Total quality management: A revolutionary management philosophy

Since 1965 America's share of world trade has declined significantly, and more than half the goods sold in this country in 1980 were manufactured abroad. To recoup market share, American business must institute a total quality control management system that's a hybrid of outstanding American and Japanese concepts and methods. So say Robert Rehder, *professor of management at the University of New Mexico, Albuquerque, and* Faith Ralston, *manager of organizational development at Honeywell in Minneapolis. Here, they discuss the five essential components of a total quality control management system.*

ROBERT REHDER
FAITH RALSTON

In January 1967, Dr. J. M. Juran predicted: "The Japanese are headed for world quality leadership, and will attain it in the next two decades, because no one else is moving there at the same pace."

American understanding of Dr. Juran's prophetic statement has been slow in coming. American managers today are increasingly recognizing quality as a key strategic variable in the global battle for market share and maintaining profitability. In 1982, *Fortune* magazine commissioned Erdos & Morgan, Inc., to do an extensive study of 200 of the largest U.S. corporations. Over 6,000 executives, outside directors, and financial analysts were asked to rate the reputations of the ten largest companies in America's 20 largest industries on eight

attributes such as financial position, quality of management, value of long-term investment, wise use of corporate assets, and quality of products/services offered. It is significant that the quality of management and the quality of products and services scores were the key predictors of high ratings. The most highly regarded companies overall, such as IBM and Hewlett-Packard, consistently received broad recognition in similar studies time and time again for the quality of their management and products.

General Electric also undertook an extensive study around the globe of over 50 companies with outstanding reputations for quality products and services. The goal was to identify major factors contributing to superior quality in leading Japanese, American, and European firms. A few of their key findings were:

- "Leading companies worldwide are turning around the quality-control culture of the past; now . . . those performing the work are also responsible for the quality of the work."
- "The indirect costs of poor quality are approximately seven times the direct-measured costs of scrap, rework, and warranty: [It's called] the iceberg effect."
- "Leading companies view customer complaints not as irritants but as precious knowledge."
- "The leaders constantly strive for quantum improvements in quality . . . rather than incremental annual targets."

The quality challenge

In 1946 Japan established a clear, long-term national goal to which it remains fully committed, namely, to set new world standards for quality products. Japan is close to reaching this goal today in several industries, and fully acknowledges the major role the United States has played in making this remarkable achievement possible. The major contributions of Drs. Deming, Feigenbaum, Juran, and many other American managers, authors, and consultants cannot be overestimated. The Japanese are admittedly honor students of American scholars and expert practitioners in adapting their ideas to Japan. After 30-plus years of development, Japan has demonstrated it can export its total quality control system throughout the world and successfully adapt this impressive system with outstanding results.

The Real World War, by Hunter Lewis and Donald Allison, documents the economic war being waged among the world's leading industrial nations for dominant shares of world markets. According to this market-share theory, long-term goals such as the establishment of major export markets are the focus of

Japan's corporate strategy and public policy rather than the short-term profit goals of most American corporations. Following a sector-by-sector analysis of the economy, the authors conclude the United States is losing market-share opportunity. This rather gloomy conclusion is widely shared among economists, business statespeople, and business editors. The shrinking American share of world markets is dramatically illustrated by the following statistics.

The United States's share of world trade has declined from 17 to 13 percent between 1965 and 1980, and more specifically it has declined:

In electronics from 35 to 10 percent.
In steel from 26 to 17 percent.
In autos from 44 to 25 percent.
In wide jetliner bodies from 95 to 65 percent.
In semiconductors from 90 to 60 percent.

Even more devastating has been the penetration of foreign competition into the U.S. home markets in automobiles, steel, and consumer electronics. In fact, more than half the goods sold in the United States in 1980 were manufactured abroad. Imported cars now approximate 33 percent penetration of the U.S. market, with the Japanese accounting for eight out of ten foreign cars sold in this country—despite self-imposed import restrictions. High quality combined with competitive prices account for the large measure of Japanese success in major export markets in 1981.

Of equal importance is a major shift in consumer expectations and new government regulations. World economic conditions have resulted in increasing consumer value placed on quality products with long, trouble-free lives. Built-in obsolescence and acceptable quality levels (AQL) are rapidly losing ground in U.S. firms as consumers, corporate industrial customers, and governments demand new levels of quality. For example, the cost of GM's extensive X body compact recalls is believed to be a major factor in rumors that GM may soon stop producing the car altogether.

Feigenbaum demonstrates the impact of high quality rather dramatically when he compares the profits of two companies that have different quality levels:

Company X		Company Y
$4,000	Product price	$4,500
$3,250	After-sale cost	$1,250
$2,500	Maintenance and service	$ 500
$5,750	Total after-sale and maintenance expenses	$1,750

Consequently, Company Y realized four times the profit of Company X despite the fact that its product was more expensive.

It is increasingly difficult for American and European managers to rely on traditional aggressive marketing strategies as a substitute for intrinsic quality and competitive prices of their products and services. The Japanese emphasis on total quality control (TQC) as a means to deliver high-quality products designed to meet specific consumer needs at competitive prices is forcing many American and European firms to reevaluate their total corporate strategies. Empirical studies supporting the role of quality in increasing market share indicate that firms that increased quality experience much greater gains in shares than those whose quality ratings were reduced or remain constant.

The development of a cross-cultural hybrid: TQC/M

The most used term in Japan to describe its quality system is total quality control (TQC). However, in the United States the word "control" frequently carries negative connotations, and the word "management" is often substituted. Therefore, in this paper we have chosen to use the term total quality control/management (TQC/M) to describe this hybrid Japanese/American system that has taken over 30 years to develop.

Statistical quality control, zero defects, and many other essential concepts and systems can easily be traced to American quality control experts such as Deming, Juran, and Feigenbaum. The Japanese took these Western rational concepts and tools and crossbred them with Japanese managerial philosophy and organizational systems. The resultant hybrid is clearly a superior system. Unlike some hybrids, however, it has not proven sterile and it can be transplanted provided, as the Japanese say, "there is careful binding of the roots and preparation of the new soil." Leading American firms such as IBM, known for the quality of its management and products, have developed similar total quality systems on their own turf and have exported them abroad as well. Few American corporations to date have been able to develop successful total quality management systems. This is in part because too few American managers have until recently been aware of quality as a key strategic variable and of major new contributions to the development of total quality systems being made by leading Japanese, European, and American firms. Today total quality management is a major area of corporate concern and interest in the United States and Europe. However, the successful implementation of total quality management systems will take many years for most traditional firms.

In the mid-1970s several American corporations, including Lockheed and Honeywell, became interested in Japanese quality control circles. In less than a decade, hundreds of American firms have developed quality circles. Quality cir-

cles, a small, voluntary group of employees and their supervisors who regularly meet to determine how they can improve their products or services, have proven seductive to American managers. They are seemingly simple to organize and in many American firms are believed to be the key to high-quality Japanese products and services. Quality circles also fit many American managers' belief that their quality problems lay mainly with production workers and supervisors. Now American firms have discovered that quality circles are difficult to keep alive in traditional American organizations and, by themselves, will not meet the quality-challenge of the leading Japanese, European, or American firms. Many American and European managers have underestimated the major changes in total organizational culture and structure necessary to implement a successful total quality system. A closer examination of the total quality control/management system will illustrate the major, long-term changes in traditional western management and organization systems that are needed.

A closer look

Dr. Kaoru Ishikawa, a major contributor to the development of total quality control in Japan, states that it is a revolutionary management philosophy characterized by the following five strategic goals:

1. Seek quality before profits. This requires a fundamental change that ideally starts at the top and gradually permeates the entire organizational belief system. Communicating the importance of quality requires that top management:

- Establish long-term quality objectives as key elements in corporate strategy.
- Maintain support of quality when significant trade-off decisions are made.
- Maintain performance standards and conformance to requirements.
- Avoid giving double messages to employees.
- Encourage behavior that seeks to improve rather than maintain the existing business.

By recognizing the interrelationship between customer satisfaction, quality, and market share, managers will be able to realize their traditional bottom line profit goals. A study by the Strategic Planning Institute in Cambridge, Massachusetts, involving approximately 1,200 firms, indicated that the return from paying for high quality exceeds the incremental costs of achieving it. If an inflated price is not charged for the increased quality, the firm can gain a disproportionately higher market share with its quality investment.

2. Develop employees' infinite human potential through education, training, delegation, and positive reinforcement. For TQC/M to take hold and permeate the organization, companywide employee participation is essential. In order to

accomplish quality improvement, quality of work life strategies must be well developed. Extensive training is required to expand each employee's knowledge of various functions. Managers need to develop the skills of communication, listening, and clarifying in order to specify clear requirements, delegate assignments, and enable employees to find the source of problems rather than continually put out fires. Understanding motivational theory and the management skills of delegation and positive reinforcement is necessary for the manager interested in involving people in the identification and permanent resolution of quality and productivity problems.

A TQC/M system links employee participation and human resource development activities directly to the financial goals of the business. Employees' attitudes and behaviors are recognized as the very basis of quality and productivity gains. Each employee in leading American and Japanese companies is seen as a creative innovator and source of ideas to improve the product and service. The Japanese are fond of saying "every worker a manager"; this phrase is more than a motto in leading Japanese organizations, it's a self-fulfilling prophesy.

The importance of shared high-quality goals cannot be overstated. People who believe in their product or service and are committed to what they are doing experience feelings of pride and self-worth that are the essence of TQC/M. Successful Japanese, European, and American managers are skilled at the development of high-quality goals, and work in their organizations serves as a powerful source of intrinsic employee motivation. The Japanese have demonstrated at home and abroad that instilling every employee with high-quality goals is the essential prerequisite to obtaining quality products and services. In many American firms, top management and staff often attempt to implement preplanned TQC/M programs without adequately securing the commitment of management, providing the necessary training, setting up reinforcement systems, or allowing adequate time for participation, buy-in, and ownership. Juran believes that massive training programs must be developed in order to educate an entire organization from top to bottom in TQC/M philosophy and skill. Traditional American organizations cannot substitute short-term quality band-aid programs for essential and fundamental changes in organizational culture and structure.

3. Build long-term consumer orientation, both outside and inside the organization. A TQC/M system places primary importance on meeting customer requirements, whether these requirements occur inside the company or outside. A customer is defined as someone who receives the product or service. For example, the marketing department might be the engineering department's customer or vice versa. Meeting customer requirements means that various functions must work together to establish these requirements and clarify them as never before.

When changes in procedure occur, they are reviewed by internal customers to determine whether the requirements need to be changed. No assumptions are made, all requirements are verified and acted upon. The consequence of this single process is ongoing and extensive communication and the development of measurements, documents, and procedures that people can trust. The extent of new structural policies and reward-system changes required to encourage this customer orientation is easily underestimated. The full extent to which corporations need to be market-oriented is also frequently misunderstood. Leading Japanese and American firms known for quality products and services establish quality standards based on their market requirements rather than engineering requirements or traditional financial considerations.

Companies that are serious about meeting customer requirements are also serious about developing close working relationships with their suppliers. Suppliers are significant contributors to any quality-improvement process. In the typical American company, 20 percent of products received from suppliers are rejected for lack of conformance. Despite this fact, 17 percent of these materials are used and only 2 to 3 percent are returned to the source. Internal effectiveness is clearly dependent upon external parts received. Nevertheless, the supplier/vendor relationship in the United States has tended to be adversarial rather than collaborative in nature.

Companies with a strong quality focus:

- Develop strong interdependent relationships with a small number of vendors.
- Hold vendors responsible for delivering a defect-free product.
- Actively involve vendors in product development and knowledge of product use.

Companies that initiate vendor quality programs typically find that over 60 percent of the errors result from inadequate communication between themselves and the vendor.

In the United States, increasing numbers of American and Japanese companies are developing intimate relationships with their vendors and customers and often building Japanese "just-in time" systems, which are designed to keep inventories low. The result of this widespread interest in quality improvement is an informal network of companies that are bound together by their commitment to TQC/M and their ability to meet the time and quality standards it necessitates.

4. Communicate throughout the organization with facts and statistical data and use measurement as motivation. For a quality management system to be effective, communication of problems and issues must take place across functional boundaries and up and down the entire organization. To accomplish this goal, it is essential that there be a common language in place that deals factually

with problems. Measurement and statistical data provide this type of language. In many companies, the tools of measurement are not used to their full capacity but as an employee control that can impede productivity.

Statistical quality control tools have traditionally been used quite differently than is the case in a TQC/M approach.

Traditionally, statistical quality control is:

- Found primarily in manufacturing areas.
- Related to acceptable quality levels and the process of rejecting parts.
- Seen primarily as a management tool to control workers' nonconformance.

Total quality control management:

- Emphasizes the existence of measurements in *all* functions.
- Uses measurements to monitor progress toward shared goals. The emphasis

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is on tracking prevention and improvement rather than making accept/reject decisions.

- Uses measurements to communicate across department boundaries with data.
- Uses measurements to make decisions at both the management and operations level.
- Uses measurements to generate shared goals and to reinforce achievement.

Measurement and statistics become the language used by management and employees to discuss common problems and to communicate effectively across departmental boundaries. Accurate measurements and data go a long way toward resolving conflicts that result from opinions and hip-shooting decision styles and provide solid data on which to base management decisions. Measurement and statistics are the essential links between people and productivity. With jointly established quality and productivity standards and continuous measurement by the employee, every employee becomes a manager. The supervisor in turn becomes more of a facilitator and provides positive reinforcement when there is measurable improvement.

5. Develop a companywide TQC/M system focusing all employees on the

quality-related implications of every decision and action at all stages of the product or service-development continuum from design to sales. Extensive communication and an effective problem solving system characterize the TQC/M system. In an environment that supports quality improvement, every employee understands what he or she is expected to do, recognizes the costs that result from nonconformance of his or her product or service, and feels responsible and able to do it right the first time. To accomplish this goal, extensive communication is necessary and procedures are in place that insure early communication of the requirements between the various functions. This communication greatly increases the chances of a successful outcome.

IBM estimates that mistakes cost $1.00 to fix in the design stage, $20.00 to fix at the tooling stage, and $50.00 to fix if the problem reaches the field. Early intervention and involvement of employees result in better decisions and in employees who are knowledgeable about all phases of the development cycle. This approach is a significant departure from the baton and buck passing that frequently occur from one function to the next. The result of increased involvement is, however, not without initial cost. Predictably, there is a longer development cycle, more meetings with various groups, greater need for communication, and a longer decision-making time. This effort results in shorter production time, less in-warranty returns, and products that gain market share by meeting the customer's needs.

In addition to early employee involvement in product development, a TQC/M system will have an effective problem solving structure able to resolve problems across department boundaries. Quality circles frequently exist in these organizations and are supported by higher level management teams that can resolve interdepartmental issues. Likert's idea of linked, overlapping groups is an effective model used successfully by Honeywell and other corporations to increase quality and productivity.

In this model:

- Problem-solving teams with high-performance goals are linked together by persons who occupy overlapping membership in several groups.
- Problem solving teams exist at all levels in the organization.
- Identified problems are resolved at the lowest possible level.
- Problems that cannot be solved are sent to the next level of management.
- Higher level teams represent more than one function.

Companies known for high quality products and services, such as Hewlett-Packard, Procter & Gamble, and Johnson & Johnson, have a wide range of innovative structures like those discussed to maintain flexibility throughout the organization and reduce the paralysis that often comes with size.

Implementing TQC/M: strategic implications

High-performing Japanese and American managers believe that TQC/M demands companywide commitment to a new way of running their organizations. The strategic-management implications are profound and include extensive long-term commitment to the marketing and financial goals of quality and the development and implementation of total organizational systems necessary to support their achievement. Significant time frames are required to implement a TQC/M strategy because it involves fundamental changes in corporate culture, human-resource and training programs, and internal organizational structure. Six to 12 years are not uncommon implementation estimates in the United States; the Japanese see TQC/M as a never ending quest for perfection. Before implementation of a TQC/M system can occur, extensive development work must be done at the highest levels in the organization. Top management needs a comprehensive understanding and commitment to quality and a clear statement of goals in order to develop the necessary problem identification and tracking systems to achieve these goals. The development of these goals and management systems require input from the many groups affected to insure the necessary ownership and commitment to TQC/M.

Effective implementation of TQC/M in the United States or Japan requires integration of existing policies and procedures. Employees in many U.S. companies now implementing TQC/M comment that they still have their regular job to do and are being asked to do additional activities that require reallocation of time. Management wants to move forward, yet is slowed down in implementation because new attitudes, skills, systems, and behaviors are necessary for TQC/M to take hold. As the quality improvement philosophy pervades the organization, it becomes apparent how many policy and procedural inconsistencies exist. Current policies such as acceptable quality levels and budget and scheduling procedures stand out as glaring misfits when examined in the light of a new quality management philosophy and organizational system.

Questions arise, such as, "Does our current recognition program reinforce the goals of quality improvement?" and "Does our current performance appraisal system encourage managers to establish and meet quality goals?" Employees are acutely aware of discrepancies and quickly evaluate management commitment to TQC/M by watching their attitudes and behaviors rather than enthusiastic words. Clear signals must be given by management that former attitudes and systems are outdated and must be altered. Today, old assumptions that quality requires trade-off decisions regarding cost and scheduling are being reexamined. It is encouraging to see how many American managers are making the transition. A great deal can be learned as companies and managers share their mutual experiences. □