

## **Chapter - 2**

### **QUALITY MANAGEMENT PHILOSOPHIES:**

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#### **Introduction:**

When we are trying to understand TQM movement fully, we must look the philosophical concepts of the masters who have shaped the evolution of TQM in management discipline. Although their qualitative and quantitative philosophies are different and critical in the emergence and development of contemporary knowledge regarding quality, but no one can understand the entire gamut of Total Quality without master's contribution.

From the concept of quality we have understood, TQM stands on tools and techniques which are considered as quality principle's or philosophies by quality Guru's in different times / situation. There are many individuals have made substantial contribution to the theory and practices of quality management but the 'Mahagurus' of quality evolution in the world are three:

1. Walter Shewart
2. Dr. Willium. Edward Deming
3. Dr. Joseph Juran
4. Dr. Philip B. Crosby

Other individuals who have helped to shape current thinking in quality management include, Massaki Imai, Armand, Feigenbaum, Kaoru Ishikawa, Genichi Taguchi, Shigeo Shingo etc.

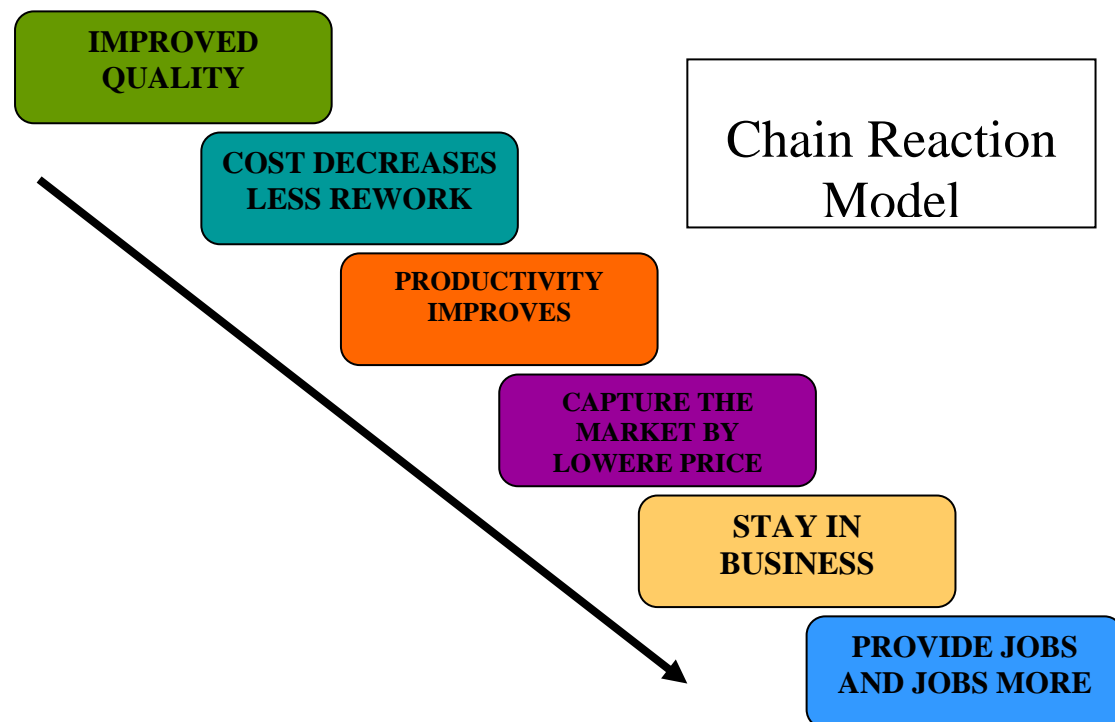
#### **Key contribution from quality Gurus:**

<b>Gurus</b>	<b>Contribution</b>
Deming	<ul style="list-style-type: none"><li>- 14 points for quality management,</li><li>- 7 deadly sins and diseases,</li><li>- the theory of variance,</li><li>- PDCA cycle</li></ul>
Juran	<ul style="list-style-type: none"><li>- Wrote Quality control hand book, called 'Bible of quality'</li><li>- Habit of quality, Quality Trilogy.</li><li>- Define 'quality' as 'Fitness of use'</li><li>- Categorised the cost of the quality</li></ul>
Crosby	<ul style="list-style-type: none"><li>- 14 steps for quality improvement</li><li>- Concept of 'Zero defects'</li><li>- Written book 'Quality is free'</li></ul>
Massaki Imai	<ul style="list-style-type: none"><li>- Kaizen</li></ul>
Ishikawa	<ul style="list-style-type: none"><li>- Cause and effect diagram</li><li>- Quality circle</li></ul>
Taguchi	<ul style="list-style-type: none"><li>- Loss Function</li></ul>
Feigenbaum	<ul style="list-style-type: none"><li>- Quality defines by the customers</li></ul>
William Shewart	<ul style="list-style-type: none"><li>- PDSA, Statistical Control Chart</li></ul>

### A. Deming Philosophy:

Edward Deming first envisioned quality management as an organization wide activity rather than a technical task for inspectors or a special quality assurance group. He identified quality as a management responsibility, observing that managers must create the systems and processes that generate quality. A quality product combines a good design with effective production methods only by meeting both these conditions could a firm assure quality.

Deming stressed that the top management has **higher** responsibility for quality improvement than senior or middle level management. Deming advocated a never ending cycle, of product design, manufacture, test and sales followed by market survey and then redesign and so forth. He claimed that higher quality, leads to higher productivity, which in turn leads to long term competitive strength. This is called Deming's '**Chain Reaction Theory.**' This theory states that 'improvements in quality lead to lower costs because they result in less rework, forward mistakes fewer delays and snags, and better quality and lower prices, a firm can achieve a higher market share and this stay in business, providing more and more jobs.



### Deming's 14 Points for Management:

Points	Explore to
1. <b>Create constancy</b> of purpose for continual improvement of product and services	Any successful organization must clear its V-M-V to provide long term direction for its management and employees
2. <b>Adopt the new philosophy</b> for eco stability ( Taylor's old principle like work measurement and work adversarial work relationship not work in present global	In today's competitive environment, companies must take a customer driven approach.

environment) based on mutual cooperation between labour and management and a never ending cycle of improvement	
3. <b>Chase dependency</b> on inspection to achieve quality	Work ownership – workers must take responsibility for their work rather than leave the problems for the inspectors.
4. <b>End the practice</b> of awarding business on price tag alone	A total cost assessment of any purchase is essential by loyalty and opportunities for mutual improvement with good suppliers
5. <b>Improve constantly and forever the system</b> of production constantly and forever the system of production and services	Improvement means reducing variation by eliminating special causes and reducing the effects of common causes. This improves quality which in turn improves productivity and decreases the costs.
6. <b>Institute training on the job</b>	Continuous improvement of organisation's most valuable resources
7. <b>Adopt and institute modern methods</b> of supervision and leadership	Leadership rather than supervision helps managers / supervisors to eliminate the elements of fear from the job and encourage team work.
8. <b>Breakdown barriers between departments and individuals</b>	Interdisciplinary 'TEAMS' and teamwork helps to breakdown barriers between department and individual and build quality product compared with strictly functionally oriented process.
9. Eliminate the use of slogans, posters and exhortations.	Motivation can be better achieved from trust and leadership than from slogans and goals.
10. Eliminate work standards and numerical quotas:	Unrealistic quotas cause fear and frustration and leave room for improvement.
11. Remove barriers that rob the hourly worker of the pride in workmanship	Deming believed that TQM sets one of the highest barriers to pride in workmanship in performance appraisal. P.A destroys team work by promoting for limited resources, focuses on short term and discourages risk taking.
12. Institute a vigorous project of education and retraining	Continual training keeps the workforce up to date with information about new development, changes in product designs and machinery, new tools and procedures and innovative techniques.
13. Drive out fear: <ul style="list-style-type: none"> <li>• Fear of reprisal, fear of failure</li> <li>• Fear of weakness, fear of losing control, fear of change</li> </ul>	Fear as a major obstacle to improve efficiency and effectiveness and a major barrier to change and survival
14. Define top management commitment to ever – improving quality and productivity	Top management must publicly demonstrate their vigorous commitments to ensure continuous quality improvement and innovation.

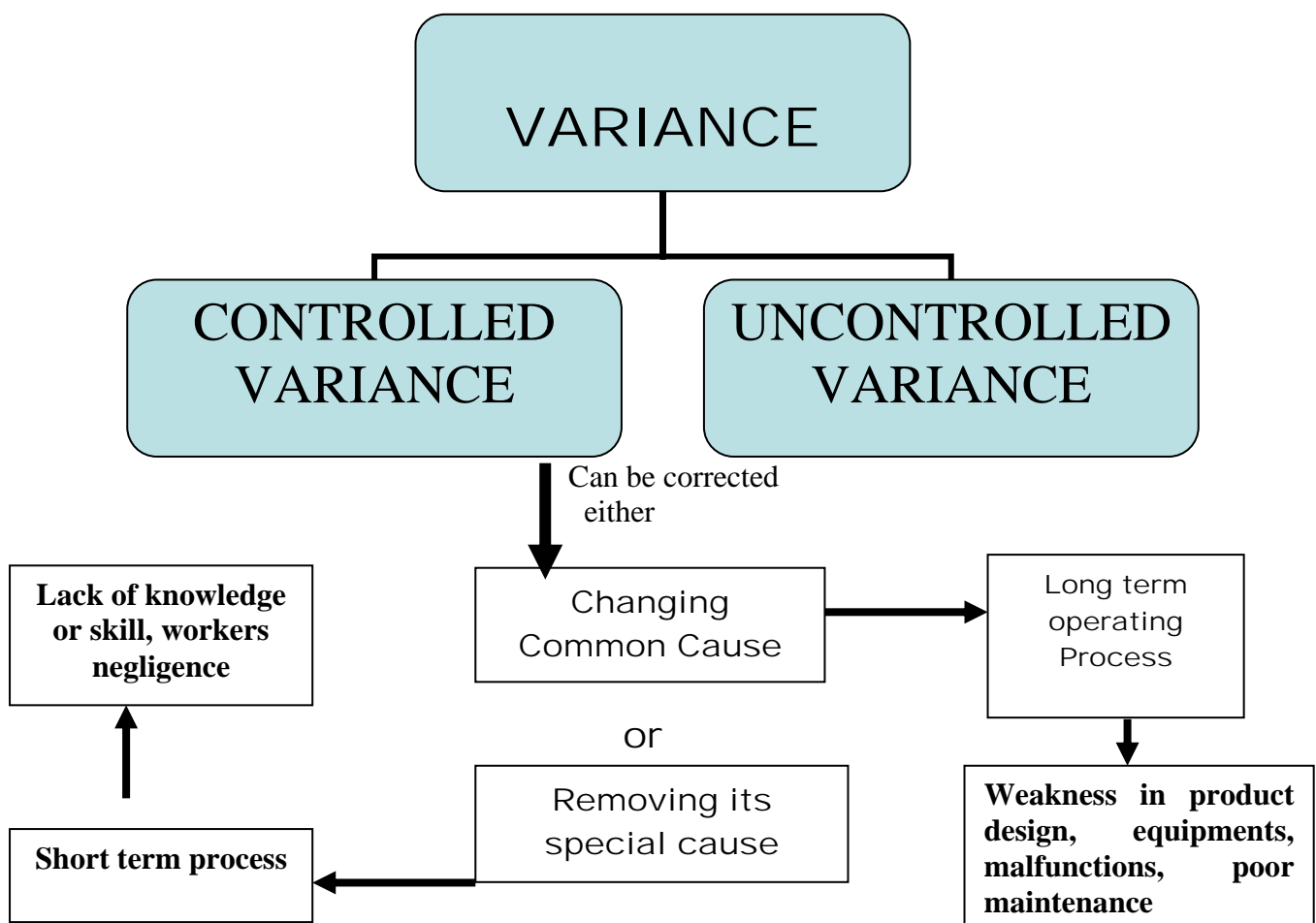
Deming used his 14 points for the management to emphasise the critical role of managers in TQM. He saw managers rather than workers on equipments as the real obstacles to TQM. In his opinion 85% of quality problems could be traced to the management while workers are responsible for the repairing 15%.

### **Deming's theory of variance:**

Deming categorised variance in two phases:

- Controlled variance – variance from standard processes that a worker can control.
- Uncontrolled variance - variance from standard processes that a worker can not control due to impact of some factors.

According to Deming, Variance can be corrected by workers or managers by either changing its common cause or removing its special causes.



### **Deming's 7 deadly diseases:**

For successful implementation of 14 points for management, managers first eliminate the bad practices known as seven deadly diseases and sins.

1. Lack of consistency of purpose – short term quality program
2. Emphasis on short term profits – firms seeking only to increase the quarterly divided undermine quality.

3. Over reliance on performance appraisal encourage revelry, fear and short term thinking. It can also undermine teamwork and mutual respect.
4. Mobility of management: excessive job hopping encourages short term thinking and habits the ability of the manager to understand the long term implicating of actions.
5. Overemphasis on visible figures: Due to over emphasis of easily capture data for evaluating the performance, managers may be unknown / or often unknowable such as the effect of a satisfied customer.
6. Excessive medical cost for employee health care that increases the final cost of goods and services. The long term effect has been a determination in competitiveness.
7. Examining costs of warranty and legal costs: professional cots – medical, laws

### **PDCA Cycle:**

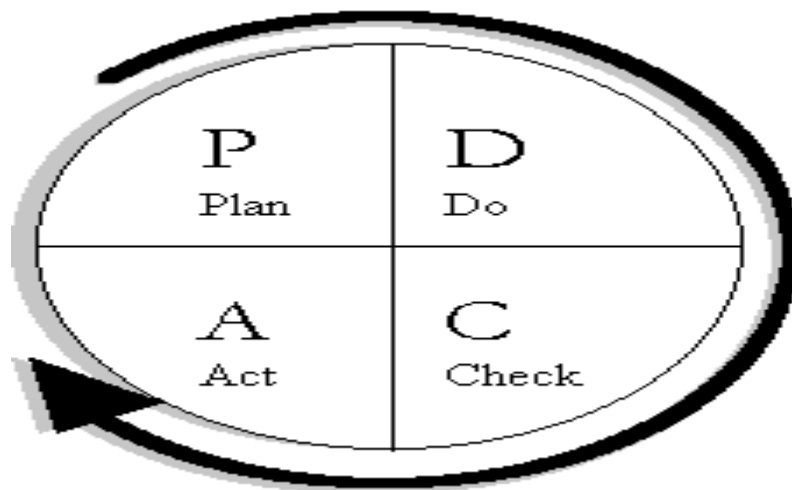
Deming's wheel / PDCA cycle is a problem solving tools adopted by firms engaged in continuous improvements. This cycle consists following steps:

**P : Plan**- The team select a process that need improvement, documents the selected processes sets qualitative goals. After assessing the benefits and the costs of the alternatives, the team develops a plan with quantifiable measures for improvement.

**D : Do** – Implement the plan – monitor the progress. Data are collected continuously to measure improvement in the process.

**C : Check** – Analyse the data collected in do step, find out how closely the results cover ponds to the goals in the plan step.

**A : Act** – It result is successful, the team documents the revised process for standard.



**PDCA – Cycle : Never ending improvement**

## **Juran's philosophy:**

After Deming, Dr. Joseph Juran has had the greatest impact on the theory and practices of quality management. Juran's contribution to TQM centres on 4 themes:

1. Compelling definition of quality and the cost of quality
2. Quality Habit
3. Quality trilogy
4. Universal break through sequences.

Dr. Juran defines quality as 'fitness for use' that results from 5 major product traits :

- Quality of design – specification
- Quality of conformance
- Availability – absence of problem
- Safety and threat of harm
- Field use – packing, stage, maintenance etc.

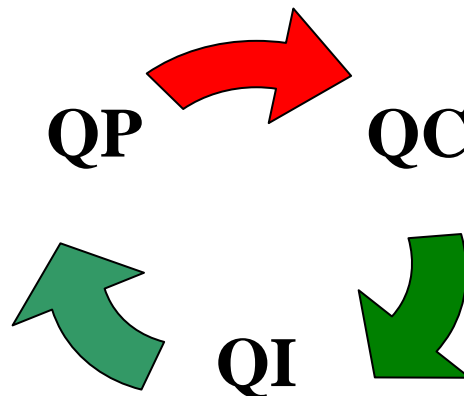
**Cost of quality:** According to Juran, costs associated with defective products includes costs of making, finding, repairing and avoiding defects. Juran categorised the cost of quality into 4 categories:

1. **Internal Failure cost**
2. **External failure cost**
3. **Appraisal cost**
4. **Prevention cost**

**Quality Habit:** According to Juran, the ultimate goal for a TQM program for the firm as a whole has to be set on a process of continuous improvement rather than slogan and exhortations. Thus focus should be developed into a habit of quality. Juran advocated a four steps process to develop quality habit:

1. Establish the specific goals
2. Establishing planning to achieve those Goals
3. Assign clear responsibility to achieve that plan
4. Base rewards on Results

**Quality Trilogy:** Juran broke down the requirements for successful TQM into 3 major activities: Quality Planning, Quality controlling and Quality Improvement.



1. **Quality Planning:** Quality Planning begins with identifying customers both external and internal, determining their needs and developing product features that respond to those needs.
2. **Quality Controlling:** Process involved with –determining what to control, establish units of measurement to evaluate data objectively establish standards of performance, measuring actual performance, interpreting the difference between actual performance and the standard and finally corrective action on the difference.
3. **Quality Improvement:** focuses on long term goal seeking to achieve quality break through that move the firm to a new level of performance.

In trilogy, according to plan once, the operation begins, usually 20% of the work has to be redo due to quality deficiencies as depicted in figure. It is not possible for the procedures to get rid of this chronic waste ( a result of deficient quality planning). Therefore, they perform the quality control (the second process of quality trilogy) to prevent the situation from getting worse. Here the process may go out of control (say resulting in 40% re work) and has to be brought back within the control limits by taking appropriate measures. Over a period of time, by employing quality improvement (the second step of trilogy), the chronic waste can be reduce to a much lower level. (Juran 1999).

### **Crosby Philosophy:**

Philip B.Crosby, the third major influence on the management tools of TQM , was a management consultant and the director of Crosby's quality college. He was contributed 3 major ideas to TQM:

1. Absolutes of quality management
2. 14 steps for quality improvement
3. Quality vaccine.

### **Crosby's 4 absolutes of Quality:**

- Quality is defined as 'conformance to requirements' not 'goodness'.
- The system for achieving quality is prevention not appraisal.
- The performance standard is ' Zero defects' not that is close enough.
- The measurement of quality is the price of non conformance, not index.

### **Crosby's 14 steps for quality Improvement:**

1. Establish management commitment
2. Form a quality improvement team
3. Est. quality measures for each activity through out the company.
4. Evaluate the cost of quality
5. Est. quality awareness of employees
6. Integrated corrective actions
7. Zero defect planning
8. Employee education

9. Hold a zero defect day to establish the new attitude.
10. Employee goal setting should take place usually on a 30, 60, 90 day basis.
11. Error cause removal should follow the identification of problems that prevent error free work environment.
12. Est. recognition for those who meet goals.
13. Est. and hold regular meetings of quality councils composed of quality professionals and team chair person.
14. Do it all over again – continuous improvement.

### **Quality Vaccine:**

Crosby advocated that TQM an integral part of an organization the quality vaccine describes a corporate quality management regimen that improves the overall health of the firm and corrects communication / system operations many of its pressing problems.

### **Masaki Imai:**

The chairman of the 'Cambridge Corporation' an international management consulting firm, based in Tokyo, brought together the man philosophy theories, and tools as a single concept – **Kaizen**.

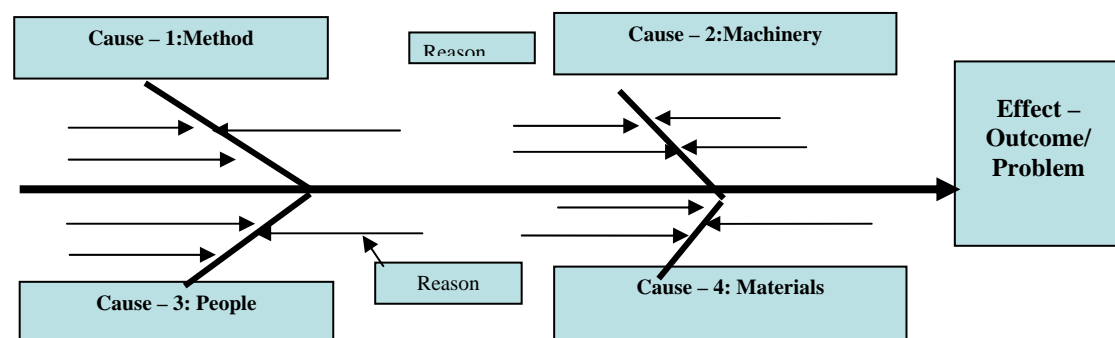
'Kaizen' – is a Japanese word means continuous improvement. Three guiding principle he pointed out in Kaizen:

1. Process view of the system
2. Stress comes from people
3. Constant sense of urgency

### **Kaoru Ishikawa:**

**Dr. K.Ishikawa** was a Japanese quality guru, developed the concept of deployment of quality control circle – small groups of people that meet regularly to plan and carry out process changes to improve quality, productivity and the work environment.

He also developed Ishikawa's cause and effect charts or fish bone diagram.



There are two sets of general categories of main causes used in the fish bone diagrams. **3 Ms and 1P - Method, Machinery, Materials and People**

**4Ps – Policies, Procedures, People and Plant**

Some key elements of his philosophy are:

1. Quality begins with education and ends with education
2. The first step in quality is to know the requirement of customers
3. The ideal state of Q.C occurs when inspection is no longer necessary.
4. Remove the root causes, not the symptoms



5. Quality control is the responsibility of all workers and all divisions.
6. Do not confuse means with the objectives
7. Put quality first and set your sights long term profits
8. Market is the entrance and exist of quality
9. Top management must not show anger when facts are presented by subordinates
10. 95% problem can solve with problem solving tool.
11. Data without dispersion information (variability) are false data.

### **Shigeo Shingo:**

According to SS, statistical methods detect errors too late in the manufacturing process, what is needed is to identify errors as they happen and to correct or deal with them right away. Shingo proposed his own version of 'zero – defects'. This is called 'POKA YOKA' in Japanese which means "FOOL PROOFING". The idea is to handle errors as they occur.

Poka Yoka emphasizes dealing with second logical issues with a relevant technical feedback and control system.

Shingo's ideas have nothing to say about human beings in terms of them as social cultural or political beings.

### **Genechi Taguchi:**

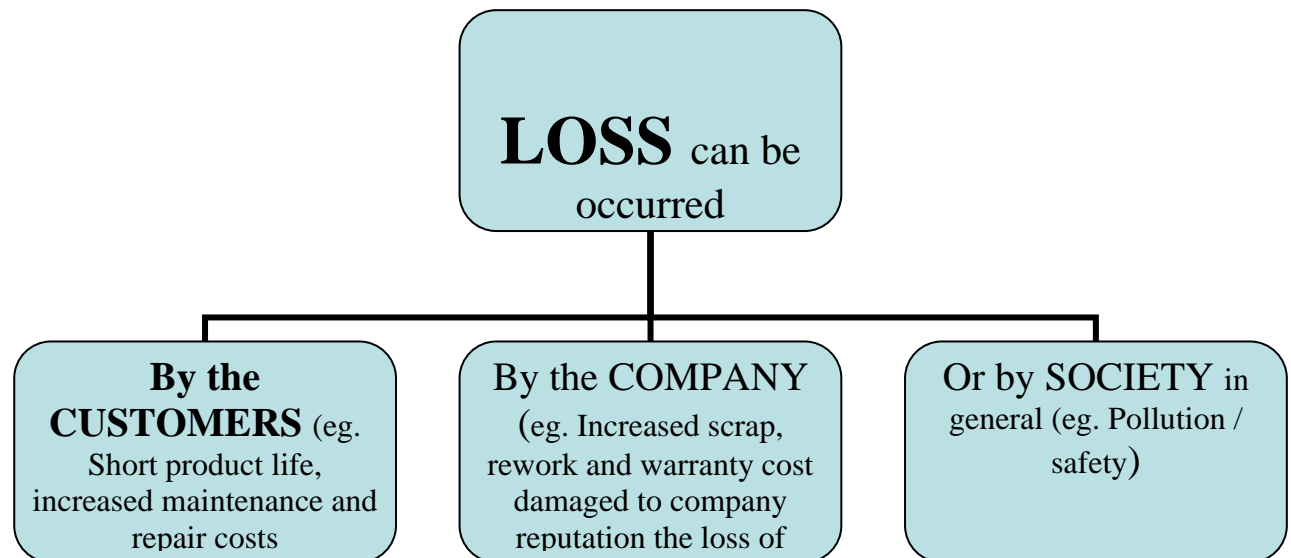
Japanese quality Guru, Genichi Taguchi, Ph.D, believes that:

- To improve quality, one must look up stream at the design stage because that is where quality begins.
- Quality must be designed in, it cannot be inspected later.

Taguchi oriented '**quality engineering**' which is an approach that involves combining engineers and statistical methods to reduce costs and improve quality by optimising product design and manufacturing processes.

Taguchi methods helps **product designers estimate the true cost of quality** and then cost effectively improve quality.

He developed his **loss function** concept that combines cost, target and variation into one metric. According to him **quality in terms of the social loss, loss to producers and consumers** from the time a product is conceived. The smaller the value of this social loss, the more desirable is the product.



**Taguchi quality** loss function is a statement that:

*‘Any deviation from the target value of quality characteristic result in extra costs to some segment of the society’.*

*Quality loss function is expressed as:  $L = C (X-T)^2$  where –*

*L – Total loss*

*C – A cost of constant*

*X – Actual average value of quality characteristics and*

*T – Target value of quality characteristics*

#### **Taguchi’s Seven Points: (off line quality control)**

Conventionally, quality control activities centre on final inspection sampling or on control charts and process control. This is known as ‘on line quality control’. Taguchi pushed the process upstream to focus on product and process design. This is known as “**off line quality control**”

#### **Taguchi’s 7 points are as follows:**

1. Product quality is measured by the total loss to society created by the product
2. Continuous quality improvement and cost reduction are necessary to survive in world competition.
3. Quality improvement requires continual and repeated reduction of variation.
4. Quality loss is frequently proportional to the square of the deviation of the performance from the nominal value.
5. Product and process design can have an important impact on a product quality and cost.
6. Performance variation can be reduced by suitable adjustment of the products parameters and /or the process parameters.
7. The appropriate parameter settings that reduce variation can be identified with the appropriate statistically designed experiments.

### Philosophical Comparison of Gurus in TQM:

<b>GURU</b>	<b>Definitions of Quality</b>	<b>Emphasis</b>	<b>Dominant factor</b>
Deming	Customer – led	Process	Control of Variation,
Juran	Customer –led	People & Process	Fitness for purpose / use
Crosby	Supply – led	Performance & process	Conformance to requirements
Ishikawa	Value – led	People & process	Company wide quality control
Taguchi	Supply – led	Proceess / Design	Quality loss function

Thus, TQM is an operational philosophy where the ultimate focus is customer and their satisfaction. To fulfil the customer's need and wants as well as for business growth; all the quality gurus suggested that to develop a culture for continuous improvement. They also explained that continuous improvement is a process to build a system that can consistently produce a quality product / services. Here, both management and the workers role are crucial because they must identify and eliminate waste and variability through-out system; take the equal responsibility for proper tools and knowledge uses and team leadership and empowerment for entire organization. This is not so easy task but it is possible and generic. If any organization really wants to develop a culture for continuous improvement, the top management must develop and follow some strategic steps for long term achievement.

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