MQT

LEADERSHIP - DEFINITIONS

- Leadership has been described as the "process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task".

- Alan Keith: "Leadership is ultimately about creating a way for people to contribute to making something extraordinary happen."

- Ken "SKC" Ogbonnia: "effective leadership is the ability to successfully integrate and maximize available resources within the internal and external environment for the attainment of organizational or societal goals."

LEADERSHIP - DEFINITIONS

- Ann Marie E. McSwain: "leadership is about capacity: the capacity of leaders to listen and observe, to use their expertise as a starting point to encourage dialogue between all levels of decision-making, to establish processes and transparency in decision-making, to articulate their own values and visions clearly but not impose them.

- Leadership is about setting and not just reacting to agendas, identifying problems, and initiating change that makes for substantial improvement rather than managing change."

LEADERSHIP - DEFINITIONS

- These three definitions talk about certain common things. They are resources, utilization of resources, managing constraints and getting extraordinary results.

- These definitions also talk about motivating people to work in unison to create results.

Concepts of Leadership
Stephen R Covey: The 7 Habits of Highly Successful People

1. **Be Proactive: Proactive people think beforehand and are ready to face a situation. Reactive people react as per** the situation and react on whims and emotions. A proactive person can plan beforehand for an eventuality. If you are well prepared then you can face a situation or solve a problem more efficiently.

2. **Begin with the end in Mind: "If you don't know where to go then you will reach nowhere" goes an old saying.**

- **Start a task with set goals.** Goals are important as they tell you where to go. They help in focusing your approach as well. Remember the famous incident from Mahabharata where Guru Dronacharya asks his disciple about what they could see during target practice.

- Arjuna gives the most perfect answer as he was focusing on the target. Because of his focused approach Arjuna became one of the best archers of his time.

3. **Put First Things First: Because of multitude of tasks and assignments one needs to prioritize.** This helps in giving more attention to more important things at hand.

4. **Think win-win: Think about mutual benefits rather than your own benefit alone.**

   Everybody wants to have an upper hand in life and in business dealings. But this is practically not possible. So best way is to find is the middle of the road.

5. **Seek first to understand, then to be understood: First give other people ample time to express themselves.**

   This will help on many fronts. The other person gets enough opportunity to say what he wants to say. You get an opportunity to understand other's perspective. You get enough time to strategize accordingly.

6. Synergy: The best example of team work can be learnt from a pleasant orchestra or 'jugalbandi' in Indian classical music. Especially in Indian classical music you will observe how maestros bury their egos and come out with astounding performances.

7.Sharpen the Saw: Skill building or practice is very important.

Nobody is perfect and perfection is a thing which can never be achieved in one's lifetime. Moreover, it always pays to practice as much as you can.

STRATEGIC QUALITY PLANNING

Seven Steps to Strategic Planning

- There are seven basic steps to strategic quality planning. The process starts with the principle that quality and customer satisfaction are the center of an organizations future. It brings together all the key stakeholders.

1. Customer needs: The first step is to discover the future needs of the customers. Who will they be? Will your customer base change? What will they want? How will the organization meet and exceed expectations?

2. Customer positioning: Next, the planners determine where the organization wants to be in relation to the customers. Do they want to retain, reduce, or expand the customer base?

Products or services with poor quality performance should be targeted for breakthrough or eliminated. The organization needs to concentrate its efforts on areas of excellence. No two individual is same, so every type of customer should be treated as per his/her profile. You cannot sell a premium product to a price conscious customer.

STRATEGIC QUALITY PLANNING

3. **Predict the future: Next, the planners must look in to their crystal balls to predict future conditions that will affect their product or service.**

Demographics, economic forecasts and technical assessments or projections are tools that help predict the future. More than one organizations product or service has become obsolete because it failed to foresee the changing technology.

If the top management can foresee the future then it helps enable the organization to prepare for future changes. Let us take example of SONY. With rapid change in technology SONY has changed its product portfolio, so it is now MP3 player instead of Walkman which we get from SONY.

STRATEGIC QUALITY PLANNING

4. **Gap analysis: Gap analysis is about the difference between what needs to be done and what are we currently doing.** It can give a clue about whether the organization should increase or decrease capacity for a particular product.

5. **Closing the gap:** If there are gaps then long term plans should be about how to fill that gap.

6. Alignment (with vision and mission): Whatever quality goals an organization is chalking out it should not lose focus from the long term vision and mission of the organization.

7. Implementation: Once every plan about goals is ready then the next step should be to plan about the

methodologies of implementation.

CUSTOMER SATISFACTION

- Customers are important asset to the organization, satisfied customers will buy more, and buy more frequently, and pay their bill promptly.

- In a manufacturing and service organization, customer satisfaction is considered as a measure of quality.

- TQM implies an organizational drive with meeting or exceeding customer needs. Understanding the customer's needs and expectations is essential to winning new business.

- To attain this level, the organization should examine their quality system to respond to their ever changing customer's needs.

Teboul Model of Customer Satisfaction

Customer needs

Company
Product/Service
offer
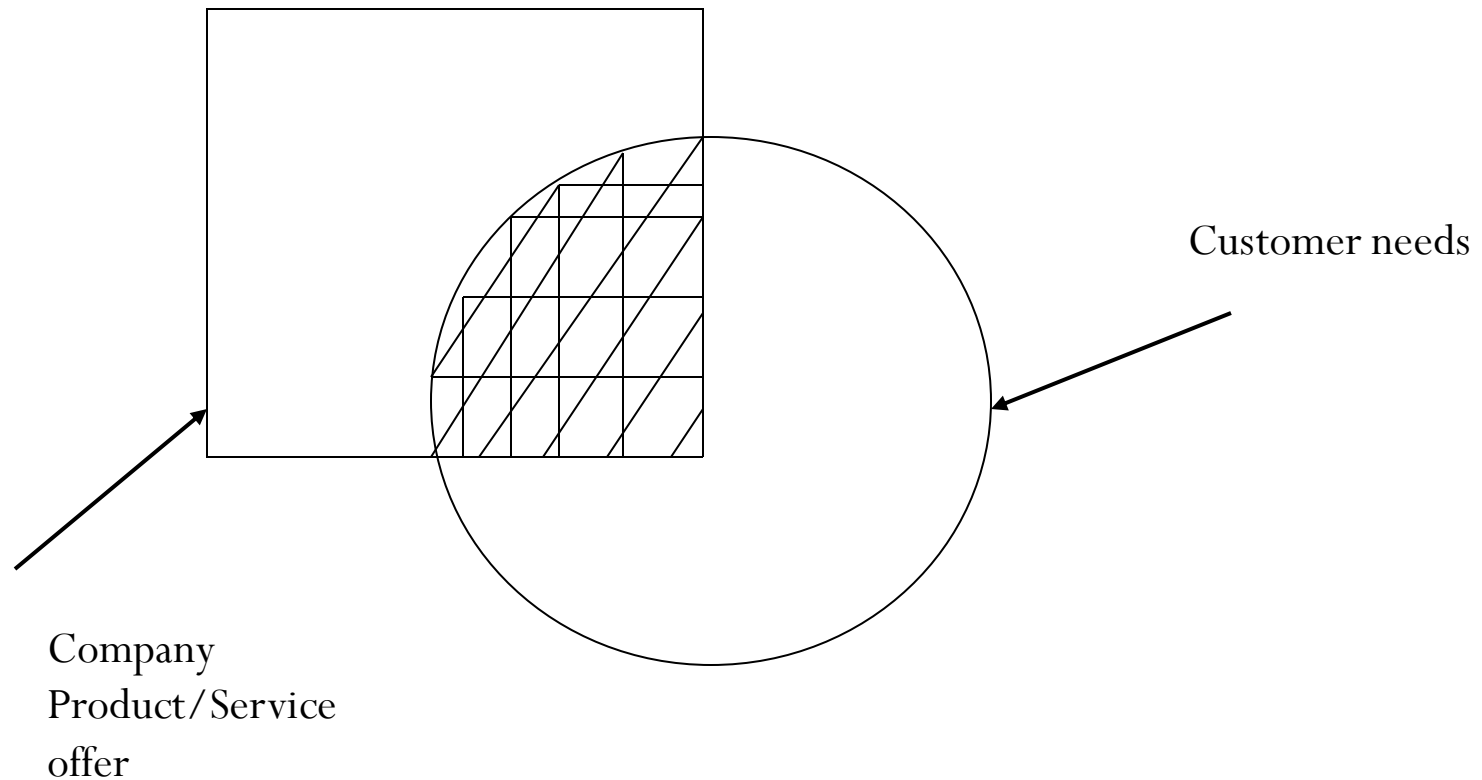
Characteristics of customer satisfaction

1. It is far from simple.

2. It is not an objective statistic, but more of feeling and attitude.

3. Therefore like people's opinion and feeling, it is subjective by nature.

4. Because of this subjective nature, it is difficult to measure.

5. The measurement of customer satisfaction is not precise.

6. The customer satisfaction should not be viewed in vacuum, i.e., it should be compared with the level of satisfaction they have with competitor's product are service.

Types of customers

1. Internal customers - each of them receives a product or service and in exchange, providers a product or service.

2. External customers - one who uses the product or service, the one who purchase the product, or the who influences the sale of the product.

CUSTOMER PERCEPTION OF QUALITY

- In an organization there is no acceptable quality level because the customer's needs, values and expectations are constantly changing and becoming more demanding.

- An American Society for Quality (ASQ) survey reveals the following end-user perception of quality
  1. Performance
  2. Features
  3. Service
  4. Warranty
  5. Price
  6. Reputation.

CUSTOMER COMPLAINTS

- Unlike the customer's feedback the customer complaints are reactive, and they are important in gaining data on customer perceptions.

- A dissatisfied customer can easily become a lost customer because of their frustrations. This customer dissatisfaction becomes a measure for organizational process improvement measures.

- Every single complaint should be accepted, analyzed, and acted upon to again win over customer's confidence. Since more than 50% of the dissatisfied customers will buy again if they are complaint has been heard and resolved.

- By adopting a positive approach the complaints can be seen as an opportunity to obtain information and provide a positive service to the customer.

Ways to get customer feedback or complaint

1. Comment Card

- A low cost method of obtaining feedback from customers involves a comment card, which can be attached to the warranty card and included with the product at the time of purchase.

- The intent of this card is to get simple information such as name, address, age, occupation and what influenced the customer's decision to buy the product.

- *Generally people respond only if something very good or very bad has happened.*

2. Customer Questionnaire

- A customer questionnaire is a popular tool for obtaining opinion and perceptions about an organization and its products and services

- However they can be costly and time consuming.

- Surveys may be administered by mail or telephone.

- In the questionnaire the customer is asked to furnish answers relating to the quality of product and services.

Ways to get customer feedback or complaint

3. Focus Groups

- Customer focus groups are a popular way to get feedback, but they too can be very expensive.
- These groups are very effective for gathering information on customer expectations and requirements.
- A group of customers is assembled in a meeting room to answer a series of questions.
- These carefully structured questions are asked by a skilled moderator.

4. Toll-Free Telephone Numbers

- Toll-free telephone numbers are an effective technique for receiving complaint feedback.
- Organizations can respond faster and more cheaply to the complaint.

5. Customer Visits

Handling the customer complaints

1. Investigate customer's experiences by actively receiving the customer feedback and then acting promptly.

2. Develop procedures for complaint resolution that include empowering front-line employee.

3. Analyze complaints; try to put them in a category for speedy response.

4. Work to identify process and material variations and then eliminate the root cause. more inspection' is not a corrective action.

5. After receiving the response, a senior manager should contact the customer and strive top resolve the concern

6. Establish customer satisfaction measures and constantly monitor them

7. Communicate complaint information, as well as the results of all inquiries and solutions, to all people in the organization.

8. Provide a monthly complaint report to the quality council for their evaluation and if needed, the assignment of process improvement teams.

9. Identify customer's expectations in advance rather than afterward through complaint analysis.

CUSTOMER RETENTION

- Customer retention represents the activities that produce the necessary customer satisfaction which in turn creates the customer loyalty.

- Customer retention moves customer satisfaction to the next level by determining what is truly important to the customers and making sure that the customer satisfaction system focuses valuable resources on things that are important to the customer.

- World-class companies know that continuous improvement and customer satisfaction should go hand-in-hand.

- Improved service to the customer is a costlier affair, so an organization must determine its return on the service investment. For this the important service elements that significantly improve revenues and market share should be determined.

- One survey indicates, it requires five times of effort to win a new customer than retaining a present customer. In this context customer retention is important for organizational success.

EMPLOYEE INVOLVEMENT

- Japanese management emphasizes the need to consider employee as a valuable resources rather than treating them as a mere tools for production.

- Employee involvement is one approach to improve quality and productivity.

- It is not an replacement for management nor is it the final word in quality improvement, it aims at better meeting of organizational goals at all levels.

1.MOTIVATION

- Knowledge of motivation helps us to understand the utilization of employee involvement to achieve process improvement.

Theories of Motivation

- He explained the motivation in terms of a hierarchy of needs and that there were five levels.

- These are survival, security, social, esteem, and self-actualization.

- It is important to note that as employees move up the hierarchy, they will immediately revert back to the previous level if they feel threatened.

HERTZBERG'S TWO FACTOR THEORY

- Hertzberg extends the Maslow's theory by using empirical research in employee motivation.

- He found that people were motivated by the motivators (intrinsic factors) like recognition, responsibility, achievement, advancement and the work itself.

- In addition he found that bad feelings were associated with preventable dissatisfiers or hygiene factors (extrinsic factors) like low salary, minimal fringe benefits, poor working conditions, ill-defined organizational policies and mediocre (ordinary) supervision.

- He also explained that the presence of extrinsic factors (for example good working condition) does not produce any motivation but their absence will create dissatisfaction among employees.

- In a same manner the absence of intrinsic factors (for example advancement) does not produce any dissatisfaction but their presence will provide strong level of motivation.

How to motivate work force

1. Know thyself
2. Know your employees
3. Establish a positive attitude
4. Share the goals
5. Monitor progress
6. Develop interesting work
7. Communicate
8. Celebrate success

2.EMPOWERMENT

- **The dictionary meaning of the term empowerment is to invest people with authority. Its purpose is to tap the enormous potential that lies within every worker.**

An operational definition is as follows:

- **Empowerment is an environment in which people have the ability, the confidence, and the commitment to take the responsibility and ownership to improve the process and initiate the necessary steps to satisfy customer requirements within well defined boundaries in order to achieve organizational values and goals.**

- Empowerment is nothing unusual; people generally want to be more in charge of their own jobs and carriers.

- After all, they do that successfully in their personal lives every day. Most people appreciate and value the trust and responsibility. This empowerment helps greatly in eliminating resistance to changes.

- Empowerment is different from delegation or job enrichment, which means distributing or entrusting work to others. In empowerment employee is held responsible for accomplishing a whole task.i.e. Employee becomes process owner, thus not only responsible but also accountable.

Three conditions are necessary for empowering employees

1. Everyone must understand the need for change
2. The system needs to change to the new paradigm(model/standard)
3. The organization must enable its employees.

3. TEAMS

❑ Teams are very effective in solving all quality and productivity problems.

❑ Team is defined as a group of people working together to achieve common objectives or goals.

❑ Teamwork is the cumulative actions of the team during which each member of the team subordinates his interests and opinions to fulfill the objectives or goals of the group.

❑ Many heads are better than one, especially in meeting ever-changing customer needs.

❑ Each member of the team have special ability that can be used for the problem. Many processes are so complex that one person cannot able solve completely.

❑ Based on the synergic effect, whole is greater than sum of its parts. Team work is better than sum of its member contribution.

❑ Team builds a rapport with each other that allows everyone to do a better job.

❑ Teams provide the vehicle for improved communication.

Types of teams

- Process improvement teams
- Cross-functional teams
- Natural work teams
- Self-directed/ self managed teams

Characteristics of successful teams

- Sponsor
- Team charter
- Team competition
- Training
- Clear objectives
- Accountability
- Well-defined decision procedures
- Resources
- Trust
- Effective problem solving
- Open communication
- Appropriate leadership
- Balanced participation
- Cohesiveness.

4. RECOGNITION AND REWARD

❑ **Recognition is a form of employee motivation in which the organization publicly acknowledges the**

   ❑ positive contributions an individual has made to the success of the organization.

   ❑ This acknowledgement is delivered using verbal and written praise and may include symbolic items such as certificates and plaques.

❑ **Reward is something tangible such as theater tickets, dinner for two, or a cash award to promote desirable behaviour.**

❑ **Recognition and reward go together to form a system for letting people know they are valuable**

❑ **members of the organization.**

   ❑ People like to be recognized, either as a team or individually.

   ❑ A persons feeling of achievement, value to the organization, knowing the organization cares and having peer recognition may be more important than any reward.

4. RECOGNITION AND REWARD

❑ **Recognition Includes**
  - ❑ Pictures on the bulletin board
  - ❑ Articles in newsletters or newspapers
  - ❑ Letters to families
  - ❑ Making a presentation to management
  - ❑ Passing along compliments from others
  - ❑ Personal phone calls or notes
  - ❑ Placing positive notes in folders
  - ❑ Increased responsibility

❑ **Rewards**
  - • **Individual Rewards**
  - ❑ Better parking space
  - ❑ Dinner out
  - ❑ Gift certificates
  - ❑ Gift to charity in the name of the recipient
  - ❑ Washing an employee's car during lunch hour
  - ❑ Trips
  - ❑ Event tickets
  - • **Group Rewards**
  - ❑ Includes an outing such as a ball game, bowling and movies
  - ❑ Group lunch or dinner

4. RECOGNITION AND REWARD

- **"Cash awards are also effective motivators for individual and team awards."**

5. PERFORMANCE APPRAISAL

❑ The purpose of performance appraisal is to let employees know how they are doing and provide a basis for promotions, salary increases, counseling and other purposes related to an employee's future.

❑ There should be a good relationship between the employee and the appraiser.

❑ Employees should be made aware of the appraisal process, what is evaluated and how often.

❑ Employees should be told how they are doing on a continuous basis and not just at appraisal time.

❑ The appraisal should point out strengths and weaknesses as well as how performance can be improved.

CONTINUOUS PROCESS IMPROVEMENT

- **PDSA CYCLE**
  - The concept was first given by Deming and later it was developed by Shewhart.
  - It is also known as **Deming cycle or PDCA cycle.**
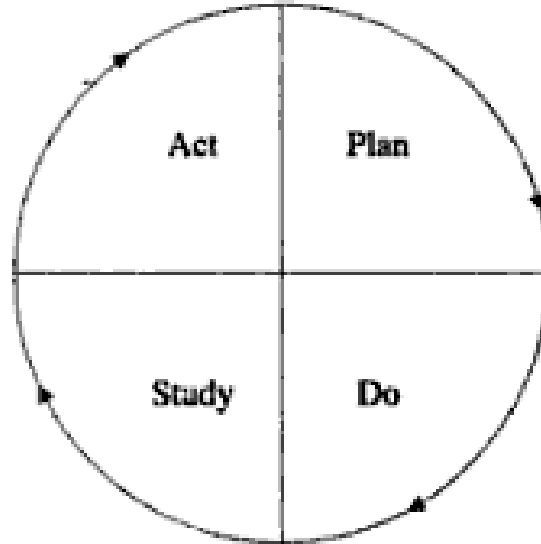
PDSA CYCLE
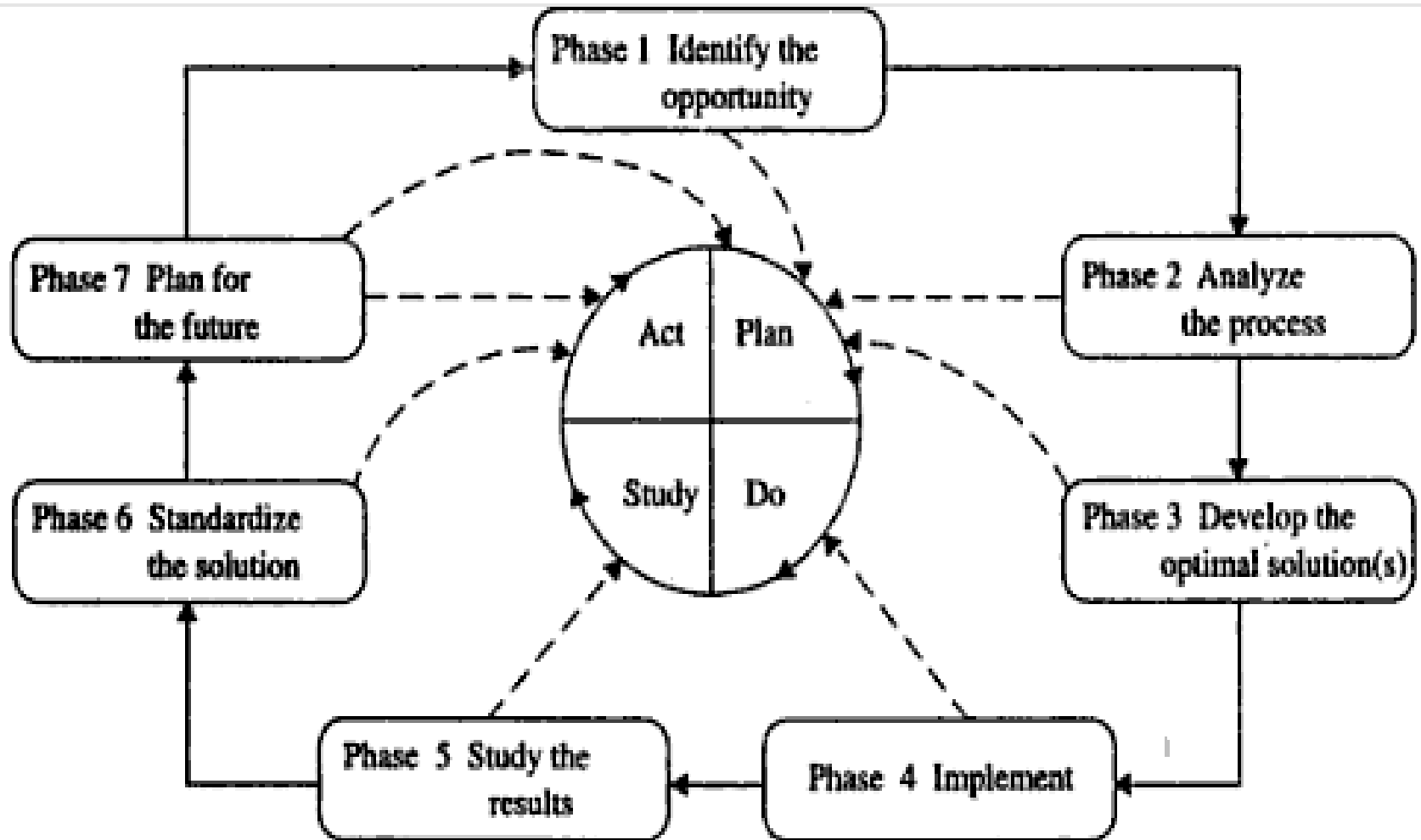
Phase – 1: Identify the opportunity:

❑ The objective of this phase is to identify and prioritize opportunities for improvement.

❑ It has three parts
- Identify the problem
- Form the team
- Define the scope.

Phase – 2: Analyze the current process:

Analyze the current process:

- The objective of this phase is to understand the process and how it is currently performed.

- Key activities are to define process boundaries outputs and customers, inputs and suppliers and process flow, determine levels of customer satisfaction and measurements needed, gather data and identify root causes.

Phase – 2: Analyze the current process:

- **With the help of process flow diagram the team will Establish performance measures with respect to customer requirements.**
  - ❑ Determine data needed to manage the process
  - ❑ Establish regular feedback with customers and suppliers.
  - ❑ Establish measures for quality/cost/time of inputs and outputs.

- **Once the target performance measures are established, the team can collect all available data and information.**
  - ❑ Gathering data by the team
  - ❑ Helps confirm that a problem exists
  - ❑ Enables the team to work with facts
  - ❑ Makes it possible to establish measurement criteria for baseline
  - ❑ Enables the team to measure the effectiveness of an implemented solution.

Phase – 2: Analyze the current process:

- **The team should develop a plan that includes input from internal and external customers and answers them following questions**
  - ❑ What problem or operation do we want to learn about?
  - ❑ What are the data used for?
  - ❑ How many data are needed?
  - ❑ What conclusions can be drawn from the collected data?
  - ❑ What action should be taken as a result of the conclusion?

Phase – 3: Develop the optimal solution

❑ The objective of this phase is to establish potential and feasible solution and recommend the best solution to improve the process.

❑ Once all the information is available the project team begins it search for possible solutions.

❑ In this phase creativity plays the major role and brainstorming is the principle technique.

❑ **There are three types of creativity**
   ❑ Create new processes
   ❑ Combine different processes
   ❑ Modify the existing processes

Phase – 4: Implement

Implement Changes:

❑ Once the best solution is selected it should be implemented.

❑ This phase has the objective of preparing the implementation plan, obtaining approval and implementing the process improvements.

❑ Although the team has the authority in implementing the solution but it has to get approval from the quality council.

❑ If such approval is needed from the quality council, the team has to give a written or oral report.

The report should fully describe about:
   ❑ Why will it be done?
   ❑ How will it be done?
   ❑ When will it be done?
   ❑ Who will do it?
   ❑ Where will it be done?

❑ The length of the report is determined by the complexity of the change.

❑ Simple changes may require only an oral report, whereas other changes require a detailed written report.

Phase 5: Study the Results:

❑ This phase has the objective of monitoring and evaluating the change by tracking and studying the effectiveness of the improvement efforts through data collection and review of progress.

❑ The team should meet periodically during this phase to evaluate the results to see that the problem has been solved or if fine tuning is required.

❑ If the team is not satisfied, then some of the phases will need to be repeated.

Phase – 6: Standardize the solution:

❑ Once the team is satisfied with the change, it must be institutionalized by positive control of process, process certification and operator certification.

❑ Positrol (positive control) assures that the important variables are kept under control.

❑ It specifies that what, who, how, where and when of the process and is an updating of the monitoring activity.

Phase – 7: Plan for the future

- **Plan for the future:**
  - This phase has the objective of achieving improved levels of process performance.
  - Everyone in the organization is involved in a systematic, long term endeavor to constantly improve quality by developing processes that are customer oriented, flexible and responsible.

5S PRINCIPLE

- SEIRI - Tidiness
- SEITON - Orderliness
- SEISO - Cleanliness
- SEIKETSU-Standardization
- SHITSUKE - Sustaining the discipline or self-discipline

Kaizen

- Kaizen can be roughly translated from Japanese to mean "good change." The philosophy behind kaizen is often credited to Dr. W. Edwards Deming. Dr. Demming was invited by Japanese industrial leaders and engineers to help rebuild Japan after World War II. He was honored for his contributions by Emperor Hirohito and the Japanese Union of Scientists and Engineers.

- Kaizen, also known as continuous improvement, is a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality.

- Kaizen can be applied to any kind of work, but it is perhaps best known for being used in lean manufacturing and lean programming.

- If a work environment practices kaizen, continuous improvement is the responsibility of every worker, not just a selected few.

KAIZEN

- Value added and non-value added work activities.
- Muda: which refers to seven classes of waste-overproduction, delay, transportation, processing, inventory, wasted motion and defective parts.
- Principles of motion study and the use of cell technology.
- Documentation of standard operating procedures.
- The five S's for workplace organization.
- Visual management by means of virtual displays that everyone in the plant can use for better communication.
- Just in time principles to produce only the units in the right quantities at the right time and with the right resources.
- POKA-YOKE to prevent or detect errors.
- Team dynamics, which includes problem solving, communication skills and conflict resolution.

Poka Yoke

- poka yoke is a Japanese term that means "mistake-proofing". A poka-yoke is any mechanism in a lean manufacturing process that helps an equipment operator avoid (yokeru) mistakes (poka). Its purpose is to eliminate product defects by preventing, correcting, or drawing attention to human errors as they occur.The concept was formalised, and the term adopted, by Shigeo Shingo as part of the Toyota Production System.

SUPPLIER PARTNERSHIP
Principles of Customer Supplier Relations By Ishikawa

- ❑ Both the customer and the supplier are fully responsible for the control of quality.

- ❑ Both the customer and the supplier should be independent of each other and respect each other's

  independence.

- ❑ The customer is responsible for providing the supplier with clear and sufficient requirements, so that the

  supplier can know precisely what to produce.

- ❑ Both the customer and the supplier should enter in to a non-adversarial contract with respect to quality,

  quantity, price, delivery method and terms of payments.

SUPPLIER PARTNERSHIP

❑ The supplier is responsible for providing the quality that will satisfy the customer and submitting necessary data upon the customer's request.

❑ Both the customer and the supplier should decide the method to evaluate the quality of product or service to the satisfaction of both parties.

❑ Both the customer and the supplier should establish in the contract the method by which they can reach an amicable settlement of any disputes that may arise.

❑ Both the customer and the supplier should continually exchange information sometimes using multi functional teams in order to improve the product or service quality.

SUPPLIER PARTNERSHIP

- Both the customer and the supplier should perform business activities such as procurement, production and inventory planning, clerical work and systems so that an amicable and satisfactory relationship is maintained.

- When dealing with business transactions, both the customer and the supplier should always have the interest of the end user in mind.

Partnering

- Partnering is a long term commitment between two or more organizations for the purpose of achieving specific business goals and objectives by maximizing the effectiveness of each participant's resources.

- **3 key elements to a partnering relationship**
  - ❑ Long term commitment
  - ❑ Trust
  - ❑ Shared Vision

- **Sourcing**
  - ❑ Sole
  - ❑ Multiple
  - ❑ Single

Supplier Selection:

- **Supplier Selection is based on**
  - ❑ Management philosophy of the organization
  - ❑ Stable management of the supplier
  - ❑ High technical standards with future technological innovations
  - ❑ Raw materials and parts required by the purchaser meet the quality specifications
  - ❑ Price is right and the delivery dates can be met
  - ❑ Supplier has an effective quality system
  - ❑ When supplier has a track record of customer satisfaction and organization credibility.

Supplier Selection:

- **Supplier Rating**
- **It is based on**
  - Quality
  - On time delivery
  - Service
  - Internal Structure
  - Review reports
  - Customer satisfaction
- Example: General Motors uses the traffic light to rate their suppliers
- Red- Problem
- Yellow- Potential Problem
- Green - Ok

Relationship Development

- The previous topics contribute to the establishment of the relationship and inspection, training, teams, recognition and reward contribute to the maintainability and growth of the relationship

- **1. Inspection**

- The goal of inspection is to eliminate, substantially reduce or automate the inspection activity.

  Four phases of inspection
  - 100% inspection
  - Sampling
  - Audit
  - Identity check

- **2. Training**

- **3. Team approach**

- 4. **Recognition**

Assignment - 2

1) Define leadership. Write its different definitions.
2) What is quality planning? Write the steps of strategic quality planning.
3) According to American Society for Quality (ASQ) survey what is the end-user perception of quality
4) Define Employee involvement.
5) What is meant by empowerment?
6) Define 5s concept.
7) How will you measure the supplier rating?
8) How will you retain the customer?
9) Advantages of continuous process.
10) What are the ways to get customer feedback or complaint.

Assignment - 3

1) What is meant by performance appraisal?
2) On what factors supplier selection depends.
3) Describe in detail about 5s Kaizen concepts with example.
4) How to achieve the best quality through the customer?
5) Explain the concept of PDSA cycle.
6) Describe in detail about employee benefits?
7) Write short notes on Leadership.
8) Explain supplier partnership.
9) Differentiate customer satisfaction and retention.
10) Explain principles of Customer Supplier Relations By Ishikawa.
11) What is motivation. How to motivate work force? Explain.

TOOLS AND TECHNIQUES FOR TOTAL QUALITY

INTRODUCTION

- Quality practitioners have adapted a variety of tools from other disciplines, such as statistics, operations research, and creative problem solving to help design, improve, and control processes.

- These tools provide a means by which problems and issues can be viewed objectively, data can be used as a basis for fact-driven decisions, and managers can deal with variation in a logical fashion.

TOOLS FOR QUALITY DESIGN

- Customers' needs and expectations drive the planning process for products and the systems by which they are produced.

- Marketing plays a key role in identifying customer expectations. Once they are identified, managers must translate them into specific product and service specifications that manufacturing and service delivery processes must meet.

- In some cases the product or service that customers receive is quite different from what they expect. It is management's responsibility to minimize such gaps. Firms use several tools and approaches to help them focus on their external and internal customers.

QUALITY CIRCLES

- A **quality circle** is a volunteer group composed of workers (or even students), who do the same or similar work, usually under the leadership of their own supervisor (or an elected team leader), who meet regularly in paid time who are trained to identify, analyze and solve work-related problems and present their solutions to management and where possible implement the solutions themselves in order to improve the performance of the organization, and motivate and enrich the work of employees.

- When matured, true quality circles become self-managing, having gained the confidence of management.

QUALITY CIRCLES

- Quality circles are an alternative to the rigid concept of division of labor, where workers operate in a more narrow scope and compartmentalized functions.

- The term *quality circles* was defined by Professor Kaoru Ishikawa in a journal.

- The first company in Japan to introduce Quality Circles was the Nippon Wireless and Telegraph Company in 1962.

QUALITY CIRCLES

- Quality circles are typically more formal groups. They meet regularly on company time and are trained by competent persons (usually designated as facilitators) who may be personnel and industrial relations specialists trained in human factors and the basic skills of problem identification, information gathering and analysis, basic statistics, and solution generation.

- Quality circles are generally free to select any topic they wish (other than those related to salary and terms and conditions of work, as there are other channels through which these issues are usually considered).

TOTAL EMPLOYEE INVOLVEMENT (TEI)

- Total employee involvement is the natural result of a work environment that encourages the active participation of each employee in the day to day operation of the company.

- The environment must clearly define goals and objectives; have stable, uniform direction; trustworthy leadership and, most importantly, have a viable, open communication throughout the organization.

- This concept sounds easy and the senior management of most companies truly believes that these conditions already exist in their companies. Unfortunately, most companies don't meet any of these criteria and, therefore, don't have the full support of their workforce.

TOTAL EMPLOYEE INVOLVEMENT (TEI)

- The key to total employee involvement rests with corporate management. Only the highest level can effect the changes in company policy and procedure that are a prerequisite to this critical part of any improvement program.

- Unfortunately, most corporate managers don't have the knowledge of day to day operation, at the plant floor level, required to recognize the limitations and problems that existing management philosophy is causing.

PROBLEM SOLVING PROCESS
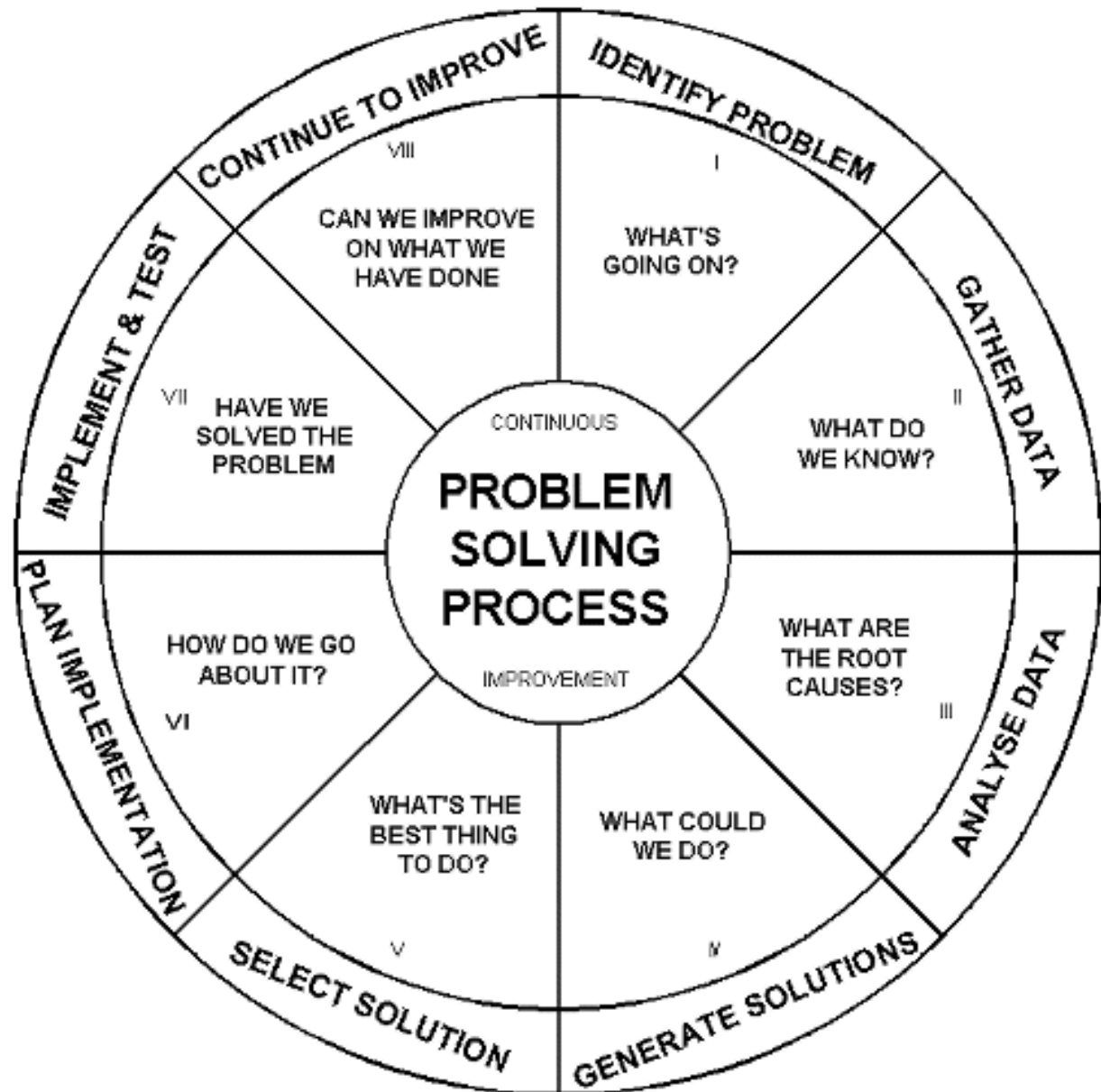
QUALITY FUNCTION DEPLOYMENT (QFD)

- QFD is a methodology used to ensure that customers' requirements are met throughout the product design process and in the design and operation of production systems.

- It is both a philosophy and a set of planning and communication tools that focuses on customer requirements in coordinating the design, manufacturing, and marketing of goods.

Quality Function Deployment (QFD)

- The focus of QFD is translating customer requirements into the appropriate technical requirements for each stage of product development and production.

- The customers' requirements – expressed in their own terms – are appropriately called the *voice of the customer*.

- These are the collection of customer needs, including all satisfiers, delighters/exciters, and dissatisfiers – the "whats" that customers want from a product. Sometimes these requirements are referred to as *customer attributes*.

The House of Quality
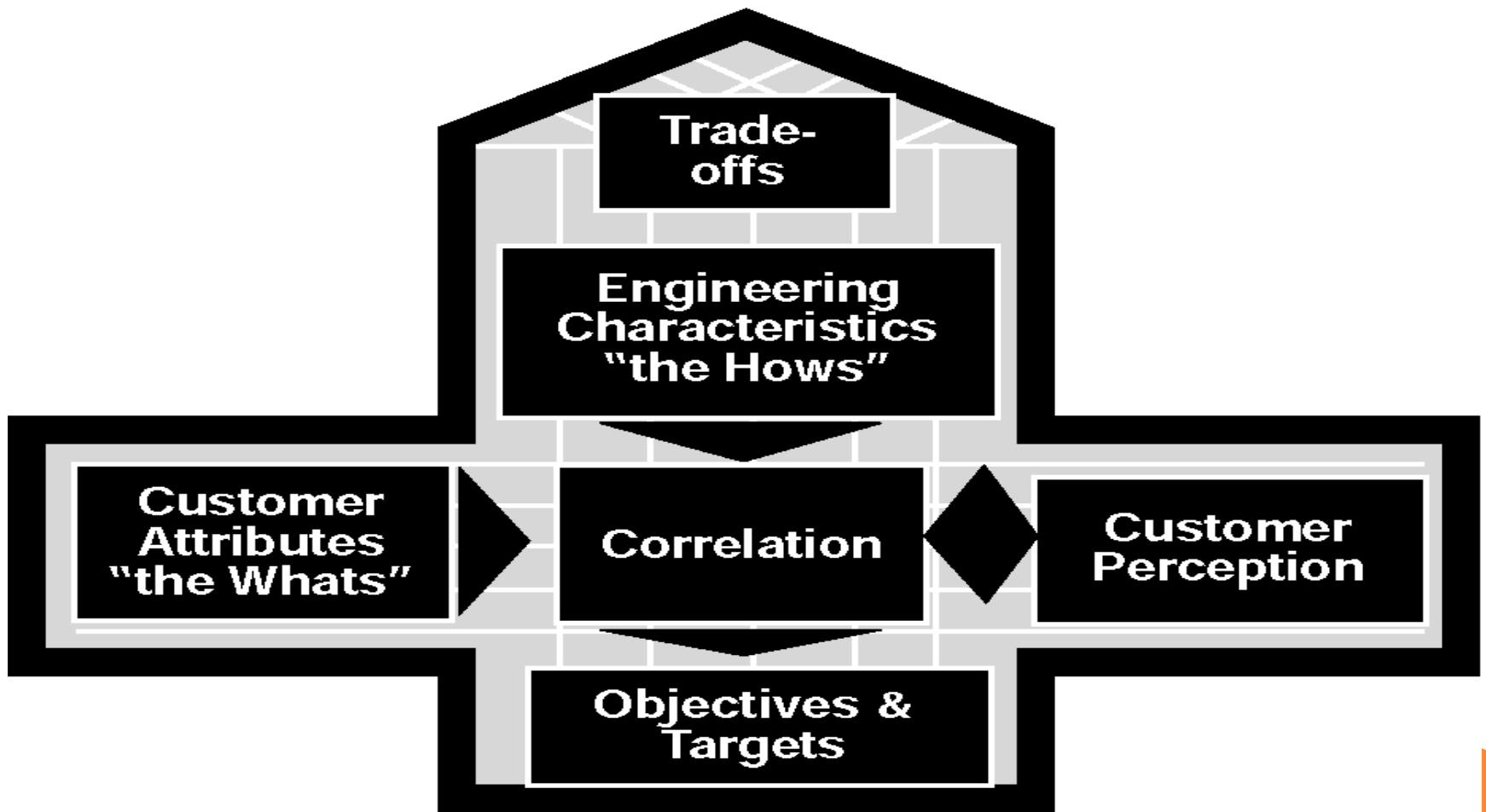
Concept Engineering (CE)

- This emerged from a consortium of companies that included Polaroid and Bose along with researchers at MIT, and is promoted and taught by the Center for Quality Management.

- It is a focused process for discovering customer requirements and using them to select superior product or service concepts that meet those requirements.

5 Major Steps (CE)

- Understanding the customer's environment
- Converting understanding into requirements
- Operationalizing what has been learned.
- Concept generation
- Concept selection

DESIGN FAILURE MODE AND EFFECTS ANALYSIS (DFMEA)

- The purpose of DFMEA is to identify all the ways in which a failure can occur, to estimate the effect and seriousness of the failure, and to recommend corrective design actions.

DFMEA USUALLY CONSISTS OF SPECIFYING THE FOLLOWING INFORMATION FOR EACH DESIGN ELEMENT OR FUNCTION:

- *Failure Modes* – ways in which each element or function can fail.

- *Effect of the failure on the customer* – such as dissatisfaction, potential injury or other safety issues, downtime, repair requirements, etc.

- *Severity, likelihood of occurrence, and detection rating*

- *Potential causes of failure* – failure is oftentimes is the result of poor design.

- *Corrective actions or controls* – might include design changes, mistake proofing, better user instructions, management responsibilities, and target completion dates.

FAULT TREE ANALYSIS (FTA)

- **Fault tree analysis** techniques were first developed in the early 1960's.

- Since this time they have been readily adopted by a wide range of engineering disciplines as one of the primary methods of performing reliability and safety analysis.

FAULT TREE ANALYSIS (FTA)

Typical TOP events might be:

- Total loss of production
- Safety system unavailable
- Explosion
- Loss of mission
- Toxic emission

FAULT TREE ANALYSIS (FTA)

- Basic events at the bottom of the fault tree generally represent component and human faults for which statistical failure and repair data is available.

Typical basic events are:

- Pump failure
- Temperature controller failure
- Switch fails closed
- Operator does not respond

Fault Tree Analysis (FTA)

- Fault trees may be used to analyse large and complex systems. They are particularly adept at representing and analysing redundancy arrangements. In addition common cause events are easily handled.

FAULT TREE ANALYSIS (FTA)

- Fault trees graphically represent the interaction of failures and other events within a system.

- Basic events at the bottom of the fault tree are linked via logic symbols (known as gates) to one or more TOP events.

- These TOP events represent identified hazards or system failure modes for which predicted reliability or availability data is required.

KAIZEN

- **Kaizen** (改善), Japanese for "improvement" or "change for the best", refers to philosophy or practices that focus upon continuous improvement of processes in manufacturing, engineering, business management or any process.

- It has been applied in healthcare, government, banking, and other industries.

- When used in the business sense and applied to the workplace, kaizen refers to activities that continually improve all functions, and involves all employees from the CEO to the assembly line workers.

POKA YOKE (MISTAKE PROOFING)

- **Poka Yoke** is a quality management concept developed by a Matsushita manufacturing engineer named Shigeo Shingo to prevent human errors from occurring in the production line.

- Poka yoke (pronounced "poh-kah yoh-kay") comes from two Japanese words – "yokeru" which means "to avoid", and "poka" which means "inadvertent errors."

- Thus, poka yoke more or less translates to "avoiding inadvertent (unintentional) errors".

Poka Yoke (Mistake Proofing)

- Poka yoke devices should have the following characteristics: 1) useable by all workers; 2) simple to install; 3) does not require continuous attention from the operator (ideally, it should work even if the operator is not aware of it); 4) low-cost; 5) provides instantaneous feedback, prevention, or correction.

- Of course, error-proofing can be achieved by extensive automation and computerization. However, this approach is expensive and complicated, and may not be practical for small operations. Besides, it defeats the original purpose of poka yoke, which is to reduce defects from mistakes through the simplest and lowest-cost manner possible.

POKA YOKE (MISTAKE PROOFING)

- The main objective of poke yoke is to achieve zero defects. In fact, it is just one of the many components of Shingo's Zero Quality Control (ZQC) system, the goal of which is to eliminate defective products.

POKA YOKE (MISTAKE PROOFING)

- Poka yoke is more of a concept than a procedure. Thus, its implementation is governed by what people think they can do to prevent errors in their workplace, and not by a set of step-by-step instructions on how they should do their job.

POKA YOKE (MISTAKE PROOFING)

- Poka yoke is implemented by using simple objects like fixtures, jigs, gadgets, warning devices, paper systems, and the like to prevent people from committing mistakes, even if they try to! These objects, known as poka yoke devices, are usually used to stop the machine and alert the operator if something is about to go wrong.

Poka Yoke (Mistake Proofing)

- Poka yoke devices should have the following characteristics: 1) useable by all workers; 2) simple to install; 3) does not require continuous attention from the operator (ideally, it should work even if the operator is not aware of it); 4) low-cost; 5) provides instantaneous feedback, prevention, or correction.

POKA YOKE (MISTAKE PROOFING)

- Poka yoke is at its best when it prevents mistakes, not when it merely catches them. Since human errors usually stem from people who get distracted, tired, confused, or demotivated, a good poka yoke solution is one that requires no attention from the operator. Such a poka yoke device will prevent the occurrence of mistake even if the operator loses focus in what she is doing.

-

POKA YOKE (MISTAKE PROOFING)

- **Examples of 'attention-free' Poke Yoke solutions:**
- 1) a jig that prevents a part from being misoriented during loading
- 2) non-symmetrical screw hole locations that would prevent a plate from being screwed down incorrectly
- 3) electrical plugs that can only be inserted into the correct outlets
- 4) notches on boards that only allow correct insertion into edge connectors
- 5) a flip-type cover over a button that will prevent the button from being accidentally pressed

POKA YOKE (MISTAKE PROOFING)

- **Three levels of Poka-Yoke:**

- 1) elimination of spills, leaks, losses at the source or prevention of a mistake from being committed

- 2) detection of a loss or mistake as it occurs, allowing correction before it becomes a problem

- 3) detection of a loss or mistake after it has occurred, just in time before it blows up into a major issue (least effective)

TOOLS FOR QUALITY PLANNING

- Planning is one of the basic functions of every manager. Because of the complexity of today's business environment, planning is not always easy to do.

- However, various tools have been developed by several Japanese companies over the last half-century as part of their planning processes.

7 NEW MANAGEMENT TOOLS

- Affinity Diagram
- Interrelationship diagraph
- Tree Diagram
- Matrix Diagrams
- Matrix Analysis
- PDPC, process decision program charts
- Arrow diagrams

AFFINITY DIAGRAM / KJ METHOD

- This is a technique for gathering and organizing a large number of ideas, opinions, and facts relating to a broad problem or subject area. It enables problem solvers to sift through large volumes of information efficiently and to identify natural patterns or groupings in the information.

EXAMPLE OF AFFINITY DIAGRAM / KJ METHOD

Environment

Interruptions

Unreasonable
Deadlines

Time of Day

Ergonomics
Noise
Lighting
Desk Height
Chair Height
Comfort

Equipment

Computers
Printers
Typewriters

Training

Typing Skill
Editing Skill
Computer Skill
Proofreading Skill

No Definition or Quality

No Measurement
No Feedback

Original Document

Author Skill
Handwriting
Grammar
Punctuation
Spelling

Requirement
Draft Copy
Final Copy
Distribution
Font

Technical Jargon   Slang

INTERRELATIONSHIP DIGRAPHS

- The purpose of an interrelationship digraph is to take a central idea and map out logical or sequential links among related categories. It shows that every idea can be logically linked with more than one idea at a time.

EXAMPLE OF AN INTERRELATIONSHIP DIGRAPH
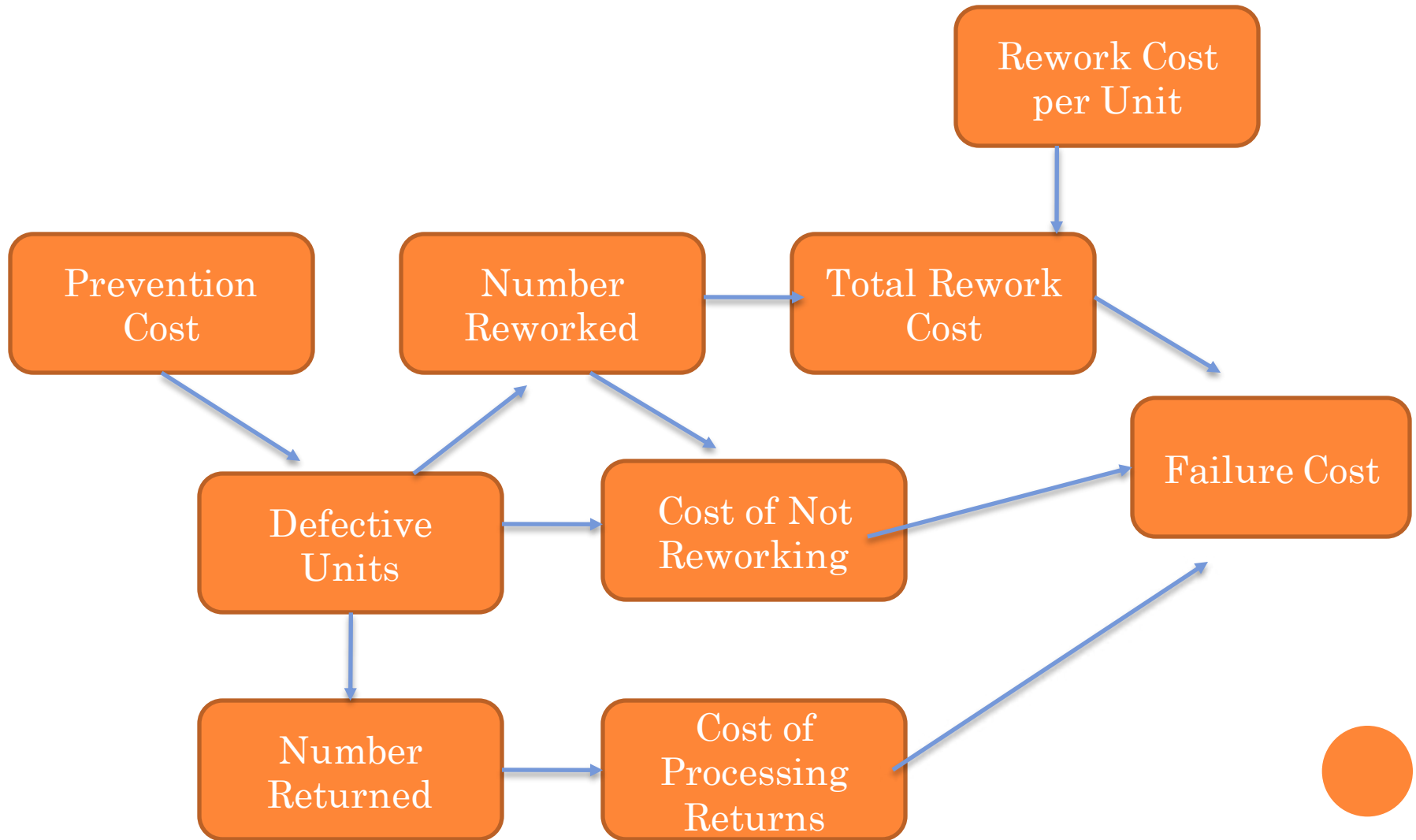
Tree Diagram

- This maps out the paths and tasks that need to be accomplished to complete a specific project or to reach a specified goal.

- A planner uses this technique to seek answers to such answers to questions such as *"what sequence of tasks needs to be completed to address the issue?"* or *"what are all of the factors that contribute to the existence of the key problem?"*
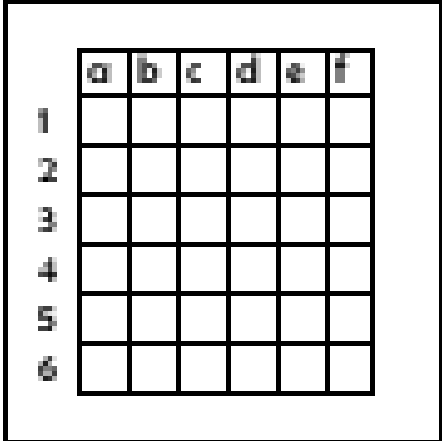
EXAMPLE OF A TREE DIAGRAM
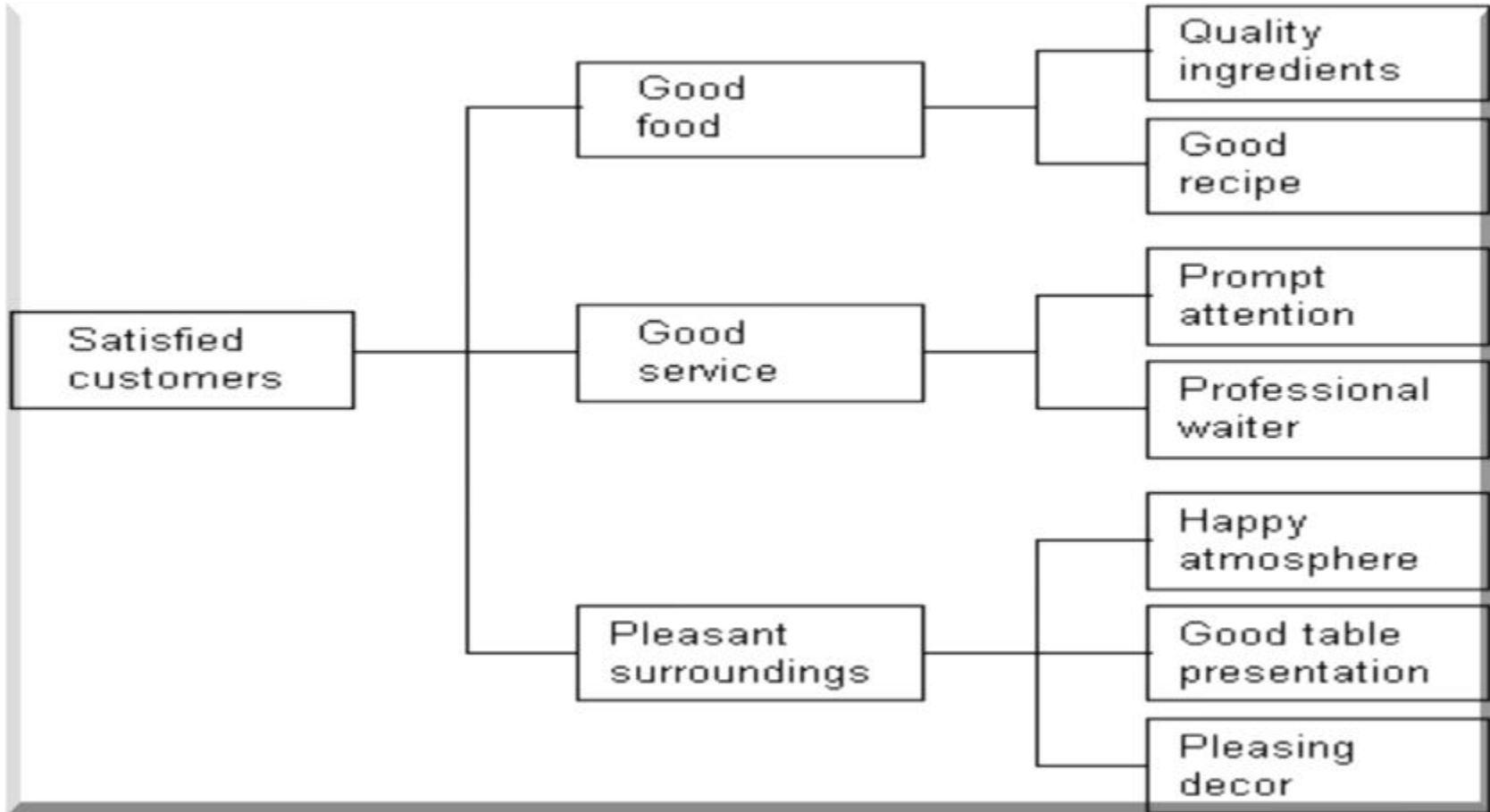
MATRIX DIAGRAMS

- This tool shows the relationship between items. At each intersection a relationship is either absent or present. It then gives information about the relationship, such as its strength, the roles played by various individuals or measurements.

- Six differently shaped matrices are possible: L, T, Y, X, C, R and roof-shaped, depending on how many groups must be compared.

EXAMPLE OF A MATRIX DIAGRAM

Value Across the Company

THE BRONZE GROUP — *Management Services*

Initiate | **Plan** | **Execute** | **Monitor & Control** | **Close**

Integration
Schedule
Cost
Scope
Risk
Quality
Procurement
Human Resources
Communication

MARKETING
- Go-to-Market
- Demand Generation
- Collateral Creation
- Events
- Virtual Teams

SALES
- Business Development
- Strategic Alliances
- Channels
- Lead Generation

OPERATIONS
- Infrastructure Deployments
- Application Development
- Application Integration
- Process Improvement
- Virtual Teams

MATRIX DATA ANALYSIS

- This process takes data from matrix diagrams and seeks to arrange it quantitatively to display the strength of relationships among variables so that they can be easily viewed and understood.

PROCESS DECISION PROGRAM CHART (PDPC)

- This is a method for mapping out every conceivable event and contingency that can occur when moving from a problem statement to possible solutions.

- It is used to plan for each possible chain of events that could occur when a problem or goal is unfamiliar.

ARROW DIAGRAMS
ACTIVITY NETWORK DIAGRAM

- These have been used by construction planners for years in the form of CPM and PERT project planning techniques.

TOOLS FOR CONTINUOUS IMPROVEMENT

- Many tools have been created or adapted from other disciplines to facilitate the process of continuous improvement.

- Seven simple statistically based tools are used extensively to gather and analyze data. These are known as the Tools for Process Analysis. Historically, these tools receded the seven management and planning tools and often are called the "Seven QC Tools" and later on have been referred to as the "New Seven."

THE SEVEN BASIC TOOLS OF QUALITY

- The **Seven Basic Tools of Quality** is a designation given to a fixed set of graphical techniques identified as being most helpful in <u>troubleshooting</u> issues related to <u>quality</u>.

- They are called *basic* because they are suitable for people with little formal training in statistics and because they can be used to solve the vast majority of quality-related issues.

The Seven Basic Tools of Quality

The seven tools are:

- Cause-and-effect diagram

  (also known as the "fishbone" or Ishikawa diagram)

- Check sheet

- Control chart

- Histogram

- Pareto chart

- Scatter diagram

- Stratification (alternately, flow chart or run chart)

CAUSE-AND-EFFECT DIAGRAMS

- The most useful tool for identifying the causes of problems.
- It is also known as a Fishbone Diagram or Ishikawa Diagram.
- It is simply a graphical representation of an outline that presents a chain of causes and effects.

CAUSE & EFFECT DIAGRAMS

Why are cause and effect diagrams helpful?

Root cause   Root cause

Focused problem

Root cause   Root cause
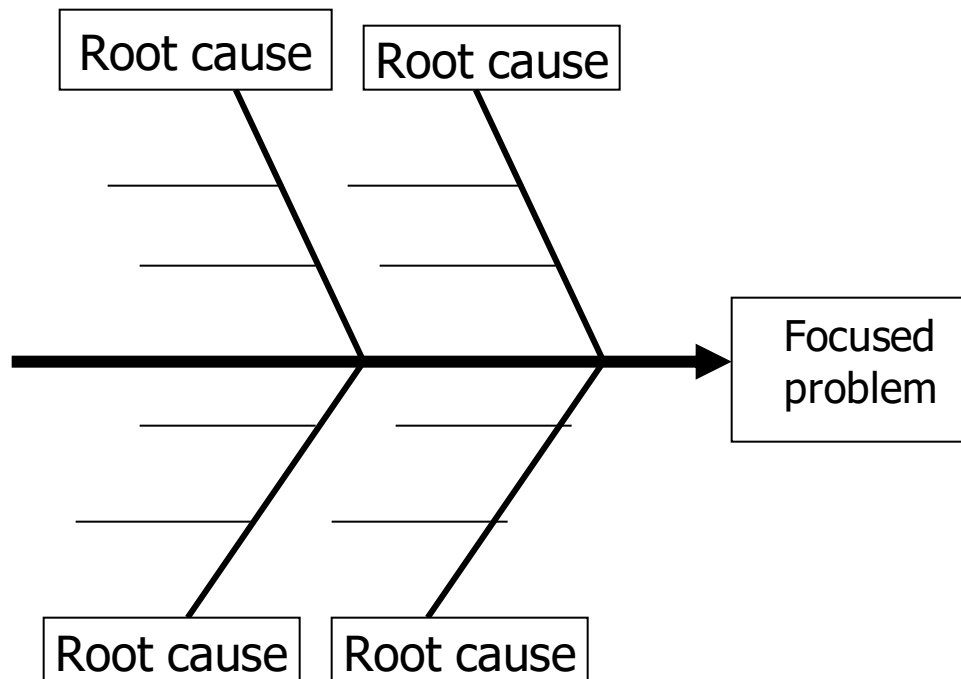
- Identify and display many different possible causes for a problem

- See the relationships between the many causes

- Helps determine which data to collect

EXAMPLE OF A CAUSE-AND-EFFECT DIAGRAM
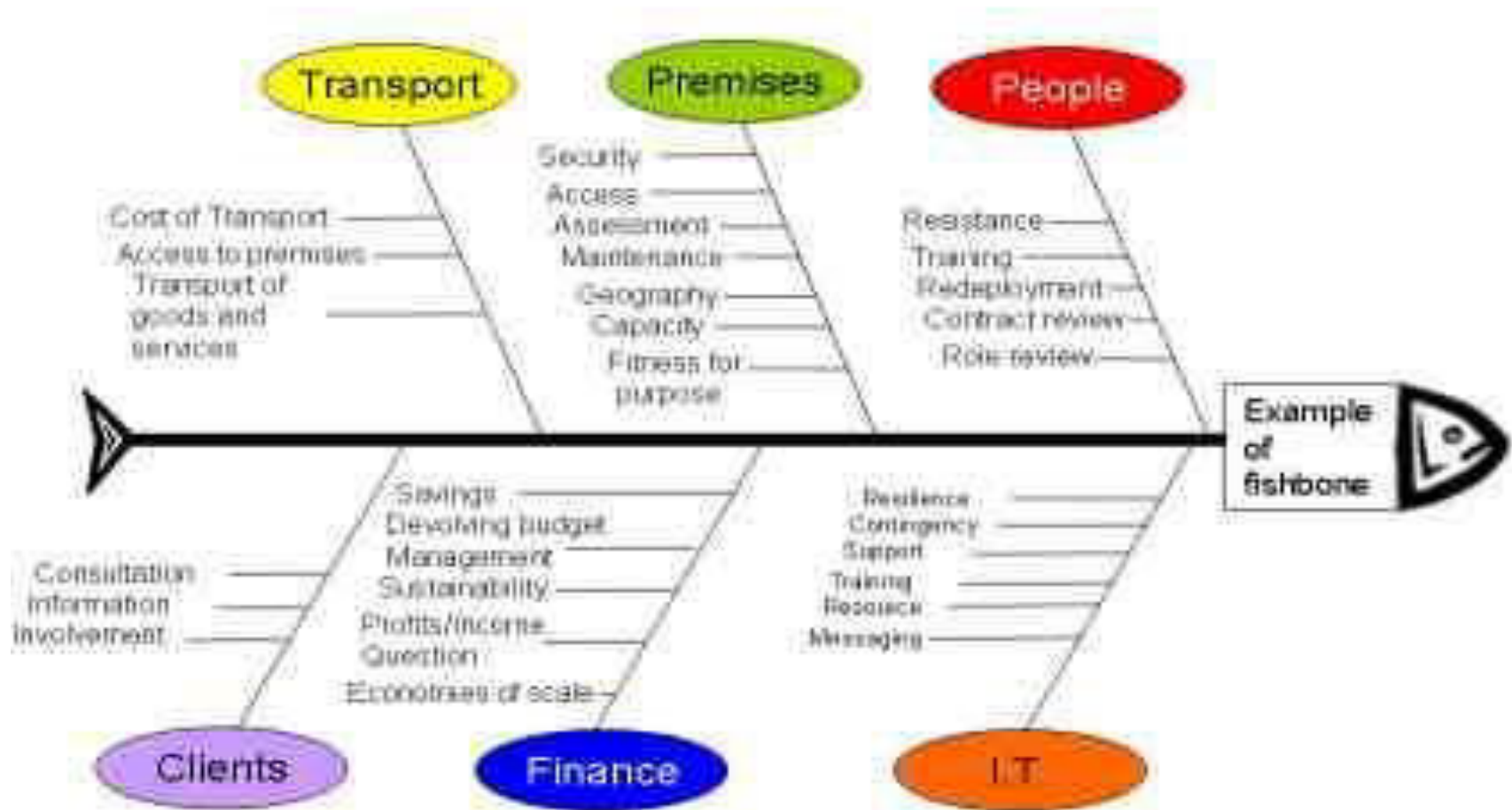
CHECK SHEETS

- These are data collection forms that facilitate the interpretation of data. Quality-related data are of two general types: ***Attribute Data*** (obtained by counting or from some type of visual inspection) and ***Variable Data*** (collected by numerical measurement on a continuous scale.

CONTROL CHART

- Control charts are considered as the backbone of statistical process control and were first proposed by Walter Shewhart.

CHECK-SHEET

Defect Types? Event occurrence	Events							Total
	Sun	Mon	Tue	Wed	Thur	Fri	Sat	
Supplied parts rusted		✔✔✔ ✔✔✔ ✔✔	✔✔✔✔ ✔	✔✔✔✔	✔✔			19
Misaligned Weld			✔✔✔			✔✔		5
Improper Test Procedure		✔		✔✔				3
Wrong Part Issued					✔✔			2
Film on Parts				✔✔✔✔		✔✔		6
Voids in Casting								0
Incorrect Dimensions								0
Adhesive Failure					✔			1
Masking Insufficient								0
Spray Failure				✔✔✔✔				4
Total		9	8	14	5	4	0	40

CONTROL CHART

- A control chart is a presentation of data in which the control values are plotted against time.

- Control charts have a central line, upper and lower warning limits, and upper and lower action limits.

- Immediate visualisation of problems.

CONTROL CHART
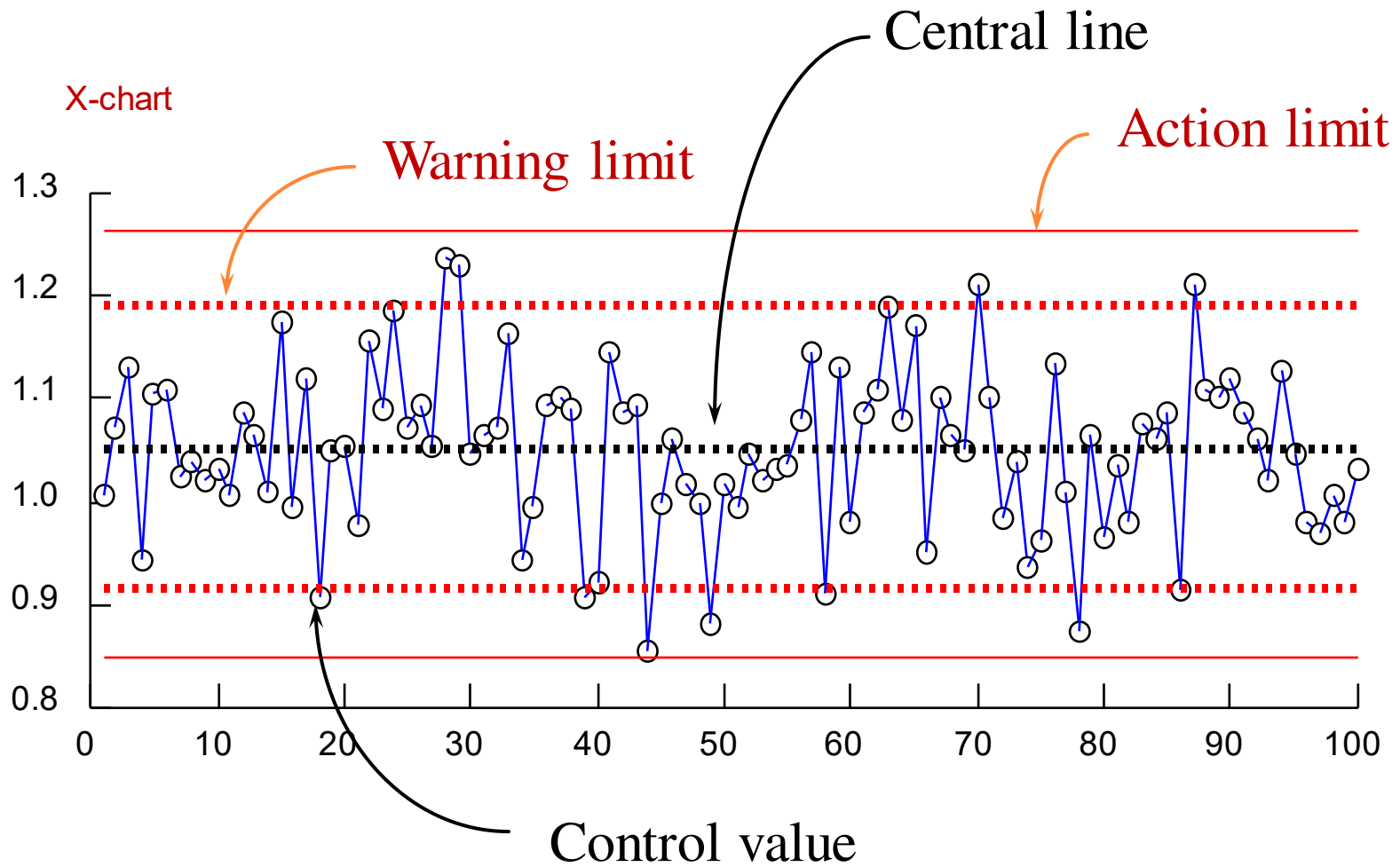
CONTROL CHARTS- WHEN TO TAKE ACTION

- One point plots outside the Action Limits.
- Two consecutive points plots between the Warning and Action Limits
- Eight consecutive points plot on one side of the Center Line
- Six points plots steadily increasing or decreasing
- When an unusual or nonrandom pattern is observed

HISTOGRAMS

- This is a graphical representation of the variation in a set of data. It shows the frequency or number of observations of a particular value or within a specified group.

- It provides clues about the characteristics of the population from which a sample is taken.

PARETO DIAGRAMS

- Pareto analysis is a technique for prioritizing types or sources of problems. It separates the "vital few" from the "trivial many" and provides help in selecting directions for improvement.

EXAMPLE OF A PARETO DIAGRAM
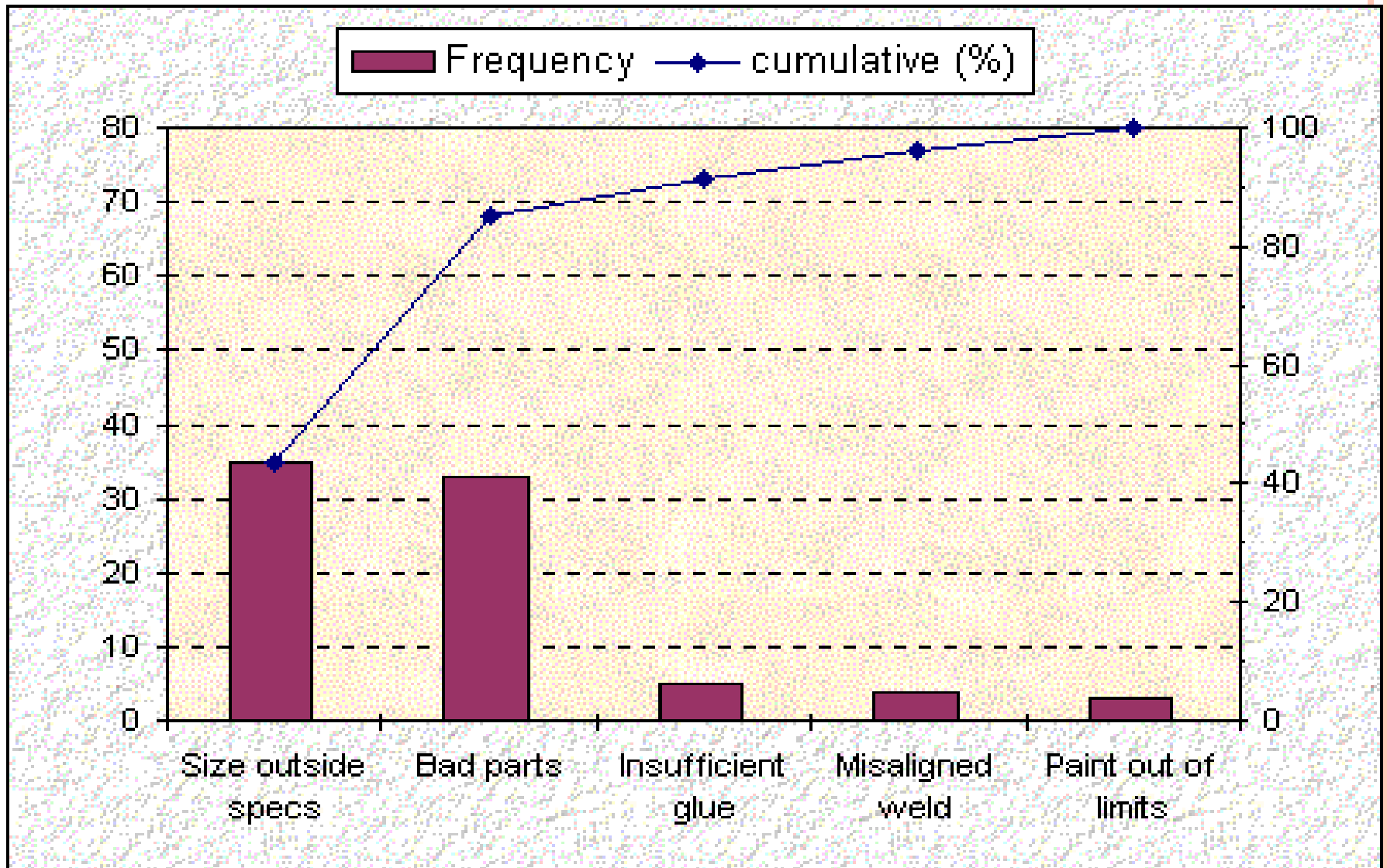
SCATTER DIAGRAMS

- Scatter diagrams illustrate relationships between variables.
- Typically the variables represent possible causes and effects obtained from cause-and-effect diagrams.

Scatter Diagrams

- A scatter diagram is a tool for analyzing relationships between two variables.

- One variable is plotted on the horizontal axis and the other is plotted on the vertical axis.

- The pattern of their intersecting points can graphically show relationship patterns. Most often a scatter diagram is used to prove or disprove cause-and-effect relationships.

- While the diagram shows relationships, it does not by itself prove that one variable Causes the other.

- In addition to showing possible cause- and-effect relationships, a scatter diagram can show that two variables are from a common cause that is unknown or that one variable can be used as a substitute for the other.

SCATTER DIAGRAMS

height | weight
positive correlation

hair | time
negative correlation
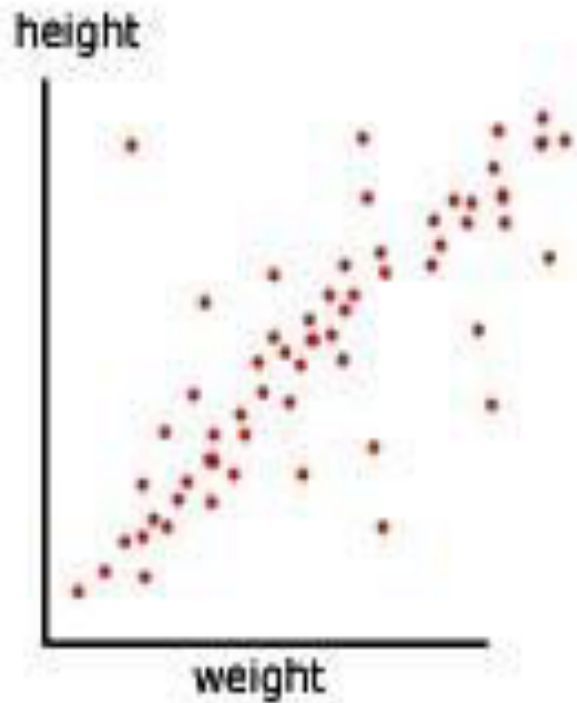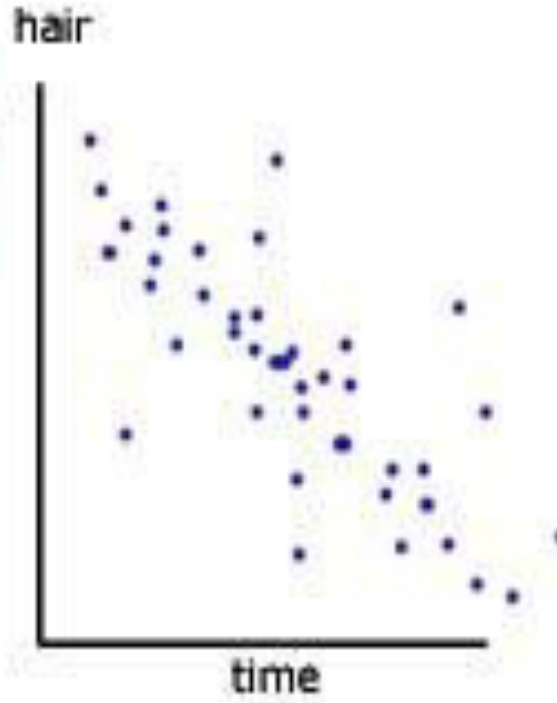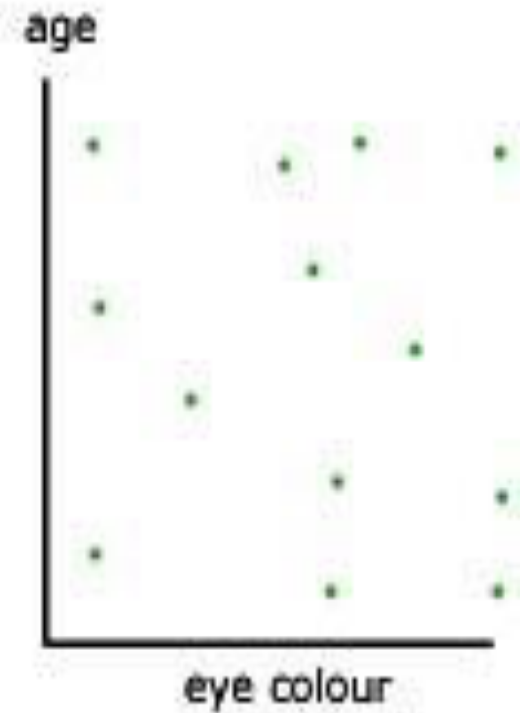
age | eye colour
zero correlation

HOW TO USE SCATTER DIAGRAM

- **Collect data**
  Gather 50 to 100 paired samples of data that show a possible relationship.
- **Draw the diagram**
  Draw roughly equal horizontal and vertical axes of the diagram, creating a square plotting area. Label the axes in convenient multiples (1, 2, 5, etc.) increasing on the horizontal axes from left to right and on the vertical axis from bottom to top. Label both axes.
- **Plot the paired data**
  Plot the data on the chart, using concentric circles to indicate repeated data points.
- **Title and label the diagram**
- **Interpret the data**
  Scatter diagrams will generally show one of six possible correlations between the variables:
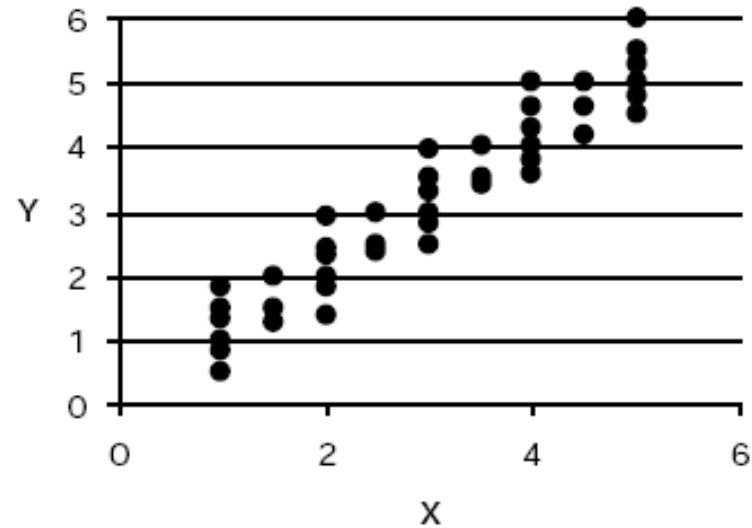
SCATTER DIAGRAM

- Strong Positive Correlation
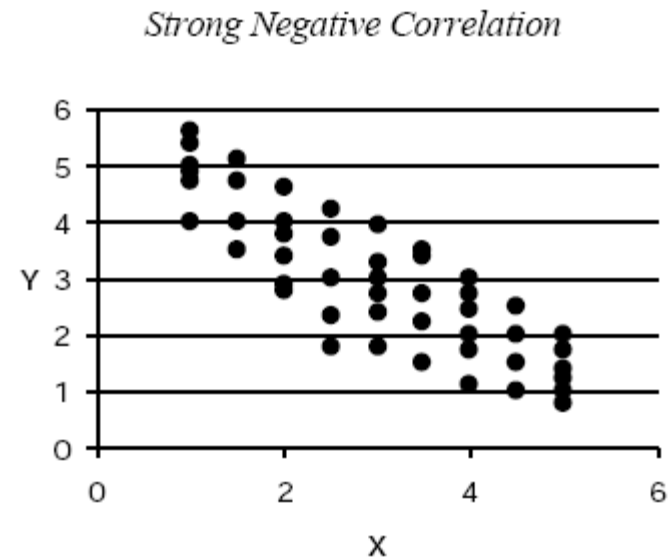 The value of Y clearly increases as the value of X increases.
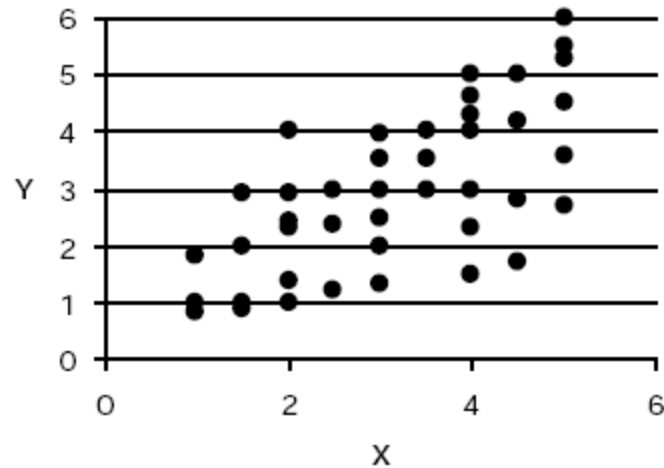

Strong Positive Correlation

SCATTER DIAGRAM

- Strong Negative Correlation
- The value of Y clearly decreases as the value of X increases.
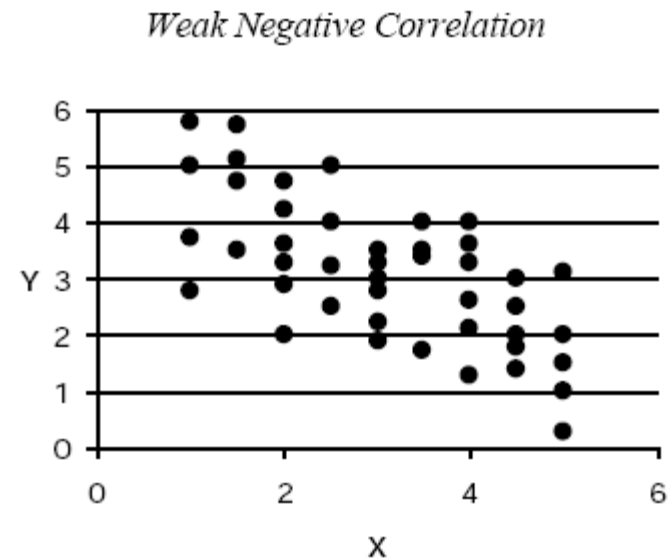

Strong Negative Correlation

SCATTER DIAGRAM

- Weak Positive Correlation
- The value of Y increases slightly as the value of X increases.
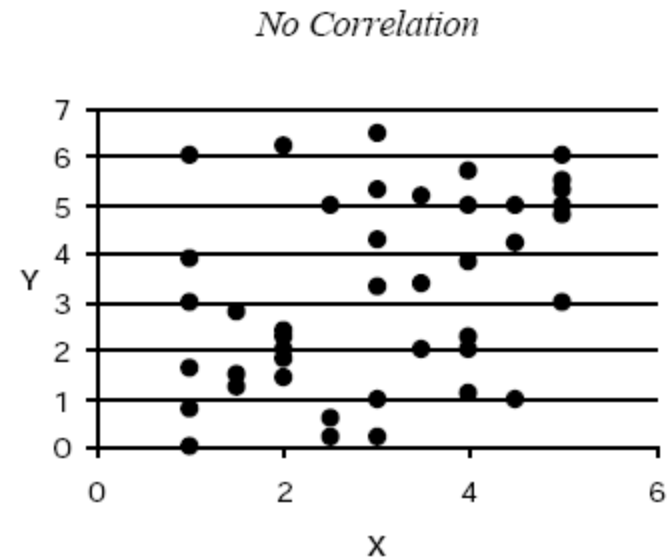

Weak Positive Correlation

SCATTER DIAGRAM

- Weak Negative Correlation
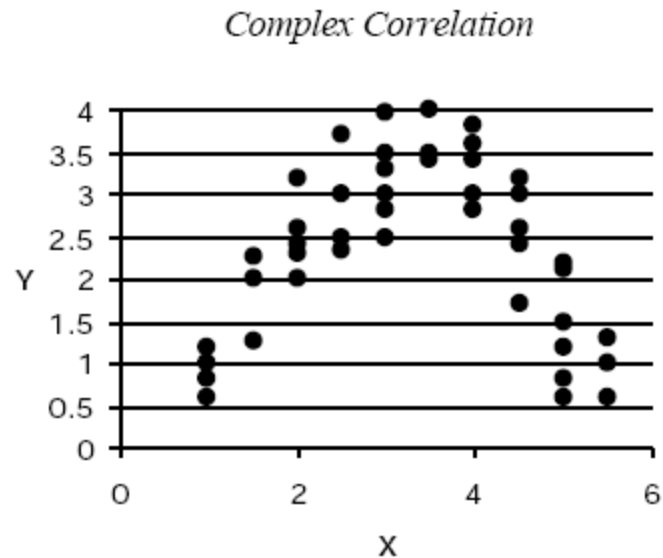- The value of Y decreases slightly as the value of X increases.

Weak Negative Correlation

SCATTER DIAGRAM

- No Correlation
- There is no demonstrated connection between the two variables

No Correlation

SCATTER DIAGRAM

- Complex Correlation
- The value of Y seems to be related to the value of X, but the relationship is not easily determined.
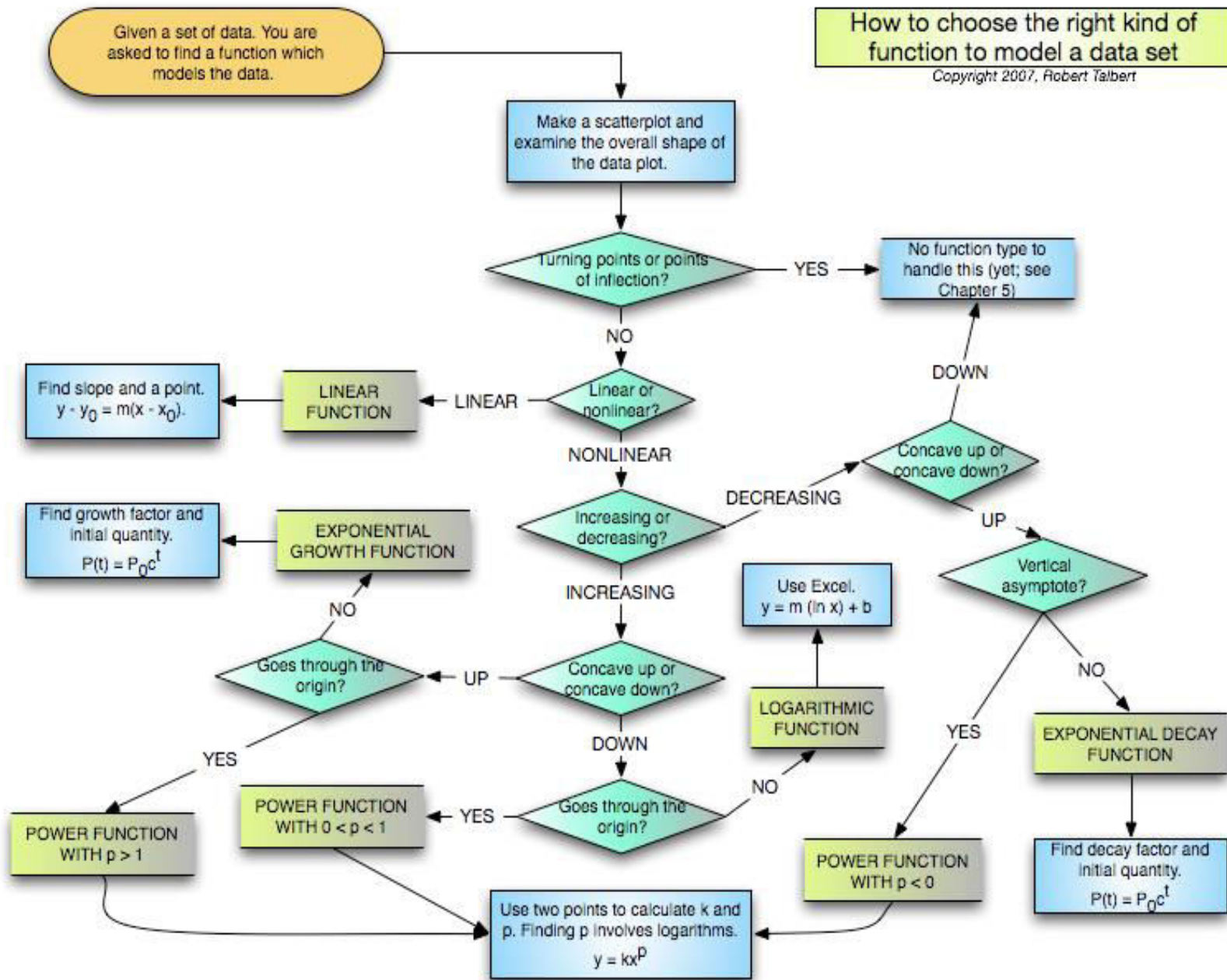
Complex Correlation

FLOWCHARTS

- This is a picture of a process that shows the sequence of steps performed. It is also called a process map.

EXAMPLE OF A FLOWCHART

How to choose the right kind of function to model a data set
Copyright 2007, Robert Talbert

Given a set of data. You are asked to find a function which models the data.

Make a scatterplot and examine the overall shape of the data plot.

Turning points or points of inflection? — YES → No function type to handle this (yet; see Chapter 5)

NO

Linear or nonlinear? — LINEAR → LINEAR FUNCTION → Find slope and a point. $y - y_0 = m(x - x_0)$.

NONLINEAR

Increasing or decreasing? — DECREASING → Concave up or concave down?

DOWN → No function type to handle this (yet; see Chapter 5)

UP → Vertical asymptote?

INCREASING

Concave up or concave down? — UP → Goes through the origin? — NO → EXPONENTIAL GROWTH FUNCTION → Find growth factor and initial quantity. $P(t) = P_0 c^t$

YES → POWER FUNCTION WITH p > 1

DOWN → Goes through the origin? — YES → POWER FUNCTION WITH 0 < p < 1

NO → LOGARITHMIC FUNCTION → Use Excel. $y = m(\ln x) + b$

Vertical asymptote? — YES → POWER FUNCTION WITH p < 0

NO → EXPONENTIAL DECAY FUNCTION → Find decay factor and initial quantity. $P(t) = P_0 c^t$

Use two points to calculate k and p. Finding p involves logarithms. $y = kx^p$

ASSIGNMENT

1. What is a quality circle explain.
2. What is poke-Yoke ? Explain.
3. Explain in detail the seven basic tools of Quality.
4. Define Affinity diagram
5. Explain Pareto diagram.
6. What is meant by FMEA?
7. Describe in detail the seven new management tools of TQM.
8. Explain the following.
   (a) Total Employee Involvement (TEI)
   (b) Design failure mode and Effect Analysis (DFMEA)
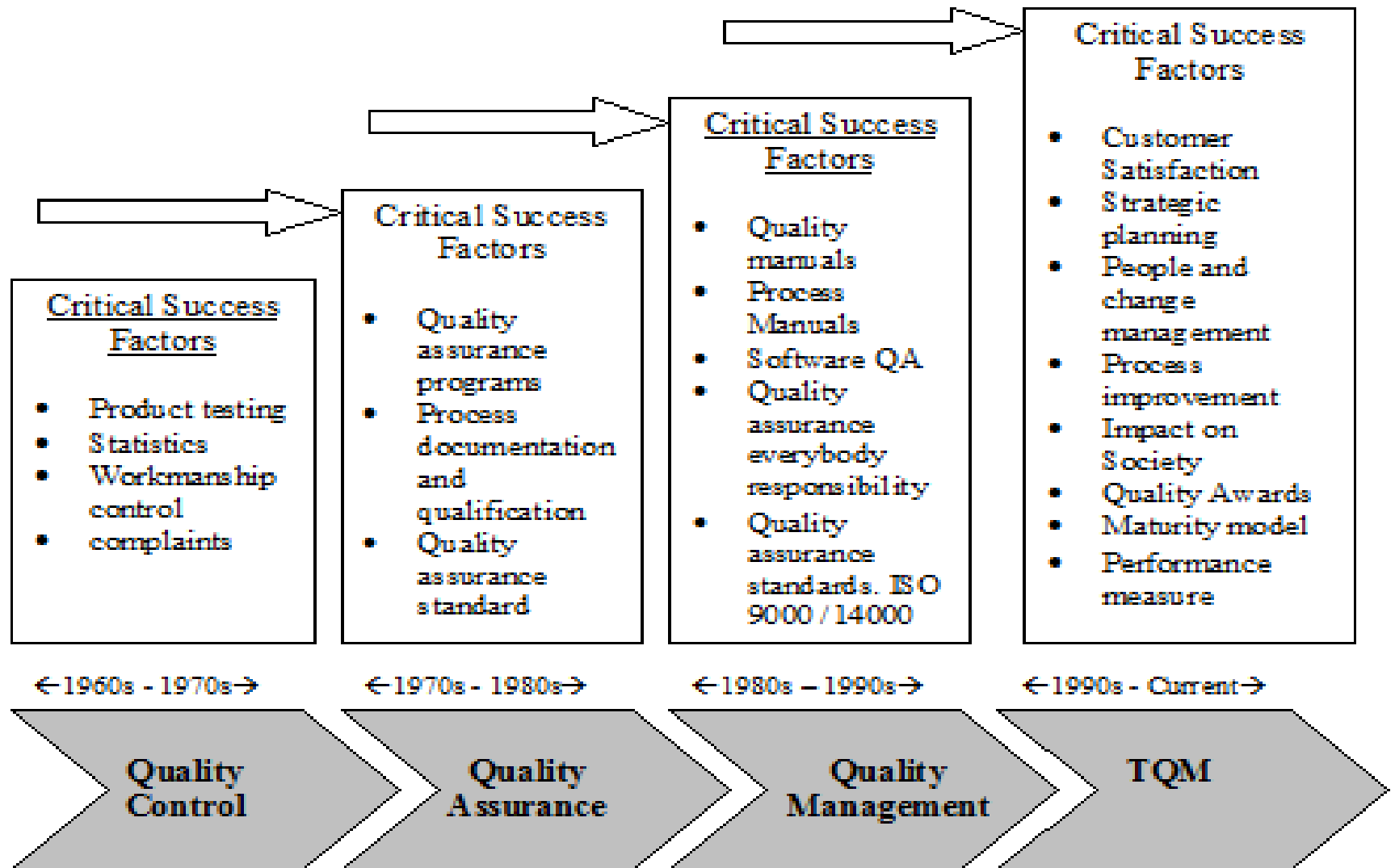   (c) Concept Engineering
   (d) Fault Tree Analysis
   (e) KAIZEN
   (f) Control Chart

Quality

Introduction to Quality

Need / Importance for quality

- Producing superior quality products / service is vital to the continued growth success of a company, therefore benefits of quality are given below.

- 1. It gives a positive company image

- 2. It improves competitive ability both nationally and internationally

- 3. It increases market share, which translates into improved profits

- 4. Overall it reduces costs which also results in profits

- 5. It reduces problems & avoids unnecessary costs

- 6. It creates an atmosphere for high employee morale, which improves productivity .

Evolution of Quality

Critical Success Factors

- Product testing
- Statistics
- Workmanship control
- complaints

←1960s - 1970s→

Quality Control

Critical Success Factors

- Quality assurance programs
- Process documentation and qualification
- Quality assurance standard

←1970s - 1980s→

Quality Assurance

Critical Success Factors

- Quality manuals
- Process Manuals
- Software QA
- Quality assurance everybody responsibility
- Quality assurance standards. ISO 9000 / 14000

←1980s – 1990s→

Quality Management

Critical Success Factors

- Customer Satisfaction
- Strategic planning
- People and change management
- Process improvement
- Impact on Society
- Quality Awards
- Maturity model
- Performance measure

←1990s - Current→

TQM

CONCEPTS OF QUALITY

- Q- Quest for excellence
- U- Understanding customers' needs
- A- Action to achieve customer's appreciation
- L- Leadership-determination to be a leader
- I- Involving all people
- T- Team spirit to work for a common goal
- Y- Yardstick to measure progress

INTRODUCTION TO TQM

What is TQM?

TQM is the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services. The goal is customer satisfaction.

TQM FRAMEWORK

TQM framework gives the overall structure of the organization.
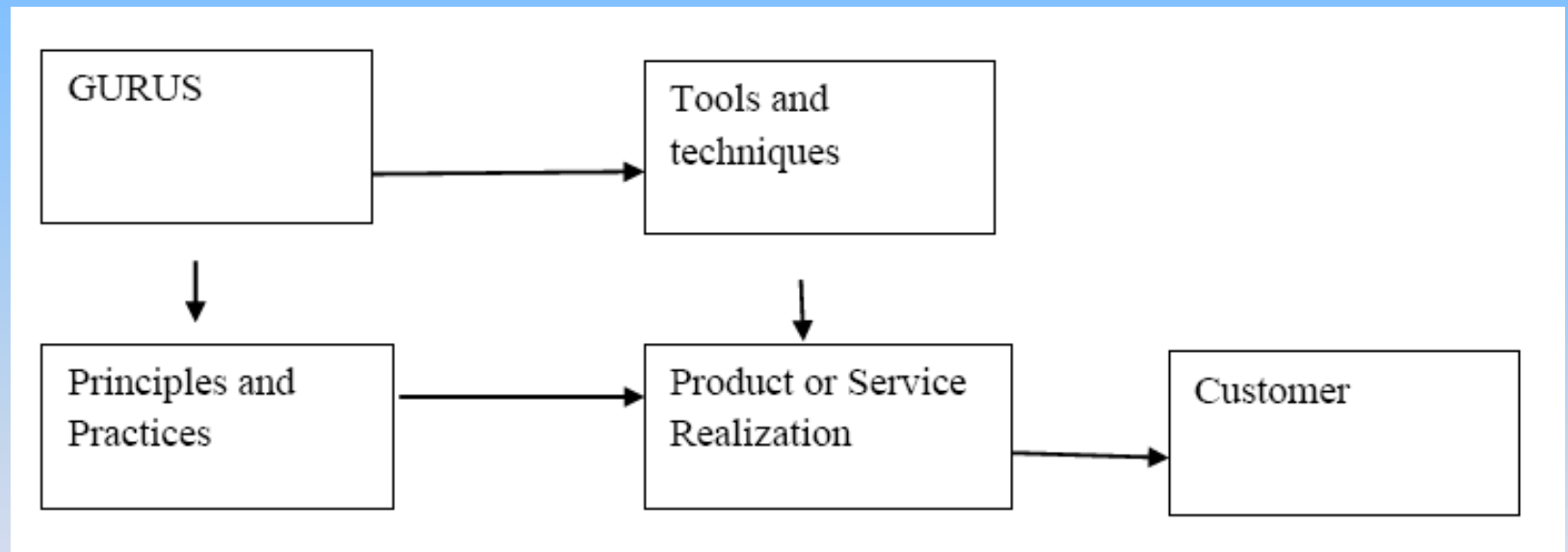
TQM Six Basic Concepts

- 1. Leadership
- 2. Customer Satisfaction
- 3. Employee Involvement
- 4. Continuous Process Improvement
- 5. Supplier Partnership
- 6. Performance Measures

TQM Six Basic Concepts

- In order to achieve excellence, six basic concepts of TQM are as follows:
  1. Top management should be aware of currect situation and needs to be commited towards TQM implementation.
  2. Focus customer requirements and product/service expectations.
  3. Involve employees in understanding the quality aspects and make them accountable
  4. Continuous improvement in the process is required
  5. Treat suppliers as your partners
  6. Develop tracking mechanism for processes and improve it as per business requirements

The Three Quality Gurus

- **<u>Deming:</u>** the best known of the "early" pioneers, is credited with popularizing quality control in Japan in early 1950s.Today, he is regarded as a national hero in that country and is the father of the world famous Deming prize for quality.

According to Deming:

- Good quality means a predictable degree of uniformity and dependability with a quality standard suited to the customer.

JURAN

- Juran, like Deming was invited to Japan in 1954 by the union of Japanese Scientists and engineers.

- Juran defines quality as fitness for use in terms of design, conformance, availability, safety and field use. He focuses on top-down management and technical methods rather than worker pride and satisfaction.

Philip Crosby:

- 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's close enough"
- The **measurement** of quality is the price of non-conformance, not indexes.

Commonality of Themes of Quality Gurus

- Inspection is never the answer to quality improvement, nor is "policing".

- Involvement of leadership and top management is essential to the necessary culture of commitment to quality.

- A program for quality requires organization-wide efforts and long term commitment, accompanied by the necessary investment in training.

- Quality is first and schedules are second.

DIFINITION OF QUALITY

The concept and vocabulary of quality are elusive. Different people interpret quality differently. Few can define quality in measurable terms that can be proved operationalized. When asked what differentiates their product or service;

The <u>banker</u> will answer" service"

The <u>healthcare</u> worker will answer "quality health care"

The <u>hotel employee</u> will answer "customer satisfaction"

The <u>manufacturer</u> will simply answer "quality product"

DEFINITION OF QUALITY

Quality can be quantified as

- $Q = P/E$
- Where Q=Quality
- P=Performance
- E=Expectations
- If Q is greater than 1.0, then the customer has a good feeling about the product or service.

DIMENSIONS OF MANUFACTURING AND SERVICE QUALITY

- **The various dimensions of product and service quality are:**
  - Performance
  - Features
  - Conformance
  - Reliability
  - Durability
  - Service
  - Response
  - Aesthetics
  - Reputation

DIMENSIONS OF MANUFACTURING AND SERVICE QUALITY

- Performance - Primary product characteristics, such as the brightness of the picture
- Features - Secondary characteristics, added features, such as remote control.
- Conformance - Meeting specifications or industry standards, workmanship.
- Reliability – Consistency of performance over time, average time for the unit to fail.
- Durability – Useful life, includes repair
- Service – Resolution of problems and complaints, ease of repair.

DIMENSIONS OF MANUFACTURING AND SERVICE QUALITY

- **Response** – Human-to-human interface, such as the courtesy of the dealer.

- **Aesthetics** – Sensory characteristics, such as exterior finish

- **Reputation** – Past performance and other intangibles, such as being ranked first.

Quality in different areas of society

Area	Examples
Airlines	On-time, comfortable, low-cost service
Health Care	Correct diagnosis, minimum wait time, lower cost, security
Food Services	Good product, fast delivery, good environment
Postal Services	fast delivery, correct delivery, cost
Academia	Proper preparation for future, on-time knowledge delivery
Consumer Products	Properly made, defect-free, cost effective
Insurance	Payoff on time, reasonable cost
Automotive	Defect-free, Reliable service
Communications	Clearer, faster, cheaper service

What is Quality?

- Conformance to specifications (British Defense Industries Quality Assurance Panel)

- Conformance to requirements (Philip Crosby)

- Fitness for purpose or use (Juran)

- A predictable degree of uniformity and dependability, at low cost and suited to the market (Edward Deming)

- Synonymous with customer needs and expectations (R J Mortiboys)

- Meeting the (stated) requirements of the customer- now and in the future (Mike Robinson)

Definitions of Quality

- **Transcendent definition:** excellence
- **Product-based definition:** quantities of product attributes
- **User-based definition:** fitness for intended use; meeting or exceeding user expectations
- **Value-based definition:** quality vs. price
- **Manufacturing-based definition:** conformance to specifications

More about Quality

- Realistic but demanding STANDARDS;

- Getting things RIGHT FIRST TIME; 'It costs less to prevent a problem than it does to correct it'

- Influences the relationship with CUSTOMERS;

- Influences how COMPLAINTS are dealt with;

- Something to do with how things LOOK and FEEL.

Deming's 14 Principles.
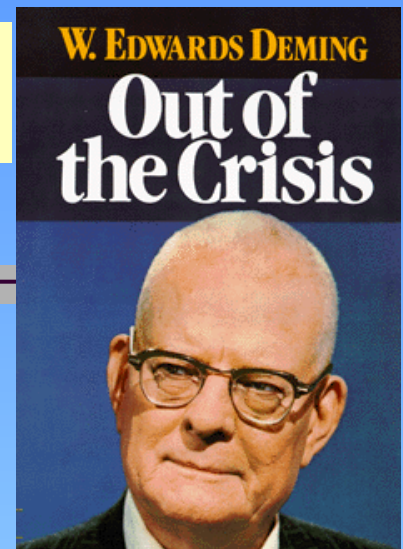
1. "Create Constancy of Purpose"
   - Define the problems of today and the future
   - Allocate resources for long-term planning
   - Allocate resources for research and education
   - Constantly improve design of product and service
2. "Adopt A New Philosophy"
   - Quality costs less not more
   - Superstitious learning
   - The call for major change
   - Stop looking at your competition and look at your customer instead
3. "Cease Dependence On Inspection For Quality"
   - 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

Deming's 14 Principles.
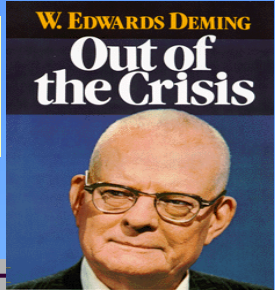
4. **"End Proactive Awarding Of Business Based On PriceAlone"**
   - Price alone has no meaning
   - Change focus from lowest inital cost to lowest cost
   - Work toward a single source (Supplier) and long term relationship
   - Establish a mutual confidence and aid between purchaser and vendor

5. **"Improve Every Process Constantly / Forever"**
   - Quality starts with the intend 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 succesful
   - Management must remove the inhibitors to good work
   - Management needs an appreciation of variation
   - This is management's new role

Deming's 14 Principles
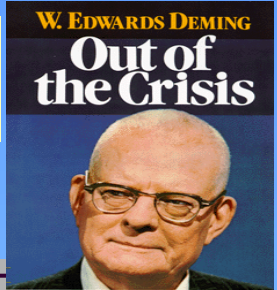
7. **"Adopt And Institute Leadership"**
   - Remove barriers to pride of workmanship
   - Know the work they supervise
   - Know the difference between special and common cause of variation

   The aim of the leadership should be to help people and machine and gadgets to do a better job .

8. **"Drive Out Fear"**
   - The common denominator of fear:
   - Fear of knowledge
   - Performance appraisals
   - Management by fear or numbers

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

9. **"Break Barriers Between Staff Areas (Departments) "**
   - Know your internal suppliers and customers
   - Promote team work

10. **"Eliminate Slogans, Exhortations And Targets"**
    - They generate frustration and resentment
    - Use posters that explain what management is doing to improve the work environment

Deming's 14 Principles.
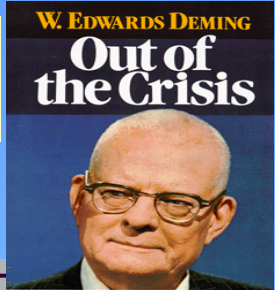
11. **"Eliminate Numerical Quotas"**
   - They impede quality
   - They reduce production
   - The person's job becomes meeting a quota

12. **"Remove Barriers That Rob Pride Of Workmanship"**
   - Performance appraisal systems
   - Production rates
   - Financial management systems
   - Allow people to take pride in their workmanship

13. **"Institute Programs For Education And Self Improvement"**
   - Commitment to lifelong employment
   - Work with higher education needs
   - Develop team building skills

14. **"Put Everybody In The Company To Work For This Transformation"**
   - Struggle over the 14 points
   - Take pride in new philosophy
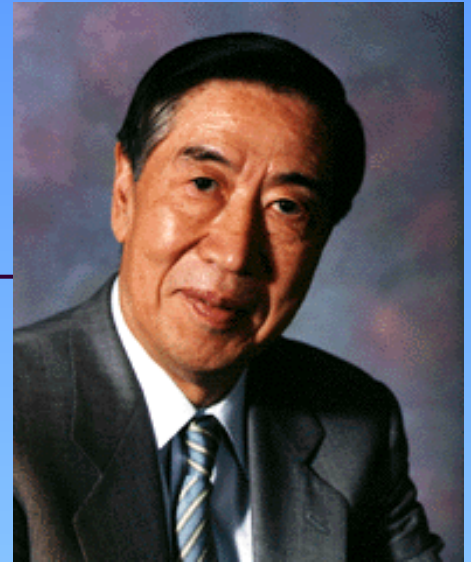   - Include the critical mass of people in the change

QUALITY DOES NOT OCCUR BY ACCIDENT

- What does the customer actually want?
  - Identify, understand and agree customer requirements

- How are you going to meet those requirements?

 - Plan to achieve them

Deming's Cycle
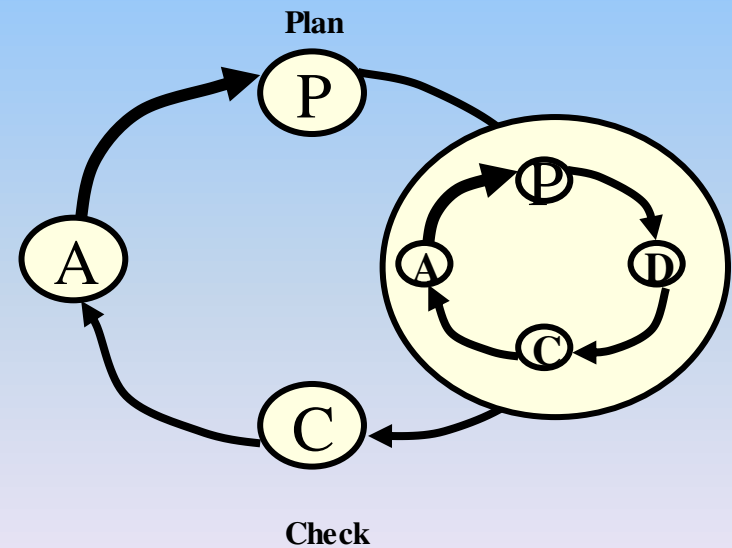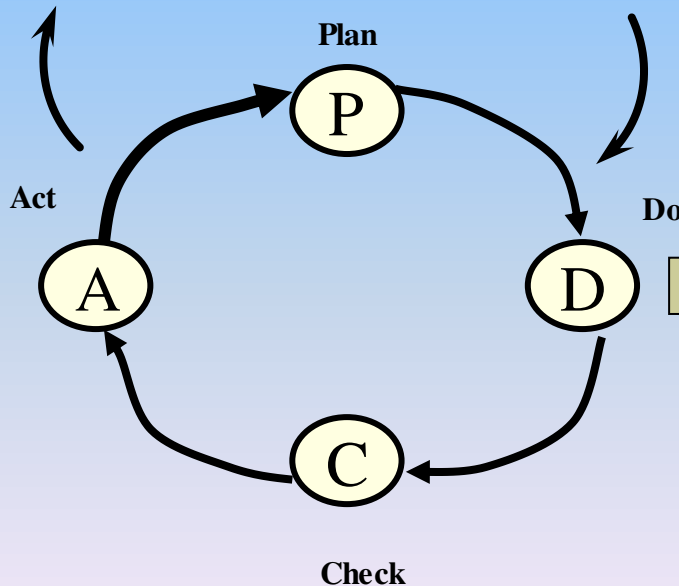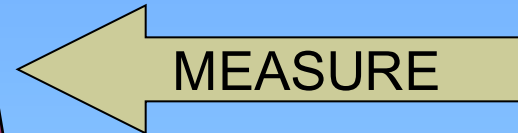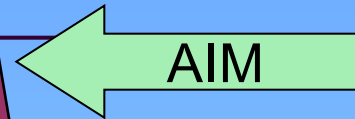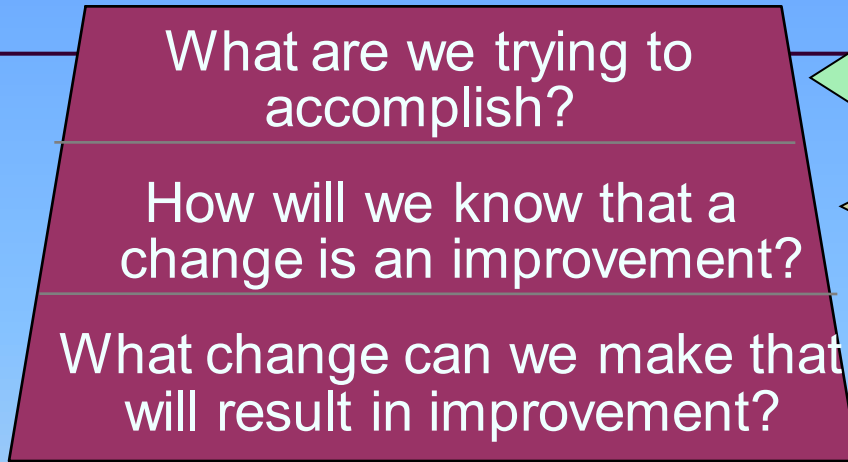
Taguchi's Contribution

■ In the early 1980s, Prof. Genechi Taguchi introduced his approach to using experimental design for

1) Designing products or processes so that they are **robust** to environmental conditions.
2) Designing/developing products so that they are robust to component variation.
3) Minimizing variation around a target value.

■ *By robust, we mean that the product or process performs consistently on target and is relatively insensitive to factors that are difficult to control.*

Taguchi Philosophy
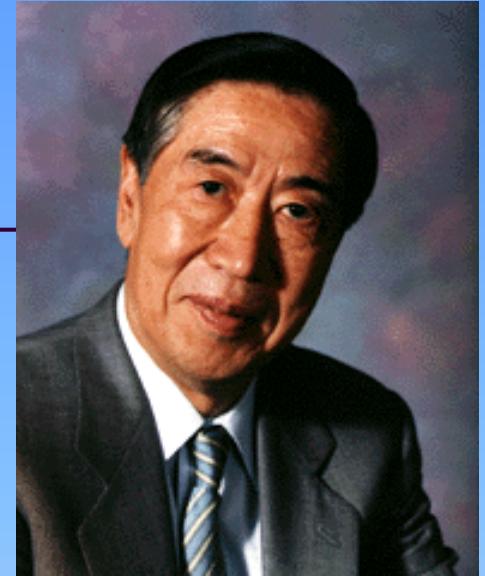
- 3 stages in a product's (or process's) development:
    1) System design: Uses scientific and engineering principles to determine the basic configuration.
    2) Parameter design: Specific values for the system parameters are determined.
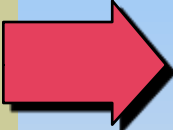   3) Tolerance design: Determine the best tolerances for the parameters.

Taguchi Philosophy

- **Recommends:** statistical experimental design methods have to be used for quality improvement, particularly during parameter and tolerance design phases.

- **Key component:** reduce the variability around the target (nominal) value.
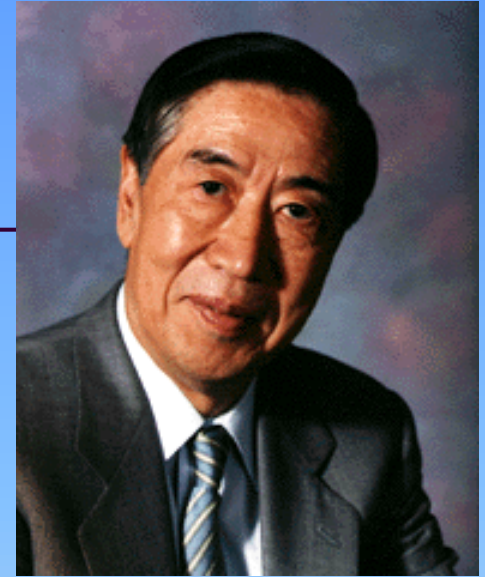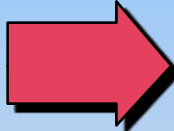
Internal and External Benefits of Quality

Internal Benefits

Reduces costs
Increases dependability
Increases speed
Boosts moral
Increases customer retention
Increases profit

External Benefits

Customer gets correct product or service

Correct specifications

Appropriate intangibles

Customer satisfaction

Customer retention

Drawbacks

- Long way to establish in the organisation
- QM design not always fit for purpose (loss of cost effectiveness)
- Substantial efforts
- Maintain system, otherwise reject it.

BARRIERS TO TQM

Lack of Management Commitment

- There must be a substantial management commitment of management time and organizational resources.
- The purpose must be clearly and continuously communicated to all personnel
- Management must consistently apply the principles of TQM

BARRIERS TO TQM

Inability to change organizational Culture

Basic Concepts

- People change when they want to and to meet their own needs.
- Never expect anyone to engage in behavior that serves the organizational values unless adequate reason (why) has been given.
- For change to be accepted, people must be moved from a state of fear to trust.
- Speeches, Slogans, Campaigns are effective only for a short period of time.
- Organization that spend more time on change, only have chances of success.

BARRIERS TO TQM

Improper Planning

- All constituents of the organization must be involved in the development of the implementation plan and any modification that occurs as the plan evolves.
- The most important thing is two way communications of ideas by all personnel during the development of the plan and its implementation.
- Customer satisfaction should be the goal rather than the financial or sales goals.

BARRIERS TO TQM

Lack of continuous training and education

- Training and education is an ongoing process for everyone in the organization.
- Training and education are most effective when senior management conducts the training on the principles of TQM.

BARRIERS TO TQM

Incompatible Organizational Structure and Isolated Individuals and Departments.

- Differences between departments and individuals can create implementation problems.
- The use of multifunctional team will help to break down long-standing barriers.
- Restructuring the organization to meet organization needs is important.
- Individuals who do not embrace the new philosophy can be required to leave the organization.

BARRIERS TO TQM

Ineffective Measurement Techniques and Lack of Access to Data and Results.

- Key characteristics of the organization should be measured so that the effective decisions can be made.
- Access to data and quick retrieval is necessary for effective processes.

BARRIERS TO TQM

Paying Inadequate Attention to Internal and External Customers

- Organizations need to understand the changing needs and expectations of their customers.
- Effective feedback mechanisms that provide data for decision making are necessary for this nderstanding.
- When an organization fails to empower individuals and teams, it cannot hold them responsible for producing results.

BARRIERS TO TQM

Inadequate Use of Empowerment and Teamwork
- Teams need to have the proper training and at least in the beginning a facilitator.
- Individuals should be empowered to make decisions that affect the efficiency of their process or the satisfaction of their customers.

Failure to Continually Improve
- A lack of continuous improvement of the processes, product or service will even leave the leader of the pack in the dust.

Assignment - 1

1. Define quality. Explain in detail about the need for TQM
2. What are the dimensions of quality?
   Explain the dimensions of manufacturing and service quality.
3. What is commonality of Themes of Quality Gurus
4. Discuss the internal and external benefits of quality.
5. Define the concept of Deming philosophy
6. Define TQM. Explain six basic concepts of TQM.
7. What is quality as per the different quality Gurus?
8. Discuss in detail about the basic concepts of quality.
9. What are terms that affects quality in manufacturing organization
10. List and Describe the barriers of TQM.