

# Quality management evolution

Quality management is a recent phenomenon. Advanced civilizations that supported the arts and crafts allowed clients to choose goods meeting higher quality standards than normal goods. In societies where [art](#) responsibilities of a master craftsman (and similarly for artists) was to lead their studio, train and supervise the on, the importance of craftsmen was diminished as mass production and repetitive work practices were instituted. The aim was to produce large numbers of the same goods. The first proponent in the US for this approach was [Eli Whitney](#) who proposed (interchangeable) parts manufacture for muskets, hence producing the identical components and creating a musket assembly line. The next step forward was promoted by several people including [Frederick Winslow Taylor](#) a mechanical engineer who sought to improve industrial efficiency. He is sometimes called "the father of scientific management." He was one of the intellectual leaders of the Efficiency Movement and part of his approach laid a further foundation for quality management, including aspects like standardization and adopting improved practices. [Henry Ford](#) also was important in bringing process and quality management practices into operation in his assembly lines. In Germany, [Karl Friedrich Benz](#), often called the inventor of the motor car, was pursuing similar assembly and production practices, although real mass production was properly initiated in Volkswagen after World War II. From this period onwards, North American companies focused predominantly upon production against lower cost with increased efficiency.

[Walter A. Shewhart](#) made a major step in the evolution towards quality management by creating a method for quality control for production, using statistical methods, first proposed in 1924. This became the foundation for his ongoing work on statistical quality control. [W. Edwards Deming](#) later applied statistical process control methods in the United States during World War II, thereby successfully improving quality in the manufacture of munitions and other strategically important products.

Quality leadership from a national perspective has changed over the past five to six decades. After the second world war, Japan decided to make quality improvement a national imperative as part of rebuilding their economy, and sought the help of [Shewhart](#), [Deming](#) and [Juran](#), amongst others. [W. Edwards Deming](#) championed Shewhart's ideas in Japan from 1950 onwards. He is probably best known for his management philosophy establishing quality, productivity, and competitive position. He has formulated 14 points of attention for managers, which are a high level abstraction of many of his deep insights. They should be interpreted by learning and understanding the deeper insights and include:

- Break down barriers between departments
- Management should learn their responsibilities, and take on leadership
- Improve constantly
- Institute a programme of education and self-improvement

In the 1950s and 1960s, Japanese goods were synonymous with cheapness and low quality, but over time their quality initiatives began to be successful, with Japan

achieving very high levels of quality in products from the 1970s onward. For example, Japanese cars regularly top the [J.D. Power](#) customer satisfaction ratings. In the 1980s Deming was asked by Ford Motor Company to start a quality initiative after they realized that they were falling behind Japanese manufacturers. A number of highly successful quality initiatives have been invented by the Japanese (see for example on this page: [Taguchi](#), [QFD](#), [Toyota Production System](#)). Many of the methods not only provide techniques but also have associated quality culture (i.e. people factors). These methods are now adopted by the same western countries that decades earlier derided Japanese methods.

Customers recognize that quality is an important attribute in products and services. Suppliers recognize that quality can be an important differentiator between their own offerings and those of competitors (quality differentiation is also called the quality gap). In the past two decades this quality gap has been greatly reduced between competitive products and services. This is partly due to the contracting (also called outsourcing) of manufacture to countries like India and China, as well internationalization of trade and competition. These countries amongst many others have raised their own standards of quality in order to meet International standards and customer demands. The ISO 9000 series of standards are probably the best known International standards for quality management.

There are a huge number of books available on quality. In recent times some themes have become more significant including quality culture, the importance of knowledge management, and the role of leadership in promoting and achieving high quality. Disciplines like systems thinking are bringing more holistic approaches to quality so that people, process and products are considered together rather than independent factors in quality management.

The influence of quality thinking has spread to non-traditional applications outside of walls of manufacturing, extending into service sectors and into areas such as [sales](#), [marketing](#) and [customer service](#).<sup>[1]</sup>

## [\[edit\]](#) Principles

Quality management adopts a number of management principles<sup>[2]</sup> that can be used by upper management to guide their organisations towards improved performance. The principles cover:

- Customer focus
- Leadership
- Involvement of people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision making
- Mutually beneficial supplier relationships

## [\[edit\]](#) Quality improvement

There are many methods for quality improvement. These cover product improvement, process improvement and people based improvement. In the following list are methods of quality management and techniques that incorporate and drive quality improvement:

1. [ISO 9004:2008](#) — guidelines for performance improvement.
2. [ISO 15504-4: 2005](#) — information technology — process assessment — Part 4: Guidance on use for process improvement and process capability determination.
3. QFD — quality function deployment, also known as the house of quality approach.
4. [Kaizen](#) — 改善, Japanese for change for the better; the common English term is *continuous improvement*.
5. Zero Defect Program — created by NEC Corporation of Japan, based upon [statistical process control](#) and one of the inputs for the inventors of Six Sigma.
6. [Six Sigma](#) — 6σ, Six Sigma combines established methods such as statistical process control, [design of experiments](#) and [FMEA](#) in an overall framework.
7. [PDCA](#) — plan, do, check, act cycle for quality control purposes. (Six Sigma's [DMAIC](#) method (define, measure, analyze, improve, control) may be viewed as a particular implementation of this.)
8. [Quality circle](#) — a group (people oriented) approach to improvement.
9. [Taguchi methods](#) — statistical oriented methods including quality robustness, quality loss function, and target specifications.
10. The Toyota Production System — reworked in the west into [lean manufacturing](#).
11. [Kansei Engineering](#) — an approach that focuses on capturing customer emotional feedback about products to drive improvement.
12. TQM — [total quality management](#) is a management strategy aimed at embedding awareness of quality in all organizational processes. First promoted in Japan with the Deming prize which was adopted and adapted in USA as the [Malcolm Baldrige National Quality Award](#) and in Europe as the [European Foundation for Quality Management](#) award (each with their own variations).
13. [TRIZ](#) — meaning "theory of inventive problem solving"
14. BPR — [business process reengineering](#), a management approach aiming at 'clean slate' improvements (That is, ignoring existing practices).
15. OQM — Object-oriented Quality Management, a model for quality management.<sup>[3]</sup>

Proponents of each approach have sought to improve them as well as apply them for small, medium and large gains. Simple one is Process Approach, which forms the basis of ISO 9001:2008 Quality Management System standard, duly driven from the 'Eight principles of Quality management', process approach being one of them. Thareja<sup>[4]</sup> writes about the mechanism and benefits: "The process (proficiency) may be limited in words, but not in its applicability. While it fulfills the criteria of all-round gains: in terms of the competencies augmented by the participants; the organisation seeks newer directions to the business success, the individual brand image of both the people and the organisation, in turn, goes up. The competencies which were hitherto rated as being

smaller, are better recognized and now acclaimed to be more potent and fruitful".<sup>[5]</sup> The more complex Quality improvement tools are tailored for enterprise types not originally targeted. For example, Six Sigma was designed for manufacturing but has spread to service enterprises. Each of these approaches and methods has met with success but also with failures.

Some of the common differentiators between success and failure include commitment, knowledge and expertise to guide improvement, scope of change/improvement desired (Big Bang type changes tend to fail more often compared to smaller changes) and adaptation to enterprise cultures. For example, quality circles do not work well in every enterprise (and are even discouraged by some managers), and relatively few TQM-participating enterprises have won the national quality awards.

There have been well publicized failures of BPR, as well as Six Sigma. Enterprises therefore need to consider carefully which quality improvement methods to adopt, and certainly should not adopt all those listed here.

It is important not to underestimate the people factors, such as culture, in selecting a quality improvement approach. Any improvement (change) takes time to implement, gain acceptance and stabilize as accepted practice. Improvement must allow pauses between implementing new changes so that the change is stabilized and assessed as a real improvement, before the next improvement is made (hence continual improvement, not continuous improvement).

Improvements that change the culture take longer as they have to overcome greater resistance to change. It is easier and often more effective to work within the existing cultural boundaries and make small improvements (that is **Kaizen**) than to make major transformational changes. Use of Kaizen in Japan was a major reason for the creation of Japanese industrial and economic strength.

On the other hand, transformational change works best when an enterprise faces a crisis and needs to make major changes in order to survive. In Japan, the land of Kaizen, [Carlos Ghosn](#) led a transformational change at Nissan Motor Company which was in a financial and operational crisis. Well organized quality improvement programs take all these factors into account when selecting the quality improvement methods.

## **[edit] Quality standards**

The [International Organization for Standardization \(ISO\)](#) created the [Quality Management System \(QMS\)](#) standards in 1987. They were the ISO 9000:1987 series of standards comprising ISO 9001:1987, ISO 9002:1987 and ISO 9003:1987; which were applicable in different types of industries, based on the type of activity or process: designing, production or service delivery.

The standards are reviewed every few years by the International Organization for Standardization. The version in 1994 was called the ISO 9000:1994 series; consisting of the ISO 9001:1994, 9002:1994 and 9003:1994 versions.

The last major revision was in the year 2008 and the series was called [ISO 9000:2000](#) series. The ISO 9002 and 9003 standards were integrated into one single certifiable standard: ISO 9001:2008. After December 2003, organizations holding ISO 9002 or 9003 standards had to complete a transition to the new standard.

ISO released a minor revision, ISO 9001:2008 on 14 October 2008. It contains no new requirements. Many of the changes were to improve consistency in grammar, facilitating translation of the standard into other languages for use by over 950,000 certified organisations in the 175 countries (as at Dec 2007) that use the standard.

The [ISO 9004:2009](#) document gives guidelines for performance improvement over and above the basic standard (ISO 9001:2000). This standard provides a measurement framework for improved quality management, similar to and based upon the measurement framework for process assessment.

The Quality Management System standards created by ISO are meant to certify the processes and the system of an organization, not the product or service itself. ISO 9000 standards do not certify the quality of the product or service.

In 2005 the International Organization for Standardization released a standard, [ISO 22000](#), meant for the food industry. This standard covers the values and principles of ISO 9000 and the [HACCP](#) standards. It gives one single integrated standard for the food industry and is expected to become more popular in the coming years in such industry.

ISO has also released standards for other industries. For example Technical Standard TS 16949 defines requirements in addition to those in ISO 9001:2008 specifically for the automotive industry.

ISO has a number of standards that support quality management. One group describes processes (including [ISO 12207](#) & [ISO 15288](#)) and another describes process assessment and improvement ISO 15504.

The Software Engineering Institute has its own process assessment and improvement methods, called CMMi (Capability Maturity Model — integrated) and IDEAL respectively.

## **[\[edit\]](#) Quality software**

The software used to track the three main components of quality management through the use of databases and/or charting applications.

## [\[edit\]](#) **Quality terms**

- Quality Improvement can be distinguished from Quality Control in that Quality Improvement is the purposeful change of a process to improve the reliability of achieving an outcome.
- Quality Control is the ongoing effort to maintain the integrity of a process to maintain the reliability of achieving an outcome.
- Quality Assurance is the planned or systematic actions necessary to provide enough confidence that a product or service will satisfy the given requirements.