Quality Management

Creating and Sustaining Organizational Effectiveness

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Organizational Philosophy

Marshall Field, who in 1880 created of one of the United States' first department stores, was an involved manager. Each day during his 40-year reign as owner, he would walk through his flagship store on State Street in Chicago, Illinois, and observe his customers and their interactions with his employees. The authors of Give the Lady What She Wants *describe the situation that created the store's famous philosophy:*

> *One day while making his rounds, Marshall Field came upon an assistant retail manager involved in a heated argument with a female customer. He pulled the employee aside and asked him what he was doing. The employee responded that he was resolving a customer complaint concerning returning merchandise. Marshall Field retorted with, "No you're not! Give the lady what she wants!" Marshall Field had established a policy of accepting merchandise returns from customers, a procedure not followed by any other department store at the time.*
>
> *Paraphrased from:*
> *Give the Lady What She Wants*, Lloyd Wendt and Herman Kogan, *1952*

WHAT ARE THE KEY ELEMENTS TO DELIGHTING CUSTOMERS AND GENERATING ORGANIZATIONAL SUCCESS?

Why is it that some leaders seem to know instinctively just what to do to make their customers happy? How do they enable their organization to delight their customers and cause their customers to have a love affair with their products or services? These same leaders are also ones who create a warm and productive working environment for their employees. What are the philosophies that guide these leaders in their efforts to create and sustain organizational effectiveness?

Marshall Field took the opinions of his internal and external customers so seriously that each working day throughout his life, he walked through his store and met daily with customers and employees. His philosophy, *Give the Lady What She Wants*, continues to be a guiding force of Marshall Field's department stores 100+ years later (although it is less gender-specific today). Leaders of today's effective organizations have studied the theories of quality management gurus such as Armand Feigenbaum, W. Edwards Deming, Joseph Juran, and others to gain an understanding of the underlying philosophy necessary to provide customer satisfaction. Although each of these men's approaches to creating effective organizations differ, the key elements remain the same. In order to consistently provide for customer satisfaction, effective organizations must:

- Determine who their customers are
- Determine the critical key success factors for meeting their customers' needs, requirements, and expectations
- Establish effective processes that enable them to provide products and services that meet their customers' needs, requirements, and expectations
- Focus on process measurement and improvement
- Provide the management involvement and commitment required for organizational success

Leaders of effective organizations study and apply the ideas of the individuals discussed below, as well as the ideas of leaders of effective organizations, such as Marshall Field, to improve their own processes and delight their customers. The key philosophical elements listed above will be covered throughout this text beginning with this chapter about several important individuals and their philosophies.

WHO ARE THE INDIVIDUALS AND WHAT ARE THEIR PHILOSOPHIES?

Dr. Armand Feigenbaum

Armand Feigenbaum (1920–) is considered to be the originator of the total quality movement. Dr. Feigenbaum defined quality based on a customer's actual experience with the product or service. His landmark text, *Total Quality Control*, first published in 1951 and updated regularly since then, has significantly influenced industrial practices. In his original text, he predicted that quality would become a significant customer-satisfaction issue, even to the point of surpassing price in importance in the decision-making process. As he predicted, consumers have come to expect quality as an essential dimension of the product or service they are purchasing.

In his text, Dr. Feigenbaum defines quality as follows:

> . . . a customer determination which is based on the customer's actual experience with the product or service, measured against his or her requirements—stated or unstated, conscious or merely sensed, technically operational or entirely subjective—always representing a moving target in a competitive market.

Note that Dr. Feigenbaum's definition of quality is broad-reaching. It stresses that quality is a customer determination; that is, only a customer can decide if and how well a product or service meets his or her needs, requirements, and expectations. These needs, requirements, and expectations may be stated or unstated, conscious or merely sensed, or technically operational or entirely subjective. Quality is also based on the customer's actual experience with the product or service throughout its life, from purchase to disposal. Dr. Feigenbaum's definition recognizes that quality, and therefore customer satisfaction, is a moving target in a competitive market. The complexity of Dr. Feigenbaum's definition is exactly what makes it an excellent definition of quality from the customer's point of view. In order to continually delight their customers, effective organizations must capture these stated or unstated, conscious or merely sensed, technically operational or entirely subjective needs, requirements, and expectations. How effective organizations do this is discussed in greater detail in Chapter 4.

To Dr. Feigenbaum, quality is more than a technical subject; it is an approach to doing business that makes an organization more effective. Throughout his life, Dr. Feigenbaum has consistently encouraged treating quality as a fundamental element of a business strategy. In his article "Changing Concepts and Management of Quality Worldwide," from the December 1997 issue of *Quality Progress*, he asserts that quality is not a factor to be managed but a method of "managing, operating, and integrating the marketing, technology, production, information, and finance areas throughout a company's quality value chain with the subsequent favorable impact on manufacturing and service effectiveness." According to Dr. Feigenbaum, management is responsible for recognizing the evolution of the customer's definition of quality for an organization's products and services. Quality systems are a method of managing an organization to achieve higher customer satisfaction, lower overall costs, higher profits, and greater employee effectiveness and satisfaction. Company leadership is responsible for creating an atmosphere that enables employees to provide the right product or service the first time, every time. Dr. Feigenbaum encourages companies to eliminate waste, which drains profitability, by determining the costs associated with failing to provide a quality product. Costs of quality are covered in greater detail in Chapter 8. Quality efforts should emphasize increasing the number of experiences that go well for a customer versus handling things when they go wrong. Statistical methods and problem-solving techniques should be utilized to effectively support business strategies aimed at achieving customer satisfaction. Note that Dr. Feigenbaum's definitions and philosophies cover all aspects of the business, from customers to employees, and from products to processes. The newest edition of his text serves as a how-to guide for establishing a quality system.

Dr. Walter Shewhart

In his writings Dr. Walter Shewhart (1891–1967) points to two aspects of quality: the subjective aspect, what the customer wants; and the objective side, the physical properties of the goods or services, including value received for the price paid. During his lifetime Dr. Shewhart worked to create statistical methods that control and improve the quality of the processes that provide goods and services. When an organization is translating customer requirements to actual products and services, statistical measures of key characteristics are important to ensure quality. While working at Bell Laboratories in the 1920s and 1930s, Dr. Shewhart was the first to encourage the use of statistics to identify, monitor, and eventually remove sources of variation found in repetitive processes.

Dr. Shewhart identified two sources of variation in a process. Controlled variation, also termed *common causes*, is variation present in a process due to the very nature of the process. This type of variation can be removed from the process only by changing the process. For example, consider a person who has driven the same route to work dozens of times and has determined that it takes about 20 minutes to get from home to work regardless of minor changes in weather or traffic conditions. If this is the case, then the only way the person can improve upon this time is to change the process by finding a new route. Uncontrolled variation, also known as *special* or *assignable causes*, comes from sources external to the process. This type of variation is normally not part of the process. It can be identified and isolated as the cause of the change in the behavior of the process. For instance, the commuter described above would experience uncontrolled variation if a major traffic accident stopped traffic or a blizzard made traveling nearly impossible. Uncontrolled variation prevents the process from performing to the best of its ability.

It was Dr. Shewhart who put forth the fundamental principle of quality: that once a process is under control, exhibiting only controlled variation, future process performance can be predicted, within limits, on the basis of past performance. In his text *Economic Control of Quality of Manufactured Product* (Van Nostrand Reinhold, 1931, p. 6), he wrote:

> A phenomenon will be said to be controlled when, through the use of past experience, we can predict, at least within limits, how the phenomenon may be expected to vary in the future. Here it is understood that prediction within limits means that we can state, at least approximately, the probability that the observed phenomenon will fall within the given limits.

Based on this principle, Dr. Shewhart developed the formulas and a table of constants used to create the most widely utilized statistical control charts in quality: the $\overline{X}$ and R charts (Chapter 10). These charts (Figure 2.1) first appeared in a May 16, 1924, memo written by Dr. Shewhart and later in his 1931 text, *Economic Control of Quality of Manufactured Product*, mentioned and quoted above. In this text Dr. Shewhart presented the foundation principles upon which modern quality control is based. Control charts have three purposes: to define standards for the process, to aid in problem-solving efforts to attain the standards, and to serve to judge whether the standards have been met.

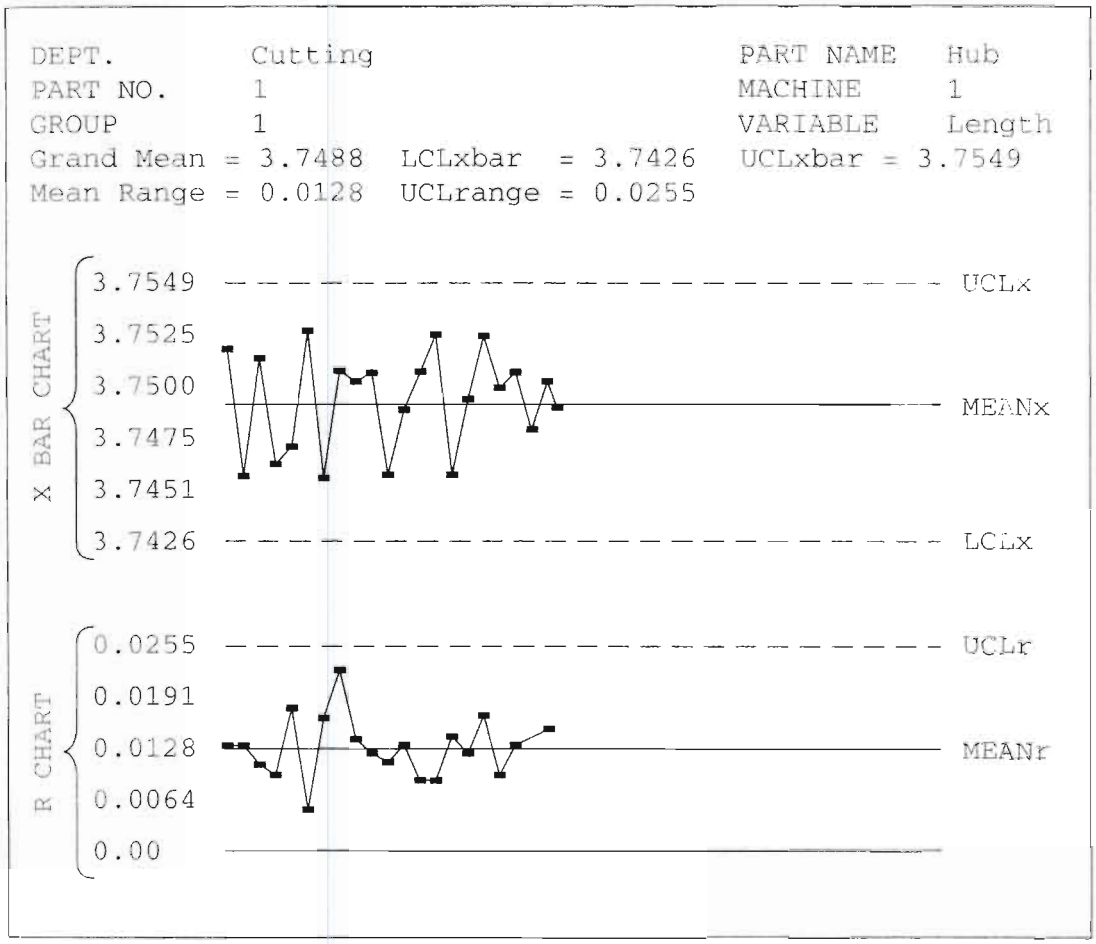

Figure 2.1 Typical $\bar{X}$ and R Charts

Although Dr. Shewhart concentrated his efforts on manufacturing processes, his ideas and charts are applicable to any process found in nonmanufacturing environments. Dr. Shewhart's tools and techniques required for improving processes and systems will be covered in greater detail in Chapter 9 and 10.

Dr. W. Edwards Deming

Dr. W. Edwards Deming (1900–93) made it his mission to teach optimal management strategies and practices for effective organizations. Dr. Deming encouraged top-level management to get involved in the process of creating an environment that supports continuous improvement. A statistician by training, Dr. Deming graduated from Yale University in 1928. Following his work with the Bureau of the Census, he first began

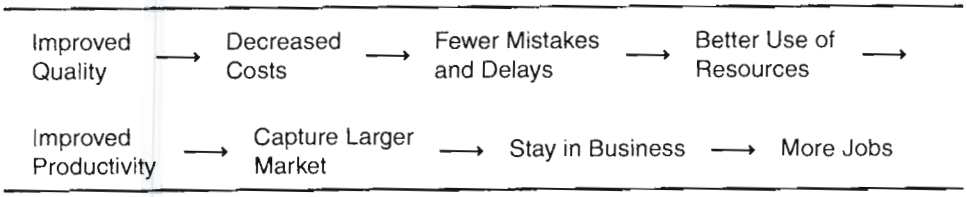

Figure 2.2 Deming's Economic Chain Reaction

spreading his quality message shortly after World War II. In the face of American prosperity following the war, his message was not heeded in the United States. His work with the Bureau of the Census and other government agencies led to his eventual contacts with Japan as that nation began to rebuild. There he helped turn Japan into an industrial force to be reckoned with. It was only after his early 1980s appearance on the TV program "If Japan Can, Why Can't We?" that Dr. Deming found an audience in the United States. Over time, he became one of the most influential experts on quality assurance.

Dr. Deming, who described his work as "management for quality," felt that the consumer is the most critical aspect in the production of a product or the provision of a service. Listening to the voice of the customer and then utilizing the information gathered to improve products and services is an integral part of his teachings. To Dr. Deming, quality must be defined in terms of customer satisfaction. Such a customer focus means that the quality of a product or service is multidimensional. It also means that there are different degrees of quality; a product that completely satisfies customer A may not satisfy customer B.

Dr. Deming considered quality and process improvement activities as the catalyst necessary to start an economic chain reaction. Improving quality leads to decreased costs, fewer mistakes, fewer delays, and better use of resources, which in turn leads to improved productivity, which enables a company to capture more of the market, which enables the company to stay in business, which results in providing more jobs (Figure 2.2). He felt that without quality improvement efforts to light the fuse, this process would not begin.

Dr. Deming's philosophies focus heavily on management involvement, continuous improvement, statistical analysis, goal setting, and communication. His message, in the form of 14 points, is aimed primarily at management (Figure 2.3). Dr. Deming's philosophy encourages company leaders to dedicate themselves and their companies to the long-term improvement of their products or services. Dr. Deming's first point is to *create a constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business and to provide jobs*. This point encourages leadership to accept the obligation to constantly improve the product or service through innovation, research, education, and continual improvement in all facets of the organization. A company is like an Olympic athlete who must constantly train, practice, learn, and improve in order to attain a gold medal. Lack of constancy of purpose is one of the deadly diseases Dr. Deming warns about in his writings. Without dedication, the performance of any task cannot reach its best. Dr. Deming's second point—*adopt a new philosophy*—rejects "acceptable" quality levels and poor service as a way of life and supports continuous improvement in all that we do. The 12 other points ask management to rethink

1. Create a constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business and to provide jobs.
2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on the basis of price tag alone. Instead minimize total cost.
5. Constantly and forever improve the system of production and service.
6. Institute training on the job.
7. Institute leadership.
8. Drive out fear.
9. Break down barriers between departments.
10. Eliminate slogans, exhortations, and targets for the workforce.
11. Eliminate arbitrary work standards and numerical quotas. Substitute leadership.
12. Remove barriers that rob people of their right to pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation.

Figure 2.3 Deming's 14 Points
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past practices, such as awarding business on the basis of price tag alone, using mass inspection, setting arbitrary numerical goals and quotas, enforcing arbitrary work time standards, allowing incomplete training or education, and using outdated methods of supervision. Mass inspection has limited value because quality cannot be inspected into a product. Quality can be designed into a product, and manufacturing processes can produce the product correctly. However, after the product has been made, quality cannot be inspected into it. Similarly, awarding business on the basis of price tag alone is shortsighted and fails to establish mutual confidence between the supplier and the purchaser. Low-cost choices may lead to losses in productivity elsewhere.

Leadership, along with the concepts of authority and responsibility, plays a significant role in all of Dr. Deming's points. Without leadership, an organization and the people working within it are rudderless. Without effective leadership, the organization and its people cannot reach their full potential. Throughout his life Dr. Deming encouraged leadership to create and manage systems that enable people to find joy in their work. Dr. Deming's point about driving out fear stresses the importance of communication between leadership and management.

Effective leaders welcome the opportunity to listen to their employees and act on valid suggestions and resolve key issues. Dr. Deming also points out the need to remove barriers that rob individuals of the right of pride in workmanship. Barriers are any aspect of a job that prevents employees from doing their jobs well. By removing barriers, leadership creates an environment supportive of their employees and the continuous improvement of their day-to-day activities. Improved management-employee interaction, as well as increased communication between departments, will lead to more effective solutions to the challenges of creating a product or providing a service.

Education and training also play an integral part in Dr. Deming's plan. Continual education creates an atmosphere that encourages the discovery of new ideas and methods. This translates to innovative solutions to problems. Training ensures that products and services are provided that meet standards established by customer requirements.

Dr. Deming defined quality as "non-faulty systems." At first glance this definition seems to be incomplete, especially when compared to that of Dr. Feigenbaum. Consider, however, what is meant by the term *systems*. Systems enable organizations to provide their customers with products and services. Faulty systems cannot help creating faulty products and services, resulting in unhappy customers. By focusing attention on the systems that create products and services, Dr. Deming is getting at the heart of the matter. Dr. Deming used the red bead experiment to help leaders understand how a process with problems can inhibit an individual's ability to perform at his or her best. He used this experiment to create an understanding of his point, "Remove barriers that rob people of their right to pride of workmanship." To conduct his experiment, Dr. Deming filled a box with 1,000 beads, 800 white and 200 red. Participants randomly scooped 100 beads from the box. The participants had no control over which beads the scoop picked up or what percentage of red beads were in the box. Given these constraints, 20% of the beads selected were red. Since only white beads were acceptable, Dr. Deming chastised those who scooped red beads from the box even though they had no control over their performance. Similarly, employees in an organization may often be blamed for faulty performance when in actuality it is the system that is faulty. The red beads represent problems in the system or process that can be changed only through leadership involvement. For Dr. Deming, it is the job of leaders to create non-faulty systems by removing the "red beads."

The importance of reducing the variation present in a system or process is one of the most critical messages Dr. Deming sent to leadership. To do this, he emphasized the use of the statistics and quality techniques espoused by Dr. Shewhart and covered in Chapters 9 and 10 in this text. According to Dr. Deming, process improvement is best carried out in three stages:

Stage 1: Get the process under control by identifying and eliminating the sources of uncontrolled variation. Remove the special causes responsible for the variation.

Stage 2: Once the special causes have been removed and the process is stable, improve the process. Investigate whether waste exists in the process. Tackle the common causes responsible for the controlled variation present in the process. Determine whether process changes can remove them from the process.

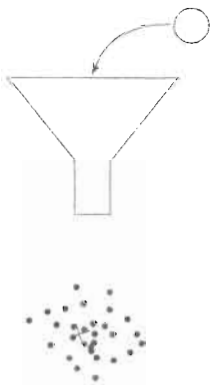
Stage 3: Monitor the improved process to determine whether the changes made are working.

Dr. Deming used a second experiment—the funnel experiment—to demonstrate how tampering with a process can actually make the performance of that process worse. For this experiment, beads were dropped one by one through a funnel over a target, while the target was held stationary and then the funnel was moved in different ways as shown in Figure 2.4. The purpose of moving the funnel was to try to get the beads to

Rule 1

No Compensation: Do not adjust the funnel position. Center the funnel over the target and leave it there for the duration of the experiment.

Rationale: Intuitively, we know that this is probably not the way to get the best results. However, this strategy will give us some baseline data. We can compare the results using one of the other rules with this baseline to measure our improvement. We could also be lucky enough to hit the target once in a while.



Rule 2

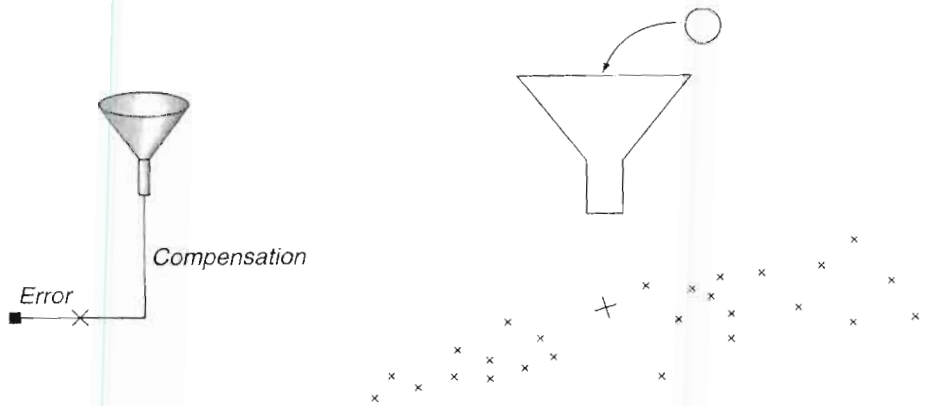
Exact Compensation: Measure the distance from the last drop to the target. Compensate for the error by moving the funnel the same distance, but in the opposite direction from its last position.

Rationale: This rule attempts to compensate for the inaccuracy of the funnel. If the funnel drops the bead off the target by a certain amount, it is reasonable to suppose that moving the funnel in the opposite direction by the same amount will improve the results. This rule requires us to remember the position of the funnel at the last drop.

Figure 2.4 Deming's Funnel Experiment

Rule 3

Overcompensation: Measure the distance from the last drop to the target. Center the funnel on the target; then move it the same distance from the target as the last drop, but in the opposite direction.



Rationale: In this case we use the target as a basis for our adjustment, rather than the last position of the funnel, as in Rule 2. This is probably our only recourse if we know only the position of the target and the last drop, and not the position of the funnel.

Rule 4

Consistency: Center the funnel over the last drop.

Rationale: The objective of Rule 4 is to maintain consistent results. Even if we miss the target, the results should be consistent, since we always aim for the position of the last drop. If we are off target, we can always take care of it later.

Figure 2.4 (*continued*)

cluster around the target, thus exhibiting little variation in where they landed. First the funnel was held stationary above the target as the beads were dropped, resulting in the bead pattern shown in Rule 1 in Figure 2.4. Next, as shown in Rule 2, the distance from the last dropped bead to the target was measured, and the funnel was moved the same distance from the target, but in the opposite direction from the last bead. Note the pattern that resulted. Then, as shown in Rule 3, the distance from the last dropped bead to

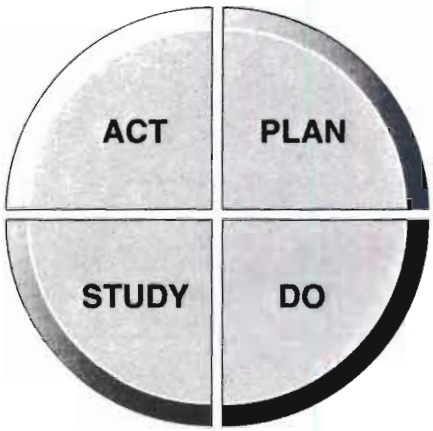


Figure 2.5 The Deming Cycle
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the target was measured. The funnel was centered on the dropped bead and was moved the same distance from it as the last dropped bead, but again in the opposite direction, creating the pattern shown. Finally, as shown in Rule 4, the funnel was centered over the last dropped bead and the next bead was dropped, producing the pattern shown. Note that the smallest pattern (the one with the least variation around the target) is the first (Rule 1), where the funnel is not moved. Using this experiment, Dr. Deming showed that tampering with a process (that is, moving the funnel) can actually increase the variation and result in poorer performance.

Tampering can be avoided by isolating and removing the root causes of process variation through the use of the Plan-Do-Study-Act problem-solving cycle. When tackling process improvement, it is important to find the root cause of the variation. When seeking the causes of variation in the process, Dr. Deming encouraged the use of the Plan-Do-Study-Act (PDSA) cycle rather than a Band-Aid sort of fix (Figure 2.5). Originally developed by Dr. Walter Shewhart, the PDSA cycle is a systematic approach to problem solving. During the Plan phase, users of the cycle study a problem and plan a solution. This portion of the cycle should be the one that receives the most attention, because good plans lead to well-thought-out solutions. The solution is implemented during the Do phase of the cycle. During the Study phase, the results of the change to the process are studied. Finally, during the Act phase, when the results of the Study phase reveal that the root cause of the problem has been isolated and removed from the process permanently, the changes are made permanent. If the problem has not been resolved, a return trip to the Plan portion of the cycle for further investigation is undertaken. The Plan-Do-Study-Act cycle of problem solving will be covered in detail in Chapter 10.

EXAMPLE 2.1 Tampering with the Process

The Whisk Wheel Company has been notified by its largest customer, Rosewood Bicycle, Inc., that Whisk Wheel will need to dramatically improve the quality level associated with the hub operation. Currently the operation is unable to meet the

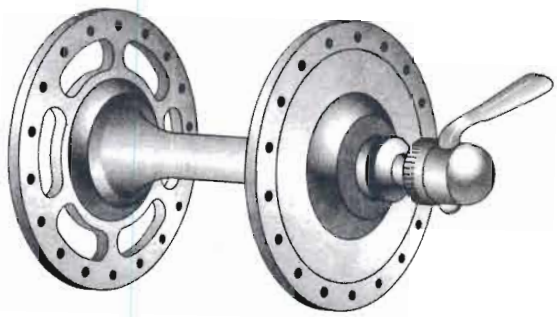

Figure 2.6 Hub Assembly

specification limits set by the customer. Rosewood has been sorting the parts on the production line before assembly, but it wants to end this practice. Figure 2.6 shows the product in question, a wheel hub. The hub shaft is made of chrome-molybdenum steel. The dimension in question is the shaft length. The specification for the length is 3.750 inches, ±0.005 inch. The process involves taking 12-foot-long chrome-moly steel shafts purchased from a supplier, straightening them, and cutting them to 3.750-inch lengths.

In order to determine the root causes of variation in hub length, the engineers are studying the cutting operation and the operator. The operator performs the process in the following manner. Every 18 minutes he measures the length of six hubs. The length values for the six consecutively produced hubs are averaged, and the average is plotted on $\bar{X}$ and R charts. Periodically, the operator reviews the evolving data and makes a decision as to whether the process mean (the hub length) needs to be adjusted. These adjustments can be accomplished by stopping the machine, loosening some clamps, and jogging the cutting device back or forth, depending on the adjustment the operator feels is necessary. This process takes about five minutes and appears to occur fairly often.

Based on the engineers' knowledge of Dr. Deming's funnel experiment, they are quick to realize that the operator is adding variation to the process. He appears to be overcontrolling (overadjusting) the process because he cannot distinguish between common-cause variation and special-cause variation. The operator has been reacting to patterns in the data that may be inherent (common) to the process. The consequences of this mistake are devastating to a process. Each time an adjustment is made when it is not necessary, variation is introduced to the process that would not be there otherwise. Not only is quality essentially decreased (made more variable) with each adjustment, but production time is unnecessarily lost.

Use Figure 2.7 to compare the differences in the charts when no adjustment is made to the process. Note that the process has stabilized because no unnecessary adjustments have been made. The method of overcontrol has proved costly in terms of both quality (inconsistent product) and productivity (machine downtime, higher scrap).

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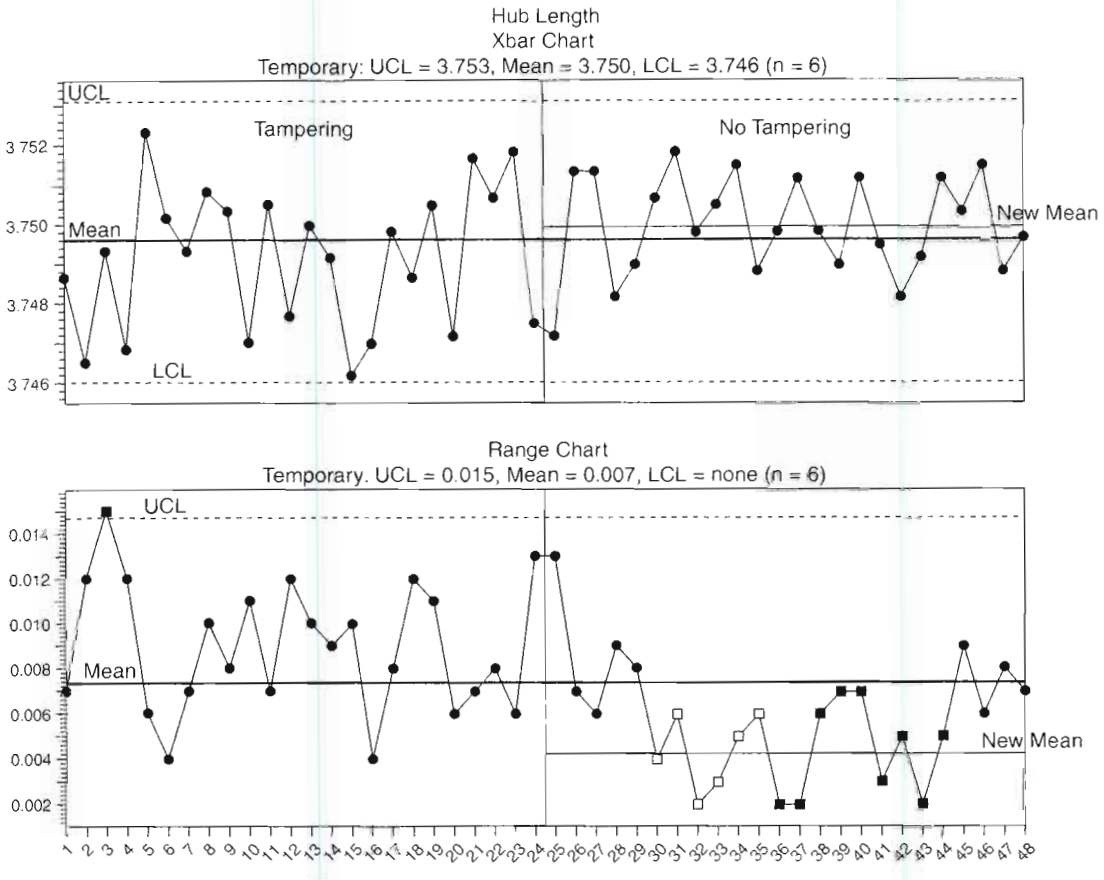

Figure 2.7 The Effects of Tampering on a System

In his final book, *The New Economics*, Dr. Deming tied much of his life's work together when he introduced the concept of profound knowledge. A system of profound knowledge has four interrelated parts:

- An appreciation for a system
- Knowledge about variation
- Theory of knowledge
- Psychology

Knowledge of all of these areas enables companies to expand beyond small process-improvement efforts and to optimize their systems in their entirety. Effective leaders have an appreciation for the systems that work together to create their organization's products and services. Their efforts focus on improving these systems by using the Plan-Do-Study-Act problem-solving method to remove the system faults that result

in errors (Chapter 10). Effective leaders also seek to create alignment between their customers' needs, requirements, and expectations; the systems that produce their products and services; and their organization's purpose. This alignment, discussed in greater detail in Chapter 6 on Strategic Planning, enables these organizations to do the right things in the right way.

Knowledge of variation means being able to distinguish between common- and special-cause variation. First defined by Dr. Walter Shewhart, common or controlled variation is the variation present in a process or system due to its very nature. This natural variation can be removed only by changing the process or system in some way. Special-cause variation, also known as *uncontrolled variation*, is the variation present in a process due to some assignable cause. This source of variation in a process can be readily identified and removed from the system or process. Being able to distinguish between the two enables leaders to guide their system improvement efforts more proficiently. This topic is covered in greater detail in Chapters 5, 9, and 10.

The theory of profound knowledge involves using data to understand situations. Dr. Deming encouraged the use of fact-based information when making decisions. Effective leaders gather and analyze information for trends, patterns, and anomalies before reaching conclusions. Chapters 8, 9, and 10 provide a variety of tools for data collection and analysis.

An understanding of psychology enables leaders to interact with customers and employees better. Creating and maintaining an effective organization is about understanding customers and employees. Chapters 4 and 7 cover these topics in greater detail.

Dr. Deming's influence continues today. Many of the concepts and ideas he espoused can be found in today's continuous improvement programs and international standards. For example, the 2000 revision of the International Organization for Standardization Quality Standard, ISO 9000, places significant emphasis on management involvement and responsibility, including communicating customer requirements, developing an integrated overall plan to support meeting customer requirements, measuring key product and service characteristics, providing ongoing training, and demonstrating leadership.

Living the continuous improvement philosophy is not easy. The level of dedication required to become the best is phenomenal. Dr. Deming warned against the "hope for instant pudding." Improvement takes time and effort and does not happen instantly. The hope for instant pudding is one that afflicts us all. After all, how many of us wouldn't like all of our problems to be taken care of by just wishing them away? Dr. Deming's philosophies cover all aspects of the business, from customers to leadership to employees, and from products and services to processes. As evidenced by his fourteenth point (Figure 2.3)—"Put everyone in the company to work to accomplish the transformation"—Dr. Deming's quality system is actually an ongoing process of improvement. To him, quality must be an integral part of how a company does business. Organizations must continuously strive to improve; after all, the competition isn't going to wait for them to catch up! The philosophies of Dr. Deming will be used throughout this text to support discussions related to the characteristics of an effective organization.

	Content of Little q	Content of Big Q
Products and services	Manufactured goods point of service	All products and services, whether for sale or not
Processes	Processes directly related to the manufacture of goods	All processes—manufacturing, support, business, and so on
Customer	Clients who buy the products	All who are affected, external and internal
Industries	Manufacturing	All industries—service, government, and so on—whether for profit or not
Cost of poor quality	Costs associated with deficient manufactured goods	All costs that would disappear if everything were perfect

Figure 2.8 Big Q versus Little q

Dr. Joseph M. Juran

Dr. Joseph M. Juran (1904–) emigrated from Romania to the United States in 1912. Dr. Juran's approach to organizational effectiveness involves creating awareness of the need to improve, making quality improvement an integral part of each job, providing training in quality methods, establishing team problem solving, and recognizing results. Dr. Juran emphasizes the need to improve the entire system. To improve quality, individuals in a company need to develop techniques and skills and understand how to apply them. His definition of quality goes beyond the immediate product or moment of service. To Dr. Juran, quality is a concept that needs to be found in all aspects of a business, and leaders must manage for quality. To more clearly communicate this concept, Dr. Juran contrasts "big Q" and "little q" to show the broad applicability of quality concepts, as shown in Figure 2.8. Note that big Q extends to all aspects of any organization, regardless of type.

In his text *Juran on Leadership for Quality: An Executive Handbook*, Dr. Juran puts forth three fundamental tenets: upper management leadership, continuous education, and annual planning for quality improvement and cost reduction. Dr. Juran discusses the importance of achieving world-class quality by identifying the need for improvement, selecting appropriate projects, and creating an organizational structure that guides the diagnosis and analysis of the projects. Successful improvement efforts encourage breakthroughs in knowledge and attitudes. The commitment and personal leadership of top management must exist in order to break through cultural resistance to change. The Juran trilogy uses three managerial processes: Quality Planning, Quality Control, and Quality Improvement (Figure 2.9 and Table 2.1). By following Dr. Juran's approach, organizations can reduce the costs associated with poor quality, and they can remove chronic wastefulness from their organizations. Quality Planning encourages the development of strategies to stay in tune with customers' needs and expectations (Chapter 6). Quality Control involves comparing products produced with

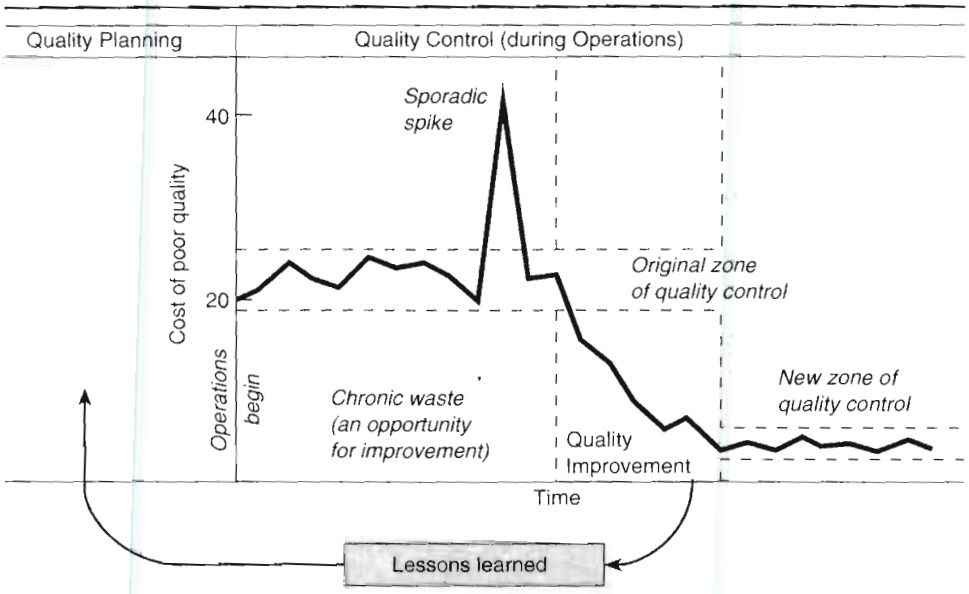

Figure 2.9 The Juran Trilogy Diagram
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Table 2.1 The Three Universal Processes of Managing for Quality

Quality Planning	*Quality Control*	*Quality Improvement*
Determine Who the Customers Are	Evaluate Actual Product Performance	Establish the Infrastructure
Determine the Needs of the Customers	Compare Actual Performance to Product Goals	Identify the Improvement Projects
Develop Product Features that Respond to Customers' Needs	Act on the Difference	Establish Project Teams
Develop Processes Able to Produce the Product Features		Provide the Teams with Resources, Training, and Motivation to:
Transfer the Plans to the Operating Forces		Diagnose the Causes
		Stimulate Remedies
		Establish Controls to Hold the Gains

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goals and specifications (Chapter 10). Quality Improvement involves the ongoing process of improvement necessary for the company's continued success (Chapter 9).

In the project-by-project implementation procedure (Table 2.2), project teams are set up to investigate and solve specific problems. A steering committee is established to guide the project teams. The steering committee serves several purposes: to ensure emphasis on the company's goals, to grant authority to diagnose and investigate problems, and to enact changes. The project teams should be composed of individuals with diverse backgrounds. Diversity allows for a variety of viewpoints, thus avoiding preconceived answers to the problem. Having a diversified group also aids in implementing the solutions found. Group members are more willing to implement

Table 2.2 Juran's Journey from Symptom to Cause: Quality Improvement in Action

Process	*Activity*	*Steering Arm*	*Diagnostic Arm*
	Assign Priority to Projects	X	
	Pareto Analysis of Symptoms		X
Journey from Symptom to Cause	Theorize on Causes of Symptoms	X	
	Test Theories: Collect, Analyze Data		X
	Narrow List of Theories	X	
	Design Experiment(s)		X
	Approve Design; Provide Authority	X	
	Conduct Experiment; Establish Proof of Cause		X
	Propose Remedies	X	
Journey from Cause to Remedy	Test Remedy		X
	Actions to Institute Remedy; Control at New Level	X	

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the solution because they have a stake in the project. The different backgrounds of the group members can also assist in breaking down the organizational cultural resistance to change. Dr. Juran's project teams are encouraged to use a systematic approach to problem solving. Group members use a variety of investigative quality tools to clarify the symptoms and locate the true cause(s) of the problem. When the cause is determined, finding a solution becomes a process of proposing remedies, testing them, and instituting the remedy that most effectively solves the problem. Controlling the process once changes have been made is important to ensure that the efforts have not been wasted. Improvements continue as the groups study and resolve other problems. As with Drs. Feigenbaum and Deming, Dr. Juran emphasizes the need for leadership to focus on customers and the systems that provide the products and services for them.

Philip Crosby

Philip Crosby's (1926–2001) message to management emphasizes four absolutes (Figure 2.10). The four absolutes of quality management set expectations for a continuous improvement process to meet. The first absolute defines quality as conformance to requirements. Crosby felt that it is necessary to define quality in order to manage quality. Customer requirements must translate to measurable characteristics for the organization's products or services. Crosby emphasized that effective organizations understand the importance of determining customer requirements, defining those requirements as clearly as possible, and then producing products or providing services that conform to the requirements as established by the customer.

Prevention of defects, the second absolute, needs to be in place in order to ensure that the products or services provided by a company meet the requirements of the customer. Prevention of quality problems is much more cost-effective in the long run. Determining the root cause of defects and preventing their recurrence are integral to effective systems.

According to Crosby, the performance standard against which any system must be judged is zero defects—the third absolute. *Zero defects* refers to making products correctly the first time, with no imperfections. Traditional quality control centered on final inspection and "acceptable" defect levels. Effective organizations must establish or improve systems that allow the worker to do it right the first time.

Crosby's fourth absolute, costs of quality, refers to the costs associated with providing customers with a product or service that conforms to their expectations. Quality costs, to be discussed in more detail in Chapter 8, are found in the costs associated with dissatisfied customers, rework, scrap, downtime, and material costs; and costs involved

Quality Definition: Conformance to Requirements
Quality System: Prevention of Defects
Quality Performance Standard: Zero Defects
Quality Measurement: Costs of Quality

Figure 2.10 Crosby's Absolutes of Quality Management

anytime a resource has been wasted in the production of a quality product or the provision of a service. Once determined, costs of quality are used by effective organizations to justify investments in equipment and processes that reduce the likelihood of defects.

In several of his books, Crosby discusses the concepts of a successful customer versus a satisfied customer. To Crosby, a successful customer is one who receives a product or service that meets his or her expectations the first time. When a customer is merely satisfied, steps may have been taken to rework or redo the product or service until the customer is satisfied; for instance, a diner receives an undercooked piece of meat and then insists that the meal be taken off his or her bill. In the action of satisfying a customer whose expectations were not met the first time, the company has incurred quality costs.

Dr. Feigenbaum's definition of quality mentions the word *intangible*. By discussing five erroneous assumptions about quality, Crosby attempts to make quality more understandable and, therefore, tangible. The first erroneous assumption—that quality means goodness, or luxury, or shininess, or weight—makes quality a relative term. Only when quality is defined in terms of customer requirements can quality be manageable. The second incorrect assumption about quality is that it is intangible and therefore not measurable. If judged in terms of "goodness," then quality is intangible; however, quality is measurable by the costs of doing things wrong. More precisely, quality costs involve the costs of failures, rework, scrap, inspection, prevention, and loss of customer goodwill.

Closely related to the first two assumptions, the third assumption states that there exists "an economics of quality." Here again, one errs in thinking that quality means building luxuries into a product or service; rather, quality means that it is more economical to do things right the first time. Often workers are blamed for being the cause of quality problems. This is the fourth erroneous assumption about quality. Without the proper tools, equipment, raw materials, and training, workers cannot produce quality products or services. Management must ensure that the necessary items are available to allow workers to perform their jobs well. The final erroneous assumption that Crosby discusses is that quality originates in the quality department. According to Crosby, the quality department's responsibilities revolve around educating and assisting other departments in monitoring and improving quality.

Crosby's quality management philosophy supports creating a greater understanding of the complexities of managing an organization. Much of his focus was on simplifying the concepts surrounding the definition of quality and the need to design systems that support the concept of producing products or supplying services containing zero defects.

CHAPTER SUMMARY

Most improvement strategies, methodologies, and standards have their foundation in the teachings of one or more of the men discussed in this chapter. Figure 2.11 provides a brief comparison of the philosophies of each man. Similarities exist between these

Advocate	Definition of Quality	Known For
Feigenbaum	Quality must be defined in terms of customer satisfaction. Due to the changing needs of customers, quality is multidimensional and dynamic.	Total Quality Control Textbook
Shewhart	Two aspects to quality: Subjective—what the customer wants Objective—physical, measurable characteristics of goods or services	Statistical Process Control Charts
Deming	Quality is multidimensional and must be defined in terms of customer satisfaction. Quality exists to differing degrees depending on the customer.	Fourteen Points
Juran	Fitness for use	Processes for Managing Quality
Crosby	Conformance to requirements. Quality must be defined in order to manage it.	Four Absolutes of Quality

Figure 2.11 Quality Advocates and Their Definitions of Quality

advocates of creating and sustaining organizational effectiveness. Although their approaches differ, each recognizes that effective organizations must:

- Determine who their customers are
- Determine the critical key success factors for meeting their customers' needs, requirements, and expectations
- Establish effective processes that enable them to provide products and services that meet their customers' needs, requirements, and expectations
- Focus on process measurement and improvement
- Provide the management with the involvement and commitment required for organizational success

QM *Chapter Questions*

1. Why is an organizational philosophy focusing on delighting customers key to organizational success?
2. Using Dr. Feigenbaum's definition of quality as a guide, describe an experience you have had with a product or service.
3. Describe in your own words the two types of variation that Dr. Shewhart identified.
4. Which of Dr. Deming's 14 points do you find the most interesting? Why?

5. Describe an example from industry related to one of Dr. Deming's 14 points.
6. How do Dr. Deming's 14 points interact with each other?
7. How do the steering/diagnostic arms of Dr. Juran's program work together?
8. In your own words, describe the difference between big Q and little q. Use examples from your own experiences to back up your description.
9. People tend to make five erroneous assumptions about quality. What are two of these assumptions, and how would you argue against them?
10. Have you seen examples of Crosby's erroneous assumptions at your own work? Describe the incidents.
11. How are the teachings of each of the people in this chapter similar? Where do they agree?
12. How are the teachings of each of the people in this chapter different? Where do they disagree?