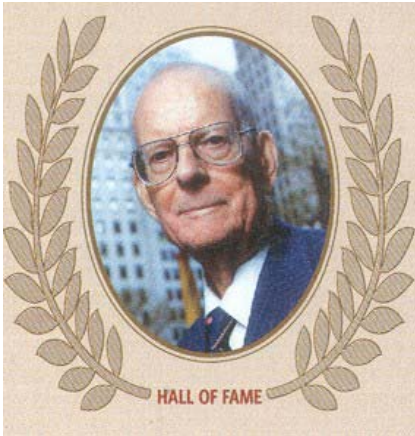


W. EDWARDS DEMING

Total Quality Management (note: He hated this term)



W. Edwards Deming is widely acknowledged as the leading management thinker in the field of quality. He is credited with being the most influential catalyst of Japan's postwar economic transformation, although it wasn't until much later that the value of his ideas and practices began to be recognized by the US manufacturing and service industries.

- 1900** *Born.*
- 1928** *Completes PhD at Yale.*
- 1950** *Begins teaching management quality in Japan.*
- 1986** *Publication of "Out of the Crisis".*
- 1987** *Receives National Medal of Technology.*
- 1993** *Founds W. Edwards Deming Institute.*
- 1993** *Dies.*

Life & Career

Deming obtained a Ph.D. in mathematical physics from Yale University in 1928 and concentrated on lecturing and writing in mathematics, physics, and statistics for the next ten years. It was only in the late 1930s that he became familiar with the work of Walter Shewhart, who was experimenting with the application of statistical techniques to manufacturing processes. Deming became interested in applying Shewhart's techniques to non-manufacturing processes, particularly clerical, administrative, and management activities. After joining the U.S. Census Bureau in 1939, he applied statistical process

control to their techniques, which contributed to a six-fold improvement in productivity. Around this time he also started to run courses for engineers and designers on his-and Shewhart's-evolving methods of statistical process control.

Deming's expertise as a statistician was instrumental in his posting to Japan after World War II as an adviser to the Japanese Census. At this time, the United States was the leading economic power, with products much envied by the rest of the world; it saw no need for Deming's new ideas. The Japanese, on the other hand, recognized that their own goods were shoddy by international standards. Moreover, after the war, they could not afford the wastage of raw materials that postproduction inspection processes brought about and were consequently looking for techniques to help them address these problems. While in Japan, Deming became involved with the Union of Japanese Scientists and Engineers (JUSE) and his career of lecturing to the Japanese on statistical methods and company-wide quality, a combination of techniques now known as Total Quality Management (TQM), had begun. (note: original name was Total Quality Control)

It was only in the late 1970s that the United States became aware of his achievements in Japan. The 1980s saw a spate of publications explaining his work and influence. In his American seminars during 1980, Deming talked of the need for the total transformation of Western-style management. In 1986 he published *Out of the Crisis*, which documented the thinking and practice that had led to the transformation of Japanese manufacturing industry. His ideas gained acceptance in the United Kingdom following the foundation of the British Deming Association in 1987. Deming died in 1993.

Key Thinking

Deming's work and writing constitute not so much a technique as a philosophy of management, one that focuses on quality and continuous improvement, but that has also justifiably had a much wider influence. Below we consider Deming's interest in variation and his approach to systematic problem-solving, which led on to his development of the 14 points that have gained widespread recognition and are central to the quality – movement.

The key to Deming's ideas on quality lies in his recognition of the importance of variation. In *Out of the Crisis* he states that "the central problem in management and in leadership... is failure to understand the information in variation." Deming was preoccupied with why things do not behave as predicted. All systems (be they the equipment, the process, or the people) have variation, but, he argued, it is essential for managers to be able to distinguish between special and common causes of variation. He developed a theory of variation: that special causes of variation are usually attributable to easily recognizable factors such as a change of procedure, change of shift or operator, and so on, but that common causes will remain when special causes have been eliminated and are normally inherent in the design, process, or system. These common causes often are recognized by workers, but only managers have the authority to change them to avoid repeated occurrence of the problem. Deming estimated that management was responsible for more than 85% of the causes of variation. This formed his central message to the Japanese.

Deming created 14 points that provided a framework for developing knowledge in the workplace and guiding long-term business plans and aims. The points constitute not so

much an action plan as a philosophical code for management. They have been extensively interpreted, both by commentators on quality control and by experts on other management disciplines.

A THEORY FOR MANAGEMENT TRANSFORMATION THROUGH APPLICATION OF THE FOURTEEN POINTS

1. Create 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 a new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership (see point 12). The aim of leadership should be to help people and machines and gadgets to do a better job. Leadership of management is in need of overhaul, as well as leadership of production workers.
8. Drive out fear, so that everyone may work effectively for the company.

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity.
- 11a. Eliminate work standards (quotas) on the factory floor. Substitute leadership,
 - b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
- 12a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
 - b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter-alia, abolishment of the annual or merit rating and of management by objective, management by the numbers.
13. Institute a vigorous program of education and self improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

DEADLY DISEASES THAT STAND IN THE WAY OF THE TRANSFORMATION

1. Lack of constancy of purpose to plan product and service that will have a market and keep the company in business, and provide jobs.
2. Emphasis on short-term profits: short-term thinking (just the opposite from constancy of purpose to stay in business), fed by fear of unfriendly takeover, and by push from bankers and owners, for dividends.

3. Personal review system, or evaluation of performance, merit rating, annual review, or annual appraisal, by whatever name, for people in management, the effects of which are devastating. Management by objective, on a go, no-go basis, without a method for accomplishment of the objective, is the same thing by another name. Management by fear would still be better.
4. Mobility of management: job hopping.
5. Use of visible figures only for management, with little or no consideration of figures that are unknown or unknowable.
6. Excessive medical costs.
7. Excessive costs of liability.

These principles are relevant to management in general, not simply to quality and process control. They contributed to Deming's status as a founder of the Quality Management movement, and attracted an audience much wider than the quality lobby.

W. EDWARDS DEMING IN PERSPECTIVE

Naturally enough, no one as universally acclaimed as Deming escapes without criticism. Some have criticized his approach as being good for improvement but uninspiring for creativity and innovation. Others say his approach is not effective in generating new products or penetrating new markets.

Others-particularly Juran, another quality guru, accuse him of over reliance on statistical methods. Deming's American lectures in the 1980s, however, point time and time again to a mistaken preoccupation with the wrong type of statistics. He

argued against figures that focused purely on productivity and control and argued for more evidence of quality, a message that Tom Peters adopted in the 1980s and 1990s.

Deming also stirred up wide interest with his rejection of management by objectives and performance appraisals. Similarly, his attitude toward integrating the workforce led TQM to be perceived as a caring philosophy. Paradoxically, however, his focus on cost-reduction has been pointed to as a cause of downsizing.

Although in the 1980s America paid tribute to Deming-not only for what he did in Japan, but also for his thinking and approach to quality management-few American companies use his methods today. One reason for this is perhaps that, by the 1980s, Deming was selling a system that worked, and implying that he had discovered the only way to achieve quality; thus he was no longer alert to changes in the problems. In Japan, in the beginning, he had listened to Japanese needs and requirements, showed them respect, and developed his thinking with them. In the United States of the 1980s, he appeared to try to dispense his philosophy rather than readapt it to a different culture.

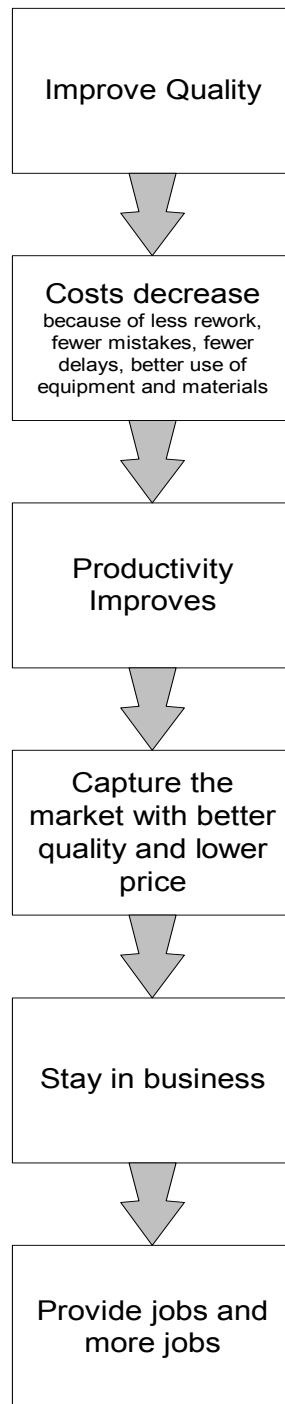
In 1951, in early recognition of their debt to Deming, the JUSE awarded the Deming prize to Japanese organizations that excelled in company-wide quality. It was not until the 1980s that the United States recognized Deming's achievements in Japan and elevated him to guru status. In 1987 the British Deming Association was founded in the United Kingdom to disseminate his ideas. From the 1990s it seemed as if Deming's legacy was likely to have both a lasting and significant impact on management theory. Why is this?

The first reason must lie in the nature of his achievement. Deming has been universally acclaimed as one of the Founding Fathers of Total Quality Management, if not the Founding Father. The revolution Second, if the 14 points make less of an impact today than they did just after World War 11 in Japan, it is probably because many aspects of those points were, adopted, assimilated, and integrated into management practice in the 1990s and have been continuously debated and taught in business schools around the world.

The third reason is more complex, and lies in the scope of his legacy. Deming's 14 Points add up to a code of management philosophy that spans the two major schools of managerial thought that have predominated since the early 20th century: scientific (hard) management, on the one hand, and human relations (soft) management, on the other. Deming succeeds despite criticisms of his overuse of statistical techniques-in marrying them together. Over half of his 14 points focus on people as opposed to systems. Many management thinkers veer towards one school or the other. Deming, like Drucker, melds them together.

The originality and freshness of Deming is that he took his philosophy not from the world of management, but from the world of mathematics, and wedded it with a human relations approach that did not come from management theory but from observation and from seeing what people needed from their working environment in order to contribute of their best.

The Deming Chain Reaction



Critical extracts from “*Out of the Crisis*”

“Quality should be aimed at the needs of the consumer, present and future.”

“..., the customer is not in a good position to prescribe product or service that will help him (or her) in the future.” *JM – innovation comes from the supplier being so close to the customer that they can predict future requirements before the customer.*

“It would be a mistake to export American management to a friendly country.” *JM – this is the exact opposite of what is happening. Globalization is really global Americanization.*

“Any substantial improvement must come from action on the system, the responsibility of management.” *JM – Deming used to say that employees work within the system and managers on the system. I believe employees should be facilitated in improving the system as well as operating it.*

“Experience alone, without theory, teaches management nothing about what to do to improve quality and competitive position...”

“The most important figures needed for management of any organization are unknown and unknowable.”

“Management by walking about (MBWA) is hardly ever effective.

“Are the boards of directors and the president dedicated to quick profits, or to the institution of constancy of purpose?” *JM – Enron, World Com, enough said.*

“The consumer is the most important part of the production line.”

“Mass inspection is with, rare exceptions of the kind noted, unreliable, costly, ineffective.”

“200% inspection, as usually carried out, is less reliable than 100% inspection....”

“Advantages of a single source and long-term relationship.” *JM – some single source relationships in Japan run up against anti-trust laws in the US. It can also lead to complacency. Toyota is a good example, Nissan a poor one.*

“..., one comes ahead by working with the single supplier, provided that he upholds his responsibilities for continual improvement.”

“The Japanese strongly believe that an atmosphere of cleanliness adds to quality”.
JM – So do the Germans.

“There is no substitute for the use of knowledge. But the prospect of using knowledge brings fear.” *JM – Point 8 – Drive out fear.*

“ removal of the barriers to pride of workmanship....”

“Money and time spent for training will be ineffective unless inhibitors to good work are removed.”

“The job of management is not supervision, but leadership.”

“No one can put in his best performance unless he feels secure.”

“... The annual rating defeats teamwork.”

“Work standards, rates, incentive pay and piece work are manifestations of inability to understand and provide appropriate supervision.” *JM – Controversial but true and clear if one understands variation.*

“... but when the quality is not there, inspection may be the only answer.”

“A good team has a social memory.”

“The 14 Points constitute a theory of management.”

“ Japanese enterprises do not appear to be organizations that maximize profits for the benefit of stockholders. Capital is obtained through bank loans, with fixed rates of return. With no shareholders to please, Japanese firms are free to operate on behalf of another constituency – their workers.” *JM – Can this possibly work in the Western World? Japan is under increasing pressure to adopt American style of short-term management.*

“The proper place for improvement is in early stages of development.”

“The performance of anybody is the result of a combination of many forces - ...”

“... apparent differences between people arise almost entirely from action of the system that they work in, not from the people themselves.” *JM – If a person is outside control limits on the positive side they deserve recognition. In the opposite situation they need help.*

“The Lone Worker. There are abundant examples of people that can not work well in a team, but who demonstrate unquestionable achievement The company must recognize the contribution of such people

“One can not be successful on visible figures alone.”

“Hope for instant pudding.” *JM – when will Americans give up the search for the quick and easy solutions?*

“The best way for a student to learn a skill is to go to work in some good company, under masters.....”

“It was Dr Joseph M Juran who pointed out that long ago that most (80% plus) of the opportunities for improvement lie in the action on the system, and that contributions of production workers are severely limited.” *JM – unless the managers empower the workers to help work on the system.*

“It is thus not sufficient to improve processes. There must also be constant improvement of design of product and service, along with the introduction of new product and service and new technology. All this is management’s responsibility.”

“A Quality Circle (*JM - read any improvement team*) can thrive only if the management will take action on the recommendations of the Circle.”

“A manager in Japan serves as an advisor or a consultant.”

“Recognition of group achievement supersedes monetary benefit to the individual.”

“The ultimate customer (e.g., owner of an automobile) does not care about the specifications of the eight hundred parts in the transmission. He only cares whether the transmission works, and if it is quiet.”

“The fallacy of zero defects. There is obviously something wrong when a measured characteristic barely inside a specification is declared to be conforming; outside it is declared to be nonconforming. The supposition that everything is all right inside the specifications and all wrong outside does not correspond to this world. A better description of the world is the Taguchi loss function in which there is minimum loss at the nominal value, and an ever-increasing loss with departure either way from the nominal value.” *JM – on target with minimum variation.*

“*“Anyone that comes to try to help us must understand all about our business.”* All evidence points to the fallacy of this supposition. Competent men in every position, if they are doing their best, know all that there is to know about their work except how to improve it. Help toward improvement can come only from some other kind of knowledge. Help may come from outside the company, combined with knowledge already possessed by people within the company but not being utilized.”

“In Japan, when a company has to absorb a sudden economic hardship such as a 25 per cent decline in sales, the sacrificial pecking order is firmly set. First the corporate dividends are cut. Then the salaries and the bonuses of top management are reduced. Next, management salaries are trimmed from the top to the middle of the hierarchy. Lastly, the rank and file are asked to accept pay cuts or a reduction in the work force through attrition or voluntary discharge. In the United States, a typical firm would probably do the opposite under similar circumstances.”

“The pay and privilege of the captains of industry are now so closely linked to the quarterly dividend that they may find it personally unrewarding to do what is right for the company.” *JM – so true.*

“Companies with good management will require five tears to remove the barriers that make it impossible for the hourly worker to take pride in his work.”

“The quality of any product or service has many scales.” *JM – these are dimensions.*

“New product and new types of service are generated, not by asking the consumer, but by knowledge, imagination, innovation, risk, trial and error on the part of the producer.”

“Many customers form their opinions about the product or about the service solely by their contacts with the people that they see

“Government service is to be judged on equity as well as on efficiency.”

“The process capability of an operation can usually be determined in about three months.”

“Aim of leadership. The aim of leadership should be to improve the performance of man and machine, to improve quality, to increase output, and simultaneously to bring pride of workmanship to people.”

“Specifically, a leader must learn by calculation wherever meaningful figures are at hand, or by judgment otherwise, who if any of his people lie outside the system on one side or the other, and hence are in need either of individual help or deserve recognition in some form.”

“How many production workers ever saw the next operation, their customer? How many ever saw the finished product in the box, ready for purchase.” *JM - We could ensure that staff get to see all the key parts of the system.*

“A basic principle is that no one should be blamed or penalized for performance that he can not govern.”

“It is well known that inspectors can miss up to 40 per cent of errors, and do so with variable quality. They can also classify as a mistake a perfectly good match.”

“An operational definition consists of a test method, a test, and a criterion by which to judge whether a piece of work may be classified as defective or acceptable.”

“... Where there is fear, there will be wrong figures.”

“Few people in supervisory positions and in management are aware how important reliable inspection is for morale of production workers.”

“Adjectives like good service, bad service, deplorable service, have no communicable meaning, unless they are defined in statistical terms

“Government obviously has the right to set standards for the goods it buys.”

“The central problem in management and in leadership is to fail to understand the information in variation.”

“94% (of troubles and possibilities for improvement) belong to the system (responsibility of management) and 6% are special.”

“Experience without theory teaches nothing.”

“Two kinds of mistake. We may now formulate two sources of loss from confusion of special causes with common causes of variation.

1. Ascribe a variation or a mistake to a special cause when in fact the cause belongs to the system (common causes).
2. Ascribe a variation or a mistake to the system (common causes) when in fact the cause was special.

Over adjustment is a common example of mistake No. 1. Never doing anything to try to find a special cause is a common example of mistake No. 2. “

“To this end, he (Shewhart) contrived the 3-sigma control limits. They provide, under a wide range of unknowable circumstances, future and past, a rational and economic guide to minimum economic loss from both mistakes.”

“There are several kinds of control charts” *JM – It is important to pick the right one. Use Winchart or ask Corinne & Renee. I also have a flowchart to help you choose the right one.*

“The Control Limits are not the specification limits.”

“The Control Chart is the process talking to us”. *JM – Attend Leadership Development Module – Intermediate SPC.*

“The most important Control Charts are those on the Chief Executives Desk.” Quote from 4-day course.

“ a recent letter to the editor of *The Times of London*. The writer had been studying a report from the Ministry of Health, whence it was obvious that half the children in the United Kingdom were below average weight. A disgrace on the nation. We must do something about the nourishment of our children. *JM – farcical statement repeated many times.*

“ as this book pleads in so many places, make use of existing information.”

“Fallacies in cost/benefit analysis. Cost/benefit analysis requires $\Delta C/\Delta B$, where ΔC is the additional cost of a plan, in use or proposed, and ΔB is the added benefit. The idea sounds good; catches on. But there are oft times serious difficulties.

1. Costs are sometimes elusive; difficult to estimate. For example, no one knows the cost of a defective item (e.g., TV tube) that reaches a customer. A customer dissatisfied with an item of small cost (a toaster, for example) may be influential in the decision on a huge contract and see to it that some other manufacturer gets it.
2. Same for benefits. Benefits are even more difficult to evaluate in dollars. However, by use of the idea of a trade-off, one benefit against another, a scale of ranks for benefits can sometimes be achieved.”

“In fact, we fear that new machinery would bring on a whole new set of problems until management understand what is wrong under present circumstances and what their responsibilities are for improvement.” Quote from one of Deming’s clients.

“Meanwhile the hourly worker sees your exhortations as cruel jokes, management unwilling to take on their responsibilities for quality.”

“Man's natural reaction to trouble of any kind in the production line is blame the operators. Instead, in my experience, most problems in production have their origin in common causes, which only management can reduce or remove.”

“Fewer figures and better information about your processes and their capabilities would lead to improved uniformity and greater output, all at reduced cost per unit.”

“Help toward improvement can come only from outside knowledge.” Also quoted on 4-day seminar, “A system can not change itself.”

“You will engage on a long-term basis a competent consultant. He will attend the seminar and guide your work on the 14 Points and the 7 Deadly Diseases.” *JM – Couldn’t agree more.*

“Industry in America needs thousands of statistically minded engineers, chemist, physicists, doctors of medicine, purchasing agents, managers.”

“Dependable performance of service would simplify life and would reduce the cost of living” JM – *Or as Joel Barker put it “bad quality products waste your life.”*

“Men from the Bell Laboratories explained to members of JUSE (Japanese Union of Scientists & Engineers) that statistical methods had improved accuracy of American weapons. My friend Dr. E. E. Nishibori, listening to them, came forth with the remark: “Yes, I know something about that. Six fire bombs fell on my house during the war, and they were all duds.””

“Quality in terms of present and future needs of the consumer became at once company-wide.”

“It has been said that all Japanese industry has achieved the best practice for quality. This is not so. Five of the horrible examples recorded in this book, of what not to do, came from Japan.”

Further Reading

Deming, W. E., *The New Economics for Industry, Government and Education*, MIT, CAES, 1993

Wheeler, D. J., *Understanding Variation – the key to managing chaos*, SPC Press, 1993

Pirsig, R. M., *Zen and the Art of Motorcycle Maintenance*, Vantage, 1974

Neave, H., *The Deming Dimension*, SPC Press?

Critical Questions

1. Many managers only embrace some of the 14 Points. They particularly struggle with giving up performance related pay. Can Deming's philosophy work in such a piece meal way?
2. Is Deming an anachronism? His ideas were developed in the thirties long before the Information Revolution. Does he have anything to offer the dot coms of today?
3. Many management intellectuals now believe in non-linear complex systems where results emerge out of almost chaotic circumstances. Does Deming and Shewhart's statistical methods have any relevance to complexity theory.
4. With the current style of American leadership and its obsession with short-term dividends and with CEO's being rewarded with huge share options, can Deming's style of leadership be implemented or sustained?
5. Dr Deming was a Liberal. He believed in creating long-term jobs and in industrial democracy. Can his ideas last in such a Conservative Nation?
6. Just look at Japan's economic position now. How can anyone claim that Dr Deming's methods work?
7. Are there any organizations in which Dr Deming's philosophy could not be applied?