Quality management

From Wikipedia, the free encyclopedia

Quality management is a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective and efficient with respect to the system and its performance. Quality management can be considered to have three main components: quality control, quality assurance and quality improvement. Quality management is focused not only on product quality, but also the means to achieve it. Quality management therefore uses quality assurance and control of processes as well as products to achieve more consistent quality.

Contents

Quality management evolution

Quality management is not 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 and craft (and craftsmanship) were valued, one of the responsibilities of a master craftsman (and similarly for artists) was to lead their studio, train and supervise the work of their craftsmen and apprentices. The master craftsman set standards, reviewed the work of others and ordered rework and revision as necessary. One of the limitations of the craft approach was that relatively few goods could be produced, on the other hand an advantage was that each item produced could be individually shaped to suit the client. This craft based approach to quality and the practices used were major inputs when quality management was created as a management science.

During the industrial revolution, 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 two. 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 aspects (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.

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 9004:2000 — 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 usage is continual 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 (Design, 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).

Proponents of each approach have sought to improve them as well as apply them to 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 adaption 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 has 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.

Quality standards

The International Organization for Standardization (ISO) created the Quality Management System (QMS) standards in 1987. These 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 have been regularly reviewed every few years by the International Organization for Standardization. The version in 1994 and was called the ISO 9000:1994 series; comprising of the ISO 9001:1994, 9002:1994 and 9003:1994 versions.

The last revision was in the year 2000 and the series was called ISO 9000:2000 series. However the ISO 9002 and 9003 standards were integrated and one single certifiable standard was created under ISO 9001:2000. Since December 2003, ISO 9002 and 9003 standards are not valid, and the organizations previously holding these standards need to do a transition from the old to the new standards.

The ISO 9004:2000 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 and not the product or service itself. ISO 9000 standards do not certify the quality of the product or service.

Recently the International Organization for Standardization released a new 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 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.

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 for quality.

Academic resources

- International Journal of Productivity and Quality Management, ISSN 1746-6474, Inderscience
- International Journal of Quality & Reliability Management, ISSN: 0265-671X, Emerald Publishing Group

See also

- Quality assurance
- Quality audit
- Quality control
- Quality management system
- ISO 15504
- Systems thinking - Applications
- Total Quality Management
- Hoshin Kanri
- Health care

External links

- Australian Organisation for Quality Inc National Body
- International Organization for Standardization
- American Society for Quality
- Japanese Society for Quality Control
- Japanese Society for Quality Assurance
- National Quality Institute of Canada
- European Organization for Quality
- European Foundation for Quality Management
- The Quality Management Network

References

- Pyzdek, T, "Quality Engineering Handbook", 2003, ISBN 0824746147
- Godfrey, A. B., "Juran's Quality Handbook", 1999, ISBN 007034003
- Process Assessment and Improvement ISBN 0-387-23182-X

Retrieved from "http://en.wikipedia.org/wiki/Quality_management"
Categories: Quality management