

# Evolution of Quality Thinking Post 1970: Part 1 of 2

## Introduction

This subject area is one which, perhaps more than most, relies on the meaning, use and interpretation of words and phrases used to define concepts, and which suffers as a result from a degree of misunderstanding and confusion. For example, there is a “nice” (in its “precise” usage) difference between “quality” management and “quality management”. And both terms rely on an understanding of the meaning of both “quality” and “management” – which will vary depending on the context in which they are used. Quality thinking could be “Quality” thinking or “Quality thinking”, ie thinking about “Quality” or a “better and more effective way of thinking”.

## What is quality?

The following responses to this question show how varied our ideas can be:

- “a measure of excellence”
- “the characteristics of a product or service that bear on its ability to satisfy stated or implied needs”
- “better than you would, or could, have ever expected”
- “what the customer perceives it to be”
- “doing the right thing right, every time”
- “the degree to which an item or process meets or exceeds the customers' requirements and expectations”
- “how closely a product or service meets its design specification”
- “surpassing customer needs and expectations throughout the life of the product”
- “a product or service free of deficiencies”
- “reducing the variation around the target”
- “a state of mind”
- “the extent to which products, services, processes, and relationships are free from defects, constraints, and items which do not add value for customers”
- “never having to say you're sorry”
- “an ever-evolving perception by the customer of the value provided by a product. It is not a static perception that never changes but a fluid process that changes as a product matures (innovation) and other alternatives (competition) are made available as a basis of comparison”
- “peace of mind”
- “never an accident”
- “the inherent features possessed by a product or service”
- “when what comes back is the client, not the product...”
- “no surprises!”
- “not achieved by doing different things. It is achieved by doing things differently”.

## What is the answer?

The replies include quite a mix of options, from the “product characteristics” view on the one hand, through meeting design specification and reducing variation and achieving (at least) customer satisfaction and other outcomes, to hints about how quality can be achieved. If all of these factors have to be managed, it is clear that we are talking about process quality management rather than just product quality management.

And the emphasis has moved from “just” meeting requirements to “**achieving excellence**”. Moreover, terms such as “sustainability”, “social responsibility” and “integration” are now as prevalent (if not more so) than “quality” in its traditional sense.

The quality of goods or of a service (or at least a customer’s perception of it) can be significantly influenced by the customer’s expectations from the product, which in turn can be founded on a number of assumptions. Both these factors can be influenced (and manipulated) significantly by the supplier as well as by a number of other factors. This subject is explained in much more detail in **Peter Bowbrick’s** book “*The Economics of Quality, Grades and Brands*”.

**Myron Tribus**, former director of the Centre for Advanced Engineering Study at MIT, puts it another way: “*There is no such thing as an immaculate perception. What you see depends upon what you thought before you looked*”.

Many assumptions made by customers are based on redundant knowledge or on ignorance, yet they have a major impact on how quality is perceived. On the other hand, a supplier can do much to manage expectations and anticipate assumptions, so that the same product is viewed totally differently under different circumstances.

There is a growing realisation that quality is multi-dimensional – things do not get done as a result of random acts and events but rather as a sequence of interrelated actions which depend on resources being available and which are affected by a variety of influences. There is also a time element in all of this – company culture, experience and knowledge, reputation and expectations can all take years to develop.

## Quality management standards

During the Second World War, a number of bombs exploded in factories during assembly. As a result, factories were required to document their procedures and to provide records to show that they were followed. They were then inspected to prove conformity to defined procedures.

In the 1970s some major organisations such as the Ministry of Defence (MoD) and Ford developed their own “quality” management standards which and required their suppliers to define how they operated and provide evidence that they “conformed” to the defined procedures – with an implied quality of product as an outcome.

In 1979, BS5750 was developed as a national standard on what constituted a quality system. In the 1980s, the International Organization for Standardization was persuaded by the British Government to adopt BS5750 as an international standard, and it became ISO9000.

### 1987

**ISO9000:1987** had the same structure as BS5750, with three “models” for quality management systems:

ISO9001:1987 Model for quality assurance in design, development, production, installation, and servicing

ISO9002:1987 Model for quality assurance in production, installation, and servicing

ISO9003:1987 Model for quality assurance in final inspection and test.

Other relevant standards during this period included the DEF STAN 05/20 series (Ministry of Defence). DEF STAN 05/21 covered the design, production and service of hardware functions and was broadly equivalent to the 1969 NATO quality management specifications (AQAP). The USA did not impose AQAP specifications for their defence contractors but introduced MIL-Q-9858 in its place.

The emphasis of ISO9000:1987 remained on inspection to ensure conformance with procedures.

### 1994

ISO 9000:1994 emphasised quality assurance by means of preventive actions instead of “just” checking the final product, but it still required evidence of compliance with documented procedures. So companies still created volumes of procedure manuals which at times made it more difficult to change and improve.

## 2000

**ISO 9001:2000** was a more significant update, combining 9001, 9002, and 9003 into one standard. It also introduced the concept of “process management”. TC176, the ISO 9001 technical committee is currently drafting the next release (ISO9001:2008), which is not expected to have substantial changes.

Along the way, a variety of sector-specific standards and guidelines (such as TickIT for software development) were produced since it was felt that the generic standards did not translate easily or that a specific industry sector had special requirements. The car industry is another sector which has developed its own standards.

This despite the fact that the international standards were designed for all sizes of organisation and for service companies as well as manufacturing. In truth, the manufacturing origins of ISO9001 have remained one of the key factors for many managers who have to interpret the standard and relate it to their ways of working.

For the same reason, it has also been a stumbling block in the adoption of the process approach which the Year 2000 edition itself promotes. And there remain two other major issues, namely the belief that “quality” is separate from “business management” and that producing a “management system definition” is in some way a substitute for a system by which to manage the business.

## “New” approaches to quality management

Other initiatives and approaches to quality management which have appeared in recent times include TQM (Total Quality Management). According to ISO, TQM is “*a management approach for an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society*”. It dates back to the 1950s, but was particularly widespread in the 1970s and 1980s.

The **Business Excellence Model** of the EFQM (European Foundation for Quality Management) (established in 1988) in Europe, and the **Malcolm Baldrige National Quality Award** (established in 1987) in the USA, both give organisations a guideline to achieve and measure their success.

**Six Sigma** is a methodology developed by Motorola to improve its business processes by minimizing defects. **Lean manufacturing** (lean production) is the optimal way of producing goods through the removal of waste and implementing flow, as oppose to batch and queue.

In reality, the latter two methodologies are aimed at “process effectiveness” and “process efficiency” respectively. The first two “models” focus on key areas against which performance is assessed. The Baldrige criteria are:

- Leadership
- Strategic Planning
- Customer and Market Focus
- Measurement, Analysis, and Knowledge Management
- Workforce Focus
- Process Management
- Results.

The (recently revised) EFQM headings are:

- Results Orientation
- Customer Focus
- Leadership and Constancy of Purpose
- Management by Processes and Facts
- People Development & Involvement
- Continuous Learning, Innovation and Improvement
- Partnership Development
- Corporate Social Responsibility.

(see **Management Systems** for more details of other system assessment tools)

It is interesting to note that in almost every case, the key elements relate to i) the objectives which the organisation is trying to achieve, ii) the resources required to ensure that processes can function, iii) the factors that can influence how (well) the processes operate, iv) the processes themselves and v) the outcomes of the processes.

The fact that all these elements are included in each model serves to emphasise the complete “system” which enables an organisation to operate. The key to process management, and to “systems thinking” (see later), is to appreciate all the factors and component parts which need to exist and to work together – or at least to be managed.

## The process of managing

You might assume that “the process approach” promoted in ISO9001:2000 was an innovation in “quality” thinking, but it was fundamental to Deming’s work last century. As **Dr Henry Neave (Professor of Leadership and Management in the Business School of the Nottingham Trent University until 2004)** pointed out in an article that introduced Dr. Walter Shewhart’s work on variation and control charts, which effectively launched Deming’s work in the 1920s:

*“A fundamental property of all but the most trivial of processes is that there will be some undesirable variation in outputs, and the foundation of Deming’s guidance on process improvement is the understanding of that variation, so that it can be reduced.*

*Each time you do your work there will be some variation. Things are never exactly the same. While variety in products and services can enrich life, variation prevents your customers from enjoying the full benefit. Variation is associated with “bad quality”. Good quality implies reliability, trustworthiness, no nasty surprises. Essentially, a feature of bad quality is too much variation, while a feature of good quality is little variation.*

*Deming used the example of the Western Electric Company which developed telephone and related equipment and invested to increase its understanding and ability. This was successful initially, but gradually ran out of steam. Deming later explained:*

*“... the harder they tried to achieve consistency and uniformity, the worse were the effects. When any kind of error, mistake, or accident occurred, they went to work on it to try to correct it. There was only one little trouble – their worthy efforts did not work. Things got worse ... they were failing to understand the difference between common causes and special causes, and that mixing them up makes things worse.”*

*...In essence, Shewhart’s breakthrough was to recognize these two very different types of variation – and their very different types of implications as regards improvement efforts, “control”, capability, and so on. What Deming later called common-cause variation is the routine variation to be expected because of what the process is, and the circumstances in which it exists and operates. Special-cause variation is anything noticeable beyond that routine variation.*

*... very different actions are called for depending on whether something is routine ... or exceptional. But how can we distinguish between the two types of variation in practice? By using the tool that Shewhart created for the purpose: the control chart.*

*It follows that, while we continue to obtain such outputs, it is illogical and impractical to claim that anything specific “caused” any one particular result: for any such result is the kind of result we know can be produced by the whole system of common causes (Deming simply called it the “system”).*

*...process monitoring is just fire-fighting, and this is nowhere near good enough. If process monitoring is all you are using the control chart for, you are missing out on the main purpose for which Shewhart created it: process improvement. Process monitoring merely aims to reach and maintain a state of statistical control. But that’s only the beginning. The next issue is: is the process capable? That means that, when it is in control, it is capable of providing outputs that meet the customers’ stated requirements?”*

## The introduction of third-party certification schemes

During the 1970s, suppliers to the North Sea Oil and Gas industry found themselves being increasingly audited by every oil major they supplied, with a view to ensuring that the goods and services they were buying were of a suitable “quality”. This in turn meant that the oil companies themselves found that they were carrying out more and more audits of their suppliers.

In the early 1980s, they got together to divide up their supplier base and work with them to “encourage” them to obtain third party certification to ISO9001. Their objective was to avoid multiple assessments of the same firms by getting a third party to provide independent evidence that the supplier had an established “quality system” which met an agreed standard (ISO9001).

The thinking was that this would enable them to rely on the supplier to deliver a consistent product – and thus to obviate the need to carry out an increasing number of audits themselves. There remains a major doubt about the success of this policy – second party audits are still carried out (even on suppliers certificated to ISO9001), and there has for some years been a major concern that the quality of product (goods or services) provided by such suppliers is no better than those without a certificate.

So the time and effort expended does not appear to have been justified, either for the “customers” or indeed for the suppliers who implemented the required systems (see later).

## **An Increasing rate of change**

As with most aspects of modern life, the rate of change in management thinking in general, and in quality matters in particular, has increased exponentially in the last 30-40 years. “Quality” thinking has in the past focussed on the reduction of variation and the production of a standard “product” which meets specifications.

Nowadays, however, there is a requirement to find different and better ways of producing better and different products, so the encouragement and support of innovation has become a differentiator for many businesses. Services are delivered by processes which are not predetermined since the customer demands cannot always be anticipated, and the quality of the service is determined by how well the supplier (ie their staff) and the delivery process itself is able to react and respond. Reduced variation is not always the measure of customer satisfaction.

The current status of the “quality” profession reflects in many ways the evolution of the concepts and application of “quality” thinking over the past 50 years. On one hand, our own Institute gained chartered status this year, which reflects its professionalism and the contribution it has made to UK business over the years. And yet debates on some electronic forums suggest that some members are questioning some fundamental aspects of the very reasons for its existence.

## **Some relevant questions**

They (and others) are asking questions such as: What is quality? How do you measure quality? What is the role of the “quality manager”? Is there a future role for a “quality manager”? Are other organisations and institutes developing their focus in a way that encroaches on the ground traditionally covered by the CQI, and the IQA before it? Should the Institute maintain an independent position? Should it even consider merging with another professional body?

The confusion in some people’s minds (both within and outwith the quality profession) is not helped by the fact that the “independent” custodian of international standards in the United Kingdom not only provides certification services against these standards, but also promotes and sells consultancy advice and training to organisations which are seeking to develop and define management systems to address these standards. It even promotes and sells software which can be used to support certain aspects of systems development and process definition.

Although other certification bodies maintain a strict independence from product suppliers, the whole certification “industry” has become so competitive that the value of an ISO9001 certificate has been seriously questioned by some observers for a considerable number of years.

The perception of the buying public as an entity, and of customers involved in an individual transaction, is affected not only by their particular experience on a specific occasion, but also by their overall perception of a supplier’s ability to address a wider range of stakeholder requirements at the present time as well as to meet future demands.

## **Measure for measure**

As an example, patients (as “customers” of the NHS) may be concerned with an overall reduction in waiting times, but they are more likely to be concerned with the attitude and concern shown by their GP on a specific visit. This may be a better assessment of the “health” of the National Health Service than how well “targets” are met. Unfortunately, such (subjective) customer opinions can be very difficult to measure although they are very important to the individuals concerned.

The ability to identify and improve the “important” elements of an organisation (its processes, performance and products) can differentiate a “quality” company from a run-of-the-mill company. When defining their management systems, all too many companies still get bogged down in the detail of process definitions and procedures, and feel that they have to set “measures” for everything that moves (or doesn’t move!), and they lose sight of the important factors which they need to manage to move the company forward.

Some online discussion forums have extended and sometimes heated debates on questions such as:

- should corrective and preventative action be one procedure or two?
- how many sentences does your quality policy contain?
- are goals and objectives the same?

While such topics may be significant for some, they are often based on a fundamental misunderstanding and lack of informed advice and are unlikely to contribute greatly to the development of “quality thinking” in the 21<sup>st</sup> century (and may even contribute to the way in which the quality perception is viewed “from the outside”). A much more radical approach is needed if the profession is to provide a positive contribution to management capability and development, to operational and organisational performance and to business success.

## Measurable or immeasurable damage

How something is presented can make a major difference to how it is perceived, and this does not apply only to product packaging. The presentation can detract from the message or the product, and in extreme cases can all but destroy the original objective. Broadcast news selects one aspect of a news story as a headline and can thus influence how the personalities involved are perceived. In politics, an event will be presented differently by different political parties to support their own point of view.

In too many cases, the “packaging” can become so overbearing and unrelated to the substance of what is being delivered that the “product” loses value and the packaging becomes an annoying distraction. Examples of this include:

- the way in which weather presenters act more like performers in the local dramatic society (in terms of both their manual and verbal gymnastics)
- even the weather map can demand undue attention to interpret it
- news programmes are preceded by some seconds of moving images, strange symbols and flashing lights
- the presenter is then barely visible amongst a sea of coloured backgrounds, more strange symbols and quirky furniture
- many website designers have yet to appreciate the need to separate meeting user requirements from giving vent to their more creative tendencies
- there seems to be an almost universal “need” to accompany any visual presentation with a piece of pop music or other noise.

When selecting software, it can be difficult for a potential user to specify requirements if they do not know what is available from existing products in the market, and they have based their “requirements” on what they have seen in the past or what a particular supplier has put forward as a “feature”, whereas some unknown features of other software may give them benefits they did not even know they wanted.

Conversely, software packages which change radically from one version to another, and add features which were not in fact wanted by the majority of users, can cause customer dissatisfaction on an alarming scale.

A very recent example of change (in more ways than one!) is the decision of the Royal Mint to remove the numbers from UK coins and only have words for the currency. As a UK citizen, I expect to be familiar enough with the coins to be able to recognise the different coins – if my experience abroad is anything to go by, visitors will be much more inconvenienced.

## The advent of systems thinking

“Systems thinking” is a way of thinking. It is an approach for developing models which can aid understanding of events, the patterns of behaviour resulting in the events and the underlying structure and relationships responsible for behaviour.

In **Computing Business magazine (August/September 2006)**, **Professor Jim Norton** talks of the need to align people, process and business need. He said:

*“In too many organisations, the business processes and the people who operate them are not fully aligned with the mission and values of the organisation. Over time, some processes have failed to adjust to the development of the business and now destroy rather than create value.*

*A major concern for both executive and non-executive directors is to ensure that the key processes in a business are documented clearly, and that those who work with them understand their importance to collective success. Such processes often cross organisational boundaries and are vital to the sharing of knowledge.”*

The objectives for such processes should always be derived from the organisation’s “mission”, performance must be reviewed against these objectives and there needs to be a way to determine whether these objectives remain relevant.

Systems thinking is “thinking in terms of systems” rather than in terms of individual components of a system – and the same principles as apply to process management (see **Specification, Design & Development of Processes, Products and Services**) can be applied. Systems thinking can (and should) be used when deciding on the best way to achieve an objective, to respond to an event or to solve a problem.

It uses the same logic as root cause analysis (RCA) and its absence explains the “law of unintended consequences”. It applies to decision making at all levels. It is also multi-dimensional, in that you will follow a process or processes to achieve an objective, but you will also have policies which shape how you operate and which therefore will affect a number of those processes. You need to appreciate the interaction of components over time rather than a linear cause and effect relationship.

An organisation’s effectiveness and efficiency is influenced not only by your own efforts but also by the external environment and events outwith your control. Identifying risks to how you operate and anticipating how your operations may impact on others, are all part of systems thinking. The same logic applies at all levels, from making a statement during a conversation up to declaring war at the other extreme.

Systems thinking is an essential requirement for management success, from the initial assessment of your current situation through planning your business strategy to designing, managing and improving the processes and products you deliver. So many factors now affect an organisation’s operations, future success and even its continuing existence that the concept of “quality” and how it is applied must expand and change to reflect the reality of business life today.

## Sources

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This is one of four modules written in 2007-2008 by Peter Fraser of MandOS for the Chartered Quality Institute (CQI)'s Body of Quality Knowledge (BoQK). The BoQK (see [www.thecqi.org/knowledge](http://www.thecqi.org/knowledge)) is the framework that defines the current boundaries of knowledge of the quality profession in the UK. It acts as one of the foundations that defines the quality profession and provides the basis for regulation.

The categories of the BoQK are:

- Concepts of quality, its history and development
- Customers, suppliers, other stakeholders and markets
- Interactions of organisations and people
- Technologies and techniques
- Laws, standards, models, associations and professional bodies
- Corporate strategy.

The four modules are:

- **Specifying, Designing and Developing Processes, Products and Services**
- **Management Systems**
- **Elements of Corporate Strategy**
- **Evolution of Quality Thinking Post 1970**