QUALITY

QUO VADIS?
QUALITÄT: QUO VADIS?
Paradigm Shift in Quality Management

The evolution of world economy during the second half of the 20th Century went along with a fundamental change of comprehension or paradigm. The focus on quantity changed to focus on quality. Rigidly and hierarchically structured organizations became flexible organisms structured along the flow of production. The digital paradigm was replaced by the customer oriented "zero-defect" acceptance and reject thinnging embraced by the customer oriented desirability paradigm.

World Economy After World War Two

The world after World War Two is characterized by the total revolution of actors, markets and distribution of economic power. The unexpected invasion of products from the Far East, which were both cheaper and of unparalleled quality, lead to a disruption of the prewar global economy and to growing unemployment in the traditional Western industrialized nations. Europe and the USA were most seriously affected.

The Deming Chain Reaction

After the war, neither recognized nor understood by the rest of the world, Japan introduced, tested and developed a fundamentally new philosophy for the continual improvement of products and services. Dr. W. Edwards Deming is the exponent of a group of American quality experts, who passed on to the Japanese their knowledge and experience in the mass production of industrial products. This group did an outstanding job, which showed overwhelming results on the world markets within a few years. The group did not ignite a straw fire but initiated a sustainable quality movement resulting in a competitiveness advantage the rest of the world was not able to overcome up until now. Deming liberated Japan from the humiliation of being a military loser. He became Japan’s national hero and received highest honors by the emperor of Japan himself.

Who is Dr. W. Edwards Deming?

A value structure as a believing Catholic, a strong theoretical background as a mathematician, physicist and statistician and more than four decades of pioneering activities made Deming the foremost authority in the field of quality.

Corner Stones of Deming’s Teachings

The basic elements of Deming’s teachings may be put under the three headings: „Sustainable Policies“, „Continual Improvement“ and „The System of Profound Knowledge“.

A sustainable policy must be the answer to the question: „Why are we doing what we are doing?“ This question should be asked not only once but over and over again.

„Continual Improvement“ is the prerequisite for survival, not only in nature but also in industry.

„The System of Profound Knowledge“ includes appreciation for a system, knowledge about variation (dispersion), theory of knowledge and psychology.

Deming, Quality Awards and Quality Standards

Deming was very critical about quality standards, certificates and awards. All are external motivators which change the focus of interest from quality to certificates and awards. Quality improvements do not require incentives. The benefit of efforts in quality means long term survival in business, something which no certificate and award can guarantee.

The Seven Deadly Diseases

Deming identifies seven malpractices in companies which inevitably lead to bankruptcy and collapse.

The Seven Obstacles

Similar to the effect of the deadly diseases, Deming recognizes seven obstacles which impede continual improvement and long term success.

Fourteen Points of Management

Deming’s famous Fourteen Points of Management are a consequence of his System of Profound Knowledge. They should serve as milestones in the process of continual improvement. They became a symbol for Demingism and are known and applied all over the world. Pat Oliphant, a world famous cartoonist, tried to illustrate the message of each of these points by a cartoon. It is hoped that this visualization both endorses the maning of each point and makes the point easier to remember.

His Master’s Voice

This chapter reproduces a collection of Deming’s best known quotes. The intention was to give the reader an idea of the clear, direct, humorous and sometimes harsh way Deming presented his thoughts.

Revolution of Thought

In an industrialized world committed to the Scientific Management of Frederick Winslow Taylor, the Deming Management Philosophy requires a revolution of thought. Pat Oliphant selected nine of the most deeply rooted convictions or paradigms, where Deming asks for a far reaching change of mind. He illustrated and at the same time endorsed the subjects of these mind changes in the language most familiar to him.

Acknowledgement

A innumerable number of books were published on various aspects of the Deming management philosophy, most of them in English. This bibliography only lists the books which this report refers to. A search in the internet bookshop www.amazon.com using the key word „W. Edwards Deming“ will provide the visitor with a list of some 500 titles.
Foreword

The postwar era brought a total turnover in the global distribution of economic strengths. The revolution in technology together with growing labor costs led to continuously improving production processes and to a shift in the creation of economic value from the primary (agriculture), to the secondary (manufacturing), and to the tertiary economic sector (service industry). This shift of the importance of economic activity led from the seventies onward to a growing loss of jobs with its first climax in the early eighties. Unemployment was not considered to be a problem in the primary sector despite its "disguised unemployment". The history of unemployment is the history of industrialization. Today, problems of labor market and unemployment including waste due to ill-health, crime and related costs stand at the top of the agenda in industrialized nations worldwide.

For many decades America and Europe dominated world markets. They both practiced a management philosophy based on the scientific management by Fredrick Winslow Taylor [1] and the bureaucracy model of the German sociologist Max Weber [2].

Like a Phoenix rising from ash and by Western economies neither recognized nor understood, a new player appeared on the court, playing the game with rules unknown before. Whereas Western managers under pressure by stockholders turned to short-term cost-thinking, the new protagonist concentrated on the qualification and motivation of its workers, the uniformity of the processes and the quality of products and services expecting that these measures will lower the cost in the long run. The history of world economy could not have confirmed more convincingly the validity of this assumption.

It is thus quite surprising that American production specialists, especially Dr. W. Edwards Deming (14th October, 1900, until 19th December, 1993), convinced the Japanese in 1950 of the firm relation between quality and cost as expressed by the Deming Chain Reaction. The new understanding for this relation focused the resources of an entire nation on one single goal, the conquest of the world market with products of unparalleled quality.

"Dr. Deming will be acknowledged by his descendants as the one personality with the greatest influence on the world economy during the 20th Century."

This statement was made by John Witney, professor at the Columbia University Graduate School of Business and the Harvard Business School during the conference of the W. Edwards Deming Institute in Arlington, VA from the 10th to the 15th October 1998. The same assessment was expressed by Daniel J. Boorstin, historian and from 1975 to 1987 director of the Library of Congress in Washington D.C., the world’s largest and most respected national library. Boorstin considered the management philosophy of Deming to be the cause of the latest and most distinctive turning point in the course of the human history during the past two millenniums (History’s Hidden Turning Points [3]).

The competition from the Far East engaged the USA in a fierce fight for economic survival with unemployment rates increasing from below 4% in the mid sixties to close to 10% in the early eighties. In his famous book, „Out of the Crisis“ [4], first published in 1982, Deming developed recommendations on what the industry and the government should be doing in order to overcome the crisis.

On the book-jacket, Deming himself introduces his book as follows:

„This book teaches the transformation that is required for survival, a transformation that can only be accomplished by man. A company can not buy its way into quality - it must be led into quality by top management. A theory of management now exists. Never again may anyone say that there is nothing new in management to teach.

When the management of most any company is asked „How do you go about improving quality and productivity?“ the usual answer that comes forth is „by everyone doing his best.“ Everyone doing his best is not the answer. It is first necessary that people know what to do. Drastic changes are required. The first step in the transformation is to learn how to change: that is, to understand and use the 14 Points in Chapter 2, and to cure themselves of the diseases in Chapter 3.

Long-term commitment to new learning and new philosophy is required of any management that seeks transformation. The timid and the faint-hearted and people that expect quick results are doomed to disappointment.

Management will in time be judged not by the quarterly dividend, but by plans and


Innovation with the aim to stay in business, to protect investment, to ensure future dividends, and to provide jobs and more jobs through improvement of product and service for the future.

One requirement for innovation is faith that there will be a future. Innovation, the foundation of the future, can not thrive unless the top management has declared unshakable commitment to quality and productivity."

The overwhelming challenge that faces the United States today is the need to regain competitive position in international commerce. America in fact continues to lose ground in manufacturing and service markets. The source of the problem? Low quality and high costs associated with many products and services.

The way to correct it? Managers must increase the quality and productivity of the systems of people and machines that they manage. Do America's managers understand what must be done? W. Edwards Deming proposes that most do not. In this, his landmark book, he explains with abundant illustrations what he believes managers have been doing wrong, informs them what they must do, and shows them Deming's Way Out of the Crisis.
**Management Summary**

During the past fifty years the roles of the various players in the global economy were totally rearranged. All of a sudden, a new player appeared on the playground asking for a part of the cake that before was divided among the traditional industrial nations. An entire nation set out to conquer the world market. The nation pursued this goal not with innovation but by doing known things better than others. It began to add something to products and services generally designated with the much over-used term „quality“. This is not remarkable. Remarkable however are two things: Firstly: It took more than thirty years and a severe economic crisis until the West started to understand what actually happened in the Far East. Secondly: The ideas and convictions of an American scientist initiated this most extraordinary turnover.

Economic data confirm that the United States learned the lesson. The same data show on the other hand that in Europe this learning process is just about to begin.

World War Two left Japan in a desolate situation: a people unable to feed themselves and without self confidence, a country without substantial natural resources and an industry in ruins.

Dr. W. Edwards Deming, a representative of the victors, driven by compassion for the suffering population and by a vision for the dignity of men in an industrialized environment, postulated the following basic human right: „A man has the right to be proud of what he is doing!“ Economies are to be restructured in a way to satisfy this basic requirement of human beings.

Based on the values of Christianity, Deming instilled the Japanese with a basic understanding for the quality of products and services, which, for that time, was most revolutionary. He explained them the compelling consequences of quality improvement, which later became known as the Deming Chain Reaction. This chain reaction was on the blackboard of every meeting with top management in Japan from July 1950 and onward.

The compelling consequences of quality improvements are:

1.) Costs decrease because of less rework, fewer mistakes, fewer delays, snags, better use of machine-time and materials
2.) Productivity improves
3.) Capture the market with better quality at lower price
4.) Stay in business
5.) Provide jobs and more jobs

The aim of quality improvements are jobs and more jobs. It is interesting to note, that Deming stresses the social function of a company and not the interest of the shareholders. Jobs activate the creative potential of human beings, generate income and provide welfare not just for a few, but for everybody. Unemployment is a waste, a terrible waste, which no nation should tolerate. Think of what the 5.2 million unemployed Germans could do for the nation.

This new understanding for the importance of quality penetrated all levels of the Japanese society and focused an entire nation on one common goal: The conquest of the world market with products of unparalleled quality.

The consequences of the subsequent efforts are now history. Japan conquered the traditional markets of Western industrialized nations. Consequently, unemployment rose in the West and arrived at a peak in the early eighties.

The history of modern age does not tell us of many ideas and concepts with a similar impact. Historians will have to explain why Western nations felt the painful consequences but were not able to fully grasp the true reasons behind.

In the Western hemisphere, the bomb exploded on 24th June 1980, 9.30 pm. The NBC documentary, „If Japan Can..... Why Can‘t We?“, shook the Americans out of their lethargic complacency.

Up until his death on 19th December 1993 Deming carried his message to top management with up to 35 Four-Day-Seminars per year. The subsequent actions of several hundred thousand managers lead to a recovery of the American economy, to high productivity and low unemployment. The impulse of Deming was the beginning of the longest period of continuous growth of the US economy since World War Two.

Deming was not the only expert who came to Japan upon invitation by General Douglas MacArthur to teach the Japanese the secrets of mass production. Also Homer M. Sarason, A. V. Feigenbaum and especially Joseph Juran made significant contributions to the post war recovery of Japan. But Deming was the only one to create a totally new management philosophy from a value structure, from theory and experience with such an impact on world economy as a whole.

This report intends to be an overview of the different philosophies and methods for the continuous improvement of quality of products and services. Quality will make companies not only competitive in the long term, it will also add jobs and more jobs.

The report summarizes the revolutionary turnover of global economy since World War Two. It describes the contribution of Deming to the astounding recovery of Japan and the subsequent reaction of Western industrialized nations to the invasion of Japanese products. It explains the basic elements of the Deming management philosophy, sustainability of policies, continuous improvement and The System of Profound Knowledge (SoPQ). „Without understanding, there is no improvement!“

This quote of Deming is the essence of his System of Profound Knowledge. Authorities on Deming are convinced, that this system is the most valuable legacy of Deming to contemporary and future generations. It stands on four pillars:

1.) The ability to think in terms of systems (Systems Thinking) and knowing how to lead Systems
2.) The ability to understand the variability of work in planning and problem solving
3.) Understanding how we learn, develop and improve
4.) Understanding people and why they behave as they do

The paper identifies the main reasons for the struggle for survival or collapse of organizations in terms of seven obstacles and seven deadly diseases. It lists his world famous Fourteen Points for Management, which became a symbol for Deming‘s teachings the world over. It presents a list of the best known quotes as an illustration on how Deming addressed critical issues.

Today’s predominant management still seems to be incurably infected by the Scientific Management of Frederick Winslow Taylor (Taylorism). Deming, however, asks to shake off this chain. His philosophy requires a fundamental new way of thinking, a paradigm shift („Think Different!“). The report shows nine examples of today’s management style in order to illustrate, what this change in thinking would mean in practice.
Paradigm Shift in Quality Management

Today the number of empty slogans linked to methods and procedures in quality management has become so immense that nobody is able to recognize the basic change of thinking, the paradigm shift, hidden behind. It is indeed a change of paradigm that took place under the pressure of the challenge from Far East. Two aspects, organization and variability, are used in order to illustrate this change.

Organization

Organizations expressed by Organization Charts

Today there is hardly any company which does not present its management structure in the form of an organization chart as shown in Figure 1.

Figure 1: Conventional presentation of the management structure of an organization

Ordering criteria is hierarchy or the competence to make decisions. The information flows from the top to the bottom. The values of the superior determine the actions. The needs, desires and requirements of both internal and external clients are only considered when they are taken up by the decision process of the superior.

The objectives of a unit are decided by the unit itself within the limits given by the superior. The different members of a unit are generally not able to see the relation of these objectives to the policies and goals of the organization as a whole.

The duties of each member and the respective information needed are usually specified in individual lists of obligations.

Organization shown as a System

Figure 2 shows the organization in the form of a system. The fabrication of an industrial product is used as an example. The flow of information follows the flow of matter. All the efforts within the system are driven by the determination to exceed the expected results of the process.

Figure 2: Systems-presentation of a manufacturing process

This was presented to the managers of Japan in 1950 and stood therefore at the very beginning of the subsequent conquest of the world markets.

Mutual dependance and cooperation of the members in units are decisive factors. Both are lost when units are enclosed in boxes and managed to compete with each other.

Work descriptions are not needed when every member of the team and the team as a whole recognizes, understands and continually improves their contribution to the aim of the system in which they work.

Understanding of Variation

In nature, there are no two things, which can considered to be completely identical. This is far from being new. Men always knew how to get along with this fact. Products of craftsmen were custom-built. Industrial production, however, required exchangeable parts. Exchangeability and interchangeability depends on various prerequisites. There are two possibilities to satisfy these requirements. Each of these two is based on its own philosophy. Both have nothing in common. The change from one to the other represents therefore again a change of paradigm, acceptability versus desirability.

Acceptability Paradigm

Product specifications are usually based on this paradigm. When product properties are within specified limits, the product is considered to be acceptable, otherwise it is not acceptable. It is either this or that. It is either slow or fast, cheap or expensive, safe or unsafe. There is nothing in between.

In the acceptability paradigm, zero-defect quality is possesible. Once the zero-defect quality standard is reached, no further improvement is possible.

Desirability Paradigm

This is the antithesis to the acceptability paradigm. The digital viewpoint of acceptability is replaced by a more sensitive view. The desirability paradigm admits that between yes and no, good and bad, black and white, cheap and expensive, safe and unsafe, beautiful and ugly, etc., infinitely many intermediate shades are possible. It admits that a product or a service can always become better, safer, cheaper, more reliable, more economical, esthetically more pleasing, e.g. a product and a service can always be improved.

Walter H. Shewhart [6, 7], W. Edwards Deming [4, 5] und Genichi Taguchi [8] have developed the scientific basis for the practical application of the desirability paradigm. The findings of these eminent scientists were not recognized nor understood by the public for decades despite their application in the development, production and distribution of products recognized the world over to be of unparalleled quality.

Taguchi defined „Quality“ in terms of the financial loss caused by the deviation of a specific property of a product from its ideal state, called the „Target“. He developed a mathematical relation between these two variables, which became known as the „Taguchi Loss Function“. The overwhelming success of Japanese products on the world market is in part attributed to the practical application of this definition is called „Quality Engineering“.

Figure 3 shows the famous Taguchi relation. The loss incurred by deviation is minimal, when the average of the process variation occurs on target. Figure 3 shows the famous Taguchi relation. The loss incurred by deviation is minimal, when the average of the process variation occurs on target. In September 1960, Taguchi gave a new definition of World-Class Quality:

„On Target with Minimum Variance“

Figure 3: Definition of World-Class-Quality according to Dr. Genichi Taguchi: „On-Target with Minimum Variance“
World Economy after World War Two

The surrender of Germany and Japan ended the Second World War. Only the production potential of the United States was left intact. The rest of the world lay on the ground and tried to get back on its feet generously supported by the United States.

The Marshall Plan for rebuilding Europe in the years after the war helped Europe to connect with its highly successful industrial past. The success of the subsequent reconstruction effort was amazing. Industrial production exceeded pre war level by 35% when the plan ended in 1952.

The situation in Japan was much worse. All industrial facilities were in ruins as well as the self confidence of the population and their confidence in the government. The country has a far from sufficient agricultural production and practically no natural resources. Iron ore is imported from Australia and crude oil comes from the Far East. With respect to the supply of goods, Japan is the most dependent of all industrial nations. The only working capital of the nation are the human beings. But the first products exported by the industry earned the nickname „Japanese Junk“.

Figure 4 shows three economic indicators of the ten nations with the largest Gross Domestic Product (GDP) and 5 selected European nations calculated on the basis of Purchasing Power Parity (PPP). Shown are the GDP, the GDP per capita and the unemployment. The information is taken from the CIA World Factbook as published in www.cia.gov last updated on 7 September 2006.

The standard is set by the United States, which generates world’s highest GDP of $12.36 trillion together with one of the world’s highest GDP per capita of $41’800 and a relatively low unemployment rate of 5.1%.

The explosive growth rate of China’s economy during the past years has pushed the country on second place with respect to the size of its GDP of $ 8.859 trillion which, due to the sheer size of the population, is linked to a low GDP per capita of $6’800 and a high unemployment rate estimated at around 20%. The low exploitation of the country’s human resources suggests that China has indeed the potential to become world’s largest economic power.

China pushed Japan on third place with its GDP of $4.018 trillion, a GDP per capita of $31’500 and an unemployment rate of 4.4%.

Figure 5 illustrates the influence of the development of the Japanese economy on the unemployment in Western industrialized nations, the USA, Germany (BRD) and on OECD-countries as a whole. The USA was affected most. Unemployment rose from around 4% in 1965 to close to 10% in the early eighties.

An investigation of the competitiveness of the European industry, carried out by the European Commission [9 and 10] confirms the unfavorable initial position of Europe in the fight for a bigger share of the world market.

Figure 7 compares some selected characteristics of the European industry with the corresponding features of the industries in Japan and the United States. High unemployment and thus bad exploitation of the human resources have adverse effects on the standard of living and productivity.

The comparatively low productivity of Japan is not caused by an inefficient industry, it is the result of an inefficient agricultural and service sector.

Low expenditures for research and development, high tax loads, market distorting public subsidies are unfavorable pre-requisites for sustainable competitiveness in the world markets.

Europe cannot withstand the competition from Japan and the United States and trust...
worthy efforts to change the detrimental factors are not visible.

A benchmarking study of the European Commission [9] confirms that this assessment is indeed true. Among other things, the Commission draws the following conclusions from this study:

- The economy of Europe has a few strengths, but the European Union is not able to exploit its inherent potential and does therefore not exhibit the efficiency of its main competitors with respect to standard of living, productivity and the creation of employment. Between Europe and its main trading partners and rivals - the USA and Japan - there exists a recurrent and apparently intractable competitiveness deficit.

- Insufficient performance leads to little growth of value added, small profit margins and low demand for products in foreign markets.

- High costs and small investments especially in immaterial goods such as management knowhow, education and research are drawbacks.

- Research in Europe is not market oriented. A closer cooperation with industry is vital. New findings, new developments and new technologies are only reluctantly accepted especially in areas related to information technology.

- Procedures to finance innovation have yet to be developed. This seems to be a special problem in Europe.

- Unequaled quality of products an services is an irreplaceable attribute for survival in a highly competitive world market. A compassion for quality should be instilled on all levels of education, professional training and practice and of continuing education. Philosophies, methods and procedures developed over the past century by eminent scientists and engineers should be recognized, understood and applied.

### The Deming Chain Reaction

The reconstruction effort after the Second World War lead to a huge demand for industrial products. Quality was of no interest. Quality and productivity were considered to be incompatible. Managers firmly believed that measures to improve quality reduce productivity or higher productivity reduces quality. The book of Walter A. Shewhart, „Economic Control of Quality of Manufactured Product“ [7] establishes a completely different relationship. Figure 6 shows the sequence of compelling consequences of quality improvements. This relation became known as „The Deming Chain Reaction“, because it was for the first time presented to the Japanese by Deming in 1950. Henceforth, the relation stood on the blackboard of every discussion of Deming with Japanese managers.

Deming instilled in Japan a completely new view of the compelling consequences of quality improvements. It is essential to note that Deming stresses the social function of a company and not the interest of the shareholder.

This new understanding for the importance of quality penetrated all levels of the Japanese society and focused an entire nation on one common goal: The conquest of the world market with products of unparalleled quality.

Deming told Japan in 1950 that within five years manufacturers the world over would be trembling and would begin to scream for protection. And indeed manufacturers did! Japan initiated a revolution of global economy not by talking about quality standards, certificates and awards but by satisfying customers the world over with products of unparalleled quality.

### Who is Dr. W. Edwards Deming?

#### His Schooling

Williams Edwards Deming was born in Sioux City, Iowa (U.S.A), on 14 October 1900. After studies at the University of Colorado he earned his doctorate (PhD) in mathe-
mathematical physics from the University of Yale in 1927.

He got his first employment as a physicist at the United States Department of Agriculture at a time when Sir Ronald Aylmer Fisher at the University College in London and Walter A. Shewhart at the Bell Laboratories made fundamental discoveries in the control of industrialized processes which later became known as "Design of Experiments" and "Statistical Process Control SPC" respectively. The close personal relation of Deming with these two eminent scientists and their fields of research was decisive for the later professional development from a physicist and mathematician to the world’s leading authority in the area of quality management.

His Values

Taylorism
In 1911 Engineer Frederick Winslow Taylor (1856 to 1915) published his landmark book “The Principles of Scientific Management” [1].

Taylor developed five principles of Scientific Management:
1.) Scientifically study each part of a task and develop the One best way of performing it.
2.) Select the best person to do the job.
3.) Train, teach and develop the worker.
4.) Provide financial incentives for following the methods.
4.) Divide work and responsibility so that managers are responsible for planning the work methods and workers are responsible for executing the work accordingly.

The principles of Taylor were first applied by Henry Ford in the production of the T-Model in his factories River Rouge and Highland Park. The specific application of Taylor’s principles by Henry Ford was called Fordism. Workers were controlled not by superiors but by the repetitive tact of the assembly line, where the worker had to perform very few routine tasks within a short given timespan dictated by the assembly line.

Taylor wanted to exploit the work potential of a large uneducated and untrained workforce. This lead at the very beginning of the industrial age to enormous productivity increases, higher salaries and shorter working hours, all in all to a higher standard of living.

Demingism
The management philosophy of Deming, called Demingism, is based on his values as a believing catholic. In his landmark book “Out of the Crisis” [4] he often refers to statements of the Old Testament. Especially in Ecclesiastes 3,22 he sees a justification for a key element of his philosophy:

“So I (King Solomon) saw that there is nothing better for a man than to enjoy his work, because that is his lot. For who can bring him to see what will happen after him?”

Deming took up this statement of King Solomon in Point 12 of his famous 14 Points for Management:

Point 12: Remove barriers that rob the hourly worker of his right to pride of workmanship.

Deming called pride in workmanship, a "birthright" of a human being. A principle task of leadership is to remove barriers. He claimed that it is the sense of having helped other people that is the single most important motivator in the workplace.

Albert Einstein expresses the same point of view in his speech to students at the State University of New York in Albany on 15 October 1936 [11].

"To me the worst thing seems to be a school that principally works with methods of fear, force and artificial authority. Such treatment destroys the sound sentiments, the sincerity and the self-confidence of pupils and produces a subservient subject. It is the supreme art of the teacher to awaken joy in creative expression and knowledge. One should guard against preaching to young people success in the customary form as the main aim in life. The most important motive for study at school, at the university and in life is the pleasure of working and thereby obtaining results which will serve the community. The most important task for our educators is to awaken and encourage these psychological forces in a young man or woman. Such a basis alone can lead to the joy of possessing one of the most precious assets in the world -- knowledge or artistic skill."

![Figure 7: Key figures for the competitiveness of the European industry in comparison with Japan and the USA (Report of the European Commission on the Competitiveness of the European Industry [9])](image-url)
Taylor versus Deming
The philosophies of Taylor and Deming are based on two totally different appreciations for the value and the psychology of human beings. They touch upon basic questions about the purpose of human life and are therefore undebatable.

In 1979, Konosuke Matsushita of Matsushita Corporation (Panasonic, National, Technics, etc.) gave a presentation to a group of American and European managers. Describing the commercial battle ahead, he quietly explained [12]:

"We are going to win and the industrial West is going to lose. There's nothing you can do about it, because the reasons for your failure are within yourselves. Your firms are built on the Taylor model: even worse, so are your heads. With your bosses doing the thinking while the workers wield the screwdrivers, you're convinced deep down that this is the right way to run a business.

Your kind of management consists of bringing the ideas in your heads in the hands of your workers.

We have outgrown the Taylor Model. Business nowadays has become so complex and survival in an increasingly unpredictable environment has become so difficult, that we cannot survive without using every single bit of creativity, knowledge and experience of our workers."

His Vocation
W. Edwards Deming died on 19 December 1993 at the high age of 93 years. His teachings about the quality of products and services had a decisive influence on the development of world market during the second half of the 20th Century. They touched upon basic questions about the purpose of human life and are therefore undebatable.

In 1979, Konosuke Matsushita of Matsushita Corporation (Panasonic, National, Technics, etc.) gave a presentation to a group of American and European managers. Describing the commercial battle ahead, he quietly explained [12]:

"We are going to win and the industrial West is going to lose. There's nothing you can do about it, because the reasons for your failure are within yourselves. Your firms are built on the Taylor model: even worse, so are your heads. With your bosses doing the thinking while the workers wield the screwdrivers, you're convinced deep down that this is the right way to run a business.

Your kind of management consists of bringing the ideas in your heads in the hands of your workers.

We have outgrown the Taylor Model. Business nowadays has become so complex and survival in an increasingly unpredictable environment has become so difficult, that we cannot survive without using every single bit of creativity, knowledge and experience of our workers."

Polkinghorn, Charles Protzman, A. V. Feigenbaum and Dr. Joseph Juran (Picture 2). Also the Japanese Dr. Kaoru Ishikawa and Genichi Taguchi left sustainable traces in the reconstruction of Japan.

However, it was the then president of the Union of Japanese Scientists and Engineers (JUSE), Iciro Ishikawa, who in June 1950 introduced Deming to the absolute top representatives of the Japanese industry. Deming convinced this select group that unparalleled quality of products and services can only be achieved with the wholehearted and active backing of top management.

"Quality must begin at the top!" Quality can never be better than what top management conceives to be quality [13, pages 21 and 22]).

Deming emphasises later that without this presentation in front of the very top managers of Japan his appeal would never have produced the impact hoped for. His similar appeals in his home country remained unnoticed.

After the war, Japan disposed of a large number of top level statisticians. But this field of knowledge was of no interest. Deming showed to them that statistics is the crucial knowledge in the area of quality and that statisticians must play a major role in the reconstruction of the country.

Upon recommendation of Deming, JUSE invited Dr. Joseph Juran (Picture 2) in 1953 to come to Japan for his first time. Juran as well as Deming received in his home country very little attention. Juran became personal consultant to Eiji Toyoda. This assignment confronted him with the particular problems of the Japanese automobile industry thereby strongly influencing Japanese manufacturing practices.

Joseph Juran is an internationally acclaimed quality guru, similar to W. Edwards Deming. Both strongly influenced Japanese manufacturing practices. Joseph Juran’s belief that “quality does not happen by accident” gave rise to the quality trilogy: quality planning, quality control and quality improvement.

Many have consulted Japan along its way to world economic power. Success always has many fathers. But Deming was the only one who created from his set of values a manufacturing philosophy which showed to be vastly superior in the years to come.

Many Americans went on pilgrimage to Japan after the superior quality of its products became obvious. Since they did not have a theory, they did not know what questions to ask. After seeing the quality circles, they believed that this must be the secret of success. They copied visible processes without knowing the underlying conditions. They conducted benchmarking.

In 1979 Clare Crawford-Mason, a television journalist became aware of Deming after several detours [14]. NBC asked her to produce a documentary with the title: "What did Happen to Good Old Yankee Ingenuity?" This documentary should answer the question, why the American industry did nothing to stop the invasion of Japanese products. The research for this assignment, however, did not produce worthwhile results, at least not results good enough to produce a captivating story.

What she learned during her first talk with Deming in his small basement office just a few miles away from the White House seemed to her totally incredible. After talks with some of Deming’s clients confirmed what Deming told her, she decided to produce the documentary.

On 24 June 1980, 9.30 pm, the documentary with the new title „If Japan Can... Why Can’t We“ was watched in millions of American homes. The film acted like a bomb.

„Quality does not improve just by working harder. Everyone doing his best is not the answer. It is first necessary that people know what to do! We expect miracles from Japanese working methods, but without a method we do not understand what we copy.‘‘ The statements of Deming lead to a sudden awakening of his
fellow countrymen from a slumber in lethargic complacency. From one day to the next Deming became one of the most sought after management consultant. We have to be aware that when this happened Deming was already eighty years old.

Ford was one of the first to seek Deming’s advise on how to find a way out of its pressing financial and quality problems. The advise of Deming helped Ford to reduce drastically its quality backlog against its Japanese main competitors. It is interesting to note that Ford was also the first to apply the “Scientific Management” of Frederick Winslow Taylor 70 years earlier. The disastrous problems Ford finds itself in today show that the firm listened to external advice but was not able to transform the recommendations into sustainable competitiveness.

At an age, when most of his fellow countrymen wait to die in old people’s homes, Deming’s famous “Four-Day-Seminars”, - around 35 seminars per year each with several hundred participants-, carried the message to several hundred thousand top managers and consultants. Deming’s activities were actively supported by the Reagan Administration. It is therefore not by accident, that in the early eighties the American economy entered the longest phase of continuous growth in history. After many years of depression, America finally found its way back to high productivity and low unemployment. This is what the Deming Chain Reaction promises to be the result of all efforts to improve quality.

Deming was an uncomfortable contemporary. His attacks of the American management were relentless. “Only top management is responsible for the problems of the American economy. Every worker wants to work hard and to do a job he can be proud of. Quality begins in the boardroom and not in the workshop. It is stupid to make a foreman responsible for the quality of the products. He did not develop and design the product, he did not select the suppliers, he did not decide on the price and on the way a product is sold and serviced.” Enthusiasm, competence and experience and an unsurpassable success record characterized his message. His message was heared, understood and put to work.

When Deming’s long-standing secretary, Mrs. Cecelia S. Kilian [13], appealed to her boss to slow down, she got the answer: “I have now waited for thirty years expecting my contemporaries to listen to what I have to say. Finally, they are ready to do just that. I cannot retire before I have answered their questions.”

His Testimony

A Revolution of Thinking

The decades after World War Two brought radical changes to all aspects of human society. Taylorism, which served its purpose well in the first phase of industrialization, is no longer able to respond to these changes. Deming therefore asks for a revolution of thinking.

During the years after the war, industry was increasingly able to satisfy the hunger of the world for material products. Customers became therefore more and more interested in the quality of products and services. Organizations best able to respond to these changed requirements, became successful. Taylorism had to be replaced by a totally new way of thinking. Deming never said that this change of mind would be easy, quite the opposite.

Figure 8 shows eight areas with deeply entrenched convictions or paradigms, where the changes mentioned above required a paradigm change. Today only a few of these are widely accepted. Most of them, however, are still subject of endless discussions and this 50 years after Japan underwent this transformation and demonstrated the extraordinary effect of this new way of thinking.

Metamorphosis of the American Way of Management

The effect of Deming’s message on the American economy cannot be ignored. His Four-Day-Seminars reached the boardrooms of America’s most influential and respected corporations. His books [4, 5] and video recordings as well as the publications of his closest affiliates are sold in millions of copies. For the crippled American automobile industry the suggestions of Deming meant the last resort. The industry is able to restrain the flooding of Japanese imports. When purchasing products and services, the American Army considers the recommendations of Deming. Most organizations maintain a long range single supplier policy with their most important suppliers. The urge to continuously improve products and services penetrates all management hierarchies. In healthcare the abbreviation CQI for continuous quality improvement became a key word. The law prescribes that in healthcare all services have to be engaged in a quality improvement process. Even organizations which have earned an ISO-Certificate as a very first step on their quality journey use Deming’s ideas as a guideline in the further development of the system.

It is unquestionable that Deming initiated in America a new and better understanding for the importance of quality. This appreciation was lost during the exhilaration for quantity and growth after the Second World War. Most importantly, however, the totally new view of management revealed by Deming will outlast future generations.

The Deming Prize

Upon his visit to Japan in July 1950, Deming lectured day after day his “Eight-Day Course on Quality Control” at the Auditorium of the Japan Medical Association in Kanda-Surugadai, Tokyo. This was followed by Dr. Deming’s “One-Day Course on Quality Control for Top Management,” held in Hakone. Through these seminars, Dr. Deming taught the basics of statistical quality control plainly and thoroughly to executives, managers, engineers and researchers of Japanese industry.

His teachings made a deep impression on the participants’ mind and provided great impetus to quality control in Japan, which was in its infancy. The transcript of the eight-day course, “Dr. Deming’s Lectures on Statistical Control of Quality,” was compiled from stenographic records and distributed for a charge. Deming donated his royalties to JUSE. In appreciation of Dr. Deming’s generosity, the late Mr. Kenichi Koyanagi, managing director of JUSE, proposed using the royalties to fund a prize to commemorate Dr. Deming’s contribution and friendship in a lasting way and to promote the continued development of quality control in Japan. In 1951 JUSE’s board of directors unanimously decided to establish the Deming Prize [15]. The medal shown in Picture 3 is given to the prize winners.

The list of prize winners reads like a, “Who is Who” in Japanese industry. The list shows well known names such as Toyota, Komatsu, Ricoh, Toshiba, Bridgestone, Matsushita, Texas Instruments Japan, Fuji Xerox etc. Also Western firms became interested to apply for the prize. In autumn 1989 the prize was awarded to Florida Power & Light, a utility.

The W. Edwards Deming Institute

The W. Edwards Deming Institute® was founded by Dr. Deming in 1993. The Institute is headquartered in Washington, D.C. It is a nonprofit corporation which provides educational services related to the
teachings of Dr. Deming. These services include conferences and seminars. The Institute also makes Dr. Deming’s personal and professional papers available to researchers at the U.S. Library of Congress. The Deming Collection at the Library of Congress includes an extensive audiotape and videotape archive of Dr. Deming. The aim of The W. Edwards Deming Institute® is to foster understanding of The Deming System of Profound Knowledge™ to advance commerce, prosperity and peace.

Affiliates to the W. Edwards Deming Institute are active in practically all American states. Especially active is an organization headquartered in California. The In2: InThinking Network was formed in 2001 by a group of students of the work of W. Edwards Deming and related theorists. The aim of the network is to make thinking about systems, variation, knowledge and psychology and their interaction - which comprises Deming’s system of profound knowledge - more conscious.

Outside the United States, the W. Edwards Deming Institute has affiliates with the same objective in Australia, Canada, France, Germany, Great Britain, India, Italy, Norway, Russia, Sweden and Switzerland.

Deming as judged by Posterity

“Dr. Deming will be recognized by future generations as the personality with the strongest influence on world economy during the 20th Century.”

This statement was made by John Witney, professor at the Columbia University Graduate School of Business and at the Harvard Business School, at the Fall Conference 1998 of the W. Edwards Deming Institute in Arlington VA. Professor Witney is not the only one to make this assertion. Daniel J. Boorstin, historian and Pulitzer Prize Winner, director of the Library of Congress from 1975 until 1987, considers Deming to be the cause of the last of the nine most significant turning points of the past two millennia („History’s Hidden Turning Points“ [3]). The sequence begins with Apostle Paul, who in the middle of the first Century spread the gospel of Jesus Christ in the Roman Empire, which at that time meant the entire world. The sequence ends with Deming, whose revolutionary thinking about the quality of products and services totally changed the course of world economy during the 20th Century.

Corner Stones of Deming’s Teachings

Deming’s teachings mean a fundamental change of convictions most people have followed for a lifetime without reflection. They create a new culture in organizations. They change the relations with customers, suppliers and fellow workers. His teachings will be later described in some detail in terms of the Seven Deadly Diseases, the Seven Obstacles and the Fourteen Points for Management. But the underlying ideas of all these rules can be presented under the following three headings:

- Sustainable policies
- Continuous improvement
Sustainable Policies

In their famous book, „Business Reengineering“ [16], Hammer and Champy recommend top management to answer over and over again the following question: „Why are we doing what we are doing?“ This question may sound trivial. But the answer is vital for the long term existence of an enterprise. Employees, suppliers and customers should know and understand the answer.

Deming used to love to tell the story about the carburetor industry, which grew to be one of the largest in America before it collapsed. The industry collapsed not because the products were bad. These were the best there are. The goal of the company was to build carburetors. But in order to stay in business, the goal of the company should have been to build a product which mixes air with fuel to get the car started and running. So the ignition pump appeared on the market, which did the job more efficiently and reliably. Consequently, the carburetor producer was pushed out of the market.

Continuous Improvement

Nobody will expect an organism or a man made system to work faultlessly. But for an organism and a system to exist on the long term, deviations are only allowed to vary withing certain limits. They must be under control. Just as organisms of nature are provided with self healing capabilities, every excessive deviation in a man made system should initiate improvement processes. Improving means problem solving, problem solving means learning and learning means surviving, in nature as well as in industry. Learning ability is therefore the prerequisite for the long term existence of an enterprise.

Walter A. Shewhart, teacher and mentor of Deming, published today’s probably best known problem-solving model in his book, „Statistical Method from the Viewpoint of Quality Control“ [7]. The improvement cycle of Shewhart consisted only of the three steps: specification, II: production and III: inspection as fundamental steps in quality control.

I. The specification of the quality of the thing wanted
II. The production of things designed to meet the specification

III. The inspection of the things produced to see whether they meet the specification

In his landmark book, „Economic Control of Quality of Manufactured Product“ [6], Shewhart gives the following definition of the term „Control“ in the context of quality management.

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

In this sense, the eclipse of the sun is a predictable phenomenon. The same holds for the free fall of a mass in the gravity field. In both cases, prediction is even very precise unlike the prediction of the life expectancy of a certain individual or the tensile strength of a steel wire.

In 1950, Deming exhiled to his Japanese audience eager to learn a quality improvement cycle consisting of the four steps „Plan-Do-Study-Act“ (P.D.S.A.), Figure 9. He was always very careful to refer to this cycle as the Shewhart Cycle. This did not avoid the PD/SA-Cycle from becoming known the world over as the Deming Cycle of Continuous Improvement. The cycle became a symbol for the success of Japanese products in global competition. Its specific application in Japan is called Kaizen [17].

Even today the West does not yet understand the application of the cycle that Shewhart had in mind. Shewhart intended this cycle being used together with his methods for process analysis. Only the correct view of process behavior leads to insight into the nature of processes as a prerequisite for process improvement. „What you do not understand, you cannot improve!“ It is also very helpful to view the cycle as a three dimensional spiral, since every passage of the cycle lifts the quality to a higher level.

When Deming in 1992, after the fall of the iron curtain and at an age of 92 years, was invited to come to Moscow to give advice for the economic development of the Soviet Union, he presented this cycle as a new way of thinking.

The System of Profound Knowledge

Big efforts and hard work do not accomplish anything, if they are not led by profound knowledge. This profound knowledge cannot be replaced by anything else. What is not understood, cannot be improved. Changes without thorough understanding is tampering. Deming recognizes that profound knowledge rests on four pillars, also called Four Pillars of Wisdom, each pillar depending on the other three, thus each being part of a system, the System of Profound Knowledge (SoPK). The pillars stand for Appreciation for a System, Knowledge about Variation, Psychology, Theory of Knowledge (Figure 10).

Many are convinced that SoPK is the most valuable legacy of Deming for this and future generations.

Appreciation for a System

In 1950 Deming confronted Japan with a totally new view of the world, the systems view. But before dealing with this new world view, the concept of the system itself has to be understood. The following definition is taken from the book of Russel L. Ackoff, „Ackoff’s Best“ [18, page 15ff].

A System is a set of two or more elements that satisfies the following three conditions:

1.) The behavior of each element has an effect on the behavior of the whole.
2.) The behavior of the elements and their effects on the whole are interdependent.
3.) However subgroups of the elements

Figure 9 Plan-Do-Study-Act (P.D.S.A.)-Cycle (also known as Shewhart-Cycle, Deming-Cycle or Ishikawa Cycle) with the four steps for problem solving and continuous improvement

The Swiss Deming Institute

Ernst C. Glauser

- 14 -
are formed, each has an effect on the behavior of the whole and none has an independent effect on it.

Therefore, when a system is taken apart, it loses its essential properties, which again means, that a system cannot be understood by analysis. Synthesis, or putting things together, is the key to systems thinking just as analysis, or taking them apart, was the key to Machine-Age thinking. Based on this concept, Deming recommended the Japanese to view production as a system as shown in Figure 11 and not as something to be taken apart. In retrospect, Deming believed that this diagram had by far the biggest impact on Japan’s recovery after the war.

Knowledge about Variation

Whatever man does, thinks, feels, perceives and senses is part of a process. Processes transform input to output and nothing in this relation can said to be true, absolute, constant, fixed and unyielding. Everything is variable.

This is not new, it is natural. Man has always understood to live with it. This fact, however, became increasingly important in the transition from custom building to mass production with the need to make parts exchangeable. For many decades, statisticians investigated the nature of process variability and arrived at methods which became known as „Statistical Process Control“ (SPC).

Deming became acquainted with this field of research during his close cooperation with Walter A. Shewhart (March 18, 1891 - March 11, 1967), physicist, engineer and statistician (Picture 4). He became aware of the importance of a thorough understanding of process behavior as a prerequisite for process improvement. „You can only improve what you understand“. Shewhart described his findings in the book „Economic Control of Quality of Manufactured Product“ [6].

Figure 12 shows the result of the application of Shewhart’s method to a practical example. The variation of electrical resistance is shown over a certain period of time. The process behind produces an arbitrary looking scatter of points. At first glance, nothing can be said about the process. Does the process satisfy the requirements? When not, what could be done to improve it?

The method of Shewhart determines the arithmetic average of process variation MEANx, the upper natural process limit UNPLx, and the lower natural process limit LNPLx. This paper cannot go into the details of the application of Shewhart’s method. Only a few explanations will therefore be given.

The upper natural process limit UNPLx and the lower natural process limit LNPLx define a certain width for the spread of the points. If process variation would be completely within these limits, it could be said that the process is in statistical control. The reason for the variation is random. The variation has common causes. It is therefore called Common Cause Variation. There is no way to find out, why one point is different from the other. The reason may be an arbitrary combination of causes within the process. It can be said, on the other hand, that a process in statistical control will vary in the future between the same upper and lower limits if no external influence occurs. This is a prediction. Deming says over and over again: „Management is Prediction“.

The example in Figure 12, however, shows quite a large number of points outside these two limits. The process exhibits Special Cause Variations, it is out of statistical control. The process is chaotic and nothing can be said about its behavior in the future. No prediction is possible. Shewhart says that every point outside the limits is very likely to have a special cause and that it is therefore economically feasible to search for this cause. Causes have to be identified and measures have to be taken that these causes cannot occur again in the future. After all measures were taken, it has to be demonstrated that the elimination of all special causes will produce a process under statistical control, e.g. a process, the behavior of which in the future is predictable.

If the hand width of a process in statistical control is not acceptable, the process must be reengineered, e.g. by replacing worn out machinery or by redefining process structure.

During his four-day-seminars, Deming used to visualize some of his most basic statements with experiments. The „Red Bead Experiment“ and the „Funnel Experiment“ were used to deepen the understanding for variation.

The Red Bead Experiment (Picture 6), in particular, was used to illustrate the following facts:

- Quality is defined by top management.

Figure 10 Deming’s System of Profound Knowledge (SoPK) with its four pillars: Appreciation for a System, Knowledge about Variation, Theory of Knowledge and Psychology

Figure 11 Production as a System as presented to the Japanese by Deming in 1950

Appreciation for a System
Knowledge about Variation
Psychology
Theory of Knowledge

Figure 10 Deming’s System of Profound Knowledge (SoPK) with its four pillars: Appreciation for a System, Knowledge about Variation, Theory of Knowledge and Psychology

Figure 11 Production as a System as presented to the Japanese by Deming in 1950
In most cases, man cannot be made responsible for defects.

Rigid and detailed work procedures do not guarantee for quality.

A numerical quota is a fortress against improvement of quality and productivity.

100 percent inspection is costly and of limited use.

The Nelson Funnel Experiment leads to the following conclusions:

- There are processes, where man can decisively influence quality.
- Hasty and unreflected process interventions (tampering) will deteriorate quality and can produce uncontrollable conditions. Processes may get out of hand and may, in the words of Deming, escape to the Milky Way.

Both experiments are described vividly in the book of William J. Latzko und David M. Saunders, „Four Days with Dr. Deming“ [19].

Genichi Taguchi (Picture 5) made a pioneering contribution to the understanding of variation. He was a member of the first generation in the Japanese quality movement. He laid the basis for Robust Design as an employee of the Nippon Telephone and Telegraph Company (NTT) in the fifties and early sixties. His contribution to the development of quality management was honored with the Deming Prize in 1962. Unfortunately, the corresponding publication „System of Experimental Design” was published in English not before 1987 [8]. In the meantime, the products developed, designed and built on the basis of Genichi Taguchi’s work have become world-renowned.

Walter Andrew Shewhart (1891 - 1967), physicist, engineer and statistician, father of statistical process control (SPC)

Genichi Taguchi (*1924), engineer and statistican. Inventor of the Taguchi Loss Function
of the Deming philosophy and the Taguchi method captured the world market. The supremacy of Japanese products is attributed to about 80% to the application of the Taguchi Methods.

Taguchi defined the term “Quality” in a way that could be applied by engineers in all phases of the manufacturing of a new product. The practical application of the definition in the design process is called “Quality Engineering”.

The old traditional definition of quality states that quality is conformance to specifications. This definition was expanded by Joseph M. Juran (Picture 2). Juran observed that “quality is fitness for use.”

Taguchi presented yet another definition of quality. His definition stressed the losses associated with a product. Taguchi stated that “quality is the loss a product causes to society after being shipped, other than losses caused by its intrinsic functions.” Taguchi asserted that losses in his definition “should be restricted to two categories: (1) loss caused by variability of function, and (2) loss caused by harmful side effects.”

Taguchi is saying that a product or service has good quality if it performs its intended functions without variability and causes little loss through harmful side effects, including the cost of using it. His philosophy embodies three important premises:

1.) For every product quality characteristic there is a target value which results in the smallest loss.

2.) Deviations from target value always result in increased loss to society.

3.) Loss should be measured in monetary units (dollars, pesos, francs, etc.).

This implies that any deviation from the target (based on customers’ desires and needs) will diminish customer satisfaction. Customer satisfaction can always be improved. This definition of quality is therefore also called the desirability approach. This is in contrast to the traditional definition of quality as conformance to specifications, also called the acceptability approach. In the acceptability approach, zero defects are possible. When zero defect state is reached, further improvements are no longer possible.

Management has been trying this approach since the beginning of the industrial revolution. The consequence was lack of progress. There is no reason to believe it will be different in the future.

The acceptability approach and the desirability approach have different objectives and lead therefore to different results. Management must adopt one or the other as a guiding principle.

This overview paper cannot go into detail with respect to the practical application of the Taguchi Methods. Since the middle of the eighties, a considerable number of books that deal with this subject were published in English, e.g. [20].

The Taguchi philosophy motivated the Japanese to strive for lower and lower deviations from target by continuously improving the work processes. The result were smaller and smaller dispersions of product characteristics producing gains as predicted by Deming along his Chain Reaction.

Japanese automobile manufacturers produce doors with that high a precision, that they can be fitted to the chassis without any adjustment. Parts are produced to „Snap-Fit”-Accuracy.

California was the first State where in 1960 the first penetration by the Japanese car makers took place. Frank Pipp, a former manufacturing executive with Ford completely disassembled a Toyota truck in order to get a feel for how well made it was. At that time, Ford, along with the other American auto makers, didn’t believe that you could assemble a car without a rubber mallet to bang together the parts that didn’t fit quite right. But when the invited automobile executives watched how a team reassembled the Toyota truck again, they were speechless. Not once did the team have to pick a mallet. All parts were entirely snap-fit. To make sure they were not hallucinating, they took it apart a second time and put it back together again. Incredibly enough, it was a snap-fit vehicle. Everybody
was speechless, until the division general manager cleared his throat and remarked: „The customer will never notice.“ Everybody agreed and trotted off happy as clams. For the American automobile industry, this arrogance toward the customer could not have had worse consequences.

This story was taken from the book of Kerins and Nadler, „Prophets in the Dark“ [21].

In the early eighties Ford equipped one of its products with an automatic transmission built for Ford by Mazda in Japan. The customer noticed, that the cars with the transmission built by Mazda operated with much less noise and no defects requiring costly warranty work as compared to the same type of car using the same automatic transmission built based on the same specifications by Ford in Batavia, Ohio [22].

Customers do not care whether something is built to specification or not. They notice, however, whether they are satisfied with a product, even if they are not able to reason. They pass this feeling on to friends and new customers are won.

This is the reason for the extraordinary success of Japanese products on the world market. Japanese manufacturers did just everything to consider the needs and desires of customers from development, to design, production, distribution, after sales service and continuous product improvement. They still do it today as it is shown by the results of the J D Power Customer Satisfaction Study 2004, 2005, 2006 [23] in Figure 13.

Year after year, Toyota leads the list by a considerable margin, followed usually by the Japanese car manufacturers Honda, Mazda, Subaru and Mitsubishi. Over decades of consistent performance Toyota accumulated an immense capital in terms of public trust motivating customers to return and to take their friends along. Toyota does not need to offer huge discounts and other sales incentives to “move the metal”. The result immediately shows up under the bottom line.

Despite today’s cruel economic environment, Toyota manages to grow continuously and to make large profits. In 2004 Toyota passed Ford to become the second largest automobile producer. Before long, Toyota will overtake General Motors becoming the biggest car company in the world probably having no less than 15% of the world market. Toyota will continue to grow because of the unparalleled quality of the products, the creative potential of the workforce and last but not least the tremendous financial strength as reflected by its market capitalization. Toyota will prevail. Most others will have the choice between shrinking or sinking.

Toyota is probably the most impressive demonstration that Deming’s Chain Reaction as shown in Figure 6 works indeed.

Theory of Knowledge

The term „knowledge“ has to be understood as a part in the sequence of data, information, knowledge, understanding and wisdom. Russell Ackoff [18] defines these terms as follows:

Data is raw. It simply exists and has no significance beyond its existence (in and of itself).

Information is data that has been given meaning by way of relational connection. This "meaning" can be useful, but does not have to be.

Knowledge is the appropriate collection of information, such that it’s intent is to be useful.

Understanding is the process by which I can take knowledge and synthesize new knowledge from the previously held knowledge.

Wisdom beckons to give us understanding about which there has previously been no understanding, and in doing so, goes far beyond understanding itself.

When talking about this subject, Deming referred to the book of Clarence Irving Lewis, „Mind and the World Order“ [24]. The following statements are taken from his book, „The New Economics“ [5].

Management is Prediction.

The term „knowledge“ has to be understood as a part in the sequence of data, information, knowledge, understanding and wisdom. Russell Ackoff [18] defines these terms as follows:

Data is raw. It simply exists and has no significance beyond its existence (in and of itself).

Information is data that has been given meaning by way of relational connection. This "meaning" can be useful, but does not have to be.

Knowledge is the appropriate collection of information, such that it’s intent is to be useful.

Understanding is the process by which I can take knowledge and synthesize new knowledge from the previously held knowledge.

Wisdom beckons to give us understanding about which there has previously been no understanding, and in doing so, goes far beyond understanding itself.

When talking about this subject, Deming referred to the book of Clarence Irving Lewis, „Mind and the World Order“ [24]. The following statements are taken from his book, „The New Economics“ [5].

Management is Prediction.

Management in any form is based on predictions. Even the most simple everyday decision, e.g. to drive home in the evening, is based on a number of predictions. Pre-
dictions require knowledge.

Knowledge is built on Theory.

Without a theory, there are no questions, without questions there is no learning. Theory without experience is of no value, experience without a theory is dangerous and costly.

Use of Data requires Prediction

Interpretation of data from test or experiment is prediction on what will happen upon application of the conclusions or recommendations that are drawn from a test or experiment.

There is no such thing as a fact

There is no true value of any characteristic, state or condition that is defined in terms of measurement or observation. Changes of procedure for measurements or observations produce new numbers. The number of people in a room depends on who is counted. The amount of iron in a shipload of iron ore depends on the procedure for taking samples. The rules on how to measure or observe are called Operational Definitions.

Psychology

Psychology deals with mental processes and behavior. It tries to answer the question on why humans behave the way they behave.

Products and services are produced by human beings and each of them is unique. Everyone dispose of an unforeseeable potential of wisdom, knowledge, creativity, experience and energy only waiting for exploitation. Neither understanding for systems, for variation nor knowledge can contribute as much to the success of an organization as a wise, thoughtful, responsible and understanding management of human resources.

Patrick M. Lencioni, an internationally known management consultant on team work, endorses this statement as follows:

"Not finance. Not strategy. Not technology. It is teamwork that remains the ultimate competitive advantage, both because it is so powerful and so rare. (...) If you could get all the people in an organization rowing in the same direction, you could dominate any industry, in any market, against any competition, at any time."

The Seven Deadly Diseases, the Seven Obstacles and the Fourteen Points for Management will show, that Deming supports a view on how to deal with human beings in organizations which completely differs from what today is still considered to be good management practice.

Deming’s view is supported by the results of a huge number of investigations described by Alifie Kohn in his two books „Punished by Rewards“ [25] and „No Competition“ [26].

Awards, Standards and Certificates

More than thirty years after Japan started to flood the world with products of unparalleled quality, Western industrialized nations choose to react. Not knowing any better, they finally decided to install quality awards and to develop quality standards.

The Malcolm Baldridge National Quality Award (MBNQA), the European Quality Award (EQA) and the ISO 9000 and ISO 14000 families of quality standards are brieﬂy described below.

Malcolm Baldridge National Quality Award (MBNQA)

In the early and mid 1980s, many industry and government leaders saw that a renewed emphasis on quality was no longer an option for American companies but a necessity for doing business in an ever expanding and more demanding, competitive world market. But many American businesses either did not believe quality mattered for them or did not know where to begin. The Baldridge Award was envisioned as a standard of excellence that would help U.S. organizations achieve world-class quality.

Juran and Feigenbaum were the main creators of the criteria behind the award. Both Deming and Crosby refused to take part in setting up the Prize because they disagreed on the criteria.

Congress established the award program in 1987 to recognize U.S. organizations for their achievements in quality and performance and to raise awareness about the importance of quality and performance excellence as a competitive edge.

Malcolm Baldridge was Secretary of Commerce from 1981 until his death in a rodeo accident in July 1987. Baldridge was a proponent of quality management as a key to the country’s prosperity and long-term strength. In recognition of his contributions, Congress named the award in his honor.

The Baldrige Award is given by the President of the United States to businesses—manufacturing and service, small and large—and to education and health care organizations that apply and are judged to be outstanding in seven areas: 1) leadership, 2) strategic planning, 3) customer and market focus, 4) measurement, 5) analysis and knowledge management, 6) human resource focus, 7) process management and results.

In the beginning, the interest of the industry for this award was quite lively. In 1991, more than one hundred applications were sent to the award committee. During the subsequent years, the number of applications decreased continuously. In 1997, only 20 applications were entered.

European Quality Award (EQA)

By 1989 14 major European companies (Bosch, BT, Bull, Ciba-Geigy, Dassault, Electrolux, Fiat, KLM, Nestle, Olivetti, Philips, Renault, Sulzer, Volkswagen) and the European commission founded the European Foundation for Quality Management (EFQM). In 1991 EFQM launched the European Quality Award EQA in response to the Deming Award in Japan and the Malcolm Baldrige Award in the USA.

Regardless of sector, size, structure or maturity, to be successful, organisations need to establish an appropriate management framework. The EFQM Excellence Model was introduced at the beginning of 1992 as the framework for assessing organisations for the European Quality Award. It is now the most widely used organisational framework in Europe and it has become the basis for the majority of national and regional Quality Awards.

The EFQM Excellence Model is a non-prescriptive framework based on 9 criteria. Five of these are „Enablers“ and four are „Results“. The „Enabler“ criteria cover what an organisation does. The „Results“ criteria cover what an organisation achieves. „Results“ are caused by „Enablers“ and „Enablers“ are improved using feedback from „Results“.

The Model, which recognises there are many approaches to achieving sustainable excellence in all aspects of performance, is based on the premise that excellent results with respect to performance, customers, people and society are achieved through leadership driving policy and strategy, that is delivered through people, part-
Management System

ISO (International Organization for Standardization), a non-governmental organization, is one of the world's foremost developers of voluntary technical standards. The ISO Central Secretariat is located in Geneva, Switzerland.

In 1987, ISO started to publish two families of management standards, ISO 9000 and ISO 14000. Both are among ISO's most widely known standards ever. They are implemented by some 887,770 organizations in 161 countries.

The ISO 9000 family is primarily concerned with "quality management". This means what the organization does to fulfill the customer's quality requirements and applicable regulatory requirements while aiming to enhance customer satisfaction and achieve continual improvement of its performance in pursuit of these objectives.

The ISO 14000 family is primarily concerned with "environmental management". This means what the organization does to minimize harmful effects on the environment caused by its activities and to achieve continual improvement of its environmental performance.

Both families are "generic management system standards". "Generic" means that the same standards can be applied to any organization, large or small, whatever its product including whether its "product" is actually a service in any sector of activity and whether it is a business enterprise, a public administration or a government department.

"Generic" also signifies that no matter what the organization's scope of activity, if it wants to establish a quality management system or an environmental management system, then such a system has a number of essential features for which the relevant standards of the ISO 9000 or ISO 14000 families provide the requirements.

"Management system" refers to the organization's structure for managing its processes - or activities - that transform inputs of resources into a product or service which meet the organization's objectives such as satisfying the customer's quality requirements, complying to regulations or meeting environmental objectives.

Effect of Awards and Standards on European Economy

Europe was very late to jump on the quality bandwagon, much too late. Europe did it after it has already lost most of its traditional markets. With apparently no resistance, Europe renounced from its leadership position in areas such as consumer electronics, photography, computers, motor vehicles and container ships. Without Nokia, the world's largest manufacturer of mobile devices, there seems to be no other area where Europe dominates the market. It is sad to observe that many of the most successful ideas in technology have European roots, but business is now made by others.

This sad development had unpleasant consequences indeed. The report of the European Commission to the Special European Council in Lisbon, 23rd to 24th March 2000 [27] says bluntly:

"Between Europe and its main trading partners and rivals, the USA and Japan, there exists a recurrent and apparently intractable competitiveness deficit. The EU has lower growth than the USA, unacceptably high unemployment and too many of its citizens are excluded from employment. Simply, it is not as dynamic as its main competitors."

Currently, around 10% of the workforce is unemployed (15 million people), poverty and social exclusion are colossal. The Commission estimates that the under use of available human resources and the wider costs of wastage in the economy (including ill-health, crime and related costs) could be between one and two thousand billion Euro per year (12 to 20% of GDP). This is a cancer at the heart of European society, wasted resources crying out to be more productively used."

The report of the European Commission [27] also shows the development of the employment rate (an indicator for productivity) in Europe EU15, in the USA and in Japan over the past 40 years (Figure 14).

The invasion of Japanese products affected America more than it did Europe. As a consequence, in the 1970's, some of America's key industries were on the edge of ruin and unemployment reached its highest post-war level (Figure 5). American industry faced a crisis. On the 24th July 1980, the NBC documentary "If Japan Can..... Why Can't We?" shook America out of its complacency. The American public were averse to the ideas, thoughts and concepts which 30 years earlier had been grasped in the Far East with overwhelming success but which in other industrial nations had been misunderstood and poorly applied. America returned from recession to higher productivity and employment. The message of Deming together with the business friendly politics of the USA's 40th President, Ronald Reagan (from 1981 to 1988), were critical for the recovery of the USA. It becomes clear from papers in the US Library of Congress that the Reagan Administration heard, understood and supported Deming's message and allowed it to influ-
ence political thinking.

Development in Europe was somewhat different. The invasion of Japanese products was never so strong as to set off a significant quality movement. Little by little, though, its traditional markets became eroded by Japanese competition. Even this did not wake up Europe from its self-righteous slumber. In 1987 a series of quality standards, ISO 9000 and ISO 14000, were released and in 1991 the European Quality Award EQA was launched. Figure 14, however, does not show any clear sign, that these measures were able to change the downward trend of the European economy.

A Critical View of Standards and Awards

Deming opposes all sorts of incentives or extrinsic motivators as a means to promote quality. Standards and awards focus organizations on the visible symbols of achievement such as certificates and medals and distract from the real goal of quality improvement, sustainable competitiveness in the world market.

The Deming management philosophy depends on a set of strong convictions or values. Ethnologists found that every human being is inherently provided with the same set of values. They are given to man by nature and do not need to be learned before. They are therefore also called laws of nature. Everybody feels about the same on what is good or bad, what is right or wrong, what is beautiful or ugly, encouraging or depressing. Deming is led by the values of his Christian faith. Since these do not oppose laws of nature, everybody is able to agree.

Today, the life of mankind has become so interrelated, so complex, that laws of nature alone do not guarantee success in life and business. Figure 15 illustrates that requirements in the following seven areas must also be satisfied: 1) philosophy (values), 2) vision, 3) strategy, 4) skills, 5) resources, 6) rewards and 7) organization. If only one of these requirements is missing, success is jeopardized. Figure 15 shows the possible consequences, if one of the seven links in the chain is absent.

Deming was 87 years old, when in 1987 the first version of the ISO 9000 family of quality standards was published and the Malcolm Baldrige National Quality Award (MBNQA) was announced. Products and services of unparalleled quality were, up until then, the consequence of the profound understanding and application of the basic principles of quality management as taught by Deming in Japan in 1950 and the years after. They came about without the influence of quality standards and quality awards. These instruments did just not exist at the time.

The values, needs and desires of human beings are at the core of the Deming management philosophy. Quality standards and quality awards, however, want to be free of values. This was the reason, why Deming could not support the criteria of the Malcolm Baldrige Award (MBNQA). The authors of standards and award criteria wanted these instruments to be applicable to any type of organization, a manufacturer, a charity organization, a university, a hospital, a financial institution, the Mafia (Cosa Nostra), a terrorist network etc.

Even though Deming recognized the tremendous importance of standardization in society, quality standards and awards are of no meaning in his comprehensive, all inclusive quality framework, his System of Profound Knowledge (SoPK). Understanding of basic principles is all that matters.

It is tragic for the millions of people that are unemployed that management of both public and private European organizations still largely ignore fundamental aspects of the philosophy behind modern quality management that helped the Japanese conquer large world market shares in electronics and automobiles and played a crucial role in the return of the US economy to the longest period of steady growth in the early eighties.

The ISO 9000 and 14000 series of quality standards represented a noble effort launched with good intentions. However, it did not work and many experts predicted that already back in the mid 1980’s when the first draft standards were circulated. Certification, documenting procedures and so on does not necessarily lead to improvement of productivity and quality. At best it may serve as a minimum. But most often ISO 9000 is used to codify the current, not necessarily very good way of doing things and in practice there is little if any emphasis on improvement, satisfying customers and reducing costs. It is a command-and-control system that stifles innovation and a genuine quality spirit. Indeed it often breeds a cynical attitude towards quality. Instead of satisfying the customers with better products and services, the effort frequently is entirely focused on satisfying the auditors, on receiving the certificate or the award medal and on the incurred publicity.

Just like a new drug is tested before it is marketed, a scientific approach would demand empirical evidence from a pilot study showing significant benefits of ISO 9000 and 14000 before the system was implemented on a broad scale. That never happened! There exists no empirical evidence showing that companies using ISO standards have more satisfied customers, greater...
ter market share or have created more jobs than those that did not. Modern quality improvement as developed over decades in Japan and the United States under the philosophical leadership of Shewhart, Deming, Juran, Taguchi, Ishikawa and others, on the other hand, have been tested again and again and has shown significant evidence of results.

In 2003, the author supervised the research for the thesis of an MBA student [29]. The research examined the question, whether the winning of an international quality award had a positive impact on overall corporate performance.

Each of the international quality award programmes examined (Deming Prize, MBNQA, EQA) claim that by implementing their criteria for quality and by being awarded with a prize for successfully completing the criteria, then this will ensure the companies business success for the future.

The Deming Prize committee claim that by implementing and winning their prize, it will open up the route to business success. The MBNQA claims that by winning their prize, it will help companies improve organizational practices, capabilities and results. The EQA claim that the companies that win the European Quality Award will be helped to continuously improve their business results.

Many studies were conducted to study the impact on awards on business success. They did all together not arrive at conclusive results. The MBA-thesis, however, applied for the first time the methodology of Shewhart on statistical process control SPC to answer this question.

Six companies that won quality awards in 1997 were investigated. Neither of the companies showed any sign of a special cause over the period of five years before and five years after the award that could be attributed to the award process. All investigated success criteria varied between the upper and lower natural process limits over the entire ten year period. This means that the awards had neither a positive nor a negative influence on business performance.

The Seven Deadly Diseases

Deming distinguishes between two types of barriers, which can impede or even prevent continuous improvement in organizations. Deadly diseases prevent and obstacles impede transformation.

Deadly Disease Nr. 1: Lack of Constancy of Purpose

It is the responsibility of top management to define and communicate the scope and objectives of an organization. Everybody should know them, the shareholders, the employees, the suppliers, the customers. A company that lacks constancy of purpose does not think beyond the next quarterly dividend and has no long-range plans for staying in business. The company is desperately sick and thus doomed to failure.

Many organizations lack planning. They prepare five year plans on glossy paper and distribute them to shareholders and employees. But plans without the corresponding action plans and performance reviews remain illusions.

Today's unsolved problems are the problems of tomorrow. An organization unable to distinguish between important and urgent is kept busy extinguishing fires. An extinguished fire does not solve a problem. It cannot do more than restore the original condition.

Deadly Disease Nr. 2: Emphasis on Short-Term Profits

With “creative bookkeeping”, every organization can show positive numbers on financial statements until close to collapse. This kind of management is called “paper entrepreneurialism”. The usual measures of this type of management are dismissals, acquisitions, mergers, evaluation of assets, transactions of bonds, securities, etc. Paper profits are the only ones easily available to professional managers who sit isolated atop organizations designed for a form of production that is no longer appropriate to Europe’s place in the world economy.

Paper profits divert attention and resources away from the difficult job of transforming the productive base. But nevertheless, this is what universities teach, and they do it well.

Deming is fond of saying: “Paper profits do not make the pie bigger. They give you a bigger piece. But this piece is taken from somebody else. It doesn’t help the society”.

Deadly Disease Nr. 3: Performance Reviews

Deming rejects decisively merit rating and annual performance reviews. He suggests that “management by fear” would be a better name. Management by objective (MBO) and management by the numbers fall in this category. The effects are devastating.

On the basis of many hundreds investigations, Alfie Kohn shows in his book “Punished by Rewards” [25] that performance reviews, merit ratings, incentive plans and other bribes encourage short-term performance at the expense of long-term planning. They discourage risk-taking, build fear, undermine teamwork and pit people against each other for the same rewards.

Deming says that such reviews leave people bitter, despondent, dejected, some even depressed, all unfit for work for weeks after receipt of rating, unable to comprehend why they are inferior. It is also unfair as it ascribes to the people in a group differences that may be caused totally by the system that they work in.

We treat adults like children with report cards, except that we don’t require a parent’s signature. The damage done to children by rating is horrendous. Many children stop learning. When will we understand variation?

Every individual is different. No system and criteria can change the fact, that in a given group of people some are above average, some are about average and some are below average. The same would also hold for a group of Noble Prize winners. It cannot be observed that rating helped an individual to improve. Quite the opposite is true! There are always some who know how to manipulate the system for their own benefit. The ratings are a poor substitute for leadership.

People learn differently. Our educational system honors those who are fast to comprehend. But some are fast, others are slow. But this criteria doesn’t mean anything for what a student is able to accomplish in his future practical work.

“I never grade my students”, said Deming when asked how he rates his students. “I give them all A’s. How do I know how the student will perform in the future. They may turn papers in, I don’t care when. What do I get? Some of the papers are good, some are even excellent and ready to be published. Who am I to judge?”

Ernst C. Glauser
People are convinced that rating will initiate competition and competition will motivate improvement. What an illusion! The greatest accomplishments of mankind were made without competition. Two hundred years ago Sebastian Bach was writing the rules of harmony for all time. Why did he do that? Pride of workmanship. Was Einstein driven by competition? Certainly not! Who dared to be his competitor? Competition is the subject of another book by Alfie Kohn [26].

Despite all these drawbacks, extrinsic motivators such as performance reviews, grades, performance-related pay, rewards and bonuses are still considered to be good management practice.

Employees have a right for further development, a right to be trained and educated. Regular discussions with employees should not be conducted with rating in mind. They should reveal know how, knowledge, experience and respective needs of improvement. They should identify problems of working atmosphere and individual plans for long term personal development.

**Deadly Disease Nr. 4: Job Hopping**

At this point Deming describes the „White Knight Syndrome“. The white knight joins an ailing company as a rescuer promising to get the company back on track. He arranges for changes which promise short term profit, shows positive results, collects the bonus and runs away before the long term consequences of his actions become visible.

Mobility from one company to another creates prima donas for quick results. It annihilates teamwork, and teamwork is vital for continued existence. Deming quotes J. Noguchi, managing director of the Union of Japanese Scientists and Engineers: „America cannot make it because of the mobility of American management.“

Mobility of labor is another problem, almost as bad as mobility of management. A strong contributing factor is dissatisfaction with the job due to lack of pride at the workplace. People either stay home or look around for another job expecting that pride will return. Absenteeism and mobility is largely a consequence of poor supervision and poor management.

**Deadly Disease Nr. 5: Management by Figures**

A company cannot be managed without visible figures. Figures are necessary for bookkeeping, the control of turnover, revenues, expenses and cash flow, payments to suppliers, payments of salaries, filing of tax returns, etc. But he that would run his company on visible figures alone will in time have neither company nor figures.

The most important figures that one needs for management are unknown or unknowable, but successful management must nevertheless take account of them. What is the benefit of a happy customer or the damage done by an unhappy customer? The same question could be asked with respect to the effect of happy or unhappy employees. What is the benefit of quality improvement measures? What is the loss from inhibitors to pride of workmanship of employees or from the annual performance rating?

Visible figures such as monthly reports reflect the performance of the past. Managing a company by means of the monthly report is like trying to drive a car by watching the yellow line in the rear-view mirror. But managers still do that, even today. Explanations are required for any figures which are not as good as they should be. Reports have to be written. Action plans for dealing with the problem have to be established and then values had better improve - whatever that means.

Management should not worry about results, they should listen to the voice of the process. Management is prediction. Nothing can be predicted by just looking at a few figures of the past. Predictions can only be derived from the analysis of process behavior over a long enough period of time. If such an analysis shows a stable process, in other words, a process in statistical control, the process will most certainly remain stable also in the future. The process is predictable.

Improvement measures without a deep insight into the nature of processes will make the processes worse, unstable, chaotic and therefore unpredictable. This is messing around with processes, also called tampering.

Statistical process analysis takes time and only a few managers are ready to invest this effort. It surprises that there is never enough time to do something right from the beginning and always enough time to do the same thing over and over again.

**Deadly Disease Nr. 6: Excessive Medical Costs**

William E. Hoglund, CEO of the Pontiac Motor Division, asserts that Blue Cross Blue Shield is the second largest supplier of his company. The cost for health insurance amounts to appr. $ 400 per car produced.

Even though this issue is of particular interest in the United States, it becomes a more and more a critical subject in other industrialized countries as well. Every dollar spent on healthcare is a loss or waste („muda“ in Japanese) and damages the competitiveness of a country in international markets. Nevertheless, people have become used to the fact, that healthcare branches off more and more of a nation’s productive potential. In order to remain competitive, every effort has to be made to reduce medical expenditures to an absolute minimum. A system unable to accomplish this does not satisfy its purpose and should be replaced by something more effective.

Industry has learned that decades ago. Toyota became a world model company in productive excellence by eliminating every waste in its production system. Toyota considered everything being waste, which does not add value for the consumer.

**Deadly Disease Nr. 7: Excessive legal costs**

Also this issue is of particular relevance in the United States.

Contracts confirmed by handshake have become an exception in Western industrialized nations. But a handshake together with an open look into the eyes of the business counterpart expresses commitment, responsibility and mutual trust. It is much more difficult to violate an agreement made on this basis than it is to breach a written contract set up by lawyers in great detail.

Mistrust doubles the cost of doing business. Mistrust is the basic reason for procedures drawn up in great detail, often 30 or 40 or more pages, for any agreement or transaction in business, whether it be simple or complex.

In contrast, two companies would draw up an agreement in one or two pages, with phrases such as „details to be worked out later, if need arise.“ It is understood without comment that the basis for working out the details later would be win-win, neither party to be the loser.
The Seven Obstacles

Obstacle Nr. 1: Quick Fix
Some believe that quality can be installed in a company like a new machine or a computer network. Put somebody in charge and quality will follow! What an illusion! In quality, there is no quick fix, no instant pudding. Quality improvements are the result of long and sustainable efforts and not the result of a process called quality.

Obstacle Nr. 2: Automation, Computers and New Machinery
Many expect wonders from investments in automation, computers and new machinery. In general, new technology increases the variability of processes, since it is usually controlled by single data measurements. Before investments are decided upon, it is always better to analyze the existing processes, to eliminate all special causes and to look after the common cause variations afterwards. If new technology is considered to reduce the dispersion, a process reengineering should follow using the P.D.S.A.-cycle to make sure that the investment produces the expected results.

Obstacle Nr. 3: Search for Examples
Every company strives for better quality and higher productivity. Not knowing how to go about it, companies embark on excursions to other companies that are ostensibly doing well. They are usually received with open arms and the exchange of ideas begins. Without knowing the underlying principles and methods, neither company knows whether or why any procedure is right nor whether or why another is wrong. The question is not whether a business is successful, but why and why was it not more successful. One can only hope that the visitors enjoyed the ride. They are more to be pitied than censured.

It is a hazard to copy from the best in class. In most cases, it leads to failure and frustration. It is necessary to understand first the theory of what one wishes to do or to make.

In the early seventies, American and European managers went on pilgrimage to Japan. They saw the quality circles and went home with the illusion that all they had to do to is to copy this tool only to find out some time later that they have a dud. A quality circle can thrive only if the management will take action upon the recommendation of the circle. But Western managers did not do their share of the work. Somebody in charge of introducing this tool is therefore careful to work first with the manager, to lay the foundation of a quality circle with a chance to succeed.

Another example is the Just-in-Time (JIT) supplier-client relationship. The system aims at having “the right material, at the right time, at the right place and in the exact amount.”

It is generally not known that the Ford Motor Company applied this technique for the first time as early as in 1922. The technique was subsequently adopted, improved and publicised by the Toyota Motor Corporation of Japan as part of its Toyota Production System (TPS) after 1950. The system was developed as part of the huge effort under the direction of Taiichi Ohno (Picture 8) to reduce every possible loss (muda) in the production system that does not add value for the customer [28].

Just-in-time (JIT) inventory systems are not just a simple method that a company has to buy in to; it has a whole philosophy that the company must follow. It embraces suppliers and clients and is driven by the customer, who orders a product. Toyota does not build a car unless it is ordered and paid for. It requires close and long-range client-supplier relationships based on mutual trust and therefore excludes buying from the cheapest supplier only as it is still common practice in the Western world.

Benchmarking is nothing but a respectable expression for „copying“. Quality does not come from copying but from profound knowledge for systems, variation, knowledge and psychology.

Obstacle Nr. 4: Our problems are different!
A common disease that afflicts management and government administration the world over is the impression that „our problems are different“. They are different to be sure, but the principles that will help to improve quality of products and services are universal in nature.

Obstacle Nr. 5: Manager Training
Management training programs at the universities are responsible for many of today’s problems in industry. The programs want to prepare the student for management tasks in business. This means that young graduates expect to be able to apply in practice what they have learned in school. They are taught that there is a profession of management and that they are prepared to step into top jobs. But most students do not have experience neither in production nor in sales. To work on the factory floor with about half the pay he hoped to get upon receipt of an MBA is not attractive to our affluent young generation. As a consequence, he struggles on, unaware of his limitations or unable to face the need to fill in the gaps. The results are obvious. What else can these young and smart men and women do after being shot to the top of corporations but to practice what has been already explained under Deadly Disease Nr. 5, management by figures.

Practically all our major corporations were started by technical men, inventors, mechanics, engineers, chemists, who had a sincere interest in quality of products. Now these companies are largely run by men interested in profit, shareholder value, profit and loss statements, not in the product.

Obstacle Nr. 6: Knowledge of Statistics
Statistics is the key subject matter of quality management. All the eminent scientists who laid the ground on which today’s knowledge of quality management was built were statisticians: Sir Ronald Aylmer Fisher, Walter A. Shewhart, W. Edwards Deming, Josef Juran and Genichi Taguchi and many others.

Picture 8 Taiichi Ohno (1912-1990) is considered to be the father of the Toyota Production System TPS, also known as Lean Manufacturing [28]
European universities do not teach the type of statistics applicable to the field of quality management. After two years of teaching and research at the University of St. Gallen, Prof. Bisgaard left the university and returned to the United States totally disappointed with the quality management practices being taught in Europe. Before coming to St. Gallen, Prof. Bisgaard was professor for quality management at the University of Wisconsin. He presently holds the position of interim dean at the Isenberg School of Management, University of Massachusetts at Amherst.

Prof. Bisgaard qualified Europe as a “Statistics Desert”. Based on this impression, Bisgaard became a co-founder of the European Network for Business and Industrial Statistics, ENBIS (for more information visit www.ibisuva.nl). This is an organization with now well over 280 members from more than 20 countries and is still growing. A primary purpose of this initiative was to encourage the use of statistics for quality improvement in European business and industry.

Obstacle Nr. 7: Specifications

There is obviously something wrong when a measured characteristic barely inside the specification limits is declared to be conforming, outside it is declared to be non conforming. The supposition that everything is all right inside the specifications and all wrong outside does not correspond to this world.

A customer does not care about specifications. All he wants is that a product does what it is supposed to do over a long period of time with no breakdowns. If a product does not meet his expectations, the customer will switch to another product.

Unfortunately, a satisfied customer may also switch on the theory that he could not lose much by switching and even might gain. Profit in business comes from repeat customers, customers that boast about your product and service and bring friends with them.

Gadgets and servomechanisms that by mechanical or electronic circuits guarantee zero defects will destroy the advantage of a narrow distribution of dimensions. They slide the distribution back and forth inside the specification limits, achieving zero defects and at the same time driving losses and costs to the maximum.

Quality will profit much more when suppliers are invited to participate in the development process. In this case, specifications are useless. The requirements for the characteristics of a product are worked out jointly.

Fourteen Points of Management

Deming described the essence of his management philosophy in 14 Points for Management. These 14 points became a symbol for Demingism and were widely accepted. They are explained in Chapter 2 of the book “Out of Crisis” [4] as guideline for the transformation of American industry.

In “Out of Crisis” these points are introduced as follows: “It will not suffice merely to solve problems, big or little. Adoption and action on the 14 points are a signal that the management intend to stay in business and aim to protect investors and jobs. Such a system formed the basis for lessons for top management in Japan in 1950 and in subsequent years. The 14 points apply anywhere, to small organizations as well as to large ones, to the service industry as well as to manufacturing. They apply also to a division within a company.”

First attempts to concentrate both knowledge and experience into distinct statements go back to the sixties. First drafts showed 10 points which reflected the experience gained from the close cooperation with Japanese firms. The number 10 did not come by accident. The analogy to the Ten Commandments in the bible should point out their fundamental role for management.

The need for a later expansion to 14 points was forced upon Deming through his experiences with Western firms in the eighties and nineties. In Japan, fear in the workplace (Point 8) and barriers between departments (Point 9) was of no concern. Only Western organizations showed how much employees suffered from fear, rating, quotas and slogans.

In the late eighties, Deming felt the need to expand the number of points even further. He then realized that in the meantime the 14 points became so widely known that he decided to subdivide Point 11 into Point 11a and 11b, Point 12 into 12a and 12b.

Point 1: Create Constancy of Purpose

Create constancy of purpose toward improvement of product and service, with the aim to become competitive, stay in business and provide jobs and more jobs.

There are two problems for the company that hopes to stay in business, problems of today and problems of tomorrow.

Problems of today encompass maintenance of quality of product put out today. It is easy to stay bound up in the tangled knot of the problems of today, becoming ever more an more efficient in them.

Problems of the future command first and foremost constancy of purpose and dedication to improvement of competitive position to keep the company alive and to provide jobs for their employees. Establishment of constancy of purpose means allocation of resources to innovation, research, education and continual improvement of products and services.

Your customers, your suppliers, your employees need your statement of constancy of purpose, your intention to stay in business by providing products and services that will help man to live better and which will have a market.

Point 2: New Philosophy

Adopt the new philosophy. We are in a new economic age, created by Japan. Western
management must awaken to the challenge, must learn their responsibilities and take on leadership for change.

Japan defined new dimensions for excellence in business. We can no longer tolerate commonly accepted levels of mistakes, defects, material not suited for the job, people on the job that do not know what the job is and are afraid to ask, handling damage, antiquated methods of training on the job, inadequate and ineffective supervision, management not rooted in the company, job hopping in management.

**Point 3: Cease Dependence on Mass Inspection**

Cease dependence on inspection to achieve quality. Eliminate the need for inspection into the product in the first place. Routine 100 percent inspection to improve quality is equivalent to planning for defects, acknowledgment that the process has not the capability required by the specifications.

Inspection to improve quality is too late, ineffective, costly. When a product leaves the door of a supplier, it is too late to do anything about its quality. Quality comes not from inspection, but from improvement of the production process. Inspection, scrap, downgrading and rework are not corrective actions on the process.

**Point 4: End the practice of awarding business on the basis of price tag alone.**

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.

About 110 years ago, John Ruskin made the following remarks about quality and prices:

On quality: "There is scarcely anything at all which someone, somewhere, can't make in a poorer quality and sell more cheaply, and people who only look at the price are this man's legitimate victims."

On prices: "It's unwise to pay too much, but far worse to pay too little. When you pay too much, all you loose is some money - that's all. When you pay too little, then sometimes you loose everything, because what you buy isn't able to do what it was bought for. Common business practice makes it impossible to pay a bit and to get a lot - quite simply, it can't be done. If you accept the lowest offer, then you would be wise to insure yourself against the risk you run - and if you do that, then you can afford to pay for the better product anyway."

We can no longer leave quality, service and price to the forces of competition for price alone - not in today's requirements for uniformity and reliability. Price has no meaning without a measure of the quality being purchased. Without adequate measures of quality, business drifts to the lowest bidder, low quality and high cost being the inevitable result.

**Point 5: Improve constantly and forever the system of production and service.**

Improve constantly and forever the system of production and service to improve quality and productivity and thus constantly decrease costs.

The road to improvement has no end. There is always a way to do things better and at lower cost. Innovation does not come from the client, it comes from the producer. Nobody asked for an automobile, a telephone, a radio, a television set, a copy machine. Ideas are always generated in the heads of the producer.

When „zero defects“ is the objective, continual improvement ends when all specifications are met. The West worries about meeting the specifications. The Japanese worry about uniformity. Uniformity, in other words, processes on target with minimum variation, always leaves room for continual improvement.

Deming introduced the methods of Shewhart for statistical process analysis together with the P.D.S.A.-cycle for continual improvement in Japan in 1950. Today, these two basic tools are as vital as ever.

**Point 6: Institute Training**

Institute training on the job.

Deming dedicates one point to training on the job, because this form is both efficient and effective.

Management needs training to learn about a company all the way from incoming material to customer.

In Japan, a manager starts his career with a long internship (4 to 12 years) on the factory floor and in other duties of the company. He knows by personal experience the problems in production, procurement, accounting, distribution, sales.

A Danish producer of hearing aids requires that every manager writes in addition to his daily management obligations operation instructions.

Every manager should be competent in elementary statistics such as process flow charting, fishbone diagrams, run charts, histograms, Pareto diagrams, scatter diagrams, control charts, elementary design of experiments.

Every Japanese employee is required to understand and use the following seven quality control tools: checksheet, Pareto
chart, flow chart, cause and effect diagram, histogram, scatter diagram and control chart.

Training has to be aware that people learn in different ways. Some have difficulty to learn by written instructions (dyslexia). Others have difficulty to learn by the spoken word (dysphasia). Some people learn best by picture, others by imitation, others by a combination of methods.

### Point 7: Adopt and institute Leadership

Institute leadership. The aim of leadership should be to help people, machines and gadgets to do a better job. Supervision of management is in need of overhaul as well as supervision of production workers.

An advertisement by the renown Juran Institute, Inc. makes the following point about leadership:

"Can there be total quality without top management? No, never! Every successful total quality effort has included the active participation of the top management. We know of no exceptions. For quality to become a way of life, top management must carry out specific actions. These actions cannot be delegated. Top management must develop a strategic plan, review and approve the organization's quality policy, provide the resources, create and participate in quality councils and quality efforts. Achieving total quality demands top management be leaders, not cheerleaders."

Quality comes from the top. Only top management has the knowledge and the right to change the system the worker works in. Juran made the distinction between defects coming from the system and defects coming from the worker. His experience was that 85% are caused by the system and only 15% by the worker. Towards the end of his life, Deming was more and more inclined to suggest, that the relationship should be 94% and 6% respectively.

Top managers alone have the responsibility for the system. This responsibility cannot be delegated. It is not enough when the mission statement says that quality is of highest priority. Management must know what this responsibility actually means. Support is not enough, actions are required!

### Point 8: Drive out Fear

Drive out fear, so that everyone may work effectively for the company.

Joy in work, innovation - not just improvement and cooperation are the three basic ingredients for a successful quality journey. The opposite of joy in work is fear in work. Nobody can do their best unless they feel secure. Deming has repeatedly emphasized that "drive out fear" should be the first of the Fourteen Points management should start to implement. It is the prerequisite for the implementation of at least 9 other points.

Fear prevents an organization from developing its full potential. Fear produces wrong numbers. Fear leads to loss. An organization managed by fear will ultimately fail.

The leadership style of Adolf Hitler during the Second World War provides a dramatic example. Western observers have no doubt that in the decisive phases of the war Adolf Hitler only received the information his subordinates knew would please him. He was therefore incapable of running the war which inevitably resulted in his defeat. Similar observations could be made during the War in the Gulf.

Fear is endemic in modern organizations. Fear has many forms as some of the following examples show: fear of losing the job if the firm cuts back, fear of not being good enough in general, fear that a colleague will be promoted and placed above your head, fear that the annual performance rating will not qualify for a raise, fear of not always having an answer when the boss asks a question, fear of losing face in front of colleagues.

Lack of knowledge produces fear. Information, education and training are the most important means to fight fear in a company. A survey showed that the following 7 measures out of 70 are most effective to prevent fear and to induce security:

1.) Competence and integrity of management
2.) Perceived responsibility in the job: The application of the P.D.S.A.-Cycle should be delegated to the operational level
3.) Sensitivity, tolerance, respect, dependability
4.) Feedback: Praise and acknowledgement when justified, help, support and instruction when necessary
5.) Job security
6.) Elimination of all psychological and organizational barriers impeding open cooperation of individuals and teams
7.) Information: Ignorance produces fear which can only be eliminated through an open information policy.

Further investigations show that competence and integrity of management (Point 1) and information (Point 7) are the most effective means to reduce fear in a company.

Deming distinguishes between „Fear“ and „Anxiety“. The reason for fear is well known. Anxiety is a state of mind without a recognizable cause.

### Point 9: Break down Barriers between Departments

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.

Restrictions and barriers always lead to less than optimum results. Deming recommends therefore to break down barriers between departments. Employees in departments and divisions such as product development, sales and production must work together to have any chance of anticipating quality problems. Organizations are to function as systems. Restrictions and barriers destroy the systems.

In the fifties, two important methods were developed in Japan, which together with other most positive effects lead to the demolition of interior barriers in large organizations: Quality Function Deployment (QFD) and Cross-Functional Management (CFM). Both methods are an immediate consequence of the systems thinking as introduced by Deming. Systems thinking is the opposite of the traditional cause-and-effect thinking and represents a fundamentally new view of the world, which was put to work in Japan so effectively during the second half of the 20th Century.

QFD transforms customer needs (the voice of the customer [VOC]) into engineering characteristics of a product or service, prioritizing each product/service characteristic while simultaneously setting development targets for product or service development. CFM manages business processes across the traditional boundaries of the functional areas minimizing suboptimization. Suboptimization is what when looks like a benefit for a particular area in the company actually hurts the company as a whole. It consists of three components: appropriate management performance metrics, periodic meetings, and inter-department communication channels.

Point 10: Eliminate Slogans

Eliminate slogans, exhortations and targets for the work force that ask for zero defects and new levels of productivity.

"Your work is your self-portrait." Would you sign that? No - not when you give me a defective canvas to work with, paint not suited to the job, brushes worn out so that I can not call it my work.

"Do it right the first time!" "Getting better together!" "Be a quality worker!" "Take pride in your work!" are directed at the wrong people. They arise from management's supposition that the production workers could, by putting their backs into the job, accomplish zero defects, improve quality, improve productivity and all else that is desirable. The charts and posters take no account of the fact that most of the trouble comes from the system which only top management can influence.

Exhortations and posters generate frustration and resentment. They advertise to the production worker that the management is unaware of the barriers to pride in workmanship.

Point 11: Quotas and Performance Ratings

Point 11A: Eliminate numerical quotas for the work force

In "Out of the Crisis" [4] we read: "A quota is a fortress against improvement of quality and productivity. I have yet to see a quota that includes any trace of a system by which to help anyone to do a better job. A quota is totally incompatible with never-ending improvement. There are better ways. Piece work is even more devastating than work standards. Incentive pay is piece work. The hourly worker on piece work soon learns that he gets paid for making defective items and scrap, the more defectives he turns out, the higher the pay for the day. Where is his pride of workmanship?"

Point 11B: Eliminate numerical goals for people in management

Internal goals set in management of a company without a method are a burlesque. Goals such as „Decrease costs of warranty by 10 percent next year!“, „Increase sales by 10 percent next year!“ „Improve productivity by 3 percent next year!“ cause frustration.

A natural fluctuation in the right direction is interpreted as a success. A fluctuation in the opposite direction sends everyone scurrying for explanations and into bold forays whose only achievements are more frustration and more problems.

To manage, one must lead. To lead, one must understand the work that he and his people are responsible for. An incoming manager must first learn from his people what they are doing. It is easier for an incoming manager to short-circuit his need for learning and to focus on the far end, the outcome. Focus on the outcome is not an effective way to improve a process or an activity. Management by numerical goal is an attempt to manage without knowledge of what to do and is in fact management by fear.

Point 12: Remove Barriers to Pride of Workmanship
Point 12A: Remove barriers that rob people of his right to pride of workmanship.

The responsibility of supervisors must be changed from stressing sheer numbers to quality. Remove barriers that rob people in management and engineering of their pride of workmanship. This means, inter alia, abolishment of the annual merit rating and of management by objective.

In the past, craftsmen were skilled workers and production was flexible and varied to suit the customer. Pride was a natural part of the work. No self-respecting craftsman would allow shoddy workmanship. He would never deliver a product which did not live up to the high standards of his craft. Under such a system, quality is built into the product and quality control is relatively easy.

This does not mean that we should turn the clock back to an earlier age. Mass production is here to stay. But today as well as in the past, pride remains the biggest motivator of all.

Dick Nunis, former Disney president is in no doubt: "There are really only two words which make things work around here ... quality and pride. If you design, build, make and maintain quality, people will be proud of what they do."

Walt Disney himself fully appreciated the importance of people: "You can dream, create, design and build the most wonderful place on earth ... but it takes people to realize a dream."

Point 12B: Drop the Annual Merit Rating

Appraisals and merit ratings prevent workers from having pride of workmanship. We suppose that the use of the annual merit rating gets the best from workers. As Deming says: "The result is precisely the opposite. You get the worst out of people. You don't get what you pay for".

Appraisals create fear, reduce cooperation between workers and managers and focus on visible results only. Frequently managers use appraisals as a salary administration tool. They use them to reward and punish. Appraisals are subjective. They commonly do not reflect the actual performance or potential of the appraised person. Appraisals are a lie.

Point 13: Encourage Self-Improvement

Encourage education and self-improvement for everyone.

Point 6 dealt with training. While training is specific, i.e. targeted at the skills required for the job, education is general, its aim being to improve employees' general knowledge.

A study carried out by Price Waterhouse, an international firm of consultants, shows that most investment in education goes to managers and specialists. Personnel at manager and executive levels use on average twice as many working days on supplementary courses as office staff and those paid by the hour.

We know today that investment in employees, even those paid by the hour, can have much greater effect than investing in machines. Investing in employees is a prerequisite of one of the sides of the new management pyramid: continuous improvement of products, services and processes. This effect can never be achieved through investments in machines alone.

Point 14: Accomplish the Transformation

Put everybody in the organization to work to accomplish the transformation. The transformation is everybody's job.

There is more to this point than meets the eye. Deming recognizes the difficulty of implementing the 13 previous points so, in this last point, he presents a seven point plan for action to implement the philosophy.

1.) Management must agree on the meaning of the 13 points.
2.) Management must have the courage to break with tradition.
3.) In building up a new quality organization, a manager for quality improvement who has direct access to top management must be appointed.
4.) Management must, as quickly as possible, build up an organization in order to carry out the continuous improvements throughout the firm.
5.) Management must explain why the changes are necessary and that they will involve everybody in the company.
6.) Management must explain that every activity, every job has its own customers and suppliers.
7.) Management must ensure that every employee in the company participates actively in a team.
His Master’s Voice

Below, a list of Deming’s best known quotes is added. It is the intention of this collection to give the reader an idea of the clear, direct, humoristic and sometimes harsh way Deming presented his thoughts. It was tried to arrange the quotes in the order of the four pillars in the System of Profound Knowledge (SoPK) shown below. This was not easy but it is thought that some kind of an order is better than a random presentation.

Most quotes were taken from Deming’s book „Out of Crisis“ [4] and from a collection prepared by one of Deming’s close personal friends, Ron McCoy [30].

Appreciation for a System

Deming’s First Theorem: “Nobody gives a hoot about profit.”

Deming’s Second Theorem: “We are being ruined by best efforts.”

There is an excuse for ignorance, but there is no way to avoid the consequences.

Management does not know what a system is.

You cannot achieve an aim unless you have a method. If someone can make a contribution to the company, he feels important.

A leader’s job is to help people.

Retroactive management emphasizes the bottom line.

Management’s job is to optimise the whole system.

Management is prediction.

Let us ask our suppliers to come and help us solve our problems.

It does not happen all at once. There is no instant pudding.

Innovation comes from the producer -- not from the customer.

Plants don’t close from poor workmanship, but from poor management.

A leader is obligated to make changes in the system of management.

The performance of any individual is to be judged in terms of his contribution to the aim of the system, not on his individual performance.

The customer invents nothing. New products and new services come from the producer.

Quality starts in the boardroom.

A system must be managed. It will not manage itself.

You must have a supplier relationship of constant improvement.

Everyone is a customer for somebody, or a supplier to somebody.

Any manager can do well in an expanding market.

Without an aim, there is no system.

A leader is a coach, not a judge.

Does experience help? No! Not if we are doing the wrong things.

Stamping out fires is a lot of fun, but it is only putting things back the way they were.

Price is not the only cost.

A leader knows who is out of the system and needs special help.

Our problems is not the Japanese.

If you stay in this world, you will never learn another one.

You do not install quality; you begin to work at it.

The transformation will come from leadership.

Management’s job is to look ahead.

Knowledge about Variation

3% of the problems have figures, 97% of the problems do not.

You cannot define being exactly on time.

We must understand variation.

Precise optimisation is not necessary. It would be too costly.

Shrink, shrink variation -- to reduce the loss.

Understanding variation is the key to success in quality and business.

You test to predict.
You should not tamper with the process. Managing by results only makes things worse.

There is no such thing as a fact. Change the rule and you will get a new number.

Confusing common causes with special causes will only make things worse.

Confusing special and common causes are the greatest two mistakes.

Meeting specifications is not enough. You cannot inspect quality into the product; it is already there.

Improve quality, you automatically improve productivity.

Management by results is confusing special causes with common causes.

The process is not just the sum of its parts. Nobody should try to use data unless he has collected data.

Without theory there is nothing to modify or learn.

Manage the cause, not the result.

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

Zero defects is a super highway going down the tube.

100% inspection will guarantee trouble. Managing by results is like looking in the rear-view mirror.

We should work on our processes, not the outcome of our processes.

Theory of Knowledge

Information is not knowledge. Knowledge comes from theory.

You should not ask questions without knowledge.

Information is not knowledge. Let's not confuse the two.

There is no knowledge without theory.

Experience teaches nothing without theory.

You do not install knowledge.

A rule should suit the purpose.

Without theory we can only copy.

We should be guided by theory, not by numbers.

If you do not know how to ask the right question, you discover nothing.

You do not find knowledge in a dictionary, only information.

We want best efforts guided by theory. Best efforts will not substitute for knowledge.

There is no substitute for knowledge.

There is no observation without theory.

It is so difficult to predict the future.

A goal without a method is nonsense.

It is easy to date an earthquake, but not an economic decline.

Without theory, there are no questions.

We know what we told him but we don't know what he heard.

It's management's job to know.

Without questions, there is no learning.

The problem is that most courses teach what is wrong.

Psychology

Our customers should take joy in our products and services.

Competition should not be for a share of the market -- but to expand the market.

If people did not make mistakes, there would be no mistakes.

Anybody can predict anything.

Have you ever known a golfer who was happy?

The merit system will put us out of business.

Judging people does not help them.

Making two people responsible guarantees mistakes.

When we cooperate, everybody wins.

Ranking. What does it do?

Forces of destruction: grades in school, merit system, incentive pay, business plans, quotas.

When a worker has reached a stable state, further training will not help him.

A man that knows his limitations is one that you can trust.

Why can't people work with pride?

Monetary rewards are not a substitute for intrinsic motivation.

If you destroy the people of a company, you do not have much left.

It is not necessary to confess past sins.

Whenever there is fear, you will get wrong figures.

The transformation can only be accomplished by man. A company cannot buy its way to quality.

Any two people have different ideas of what is important.

They are just doing their best. How do they know?

We can do something about our problems or continue the way we are.

People are entitled to joy in work.

We are being ruined by the best efforts of people who are doing the wrong thing.

Money is not a substitute for intrinsic motivation.

If you destroy the people of a company, you do not have much left.
Revolution of Thought

In an industrialized world committed to the Scientific Management of Frederick Winslow Taylor, the Deming Management Philosophy requires a revolution of thought. When after World War II the hunger for material goods was satisfied, customers became more and more interested in the quality of products and services specifically developed, designed and produced to satisfy individual needs. Companies were the most successful which could meet manifold customer requirements at minimum cost.

Pat Oliphant -the New York Times considers him to be the most influential cartoonist of our time- has selected nine of the most deeply rooted convictions, where Deming asks for a far reaching change of mind. Pat Oliphant illustrates these mind changes in a language most familiar to him.

Cooperation instead of competition

Already during childhood, man is prepared for a life in a competing world following Darwin’s belief, that only the most capable, both physically and intellectually, will survive. Man enters a cruel production system where many are not able to persist. Instead of a distructive life in competition, Deming proposes cooperation towards a mutually desirable goal.

Everybody wins through cooperation

It is accepted without saying that for somebody to win, others must lose. If somebody wants to have a bigger piece of the pie, the other pieces will inevitably be smaller. But this does not need to be true. Work together to make the pie bigger, then the pieces will be bigger as well. Everybody wins!

Do not work for the boss, work for the customer

If you want to advance in school and later in business, you have to satisfy the teacher and then the boss. In a world striving for quality instead of quantity, there is no room for this type of attention to teachers and bosses. Customer satisfaction is a commitment for employees and superiors alike.

There is a culprit for every defect

This statement is generally wrong. Experience shows that in 94% of all cases the system and not the worker is at fault.
There is always room for improvement
The quality way has one goal, customer satisfaction, but no end. Possibilities for improvement can be found every time and everywhere, in a large context as well as in detail.

Good components do not necessarily lead to a good system
In the Scientific Management of Frederick Winslow Taylor [1] systems are cut into small components, which can be produced in large quantities with little or no know-how. But in systems, the weakest link determines the strength of the chain.

Inspections do not guarantee for quality
In an inspection based system only the products are of value which pass the inspection hurdle. A quality system, however, produces what the group expects.

Good financial statements are not indicators for long term success
Acquisitions, financial transactions and other gimmicks together with creative book-keeping can produce any desired financial statement. But the stomach ache when digesting the difficulties will show up only after the opulent meal.

A diploma does not mean the end of training and education
Diplomas, certificates, prizes and rewards lead the holder to believe that the goal was reached. But the challenges of today’s world require lifelong learning. It would therefore be more appropriate if diplomas and certificates were called learner’s permits.
Acknowledgement

The following individuals and organizations have actively contributed to this report:

Lloyd Dobyns, Clare Crawford-Mason and Robert W. Mason,

are the authors of the groundbreaking NBC documentary, “If Japan Can ... Why Can’t We?” In the United States, this television production made Deming a celebrity virtually from one day to the other. He became the nation’s most sought after management consultant.

In 1980, this team founded CC-M, Inc. www.managementwisdom.com in Washington DC. CC-M produced a comprehensive presentation of the Deming philosophy. The Library contains now more than 32 hours of programs with narration and teaching guides on DVD.

CC-M, Inc. authorized the reproduction of 32 cartoons by the world renowned cartoonist Pat Oliphant. The artist drew these cartoons for the CC-M-production „The Prophet of Quality, Part I and II“ and „The Deming Revolution“.

Diana Deming Cahill, Linda Deming Ratcliff und Bill Ratcliff

are members of the The W. Edwards Deming Institute Board of Trustees.

The W. Edwards Deming Institute®, www.deming.org, was founded by Dr. Deming in 1993 with the aim to foster understanding of The Deming System of Profound Knowledge™ to advance commerce, prosperity and peace. The Institute is headquartered in Washington, D.C. It is a nonprofit corporation which provides educational services related to the teachings of Dr. Deming. These services include conferences and seminars. The Institute also makes Dr. Deming's personal and professional papers available to researchers at the U.S. Library of Congress. The Deming Collection at the Library of Congress includes an extensive audiotape and videotape archive of Dr. Deming.

The In2:InThinking Network www.in2in.org is to promote study and awareness of individual and collective thinking about sub-systems, psychology, variation, knowledge, and their interactions - elements recognized as the basis of Dr. W. Edwards Deming’s “System of Profound Knowledge (SoPK).

The concept of “inThinking” derives from “thinking about thinking”, where thinking is defined as “a way of reasoning.” InThinking invites an individual to learn to perceive the patterns of interdependencies surrounding him or her and to reason and judge with this insight.

Such a personal transformation of thinking builds upon the foundation of Profound Knowledge to include the theories of Dr. Russell Ackoff, Dr. Edward de Bono and Dr. Genichi Taguchi, among others.

In 2002, the Network organized its first Annual Forum, which since then developed from a “west coast” Forum into something much larger – an international thinking network.

The Network distributes a monthly newsletter featuring news, articles, book and conference reviews, and other items of interest.
Bibliography

[29] Daithi Casey, „An Examination of the Impact of International Quality Awards on Overall Corporate Performance“, MBA in International Business Consulting, Fachhochschule Offenburg, Gengenbach, Germany, June 2003
"THE RIGHT QUALITY & UNIFORMITY ARE FOUNDATIONS OF COMMERCE, PROSPERITY & PEACE."
W. EDWARDS DEMING