

Quality Management: A Need of Today

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Abstract

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 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 methods discussed in this article.

KEYWORDS: Quality leadership, Six Sigma, BPR, Zero Defect Program, Quality circle, Object-oriented Quality and Risk Management

Introduction: Meaning:

The term *quality management* has a specific meaning within many business sectors. This specific definition, which does not aim to assure 'good quality' by the more general definition, but rather to ensure that an organization or product is consistent, can be considered to have four main components: quality planning, quality control, quality assurance and quality improvement. Quality management is focused not only on product/service 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. Total Quality Management (TQM) is a management approach or strategy aimed at embedding awareness of quality in all organizational processes, on which organizations must strive to continuously improve these processes by incorporating the knowledge and expertise of workers.

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 arts and crafts are the responsibility of a master craftsman or artist, they would lead their studio and train and supervise others. The importance of craftsmen 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** was also 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 military materials 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. These 14 points include key concepts such as:

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- Break down barriers between departments
 - Management should learn their responsibilities, and take on leadership
 - Supervision should be to help people and machines and gadgets to do a better job
 - Improve constantly and forever the system of production and service
 - Institute a vigorous program of education and self-improvement
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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: **Genichi 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 management. 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*.

Principles

The International Standard for Quality management (ISO 9001:2008) adopts a number of management principles that can be used by top management to guide their organizations towards improved performance. The principles include:

1. Customer focus

Since the organizations depend on their customers, they should understand current and future customer needs, should meet customer requirements and try to exceed the expectations of customers. An organization attains customer focus when all people in the organization know both the internal and external customers and also what customer requirements must be met to ensure that both the internal and external customers are satisfied.

2. Leadership

Leaders of an organization establish unity of purpose and direction of it. They should go for creation and maintenance of such an internal environment, in which people can become fully involved in achieving the organization's quality objective.

3. Involvement of people

People at all levels of an organization are the essence of it. Their complete involvement enables their abilities to be used for the benefit of the organization.

4. Process approach

The desired result can be achieved when activities and related resources are managed in an organization as process. This may also affect positively the quality of management.

5. System approach to management

An organization's effectiveness and efficiency in achieving its quality objectives are contributed by identifying, understanding and managing all interrelated processes as a system.

6. Continual improvement

One of the permanent quality objectives of an organization should be the continual improvement of its overall performance.

7. Factual approach to decision making

Effective decisions are always based on the data analysis and information.

8. Mutually beneficial supplier relationships

Since an organization and its suppliers are interdependent, therefore, a mutually beneficial relationship between them increases the ability of both to add value.

The above eight principles form the basis for the quality management system standard ISO 9001:2008.

Quality improvement

There are many methods for quality improvement. These cover product improvement, process improvement and people based improvement. The following list presents the 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** — 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 failure mode and effects analysis (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 (ignoring existing practices).

15. OQRM — Object-oriented Quality and Risk Management, a model for quality and risk management.

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* 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". 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 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 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.

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 9001:2000. 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/IEC 12207 & ISO/IEC 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 software

Quality Management Software is a category of technologies used by organizations to manage the delivery of high quality products. Solutions range in functionality; however, with the use of automation capabilities they typically have components for managing internal and external risk, compliance, and the quality of processes and products. Pre-configured and industry-specific solutions are available and generally require integration with existing IT architecture applications such as ERP, SCM, CRM, and PLM.

1. Quality Management Software Functionalities

- Non-Conformances/Corrective and Preventive Action
- Compliance/Audit Management
- Supplier Quality Management
- Risk Management
- Statistical Process Control
- Failure Mode and Effects Analysis
- Complaint Handling
- Advanced Product Quality Planning
- Environment, Health, and Safety
- Hazard Analysis & Critical Control Points
- Production Part Approval Process

2. Enterprise Quality Management Software

The intersection of technology and quality management software prompted the emergence of a new software category: Enterprise Quality Management Software (EQMS). EQMS is a platform for cross-functional communication and collaboration that centralizes, standardizes, and streamlines quality management data from across the value chain. The software breaks down functional silos created by traditionally implemented standalone and targeted solutions. Supporting the proliferation and accessibility of information across supply chain activities, design, production, distribution, and service, it provides a holistic viewpoint for managing the quality of products and processes.

Conclusion

Business success may simply be the extent to which your organization can produce a higher-quality product or service than your competitors are able to do at a competitive price. When quality is the key to a company's success, quality management systems allow organizations to keep up with and meet current quality levels, meet the consumer's requirement for quality, retain employees through competitive compensation programs, and keep up with the latest technology. Thus, Quality Management is the need of today.

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