

# The Development, Introduction and Sustaining of Total Quality Management (TQM)

The purpose of part 1 is to introduce the reader to some of the fundamentals of TQM. It deals with how to introduce TQM into an organization and its subsequent development. Sustaining TQM is far from easy, and the final chapter examines issues to which attention needs to be given. It contains the following seven chapters:

- Chapter 1 – TQM: An Overview
- Chapter 2 – The Role of Management in TQM
- Chapter 3 – The Received Wisdom on TQM
- Chapter 4 – The Introduction of TQM
- Chapter 5 – A Framework for the Introduction of TQM
- Chapter 6 – Levels of TQM Adoption
- Chapter 7 – Sustaining TQM

Chapter 1 examines the evolution of *quality management* ('co-ordinated activities to direct and control an organization with regard to quality') from *inspection* ('conformity evaluation by observation and adjustment accompanied as appropriate by measurement, testing or gauging') to *quality control* ('part of quality management focused on fulfilling quality requirements') to *quality assurance* ('part of quality management focused on providing confidence that quality requirements will be fulfilled' (BSEN ISO 9000 (2000))) and finally to *Total Quality Management (TQM)*. In describing this evolution a comparative analysis is made of the essential difference between detection- and prevention-based approaches. The key elements of TQM are also discussed. TQM is not defined in BSEN ISO 9000 (2000) but, put simply, it is the mutual co-operation of everyone in an organization and associated business processes to produce products and services which meet and, hopefully, exceed the needs and expectations of customers. In describing this evolution a comparative analysis is made of the essential differences between detection- and prevention-based approaches. The key elements of TQM are also discussed.

Chapter 2 outlines the main reasons why senior management should become personally involved in TQM. It examines what they need to know about TQM and what they need to do in terms of actions. The role of middle and first-line management is also key to putting in place the principles of TQM, and the activities which they need to get involved with are outlined and examined.

Chapter 3 deals with the received wisdom on TQM. Quality management experts such as Crosby, Deming, Feigenbaum and Juran have had a considerable influence on the development of TQM throughout the world and their views and teachings are summarized in this chapter. The Japanese have had a profound influence on the understanding and development of TQM. Therefore, no book on TQM would be complete without some discussion of the way in which Japanese companies develop and manage the concept. The views of four influential Japanese experts (Imai, Ishikawa, Shingo and Taguchi) are explored and a summary is provided of Japanese-style Total Quality.

Chapter 4 deals with the introduction of TQM. It sets out by examining change and continuous improvement and deals with how the improvement process is triggered, which is usually in combination: the Chief Executive, competition, demanding customers and fresh-start situations. Following this, the chapter goes on to examine a range of approaches which can be followed in the introduction of TQM.

Chapter 5 presents a framework to assist with the introduction of TQM. The material draws together a number of issues which need to be considered in its introduction and development. The structure of the framework consists of four main sections: organizing, using systems and techniques, measurement and feedback, and changing the culture. The framework has been used by a number of organizations in both the public and private sectors and in manufacturing and service industries to introduce the basic elements and practices of TQM.

Companies adopt and commit themselves to TQM in a variety of ways. Chapter 6 examines six different characteristics and behaviours which have been found to be typically demonstrated by organizations across the world. These six levels of TQM adoption can be used as an internal measure by which organizations can compare their standing and which help them review their performance.

Most organizations will encounter problems and obstacles in the introduction and development of TQM. If they are aware of what these are, they can agree actions to steer around or minimize them. Chapter 7 explores some of the typical problems in sustaining TQM. Also presented is an Audit Tool by which organizations can assess if they are experiencing the factors which can have a negative impact on the sustainment of TQM.

## Reference

BS EN ISO9000 (2000), *Quality Management Systems: Fundamentals and Vocabulary*. London: British Standards Institution.

# TQM: An Overview

B. G. Dale

## Introduction

In today's global competitive marketplace the demands of customers are for ever increasing as they require improved quality of products and services. Also, in some markets there is an increasing supply of competitively priced products and services from low labour cost countries such as those in the Far East, the former Eastern bloc, China, Vietnam and India. Continuous improvement in total business activities with a focus on the customer throughout the entire organization and an emphasis on flexibility and quality is one of the main means by which companies face up to these competitive threats. This is why quality and its management and the associated continuous improvement are looked upon by many organizations as the means by which they can survive in increasingly aggressive markets and maintain a competitive edge over their rivals. The companies that do not manage this change will fail. As a result of the efforts made by organizations to respond to these marketplace demands the quality of products, services and processes has increased considerably during the last two decades. Feigenbaum and Feigenbaum (1999) point out that:

Total Quality is a major factor in the business quality revolution that has proven itself to be one of the 20th century's most powerful creators of sales and revenue growth, genuinely good new jobs, and soundly based and sustainable business expansion.

Having said this, it should be pointed out that in many markets today quality, narrowly defined as the reliability of product and service quality, is not the competitive weapon it once was. It is now expected as a given requirement and is considered an entry-level characteristic to the marketplace.

These days the most progressive organizations are embarking on a journey of transformation towards total quality management (TQM) and this is coupled with its spread, from the manufacturing to the service sector and on to public services. Total quality management is an ever-evolving practice of doing business in a bid to develop methods and processes which cannot be imitated by competitors. What is TQM? In simple terms, it is the mutual co-operation in an organization and associated

business processes to produce value-for-money products and services which meet and hopefully exceed the needs and expectations of customers.

This chapter provides an overview of TQM and introduces the reader to the subject. Many of the themes outlined are explored later in the book. It opens by examining the different interpretations which are placed on the term 'quality'. It then examines why quality has grown in importance during the last decade. The evolution of quality management ('Co-ordinated activities to direct and control an organization with regard to quality': BS EN ISO9000 (2000)) is described through the stages of inspection, quality control, quality assurance and onwards to TQM. In presenting the details of this evolution the drawbacks of a detection-based approach to quality are compared to the recommended approach of prevention. Having described these stages the chapter examines the key elements of TQM – commitment and leadership of the chief executive officer (CEO), planning and organization, using tools and techniques, education and training, employee involvement, teamwork, measurement and feedback, and culture change.

The chapter ends by presenting a summary of the points which organizations need to keep in mind when developing and advancing TQM. This is done under the broad groupings of organizing, systems and techniques, measurement and feedback, and changing the culture.

## **What is Quality?**

'Quality' is now a familiar word. However, it has a variety of interpretations and uses, and there are many definitions. Today and in a variety of situations it is perhaps an over-used word. For example, when a case is being made for extra funding and resources, to prevent a reduction in funding, or to keep a unit in operation and in trying to emphasize excellence, just count the number of times the word 'quality' is used in the argument or presentation.

Many people say they know what is meant by quality, they typically claim 'I know it when I see it' (i.e. by feel, taste, instinct and/or smell). This simple statement and the interpretations of quality made by lay people mask the need to define quality and its attributes in an operational manner. In fact, quality as a concept is quite difficult for many people to grasp and understand, and much confusion and myth surround it.

In a linguistic sense, quality originates from the Latin word 'qualis' which means 'such as the thing really is'. There is an international definition of quality, the 'degree to which a set of inherent characteristics fulfils requirements' (BS EN ISO9000 (2000)).

In today's business world there is no single accepted definition of quality. However, irrespective of the context in which it is used, it is usually meant to distinguish one organization, event, product, service, process, person, result, action, or communication from another. For the word to have the desired effect as intended by the user and to prevent any form of misunderstanding in the communication, the following points need to be considered:

- The person using the word must have a clear and full understanding of its meaning.
- The people/audience to whom the communication is directed should have a similar understanding of quality to the person making the communication.

- Within an organization, to prevent confusion and ensure that everyone in each department and function is focused on the same objectives, there should be an agreed definition of quality. For example, Betz Dearborn Ltd. define quality as: ‘That which gives complete customer satisfaction’, and Rank Xerox (UK) as ‘Providing our customers, internal and external, with products and services that fully satisfy their negotiated requirements’. North-West Water Ltd. use the term ‘business quality’ and define this as:

Understanding and then satisfying customer requirements in order to improve our business results.

Continuously improving our behaviour and attitudes as well as our processes, products and services.

Ensuring that a customer focus is visible in all that we do.

There are a number of ways or senses in which quality may be defined, some being broader than others but they all can be boiled down to either meeting requirements and specifications or satisfying and delighting the customer. These different definitions are now examined.

### Qualitative

When used in this way, it is usually in a non-technical situation. BS EN ISO9000 (2000) says that ‘the term “quality” can be used with adjectives such as poor, good or excellent’. The following are some examples of this:

- In advertising slogans to assist in building an image and persuade buyers that its production and services are the best: Esso – Quality at Work; Hayfield Textiles – Committed to Quality; Kenco – Superior Quality; Philips Whirlpool – Brings Quality to Life; Thompson Tour Operations – Thompson Quality Makes the World of Difference.
- By television and radio commentators (a quality player, a quality goal, a quality try).
- By directors and managers (quality performance, quality of communications).
- By people, in general (quality product, top quality, high quality, original quality, quality time, quality of communications, quality person, loss of quality, German quality, 100 per cent quality).

It is frequently found that in such cases of ‘quality speak’ the context in which the word quality is used is highly subjective and in its strictest sense is being misused. For example, there is more than one high street shop which trades under the name of ‘Quality Seconds’, and there is even a shop which advertises under the banner of ‘Top Quality Seconds’. A van was recently spotted with the advertising slogan ‘Quality Part-Worn Tyres’ on its side.

### Quantitative

The traditional quantitative term which is still used in some situations is acceptable quality level (AQL). This is defined in BS4778 (1991) as: ‘When a continuing series

of lots is considered, a quality level which for the purposes of sampling inspection is the limit of a satisfactory process'. This is when quality is paradoxically defined in terms of non-conforming parts per hundred (i.e. some defined degree of imperfection).

An AQL is often imposed by a customer on its supplier in relation to a particular contract. In this type of situation the customer will inspect the incoming batch according to the appropriate sampling scheme. If more than the allowed number of defects are found in the sample the entire batch is returned to the supplier or the supplier can, at the request of the customer, sort out the conforming from non-conforming product on the customer's site. The employment of an AQL is also used by some companies under the mistaken belief that trying to eliminate all defects is too costly.

The setting of an AQL by a company can work against a 'right first time' mentality in its people as it appears to condone the production and delivery of non-conforming parts or services, suggesting that errors are acceptable to the organization. It is tantamount to planning for failure. For example, take a final product which is made up of 3,000 parts: if the standard set is a 1 per cent AQL, this would mean that the product is planned to contain 30 non-conforming parts. In all reality there are likely to be many more because of the vagaries of the sampling used in the plan or scheme, whereby acceptance or rejection of the batch of product is decided.

Another example of a quantitative measure is to measure processes using sigmas (a sigma is a statistical indication of variation) and parts per million defects. A sigma is essentially a measuring device that is an indication of how good a product or service is. The higher the sigma value the lower the number of defects. For example, 3 sigma equals 66,807 defects per million opportunities, while 6 sigma equals 3.4 (these values assume a normal distribution with a process shift of 1.5 sigma). The sigma level is a means of calibrating performance in relation to customer needs.

The concept of 6 sigma (a quality improvement framework) has developed from its origins in Motorola in the 1980s as an approach to improving productivity and quality and reducing costs. Six sigma is the pursuit of perfection and represents a complete way of tackling process improvement, involving many of the concepts, systems, tools and techniques described in this book. The 6 sigma concept is currently very popular as a business improvement approach. It is a quantitative approach to quality improvement. The key features include a significant training commitment in statistics and statistical tools, problem-solving methodology and framework, project management, a team-based project environment, people who can successfully carry out improvement projects (these are usually known as black belts and green belts), leaders and project champions.

Yet another example of a quantitative measure of quality are levels of service performance requirements; see the data in table 1.1.

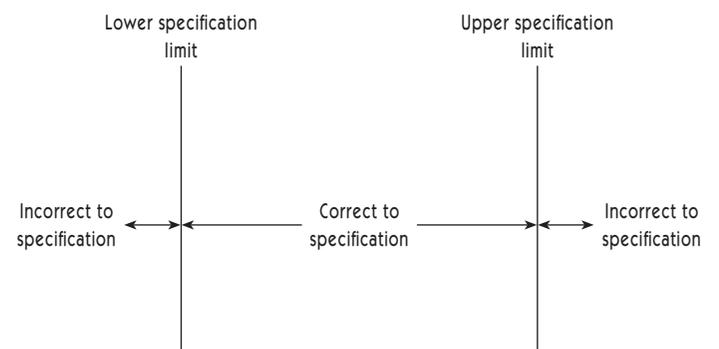
### Uniformity of the product characteristics or delivery of a service around a nominal or target value

If a product or service dimensions are within the design specification or tolerance limits they are considered acceptable; conversely, if they are outside the specification they are not acceptable (see figure 1.1). The difference between what is considered to be just inside or just outside the specification is marginal. It may also be questioned whether this step change between pass and fail has any scientific basis and validity.

**Table 1.1** Levels of service performance requirements

<i>Comparative measure</i>	<i>Grade</i>	<i>Billing queries: % answered within 5 days</i>	<i>Written complaints: % answered within 10 days</i>	<i>Billing metred customers: % read minus % unread</i>
Well above average	A	>95	>98	>99.4
Above average	B	92–95	96–98	98.5–99.4
Average	C	89–92	94–96	96.0–98.4
Below average	D	86–89	92–94	93.0–95.9
Well below average	E	<86	<92	<93.0

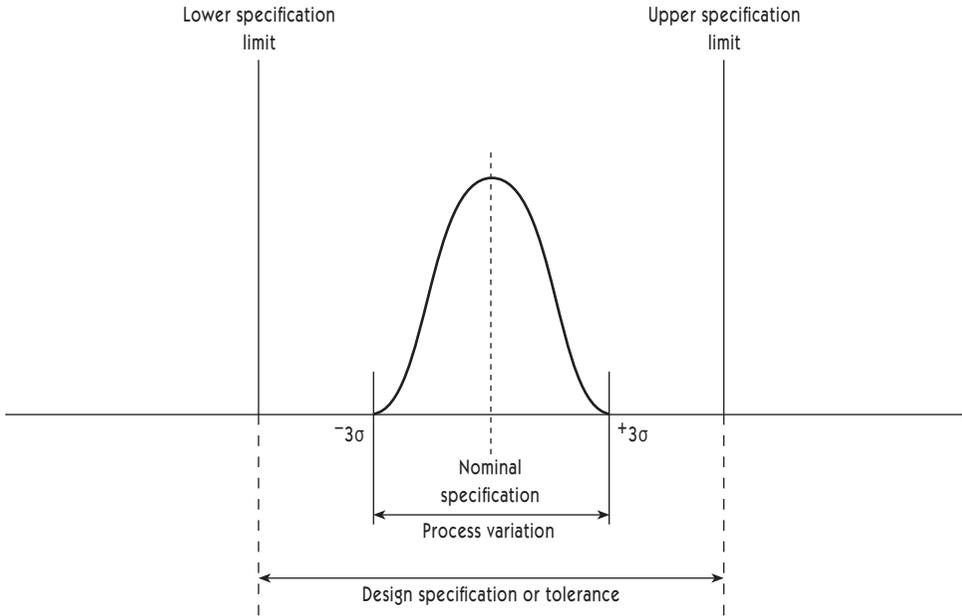
*Source:* OFWAT (1995/6)

**Figure 1.1** The inside/outside specification dilemma

Designers often establish specification limits without sufficient knowledge of the process by which the product and/or service is to be produced/delivered and its capability. It is often the case that designers cannot agree amongst themselves about the tolerances/specification to be allocated, and it is not uncommon to find outdated reasoning being used. They also tend to define and establish a tighter tolerance than is justified to provide safeguards and protect themselves. In many situations there is inadequate communication on this matter between the design and operation functions. Fortunately, this is changing with the increasing use of simultaneous or concurrent engineering.

The problem with working to the specification limits in a manufacturing situation is that it frequently leads to tolerance stack-up and parts not fitting together correctly at the assembly stage. This is especially the case when one part which is just inside the lower specification limit is assembled to one which is just inside the upper specification. If the process is controlled such that a part is produced around the nominal or a target dimension (see figure 1.2), this problem does not occur and the correctness of fit and smooth operation of the final assembly and/or end product are enhanced.

The idea of reducing the variation of part characteristics and process parameters so that they are centred around a target value can be attributed to Taguchi (1986). He writes that the quality of a product is the (minimum) loss imparted by the product to the society from the time the product is shipped. This is defined by a



**Figure 1.2** Design tolerance and process variation relationship

quadratic loss curve. Among the losses he includes time and money spent by customers, consumers' dissatisfaction, warranty costs, repair costs, wasted natural resources, loss of reputation and, ultimately, loss of market share.

The relationship of design specification and variation of the process can be quantified by a capability index, for example,  $C_p$  which is a process potential capability index:

$$C_p = \frac{\text{Total specification width}}{\text{Process variation width}}$$

### Conformance to agreed and fully understood requirements

This definition is attributed to Crosby (1979). He believes that quality is not comparative and there is no such thing as high quality or low quality, or quality in terms of goodness, feel, excellence and luxury. A product or service either conforms to requirements or it does not. In other words, quality is an attribute (a characteristic which, by comparison to a standard or reference point, is judged to be correct or incorrect) not a variable (a characteristic which is measurable). Crosby makes the point that the requirements are all the actions required to produce a product and/or deliver a service that meets the customer's expectations, and that it is management's responsibility to ensure that adequate requirements are created and specified within the organization.

This is a useful definition to use in the development of service-level agreements (SLAs) in an internal customer-supplier relationship. For example, the purpose and scope of the SLA between the Regional Engineering Managers and Distribution Finance of Norweb Distribution is detailed below:

This agreement specifies the services to be provided by Distribution Finance to Regional Engineering Managers for the period 1st July, 1995 to 30th June, 1996.

The agreement covers the following services:

- Management accounts
- Revenue and capital forecasting, commentary, budgeting and monitoring
- Business modelling
- Auditing
- Capital appraisal
- Administration of financial aspects of capital projects
- Overtime monitoring
- Financial aspects of strategic and business planning
- Ad hoc professional financial advice and investigations
- Control account reconciliation
- Capital and revenue costing
- Financial policy
- Corporate financial and taxation returns
- Cashiering services
- Rechargeable billing, disputed accounts and sales ledger facilities
- Retention of records
- Administration of financial aspects of fault projects

Some products and services are highly sophisticated in terms of their design but are poor in terms of conformance to requirements. On the other hand, some are simple in terms of their design but exhibit high levels of conformance to requirements. The 'quality of design' (the degree to which the design of the product and/or service achieves its purpose) can be confused with the 'quality of conformance' (how well the product and/or service conforms to the design). Stemming from this confusion about design and conformance there can be a tendency to believe that 'better' quality means higher costs. This view results from the confusion between quality and grade. Grade represents the addition of features and characteristics to satisfy the additional needs of customers and this clearly requires extra monies, but grade is different to quality.

### Fitness for purpose/use

This is a standard definition of quality first used by Juran (1988). Juran classifies 'fitness for purpose/use' into the categories of: quality of design, quality of conformance, abilities and field service. Focusing on fitness for use helps to prevent the over-specification of products and services. Over-specification can add greatly to costs and tends to militate against a right-first-time performance. How fit a product or service is for use obviously has to be judged by the purchaser, customer or user.

### Satisfying customer expectations and understanding their needs and future requirements

A typical definition which reflects this aim is: 'The attributes of a product and/or service which, as perceived by the customer, makes the product/service attractive to

them and gives them satisfaction.’ The focus of the definition is adding value to the product and/or service.

Satisfying customers and creating customer enthusiasm through understanding their needs and future requirements is the crux of TQM, and all organizations are dependent on having satisfied customers. TQM is all about customer orientation and many company missions are based entirely on satisfying customer perceptions. Customer requirements for quality are becoming stricter and more numerous, and there are increasing levels of intolerance of poor-quality goods and services and low levels of customer service and care. The customer is the major reason for an organization’s existence and customer loyalty and retention is perhaps the only measure of organizational success. In most situations customers have a choice: they need not place future orders with a supplier who does not perform as they expected or who they feel has deceived them. They will certainly not jeopardize their own business interest out of loyalty to a supplier whose products and service fail to perform properly, and will simply go to a competitor. In the public sector the customer may not have the choice to go elsewhere; however, they can go to litigation, write letters of complaint, cause disruption, and use elections to vote officials out of office. The aim of superior-performing companies is to become the supplier of choice to their customers and to ‘lock’ themselves into their customers’ mode of operation by becoming their sole supplier, and by adding value to their customers’ businesses by process improvement and cost-down activities. A number of countries (e.g. America and Sweden) have now developed a customer satisfaction index. The American index, for example, indicates satisfaction with the quality of goods and services in the following areas:

- Retail and finance
- Insurance
- Transportation
- Communication
- Utilities and services
- Manufacturing durables and non-durables

The superior-performing organizations go beyond satisfying their customers: they emphasize the need to delight them by giving them more than what is required in the contract; they also now talk about winning customers and becoming infatuated with their customers. The wisdom of this can be clearly understood when we consider the situation where a supplier has given more than the customer expected (e.g. an extra glass of wine on an aircraft; a sales assistant going out of their way to be courteous and helpful and providing very detailed information) and the warm feelings generated by this type of action.

A customer-focused organization also puts considerable effort into anticipating the future expectations of its customers (i.e. surprising quality), and, by working with them in long-term relationships, helps them to define their future needs and expectations. They listen very closely to their customers and ‘real’ users of the product or service, in order to gain a clearer perspective on customer experiences. They aim to build quality into the product, service, system and/or process as upstream as is practicable. Excitement and loyalty are the words used to describe this situation.

Those companies intent on satisfying customer needs and expectations will have in place a mechanism for facilitating a continuous two-way flow of information between themselves and their customers. There are a variety of means available to companies for them to assess issues such as:

- How well they are meeting customer expectations
- How well the brand is respected
- What are customers' chief causes of concern
- What are the main complaints
- What suggestions customers might have for improvements
- How they might add value to the product and/or service
- How well they act on what the customer says
- The best means of differentiating themselves in the marketplace

The trend is for increasing the level of contact with the customer. These 'moments of truth' (Carlzon 1987) occur far more frequently in commerce, public organizations, the Civil Service and service-type situations than in manufacturing organizations. The means include:

- Customer workshops
- Panels and clinics
- Using 'test' consumers and mystery shoppers
- Focus groups
- Customer interviews
- Market research
- Dealer information
- Questionnaire surveys
- Product reports
- Trailing the service and/or product
- Trade shows

Customer complaints are one indication of customer satisfaction, and many organizations have a number of metrics measuring such complaints. BS8600 (1999) provides guidance on how to develop an effective complaints management system in order to analyse and use complaints effectively. The rationale is that managing complaints in a positive manner can enhance customer perceptions of an organization, increase lifetime sales and values and provide valuable market intelligence.

Having listened to 'customer voices' an organization should put in place appropriate strategy and actions for making the necessary changes and improvements. It is also important to clarify and identify the elements and characteristics of the product and service which the customer finds attractive. The SERVQUAL questionnaire developed by Parasuraman et al. (1988) may be used to track these kinds of issues. This customer-required quality (i.e. their wants) should be translated into the language of internal needs and driven back through all levels in the organizational hierarchy. It is important that the requirements are put into terms that are measurable, realistic and achievable; the use of quality function deployment (QFD) is useful in this respect. Customer needs and requirements are for ever changing, and organizations have to live up to their customers' expectations; they are never satisfied, even though the supplying organization may think they are.

## **Why is Quality Important?**

To answer this question just consider the unsatisfactory examples of product and/or quality service that you, the reader, have experienced, the bad feelings it gave, the

resulting actions taken and the people you told about the experience and the outcome. Goodman et al. (2000), based on a range of studies carried out by TARP (Technical Assistance Research Programs), outline two arguments that are effective in selling quality to senior management.

First, quality and service improvements can be directly and logically linked to enhanced revenue within one's own company; and secondly, higher quality allows companies to obtain higher margins.

The following extracts some quantitative evidence in relation to these arguments:

- 'Problems decrease customer loyalty by 15 per cent to 30 per cent'
- '50 per cent of individual consumers and 25 per cent of business customers who have problems never complain to anyone at the company'
- 'If the call center can resolve a customer's problem using quality service, thus changing a dissatisfied customer to a satisfied one, the company usually gets an increase in loyalty of 50 percentage points'
- 'One potential customer will be lost for every 50 who hear someone complain about a product or service'
- 'Market leaders can change between 5 per cent and 10 per cent premiums for outstanding quality and service'

The customer service information in Box 1.1 provides additional quantitative facts about this. These data emphasize the importance of customer acquisition and retention.

The following are examples of survey data which have focused on the perceived importance of product and service quality.

### Public perceptions of product and service quality

In 1988 the American Society for Quality (ASQ) commissioned the Gallup organization to survey public perceptions on a variety of quality-related issues. This survey was the fourth in a series which began in 1985; the 1985 and 1988 surveys focused on US consumers and the 1986 and 1987 studies surveyed attitudes of company executives. The 1988 study was done by conducting telephone interviews with 1,005 adults in the United States during the summer of 1988. A selection of results, as reported by Ryan (1988) and Hutchens (1989), is outlined below:

- The following is a ranking of factors that people consider important when they purchase a product:
  - Performance
  - Durability
  - Ease of repair, service availability, warranty, and ease of use (these four factors were ranked about the same)
  - Price
  - Appearance
  - Brand name
- People will pay a premium to get what they perceive to be higher quality.

## BOX 1.1 CUSTOMER SERVICE FACTS

### Customer Service Facts: Did You Know That\* . . .

- 1 If 20 customers are dissatisfied with your service, 19 won't tell you. 14 of the 20 will take their business elsewhere.
- 2 Dissatisfied customers tell an average of 10 other people about their bad experience; 12 per cent tell up to 20 people.
- 3 Satisfied customers will tell an average of 5 people about their positive experience.
- 4 It costs five times more money to attract a new customer than to keep an existing one.
- 5 Up to 90 per cent of dissatisfied customers will not buy from you again, and they won't tell you why.
- 6 In many industries, quality of service is one of the few variables that can distinguish a business from its competition.
- 7 Providing high quality service can save your business money. The same skills that lead to increased customer satisfaction also lead to increased employee productivity.
- 8 Customers are willing to pay more to receive better service.
- 9 95 per cent of dissatisfied customers will become loyal customers again if their complaints are handled well and quickly.

\* Statistics compiled by Mattson & Associates from service sector companies in the USA.

**Source:** CMC Partnership Ltd. (1991)

- Consumers are willing to pay substantially more for better intrinsic quality in a product.
- According to the respondents, the following are the factors what make for 'higher' quality in services:
  - Courtesy
  - Promptness
  - A basic sense that one's needs are being satisfied
  - Attitudes of the service provider
- When consumers do experience a problem with the product, they appear reluctant to take positive action with the manufacturer. The 1987 survey revealed that executives regard customer complaints, suggestions and enquiries as key indicators of product and service quality.

An ASQ/Gallup survey (ASQ/Gallup 1991) was conducted to survey the attitudes and opinions of consumers in Japan, West Germany and the United States in relation to questions such as: 'What does quality really mean to them? How do they define it and does it influence their buying behaviour? What is their perception of the quality from other parts of the world? and What are the dynamics underlying a consumer's reasons for buying or not buying something produced in a foreign

country?’ On a number of issues, this survey updates American attitudes expressed in the 1988 survey. Over 1,000 people in each country were questioned. A selection of summary highlights from the report are outlined below:

- ‘Consumers in the US, Japan and West Germany in many respects are alike in terms of the attributes they consider important in determining the quality of the products they buy. For example, approximately one in five look to the brand name of a product. Durability is also important to at least 10 per cent of the consumers in each of the countries surveyed.’
- ‘Asked what factors are most important in influencing their decision to buy a product, price is the leading response in West Germany (64 per cent) and in the US (31 per cent). Performance (40 per cent) is most important among Japanese consumers, followed by price (36 per cent).’
- ‘A majority (61 per cent) of US consumers believe it is very important to US workers to produce high quality products or service.’
- ‘Price and quality are the reasons given most frequently by American consumers for buying a product made in Japan or Germany.’

### Views and roles of senior management

- 1 In 1992 ASQ commissioned the Gallup organization to study the nature of leadership for quality within American business organizations by surveying opinions of senior management in both large and small organizations. The objective was to explore their views concerning quality improvement and the role of directors with regard to quality. Some 684 executives were interviewed. The following is a summary of the main findings extracted from ASQ/Gallup (1992).
  - ‘At least six in ten executives report that they have a great deal of personal leadership impact on customer focus and satisfaction, strategic quality planning, quality and operational results and financial results.’
  - ‘Most executives believe management plays a greater role than the board in determining quality policy within their company.’
  - ‘More than four in ten (45 per cent) report their board does discuss quality frequently.’
  - ‘Four in ten (43 per cent) executives report their board reports on consumer satisfaction frequently, and almost as many (38 per cent) report the board reviews reports on customer retention or loyalty frequently.’
- 2 The European Foundation for Quality Management (EFQM) contracted McKinsey and Company to survey the CEOs of the top 500 west European corporations in relation to quality performance and the management of quality; 150 CEOs responded to the survey. The following are some of the main findings as reported by McKinsey and Company (1989).
  - Over 90 per cent of CEOs consider quality performance to be ‘critical’ for their corporation.
  - 60 per cent of CEOs said that quality performance had become a lot more important than before (late 1970s).

- The four main reasons why quality is perceived to be important are:
    - Primary buying argument for the ultimate customer
    - Major means of reducing costs
    - Major means for improving flexibility/responsiveness
    - Major means for reducing throughput time.
  - The feasible improvement in gross margin on sales through improved quality performance was rated at an average of 17 per cent.
  - More than 85 per cent of the leading CEOs in Europe consider the management of quality to be one of the top priorities for their corporations.
- 3 Lascelles and Dale (1990), reporting on a survey they carried out of 74 UK CEOs, say that ‘Almost all the respondents believe that product and service quality is an important factor in international competitiveness. More than half have come to this conclusion within the past four years.’

### Quality is not negotiable

An order, contract or customer which is lost on the grounds of non-conforming product and/or service quality is much harder to regain than one lost on price or delivery terms. In a number of cases the customer could be lost for ever; in simple terms the organization has been outsold by the competition.

If you have any doubt about the truth of this statement just consider the number of organizations who have gone out of business or lost a significant share of a market, and consider the reported reasons for them getting into that position. Quality is one of the factors which is not negotiable and in today’s business world the penalties for unsatisfactory product quality and poor service are likely to be punitive.

### Quality is all-pervasive

There are a number of single-focus business initiatives which an organization may deploy to increase profit. However, with the improvements made by companies of their mode of operation, reduction in monopolies, government legislation, deregulation, changes in market share, mergers, takeovers, collaborative joint ventures, there is less distinction between companies than there was some years ago. TQM is a much broader concept than previous initiatives, encompassing not only product, service and process improvements but those relating to costs and productivity and to people involvement and development. It also has the added advantage that it is totally focused on satisfying customer needs.

A related issue is that organizations are often willing to pay more for what they perceive as a quality product; see the results of the ASQ/Gallup survey of 1992, as outlined in table 1.2.

### Quality increases productivity

Cost, productivity and quality improvements are complementary and not alternative objectives. Managers sometimes say that they do not have the time and resources to

**Table 1.2** Customers willing to pay for quality

<i>Industry type</i>	<i>Number of customers willing to pay more for a quality product</i>	<i>Number of customers unwilling to pay extra for better quality</i>
Clothing/textiles	135	5
Furniture	74	4
TV/audio	66	6
Home	55	4
Automotive	36	10

*Source:* ASQ/Gallup (1992)

ensure that product and/or service quality is done right the first time. They go on to argue that if their people concentrate on planning for quality then they will be losing valuable operational time, and as a consequence output will be lost and costs will rise. Despite this argument, management and their staff will make the time to rework the product and service a second or even a third time, and spend considerable time and organizational resources on corrective action and placating customers who have been affected by the non-conformances.

Remember ‘Murphy’s Law’ – ‘There is never time to do it right but always time to do it once more.’

### Quality leads to better performance in the marketplace

The Profit Impact of Market Strategy (PIMS), conducted under the Strategic Planning Institute in Cambridge, Massachusetts, have a database which contains over 3,000 records of detailed business performance. The Institute is a co-operative run by its members. The database allows a detailed analysis of the parameters which influence business performance. A key PIMS concept is relative perceived quality (RPQ); this is the product and service offering as perceived by the customer. PIMS data is often used to model options before adapting a change initiative and to assess how improvements translate into improved profits and enhanced customer loyalty. It has been established that the factors having most leverage on return on investment are RPQ and relative market share, and that companies with large market shares are those whose quality is relatively high, whereas companies with small market shares are those whose quality is relatively low (see Buzzell and Gale 1987). Another key finding is that businesses who know and understand customers’ priorities for quality improvements can achieve a threefold increase in profitability (Roberts 1996).

### Quality means improved business performance

Kano et al. (1983) carried out an examination of 26 companies which won the Deming Application Prize (this is a prize awarded to companies for their effective implementation of company-wide quality control; for details see chapter 24). Between 1961 and 1980 they found that the financial performance of these companies in

terms of earning rate, productivity, growth rate, liquidity, and net worth was above the average for their industries.

A report published by the US General Accounting Office (GAO) (1991) focused on the top 20 scorers of the Malcolm Baldrige National Quality Award (MBNQA) in the period 1988–9. Its purpose was to determine the importance of TQM practices on the performance of US companies. Using a combination of questionnaire and interview methods, the companies were asked to provide information on four broad classes of 20 performance measures – employee-related indicators, operating indicators, customer satisfaction indicators and business performance indicators. Improvements were claimed in all these indicators (e.g. market share, sales per employee, return on assets, and return on sales). Useful information on financial performance was obtained from 15 of the 20 companies who experienced the following annual average increases:

- Market share: 13.7 per cent
- Sales per employee: 8.6 per cent
- Return on assets: 1.3 per cent
- Return on sales: 0.4 per cent

Larry (1993) reports on a study carried out on the winners of the MBNQA and found that they ‘Yielded a cumulative 89 per cent gain, whereas the same investment in the Standard and Poor (S&P) 500 – Stock Index delivered only 33.1 per cent.’ Wisner and Eakins (1994) also carried out an operation and financial review of the MBNQA winners from 1988 to 1993. One of the conclusions reached was that the winners appear to be performing financially as well as or better than their competitors.

As reported by Bergquist and Ramsing (1999), Bergquist carried out a study in 1996, entitled ‘An Assessment of the Operational and Financial Impact on Companies of Quality Awards in the United States’, which used the same approach as the 1991 GAO study, expanding to 40 the original 20 performance measures. The focus of the study was a questionnaire survey of winners and applicants of MBNQA and State Quality Awards, between the years 1990 and 1995. They conclude:

89 per cent of the winners and 77 per cent of the applicants who responded to the mail survey believed that using award criteria did have a positive impact on company performance, a link appears to exist between award criteria and perceived company performance.

The Bradford study (Letza et al. 1997), carried out at the University of Bradford Management Centre, identified 29 companies within the UK which display characteristics associated with TQM. Following the US GAO work the study was first carried out over the period 1987 to 1991 and has been repeated for the period 1991 to 1995. Nine measures have been used by the study team to compare company performance with the median for the particular industry. The second study reveals the following:

- 81 per cent of companies are above the industry median for turnover per employee.
- 81 per cent of the companies provide a higher salary to turnover ratio than their peers.
- 74 per cent of the organizations remunerate their employees above the median for the industry.

- 65 per cent of the organizations produce above-median profit per employee for their industry.
- 62 per cent of the organizations have a higher net asset turnover than their peer group.

The authors also go on to say that ‘Four of the nine measures are marginally below the median for their industry but this is to be expected as quality becomes institutionalised and more widespread.’

Easton and Jarrell (1998) have undertaken an extremely thorough study which has examined the impact of TQM on financial performance for a sample of 108 firms. The impact of TQM has been assessed by examining the unexpected changes in financial performance for a five-year period following the introduction of TQM. Easton and Jarrell (1998) conclude that ‘The findings indicate that performance, measured by both accounting variables and stock returns, is improved for the firms adopting TQM. The improvement is consistently stronger for firms with more advanced TQM.’

Another very thorough study is that undertaken by Hendricks and Singhal (1996) in America, which began in 1991. They have measured the effects of TQM on long-term business performance. The study sample comprised nearly 600 award-winners (e.g. MBNQA, State Quality Awards and Supplier Awards) and compared their performance with that of similar companies that had not won such an award. The study found that it required a long time period to establish the link between TQM and financial performance because of its evolutionary nature. For the implementation period which started six years before a company won an award, they found no difference between award-winners and non-award-winners. The following are some of the key results from the post-implementation period:

- Winners experienced a 91 per cent increase in operating income compared with their respective controls (43 per cent).
- Winners gained a 69 per cent increase in sales compared with their controls (32 per cent) and attained a 79 per cent increase in total assets compared with the respective controls (37 per cent).
- Winners increased their employees by 23 per cent compared with their respective controls (7 per cent).
- Over the five-year study period the award-winners outperformed the S&P 500 index by 34 per cent.

In the X factor report (1999) the award submissions from 14 European and UK quality/business excellence award-winning companies were analysed regarding financial performance. The results were examined for (1) three-year trends and sustained good performance; (2) five-year trends and sustained excellent performance; and (3) favourable comparisons with set targets. Strong positive trends and/or sustained excellent performance over three years were demonstrated by over 70 per cent of the companies using three main financial measures:

- Revenue growth
- Operating profit
- Return on assets

Other financial measures against which these role-model companies performed well over three and five years and against targets/benchmarks, included:

- Cashflow
- Liquidity
- Debtor days
- Shareholder funds

George (2002) reports on the Q-100 index, which was established in 1998. This is based on investments in American-based organizations which are using TQM. The search for such companies is undertaken by the Malcolm Baldrige National Quality Award criteria. The Q-100 consists of approximately 100 of the 500 S&P companies, which are weighted and diversified to align them with the weightings and sectors in the S&P 500. Among the findings reported by George (2002) are:

From September 30th, 1998 to December 31st, 2001 the Q-100 returned 26.97 per cent compared with the S and P 500 return of 17.59 per cent.

A \$10,000 investment in both indices on September 30th, 1998 would have grown to \$12,697 for the Q-100 on the last day of 2001, compared with \$11,759 for the S and P 500.

Perhaps the best-known quality/financial metric is the 'Baldrige Index'. This is a fictitious stock fund made up of publicly traded US companies that have received the MBNQA during the years 1991 to 2000. The US Commerce Department's National Institute of Technology (NIST) invested a hypothetical \$1,000 in each of the two whole company winners and the parent companies of 18 subsidiary winners. They also made the same investment in the S&P 500 at the same time. The investments have been tracked from the first business day of the month following the announcement of the award receipts through to 3 December 2001. NIST (2002) reported that the two company winners outperformed the S&P 500 by more than 4.5 to 1, achieving a 512 per cent return on investment. The group of whole-company award-winners plus the parent companies of the subsidiary winners outperformed the S&P 500 by 3 to 1, a 323 per cent return on investment compared to a 110 per cent return for the S&P 500.

### The cost of non-quality is high

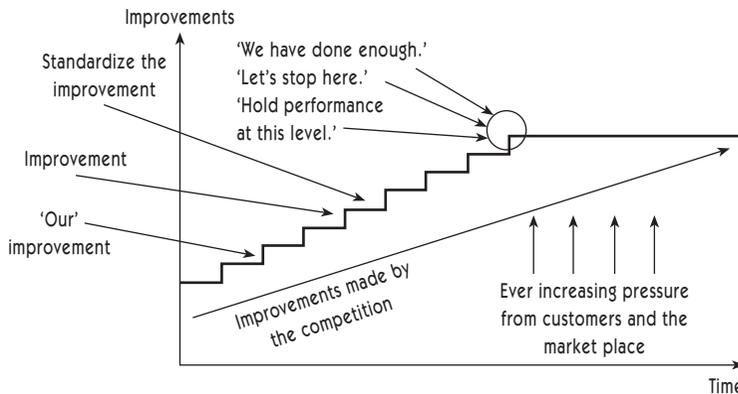
Based on a variety of companies, industries and situations, the cost of quality (or to be more precise the cost of not getting it right the first time) ranges from 5 to 25 per cent of an organization's annual sales turnover in manufacturing or annual operating costs in service-type situations; see chapter 9 and Dale and Plunkett (1999) for details. An organization should compare its profit-to-sales turnover ratio to that of its quality costs-to-sales turnover ratio in order to gain an indication of the importance of product and service quality to corporate profitability.

A related cost issue is that of product liability, which is concerned with the legal liability of a manufacturer or supplier of goods for personal injuries or damage to property suffered as a result of a product which is defective and unsafe; see European Commission Directive (1985). A powerful example of the cost and implications of the failure to get a product right is provided by Wilks (1999):

In July this year General Motors was fined a record \$4.9 billion following a crash in 1993 which seriously burned six people involved in a rear end car collision. The severity of their injuries – some suffered 60 per cent burns – was put down to design fault in placing the petrol tank too close to the rear bumper. The victims' lawyers discovered that an internal GM study had highlighted this danger and that the manufacturer had known 'for years' that this model was potentially unsafe. To alter the design would have cost the company \$8.59 per car.

## Customer is king

In today's markets, customer requirements are becoming increasingly more rigorous and their expectations of the product and/or service in terms of conformance, reliability, dependability, durability, interchangeability, performance, features, appearance, serviceability, user-friendliness, safety, and environmental friendliness is also increasing. These days many superior-performing companies talk in terms of being 'customer-obsessed'. At the same time, it is likely that the competition will also be improving and, in addition, new and low-cost competitors may emerge in the marketplace. Consequently there is a need for continuous improvement in all operations of a business, involving everyone in the company. The organization which claims that it has achieved TQM will be overtaken by the competition. Once the process of continuous improvement has been halted, under the mistaken belief that TQM has been achieved, it is much harder to restart and gain the initiative on the competition, (see figure 1.3). This is why TQM should always be referred to as a process and not a programme.



**Figure 1.3** Quality improvement: a continuous process

## Quality is a way of life

Quality is a way of organizational and everyday life. It is a way of doing business, living and conducting one's personal affairs. In whatever each one person does, and in whatever situation, the task(s) must be undertaken in a quality conscious way. Quality is driven by a person's own internal mechanisms – 'heart and soul', 'personal beliefs'. Belief in it can be likened to that of people who follow a religious faith.

An organization committed to quality needs quality of working life of its people in terms of participation, involvement and development and quality of its systems, processes and products.

## The Evolution of Quality Management

Systems for improving and managing quality have evolved rapidly in recent years. During the last two decades or so simple inspection activities have been replaced or supplemented by quality control, quality assurance has been developed and refined, and now many companies, using a process of continuous and company-wide improvement, are working towards TQM. In this progression, four fairly discrete stages can be identified: inspection, quality control, quality assurance and total quality management; it should be noted that the terms are used here to indicate levels in a hierarchical progression of quality management (figure 1.4). British and International Standards definitions of these terms are given to provide the reader with some understanding, but the discussion and examination are not restricted by these definitions.

### Inspection

Conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging. (BS EN ISO9000 (2000))

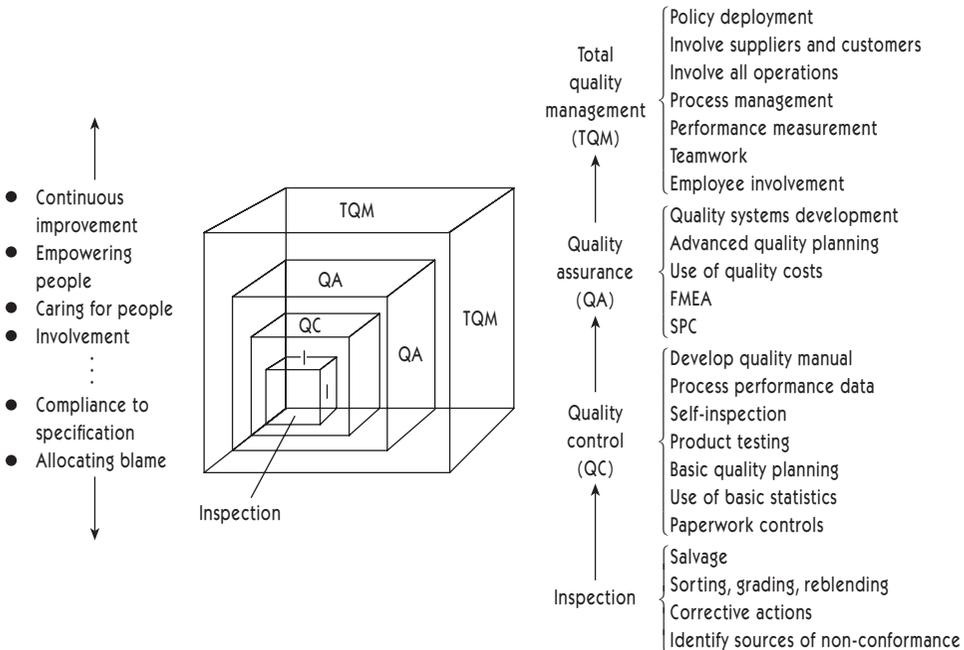


Figure 1.4 The four levels in the evolution of TQM

At one time inspection was thought to be the only way of ensuring quality, the ‘degree to which a set of inherent characteristics fulfils requirements’ (BS EN ISO9000 (2000)). Under a simple inspection-based system, one or more characteristics of a product, service or activity are examined, measured, tested, or assessed and compared with specified requirements to assess conformity with a specification or performance standard. In a manufacturing environment the system is applied to incoming goods and materials, manufactured components and assemblies at appropriate points in the process and before finished goods are passed into the warehouse. In service, commercial and public service-type situations the system is also applied at key points, sometimes called appraisal points, in the production and delivery processes. The inspection activity is, in the main, carried out by dedicated staff employed specifically for the purpose, or by self-inspection of those responsible for a process. Materials, components, paperwork, forms, products and goods which do not conform to specification may be scrapped, reworked, modified or passed on concession. In some cases inspection is used to grade the finished product as, for example, in the production of cultured pearls. The system is an after-the-event screening process with no prevention content other than, perhaps, identification of suppliers, operations, or workers, who are producing non-conforming products/services. There is an emphasis on reactive quick-fix corrective actions and the thinking is department-based. Simple inspection-based systems are usually wholly in-house and do not directly involve suppliers or customers in any integrated way.

## Quality control

Part of quality management focused on fulfilling quality requirements. (BS EN ISO9000 (2000))

Under a system of quality control one might expect, for example, to find in place detailed product and performance specifications, a paperwork and procedures control system, raw material and intermediate-stage product-testing and reporting activities, logging of elementary process performance data, and feedback of process information to appropriate personnel and suppliers. With quality control there will have been some development from the basic inspection activity in terms of sophistication of methods and systems, self-inspection by approved operators, use of information and the tools and techniques which are employed. While the main mechanism for preventing off-specification products and services from being delivered to customers is screening inspection, quality control measures lead to greater process control and a lower incidence of non-conformance.

Those organizations whose approach to the management of quality is based on inspection and quality control are operating in a detection-type mode (i.e. finding and fixing mistakes).

### *What is detection?*

In a detection or ‘firefighting’ environment, the emphasis is on the product, procedures and/or service deliverables and the downstream producing and delivery processes; it is about getting rid of the bad things after they have taken place. Considerable effort is expended on after-the-event inspecting, troubleshooting, checking, and testing of the product and/or service and providing reactive ‘quick fixes’ in a bid to ensure

that only conforming products and services are delivered to the customer. In this approach, there is a lack of creative and systematic work activity, with planning and improvements being neglected and defects being identified late in the process, with all the financial implications of this in terms of the working capital employed. Detection will not improve quality but only highlight when it is not present, and sometimes it does not even manage to do this. Problems in the process are not removed but contained, and are likely to come back. Inspection is the primary means of control in a 'policeman' or 'goalkeeper'-type role and thereby a 'producing' versus 'checking' situation is encouraged, leading to confusion over people's responsibilities for quality – 'Can I, the producer, get my deliverables past the checker?' It also leads to the belief that non-conformances are due to the product/service not being inspected enough and also that operators, not the system, are the sole cause of the problem.

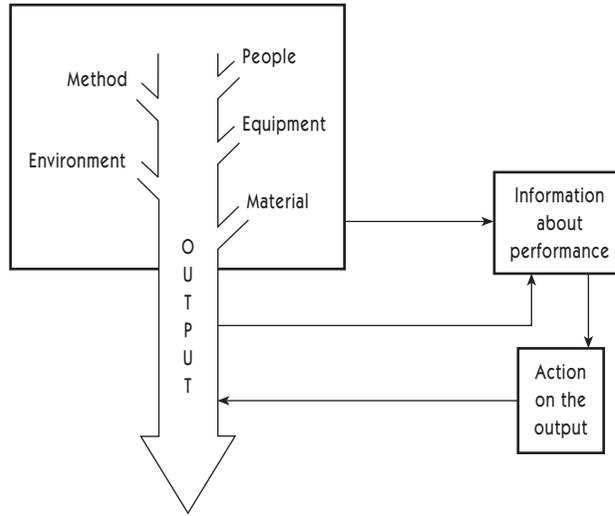
A question which organizations operating in this mode must answer is: does the checking of work by inspectors affect an operator's pride in the job? The production-inspection relationship is vividly described by McKenzie (1989).

With a detection approach to quality, non-conforming 'products' (products are considered in their widest sense) are culled, sorted and graded, and decisions made on concessions, rework, reblending, repair, downgrading, scrap, and disposal. It is not unusual to find products going through this cycle more than once. While a detection-type system may prevent non-conforming product, services and paperwork from being delivered to the customer (internal or external), it does not prevent them being made. Indeed, it is questionable whether such a system does in fact find and remove all non-conforming products and services. Physical and mental fatigue decreases the efficiency of inspection and it is commonly claimed that, at best, 100 per cent inspection is only 80 per cent effective. It is often found that with a detection approach the customer also inspects the incoming product/service; thus the customer becomes a part of the organization's quality control system.

In this type of approach a non-conforming product must be made and a service delivered before the process can be adjusted; this is inherently inefficient in that it creates waste in all its various forms: all the action is 'after-the-event' and backward-looking. The emphasis is on 'today's events', with little attempt to learn from the lessons of the current problem or crisis. It should not be forgotten that the scrap, rework, retesting, reblending, etc. are extra efforts, and represent costs over and above what has been budgeted and which ultimately will result in a reduction of bottom-line profit. Figure 1.5, taken from the Ford Motor Company three-day statistical process control (SPC) course notes (1985), is a schematic illustration of a detection-type system.

An environment in which the emphasis is on making good non-conformance rather than preventing it from arising in the first place is not ideal for engendering team spirit, co-operation and a good climate for work. The focus tends to be on switching the blame to others, people making themselves 'fireproof', not being prepared to accept responsibility and ownership and taking disciplinary action against people who make mistakes. In general, this behaviour and attitude emanates from middle management and quickly spreads downwards through all levels of the organizational hierarchy.

Organizations operating in a detection manner are often preoccupied with the survival of their business and little concerned with making improvements.



**Figure 1.5** A detection-based quality system  
**Source:** Ford Motor Company (1985)

## Quality assurance

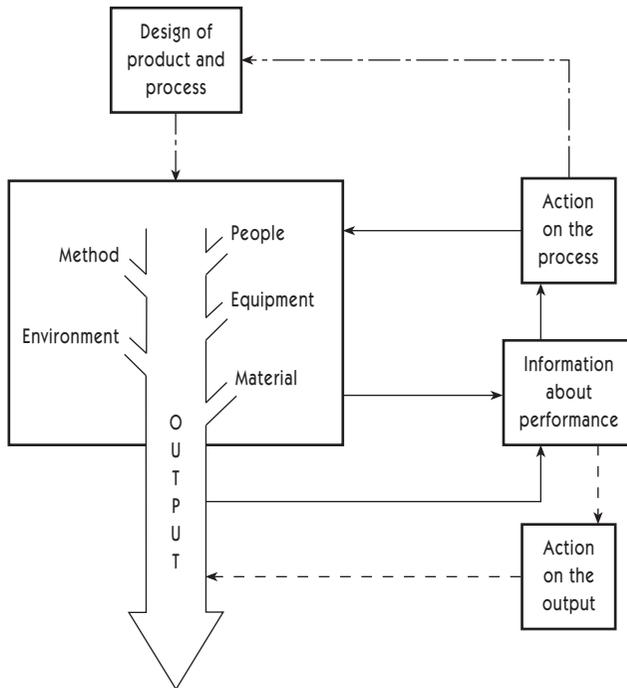
Finding and solving a problem after a non-conformance has been created is not an effective route towards eliminating the root cause of a problem. A lasting and continuous improvement in quality can only be achieved by directing organizational efforts towards planning and preventing problems from occurring at source. This concept leads to the third stage of quality management development, which is quality assurance:

Part of quality management focused on providing confidence that quality requirements will be fulfilled. (BS EN ISO9000 (2000))

Examples of additional features acquired when progressing from quality control to quality assurance are, for example, a comprehensive quality management system to increase uniformity and conformity, use of the seven quality control tools (histogram, check sheet, Pareto analysis, cause-and-effect diagram, graphs, control chart and scatter diagram), statistical process control, failure mode and effects analysis (FMEA), and the gathering and use of quality costs. The quality systems and practices are likely to have met, as a minimum, the requirements of the BS EN ISO9001 (2000). Above all one would expect to see a shift in emphasis from mere detection towards prevention of non-conformances. In short, more emphasis is placed on advanced quality planning, training, critical problem-solving tasks, improving the design of the product, process and services, improving control over the process and involving and motivating people.

### *What is prevention?*

Quality assurance is a prevention-based system which improves product and service quality, and increases productivity by placing the emphasis on product, service and



**Figure 1.6** A prevention-based quality system  
**Source:** Ford Motor Company (1985)

process design. By concentrating on source activities and integrating quality into the planning and design stage, it stops non-conforming product being produced or non-conforming services being delivered in the first place; even when defects occur they are identified early in the process. This is a proactive approach compared with detection, which is reactive. There is a clear change of emphasis from downstream to the upstream processes and from product to process (see figure 1.6); ‘product out’ to ‘customer in’. This change of emphasis can also be considered in terms of the plan, do, check, act (PDCA) cycle. In the detection approach the ‘act’ part of the cycle is limited, resulting in an incomplete cycle, whereas, with prevention, act is an essential part of individuals and teams striving for continuous improvement as part of their everyday work activities. With prevention there is a clearly defined feedback loop with both negative and positive feedback into the process, product, and service development system.

Quality is created in the design stage and not at the later control stage; the majority of quality-related problems are caused by poor or unsuitable designs of products and processes. In the prevention approach, there is a recognition of the process as defined by its input of people, machines, materials, method, management and environment. It also brings a clearer and deeper sense of responsibility for quality and eliminates the root cause of waste and non-value-adding activity to those actually producing and delivering the product and/or service.

Changing from detection to prevention requires not just the use of a set of tools and techniques, but the development of a new operating philosophy and approach

which requires a change in management style and way of thinking. It requires the various departments and functions to work and act together in cross-functional teams to discover the root cause of problems and pursue their elimination. Quality planning and continuous improvement truly begin when top management includes prevention as opposed to detection in its organizational policy and objectives and starts to integrate the improvement efforts of various departments. This leads to the next level, that of total quality management.

### Total quality management

The fourth and highest level – TQM – involves the application of quality management principles to all aspects of the organization, including customers and suppliers, and their integration with the key business processes.

Total quality management requires that the principles of quality management should be applied in every branch and at every level in the organization with an emphasis on integration into business practices and a balance between technical, managerial and people issues. It is a company-wide approach to quality, with improvements undertaken on a continuous basis by everyone in the organization. Individual systems, procedures and requirements may be no higher than for a quality assurance level of quality management, but they will pervade every person, activity and function of the organization. It will, however, require a broadening of outlook and skills and an increase in creative activities from those required at the quality assurance level. The spread of the TQM philosophy would also be expected to be accompanied by greater sophistication in the application of tools and techniques, increased emphasis on people (the so-called soft aspects of TQM), process management, improved training and personal development and greater efforts to eliminate wastage and non-value-adding activities. The process will also extend beyond the organization to include partnerships with suppliers and customers and all stakeholders of the business. Activities will be reoriented to focus on the customer, internal and external with the aim to build partnerships and go beyond satisfying the customer to delighting them. The need to self-assess progress towards business excellence is also a key issue.

There are many interpretations and definitions of TQM. Put simply, TQM is the mutual co-operation of everyone in an organization and associated business processes to produce value-for-money products and services which meet and hopefully exceed the needs and expectations of customers. TQM is both a philosophy and a set of guiding principles for managing an organization to the benefit of all stakeholders. The eight quality management principles are defined in BS EN ISO9000 (2000) as:

- *Customer focus.* Organizations depend on their customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations.
- *Leadership.* Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.
- *Involvement of people.* People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.
- *Process approach.* A desired result is achieved more efficiently when activities and related resources are managed as a process.

- *System approach to management.* Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objective.
- *Continual improvement.* Continual improvement of the organization's overall performance should be a permanent objective of the organization.
- *Factual approach to decision-making.* Effective decisions are based on the analysis of data and information.
- *Mutually beneficial supplier relationships.* An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

## The Key Elements of TQM

Despite the divergence of views on what constitutes TQM, there are a number of key elements in the various definitions which are now summarized. Other chapters will provide more detail of these elements.

### Commitment and leadership of the chief executive officer

Without the total demonstrated commitment of the chief executive officer and his or her immediate executives and other senior managers, nothing much will happen and anything that does will not be permanent. They have to take charge personally, lead the process, provide direction, and exercise forceful leadership, including dealing with those employees who block improvement and impetus. However, while some specific actions are required to give TQM a focus, as quickly as possible it must be seen as the style of management and the natural way of operating a business.

### Planning and organization

Planning and organization feature in a number of facets of the improvement process, including:

- Developing a clear long-term strategy for TQM which is integrated with other strategies such as information technology, production/operations and human resources and also with the business plans of the organization.
- Deployment of the policies through all stages of the organizational hierarchy with objectives, targets, projects and resources agreed with those responsible for ensuring that the policies are turned from words into actions (see chapter 8).
- Building product and service quality into designs and processes.
- Developing prevention-based activities (e.g. mistake-proofing devices).
- Putting quality assurance procedures into place which facilitate closed-loop corrective action.
- Planning the approach to be taken to the effective use of quality systems, procedures and tools and techniques, in the context of the overall strategy.
- Developing the organization and infrastructure to support the improvement activities. This includes allocating the necessary resources to support them. While it is recommended that some form of steering activity should be set up to provide direction and support and make people responsible for co-ordinating

and facilitating improvement, the infrastructure should not be seen as separate from the management structure.

- Pursuing standardization, systematization and simplification of work instructions, procedures and systems.

### Using tools and techniques

To support and develop a process of continuous improvement an organization will need to use a selection of tools and techniques within a problem-solving approach. Without the effective employment and mix of tools and techniques it will be difficult to solve problems. The tools and techniques should be used to facilitate improvement and be integrated into the routine operation of the business. The organization should develop a route map for the tools and techniques which it intends to apply. The use of tools and techniques as the means will help to get the process of improvement started: employees using them feel involved and that they are making a contribution, quality awareness is enhanced, behaviour and attitude change starts to happen, and projects are brought to a satisfactory conclusion.

### Education and training

Employees, from top to bottom of an organization, should be provided with the right level and standard of education and training to ensure that their general awareness and understanding of quality management concepts, skills, competencies, and attitudes are appropriate and suited to the continuous improvement philosophy; it also provides a common language throughout the business. A formal programme of education and training needs to be planned and provided on a timely and regular basis to enable people to cope with increasingly complex problems. It should suit the operational conditions of the business: is training done in a cascade mode (everyone is given the same basic training within a set time-frame) or is an infusion mode (training provided as a gradual progression to functions and departments on a need-to-know basis) more suitable? This programme should be viewed as an investment in developing the ability and knowledge of people and helping them realize their potential. Without training it is difficult to solve problems, and, without education, behaviour and attitude change will not take place. The training programme must also focus on helping managers think through what improvements are achievable in their areas of responsibility. It also has to be recognized that not all employees will have received and acquired adequate levels of education. The structure of the training programme may incorporate some updating of basic educational skills in numeracy and literacy, but it must promote continuing education and self-development. In this way, the latent potential of many employees will be released and the best use of every person's ability achieved.

### Involvement

There must be a commitment and structure to the development of employees, with recognition that they are an asset which appreciates over time. All available means,

from suggestion schemes to various forms of teamwork, must be considered for achieving broad employee interest, participation and contribution in the improvement process; management must be prepared to share information and some of their powers and responsibilities and loosen the reins. This also involves seeking and listening carefully to the views of employees and acting upon their suggestions. Part of the approach to TQM is to ensure that everyone has a clear understanding of what is required of them, how their processes relate to the business as a whole and how their internal customers are dependent upon them. The more people who understand the business and what is going on around them, the greater the role they can play in the improvement process. People have got to be encouraged to control, manage and improve the processes which are within their sphere of responsibility.

### Teamwork

Teamwork needs to be practised in a number of forms. Consideration needs to be given to the operating characteristics of the teams employed, how they fit into the organizational structure and the roles of member, team leader, sponsor and facilitator. Teamwork is one of the key features of involvement, and without it difficulty will be found in gaining the commitment and participation of people throughout the organization. It is also a means of maximizing the output and value of individuals.

There is also a need to recognize positive performance and achievement and celebrate and reward success. People must see the results of their activities and that the improvements they have made really do count. This needs to be constantly encouraged through active and open communication. If TQM is to be successful it is essential that communication must be effective and widespread. Sometimes managers are good talkers but poor communicators.

### Measurement and feedback

Measurement, from a baseline, needs to be made continually against a series of key results indicators – internal and external – in order to provide encouragement that things are getting better (i.e. fact rather than opinion). External indicators are the most important as they relate to customer perceptions of product and/or service improvement. The indicators should be developed from existing business measures, external, competitive and functional generic and internal benchmarking, as well as customer surveys and other means of external input. This enables progress and feedback to be clearly assessed against a roadmap or checkpoints. From these measurements, action plans must be developed to meet objectives and bridge gaps.

### Ensuring that the culture is conducive to continuous improvement activity

It is necessary to create an organizational culture which is conducive to continuous improvement and in which everyone can participate. Quality assurance also needs to be integrated into all an organization's processes and functions. This requires

changing people's behaviour, attitudes and working practices in a number of ways. For example:

- Everyone in the organization must recognize that whatever they do can be improved. They must be involved in 'improving' the processes under their control on a continuous basis and take personal responsibility for their own quality assurance.
- Employees must be encouraged to identify wastage in all its various forms to take out cost and get more value into a product or service.
- Employees can stop a process without reference to management if they consider it to be not functioning correctly.
- Employees must be inspecting their own work.
- Defects must not be passed, in whatever form, on to the next process. The internal customer–supplier relationship (everyone for whom you perform a task or service or to whom you provide information is a customer) must be recognized.
- Each person must be committed to satisfying their customers, both internal and external.
- External suppliers and customers must be integrated into the improvement process.
- Mistakes must be viewed as an improvement opportunity. In the words of the Japanese, every mistake is a pearl to be cherished.
- Honesty, sincerity and care must be an integral part of daily business life.

Changing people's behaviour and attitudes is one of the most difficult tasks facing management, requiring considerable powers and skills of motivation and persuasion; considerable thought needs to be given to facilitating and managing culture change. In the words of a government chief engineer in the Hong Kong civil engineering department, 'Getting the quality system registered to ISO9001 is the easy bit, it is changing people's attitudes and getting them committed to continuous improvement what is presenting the greatest challenge.'

### **Summary: Developing TQM**

In concluding this chapter a list of points is offered which organizations should keep in mind when developing TQM. Many of them are expanded upon in the chapters that follow:

#### **Organizing**

- There is no ideal way of assuring the quality of an organization's products or services. What matters is that improvement does occur, that it is cost-effective, and that it is never-ending.
- There is no one best way of starting a process of continuous improvement which suits all organizations and cultures.
- Senior management's commitment is vital in order to gain credibility, assure continuity and establish longevity of the process. They need to think deeply

about the subject and commit to it the necessary resources. Managers must also place more emphasis on leadership and create an environment in which people can develop and apply, to full potential, all their skills.

- Planning should have a 10-year horizon in order to ensure that the principles of TQM are firmly rooted in the culture of the organization. Patience and tenacity are key virtues.
- Quality objectives and strategies must be developed and deployed down through the organizational hierarchy, along with agreeing goals for improvement.
- The improvement process needs to be integrated with other organizational improvement initiatives and business strategies.
- A multi-disciplinary TQM steering committee chaired by the chief executive must be established and appropriate infrastructure established to support the improvement process. It is important that this infrastructure is integrated into the existing structure.
- At the outset the main quality problems must be identified and tackled by the senior management team – ‘lead by example’.

### Systems and techniques

- The quality management system must be well documented, provide direction and feedback and be audited internally on a regular and effective basis.
- The day-to-day control and assurance activity must be separated from the improvement process.
- There must be a dedication to removing basic causes of errors and wastage.
- At the design stage all potential non-conformances must be identified and eliminated.
- A system by which all staff can raise those problems which prevent them turning in an error-free performance should be in place.
- It should be recognized that tools, techniques, systems, and packages are used at different stages in different organizations in their development of TQM.
- The timing of the introduction of a particular tool, technique, system or package is crucial to its success.
- Mistake-proofing of operations should be investigated.
- Statistical methods should be used.

### Measurement and feedback

- It should be recognized that customer satisfaction is a business issue and that all processes should work towards satisfying the customer.
- All available means must be used to determine customer requirements and develop systems and procedures to assess conformance.
- It should be easy for the internal and external customer to complain. Ensure that all customer complaints are picked up and analysed, and that there is appropriate feedback.
- The attitude that ‘the next process/person is the customer’ must be encouraged.
- Measures of customer satisfaction and quality indicators for all internal departments must be developed.

- Regular self-assessment of the progress being made with quality improvement against the criteria of the Malcolm Baldrige National Quality Award for Performance Excellence (1999) and the EFQM excellence model (1999), or a similar model should be carried out. This will assist in making the quality improvement efforts more efficient and cost effective.

### Changing the culture

- All aspects of customer and supplier relationships should be developed, improved and assessed on a regular basis.
- Teamwork must be practised at all levels.
- People must be involved at all stages of the improvement process, and not simply in those aspects which directly affect their role.
- Education and training should be continuous and widespread, in order to foster changes in attitudes and behaviour and to improve the skills base of the organization.
- Recognize that change is continuous and must be embedded in the culture of the organization.

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