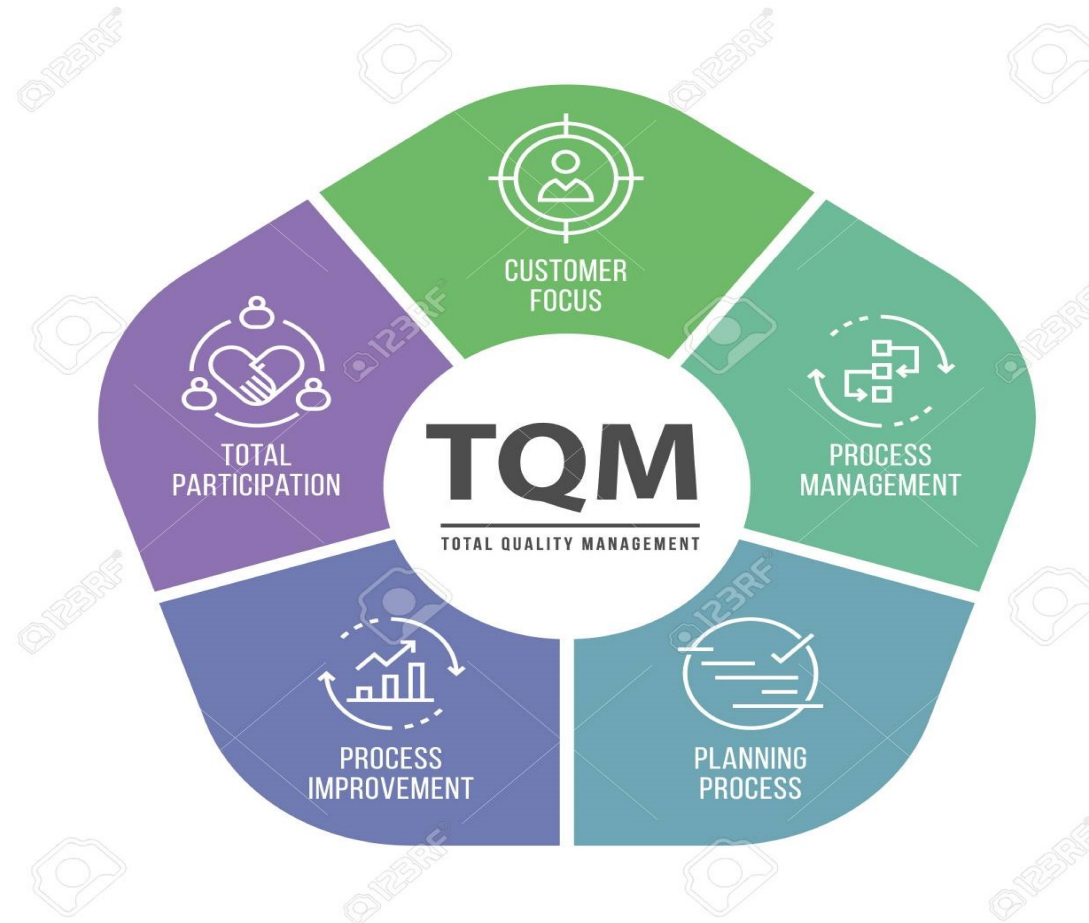


TOTAL QUALITY MANAGEMENT

BME-55 IV Year Mechanical 2020-21

UNIT-1

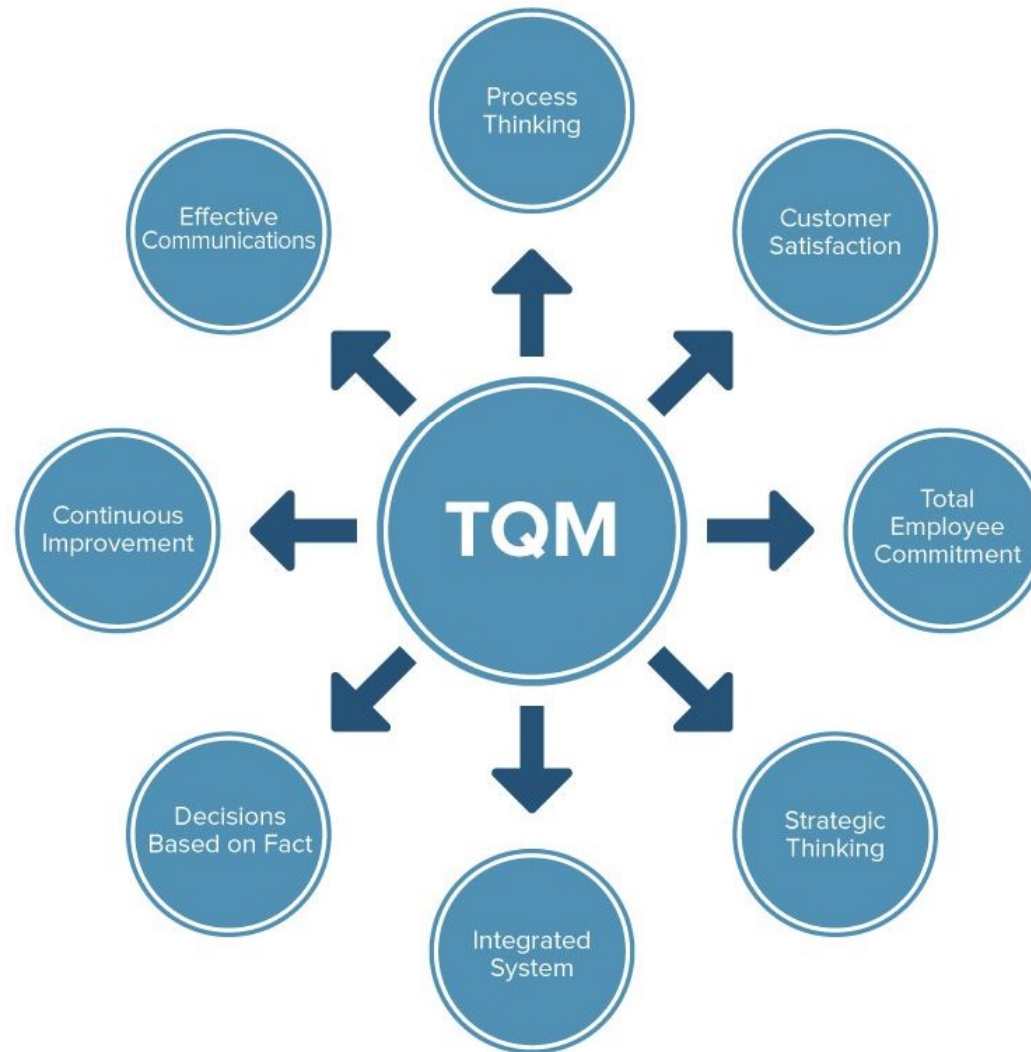
PROF.D.K.SINGH



INTRODUCTION

- Total Quality Management (TQM) is customer oriented management philosophy and strategy. It is centered on quality so as to result in customer delight. The word “Total” implies that all members of the organization make consistent efforts to achieve the objective of customer delight through systematic efforts for improvement of the organization.

8 ELEMENTS OF TQM



NATURE OF TQM

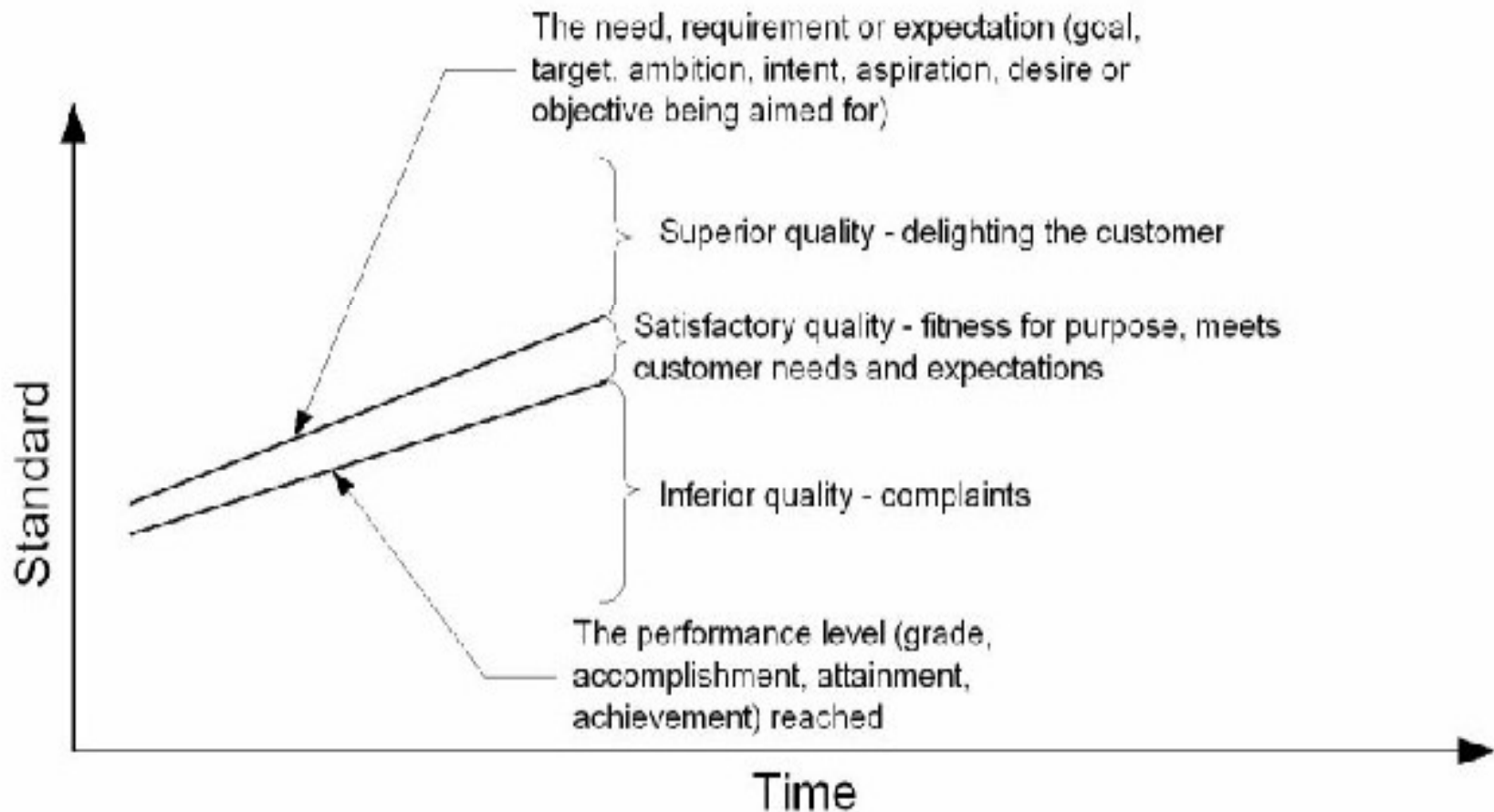
- It starts from Top management.
- It is a consistent process.
- It is a part of strategic planning and thinking.
- It is customer oriented.
- It is a team work.
- It is related with consistent improvement of quality.
- Every employee is involved in Quality Improvement Aspect.
- Every employee is responsible for the success of TQM.

WHAT IS QUALITY?

- Quality is fitness for use.
- The totality of features and characteristics of a product or service that bear on its ability to satisfy a given need.
- Quality involves meeting customers need, preferences and exceeding it.
- Quality also encompasses people, process and environment.



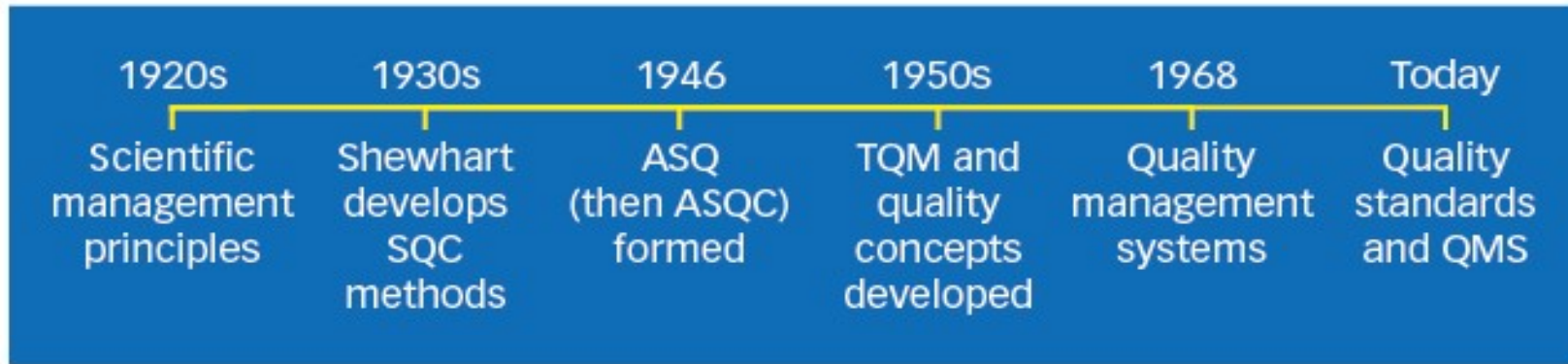
WHAT IS QUALITY?...



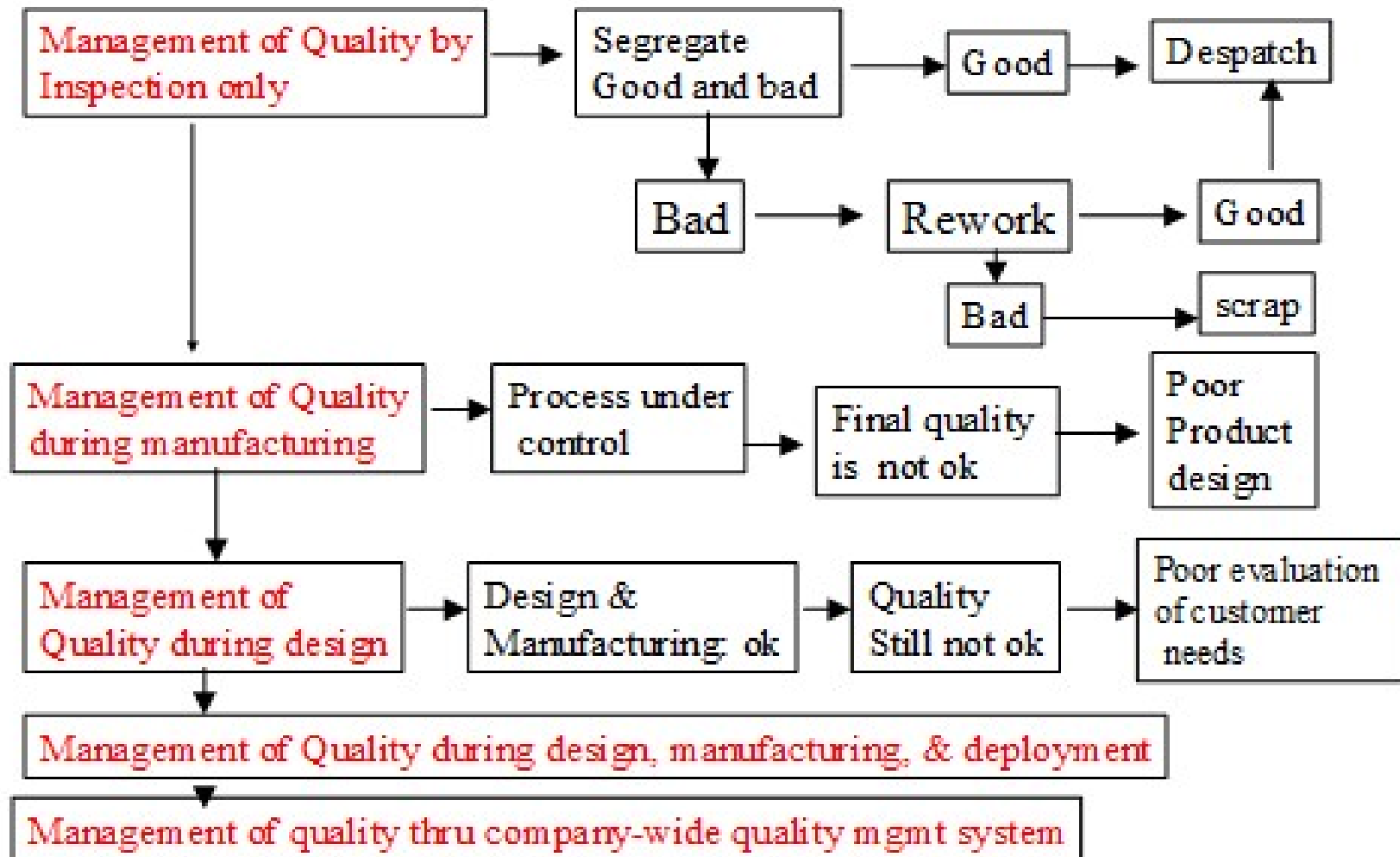
NEED FOR QUALITY

- Increased productivity
- Reduced cost of repairs
- Increased loyal customer base
- Better profits

EVOLUTION OF QUALITY



Evolution of Quality Management Concept



PRODUCT QUALITY



8 DIMENSIONS OF PRODUCT QUALITY

Dimension	Definition	Example
Performance	The primary operating characteristics of a product	Top speed of a car. Sound clarity and power of stereo system.
Features	The secondary characteristics that supplement its basic functioning	Stopwatch function on wristwatch. Remote control on digital camera
Reliability	The probability of failure-free performance over a specified period of time.	Mean Time Between Failures (MTBF), and the Mean Time to First Failure (MTFF) are classic Measures.
Conformance	The degree to which a product's physical and performance characteristics meet design specifications	Specified hole diameter, overall length of part, etc.
Durability	A measure of useful product life i.e. the amount of use a customer gets from a product before it deteriorates or must be replaced	Operating hours on a jet engine before it must be replaced
Serviceability	The ease, speed, courtesy and competence of repair	Time and effort required to get brakes repaired
Aesthetics	How the product feels, sounds, tastes or smells, a matter of personal preference.	Clothing colour, styling, and material.
Perceived Quality.	Quality based on reputation	French wines, German cars,

SERVICE QUALITY

- **Service:** Action of helping or doing work for someone.
- **Quality:** An essential and distinguishing attribute of a service.
- **Service Quality:** The degree and direction of discrepancy between customer's perceptions and expectations.
- Service delivery

WHAT IS SERVICE QUALITY?

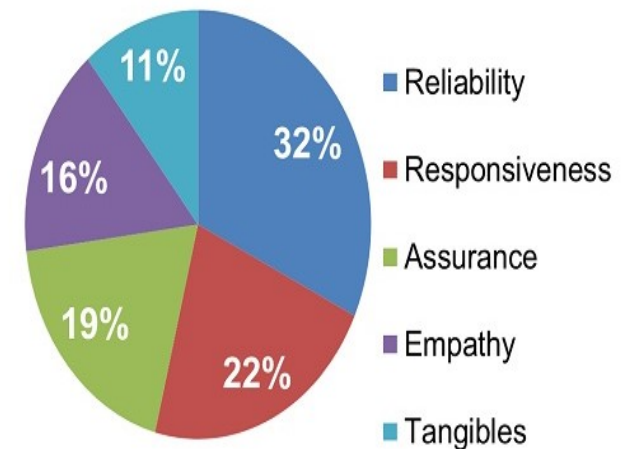
“A service is any activity or benefit that one party can offer to another which is essentially intangible and does not result in the ownership of anything.”

By Kotler, Armstrong, Saunders and Wong

“Services are economic activities that create value and provide benefits for customers at specific times & places as a result of bringing about a desired change in or on behalf of the recipient of the service.”

By Christopher Lovelock

DIMENSIONS OF SERVICE QUALITY



THE DEMING MANAGEMENT PHILOSOPHY

- **William Edwards Deming** (1900-1993) was an American engineer, statistician, professor, author, lecturer, and management consultant.
- He found great inspiration in the work of Walter Shewhart like Statistical Process Control, Operational definitions, and the PDSA (Plan-Do-Study-Act) cycle.
- Deming is best known for his 14 points for quality & his system of thought called the **System of Profound Knowledge**.

DEMING'S 14 POINTS FOR MANAGEMENT

Deming's 14 Points

- | | |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|  1. Create constancy of purpose |  8. Drive out fear |
|  2. Adopt new philosophies |  9. Eliminate boundaries |
|  3. Cease inspection, require evidence |  10. No slogans |
|  4. Improve quality of supplies |  11. No numerical standards |
|  5. Continuously improve production |  12. Cultivate pride in work |
|  6. Ensure employees are educated |  13. Encourage self improvement |
|  7. Supervisors must help staff |  14. Commit to quality |

THE JURAN PHILOSOPHY

- Joseph M. Juran was an industrial engineer.
- He proposed a simple definition of quality:
“fitness for use.”
- Dr. Juran was the first to incorporate the human aspect of quality management which is referred to as Total Quality Management.

JURAN'S QUALITY TRIBOLOGY

- According to Juran, the management of quality consists of three inter-related quality oriented processes namely:
 - Quality planning
 - Quality control
 - Quality improvement



JURAN'S 10 POINTS FOR MANAGEMENT

- Build awareness of opportunities to improve
- Set goals for improvement
- Organize to reach goals
- Provide training
- Carry out projects to solve problems
- Report progress
- Give recognition
- Communicate results
- Keep score
- Maintain momentum by making annual improvement part of the regular system and process of the company

THE CROSBY PHILOSOPHY

- Philip Bayard Crosby (1926-2001) was a businessman & author who contributed to management theory and quality management practices.
- He is best known in relation to the concepts of 'Zero Defects' and 'Do it Right First Time'.
- Crosby's TQM approach is based on his four absolutes of Quality management.



Four Absolutes of Quality

1. The definition of quality is conformance to requirements (requirements meaning both the product and the customer's requirements)
2. The system of quality is prevention
3. The performance standard is zero defects (relative to requirements)
4. The measurement of quality is the price of non-conformance.



CROSBY'S 14 POINTS FOR MANAGEMENT

CROSBY'S 14 STEPS

1. Management Commitment
2. Quality Improvement Team
3. Quality Measurement
4. Cost of Quality Evaluation
5. Quality Awareness
6. Corrective Action
7. Zero Defects Planning
8. Quality Education
9. Zero Defects Day
10. Goal Setting
11. Error Cause Removal
12. Recognition
13. Quality Councils
14. Do It All Over Again

COMPARISON

	Deming	Juran	Crosby
Definition of quality	Continuous improvement	Fitness for use	Conformance to requirements
Emphasis	Tools/system	Measurement	Motivation (behaviour)
Types of tools	Statistical process control	Analytical, cost-of-quality	Minimal use
Use of goals and targets	Not used	Significant emphasis	Posted goals for workers

COST OF QUALITY

Four Types of Quality Cost



COST OF QUALITY

Cost of Conformance

Prevention Costs

(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project
to avoid failures

Cost of Nonconformance

Internal Failure Costs

(Failures found by the project)

- Rework
- Scrap

External Failure Costs

(Failures found by the customer)

- Liabilities
- Warranty work
- Lost business

Money spent during and after
the project **because of failures**

COST OF QUALITY

Total Cost of Quality — One View



BARRIERS TO TQM

- Lack of management commitment
- Inability to change organization culture
- Improper planning
- Lack of employees commitment
- Inadequate use of empowerment
- Lack of continuous training & education
- Paying inadequate attention to internal and external customers
- Failure to continually improve

QUALITY STATEMENTS

Quality statement are established by a quality council to provide overall directions for achieving the total quality culture. The 3 elements of Quality Statements are:

- **Vision statement-** a short declaration of what the organization hopes to be tomorrow.
- **Mission statement-** a statement of purpose-who we are, who are our customers, what we do, and how we do it.
- **Quality policy-** is a guide for everyone in the organization, how they should provide products and services to the customers.

EXAMPLES OF QUALITY STATEMENTS

Vision Statement of Accenture

To become one of the world's leading companies, bringing innovations to improve the way the world works and lives.

Mission statements of top companies

TECH



"To organize the world's information and make it universally accessible and useful."



"To give people the power to build community and bring the world closer together."



"To be earth's most customer-centric company; to build a place where people can come to find and discover anything they might want to buy online."



"Transportation as reliable as running water, everywhere for everyone."



"To help create a world where you can belong anywhere and where people can live in a place, instead of just traveling to it."



"To give everyone the power to create and share ideas and information instantly, without barriers."

NON TECH

"To be our customers' favorite place and way to eat and drink."



"To refresh the world in mind, body and spirit. To inspire moments of optimism and happiness through our brands and actions. To create value and make a difference."



"To bring inspiration and innovation to every athlete in the world."



"To inspire tomorrow's creators to use technology to build brighter futures for themselves, their families and the world."



"Dedication to the highest quality of customer service delivered with a sense of warmth, friendliness, individual pride, and Company Spirit."



EXAMPLES OF QUALITY STATEMENTS...



Quality policy of IRISS Medical Technologies

IRISS Medical is committed to providing innovative high quality products and services that meet or exceed the expectations of our customers. This includes:

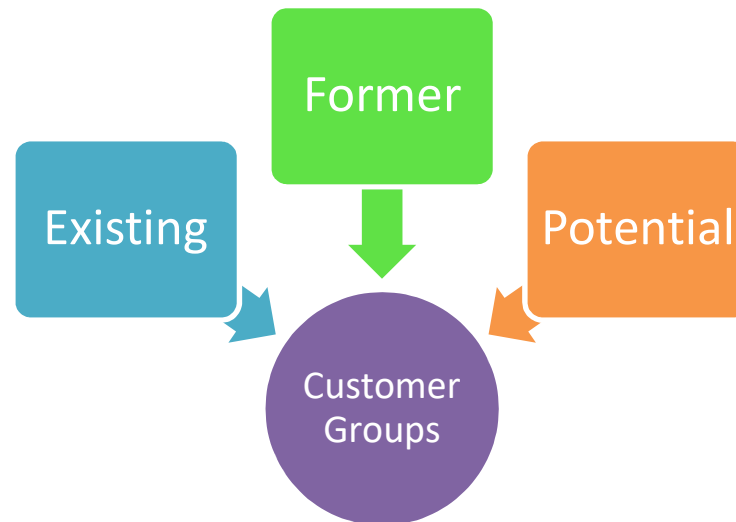
- Maintaining a shared quality vision and a focus on continuous improvement of our products, processes, and services (including delivery);
- Understanding the requirements and meeting the needs of our customers;
- Involving all employees in the delivery of quality products and services, and
- Meeting all current requirements for national and international regulations.

Authorised and Endorsed by:  Date: 29 Nov 2013

CEO

CUSTOMER & THEIR NEEDS

- **Definition of Customer:** In general, a customer is the recipient of a good or service or a product or an idea- obtained from a seller, vendor, or supplier via a financial transaction or exchange for money or some other valuable consideration.



- **Customer Groups**

- **Existing customers:** Customers who have purchased or otherwise used an organization's goods or services, typically within a designated period of time.
- **Former customers:** Those who have formerly had relations with the marketing organization typically through a previous purchase.
- **Potential customers:** Those who have yet to purchase but possess what the market believes are the requirements to eventually become existing customers.

BASIC REQUIREMENTS OF THE CUSTOMER

- High levels of quality
- Fast, efficient, accurate & timely service
- High quality products/services at a competitive price
- Zero deviation from expected performance of products or services
- Quick response of queries; helpful service staff to provide timely information
- Don't expect long queues, waits or hold for long time
- Easy to surf websites without unnecessary advertisements/promos

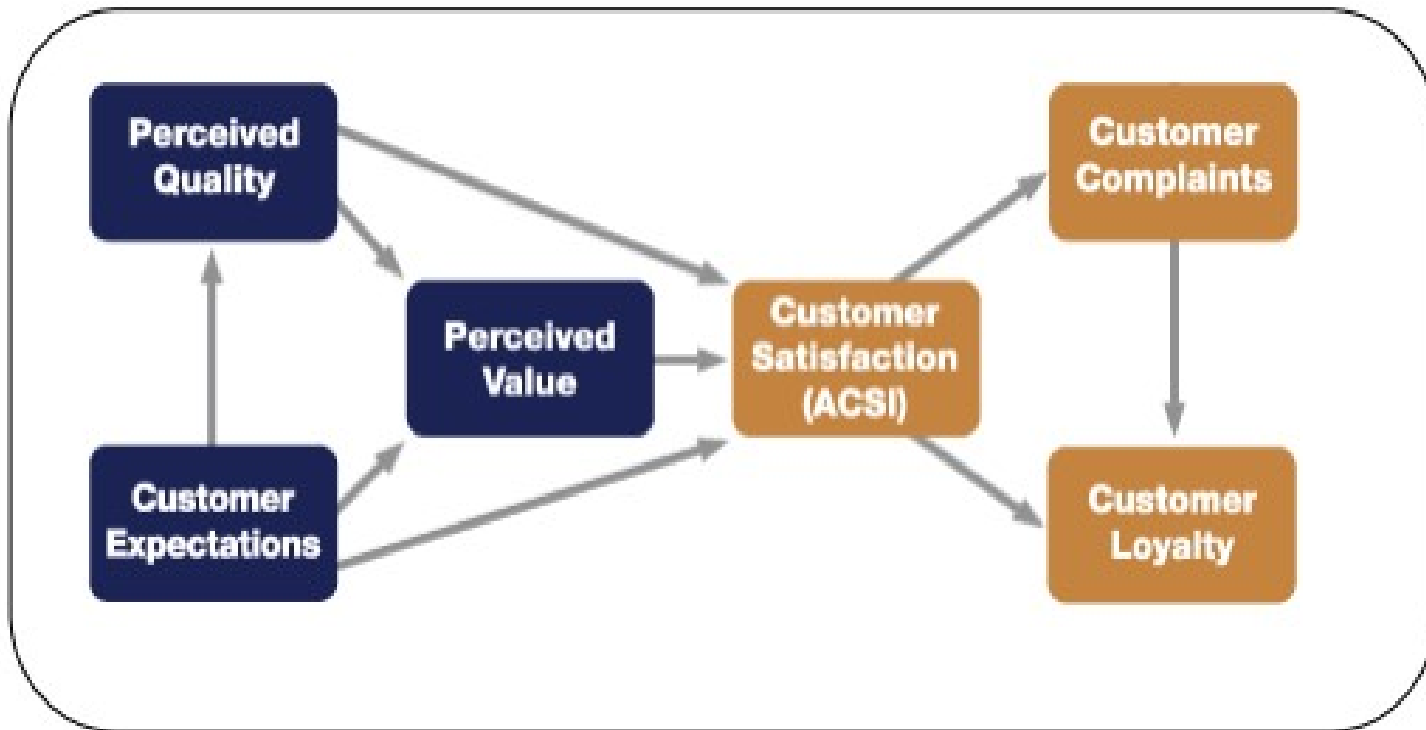
CUSTOMER ORIENTATION

- It is a business strategy that requires management & employees to focus on the changing wants & needs of its customers.
- It refers to a series of actions taken by the management to support the needs of their customers by engaging their employees in order to ensure customer satisfaction.
- It is a modern marketing philosophy & approach that guide the marketing managers to design their marketing mix in such a way that the firm can offer max. possible satisfaction to target customers.

CUSTOMER SATISFACTION

- The customer satisfaction (ACSI) index score is calculated as a weighted average of three survey questions that measure different facets of satisfaction with a product or service. ACSI researchers use proprietary software technology to estimate the weighting for each question.

THE AMERICAN CUSTOMER SATISFACTION INDEX (ACSI) MODEL



THE AMERICAN CUSTOMER SATISFACTION INDEX (ACSI) MODEL

- Various multivariable components are measured by several questions that are weighted within the model. Further, it uses customer interviews as input to a multi-equation econometric.
- It is a cause-and-effect model with indices for drivers of satisfaction on the left side (customer expectations, perceived quality, and perceived value), satisfaction (ACSI) in the center, and outcomes of satisfaction on the right side (customer complaints and customer loyalty, including customer retention and price tolerance).

CUSTOMER COMPLAINTS

- Customer complaints are measured as a percentage of respondents who indicate they have complained to a company directly about a product or service within a specified time frame. More complaints mean more dissatisfaction.

INSPECTION & CONTROL OF PRODUCT

- 100 % inspection: Every piece is separately inspected & time, money and effort required is more. No chance of sampling error as each item goes through the process of inspection. It is suitable only when a small no. of pieces require inspection or a very high degree of quality is required.

Example: Jet engines, aircraft, medical & scientific equipments etc.



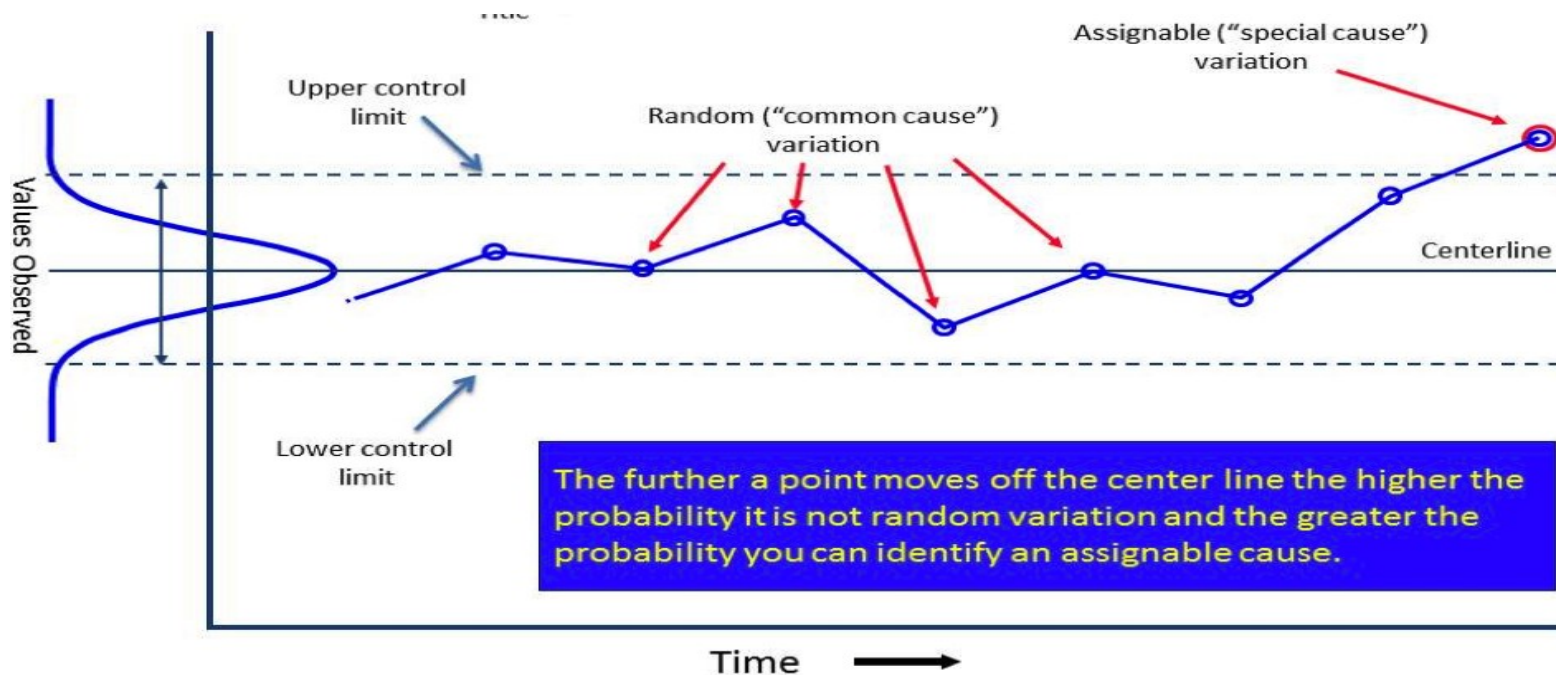
INSPECTION & CONTROL OF PRODUCT...

- Sampling inspection: Sampling is done on the basis of sample drawn from a population. Money & time is saved. Less no. of inspectors is required. Samples taken from different batches of products are representatives and the conclusions are drawn on that basis. The entire lot may be rejected if samples are defective.
- Example: CFL tubes, fans, A.C., music systems, washing machine etc.



- Statistical Process Control: Statistical tool for reducing the variability in processes.
 - Output of the process is evaluated to determine if it is statistically acceptable or not.
 - Based on Central Limit Theorem i.e. the samples will follow a normal distribution regardless of the shape of the parent distribution.
 - Used with the help of control chart.
 - With the help of control chart the process o/p can be monitored to see if it is random or not.

- Control chart is a graphical representation obtained from the representative sample means taken at regular time interval.
- Upper & lower control limits define the range of acceptable variation. Centerline is the mean of all samples.



BENEFITS OF SPC

- It controls variation in the processes & hence controls quality.
- It provides a means of detecting error during production.
- It helps to have standardized quality of production.
- It reduces inspection costs.
- It is used to identify abnormal condition & trouble spot in the process.
- It provides a means of determining the capability of the manufacturing process.