnover of smaller amounts of stock reduces likelihood of deterioration/decay

### **Disadvantages:**

- less rigid control – theft and loss more likely
- takes up space in production areas

## The Kanban system

### **Advantages:**

- stock usage exactly matches production requirements
- savings are made on both purchase and storage costs of unused stocks
- production delays are prevented
- close ties with suppliers are established

### **Disadvantages:**

- there is a high dependency on suppliers and their ability to conform to your requirements
- suppliers must be willing to participate.

## The Choice of Distribution Channel

An efficient channel of distribution will allow a business to make products available to consumers quickly, when required, and at a minimum distribution cost to the firm itself. Large firms often choose different channels for different products.

There are many factors that can influence a business' decision.

### The Product

The nature of the product itself will influence the type of distribution channel chosen.

- Perishable or fragile goods, such as fresh fruit, require direct channel of distribution, so half the time spend handling the product is reduced.
- Technically complex goods also need a direct link between the producer and the consumer. This is so that any problems which arise from installation can be quickly dealt with, without the need to go through an intermediary.
- Goods or services which are tailor made tend to have more direct channels so that the consumer's needs can be passed to the producer.
- Goods which are heavy or are packaged in non-standard shapes are likely to require a direct channel of distribution. If handling is difficult, the cost of distribution is likely to find rival brands on shop shelves.
- Producers wishing to sell large quantities of low valued goods are likely to use a wholesaler. They will not want to keep stocks of low valued goods if they are receiving order for more highly priced goods. Selling through wholesalers will mean they can sell low valued products in bulk, as quickly as possible.

## The Market

Large and dispersed markets usually require intermediaries. Smaller, local markets can often use a system where consumers buy directly. This is also true of the size of an order, where smaller orders can be sent by a more direct channel of distribution.

The market segment at which the product is aimed may influence the retail outlet at which the product is made available. For example, products aimed at travelling business people may be sold near to a railway station.

## Legal Restrictions

Legislation may influence the channel that can be used for particular product. Certain drugs, for example, can only be sold by pharmacists through a prescription.

## The Company

Larger companies are often able to set up their own distribution networks.

## Physical Distribution

Physical distribution is the movement of products from one place to another. It is an important part of the marketing process for 2 main reasons:

- Failure to deliver a product in the right quantities at the right place and at the right time can damage an effective marketing effort.
- The cost of physical distribution can be high - in some cases higher than the cost of actually producing the product.

Two aspects of physical distribution are important to a business holding stocks and transporting products.

## Holding Stocks

Ideally a business would be able to guarantee every customer the product they wanted, whenever they wanted it. To do this a firm would have to hold huge amounts of stock. Holding excessive amounts of stock is very costly. Holding very low stock levels, however, could mean turning down orders.

The solution is for a business to assess the level of stocks needed to maintain an agreed level of customer service. This often means holding enough stock to satisfy regular orders, but not enough to deal with sudden changes in demand.

## Transporting Products

This is concerned with how goods can be physically delivered to markets. Firms need to consider the relative costs and speed of transporting their goods by road, rail, sea or air. For example, aeroplanes are faster than ships when transporting exports for the UK. However, firms must decide whether this advantage outweighs the costs which result from using this mode of transport. There are times when the nature of a product dictates the transport. For example, an Orkney Islands based firm which sell freshly caught lobster to Paris restaurants has little choice but to fly the product to France.

When transporting goods, firms must also consider possible damage to or deterioration of goods. Packaging may help to reduce damage and deterioration, for example, if vacuum packs are used.

## Production - Types of Production Method

### *Definition*

In our introduction to production and operations management ("POM") we suggested that there are several different methods of handling the conversion or production process - Job, Batch, Flow and Group. This revision note explains these methods in more detail.

### *Introduction*

The various methods of production are not associated with a particular volume of production. Similarly, several methods may be used at different stages of the overall production process.

### Job Production

With Job production, the complete task is handled by a single worker or group of workers. Jobs can be small-scale/low technology as well as complex/high technology.

Low technology jobs: here the organisation of production is extremely simple, with the required skills and equipment easily obtainable. This method enables customer's specific requirements to be included, often as the job progresses. Examples include: hairdressers; tailoring

High technology jobs: high technology jobs involve much greater complexity - and therefore present greater management challenge. The important ingredient in high-technology job production is project management, or project control.

The essential features of good project control for a job are:

- Clear definitions of objectives - how should the job progress (milestones, dates, stages)
- Decision-making process - how are decisions taken about the needs of each process in the job, labour and other resources



Examples of high technology / complex jobs: film production; large construction projects (e.g. the Millennium Dome)

Advantages	Disadvantages
<ul style="list-style-type: none"><li>▪ Easy to organise production</li><li>▪ Can customise orders</li><li>▪ 'one-off' orders can be accommodated</li><li>▪ Workers involved in entire production process from start to finish</li></ul>	<ul style="list-style-type: none"><li>▪ Production costs likely to be high</li><li>▪ Production time may be longer</li><li>▪ Investment in machinery may be higher as specialist equipment may be needed</li></ul>

As businesses grow and production volumes increase, it is not unusual to see the production process organised so that "Batch methods" can be used.

### Batch Production

Batch methods require that the work for any task is divided into parts or operations. Each operation is completed through the whole batch before the next operation is performed. By using the batch method, it is possible to achieve specialisation of labour. Capital expenditure can also be kept lower although careful planning is required to ensure that production equipment is not idle. The main aims of the batch method are, therefore, to:

- Concentrate skills (specialisation)
- Achieve high equipment utilisation

This technique is probably the most commonly used method for organising manufacture. A good example is the production of electronic instruments. Batch methods are not without their problems. There is a high probability of poor work flow, particularly if the batches are not of the optimal size or if there is a significant difference in productivity by each operation in the process.

Batch methods often result in the build up of significant "work in progress" or stocks (i.e. completed batches waiting for their turn to be worked on in the next operation).

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>▪ Allows flexible production</li> <li>▪ Stocks of part-finished goods can be held and completed later</li> <li>▪ Workers can specialise</li> </ul>	<ul style="list-style-type: none"> <li>▪ Production runs of small batches can be expensive to produce</li> <li>▪ If production runs are different there may be extra costs and time delays in setting up different equipment</li> <li>▪ Repetitive work for employees</li> </ul>

### Flow Production

Flow methods are similar to batch methods - except that the problem of rest/idle production/batch queuing is eliminated.

Flow has been defined as a "method of production organisation where the task is worked on continuously or where the processing of material is continuous and progressive,"

The aims of flow methods are:

- Improved work & material flow
- Reduced need for labour skills
- Added value / completed work faster

Flow methods mean that as work on a task at a particular stage is complete, it must be passed directly to the next stage for processing without waiting for the remaining tasks in the "batch". When it arrives at the next stage, work must start immediately on the next process. In order for the flow to be smooth, the times that each task requires on each stage must be of equal length and there should be no movement off the flow production line. In theory, therefore, any fault or error at a particular stage can halt the entire process.

In order that flow methods can work well, several requirements must be met:

(1) There must be substantially constant demand

If demand is unpredictable or irregular, then the flow production line can lead to a substantial build up of stocks and possibility storage difficulties. Many businesses using flow methods get round this problem by "building for stock" -

i.e. keeping the flow line working during quiet periods of demand so that output can be produced efficiently.

(2) The product and/or production tasks must be standardised

Flow methods are inflexible - they cannot deal effectively with variations in the product (although some "variety" can be accomplished through applying different finishes, decorations etc at the end of the production line).

(3) Materials used in production must be to specification and delivered on time

Since the flow production line is working continuously, it is not a good idea to use materials that vary in style, form or quality. Similarly, if the required materials are not available, then the whole production line will come to a close - with potentially serious cost consequences.

(4) Each operation in the production flow must be carefully defined - and recorded in detail

(5) The output from each stage of the flow must conform to quality standards

Since the output from each stage moves forward continuously, there is no room for sub-standard output to be "re-worked" (compare this with job or batch production where it is possible to compensate for a lack of quality by doing some extra work on the job or the batch before it is completed).

The achievement of a successful production flow line requires considerable planning, particularly in ensuring that the correct production materials are delivered on time and that operations in the flow are of equal duration. Common examples where flow methods are used are the manufacture of motor cars, chocolates and televisions.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>▪ Economies of scale</li> <li>▪ Automated production lines save time and money</li> <li>▪ Quality systems can be built into the production</li> </ul>	<ul style="list-style-type: none"> <li>▪ Standard product produced (opposite of customised)</li> <li>▪ High set-up costs of automated lines</li> <li>▪ Repetitive and boring work</li> <li>▪ Long production runs may produce more than is needed</li> </ul>

## Production methods

A business must operate in the most efficient way possible, ie it must find the most cost-effective and fastest method of production. The choice of production method will depend on:

- the product being produced
- the size of the market
- the size of the business
- the finance available
- the technology available.

Production will be either *labour intensive* or *capital intensive* and there are advantages and disadvantages of each method. Ultimately the choice is *man vs machine*.



**Labour-intensive production** is where a business uses a larger proportion of human input than machinery to complete the production process, for example fruit picking, postal service and hospitality industry.

Labour-intensive production is used when:

- the cost of labour is relatively cheaper than the cost of machinery
- the production process requires specific skills
- the use of machinery would be impractical due to lack of space or mobility
- the production process relies on the ability of humans to think, act on initiative and problem solve
- the production process requires flexibility, for example job production will use a high proportion of labour as specialist skills will be needed to make unique products.

<b>Labour-intensive production</b>	
<b>Advantages</b>	<b>Disadvantages</b>
Additional flexibility due to human skills – can make one-off items	A skilled workforce can be expensive to recruit, pay and train
More responsive to change	Business cannot take advantage of economies of scale
Lower startup costs than capital-intensive production as no initial outlay on machinery/equipment	Staff illness or absence can impact on the production process
The use of human judgment is needed or can improve the process	Additional quality control measures may be required due to human error
	Can be less efficient than capital-intensive production

**Capital-intensive production** is where the production process relies more on machinery and other capital equipment relative to human input. This type of production is used to produce goods on a large scale, for example cars and washing machines.

Capital-intensive production is used when:

- the supply of labour is limited
- the production process is routine and repetitive
- the cost of the capital is relatively cheap compared to labour
- the use of machinery improves the quality and accuracy of production
- the use of machinery improves efficiency and consistency of output.



Capital-intensive production is more likely to be associated with batch or flow production. It can be further categorised as follows:

**Mechanisation:** Where humans use machinery to help them in the production process, often to replace the physical, muscular part of the process. Human judgement is still required.

**Automation:** A step further than mechanisation, where control systems and information technology are used to manage production, reducing or replacing human intervention. Automation removes the need for human judgement.

Automation is often the most cost-effective method of production, but when a business moves from a labour-intensive to either a mechanised or automated method of production redundancies occur, which could lead to negative publicity for the business.

<b>Capital-intensive production</b>	
<b>Advantages</b>	<b>Disadvantages</b>
Machinery can operate 24/7	Large initial outlay to purchase machines
Higher volume of goods can be produced	Cost of maintaining and repairing equipment can be high
Quality of output is standardised and consistent	Only suitable for standardised production process – difficult to adapt or change
Removes the chance of human error	Production time is lost if machines break down
Machines can do work that would be dangerous or hazardous to humans	Worker motivation is low as they are de-skilled. Can also lead to redundancies.

## FACTORS AFFECTING QUALITY

- **Quality assurance**
- **Quality control**
- **Quality standards**
- *Total quality management*

In today's highly competitive global market **quality** has become one of the key decision areas in operations. Quality is an extremely difficult term to define as it can mean different things to different people.

From the consumer's point of view quality may be:

- quantity provided for the price paid;
- reliability or lifetime of the product;
- the extent to which the product or service satisfies a customer's particular requirements, for example, technical features, appearance, and how well the product/service compares with its marketing description.

From the producer's point of view quality may be:

- meeting exact specifications;
- a highly skilled workforce;
- no customer complaints.

### Quality assurance

Quality assurance is an attempt to make sure that quality standards are set, agreed and met throughout the organisation. The aim is to ensure customer satisfaction and reduce the return of faulty goods.

### Quality control v Quality assurance

Often thought to mean the same thing, these terms in fact describe different approaches to managing quality.

**Quality control** is historic, reactive and based on power. Consequently it often leads to waste, and the scrapping and re-working of products. This approach has some significant psychological implications. It works by failure, by denying the possibility of getting things right.

'Control' *assumes* that there will be wastage and scrap as inevitable parts of the production process. Up to 25% of output can be wasted in a company that practises a system of 'control' in which quality is checked at the end of the manufacturing process. This has led to the 'Friday car syndrome', which can result in heavy costs in raw materials and manpower.



An example of a quality control system was found in Kellogg's, where samples of breakfast cereal are removed from the production line every half-hour, around fifty samples per day, and tested for quality. The cereals are graded from 1 to 10 by a small group of trained staff. A grade of 10 is perfect. A grade between 9.8 and 7 means that there is no visible reduction in quality as far as the customer would notice. The cereals all also undergo a series of other tests – looking at nutritional values, texture, taste, colour, etc.

**Quality assurance** is based on prevention. Requirements are determined in advance, thereby minimising the risk of error, or non-conformity to specifications. It aims to create a situation in which 'right first time, every time' becomes a real possibility. This system, in which quality is checked at every stage of the manufacturing process, has been known to reduce wastage and scrap to 5% or less. As a result, in most organisations there is less and less dependence placed on quality control and far more placed on quality assurance systems. In today's highly competitive market place, the resulting increase in profits, the reduction in costs, and, above all, the improvement in customer satisfaction are all vital.

Factors that the organisation will consider when assessing if they can provide quality in their operating systems include:

- the time, effort and technological input into the design process;
- the quality of supplies of materials and components;
- the commitment and skill of the workforce;
- the system of monitoring and controlling the operating process;
- the ability to meet delivery deadlines;
- the after-sales service provided.

## Quality standards

From much that we read about recent business organisations and their operations we might think that the concept of quality has dominated the thoughts of all management teams, regardless of the type or size of the organisation. From schools finding themselves on league tables, and general practice doctors' surgeries having to fulfil a Patient's Charter in their performance, to all types of consumer goods being branded as 'quality' products, all producers and service providers seem to be involved with 'Total Quality Management'.

The traditional view of quality is that there is some conformity with specifications of standards. However, modern thinking now broadens this view to emphasise the importance of the perspective of the customer in the setting of quality definitions. In this way, quality is seen more as fitness for purpose or intended use. This might include measures of appearance, safety, availability, value for money, ease of use, consumer after sales support, the reputation of the product and the organisation, and even the way staff deal with customers.

In recent years the government, through the British Standards Institute, has defined quality assurance as an all-embracing concept involving all stages and all people in the production process. This is a significant move away from the previously held notion of quality control, where the emphasis was on detection and the remedial treatment of faults.

The government further pushes organisations to adopt Quality Standards such as BS5750 by stating that they will only award contracts to those organisations that hold the certificate.

There has to be general agreement within the organisation about the quality standards that it is to aim for in its operations. Quality manuals have to set out policy and procedures on quality assurance and identify the quality standards set down by the organisation. Inspections will be made into current procedures and working practices to ensure that what is laid down in the manual is being put into practice. If these are of a sufficiently high standard there is a recognised quality standard award certificate that can be made to manufacturing industries, allowing them to incorporate the standard into their marketing literature.

British Standard 5750 is the standard that has been developed as a benchmark for quality in the United Kingdom. Consequently BS5750 and its international equivalent, the International Organisation for Standardisation's ISO9000, are recognised as the mark of quality in over ninety countries worldwide. Other award schemes also exist whereby TQM can be recognised, for example, through the European Foundation for Quality Management (EFQM).

Other organisations award their own quality assurance marks. These include the British Standards Institution Kite Mark, the Association of British Travel Agents (ABTA) symbol, and the pure new wool symbol of the Wool Marketing Board.

Investors In People (IIP) is another recognised quality standard that can be achieved by organisations that provide training and other development opportunities for all staff.

### **Total Quality Management (TQM)**

The main aim of Total Quality Management is to produce a perfect product or service every time in order to meet customer requirements. In the UK the system was first seen more than twenty years ago when the Ministry of Defence set out the specifications or standards that their suppliers had to meet before the Ministry would buy from them. Gradually over the years similar standards have evolved to cover a wide range of industries.

Total Quality Management uses the principles of 'Quality Assurance' but takes a fundamentally different view of quality. The principle upon which this system operates is that in order to achieve 'quality', the requirements, specifications, and needs of the customer or client come above everything else. The culture shift must be made from 'we know what quality is' to 'You tell us what you want and that will be our definition of quality'.

In practical terms TQM assumes that the next person with 'ownership' of the good, or the next person to use the good, are customers or clients – not simply the person who ends up purchasing the good for his/her own use.

Quality is therefore essential at each and every step in the production of a good, or, for that matter, in the provision of a service, to which the same principles apply.

For example, on the production line in a factory, the next person down the line from *you* is *your customer or client*. You must therefore ensure that when the part-assembled car leaves you to move on to the next worker, any work you have done on it is of the highest standard and quality – just as you will expect to receive the car parts from the worker in front of you.

It is felt that, although it is initially costly to establish, TQM can achieve savings in the long run by reducing wastage to around 3%. This can make a considerable difference to an organisation.

#### **TQM requires:**

- the understanding that this is a core corporate philosophy focusing on the needs of the consumer;
- a commitment by top management, and therefore the provision of the necessary resources;
- that every member of the organisation be consulted and involved in setting standards (***every member of the organisation*** means just that, from the receptionist, office cleaner and store-man to top management);

- a focus on teamwork and creative thinking to identify future improvements;
- that it be viewed as a long-term concept;
- a quality plan to be established which offers a structured, disciplined approach to quality;
- emphasis to be placed on the collection and analysis of information;
- employee training to be treated as essential;
- a constant checking of performance (quality standards) by individuals;
- a constant search for improvement;
- focus on the total quality of output, in which case cost savings can be considerable.

### **Introducing and implementing quality assurance or TQM systems**

Quality assurance requires four elements to be managed:

1. The definition of 'quality' at each and every stage of the process;
2. The commitment of *all*;
3. A system in which this quality can be assured;
4. A measure of the ability to meet quality requirements.

#### **1. *The definition of quality***

Ultimately this lies with the customer in terms of defining a specification of the desired product/service and may include specific reference to, for example:

- intended usage,
- required outcomes,
- standards of safety,
- efficiency,
- quality of the finished product,
- cost.

It is up to the supplier to clarify the customer's definition and confirm his ability to supply to these requirements.

Suppliers must take responsibility for helping their customers to articulate precise requirements. Vague definitions of ideas will be impossible to implement, as these lead to misunderstandings and errors that, by the nature of the system, must be eradicated.

Only if instructions are specific at every stage of the process can quality be assured, and for this specifications must also be precise.

## 2. ***The commitment of all***

- a clear commitment to quality in the mission statement of the organisation,
- a quality manual/handbook which outlines the specific components of each job within the organisation,
- a clear definition of the responsibility of every individual within the organisation to deliver quality on every occasion to every customer,
- the drawing up and implementation of a 'contract' to confirm the mutual obligation of the supplier and the customer,
- the establishment of 'standard operating procedures' (schemes of work, checking procedures, etc.) to help ensure consistency,
- the use of quality audits to establish the integrity of provision against the set specifications,
- the use of quality circles,
- the use of benchmarking.

## 3. ***A system in which this quality can be assured***

Effective management for quality assurance will require organisations to set up systems and processes that will include:

- systems to help in the definition and specification of products/services,
- systems for checking and monitoring the process and quality at all stages in production/provision,
- using appropriate documentation to set out requirements and to record progress and quality achieved,
- keeping records,
- designating individual responsibility for ensuring quality throughout the organisation,
- reviewing, monitoring and feedback from operatives,
- staff appraisal,
- settings of specific targets of achievement,
- providing comprehensive job descriptions,
- providing comprehensive and clearly understood instructions and information at all times.

## 4. ***A measure of the ability to meet quality requirements***

This can be carried out in a number of ways, both qualitatively and quantitatively. It may be made on customer's perceptions, or on objective measurements – both are valid indicators of conformity.

## Benchmarking

This is a process of **quality assurance** that sets performance standards against which work can be measured. These standards are set using the achievements of the most efficient producers in a particular market place or industry. The benefit of this is that production managers assess the performance of their operations against that of the market leaders in a truly competitive environment. The 'best industry standard' organisation can be identified by asking several sources, for example customers, industrialists, business analysts or journalists.

One drawback is that there may be resistance from the market leaders to providing their performance figures to be used by competitors. A second is that organisations must continue to benchmark their processes – even when they become industry leaders – as competitors will also be trying to produce better quality goods and thereby increase their market share.

Benchmarking is seen as a vital element in the success of an organisation in a global and highly competitive market.

## Quality circles

There are two principles behind the concept of quality circles in the work place:

- no one in the production process knows more about the problems that might arise than shop floor workers;
- workers will appreciate and be motivated by the opportunity to use their knowledge and talents alongside management in a problem-solving environment.

A quality circle is a group that meets regularly to identify and resolve problems about quality in the production process. Their remit includes the consideration and recommendation of suitable alternative practices that are then put to management. The members of the quality circle will largely consist of shop-floor workers, but may also include engineers, quality inspectors and members of the sales team who are there to present the customer's angle.

Like a number of successful modern management techniques, the idea of quality circles originated in the Japanese manufacturing industries. Toyota Motor Company was the first to establish quality circles in the 1950s.

The inclusion of quality circles in the workplace is seen as a successful way of bringing both *consultation* and *job enrichment* onto the shop floor.

## Summary of factors affecting quality

'Quality, reliability and cost are all interconnected. With enough expenditure anything can be endowed with high quality . . . and with adequate expenditure almost anything can be made to be very reliable. It follows, then, that a company can provide a product or service at different quality levels, each of which necessitates a different price. There is no simple level of quality; nor is there an absolute quality level. Nothing will be perfect, no matter how much it costs. In general, costs rise steeply for increasing quality, but beyond a certain level, value to the customer increases more slowly.'

Ray Wild, *Essentials of Production and Operations Management*, 2nd edn.

From the above we can develop simple definitions as follows:

### **Quality:**

The quality of a product or service is the degree to which it satisfies customers' requirements. This is influenced by:

### **Design quality:**

The degree to which the specification of the product or service satisfies customers' design requirements; and

### **Manufactured quality:**

The degree to which the product or service, when made available to the customer, conforms to specification.

## **Quality: mystery shoppers**

Mystery shopping is the practice of using trained shoppers to anonymously evaluate:

- customer experience
- operational efficiency
- employee integrity
- use of merchandising
- service/product quality.

Customer service is often the key to the ongoing success or failure of a business. It is more cost-effective to retain a customer than attract a new one, therefore making sure customers receive the appropriate level of service is a good investment.

### **Advantages to the business**

- Feedback is received that can be used to improve processes.
- Training needs can be identified.
- Improves customer retention.
- Monitors quality of products and service.
- Improves employee awareness of the importance of customer service.
- Reinforces positive action by offering an incentive-based reward system to employees and managers.





## **Ethical and environmental considerations**

### **Fairtrade**

Fairtrade is about achieving better prices and fair terms of trade for farmers in the developing world, who may have been exploited by greedy purchasers who may not pass on profits. Farmers pay their workers a fair wage, health and safety improves, and the local community becomes more sustainable. Fairtrade also ensures that the economic benefits are shared with the workers and farmers, not just the shareholders of the business.

The not-for-profit organisation Fairtrade International ([www.fairtrade.org.uk](http://www.fairtrade.org.uk)), awards the Fairtrade Mark for products that meet its strict criteria. It can be seen on food products such as coffee, chocolate, bananas and sugar in addition to non-food products such as cotton.

Larger companies such as Starbucks and Cadbury have joined the fairtrade movement in recent years as they believe that the process strengthens the producers' position in the market place as well as reassuring ethically motivated consumers.

Cadbury and the Fairtrade Foundation announced plans to achieve Fairtrade certification for Cadbury Dairy Milk, the nation's top selling chocolate bar. This groundbreaking move will result in the tripling of sales of cocoa under Fairtrade terms for cocoa farmers in Ghana.

Cadbury Chief Executive, Todd Stitzer, says, "This is an historic moment for our company. I am proud that the nation's favourite chocolate bar will display the FAIRTRADE Mark. I was in Ghana last month and saw how vital it is that businesses support their partners and the communities they live in. We believe that by joining forces with the Fairtrade Foundation, we can further improve living standards and conditions for farmers and farming communities, and create a sustainable supply of high quality cocoa for Cadbury."

The company has committed to the Fairtrade certification of Cadbury Dairy Milk for the whole of the British and Irish markets. The move will mean that the millions of Cadbury Dairy Milk consumers will be able to enjoy Fairtrade ingredients in their favourite chocolate bar, while the taste stays the same.

Todd Stitzer adds, "By working together, the Fairtrade Foundation and Cadbury believe we can get more people in the UK to buy Fairtrade products and achieve more for this cause than we ever could individually. This Fairtrade initiative is part of our ongoing commitment to cocoa farmers in Ghana where we originally established cocoa farms 100 years ago and last year launched the Cadbury Cocoa Partnership – after all, what's good for the farmers is good for our customers and our business."

Last month Todd Stitzer visited the Eastern Region of Ghana. He spoke to farmers about the modern-day difficulties of cocoa farming and discussed how increasing stability of cocoa earnings through stronger farmers' organisations and Fairtrade certification could deliver significant improvements to livelihoods, enabling farmers both to implement sustainable agricultural practices and to improve life in the wider community.

Benjamin Atiemo lives in Adjeikrom village, one of the places where cocoa farmers will now be working together to achieve Fairtrade certification. He expressed his concern about the future of cocoa farming in the area, saying that unless farming practices improve so farmers can increase their yields and incomes, young people will drift to the cities, where, without skills or education, they may end up unemployed and aimless.

*(Extracts from Fairtrade Foundation press release)*

A business benefits in many ways by being part of Fairtrade:

- **diverse market place** as demand for consumer goods is increasing as more market segments demand ethically sourced products. The UK market for Fairtrade goods is doubling in size approximately every 2 years. Social demand means that there has been an increase in consumers wanting ethical products. If a business does not produce or sell Fairtrade products it excludes a significant number of consumers from the market place.
- **increased customer loyalty** as commitment to Fairtrade could increase customer retention, giving the business more stability.
- **a good public image**, as being seen as ethically minded will encourage consumers to choose a business over competitors who do not offer ethically sourced products. This could result in increased sales and profitability for the business. A survey by Free Poll found that 96% of consumers are prepared to spend extra on products if they perceive them to be more ethically produced.
- **recruitment of staff and volunteers** will be easier as a Fairtrade business will be viewed as being caring and ethical – staff and volunteers are likely to have the same ethical stance and retention may also increase.



However, there are also some drawbacks for the business:

- **the price is higher for the consumer** compared to non-Fairtrade products, which can be viewed unfavourably by some consumers
- **small-scale production** is promoted by Fairtrade, but economies of scale cannot be achieved and it is more difficult to control production methods and prices. These factors can deter large businesses from working with these farmers.
- **tariffs** are much lower for non-processed supplies so it may not be profitable for the business to import, for example, roasted coffee instead of coffee beans.

- **concern over climate change and food miles** has resulted in some businesses and consumers weighing up the benefits of Fairtrade with the cost to the environment of transporting the goods.

## Environmental responsibility

Environmental responsibility refers to the duty that a company has to operate in a way that protects the environment.

Businesses are under increasing pressure to show environmental responsibility not only because it is viewed as being ethically correct but because it is also required by law.

Legislation is in place to control factors such as:

- emissions into the air
- storage and disposal of waste
- emissions into the water supply
- causes of nuisance, for example noise, smoke, fumes, gases, odour, light pollution and accumulation of rubbish.

If a business causes damage to the environment it has a legal obligation to take action to repair the damage.

Complying with legislation and operating in an ethical manner can have many benefits for a business.



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ethical

- reducing energy use can reduce running costs
- reducing the amount of raw materials used can reduce production costs and minimise the cost of waste disposal
- income may be generated from recycling equipment and materials, and saving can be made on the cost of disposing these items
- taking preventative measures to avoid environmental damage can be more cost-effective than incurring the expense of cleaning up once damage has been done or paying fines imposed.

In addition:

- many government organisations will only work with a business that takes environmental responsibility seriously
- many investors will only invest their funds with an environmentally responsible business

- it can be easier to attract investment from banks
- it enhances a business's reputation and can improve customer loyalty.

Profit maximisation will always be the primary objective of a business in the private sector, but many businesses are now realising that acting in an environmentally responsible way can improve their profitability and the long-term success of the business.

## Ethical operations

Working ethically means doing the right thing acting in a way that is both fair and honest to stakeholders. Ethical decisions will take into

- **impact** – who will be affected by the decision?
- **fairness** – will those who are affected by the consider it to be fair?



and  
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decision

Behaving ethically is not quite the same as behaving lawfully:

- **ethics** are about what is morally right and what is morally wrong
- **law** is about what is lawful and what is unlawful.

An ethical decision is one that is both legal and meets the ethical standards of the stakeholders.

Henry Ford, who founded the Ford Motor Company, said in 1903:

*'A business that makes nothing but money is a poor business.'*

He was referring to the responsibility of businesses not only to create good products for their customers, but also to share good practice and goodwill with all of their stakeholders.

Within the operations function of a business one of the key decisions is which supplier to use. A business can only claim to operate ethically if its suppliers are also ethical.

Unethical practices of suppliers can include:

- the use of child labour
- the use of sweatshops for production, for example hot conditions, long working hours
- the violation of workers' rights
- the violation of health and safety standards.

<b>Advantages</b>	<b>Disadvantages</b>
Increased sales revenue as demand from ethically motivated consumers grows	Cost of sourcing ethical labour and materials can be high
Improved business image, leading to increased brand awareness	Higher overheads, for example training staff to ensure adherence to ethical policy
Easier access to sources of finance, eg ethical investors	Ethical standards vary between countries, which can be problematic for multinational corporations
Improved employee motivation and recruitment	

## Technology

### Computer-aided design

Computer-aided design (CAD) is the use of computer software to assist in the creation, modification and analysis of a product during the design process. The product can be built and tested virtually to ensure it meets the needs of the customer and the business, which reduces the cost of creating and then modifying a prototype.



CAD is used extensively in industries such as car design, shipbuilding, architecture and engineering.

The advantages of CAD are:

- more accurate than hand drawings therefore reduces human error
- increases the productivity of the designer as designs can be saved and modified on the computer instead of new hand drawings being created
- images can be saved to be edited at a later date
- images can be sent via email
- images can be viewed in two and three dimensions.

The disadvantages of CAD are:

- the initial cost of the software is high
- computers need a large amount of processing power to support the software
- staff need to be trained to use the software.

### Computer-aided manufacture

Computer-aided manufacture (CAM) is the use of computers in the manufacturing process. Machinery and other equipment are regulated by a computer which is programmed to control and co-ordinate each stage of the production process.



CAM is an appropriate method of manufacturing when a large number of identical items are being produced, for example in the electronics, car and textile industries.

The advantages of CAM are:

- improved efficiency as production can occur 24/7
- improved accuracy and consistency as human error is eliminated
- reduction in waste
- machines will work at a programmed pace therefore speed of production is more predictable.

The disadvantages of CAM are:

- high initial outlay to purchase the machines/computers
- production will stop if machinery/computers breakdown.

### **Electronic point of sale**

An electronic point of sale (EPOS) system is a combination of hardware and software that allows a business to maintain accurate stock and financial records. The system can also be extended to provide valuable information about customers' buying habits.

An EPOS system improves stock control as it uses barcodes to:

- record products received into stock
- record products sold
- update stock levels frequently and accurately
- provide accurate pricing information
- identify demand for products.

EPOS helps a business minimise the risk of holding too much or too little stock.

An EPOS system can be linked to a business's website so that customers using e-commerce can check stock availability. They can identify if the product is in stock and when it will be delivered, register for stock alerts and reserve goods online to collect in store.

In addition to stock control, EPOS can readily be adapted to monitor customer behaviour.



**Tesco: How one supermarket came to dominate**  
**(BBC Website 9 September 2013)**

But what really took Tesco to the top was watching customer behaviour. It was the first British supermarket to do so and it was a game-changing move.

The introduction of the Tesco Clubcard is the single most significant factor in the success of the company, says Sir Terry Leahy, Tesco chief executive from 1997–2011. “I knew the whole industry’s structure would never be the same again” he says.

Tesco collected raw data on what people were buying and turned it into profitable information. It was also able to offer personalised discounts and rewards. Rolled out nationally in 1995, the card was an instant success. One year later Tesco became the UK’s top supermarket.

The scheme fundamentally changed the way all supermarkets did business and typifies Tesco’s success, say business analysts.

“It became such a success story because it was aggressive at adapting to consumer trends, diversifying and innovating,” said one analyst. “It took a hell of a lot of risks in the 1990s but they paid off.”

## Electronic surveys

One type of electronic survey is the **email survey**, which is contained within an email message or as an attached file. Respondents read the message, answer the questions and then reply to the researcher. From a business perspective these surveys are easy to develop and use as they do not require a high level of IT skills. Respondents need only basic IT skills to respond, making the collection of data straightforward.

A second type of electronic survey is the **web based survey**. Respondents are typically sent an email containing a link to the URL address for the survey. These surveys offer greater flexibility as a wide variety of response options can be used, for example check boxes and pull-down menus. Once the survey is completed the respondent simply clicks 'submit'. Statistical analysis software is used to scrutinise the data and present it as useful information, for example graphs and charts.

Electronic surveys have many advantages:

- emails can be sent 24/7 and read by the respondent when it is convenient – this eliminates the issue of time zones
- the respondent can choose to complete the survey at a time which suits them
- designing the survey is relatively easy and cost-effective
- the cost of sending the survey is low compared to mail, phone or personal survey methods
- they can be sent to a large amount of people.

Issues which may arise from using electronic surveys are:

- concerns over the privacy and anonymity of respondents' details included in the completed survey
- reluctance of respondents to transfer information over the internet
- response rate falls rapidly within 3–4 days of the survey being issued
- messages may be deleted by respondents before survey is completed
- compatibility with different operating systems and devices
- sample will contain bias as the population is unknown compared to traditional methods of selecting a sample, for example the majority of internet users are male, educated to degree level and have a higher than average income.



To improve the response rate an electronic survey should be visually appealing and offer incentives to respondents, for example 10% off next purchase, prize draw to win a holiday etc.

### **Internet/online advertising**

The internet can be used to deliver promotional marketing materials to consumers when they are looking online. Internet usage increases daily and it is now the predominant method of communication and entertainment for the majority of the population, replacing traditional formats such as newspapers and television.

Marketeers realise that traditional promotional methods such as free pens and mugs are expensive and ineffective, and use of long-established media formats such as radio, magazines, TV and newspapers are being superseded by the internet. To achieve the best value for money from advertising budgets, businesses are increasingly moving towards internet advertising, at the expense of traditional methods.

Internet advertising includes email marketing, search engine marketing, social media marketing, display advertising and pop ups. Adverts can be randomly generated, but online advertisers often use cookies which identify a specific computer and the browsing history of the user. This data allows them to deliver targeted advertising, customised to an individual's interests and tastes, and can even identify when a user has left a page without making a purchase, allowing the advertiser to contact them with a reminder to complete their purchase. Research has indicated that consumers prefer to receive targeted adverts instead of random adverts.

Internet advertising allows the customer to directly interact with the advert at the click of a mouse, making it significantly more powerful than other forms of advertising. Marketeers capitalise on this to drive direct sales via e-commerce.

**Viral marketing** can be a very effective and inexpensive way of generating lots of interest in a business. When information about a product or service is promoted in an attention-grabbing way it can go 'viral' very quickly. For example, one person sees the information and forwards it to 10 people, who then also each forward it to 10 people and so on, causing the message to spread very rapidly. This is the electronic equivalent of word of mouth.

Viral marketing may create a large amount of interest in a business, but this does not necessarily lead to an increase in sales.