Project Management

The Project Manager

The Project Manager

- The project manager can be chosen and installed as soon as the project is selected for funding
  - This simplifies several start up activities
- The project manager can also be chosen later
  - This makes things a little bit difficult
- Senior management briefs the project manager
- Project manager begins with a budget and schedule
  - As people are added the budget and schedule are refined

Role of a Project Manager

Project Managers must answer the following questions :-

- What needs to be done and by who?
- When must it be done and what are the risks involved?
- What resources do we need and how are the resources required to do the job to be obtained?

Formulating the Project Team

- Very few people will work for the project manager
- The "team" will disband at the end of the project
- The project manager negotiates for the desired skills sets, usually the project manager wants the best qualified individual
- Once workers are assigned to a project, the project manager must motivate them

Acquiring Adequate Resources

- Project budgets are usually inadequate
- Resource trade-offs must be considered
- Availability of resources is seen as a "win-lose" proposition
- Risks should also be considered since crises can occur that require special resources

The Most Important Characteristics of Team Members

- High-quality technical skills to do the job
- Negotiation Skills
- Problem solving skills
- Strong goal orientation
- High self-esteem
- Good time managers

Tuckman Ladder

Teams progress through four development phases:

1. Forming - involves the introduction of team members, either at the initiation of the team, or as new members are introduced. This stage is necessary, but little work is actually achieved.
2. Storming- occurs as team members have different opinions as to how the team should operate. People test each other, and there is often conflict within the team.

3. Norming - is achieved when team members have developed a common working method, and cooperation and collaboration replace the conflict and mistrust of the previous phase.
4. Performing - occurs when the emphasis is on reaching the team goals, rather than working on team process. Relationships are settled, and team members are likely to build loyalty towards each other. At this stage, the team is able to manage tasks that are more complex and cope with greater change.
5. Adjourning - involves the break-up of the team after they successfully reach their goals and complete the work.

Dealing with Obstacles

- Every project is unique
- The project manager should be ready to face a series of crises
- A big problem is "scope creep"
- Good project managers are fire fighters when it comes to challenges

Dealing with Obstacles Cont'd

- Early problems are associated with lack of resources
- Later problems are associated with:
  - Last-minute schedule and technical changes
  - What next for a team when the project is completed

Making Project Goal Trade-Offs

- Project managers must make trade-offs between the project goals of:
  - Cost
  - Time
  - Scope
  - Ancillary goals
- Multiple projects
- Project goals and organizational goals

Maintaining a Balanced Outlook

- Hard to tell where a project is headed
- Outlook can change over the life of a project
- Technical problems cause waves of pessimism and optimism
- Maintaining a positive outlook is a very critical

Attributes of Effective Project Managers

- Credibility
- Sensitivity
- Leadership, ethics, and good management style
- Ability to handle stress
- They must also have the drive to complete the task!

Project Quality Management

Importance of Project Quality Management

- Many people joke about the poor quality of some IT products and services
- People seem to accept systems being down occasionally or needing to reboot their PCs
- But quality is very important in IT projects

What is Quality?

- The International Organization for Standardization (ISO) defines **quality** as "the degree to which a set of inherent characteristics fulfils requirements" Other experts define quality based on:

-**Conformance to requirements**: The project's processes and products meet written specifications

-**Fitness for use:** A product can be used as it was intended

What is quality management

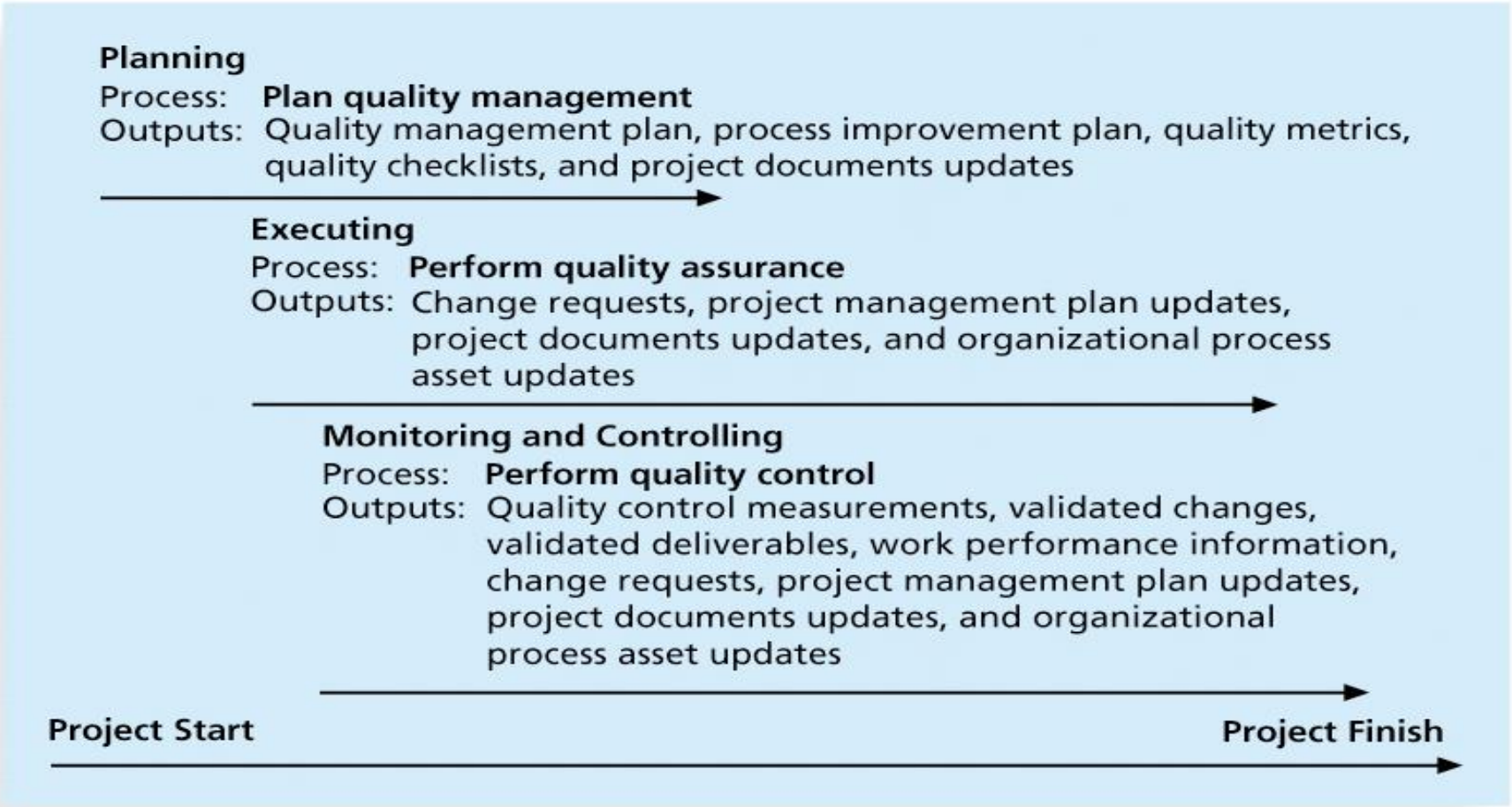
- **Project quality management** ensures that the project will satisfy the needs for which it was undertaken. Some quality Processes include:-

-**Planning quality management**: Identifying which quality standards are relevant to the project and how to satisfy them; a **metric** as a standard of measurement can be used.

-**Performing quality assurance**: Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards

-**Performing quality control:** Monitoring specific project results to ensure that they comply with the relevant quality standards

Project Quality Management Summary



Planning Quality Management

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome
- Important to prevent defects by:
  - Selecting proper materials
  - Training and indoctrinating people in quality
  - Planning a process that ensures the appropriate outcome

Scope Aspects of IT Projects

Functionality is the degree to which a system performs its intended function

- **Features** are the system's special characteristics that appeal to users
- **System outputs** are the reports and files the system generates
- **Performance** addresses how well a product or service performs the customer's intended use
- **Reliability** is the ability of a product or service to perform as expected under normal conditions
- **Maintainability** addresses the ease of performing maintenance on a product

Who's Responsible for the Quality of Projects?

- Project managers are ultimately responsible for quality management on their projects
- Several organizations and references can help project managers and their teams understand quality e.g. International Organization for Standardization (www.iso.org) , IEEE (www.ieee.org)

Performing Quality Assurance

- **Quality assurance** includes all the activities related to satisfying the relevant quality standards for a project
- Another goal of quality assurance is continuous quality improvement
- **Benchmarking** generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization
- A **quality audit** is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects

Controlling Quality

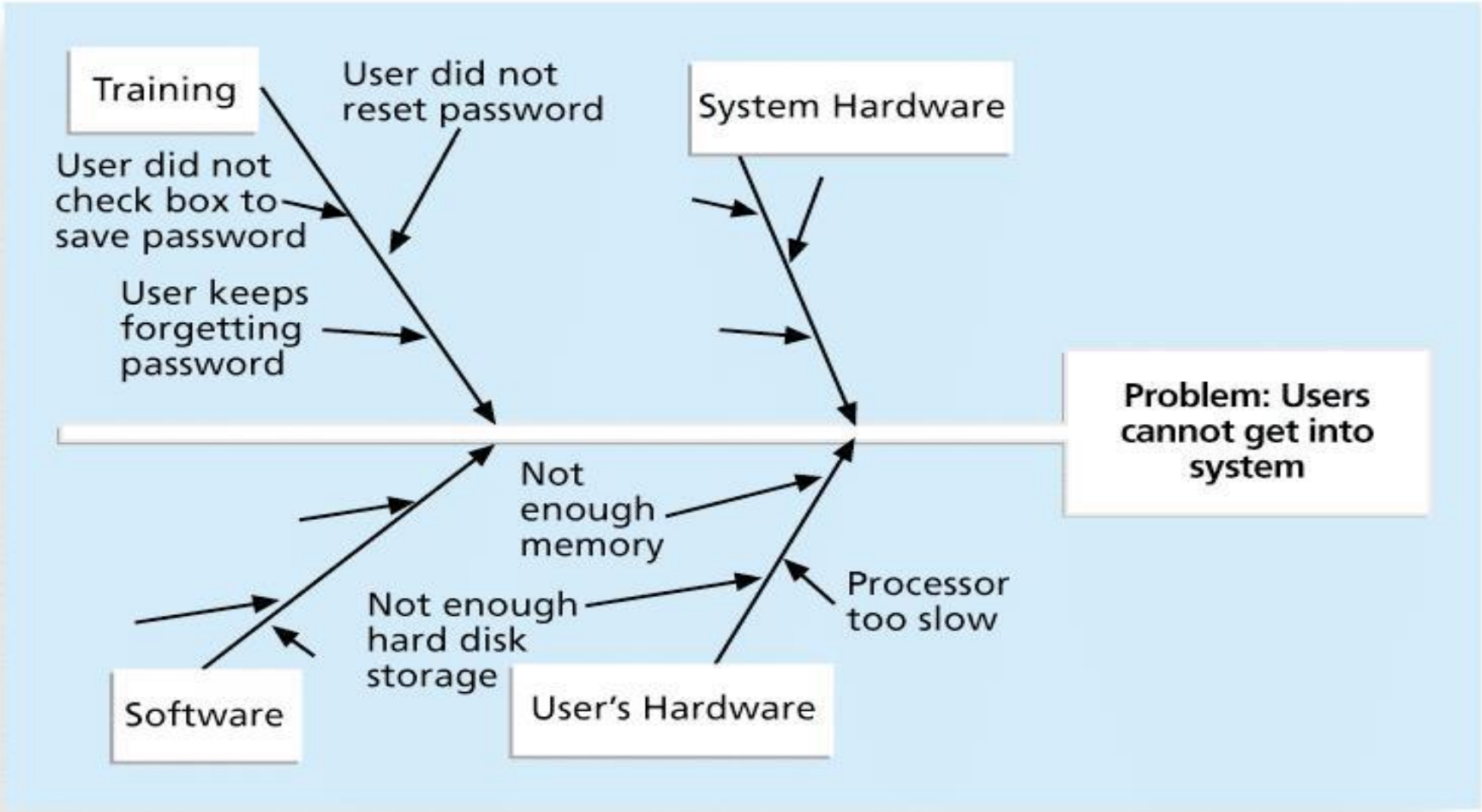
- The main outputs of quality control are:
  - Acceptance decisions
  - Rework
  - Process adjustments
- There are Tools of Quality that help in performing quality control

Some of the tools we can use to monitor quality are:-

1. Cause-and-Effect Diagrams

- **Cause-and-effect diagrams** trace complaints about quality problems back to the responsible production operations
- They help you find the root cause of a problem

Sample Cause-and-Effect Diagram



2. Quality Control Charts

A **control chart** is a graphic display of data that illustrates the results of a process over time

• Quality control charts allow you to determine whether a process is in control or out of control

-When a process is in control, any variations in the results of the process are created by random events; processes that are in control do not need to be adjusted

-When a process is out of control, variations in the results of the process are caused by non-random events; you need to identify the causes of those non-random events and adjust the process to correct or eliminate them

Examples of Quality Control Charts

a. Check sheet

- A check sheet is used to collect and analyze data
- It is sometimes called a tally sheet or checklist, depending on its format
- In the example below most complaints arrive via text message, and there are more complaints on Monday and Tuesday than on other days of the week

System Complaints

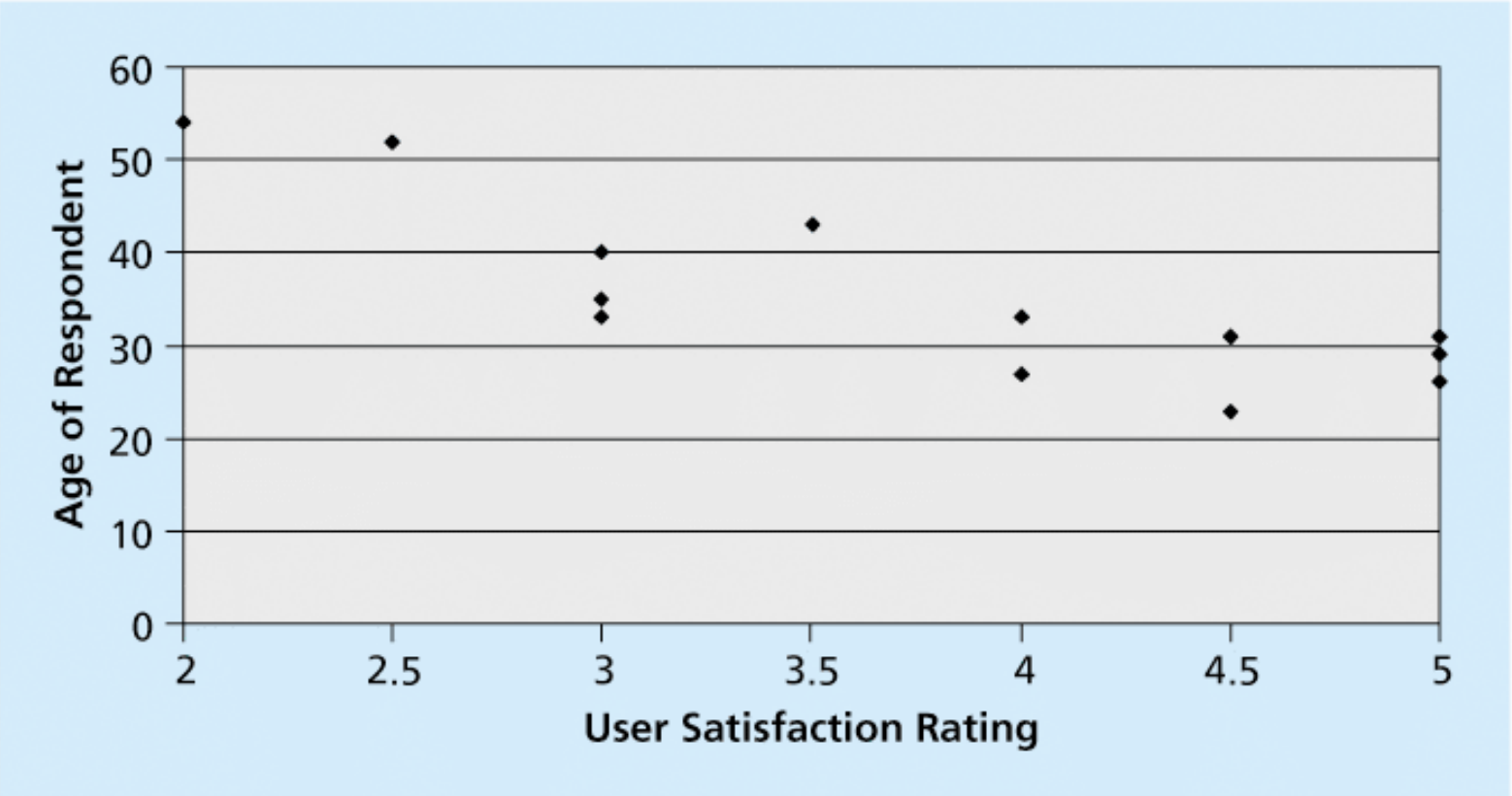
Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Email	𝍸	𝍸	𝍸	𝍸	𝍸		𝍸	12
Text	𝍸 𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	29
Phone call	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸		8
Total	11	10	8	6	7	3	4	49

- This information might be useful in improving the process for handling complaints

b. Scatter diagram

- A **scatter diagram** helps to show if there is a relationship between two variables
- The closer data points are to a diagonal line, the more closely the two variables are related

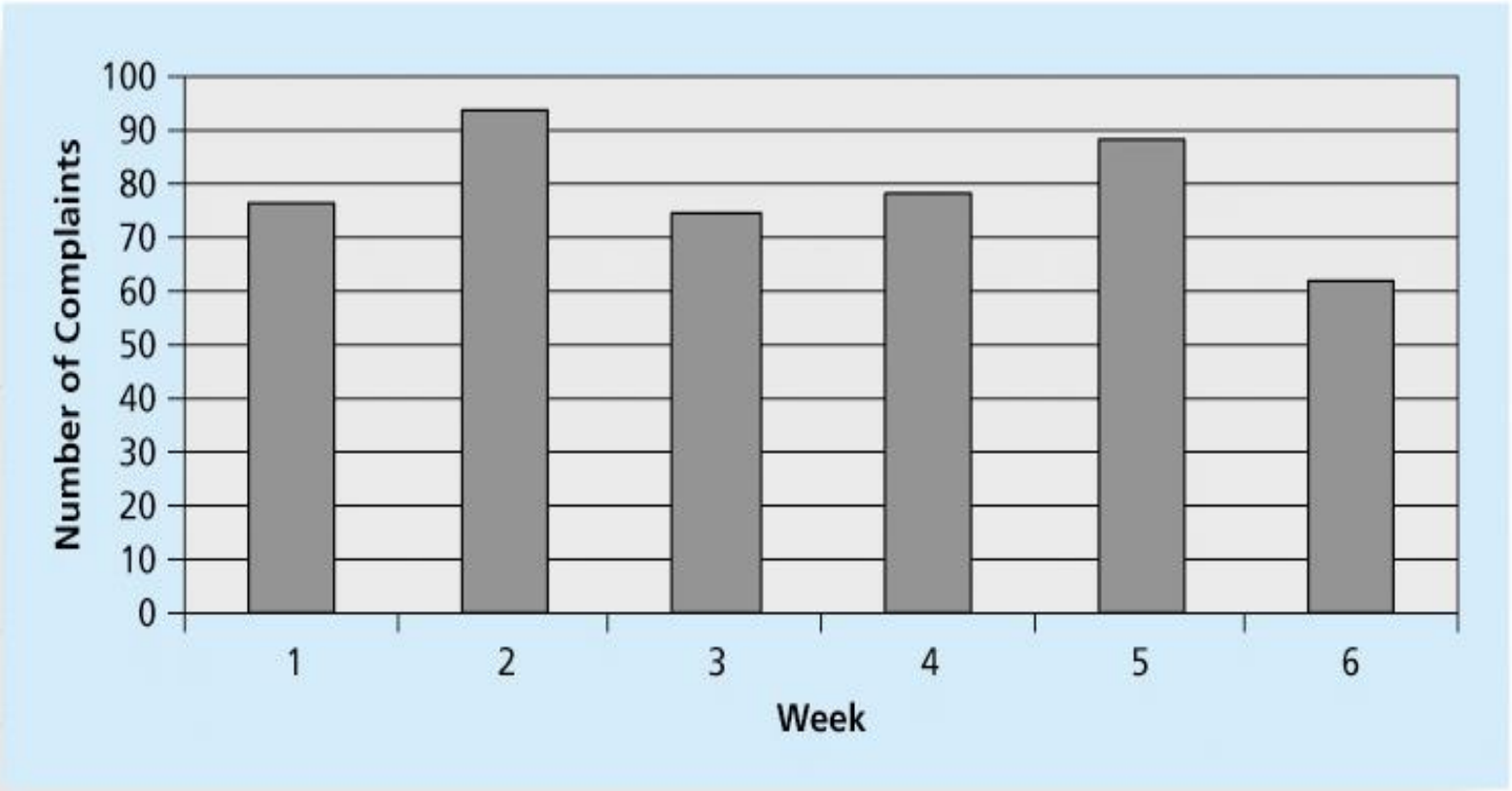
Sample scatter diagram



c. Histograms

- A **histogram** is a bar graph of a distribution of variables
- Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency

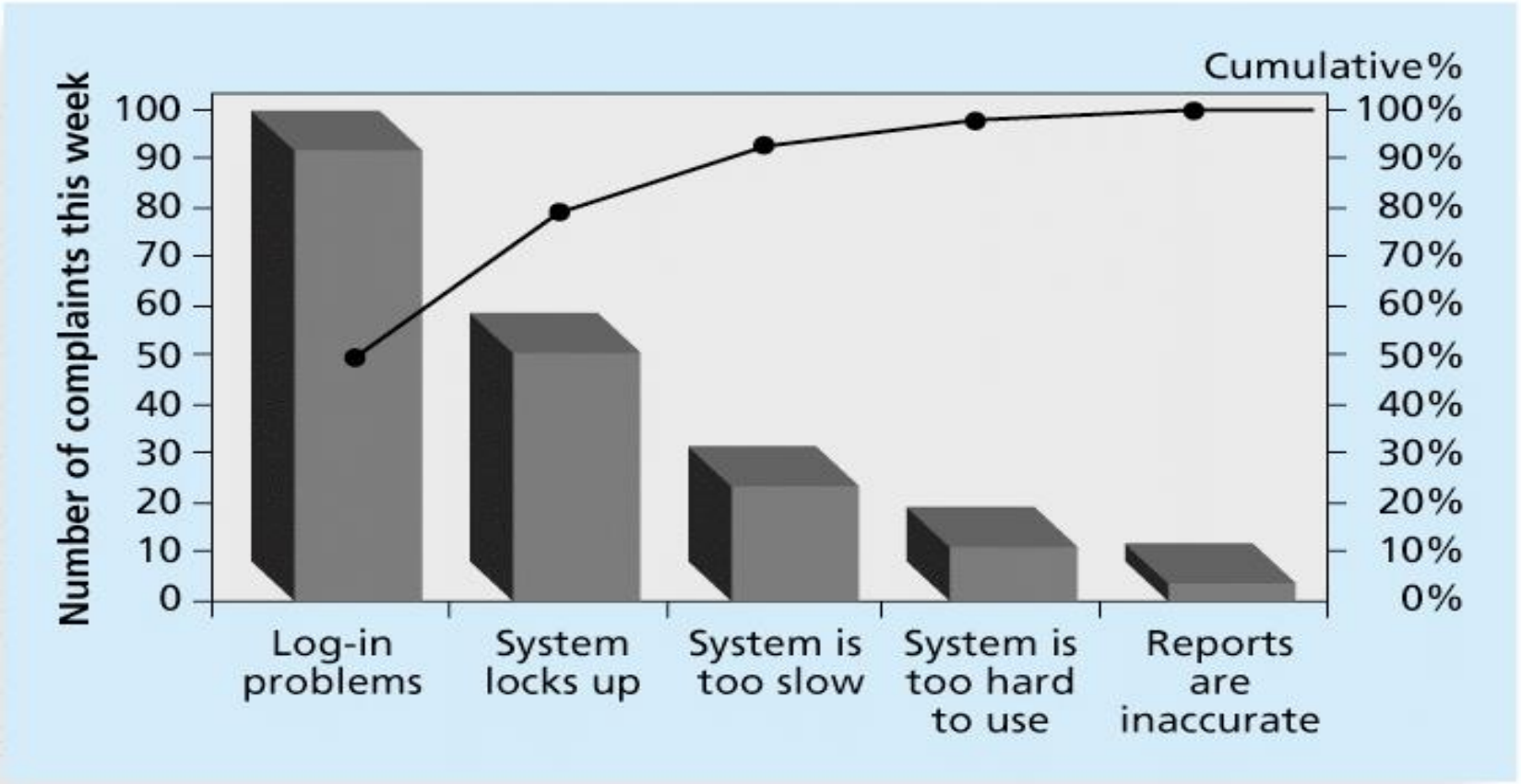
Sample Histogram



d. Pareto Charts

- A **Pareto chart** is a histogram that can help one to identify and prioritize problem areas

Sample Pareto Chart



SIX SIGMA

- **Six Sigma** is “a comprehensive and flexible system for achieving, sustaining, and maximizing business success.
- Six Sigma is uniquely driven by close understanding of customer needs, disciplined use of facts, data, and statistical analysis, and diligent attention to managing, improving, and reinventing business processes”*

Basic Information on Six Sigma

- The target for perfection is the achievement of no more than **3.4 defects per million opportunities**
- The principles can apply to a wide variety of processes
- Six Sigma projects normally follow a five-phase improvement process called DMAIC

The Six Sigma DMAIC process

This is a systematic, closed-loop process for continued improvement that is scientific and fact based. It stands for:-

-**Define**: Define the problem/opportunity, process, and customer requirements

-**Measure**: Define measures, then collect, compile, and display data

-**Analyze**: Scrutinize process details to find improvement opportunities

-**Improve**: Generate solutions and ideas for improving the problem

-**Control**: Track and verify the stability of the improvements and the predictability of the solution

How is Six Sigma Quality Control Unique?

- It requires an organization commitment.
- Six Sigma organizations have the ability and willingness to adopt new objectives, such as reducing errors and getting things done faster
- It is an operating philosophy that is customer focused and strives to eliminate waste, raise levels of quality, and improve financial performance at *break through* levels

Six Sigma and Project Management

- Joseph M. Juran stated, “All improvement takes place project by project, and in no other way”*
- It’s important to select projects carefully and apply higher quality where it makes sense
- Six Sigma projects must focus on the gap between the current and desired performance and not have a clearly understood problem or a predetermined solution

Six Sigma Projects Use Project Management

- The training for Six Sigma includes many project management concepts, tools, and techniques
- For example, Six Sigma projects often use business cases, project charters, schedules, budgets, and so on
- Six Sigma projects are done in teams; the project manager is often called the team leader, and the funder is called the champion

Modern Quality Management

Modern quality management:

- Requires customer satisfaction
- Prefers prevention to fixing issues
- Recognizes management responsibility for quality

The Cost of Quality

- The **cost of quality** is the cost of conformance plus the cost of nonconformance
  - Cost of **Conformance** means delivering products that meet requirements and fitness for use
  - **Cost of nonconformance** means taking responsibility for failures or not meeting quality expectations

Five Cost Categories Related to Quality

Prevention cost: Cost of planning and executing a project so it is error-free or within an acceptable error range

- **Appraisal cost**: Cost of evaluating processes and their outputs to ensure quality
- **Internal failure cost**: Cost incurred to correct an identified defect before the customer receives the product
- **External failure cost**: Cost that relates to all errors not detected and corrected before delivery to the customer
- **Measurement and test equipment costs**: Capital cost of equipment used to perform prevention and appraisal activities

Project Risk Analysis and Management

Introduction

- The future can never be predicted with 100% accuracy

Project plans have to be based on *assumptions*

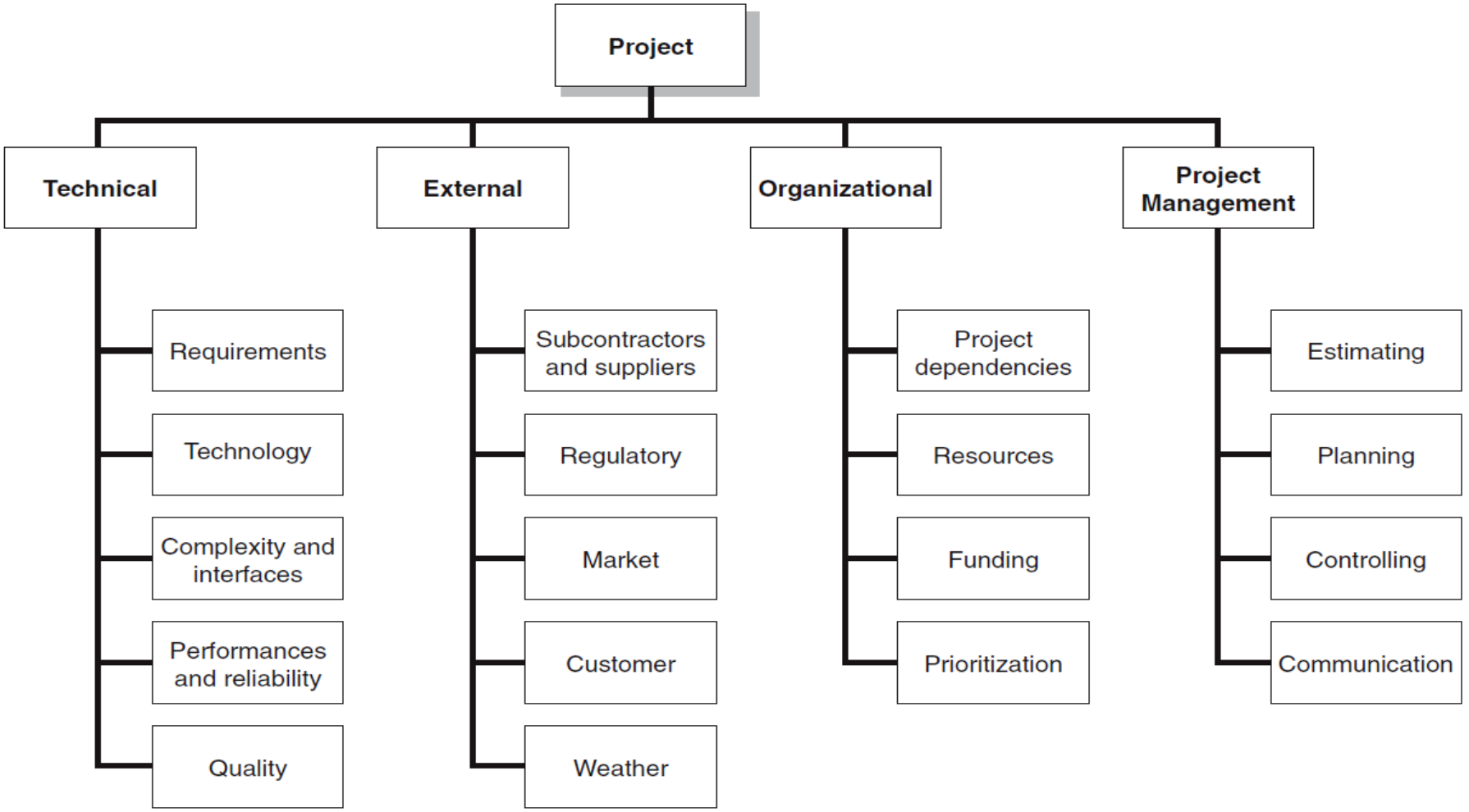
We need to factor consequences of uncertainties(risks)

'Risk is the chance of exposure to the adverse consequences of future events' ; or

Risk is a measure of the probability and consequence of not achieving a defined project goal. When the risk happens it becomes a problem or an issue.

- Risk can be analyzed using Risk Breakdown Structure (RBS): *Technical, External, Organization or Project management risks.*

The Risk Breakdown Structure (RBS)



Managing Risks

Risk management is the act or practice of dealing with possible risks.

- Risk management is not a separate activity but rather on aspect of sound project management.
- Need to provide adequate resources for Risk Management
- Need to identify and assess project risk using standard approach

Project Risk Management

- The goal of project risk management can be viewed as minimizing potential negative risks while maximizing potential positive risks.
- The term **known risks** is sometimes used to describe risks that the project team have identified and analyzed. Known risks can be managed proactively.
- However, **unknown risks**, or risks that have not been identified and analyzed, cannot be managed.
- A good project manager should take time to identify and manage project risks

Risk Management Strategies

Reactive

- project team reacts to risks when they occur
- mitigation—plan for additional resources in anticipation of fire fighting
- fix on failure —resource are found and applied when the risk strikes
- crisis management—failure does not respond to applied resources and project is in jeopardy

Proactive

- formal risk analysis is performed
- organization corrects the root causes of risk

-examining risk sources that lie beyond the bounds of the software

-developing the skill to manage change

Risk management process

There are six major processes involved in risk management:-

1. Planning risk management
2. Identifying risks
3. Performing qualitative risk analysis
4. Performing quantitative risk analysis
5. Planning risk responses
6. Monitoring and controlling risk

1. Planning Risk Management

- This involves deciding how to approach and plan the risk management activities for the project.
- By reviewing the project scope statement; cost, schedule, and communications management plans; enterprise environmental factors; and organizational process assets, project teams can discuss and analyze risk management activities for their particular projects.
- The main output of this process is a **risk management plan**.
- **Risk management plan** :-a plan that documents the procedures for managing risk throughout a project

Components of a Risk management Plan

- **Methodology**: -How will risk management be performed on this project? What tools and data sources are available and applicable?
- **Roles and responsibilities**: -Who are the individuals responsible for implementing specific tasks and providing deliverables related to risk management?
- **Budget and schedule**: -What are the estimated costs and schedules for performing risk-related activities?
- **Risk categories**: -What are the main categories of risks that should be addressed on this project? Is there a risk breakdown structure for the project?

- **Risk probability and impact:** -How will the probabilities and impacts of risk items be assessed? What scoring and interpretation methods will be used for the qualitative and quantitative analysis of risks? How will the probability and impact matrix be developed?
- **Revised stakeholders tolerances:** -Have stakeholder's tolerances for risk changed? How will those changes affect the project?
- **Tracking:** -How will the team track risk management activities? How will lessons learned be documented and shared? How will risk management processes be audited?
- **Risk documentation:** -What reporting formats and processes will be used for risk management activities?

2. Identifying Risks

- This involves determining which risks are likely to affect a project and documenting the characteristics of each.
- The main output of this process is the start of a **risk register**
- A **risk register** is a document that contains results of various risk management processes.
- It is a tool for documenting potential risk events and related information

Risk Identification Techniques

- **1.Brainstorming** is a technique by which a group attempts to generate ideas or find a solution for a specific problem by gathering ideas spontaneously and without judgment.
- This approach can help the group create a comprehensive list of risks to address later in the qualitative and quantitative risk analysis processes.
- An experienced facilitator leads the brainstorming session and introduce new categories of potential risks to keep the ideas flowing.
- After the ideas are collected, the facilitator can group and categorize the ideas to make them more manageable.

- **2.Delphi Technique:-**it is a systematic, interactive forecasting procedure based on independent and *anonymous* input regarding future events. The Delphi technique uses repeated rounds of questioning and written responses, including feedback to earlier-round responses, to take advantage of group input, while avoiding the biasing effects possible in oral panel deliberations.
- Delphi technique requires a panel of experts for the particular area in question

- **3.SWOT Analysis:-**it is analysis of strengths, weaknesses, opportunities, and threats, which is often used in strategic planning. SWOT analysis can also be used during risk identification by having project teams focus on the broad perspectives of potential risks for particular projects.

- **4.Use of checklists:-** usually based on the experience of past projects and risks that have been encountered in previous projects, provide a meaningful template for understanding risks in a current project.
- **5.Diagramming techniques:-** include using cause-and-effect diagrams e.g. flowcharts, and influence diagrams. System or process **flowcharts** are diagrams that show how different parts of a system interrelate.

Components of a Risk Register

- *An identification number for each risk event*: The project team need to identify each risk with some type of unique descriptor, such as an identification number.
- •*A rank for each risk event*: The rank is usually a number, with 1 being the highest ranked risk.
- •*The name of the risk event*: For example, defective server, late completion of testing, reduced consulting costs, or good publicity.
- •*The category under which the risk event falls*: For example, defective server might fall under the broader category of technology or hardware technology.

- *A description of the risk event*: this helps to provide a more detailed description.
- *The root cause of the risk*: The root cause of the defective server might be a defective power supply.
- *Triggers for each risk*: Triggers are indicators or symptoms of actual risk events. For example, Defective products may be symptoms of a low-quality supplier.
- *Potential responses to each risk*: A potential response to the risk event such as supplier to replace a defective server within a certain time period at a negotiated cost.
- *The* risk owner *or person who will own or take responsibility for the risk*:
- *The probability of the risk occurring*: There might be a high, medium, or low probability of a certain risk event occurring.

- *The impact to the project if the risk occurs*: There might be a high, medium, or low impact to project success if the risk event actually occurs.
- *The status of the risk*: Did the risk event occur? Was the response strategy completed? Is the risk no longer relevant to the project? For example, a contract clause may have been completed to address the risk of a defective server

3. Performing Qualitative Risk Analysis:-

- This involves prioritizing risks based on their probability and impact of occurrence.
- After identifying risks, project teams can use various tools and techniques to rank risks and update information in the risk register.
- The main output is **risk register updates.**

4. Performing Quantitative Risk Analysis:

- This involves numerically estimating the effects of risks on project objectives.
- The main output of this process is also **risk register updates.**

5. Planning risk responses - developing options and determining actions to enhance opportunities and reduce threats to the project`s objectives.

6. Monitoring and controlling risk – keeping track of the identified risks, monitoring residual risks and identifying new risks, ensuring the execution of risk plans, and evaluating their effectiveness in reducing risk.