Why Deming, Why Now?

Rafael Aguayo

W. Edwards Deming, renowned scientist, quality and management thinker passed away in December 1993. Technology, globalization and financial crisis have since dramatically altered the economic and political landscape. What possible relevance could Deming have in the 21st century?

The answer is plenty. With the failure of companies, governments and economies all around us it is becoming clear that now, more than ever, Deming's wisdom is sorely needed. To understand Deming we need to do a quick review of his contributions, history and legacy. No other management thinker, with the possible exception of Deming's teacher and friend, Walter Shewhart, can claim to have dramatically impacted so many companies and even whole nations. We will cite 4 major cases where Deming or Shewhart had a profound positive impact on companies and whole nations.

The Deming/Shewhart Management Legacy

Exhibit A. In the early part of the Twentieth Century as the United States was industrializing, quality and management were areas of critical importance. Frank Gilbreth, Fredrick Taylor and Henry Ford were among the well known names who addressed these issues. One large company, American Telephone and Telegraph, or AT&T, found that although it had access to the best methods and thinking of the day, they were insufficient. The harder they tried to make products alike, the worse the results. A young physicist at Bell Laboratories was assigned the problem and the result were a series of concepts and tools that would revolutionize quality. In 1931 Shewhart published *Economic Control of Quality of Manufactured Product,* and statistical quality improvement was born. The formal name for his tools came to be known as Statistical Process Control. The methods were adopted by AT&T systemwide and the result was the company became the premier company in the world with the highest level of quality and reliability.

Walter Shewhart had a friend and colleague, W. Edwards Deming, who was also trained in physics. They collaborated in the new field of statistics and Deming became one of the leading experts in quality control, behind Shewhart. Later in the decade Deming invited Shewhart to give a series of lectures on quality in Washington, D.C. These were later edited into a book *Statistical Method from the Viewpoint of Quality Control,* (1939) for which Deming was the editor.

Exhibit B. The US had followed a policy of isolationism prior to World War II and was reluctantly dragged into the Second World War when Pearl Harbor was attacked. The country had to quickly convert peace time plants to make massive amounts of military goods. The Department of War launched a crash program in quality control to help make the transition. Deming was one of the leading experts invited to teach plant managers and engineers the principles of quality control. One of the premises of quality control is that improving quality increases productivity and decreases costs. Higher productivity and fewer problems and defects also results in a dramatic increase in capacity. This is counterintuitive and the opposite of conventional thinking. But the incredible results confirmed this. The US became the most productive nation on Earth and military production zoomed. At the end of the war a popular refrain was, "production won the war."

Exhibit C. But after the war as American service men rushed back home companies quickly forgot the lessons of quality. Now any company that could produce had a ready market, especially since much of the manufacturing capacity of the rest of the world had been destroyed. US quality improvements stalled and in many cases went backwards. On the other side of the Pacific, Japan was suffering from its defeat. It had lost its foreign markets and major suppliers of raw materials. It also had a well deserved reputation for shoddy consumer products. A group of Japanese leaders began to believe that quality control could have an epochal effect on the country and Deming's name kept showing up in the literature. They invited Deming to give a series of lectures to Japanese managers and engineers just as he had in the US.

Deming accepted but at that first lecture realized he was making the same mistake he had made in the US, he was not addressing one key audience that he now realized was critical —top management. He spoke to his hosts who understood the problem and sent out telexes to the CEOs of major Japanese companies. In that first seminar to management Deming told them their responsibilities. He kept coming back to Japan almost yearly to teach more people and clarify and expand his teachings. The results were equally as incredible as the results in the US during WWII. Japan went from a defeated nation with few resources and a reputation for shoddy consumer goods to a nation with a reputation for the best quality in the world and the second largest economy in the world, behind the US. It has become a model of development and an inspiration for other Asian nations.

Exhibit D. Deming's students, Japanese industrialists, learned their lessons too well. They started to dominate markets worldwide in such diverse goods as radios, televisions, consumer goods, motorcycles, watches and cameras. In some cases they drove American firms completely out of those industries. By the late 1970s they were closing in on automobiles, semiconductors and computers. And American firms were baffled and helpless. American management consultants were at a loss. The advice of American management thinkers fell flat. But in 1980 NBC, which was equally baffled, began to put together a show to try and explain what made Japanese Industry so formidable. They heard of this 79 year old professor who had been to Japan in the 1940s and 1950s and had been recognized by the Japanese government for his contribution to Japanese industry. At his home in Washington, D.C., he showed them the 8mm video of him receiving

Japan's highest honor. The last 20 minutes of the NBC white paper, *If Japan Can Why Can't We?,* featured Deming.

After the show aired Deming was inundated with calls. He was booked 3 years in advance. He began a series of consulting assignments and launched his now legendary 4-day seminars to train American managers. The results were just as stunning with some companies being brought back from near extinction. Among these were Ford, Intel and Harley Davidson. And quality, quality management, TQM and other movements sprung up in the 1980s inspired by Deming. ISO 9000 made a comeback. Some of the other ideas that were launched in response to the emphasis on quality and process improvement during the era were Six Sigma and in the 1990s the term Lean was introduced in the US as an attempt to replicate some of the Japanese efficiency.

Deming Today

Why isn't Deming better known and more widely appreciated today? That's a good question. Part of the reason may be that many people wanted to take credit for the incredible upsurge in productivity and quality that was occurring in the US in the 1980s. One example is Reengineering. The authors of the book *Reengineering the Corporation* had observed Ford making dramatic improvements in productivity and in some cases completely redoing their processes. In what can best be described as vulgar and vainglorious they tried to take credit for that. This of course completely ignored the fact that since 1980 Deming had been Ford's consultant. But the book *Reengineering the Corporation* was professionally written, promised unlimited results and was heavily and successfully marketed. Unfortunately the authors were also ignorant of the intricate and interwoven principles that Deming taught. The result was a predictable fiasco. Companies spent hundreds of millions of dollars (possibly more) to bring in consultants, all instant experts in this new phenomenon. And the results were chaos. The movement ended with one of the authors stating that Reengineering would have worked were it not for the damn people in a company. But not after creating massive losses in many companies and further increasing employee cynicism. And so it goes. Other people did a better job marketing and promised instant results. Our mission is to reverse that and make Deming more accessible to more people, while always maintaining integrity with respect to his teaching.

Other Factors that Have Helped Obscure Deming's Influence

Unfortunately, few people fully grasp his management ideas. Even worse, many have an incorrect understanding. People, who should be savvier, have presented an incorrect, flat caricature of Deming's contribution to management. One blatant example is *The Machine That Changed the World,* the book by MIT professors that introduced and popularized the word Lean in the West. The book fawns over the prowess and success of Japanese Industry in 1990, while completely overlooking

- The devastation of Japanese Industry and society from the War effort of WWII.
- The poor state of quality of Japanese manufactured goods in 1950;

- The fact that Deming began a series of lectures to managers and seminars to top management in 1950;
- The tremendous transformation that started to occur that year;
- The establishment of the Deming Prize by grateful Japanese Industrialists who attended and sponsored those lectures;
- And the subsequent awarding to Deming, by a grateful Japanese nation, the highest honor it could bestow on a noncitizen, the Second Order Medal of the Sacred Treasure, which explicitly recognized his immense contribution to advancing the development of Japanese Industry.

Instead the book limits Deming's contribution to introducing Statistical Process Control, which by itself would be a significant contribution, except that even here the book trivializes that as being limited to keeping individual machines in control—either a serious lapse of understanding, or an ungracious and blatant attempt to minimize Dr. Deming's contributions. No mention is made of how SPC can be used to control processes or that properly used it can lead to never ending improvement, which in turn can lead and in fact did lead to dominance in several industries by quite a few Japanese companies.

One of the biggest anomalies in the book, *The Machine That Changed the World,* is that the automobile plant with the highest quality in the world is not in Japan as they would have predicted. Instead it is the Ford plant in Hermosillo, Mexico. A plant in the third world beat out the best plants in Japan, Germany and the US, upsetting their thesis. The authors try to explain this away by saying that perhaps Mazda's relationship with Ford had something to do with it. This completely overlooks the fact that at the time Ford was much stronger than Mazda and owned one third of the company. It also overlooks the more important fact that at the time Ford's management and quality consultant was none other than W. Edwards Deming.

The result is that many people, especially younger managers, are aware that Western Management as practiced in the latter part of the twentieth century was failing, but they believe just focusing on process with concepts like flow, just-in-time and 5 whys is enough to transform their companies and save them. **They are wrong**.

Six Sigma

One tool currently (2011) taught and used without proper knowledge or adequate understanding by some consultants and managers is Six Sigma. This was the proud offspring of Motorola that was enthusiastically taken up and promoted by GE. These two successful companies touted this method as the best way to success and profitability. GE in particular generated hundreds of millions of dollars in revenues teaching Six Sigma to other companies. But the method did not work very well for either company. Motorola's market share in its main business dropped from over 50% to 3% and it has barely avoided bankruptcy. An investment in GE stock in 2000, when Welch was riding high, would have lost 73% of its value by 2010. GE would have gone bankrupt in 2007 were it not for a bailout in the form of a US government guarantee.

To many objective observers it is pretty clear that things are not going well, certainly not in the US, certainly not in Europe or even in Asia. And this is not just because we are in the midst of a recession. The boom from 2002 to 2007 was a false boom built on artificial demand as the US Federal Government ran up tremendous deficits. This is what Deming would have called tampering: trying to make things better by making adjustments; in this case adjustments to aggregate economic demand. This way only leads to pain.

While some companies and some people have done well, in the US the average person has become worse off over the last 10 years, and for many, even in the last 20. The economic numbers hide the reality. Economic indicators have been conveniently adjusted. If we made equal comparisons with the past we would find that things are much worse than indicated by the economic statistics. In the recession of 2008 US unemployment , was given as being just shy of 10%, compared with more than 10% in the last major recession in 1980. But were we to compute unemployment in the same manner that was used in 1980 the level in 2008 would have been around 14%. Add in underemployment and the figure is closer to 20%. One in five Americans could not and still cannot find enough or adequate work.

While companies claim to be in strong positions, even large ones like GE rely on debt and leverage, putting them at risk for a sudden demise when economic conditions shift rapidly.

Here are three major areas where Deming's signature wisdom, profound knowledge, is needed more than ever: education, management and economics.

Education

In education, the Obama administration, like the Bush administration before it, is encouraging schools to reward individual teachers with greater pay based on how well their students perform on standardized tests. This violates several of Deming's principles.

- It assumes that teacher results are based on working harder, yet in every organization almost everyone is trying their hardest. **Best efforts** will not help. In fact empirical tests show that teachers who are compensated more for performance do not outperform a control group of teachers who are not compensated for results. [i]

- Upwards of 85% of the results of students are **due to the system**. And the system includes administrators, principals, elected officials, the education and training system for teachers, parents and societies as well as the teachers. Some schools have in fact experienced tremendous improvements in student results. And in all of these schools teachers have received much more support, coaching and training; and are made to feel like professionals. They are encouraged to grow

and improve. Deming identified pride of workmanship and joy in work as key determinants of quality in any organization over 60 years ago.

- By setting up a **goal, or target** that is outside the capability of the system, in this case higher test scores, you are asking teachers and administrators to distort the system. Setting goals and quotas will not make our school system better. Yes, it is true that setting these goals and quotas means they will be met but at what cost? People can be very creative in meeting a goal. Thus schools that have a goal of a higher graduation level, that the current system cannot achieve, will transfer students to other schools, reclassify them as having left the school system and just outright lie to meet their goals. Other options used to meet the goal include graduating students who are not qualified and therefore not ready to function in society at a high level. Another option is to create easier and easier tests. Thus colleges find their incoming classes have poorer and poorer abilities. Incoming students often cannot write a coherent sentence.

- The temptation **and pressure fo**r students to cheat in such a system is immense. One survey found that 97% of students in a competitive high school had cheated at some point. As one can imagine they become very good at it and this carries over to work. This system creates robotic students who cannot think but can focus on short term goals. They are great at taking tests and cheating. This has been happening for 20 years and the trend accelerated in 2002 when No Child Left Behind was begun. We have created a generation of young people with perverse values. These 'high performing' students now run our banks and corporations. No one should be surprised, given these conditions in our schools, that cheating and chasing numbers is ingrained into so much of the corporate culture. The inevitable results are company lapses in quality and integrity as we have witnessed at so many companies of late including the major banks, Johnson & Johnson and Glaxo among many others.

- Further since a school is **a system, and part of a larger system,** it **obeys system dynamics**. By working toward **artificial goals** such as higher test scores the system gets distorted. This shows up as students who graduate but cannot write a sentence or students who are good at taking tests but cannot think. It also shows up as teachers who are perfectly good teachers but get discouraged, or are even fired because they failed to lie about their results or just got poor results due to chance, the luck of the draw. Their students may have had a bad day. The test may have been easier last year, for these students. Any process, and that includes test taking, has a great deal of variation. The same test given to the same students on different days can have very different results.

- One other point, although hardly the last lesson for education from a man who has been dead for 17 years, is that teachers can learn, and they must learn. Learning means education and training. **Training** is what is necessary to do the job today. And that is not just learning about the subject matter, such as history or math. It must also be about the skills of teaching, such as organizing lectures, breaking

ideas down into smaller pieces, empathy and learning to read the class even when nothing is said.

- It is incredible that college sports coaches are today paid hundreds of thousands of dollars, even millions of dollars. No one believes, rightly so, that you can just send a group of athletes, no matter how talented, out on a field and expect them to win. In fact you can expect them to get slaughtered if they go up against a team that has been properly and competently coached. A **coach's job** is to prepare each player to play at his best and to get them to play as a team. Similarly a conductor's job is to get each musician to play his best as part of the whole orchestra. If each one plays as if he were performing a solo the orchestra fails. Yet we expect every teacher to perform her best on her own with little or no coaching. Some will learn reasonably well on their own, some won't. But even those who do learn well on their own would learn much better and more thoroughly with a competent coach. A school system that regularly coaches teachers on their teaching skills, empathy and related skills, as well as subject matter expertise will regularly outperform one that does not. Instead of firing willing teachers we should be developing them to excel.

Michelle Rhee is a very photogenic, very attractive, serious, young woman and was chancellor of the Washington D.C. Public School System. She is well meaning and made a concerted, conscientious effort to improve the school system. And she did some good things, some of which were unpopular. She closed schools that were half empty and thereby lowered fixed costs in the school system. This allowed her to allocate funds that formerly went to heat, light and electricity to teachers so that every school could have a librarian, art teacher and special education teacher.

But she fell into the trap of blaming the teachers for the problems of the whole system. She fired hundreds of teachers. And who will replace them? The district must now go out into the marketplace and hire new teachers to replace them and the odds that they will find better ones are only 50-50. If in fact the teachers' performance was due to chance, that is to say systemic causes outside each teacher's control, then hiring new teachers will only make the system worse. New teachers will have to relearn the ropes of this system and the neighborhoods, parents and other teachers. But the student results will not be any better. It is foolhardy to believe you can change the results of a system by changing some of the people who work in the system.

While Ms. Rhee means well, unless she begins managing in a radically different style she will continue to fail. She may be a great teacher herself (or not—that has not been demonstrated either way), but that does not make her a great leader of teachers. She claimed that the most important characteristic for her job was courage, specifically the courage of her boss, the mayor of Washington D.C, the man who hired her and supported her to the end. But she is mistaken. The most important quality, the essential quality required to transform an organization is knowledge, specifically Deming's System of Profound Knowledge. This would guide her to understand how organizations function,

how people work best and how the two can interact for better outcomes for everyone, students, parents, teachers and society.

Management

Jack Welch was the much celebrated CEO of GE from 1981 to 2001. During his reign he instituted several management ideas that became strongly identified with him and influenced many others. He called for set goals from every manager in every one of GE's businesses, generally looking for increases in profit of 15% per year every year. He insisted that the bottom 10% of managers be fired each and every year. And he adopted a secret weapon, Six Sigma, a statistical tool that was meant to improve the operation and profits every year. And GE became the most valuable company in the US, possibly the world, based on stock market valuations. Fortune magazine called him "Manager of the Century" in 1999.[ii]

It is only natural that other companies and other managers would try and emulate Welch because of his apparent success. Other companies have embraced strong goal setting. One school teaches Welch's methodology of firing the bottom 10% and Six Sigma became all the rage among American managers, eclipsing other process improvement tools and systems. Deming seriously warned about the dangers of all three of these ideas. Goals, which are just another form of management by objectives, distort the system and create many more problems. To fire the bottom 10% of any group is madness and Six Sigma, as practiced by Welch was seriously flawed. As Deming said, it is possible to have zero defects and zero customers.

The Welch Legacy

So how well has the Welch legacy held up? If you had invested in GE when Welch was at the height of his fame, in 2000, when Six Sigma was being adopted throughout the company, you would have lost over 70% of the value of your investment. Shortly after taking over as CEO, his successor, Jeffrey Immelt, sold a major GE subsidiary, their reinsurance business, to another large insurance company. When the buyer looked over the financial books during the due diligence process, it was clear that GE had kept reserves at an extraordinarily low levels that artificially increased profits over the prior decade. In order for the sale to go through, the reserves had to be dramatically increased. GE had to put much more capital into their insurance subsidiary and financial results for the last few years needed to be restated. Instead of profits having grown by 15% a year, as Welch had reported, they had fallen or been flat the last five years of Welch's tenure. When Jack Welch needed additional profits he got them the old fashioned way—he resorted to financial alchemy. The sterling results were completely illusory. This is totally in line with Deming's prediction.

But this was just the tip of the iceberg. Immelt was forced to admit that Six Sigma was not working so he resorted to the old game of putting lipstick on a sow. He renamed it Lean Six Sigma. Now tens of thousands of managers and consultants are running around doing great damage with a new word.

But even that understates the extent of the damage. What was obvious to competent financial analysts, although not managers, consultants and the general public was that Welch was dangerously increasing debt, leverage and risk. It is easy to increase profits if you have borrowing capacity; just borrow more short term and lend it out long term at a higher rate. Deming stated that anyone could increase short term profits. But doing so can destroy a company. The problem is that short term interest rates can rise precipitously or short term funds can cease to be available at all. And if the financial assets of the company, such as commercial real estate loans, are questionable the results can be devastating. This is exactly what happened to mighty GE during the financial crisis of 2007. It would have been forced into bankruptcy except for the largess of the federal government which started guaranteeing GE's commercial paper.

Six Sigma at Home Depot

As just one example of the damage that can be done, one of Welch's top lieutenants, Robert Nardelli, a man who had made all his numbers while at GE lost out in the race to become the CEO. He was instead hired to become the CEO of Home Depot. While he managed the financial numbers so profit seemed to increase, the quality of service dropped and customers went elsewhere. He was fired but kept his $200 million compensation.

Six Sigma at Motorola

Another equally successful company was Motorola who claimed to have invented Six Sigma. And in the late 1980s they claimed to have saved $18 billion through their Six Sigma program. And as their savings from Six Sigma continued their market share plummeted. Market share for cell phones, which had been as high as 50%, fell to 3% in 2010. They barely avoided bankruptcy and the company was broken up into two pieces. The handset division, formerly their crown jewel, may very well be purchased by another company a potential ignoble end to the storied Motorola name.

Six Sigma at Nortel

Another company that prided itself on its full buy-in and expertise in Six Sigma was Nortel, formerly known as Northern Telecom. At one time they were a highly respected company with high quality products and a motivated workforce, but the adoption of Six Sigma and the worst principles of Western Management that seem to come with it led to the company's decline. In this case bankruptcy was not avoided and the company has since been liquidated. About a year before liquidation I had a conversation with an acquaintance, a Nortel manager who had just received his Six Sigma black belt. He was all excited as to how he could use statistical tools to help pull the company through its problems. I thought the comments were ludicrous. It was as if a teller at Citibank was trying to save the bank after the multi-billion dollar blunders of top management. Deming stated in no uncertain terms, "Quality is made in the boardroom." This is basic and rudimentary. Ignorance of Deming among people trained in Six Sigma is palpable and pathetic. This ignorance is one key reason why Six Sigma is failing and will continue to fail.

So if Six Sigma were so powerful where are the success stories to back it up? And why is it wildly popular? One possible answer to the second question is that Six Sigma is popular because of Jack Welch's reported success. His successes were reported on page one of the papers, in bold headlines, while the restatements and extra leverage were in the back pages. More accurately it was known to sophisticated professionals who backed away from GE shares long ago. But the less sophisticated have been left with the illusion of success. This is why we say that the prevailing style of management has been shown to be lacking. More accurately, Western management, as it is currently practiced, has failed. If America and the West continue down this path the results will be even uglier.

Meanwhile other companies that had listened to Deming and avoided the Six Sigma fad have continued to prosper. Among some of these companies are Harley Davidson, Colgate Palmolive, Intel, Toyota and Honda.

Six Sigma and Process Improvement

Six Sigma is an attempt at Process Improvement that took hold in the 1980s when American companies were being systematically challenged and overtaken by the Japanese juggernaut. Japanese industry, having been trained by Deming and his Japanese disciples, knew the value of quality and knew how to achieve it. But rather than adopt Statistical Process Control (SPC) and the simple, efficient yet effective tools developed over 50 years by Japanese and American statisticians and managers, some companies wanted their own version. They wanted something new, the next new thing. While this was understandable it was a costly mistake.

SPC as taught by Deming was accompanied by his philosophy, which included the 14 points, the Red Bead Experiment and other lessons that contradicted the basic principles of Western Management. But too many mangers and business school professors didn't want to change their beliefs. They just wanted the newest tool, the latest instant pudding. And since they were not willing to put in the time to really understand the principles, which takes some effort, they created a monster. Even when they borrowed tools from SPC and other successful methods, their understanding was too superficial and therefore failure was inevitable.

SPC had been taught to US companies during the Second World War under a crash program sponsored by the Department of War. It was one key factor that led to the tremendous improvement in quality and output. What made the dramatic transformation to a war time economy even more startling was that a whole new population of workers, with no prior production experience entered the workforce—women. With the men at war there was a shortage of labor and women entered the workforce in large numbers.

With the startling success of quality in the US during the war one might have expected industry to build on that after the war, but it did not. Instead, as soon as the pressure for quality and efficient production was lifted, quality went out the window. The returning GI's had amassed savings and the US manufacturing base was the only one that had been unscathed by the war. Any company that could produce was able to sell its production.

Deming and other quality experts were disappointed by this turn of events. One reason for this setback may have been that the understanding of quality and quality tools was not deep enough. Control charts were touted by the less knowledgeable as a solution for everything. They were used in cases where they were inappropriate. And top management had never been taught the importance of quality and how it was a powerful strategic weapon. Quality properly used develops loyal customers, lowers costs and increases capacity. The result is much greater revenues and profitability. This is a virtuous cycle that flows one way, from improved quality to customer satisfaction and to lower costs and higher profitability. But attempts to lower costs or cut costs do not lead to better quality and often lead to less satisfied customers. The same is true of attempts to manage profits through either higher prices or forcing sales onto customers. Eventually customers get fed up and leave.

While top management of some companies listened to Deming while he was alive, others preferred not to. They wanted to keep their old ideas and just use some new tools. This is **a great mistake**. For while the tools are powerful **is it the management thinking behind them, that makes the great difference**.

Why is Six Sigma inadequate and how is it in opposition to true quality? A list of the differences may be helpful.

1. External quality vs. internal quality.
Certainly working on the internal processes of a company can help lower costs and increase productivity. It might also have a profound effect on the external quality, that is to say the perception of quality by customers. But internal quality and process improvement is just one part, albeit an important part, of quality. The ultimate goal has to be satisfying and delighting customers.

Just as much effort must go into understanding how a product is used and adapting the product for the customer. This might mean a process of constantly redesigning the product. This is a key part of sophisticated quality management. It is possible to create a product with absolutely no defects or problems, but if the customer has moved on to something else you will have no defects and no customers.

In fact there should be two PDSA cycles in a company. One is the constant redesign and improvement of the product, the other is the constant improvement of processes. The tools used in each are different. For redesigning the product, for instance one might use customer surveys, focus groups, feedback from customer service, field work and so on. While for process improvement there are many tools including SPC to make processes effective, of high quality and of high productivity.

2. Incremental improvement is not enough. Innovation is required as well. Any product no matter how good can only improve incrementally for so long. In fact Deming said there are four ways to improve: improve the process, innovate the process; improve the product, innovate the product. We might add there are also revolutions in process and product, when the innovation is so extreme that it creates a new product category or even

industry. These additional forms of improvement are very important to the long run viability of a company and a society. Six Sigma addresses none of these and Welch's ideas deter creativity. For all these types of improvements to occur with regularity individuals in the organization need the confidence to bring up new ideas. A company must tolerate even encourage new ideas. There will naturally be failure as a result of experimentation. People need to be able to dissent and experiment without fearing for their families' wellbeing. Firing the so called "bottom" 10% guarantees that dissent, creativity and experimentation will cease.

Deming's mission was to restore the individual. But what is it that kills the individual and breeds fear? It is strict mindless goal setting as per Jack Welch. It is firing the bottom 10%. This is especially true when a company is relatively stable with a good hiring system, good training and reasonably stable processes. In a stable company most of the variation from employee to employee and from year to year is due to chance, built into the system and outside the control of any one individual. Thus someone can work as hard as possible and yet still fall in the bottom 10%. And therefore a lot of energy must be directed at manipulating the numbers instead of improving.

3. Goals in and of themselves, especially tight, stretch numerical goals are counterproductive. They destroy quality, customer satisfaction and the long term health of the company. Wow, you say, this is just the opposite of what some big management hot shot teaches. Surely we must be joking. Those people who push for these tight stretch goals may have had one year with one company or one person where tight numerical stretch goals were established and met or nearly met. And this one example is used to justify them elsewhere. But for every case where the goals were reached there are many cases where the goals were not reached and the company was left disheartened and broken.

4. The damage caused by goals that are met.
But the real damage occurs in those companies where the goals are actually met. These are the biggest losers. Life, real life, not the imaginary life of managers who live in the fantasy world of made up accounting numbers, varies considerably. Anyone who tells you that their profits have gone up exactly 15% in real terms each and every year is lying. The world does not operate that way. But it is possible to show those kinds of gains by manipulating the numbers, by playing games, making up accounting numbers, cutting important programs that don't add to today's profits, lying or taking actions that hurt the company in some fundamental way.

This can be carried on for quite a while if the manager is skillful enough in manipulating numbers. Think of Enron that for close to a decade was worshipped as an innovative company; World Com that became the benchmark in the telecommunications industry; Citibank that was touted as a great money machine. All of these companies met a quick death when their accounting games were discovered except for Citibank which was bailed out by the US government, along with GE.

As the company promotes those who are adept at meeting goals and weeds out those who are honest and are interested in long term improvement and productivity the company

reaches a point of no return. And just like in musical chair, the manager who is in command when the problems are exposed is blamed for all the problems.

5. Success at lowering measured costs may increase overall costs. Motorola claimed to have cuts costs by $18 billion. If it kept that up it would have eventually achieved negative costs. It is very easy to cut one cost, such as materials usage. Do that enough and you can claim to have saved quite a bit of money. But while material costs may have gone down, labor, or energy costs, which were not measured and were not part of the project might increase. The cost increases may even occur in the same department where the savings are supposed to have occurred.

6. Lowering costs in one department may increase costs in another department. Even if the goal is to decrease the costs in a department, and the project succeeds the results may be but an illusion. Any project done in a vacuum can and probably will result in higher costs in another department. The oven division responsible for hardening the finish can easily lower its cost by lowering the temperature a few degrees. But other departments further downstream may now find the product does not hold a finish well. As a result scrap and waste increase as does the time required to produce a good unit.

7. Lowering costs in one department or even throughout the company can decrease quality. And if the quality of the overall product suffers as a result and customers notice the company will pay the ultimate price, loss of customers. Thus one of Deming's 14 points is to break down barriers between departments. Because of the interactive nature of a company, appreciation for a system, in Deming's terminology, a small change in a company, done independently (without feedback or measurement of its effect elsewhere in a company) can increase costs or worse still destroy quality. Without considering a company as a system, costs cutting efforts and even process improvement efforts, lead to worse quality from the perception of the customers. They are almost certain to lead to higher quality in other departments. The overall effect could very well be lower quality and higher prices even though reams of data are used to justify and confirm that costs have been reduced in the areas targeted. But worst of all the quality is sure to suffer and so are customers.

Deming is the only person we know, with the possible exception of Shewhart, who could claim to have been the intellectual force behind the transformation of many companies, all at the same time, and even whole nations. And it is our belief that his management philosophy is more accurate, more comprehensive and more potent than anyone else's. A reasonable question is why. How is it possible that one person can so outstrip all other management thinkers by such a wide margin? To understand that we again need to study history. When Deming was a candidate for a PhD at Yale in the 1920s he interned at AT&T where he met Walter Shewhart of the Bell Laboratories, the preeminent research laboratory in the world. Shewhart, like Deming, was trained in physics. As a scientist Shewhart knew the importance of empirical verification. He understood that whatever he developed had to work, work well and work under all kinds of conditions.

He had the resources of Bell Laboratories plus access to the operations of AT&T, which besides being a service behemoth had one of the largest and most efficient manufacturing

operations in the world. In fact it was the problems the manufacturing operations were having in creating uniform products that was the corporate stimuli for his research. Shewhart developed statistical methods to address the issues. And he tested them again and again. When his ideas were fully developed he was able to test them in practice in one of the best manufacturing environments anywhere. Unlike other theories that are developed in an office, Shewhart's ideas on quality and SPC had to work. And they were tested and retested and then employed in an actual industrial environment, where more observations and tests took place. They were then introduced throughout the company. AT&T already successful became more so and developed a reputation for unmatched quality.[iii]

Deming benefited from this association and made his own contributions to the dialog. Even though Deming did not work at AT&T upon graduating from Yale, he and Shewhart remained friends and colleagues. He was the editor for Shewhart's second book. The book is based upon 4 lectures that Shewhart delivered at the graduate school of the USDA at the behest of Deming. Indeed the collaboration between Shewhart and Deming was the first **Deming Collaboration**. And other scientists and statisticians also contributed. Unlike other process improvement methodologies and management ideas, the Shewhart Deming approach received contributions from many people and it was rigorously tested.

A Breakthrough in Understanding

By 1950 when Deming was invited to lecture in Japan he initially planned to cover similar material to what he had covered in the crash program in quality control during WWII. A current idea is that it takes 10 years of practice or active participation in a field to become an expert. But by this time he had over 20 years of active participation in quality and management. He was one of the founders of the field and had worked and collaborated with the founder of statistical quality. He was in fact an expert several times over. And when he was lecturing to Japanese statisticians and mangers he was hit with an epiphany that in order for this to take hold in Japan he needed to talk to top management. That epiphany was 20 years in the making and was only possible because of the quick success of quality during the war and the equally swift rejection of quality among US firms once the war was over.

And his lectures to top management in Japan were a resounding success and Japan transformed from a poor war ravaged nation to become a major exporter, a technology leader, a nation with an unprecedented level of quality in all aspects of society and the second largest economy in the world despite having a land mass no larger than California. And Japan, with the establishment of the Deming Prize, became a fount of new theory and applications with many statisticians, engineers and managers actively contributing to the improvement of quality. Indeed we might call this the second **Deming Collaboration**.

When Deming was rediscovered in the US in 1980, he now had 50 years of practice. He was a national treasure. Among the companies that embraced his ideas in some form were Harley Davidson, Colgate Palmolive, Intel, Proctor & Gamble, Ford and Wal-Mart.

While some companies realized his power and embraced his ideas the mass media did not. As a result many people have never heard of him and those that do often have a distorted, flat view of his ideas. But even if a person has some appreciation of Deming's management theories or process improvement, one needs to be realistic. What was developed over 60 years, in collaboration with other exceptional people, may take some real work and several years, to understand deeply. But we need also realize that the benefits of this understanding are well worth the effort. And even a little knowledge can make a big difference in how successful a company can become.

Other So Called Quality Programs and Process Improvement Ideas

It might be useful at this point to review other current or past ideas on quality and process improvement. While each of these can have value to a company at some point in the company lifecycle, we maintain that they become much more powerful and effective if management has a basic understanding of Deming management principles; and further without that understanding any tool can be used and will eventually be used in a way that does great harm to the company and its people.

ISO 9000

This standard of the International Standards Organization was copied almost verbatim from an American National Standards Institute (ANSI) standard from about 1950. It was developed when quality in the US still had some cachet but was fading. The basic idea is that if all the steps in a process are performed in exactly the same manner each time the results will be exactly the same or at least controllably the same. It therefore requires a company to document all its processes and then to execute the steps in its processes exactly as documented. This sounds logical but is completely wrong.

Shewhart's work at AT&T began with finely honed processes that were performed in precisely the same manner, as far as anyone could determine, yet the results were wildly out of control at times. Further attempts to lessen the variation and bring the system into control only backfired. The more management tried to improve quality and lessen the variation the worse it became. The results were published in his 1931 book, *Economic Control of Quality of Manufactured Product*. When the ANSI standard was first published around 1950 it was already obsolete by 20 years. Companies that advertise that they are ISO 9000 compliant are merely advertising ignorance concerning quality.

Another problem with ISO 9000 is that all the effort to document processes is not only time consuming and expensive, it is counterproductive. When Taiichi Ohno, one of the main developers of the Toyota Production System and Just-in-Time, was developing these important innovations in production he refused to put anything in writing. Constant innovation was occurring and documenting processes would not only detract from improvement and innovation efforts, it would tend to calcify the process and retard innovation.

But in the end it comes down to results. Where are the success stories? While we suspect that some small totally disorganized companies may have benefited from

reviewing their processes in an ISO effort this is but a first step, and to assume that documenting processes can somehow assure quality is incorrect. If your competitor is intelligently improving quality and processes then ISO is not just incorrect, it is suicide.

Lean

Lean is the term coined by several MIT professors to try and describe the methods employed by Japanese companies specifically in the automobile industry that gave Japan such a dramatic advantage over their American counterparts, in the book, *The Machine That Changed the World.* They focused on the Toyota Production System and more specifically on the Just-In-Time system developed by Taiichi Ohno. They also found a cute term that fits nicely into the psyche of American Management with the term Lean, a word that is not used in Japan. Lean implies something easy, intuitive and superficial, everything that is wrong with quality as currently practiced in the West.

Concepts like work flow, tact time and minimal inventories are useful in many settings. They are one set of tools in the toolbox of a quality professional. However they do not explain how Japanese companies were able to design better cars that had much fewer defects than their American counterparts from day one. While the book acknowledges that difference it does not fully understand the cultural and managerial differences that make that possible or their source. The source is Deming and had the authors attended one four-day seminar they could have grasped the profound differences.

It should also be noted that the automobile assembly line is but a small part of the automobile manufacturing process representing but 15% of the total. Tools like 5-Whys, Andon and Baka-Yoke are important and help eliminate digital defects, those that can be seen and counted. They do not help with analog defects or with measured qualities as opposed to counted ones.

Statistical Process Control

This is the original process improvement methodology, first developed by Shewhart. From this many of the great concepts and insights have developed. But considered by itself without the transformation in management thinking that must accompany any successful transformation, it is just another tool. Improperly used, just like with all the other tools, it can cause great damage.

Just adopting some quality or process improvement tools can have very dramatic results and lead to rapid improvements. We do not mean to discourage the use of good tools, if they are introduced by a master. But the positive and eye-opening short term improvements that result can lead management in its enthusiasm to redouble its efforts without the deep understanding that is required. Improvement can be intoxicating and can lead to a mad rush for results that when combined with the faulty practices of managing for results sooner or later leads to disaster—every time.

Without a deep understanding of variation, knowledge of people, an appreciation of the functioning of systems on the part of management the tools are just tools that cannot

transform a company. Management needs Profound Knowledge if it is to take a leap forward and if business is to help lead society into the future.

Too many consultants and would-be advisors talk about implementing Deming, a faulty term that Deming hated. Instead he seemed to have had an epiphany later in life that the right term, what was required, was a transformation. And what is required now is a global transformation: Global Transformation of management through Profound Knowledge.

So in short: Why Deming? Why Now? Because his ideas work, and by not listening to him we have dug a huge hole for our companies and our world. Today we face a crisis of epic proportions. Economic stimulation will only help for so long. We need to make fundamental changes to the way we run our companies, our schools and our economies.

Economics

Perhaps one of the most potent areas where Deming's Profound Knowledge can affect our lives is in the realm of economics. At issue for the last 100 years and actually much longer is the role of government in smoothing out excessive fluctuations in the economy. The question took a central role in economics during the great depression of the 1930s; when the economy failed to bounce back from the meltdown of 1929 to 1933. The stock market had crashed in 1929 and valuations continued to decline for years afterwards. Two waves of banking failures in 1931 and 1933 and the destruction of the money supply were factors that left the economy and the people of the world in a state of shock.

The quick economic rebound predicted by classical economics failed to materialize and in 1936 the most highly respected economist of his day, John Maynard Keynes, published the General Theory of Employment Interest, and Money. The book took a more comprehensive look at the economy and postulated that classical economics was but a special case of a much broader economic theory. Under some conditions the economy could get stuck in a liquidity trap, making a spontaneous recovery all but impossible.

Today the most superficial explanation of the issue is painted as one of stimulus spending or not. But the General Theory is a much more serious undertaking that attempts to understand more thoroughly the workings of the economy. Keynes also questions the total disregard of trade deficits among classical economists and scolds fellow economists for being blind to the empirical evidence when it contradicts their inbred beliefs, among other astute observations.

One very important observation is that recessions seem to have an inherent time cycle of about 5 years before demand can begin to recover and restore the economy to something resembling full employment. But the idea that recessions have a kind of wave like function invites deeper observations.

One of Deming's key lessons for managers, actually it stems from his teacher, Walter Shewhart, is that attempts to improve a system with some natural variation will only make the system worse. Adjusting the system will increase the variation, not lessen it.

The highs may be higher but the lows will be lower. This was so important that Deming gave it a special name, Tampering. Strictly speaking Tampering refers to a system with random changes, but it can readily be adapted to a system with oscillations. In fact this was suggested in the 1990 book *Dr. Deming: The American who Taught the Japanese about Quality* by Rafael Aguayo and it received hearty approval from Deming himself.

What this implies is that the attempts made by the Federal Reserve of the United States during the 1920s to stimulate economic growth that led to the Roaring Twenties, were in fact one of the major causes of the depression that followed. When the Fed reversed course in 1928 and decided to reign in money supply it set up a situation similar to Rule 3 of the Funnel. This refers to a simple but effective demonstration that Deming used since at least 1980 to visually teach the ill results from excessive adjustments to the system.[iv] Making these kinds of adjustments exacerbates the swings in the economy.

In the 1960s President John F. Kennedy, who had studied economics at Harvard, pushed through congress an income tax cut, to create greater demand in the economy. This was to stimulate the economy, which it did. The 1960s were a dynamic period for the economy, which grew at 6%. But it was accompanied by increasing inflation. And when even moderate steps were taken in the 1970s to moderate inflation the economy stagnated. The term stagflation was born as reality once again proved conventional economics wrong. Economists had believed that economic stagnation and inflation could not exist simultaneously for extended periods. But the two existed side by side for over a decade. Once again an artificially induced boom of about a decade was followed by a lost decade with little growth and quite a bit of inflation.

In 1981 inflation was finally brought under control, after the Federal Reserve tightened money for several years bringing interest rates to levels approaching 20%, unemployment to over 10% and spurring the death of a whole industry, the Savings and Loan industry.

And with Ronald Reagan as president the nation embarked on a new stimulus program that was couched as Supply Side Economics. Once again Income Taxes were cut but this time even more drastically. This time it was not inflation that stirred. Instead the trade deficit ballooned and the US went from being the world's largest creditor to the world's largest debtor.

Jobs left the US in huge numbers. And financial bubbles began to erupt. We had a real estate bubble in the 1980s, a stock market and dotcom bubble in the 1990s. While this was happening the US was running huge and increasing trade deficits and other nations were gladly allowing companies to move their factories from the US to them. In 2000 we once again had a crash in the stock market and began a steep recession. And what was the response from the new administration of George Bush? Why more tax cuts of course. And while the national debt ballooned and the trade deficit ballooned more bubbles began to develop. Real estate was the most outstanding one but the stock market also had excessive valuations. And when the music stopped in 2007 we had an international banking crisis of immense proportion, a global recession that is still developing and still threatens to bring the global economy to its knees.

The rest of the world has come to rely on US consumers spending more than they make and the US government supporting this with government budget deficits. In other words the whole world now depends on the US' dysfunctional behavior. At the very least we will have another lost decade. At the worst end of the range of possibilities we will have a severe economic crisis that could lead to the breakdown in the international system and might very well lead to the rise of strongmen in many countries and make war more possible. We are at a critical point in history and half baked untested management theories can only lead us into a greater morass. More than ever we need profound knowledge. Why Deming, why now? Now you know.

[i] For an interesting video that confirms one of Deming's important points: that more money is not necessarily a motivator for better performance and may even be counterproductive; see Daniel Pink's YouTube video RSA Animate.
[ii] In Fairness to Fortune they also had called Enron one of the great companies of the day, months before it was discovered that their success was based on fraud.
[iii] Companies split, get bought up and merge. Even without this kind of corporate surgery companies can alter their behavior dramatically. The AT&T of today bears almost no resemblance to the AT&T of 1930s, 40s and 50s.
[iv] For a full treatment of the Funnel Experiment and the effects of various types of adjustments see Aguayo's *Dr. Deming: the American who Taught the Japanese About Quality,* chapter 5.