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Qualitopia, The Quest for Perfection through Quality Management Principles

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Abstract

Quality Principles are the final and ultimate approach to the systematic search for perfect world. After the introduction of the word “Utopia” by Sir Thomas More in 1516, concept of Utopia has evolved into a new meaning in today’s world. The philosophy of perfection and ideal society with a working economical system has evolved through the quality concept which is invented and developed by the great minds of the last century. This paper is about the quest for universal utopia focusing on how the Quality in general and specifically Quality Management principles show us the way to proceed towards “Qualitopia”

Keywords:

Utopia, Quality, Juran, Demming

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Concept of Utopia

In 1516 Sir Thomas More wrote the book *Of the Best State of a Republic, and of the New Island Utopia*. The book was describing a fictional island in Atlantic Ocean with a perfect socio-political system. From then on the term has been used to describe attempts to create ideal society, or fictional idealistic societies in literature and arts. By selection of the word Utopia which is composed of the Greek prefix U meaning “not” and “Topia” meaning “place” in Greek, it’s almost certain that Sir More had the intention of using homophone Eutopia containing “Eu”² Good or well in place of “U” as an allegory of “no place is good place” implying the non-existence of a perfect society. However the term he created, namely “utopia” is more commonly assumed to be a place of perfection rather than a place of nonexistence. This is because the human endeavour to reach perfection has never ended. In fact this quest has not started by Sir Thomas More.

The Plato’s “State” was an example of the description of perfect state, written 19 centuries before Sir T. More. Famous Greek philosopher’s book is different from Sir More’s satirical work that it was describing the ideal ruling system with the intention of creating a guideline. He advocated philosopher kings to be in charge of the kingdom for the perfect state to run.

The optimistic or idealistic description of a society also resulted in the mirroring concept of “dystopia” meaning “bad - place” The examples of these are “Nineteen Eighty Four” by George Orwell and “Brave New World” by Aldous Huxley criticising totalitarian attempts of creating an ideal society through technology and science. These criticisms of the abuse of technology and knowledge to create a disastrous society instead of a perfect one, may be the cause of emphasis on ethical principles and human empowerment focus in many of the quality philosophers of the last century, which are given below. Therefore these examples of dystopia deserve recognition in the synthesis of a Quality perfection in the second half of the century, ironically containing the year 1984 in which George Orwell had predicted the world to be a horrible place.

The concept of modern Utopia has evolved into perfection through an ideal social and economical system containing quality concept, invented, and developed by some of the greatest minds of the 20th century.

The principles and knowhow produced by Armand Feigenbaum, W. Edwards Deming, Joseph M. Juran, G. Taguchi, Philip Crosby and some other

² Eu is also the revised acronym for European Union(EU) which was changed from European Community into EU. The “good” meaning in Greek seems not to be a coincidence, since European Union is almost a synonym for Quality Standards for a better world.

quality “Guru”s have outlined the road map for the 21st century version of perfect world: “Qualitopia.” In the idealistic place called Qualitopia the world has “Universal” standards implemented in local scale, even not limited to the planet Earth therefore exceeding the meaning of “Global”. In this paper mainly the two Gurus’ principles and management philosophies will be analyzed., Joseph M. Juran and W.Edwards Deming Not neglecting the works of others who are cited above, and many others who are not mentioned, the reader is encouraged for further reading on the references given at the end of paper.

History of Perfection

Quality Control started in Athens in ancient times, with the checking of the exported products and goods of the negihboring communities, filtering out the nonconformant goods for the benefit of the Athen’s society. This shows the aspect of “locality” of the historical version of perfection. Of course this had a great impact in the neighboring lands through improvement of the suppliers who want to trade with this relatively rich and prosperous state, but nevertheless the limitations in terms of transportation and communication prevented the global or even a large scale standardization of a quality system in other parts of the world at this moment in history.

Another example can be cited from Asia. Sun Tzu a great Chinese commander and writer of the book “The Art of War” tried to improve the strategy of the kingdom he served. This was also an approach of perfection starting from local to global, since the targets of his strategy was to unify the rule of the great lands of China. Although this rule resulted in a long term peace, perfect warrior state must have been a nightmare for its enemies.

Ottoman Empire and its predecessor Seljukian Empire were also in search of the ideal state of the world, both looking at the issues in a “Jihan-Shumul” way in which “Jihan” meaning “whole world”, and “Shumul” meaning “covers” with the combination having a meaning very close to if not equal to “Global”. The global unity idea of the Ottomans were closest to success until modern history with the most sustaining single State ruling over the largest areas of the world. This was resulting from not only the Islamic ideals forming the foundation of the state but also from the Roman-Eastern Roman culture which was adopted successfully by Turks to create the best working political and social system of their times. However not having devised and implemented global standards for vital knowledge areas like trade, or industry and confining their

standardization in only military power and religious education, Ottomans lost their great advantage of strategical depth over the lands they ruled.³

During all of these efforts to reach a perfect world, in spite of the local and sectoral achievements of the above mentioned examples, a global standardization effort didn't emerge until the second half of 20th century. But let's start from a little earlier.

Interchangeable Parts, Giving the First Signals of a Changing World

During the nineteenth century, and exhibited at the Great Exhibition of 1851 at the Crystal Palace, was first shown the concept of 'interchangeable parts'. In this case, rifles were shown, where one part of one rifle would fit onto another rifle in the batch. While there was little interest at the time, the implications for future manufacturing and assembly were enormous. It meant that parts could be made in one part of the world and then assembled onto parts made in a different part of the world. For this to work, quality of components had to be ensured. Prior to this, products were made as individual items and, if any part failed, it had to be replaced by an individually made component often produced by a skilled craftsman. With the introduction of interchangeable parts it was possible to store a selection of these parts and use them to replace parts that had broken. Because of interchangeable parts, mass-production became possible. Large numbers of components could be produced and assembled by unskilled workers. Early in the twentieth century, demand exceeded supply, but during the latter half of the century this situation reversed. Increasingly in the twenty-first century customers have a choice for practically everything that they purchase, be it electricity supply, telephone services or Internet Service Providers. With so much choice, customers become more focused on obtaining good quality and rejecting poor quality.^[1]

Juran, a Leader in Search for Perfection

Both the life and influence of Joseph M. Juran are characterized by a remarkable span and an extraordinary intensity. Born in 1904, Juran has been active for the bulk of the century, and influential for nearly half that period. Juran's major contribution to our world has been in the field of management, particularly quality management. Juran has been called the "father" of quality, a

³ The perfection through accumulation of local values from a global source is still forming the diversity and quality of the food culture in the Turkey, Greece, Albania, Syria and many other ex-Ottoman states.

quality "guru" and the man who "taught quality to the Japanese." Perhaps most important, he is recognized as the person who added the human dimension to quality-broadening it from its statistical origins to what we now call Total Quality Management.^[2]

He also developed the "Quality Trilogy," an approach to cross-functional management that is composed of three managerial processes: quality planning, quality control and quality improvement.

The clues of Juran's desire to create a perfect world is hidden in his interest and success in the game of Chess. Chess unlike chance games, is the game for "The Perfectionist" It has almost permanently stable and simple rules⁴ not allowing "mother luck" interfere with the outcome of the game which is determined by the sole mental abilities of the player. Juran has been a chess player most of his life, dominating the Western Electric Chess championship for long years, he had been working there. There's no information whether he also played Chinese game of Go which has even simpler rules and comparable or even superior combinatory depth, however his chess interest is enough to conclude about the perfectionist approach he had in his mind in all the milestones he has achieved on the road to Qualitopia. This great man has died on Feb. 28, 2008, from natural causes at the age of 103 leaving a huge treasure of knowledge and principles some of which we would like to analyse in this paper. Juran's Quality management principles are^[3]:

"Continuous improvement and learning": Refers to both incremental and breakthrough improvement, and applies to both the individual and organization. Improvement and learning can be directed toward better products and services, toward better processes and toward being more responsive, adaptive and efficient. ^[3] Organization's commitment to making constant improvements in the design, production, and delivery of goods and services is called continuous improvement. Improvements can almost always be made to increase efficiency, reduce costs, and improve customer service and satisfaction. Everyone in the organization should be constantly on the lookout for ways to do things better.^[4]

"Ethics and responsibility": Quality organizations and individuals see themselves as part of a larger whole, which must be respected. Leadership includes influencing other organizations, private and public, to support the causes in which it believes, such as improved education, resources conservation, community service or crime reduction. ^[3] Ethics is more than a matter of individual behavior; it's also about organizational behavior. Employees' actions

⁴ Chess has its own quality improvement history, having slow and unexciting rules at the ancient times, starting to change through time and reaching the current rules in 16th century, unlike Chinese game of Go which stayed unchanged since its invention at its first form.

aren't based solely on personal values alone: They're influenced by other members of the organization, from top managers and supervisors to coworkers and subordinates. So how can ethical companies be created and sustained? Businesspeople face two types of ethical challenges: ethical dilemmas and ethical decisions. An ethical dilemma is a morally problematic situation in which one must choose between two or more alternatives that aren't equally acceptable to different groups. Such a dilemma is often characterized as a "right-versus-right" decision and is usually solved in a series of five steps: ^[4]

- Define the problem and collect the relevant facts.
- Identify feasible options.
- Assess the effect of each option on stakeholders (owners, employees, customers, communities).
- Establish criteria for determining the most appropriate option.
- Select the best option, based on the established criteria.

An ethical decision means a "right-versus-wrong" decision—one in which there's a right (ethical) choice and a wrong (unethical or downright illegal) choice. When made a decision that's unmistakably unethical or illegal, one has committed an ethical lapse. If one is presented with what appears to be an ethical decision, asking oneself the following questions will improve his odds of making an ethical choice: ^[4]

- Is the action illegal?
- Is it unfair to some parties?
- If I take it, will I feel bad about it?
- will I be ashamed to tell my family, friends, coworkers, or boss about my action?
- Would I want my decision written up in the local newspaper?
- If one gives answer yes to any one of these five questions, he's probably about to do something that he shouldn't.

"External focus": Students, customers, readers, patients, clients or citizens are primary recipients of a product or service. It is those recipients upon which we must focus. As Peter Drucker said, "The purpose of an organization lies outside itself." A focus on external stakeholders can influence an organization's success by increasing this group's satisfaction and loyalty ^[3]. The external customers are the number one priority for an organization since they are the source of vital information and revenues. The focus should be on them to satisfy and gain confidence of them. The nonconformance is not sole responsibility of the quality manager but every employee, manager and supplier who took part in the production or service has shared responsibility and they are accountable.

“Fact-based decisions”: Improvement within organizations requires information that supports evaluation and decision-making. Trends, projections, cause-and-effect, etc., may not be evident without analysis [3] . Factual approach to decision making results from the fact that effective decisions are based on the analysis of data and information. Key benefits of implementing this approach are: [5]

- Informed decisions.
- An increased ability to demonstrate the effectiveness of past decisions through reference to factual records.
- Increased ability to review, challenge and change opinions and decisions.
- And applying the principle of factual approach to decision making typically leads to:
 - Ensuring that data and information are sufficiently accurate and reliable.
 - Making data accessible to those who need it.
 - Analysing data and information using valid methods.
 - Making decisions and taking action based on factual analysis, balanced with experience and intuition.

“Fast response”: Focusing on timeliness tends to reduce process steps and costs within an organization. Quality products and services introduce convenience to, and remove delays from, our lives. Time improvements often drive improvements in overall organization, cost, quality and productivity. [3] Time is the most scarce resource anyone has. Therefore the customer satisfaction and therefore quality depends on the most efficient usage of employee time and prevent the waste of customers’ time. In case of a nonconformance the fast response is vital to minimize the impact on customers. The most valuable spurce of information for an organization is the feedback from a dissatisfied customer. Usage of this information in a timely manner will turn dissatisfaction into satisfaction, which otherwise will have the impact of high amounts of quality cost.

“Involvement of people”: No matter the endeavor, quality improvement relies on individuals and teams. Organizations depend on the knowledge, skills, innovation and motivation of their employees. Their contributions must be integrated and aligned with the organization’s strategy [3] . Successful Quality Management requires that everyone in the organization, not simply upper-level management, commits to satisfying the customer. A defective product isn’t solely the responsibility of the manufacturer’s quality control department; it’s the responsibility of every employee involved in its design, production, and even shipping. To get everyone involved in the drive for quality assurance, managers must communicate the importance of quality to subordinates and motivate them to focus on customer satisfaction. Employees

have to be properly trained not only to do their jobs but also to detect and correct quality problems. In many organizations, employees who perform similar jobs work as teams, sometimes called quality circles to identify quality, efficiency, and other work-related problems; to propose solutions; and to work with management in implementing their recommendations. ^[4]

“Long-range view of the future”: Ideas, products, services, processes and relationships suffer when long-term consistency of purpose is sacrificed to expediency. New opportunities, changing expectations and evolving stakeholder requirements must be considered by the organization. Short-term plans, strategies and resources allocations need to reflect long-term influences^[3]. Long term views result in long term customers and a stable environment for the organization. This adds to the quality level of the products and services of the organization.

“Prevention orientation”: In medicine, law, government and business the search for quality relies upon the idea that problems can be prevented. It is virtually always less costly to prevent a problem than to correct it “downstream.” Accordingly, organizations need to emphasize opportunities for interventions “upstream” ^[3]. The quality inspection or quality control is not enough, however the control in the sense of improving the process to prevent the problems to occur is the key to the success of organizations.

“Results orientation”: Balanced and integrated results that pay attention to all stakeholders are the hallmark of a quality enterprise. Results also offer a way to communicate short- and long-term priorities, to monitor performance and to marshal support for improvement ^[3]. Employees with this competency communicate business performance measures and clarify priorities. They work on important issues first, staying with a plan of action or point of view until the desired goal has been obtained or is no longer reasonably attainable. They recognize opportunities, act on them, and look for ways to quickly overcome barriers. They persevere in the face of adversity or opposition. They translate ideas into action.

“Systems approach”: The most important problems of a business, an enterprise and society are systemic, deeply rooted and have multiple causes. Coherence of understanding requires a systems view. All elements of that system must be aligned in the same direction to achieve true breakthroughs in quality ^[3]. System approach to management can be summarized as identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives. Key benefits of this approach can be listed as: ^[5]

- Integration and alignment of the processes that will best achieve the desired results.

- Ability to focus effort on the key processes.
- Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization.
- Applying the principle of system approach to management typically leads to:
- Structuring a system to achieve the organization's objectives in the most effective and efficient way.
- Understanding the interdependencies between the processes of the system.
- Structured approaches that harmonize and integrate processes.
- Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers.
- Understanding organizational capabilities and establishing resource constraints prior to action.
- Targeting and defining how specific activities within a system should operate.
- Continually improving the system through measurement and evaluation.

“Waste reduction”: Time and materials are wasted extravagantly in many fields. Reducing waste can improve quality and increase the abundance of time and materials in an organization. [3] This concept was the source of the current now known as “lean management” focuses on reduction of waste and scrap through process improvement and quality built in the design. The environmental utopias are all one way or the other are based on this principle. Production and consumption load on the planet minimized through Quality management. This is one of the most important principles of Quality Management in search for the perfection.

“Visionary leadership”: Leaders must live the vision and values of their organizations, set high standards, and honorably serve all of their constituencies. [3] Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives. Key benefits of visionary leadership can be listed as: [5]

- People will understand and be motivated towards the organization's goals and objectives.
- Activities are evaluated, aligned and implemented in a unified way.
- Miscommunication between levels of an organization will be minimized.
- Applying the principle of leadership typically leads to:

- Considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole.
- Establishing a clear vision of the organization's future.
- Setting challenging goals and targets.
- Creating and sustaining shared values, fairness and ethical role models at all levels of the organization.
- Establishing trust and eliminating fear.
- Providing people with the required resources, training and freedom to act with responsibility and accountability.
- Inspiring, encouraging and recognizing people's contributions.

Toward a Quality Advantage

When a product or service invokes a pleasurable experience, when it is provided with little waste, and when it is reliable over time, we think of it as “quality.” When an organization reliably produces these experiences consistently, over a generation or more, it has achieved a “quality advantage.” Organizations that gain such an advantage grow and prosper, but such an advantage is difficult to achieve and maintain. Only a few organizations have maintained a quality advantage for more than a generation. Among the most celebrated are Toyota, Procter & Gamble, Johnson & Johnson, 3M, Mayo Clinic, and Milliken Co. Without vigilance, even great organizations like these can lose their quality advantage over the course of just a few years. But constant cultivation of a quality advantage is the most reliable approach to being a great organization. This diligent approach stands in contrast to the pursuit of management fads prevalent in today’s leadership culture.^[6]

Beyond Marketplace Advantages

What if we were able to see our major problems as “quality problems” that, addressed by knowledgeable leaders, are amenable to new solutions? For example, Alcoa and Milliken Co. have decided that employee safety is their most important “quality problem.” Applying quality principles, they have nearly eliminated work loss incidents – reducing their occurrence by more than 99 percent. In healthcare, some facilities have applied quality principles to make previously intractable hospital-acquired infections a thing of the past. The principles that help solve these seemingly unsolvable problems need not be limited to business products and services, nor to worker or patient safety. Applying quality principles to all fields of human endeavor can save countless

lives and trillions of dollars. To accomplish this, quality principles need to be widely understood. At the outset, they should be embraced by every business leader. In the long term, our challenge is to ensure that every leader of every organization will understand them. We can build this widespread embrace of quality principles only by ensuring that every university faculty member and graduate grasps them at a deep level.^[6]

Deming, an American Professor in Japan

W.Edwards Deming (October 14, 1900 – December 20, 1993) was an American statistician, professor, author, lecturer, and consultant. Deming is widely credited for improving production in the United States during the Cold War, although he is perhaps best known for his work in Japan. The resistance to change from old fashioned American management teams, caused Deming to look for perfection and use his teachings at thousands of miles away from home.

He was immediately endorsed by the Japanese industry which was already powerful in production capacity but had a bad reputation of low quality. He was known in Japan (and elsewhere) for his kindness to and consideration for those he worked with, for his robust, if very subtle, humor, and for his interest in music. This hardworking and productive man gained the respect of his Japanese colleagues and pupils and worked with them also running the NBC show “If Japan can why can’t we” based on his workings in Japan. In 1981 Ford Motor Company (FMC) asked for his help to go out of crisis. Deming accepted this task and successfully achieved to make FMC a profitable company in less than 5 years. Deming died in December 20, 1993, unfortunate for the world not to have such value to go out of the 2008 crisis.^[7]

Here are Demmings sentences in his article, “The New Economics for Industry, Government, Education”: "The prevailing style of management must undergo transformation. A system cannot understand itself. The transformation requires a view from outside. A lens is needed which I call: *A system of profound knowledge*. It provides a map of theory by which to understand the organizations that we work in."^[8]

The first step is transformation of the individual. This transformation is discontinuous. It comes from understanding of the system of profound knowledge. The individual, transformed, will perceive new meaning to his life, to events, to numbers, to interactions between people.

"Once the individual understands the system of profound knowledge, he will apply its principles in every kind of relationship with other people. He will have a basis for judgment of his own decisions and for transformation of the organizations that he belongs to. The individual, once transformed, will:

- Set an example;
- Be a good listener, but will not compromise;
- Continually teach other people; and
- Help people to pull away from their current practices and beliefs and move into the new philosophy without a feeling of guilt about the past.”

Deming advocated that all managers need to have what he called a System of Profound Knowledge. He discussed the Plan, Do, Study⁵, Act continuous improvement cycle developed around 1950 which he refers to as the Shewhart cycle. He provides an illustration showing a circle where a plan for a change or test of a change in the process or system is developed in the first step, the change or test of change is made below clockwise in the do step, the results are examined in the study step, and the change is either adopted or abandoned in the act step. This leads to the start step, i.e., next plan for change or test of a change in the process or system, the foundation for the whole cycle.^[8]



Figure 1: Shewart Cycle⁶

On the subject of manager's role with people, Deming says that "We are living in prison, under the tyranny of the prevailing style of interaction between people, between teams, between divisions." We must replace the idea that we need competition between people with cooperation. He shows how present practices squeeze intrinsic motivation, self esteem and dignity out of people over their life time. He lists the forces of destruction as forced distribution of grades, merit systems, competition between people and groups, incentive pay, numerical goals, explanation of variances, and treating every group as a profit center. He also shows the characteristics that people are born with such as intrinsic motivation, self esteem, dignity, cooperation, and joy in learning. According to Deming all of the forces of destruction must be replaced with new ways to manage people. After the transformation, a manager will: ^[8]

⁵ Dr. Deming's version of this cycle contains in the same order Plan, Do, Check, Act with "Check" replacing "Study" is known as Deming Cycle.

⁶ Taken from "Management and Accounting Web", <http://maaw.info/ArtSumDeming93.htm>, also see Footnote 5.

- Understand the meaning of a system and convey this to the people in the system.
- Help people see how they must cooperate with the preceding and following stages as a component of the system to optimize the system.
- Understand that people are different and use this knowledge to develop their abilities to optimize the system.
- Be a continuous learner and encourage continuous learning for others in the system
- Be a coach and counsel, not a judge.
- Understand a stable system and that anyone's performance will reach a stable state.
- Develop and mainly use knowledge, personality and persuasive power in the management of people, and not rely on authority of office except to change the system for improvement.
- Study results to improve as a manager of people.
- Try to discover if anyone is outside the system in need of special help. This is an extension of item 6 above.
- Create an environment of trust to encourage freedom and innovation.
- Not expect perfection.
- Listen and learn without passing judgment.
- Have an unplanned and unhurried conversation with each worker at least once a year to understand their aims, hopes and fears.
- Understand the benefits of cooperation and the losses created by competition between people and groups.

The System of Profound Knowledge is the basis for application of Deming's famous 14 Points for Management, given below. The points were first presented in his book "Out of the Crisis" [11]

1: **"Create a constancy of purpose"** Define the problems of today and the future, allocate resources for long-term planning, allocate resources for research and education, constantly improve design of product and service

2: **"Adopt the new philosophy"** Quality costs less not more superstitious learning; call for major change; stop looking at the competitor and look at the customer instead

3: **"Cease dependence on inspection"** Quality does not come from inspection; mass inspection is unreliable, costly, and ineffective; inspectors fail to agree with each other; inspection should be used to collect data for process control

4: **"Do not award business based on price tag alone"** Price alone has no meaning; change focus from lowest initial cost to lowest total cost; work

toward a single source and long term relationship; establish a mutual confidence and aid between purchaser and vendor

5: **"Improve constantly the system of production and service"**

Quality starts with the intent of management; teamwork in design is fundamental; forever, continue to reduce waste and continue to improve; putting out fires is not improvement of the process

6: **"Institute training"** Management must provide the setting where workers can be successful; management must remove the inhibitors to good work; management needs an appreciation of variation; this is management's new role.

7: **"Adopt and institute leadership"** apply Management By Objectives; implement work standards, meet specifications, start a zero defects program, replace appraisal of performance with leadership. Leaders must remove barriers to pride of workmanship, know the work they supervise, know the difference between special and common cause of variation

8: **"Drive out fear"** The common denominator of fear, the fear of knowledge, stop performance appraisals and management by fear or numbers

9: **"Break barriers among staff areas"** Know the internal suppliers and customers, promote team work

10: **"Eliminate slogans, exhortations, and targets"** They are directed at the wrong group. They generate frustration and resentment. Use posters that explain what management is doing to improve the work environment

11: **"Eliminate numerical quotas"** They impede quality. They reduce production. A person's job becomes meeting a quota

12: **"Remove barriers"** Stop performance appraisal systems, production rates, financial management systems and allow people to take pride in their workmanship

13: **"Institute a program of education and self-improvement"** Commitment to lifelong employment Overtime and education Work with higher education of needs Develop team building skills in children

14 : **"Take action to accomplish the transformation"** Management must: Struggle over the fourteen points, take pride in the new philosophy, include the critical mass of people in the change and learn and use the Shewhart cycle

The Knowledge of variation involves understanding that everything measured consists of both "normal" variation due to the flexibility of the system and of "special causes" that create defects. Quality involves recognizing the difference in order to eliminate "special causes" while controlling normal variation. Deming taught that making changes in response to "normal" variation would only make the system perform worse. Understanding variation includes

the comprehension of mathematical certainty that variation will normally occur within six standard deviations of the mean. In Mathematics standard deviation is shown by the Greek Letter “sigma” The variations that occurs within six standard deviations of the mean are not meant to be responded by changes. This idea has later on resulted in the “Six Sigma” system of Total Quality Management.⁷

Major Milestones in the Evolution of Quality Management

Quality control

Probably the first example of quality control was instigated by the great civil engineer (later Sir) Joseph Basalgette when building the London sewer tunnels in the 1860s. Portland cement had recently been introduced but it was untried. Tests by Basalgette (this was in the days when managers actually did the work themselves) showed that it was stronger than any other cement available at that time and became hard in wet conditions. But it had the drawback that if the mixture was wrong, then the cement lost a great deal of its potential strength. Both Brunel and Stevenson, the greatest engineers of their day, warned Basalgette against using Portland Cement because of the problems of maintaining consistency in the mix. Basalgette ignored their advice and went ahead with it but instigated a rigorous quality control exercise in which each batch of mixed cement was tested before use. This proved to be successful and almost all of the 308 million bricks are still in position held by the cement nearly a century and a half later [1]

Quality Control vs. Zero Defects

The first quality standards were produced by the British military in the 1950s and 1960s. During this period, quality control was still the main way of ensuring quality. This was known as ‘end of line’ approach, because the problem was made and then checked to see if it was correct. In the manufacturing sector in the 1970s one third of employees were employed checking the work of others. Of course, this is a shocking waste of manpower, especially as the best workers were used to check the work of others and were themselves unproductive. The main problem with quality control is that it does not work. It is very difficult to achieve 99% quality through inspection. In some sectors this can not be tolerated. For example, what percentage of planes, which took

⁷ To go through Six Sigma Total Quality Management System, is beyond scope of this paper. However reader may find additional information on the following link:
<http://www.motorola.com/content.jsp?globalObjectId=3088>

off with hundreds of passengers not arriving to destination, should we tolerate? Often products and services require level of quality equal to 100% – and this means they should be error-free. Health institutions may have to pay out huge amounts of money each year due to (quality) mistakes. Some management books contain a serious error shown in a graph of cost of inspection against cost of correction and where the two curves cross is stated to be the optimum quality level. In practice this means that there is an acceptable level of quality that might be less than 100%. Of course this is unacceptable. Actually, quality control is not quite dead, but instead of checking the product for faults the control should be on the process to ensure that faults cannot be produced. “Poka yoke” is about stopping processes as soon as a defect occurs, identifying the defect source and preventing it from happening again. Statistical quality inspection will ultimately no longer be required, as there will be no defects to detect – “zero defects”. Poka yoke relies on source inspection, detecting defects before they affect the production line and working to eliminate the defect cause. Mistake proofing is also a component of poka yoke. Shingo introduced simple devices that make it impossible to fit a part incorrectly or make it obvious when a part is missing. This means that errors are prevented at source, supporting a zero defects process. ^[9]

The concept of zero defects is also part of Quality Guru Philip B. Crosby’s work. He was also against the Acceptable Quality Level concept of “Quality control” and was criticising this concept by the following words: “The real problem created by AQLs and the mind virus that went along with it was the commitment that error was inevitable and concentration should be on earliest possible detection and dynamic correction.”^[10]

Quality assurance

In much of the world, manufacturing companies have moved away from inspection and quality control to quality assurance. Quality inspectors have been retrained in quality assurance. In the mid-1970s the Japanese started importing cars into Europe. They were ugly, they tended to rust, but people bought them because they worked. In the late 1970s Lord Stokes of BMC contacted Geoffrey Fielden, then Chairman of the British Standards Institution, asking if there was anything that could be done to increase the quality of British cars to enable them to compete with the influx of Japanese. Based on military standards BSI produced a standard for quality assurance, BS 5750. Quality assurance is the ‘beginning of line’; procedures are put in place to which people work, and by doing so good quality is ensured. This proved to be very successful and has been developed into what is, now known as ISO 9000. It is the world’s biggest selling standard. ^[1]

ISO 9000 Family of Standards

The family of ISO 9000 standards in general and specifically ISO 9001:2000 (the transition to ISO 9001:2008 is taking place) is now firmly established as the globally accepted standard for providing assurance about the quality of goods and services in supplier-customer relations. ISO 14001:2004 confirms its global relevance for organizations wishing to operate in an environmentally sustainable manner. The positive roles played in globalization by ISO's standards for quality and environmental management systems include the following:[5]

- a unifying base for global businesses and supply chains – such as the automotive and oil and gas sectors
- a technical support for regulation – as, for example, in the medical devices sector)
- a tool for major new economic players to increase their participation in global supply chains, in export trade and in business process outsourcing;
- a tool for regional integration – as shown by their adoption by new or potential members of the European Union
- in the rise of services in the global economy – nearly 32 % of ISO 9001:2000 certificates and 29 % of ISO 14001:2004 certificates in 2007 went to organizations in the service sectors, and
- in the transfer of good practice to developing countries and transition economies.

This paper lists the eight quality management principles on which the quality management system standards, the ISO 9001:2008 is based. These principles can be used by senior management as a framework to guide their organizations towards improved performance. The principles are derived from the collective experience and knowledge of the international experts who participate in ISO Technical Committee ISO/TC 176, Quality management and quality assurance, which is responsible for developing and maintaining the ISO 9000 standards. First seven of these principles were analysed in the above section of Juran's Quality Management Principles. Therefore they will not be repeated here

- Customer focus
- Leadership
- Involvement of people
- Process approach
- System approach to management
- Continual improvement

- Factual approach to decision-making
- Mutually beneficial supplier relationships: An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value. Key benefits of this principle are:^[5]
 - Increased ability to create value for both parties.
 - Flexibility and speed of joint responses to changing market or customer needs and expectations.
 - Optimization of costs and resources.

And applying the principles of mutually beneficial supplier relationships typically leads to:

- Establishing relationships that balance short-term gains with long-term considerations.
- Pooling of expertise and resources with partners.
- Identifying and selecting key suppliers.
- Clear and open communication.
- Sharing information and future plans.
- Establishing joint development and improvement activities.
- Inspiring, encouraging and recognizing improvements and achievements by suppliers.

Initially, companies in the United States refused to adopt ISO 9000 but now, as they found they were losing market share, they have become enthusiastic adopters. The European Union has required that quality systems of many suppliers of products related to health, safety and the environment be formally registered, by a third party, according to the ISO 9000 Series standard. This action has made adoption of the ISO standards a prerequisite for doing business in Europe. Countries in Asia, Africa and South America are more and more considering adoption of these standards as a means to increased trade among themselves and with the United States. Benefits of External Quality Standards can be grouped into two categories: ^[1]

- Internal benefits
 - Defines responsibilities
 - Written procedures form a point of reference for all staff
 - Reduces costs of failure
 - Improves morale and motivation
- External benefits

- Enhances marketability (as some customers only buy from registered suppliers)
- Enhances customer confidence
- Enhances image and reputation

The Journey of Evolving Quality, Total Quality Management

Total Quality Management (TQM) is the management philosophy covering the above given thoughts and ideas, aiming for the satisfaction of the stakeholders of any service or product, especially the customers. It's highly strategic and covers the business in full range. Total Quality Management targets involvement of all the employees of the organization including from lowest level to top management in the business processes and improvement of all activities. TQM requires usage of certain tools and techniques like work flow diagrams, cause and effect diagram, schedules and job descriptions.

The basic necessary condition is that this way of thinking must be adopted by both top management and employees as well as consumers and stakeholders. As important as this condition is to establishment of training and educational activities as an essential and continuous part of the management and business processes.

Basic Principles of TQM are customer focus, continuous improvement, total collaboration, corporate culture, process management and control, human empowerment and leadership.

Future of Quality Management

Answer to the two questions: What will the world look like if the driving forces turn out in a worst case scenario and

what will the world look like with these forces playing out in a best case scenario? The answers are Doomsday and Qualitopia respectively. Here is a list of driving forces of 21st century:

Globalization is a key force. Almost everybody agree on the impact of this force. Huge market opportunities of developed countries are huge threats to developing countries. Some countries are suffering from globalization in terms of competition of low labor costs in massively populated countries such as China and India

Individuals are highly mobile, transportation, electronics and communication is decreasing the importance of where the work is done.

People all over the world is increasing their appetite and consumption, creating opportunities for global producers

Social responsibility is increasing, companies are more green, more sustainable and environmentally safe.

Organizations will have to transform themselves to change every 3-4 years compared with 20-30 years of fairly stable activities before change is forced in last century.

Those have adapted the flexibility and have ability to transform will have great advantage over the others who will have to suffer the consequences of the given external forces.

Timeliness and moderate quality of a product is not enough for differentiation in the market. Now differentiation is based on the more stringent quality criteria.

There's an aging population on the face of the world, causing higher costs on society by nonproducer population. This may create different markets for some businesses, but the net cost on society will always be increasingly negative.

Health care is developing in parallel to increasing welfare of some countries like China and India.

Environmental concern is always in the first ten issues of the planet since 1999. There's a sense of urgency in regard to this issue. Consumers expect organizations to improve environmental practices.

All these driving forces are going to shape the Quality notion of the future, namely 21st century. The world to turn into Qualitopa or doom depends not on the attitude of billions of people, but their relatively small number of leaders.

Conclusion

Quality is the refined approach to quest for perfection. Ever since it was first introduced as Quality Inspection and Quality Control, it continues to serve humanity in this endeavour. Like its name-father Utopia, Qualitopia is not a place but the journey towards a better world. Through quality and quality management, with "Continuous Improvement" as its engine and the only Certainty, "The Uncertainty" it's driving power, "Locally implemented", "Universal standards" are announcing the dawn of the "Qualitopia".

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