



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

TOTAL QUALITY MANAGEMENT

Nature and Evolution of Total Quality Management

by

Robert R. Cangemi, Ph.D.
Professor
Pace University
Lubin Graduate School of Business
White Plains, New York

Good morning, ladies and gentlemen. I am delighted to have the opportunity to speak to you about Total Quality Management. In fact, any time I have such an opportunity I jump on it. You see, about two years ago, I became a convert. And like many converts, I also became a zealot and perhaps even an evangelist. So today my assignment is to speak about the "Nature and Evolution of Total Quality Management," and I do it with enthusiasm.

The points that I plan to cover are:

- A view of the evolution of TQM through the contributions of three American management thinkers;
- What do we mean by a total quality management strategy; and
- Where does total quality management stand today and what are the implications to corporations who adopt it?

Total quality management is an endless journey in pursuit of a delighted customer. In recent years, the word "quality" itself has changed meaning. It has come to mean more than the reliability and price/performance of a product

or service, as essential as those are. It is more than a program. It encompasses every aspect of customer satisfaction, including how fast a solution is delivered, its usability, availability of support, efficiency of service, and even the simplicity of bills and prompt, courteous telephone responses. Total quality management needs to be integrated into everything the business does.

Why is quality so important now to U.S. business? Well, it is so important that U.S. industry leaders like David Kearns (formerly CEO of Xerox and now assistant secretary of education), Edwin Artzt (CEO of Procter & Gamble), John Akers (CEO of IBM) and Robert Galvin (CEO of Motorola) have said that for their companies the implementation of a total quality management strategy is a matter of survival. That's right survival!!!

Why has it come at this time? You only have to think back to after World War II when the United States was the only intact plant of industrialized nations. The United States set the quality standard for the world; whatever we created, we sold. Engineering and M.B.A. programs emphasized sheer production, while losing sight of quality. There really was no pressure to do anything different. We were selling everything we made.

As our marketplace became worldwide, the U.S. advantage vanished. In a global marketplace it no longer mattered where a product came from. People want quality and want more quality at less cost. In the 1970s foreign competitors began turning out products that were often made better, sold at a lower cost or produced faster than were domestic goods.

What U.S. companies today are going through is nothing less than a complete transformation in order to recapture their former advantage and vision.

The transformation is from a traditional management focus to a total quality management focus. And, this total quality management focus is an extension of, rather than a replacement for, traditional management.

We traditionally viewed our companies through financial targets, hierarchical departmental structure, and operational measurements. Our analysis of progress reflected that view. We measured ourselves on how well we were doing in our own departments with little regard for the impact on the overall business. The paradigm shift is shown by a total quality management view of the organization. This view incorporates cross-functional process teams, measurements based on what customers think is important to meet their needs and to deliver defect-free solutions, and assessment goals based on the Malcolm Baldrige criteria which we will briefly consider later.

Although total quality management is an endless journey for a company, the quality movement did have a beginning. Dr. Blanton Godfrey (President of the Juran Institute) stated that it began on May 16, 1924, the day when Walter A. Shewhart of Bell Laboratories communicated to his manager what may have been the first control chart. Shewhart suggested a way of using statistics to improve quality in telephones. Of the 40,000 employees making telephone equipment at Western Electric's Hawthorne Works in Chicago, a whopping 5,200 were in the inspection department. Shewhart taught his statistical methods at Hawthorne and other plants. Within a few years, Western Electric put out a handbook of quality control methods that became an industrial bible.

Now let's jump to the period following the end of World War II. Although Shewhart's lessons of statistical process control were beginning to be taught to the Japanese by Bell Laboratories employees at the invitation of General MacArthur, it was Dr. W. Edwards Deming's arrival in July of 1950 by the invitation of Ichiro Ishikawa, to lecture Japanese senior officers that put the quality revolution into orbit in Japan.

In contrast to the specialized approach traditionally used in the United States, a number of Japanese companies, rebuilding from post-war devastation, adopted an innovative, integrated approach to achieving quality. Several leading applied statisticians and quality experts (including Deming and Juran) introduced quality management principles to Japanese Industry. The Union of Japanese Scientists and Engineers, provided a forum for widespread dissemination of statistical quality control techniques.

We will discuss some thoughts of three American quality gurus this morning--Dr. Deming, Joseph M. Juran, and Philip B. Crosby.

Let's begin with Deming. Deming is the philosopher; the others are more pragmatic, telling managers what to do to make things better. Deming does not! Believers in his method have compared it to a religion because, they say, it not only improves quality in manufacturing, service, government and education, but it also makes people's lives better. Donald Petersen, retired chairman of Ford Motor Company, describes himself as a "a disciple of Dr. Deming."

Deming's method is revolutionary in that nothing stays the same. The Deming method changes the relationship with customers; it changes the relationship with suppliers; it changes the relationship with employees. The Deming method has as part of it fourteen points which we will briefly go over. However, two key ingredients are *constancy of purpose* and *continual improvement*.

Constancy of purpose is the first of fourteen points, the linchpin to Deming's method. You have to have some reason to be in business other than to make money. You also have to know

what business you are in and how to stay ahead of the customer's needs in that business. Most companies don't know this, he tells us. Constancy of purpose requires that you know what business you are in and how to stay in that business.

Continual improvement is the fifth of the fourteen points and is, perhaps, the most easily understood. Nothing is ever good enough, the job is never over, and the day you decide you can't make it any better, someone else, somewhere else will and will drive you out of business.

Because management was responsible, in Deming's view, for 85 percent of all quality problems, management had to take the lead in changing the systems and processes that created those problems.

Accordingly, Deming delineated two means of process improvement: changing the "common causes" that were systemic (and were thus shared by numerous operators, machines, or products) and removing the "special causes" that produced non-random variation within systems (and were usually confined to individual employees or activities). Common causes include poor product design, incoming materials unsuited to their use, machines out of order, improper bills of materials, machinery that would not hold tolerances, poor physical conditions and so on. Special causes include lack of knowledge or skill, worker inattention, or a poor lot of incoming materials. Management was responsible for common causes; operators were responsible for special causes.

The key tool that Deming advocated to distinguish between systemic and special causes--and indeed, the key to quality improvement in general--was statistical process control. The less the variation in the process the more quality improves. This is how Deming defines quality.

Point 14 is *take action to accomplish the transformation*. Deming tells us to follow the Shewhart Cycle!

PLAN 1) What could be the most important accomplishment of this team? What changes might be desirable? Are new observations needed? If yes, plan a

change or test. Decide how you will use the observations.

DO 2) Search for data on hand that could answer the question asked in Step 1. Or, carry out the change or test decided upon, preferably on a small scale.

CHECK 3) Observe effects of the change or test.

ACT 4) Study the results. What did we learn?

5) Repeat Step 1, with knowledge gained.

6) Repeat Step 2, and onward.

This is the thrust of the management system Deming taught to the Japanese and what we in America are still trying to learn. To show their gratitude, the Union of Japanese Scientists and Engineers established the Deming Prize in 1951, with the intention of raising the quality levels in Japanese industry.

Deming says quality requires transformation, but Joseph Juran (our next guru), whose impact on Japanese quality is usually considered second only to Deming's, says managing for quality is analogous to managing for finance and does not require a transformation. He says financial planning, financial control, and financial improvement by management become quality planning, quality control, and quality improvement; he calls this the Juran Trilogy. He wrote that "conceptual approaches are identical with those used to manage for finance." However, "the procedural steps are special, and the tools used are also special." Juran does not say quality is easy; he does say that it often fails because top management does not appreciate how much work is necessary to make it a successful strategy. In the beginning there is probably a 15 percent overlay of work due to team work, meetings, and doing work between your regular responsibilities.

Juran defines quality as "fitness for use," meaning that users of a product or service should be able to count on it for what they need or want to do with it. In addition, Juran stretches the word "customers" to include *all persons who are*

affected by our processes and our products. This includes EXTERNAL and INTERNAL customers.

Fitness for use has five major dimensions: quality of design, quality of conformance, availability, safety, and field use. To achieve fitness for use, Juran developed a comprehensive approach to quality that spanned a product's entire life--from design through vendor relations, process development, customer relations, and field service. Each area was carefully dissected, and approaches were proposed to specify and quantify its impact on the various elements of fitness for use. A broad range of statistical techniques was included to assist in the analysis.

Juran also recognized that to get the attention of top management he had to talk in top management's language--money. For this reason, he advocated a cost-of-quality accounting system. Quality costs were costs "associated solely with a defective product--the costs of making, finding, repairing, or avoiding defects." They were of four types: 1) internal failure costs (from defects discovered before shipment); 2) external failure costs (from defects discovered after shipment); 3) appraisal costs (for assessing the condition of materials and product); 4) and prevention costs (for keeping defects from occurring in the first place). In most companies, Juran found, external and internal failure costs together accounted for 50 percent to 80 percent of the cost-of-quality.

Philip Crosby was the first person in U.S. industry to hold the title of corporate vice president of quality when he was at ITT; he gives us yet another view of quality. Typically, top managers viewed quality as intangible or else to be found only in high-end-products. However, Crosby says quality does not mean goodness, luxury, shininess, or weight. He spoke of quality as "conformance to requirements" and believed that any product that consistently met its design specifications was of high quality. "Conformance to requirements" must be clearly stated so that it cannot be misunderstood. Continual measurements determine conformance to these requirements. The non-conformance detected is the absence of quality. Quality problems become non-conformance problems, and quality becomes definable. Quality is then measurable--in cold

harsh cash. It is measured by the cost of quality which is the expense of non-conformance--or the cost of doing things wrong. In fact, he believed that if quality were improved, total costs would inevitably fall, allowing companies to increase profitability. This reasoning led Crosby to the famous theme title of his book--*Quality is Free*.

The costs he spoke of are divided into Prevention, Appraisal and Failure categories. They all result from not doing things right the first time. He estimated that costs of quality ran between 15 percent and 20 percent of sales in most companies, and that a well run quality management program can spend less than 2.5 percent of sales on the prevention and appraisal activities necessary to make certain the company maintains its standards of excellence. (Motorola, which is considered a world class company, estimates its cost of quality is 7.5 percent of sales.)

Crosby emphasized prevention over detection (which Deming and Juran did too) and focused on changing corporate culture rather than analytical or statistical tools. Crosby believed every company should tailor its own defect-prevention program and the goal should always be "Zero Defects"; he called this an *absolute* of quality management. Both Deming and Juran state that zero defects is impossible. There will always be some variation.

Let's take a look at Zero Defects. The following examples will help you understand why Crosby is so adamant. With a one percent error rate, every year 38,000 new born babies would be dropped, and there would be 15,000 fatal plane crashes. With a job being done correctly 99.9 percent of the time, 20,000 drugs would be incorrectly dispensed each year, and there would be 26,000 bad operations carried out each year.

Federal Express guarantees 100 percent accuracy; the U.S. Postal Service has a 98 percent accuracy goal. At 98 percent accuracy, the Postal Service will mishandle 15,000 shipments every day--that means 30,000 unhappy customers.

Jan Carlzon (President and CEO of Scandinavian Airlines) gave us the concept of *Moments of Truth*. A Moment of Truth is an

episode in which a customer comes in contact with any aspect of the company, however remote, and thereby has an opportunity to form an impression of the quality of its service. He says we need to measure quality at each episode. On October 1st, 1992, Quality Day, Jan Carlzon revisited his concept. He reminded us that before 1979 we measured progress in terms of technical efficiency; now the focus is on the customer. He says his company flies people not planes. The challenge is to see an individual in each customer.

Companies that aspire to be world class are striving to be six sigma companies--a Motorola concept. This is a very high level of quality, with only 3.4 defects, failures or errors per million measurable units of product or service opportunities. The units can be invoices, incoming telephone calls, subassemblies, proposals, shipments, service calls or other quantifiable units. Six sigma is a proven statistical approach to reach virtually defect-free levels of quality. It requires analyzing and defining the process by which work is done, identifying the causes of defects, and eliminating them in a systematic and measurable way.

Well, where do we stand now in our quality movement? On August 20, 1987, President Reagan signed the Malcolm Baldrige National Improvement Act. This law established the Malcolm Baldrige National Quality Award--designed to recognize companies that have successfully implemented total quality management systems. This award is managed by the U.S. Department of Commerce.

Let's consider the core values and concepts. The Baldrige Award criteria focus on improving value to the customer while maximizing the overall effectiveness and productivity of the organization. Organizations can accomplish this by building the TQM process around the following ten core concepts:

*** Customer Driven Quality.** The quality of products and services is defined as satisfying and delighting the customer. As the TQM process matures, customer driven quality becomes a strategic concept for the company.

*** Leadership.** Senior executives must create clear, visible values and expectations. They "walk the talk" by demonstrating personal involvement in quality improvement activities.

*** Continuous Improvement.** Since the highest quality companies apply the principles of continuous improvement, the world class quality standard is not a static standard but a moving target. Therefore, achieving and maintaining the highest quality and competitiveness levels requires a well-executed approach. In addition, continuous improvement must be applied to all operations and processes including the TQM process itself.

*** Full Participation.** Meeting world class quality standards requires a fully committed, well-trained, empowered and involved work force. Human resources are the only resources that can increase in value over time. This is achieved by executing a well-defined plan for human resource development and management.

*** Fast Response.** Success in competitive markets requires decreasing the product/service introduction cycles. This cycle should measure the time from the conception of the idea to the delivery of a product or service which meets or exceeds customer needs and expectations.

*** Design Quality and Prevention.** The quality improvement process emphasizes preventing problems by building quality into the products and services during the design process. This must be done if cycle times are to be reduced.

*** Long Range Outlook.** Achieving quality and market leadership requires a long term outlook. The goals, long-term plans, short-term plans, and measures must be effectively linked together to align the employees with the corporate resources to meet the goals.

*** Management by Fact.** Corporations must be managed "by facts not gut feelings." The information used for decisions must be based on reliable data and analysis, and must be linked to customer satisfaction.

*** Partnership Development.** Companies should seek to build partnerships with all stakehol-

ders of the company. The stakeholders include customers, suppliers, employees, stockholders, the community, universities, and others.

* **Public Responsibility.** The company needs to address areas of corporate citizenship and responsibility. Included in this value is the sharing of nonproprietary quality related information.

In 1992, 90 companies applied for the Baldrige award (15 service companies, 44 small businesses and 31 manufacturing firms). Only two companies can win in each category; an award does not have to be conferred. The winners this year are: AT&T Universal Card Services and Ritz-Carlton Hotel in the service sector category, AT&T Transmission Systems and Texas Instruments Defense System & Electronics Group in the manufacturing group and Granite Rock Co. in the small business sector.

Worldwide, the European Community has adopted the International Standards Organization's 9000 Series Standards, a set of five quality management standards that provide a framework to ensure cross-border quality. EC government procurement and some European companies will require ISO 9000 registration of any company wanting to do business with them after 1993.

To register, a company must identify and document all the processes that affect quality, from management responsibility to training, and then ensure that they function effectively.

As great as the progress has been for U.S. companies in embracing total quality management this past decade, evidence indicates there is still some way to go. The results of the 1990 ASQC/Gallup survey, which found that American workers perceive a big gap between what companies say about the importance of quality and what they actually do about it, are confirmed in a new study by the American Quality Foundation and Ernst & Young. Among the findings, the study found that senior management in 20 percent of U.S. businesses don't regularly review the consequences of quality performance. This contrasts with the 2 percent of Japanese businesses that fail to do so.

Although U.S. corporations have been late to use total quality management as a strategy to manage their businesses when compared to Japan (remember the Japanese created the Deming Award in 1951 and the U.S. established the Baldrige award in 1987--that's a 36-year difference) a multiplier effect is at work in the United States. Many large companies are requiring and assisting their suppliers to demonstrate that they have quality processes and if they can't do it after a reasonable period of time, they will be dropped as suppliers. This is really a survival issue!!! Motorola has given their suppliers five years to get to the point where they will apply for a Baldrige Award or be dropped. A similar story can be told for Ford, Xerox and IBM and others. So one large company can influence thousands of suppliers to put in place a quality strategy.

I will end on this optimistic note and thank you for giving me this opportunity to spread the word according to Total Quality Management.

References

- Crosby, Philip, 1979, *Quality Is Free*. New York: McGraw-Hill.
- Deming, W. Edwards, 1986, *Out of the Crisis*. Cambridge, MA: MIT Center for Advanced Engineering Study.
- Dobyns, Lloyd and Clare Crawford-Mason, 1991, *Quality or Else*. Boston: Houghton Mifflin.
- Garvin, David A. 1988, *Managing Quality*. New York: The Free Press.
- Juran, J. M., 1988, *Juran On Planning for Quality*. New York: The Free Press.
- Juran, J. M. 1989, *Juran On Leadership for Quality*. New York: The Free Press.
- Walter, Mary, 1986, *The Deming Management Method*. New York: Putnam Publishing Group.
- Walton, Mary, 1991, *Deming Management At Work*. New York: Putnam Publishing Group.