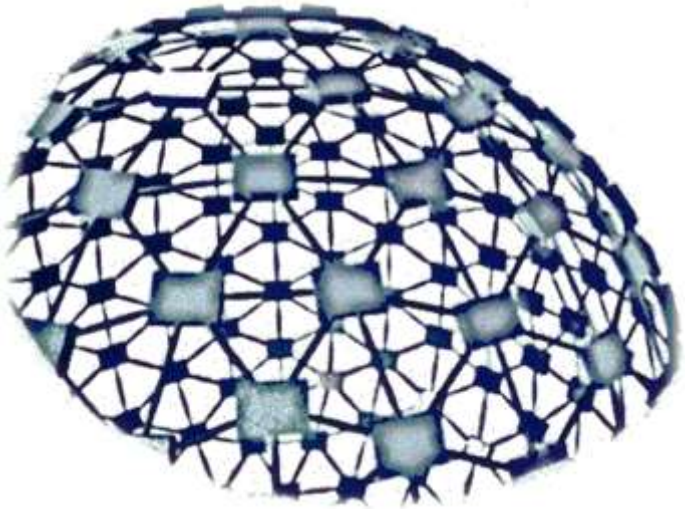

Chapter 8:
Project Quality Management

What Is Project Quality Management? (1 of 3)

- International Organization for Standardization (ISO) definition of quality : "The degree to which a set of inherent characteristics fulfils requirements" (ISO9000:2000)

قدرة المنتج أو الخدمة على تحقيق مجموعة من السمات الأساسية المطلوبة

- Other definitions of quality
  - Conformance to requirements (الامتثال)
    - Project's processes and products meet written specifications
  - Fitness for use (ملاءمة)
    - Product can be used as it was intended

What Is Project Quality Management PQM? (2 of 3)

- Project quality management processes

1. Planning quality management: identifying which quality **standards** are relevant to the project and how to satisfy them; a **metric** is a standard of measurement. In IT projects, quality may include planning for *response time*, ensuring the system produces accurate information. Metrics: failure rates, availability of goods , customer satisfaction ratings.
2. performing quality assurance, translating the quality management plan into executable quality activities
3. Controlling quality: monitoring specific **project results** to ensure they comply with the relevant quality standards

1- Planning Quality Management (1 of 2)

- The *first step* to ensuring project quality management is planning

- It is the process of **identifying quality requirements and/or standards** for the project and its deliverables, and documenting **how** the project will demonstrate compliance with relevant quality requirements

التوجه الحالي هو الوقاية من العيوب

- The current thrust in modern quality management is the **prevention** of defects through a program of:

من خلال:

1- Selecting the proper **materials**, (اختيار)

2- **Training** people in quality, (تدريب)

3- **Planning a process** that ensures the appropriate outcome. (تخطيط)

Planning Quality Management (2 of 2)

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Scope aspects of IT projects

1. Functionality: degree to which a system performs its intended function
2. Features: system's special characteristics that appeal to users
3. System outputs: screens and reports the system generates
4. Performance addresses: how well a product or service performs the customer's intended use
5. Reliability: ability of a product or service to perform as expected under normal conditions
6. Maintainability: ease of performing maintenance on a product

All project stakeholders must work together to balance the quality, scope, time, and cost dimensions of the project. Project managers are ultimately responsible for quality management on their projects

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2. Performing Quality assurance

يستهدف جميع الأنشطة المتعلقة بتلبية المعايير.

Quality assurance includes all the activities related to satisfying the relevant quality standards for a project

Tools and Techniques

- 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 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
  - In-house auditors or third parties
  - scheduled or random.

3. Controlling Quality

Main **outputs** of quality control

1. **Acceptance decisions**: determine if the products or services produced as part of the project will be accepted or rejected. If accepted, It is validated deliverables. If the stakeholders reject some of the products or services, there must be rework
2. **Rework**: action taken to bring rejected items into compliance with product requirements, specifications, or expectations
3. **Process adjustments**: correct or prevent further quality problems based on quality control measurements. Process adjustments often result in updates to the quality baseline, organization process assets, and the project management plan

Who's Responsible for the Quality of Projects?

- Project managers are ultimately responsible for quality management on their projects. Project managers should be familiar with basic quality terms, standards, and resources.
- Several organizations and references can help project managers and their teams understand quality

1. International Organization for Standardization (www.iso.org)
2. IEEE (www.ieee.org)

8 Tools and Techniques for Quality Control

- Basic tools of quality that help in performing quality control

1. Cause-and-effect diagrams الرسوم البيانية لسبب و النتيجة
2. Control chart رسم بياني للتحكم
3. Checksheet نموذج بياني
4. Scatter diagram الرسم البياني المبعثر
5. Histogram
6. Pareto chart مخطط باريتو
7. Flowcharts charts مخططات سير العمل

8 Tools and Techniques for Quality Control

1- Cause-and-Effect Diagrams

- Trace complaints about quality problems back to the responsible production operations. In other words, they **help you find the root cause of a problem**. تساعد في إيجاد السبب الجذري للمشكلة .
- Also known as fishbone or Ishikawa diagrams
- You can also use the technique known as the **5 whys**, in which you repeatedly ask the question “Why?” to help peel away the layers of symptoms that can lead to the root cause of a problem.

Sample cause-and-effect diagram

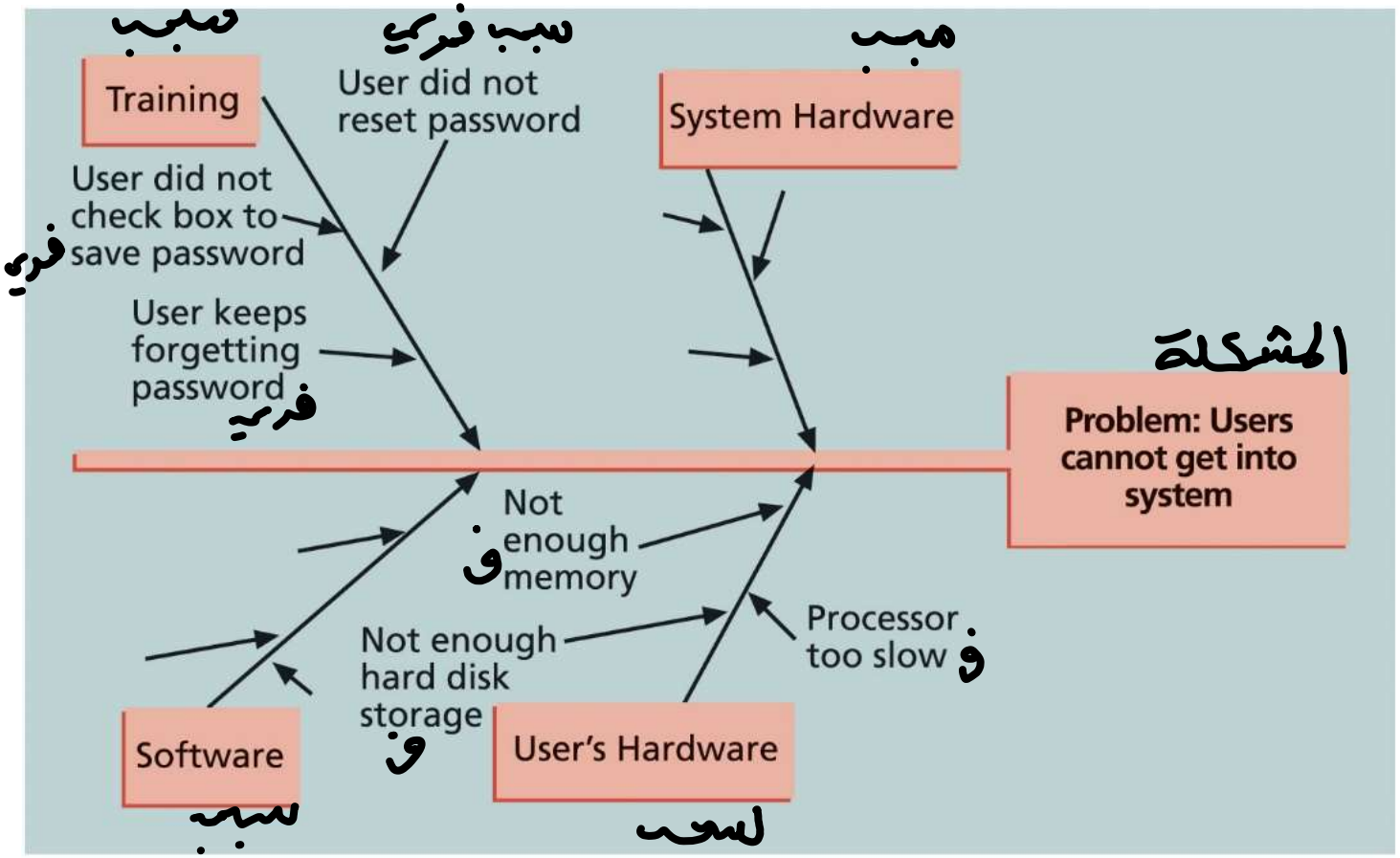

FIGURE 8-2 Sample cause-and-effect diagram

8 Tools and Techniques for Quality Control

2- Quality Control Charts

هي فحص دقتا تبع عملية معينة عبر الوقت

- 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

2- Quality Control Charts

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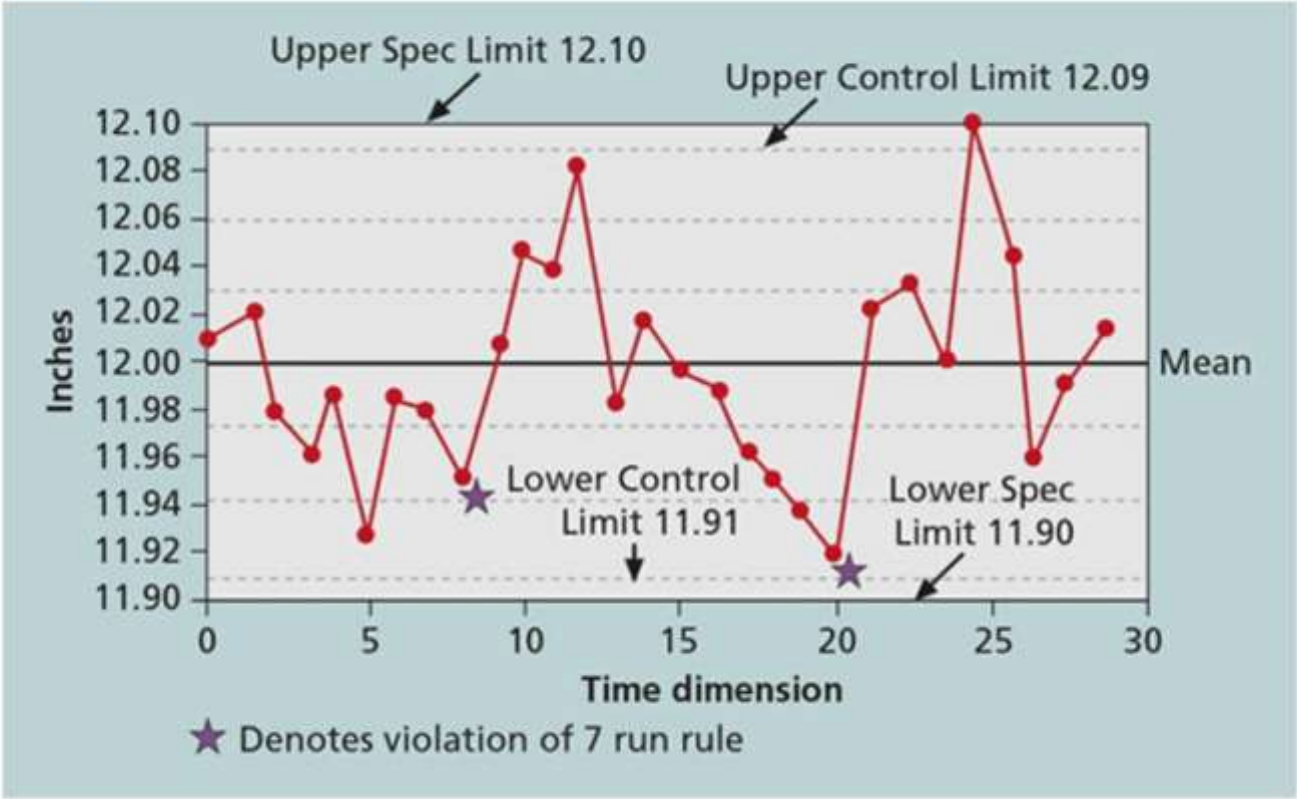
Figure 8-3. Sample control chart



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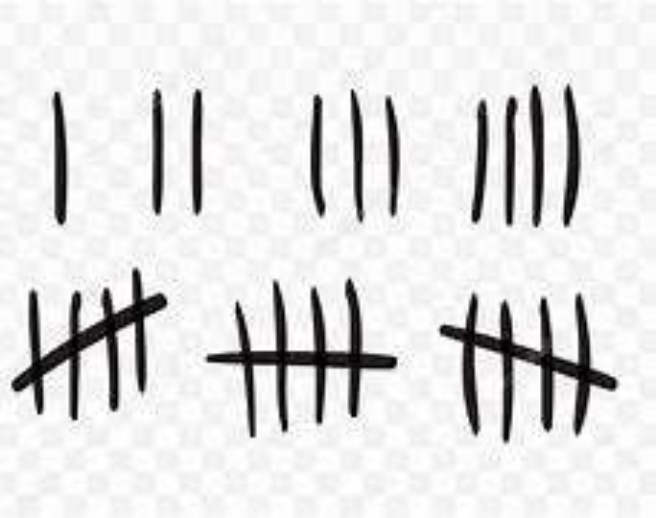
8 Tools and Techniques for Quality Control

3- Checksheet

أداة لجمع وتحليل البيانات

- A check sheet is used to collect and analyse data
- Sometimes called a tally sheet or checklist, depending on its format
- The tally marks are used to enter each data occurrence manually



Tools and Techniques for Quality
3- Checksheet

ex :

As we can see in the figure most complaints arrive via text message, and there are more complaints on Monday and Tuesday than on other days of the week. This information might be useful in improving the process for handling complaints

System Complaints

Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
E-mail	3	4	1	2	1		1	12
Text	7	4	6	3	4	2	3	29
Phone call	1	2	1	1	2	1		8
Total	11	10	8	6	7	3	4	49

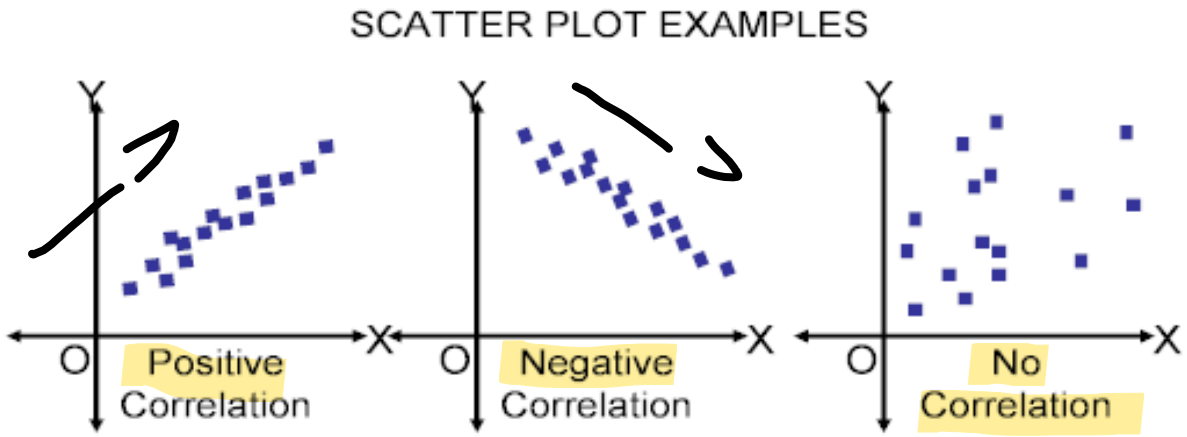
FIGURE 8-4 Sample checksheet

8 Tools and Techniques for Quality Control

4- Scatter Diagram

أداة تساعد في تحليل العلاقة بين متغيرين

- 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.



Tools and Techniques for Quality Control 4- Scatter Diagram

FIGURE 8-5 Sample scatter diagram

Tools and Techniques for Quality Control

5- Histograms

أداة تستخدم لتمثيل توزيع المتغيرات بشكل أبسط

- **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

FIGURE 8-6 Sample histogram

This histogram is created to show how many total complaints about the system they received each week?!

Tools and Techniques for Quality Control

6- Pareto Charts

مخطط يساعد على تحديد وترتيب المشاكل والأسباب

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

٨٠٪ من المشاكل تكون نتيجة ٢٠٪ من الأسباب

- Pareto analysis is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes

- The variables described by the histogram are ordered by frequency of occurrence.

- Pareto charts help you identify the vital *few contributors that account for most quality problems* in a system.

Tools and Techniques for Quality Control
6- Pareto Charts

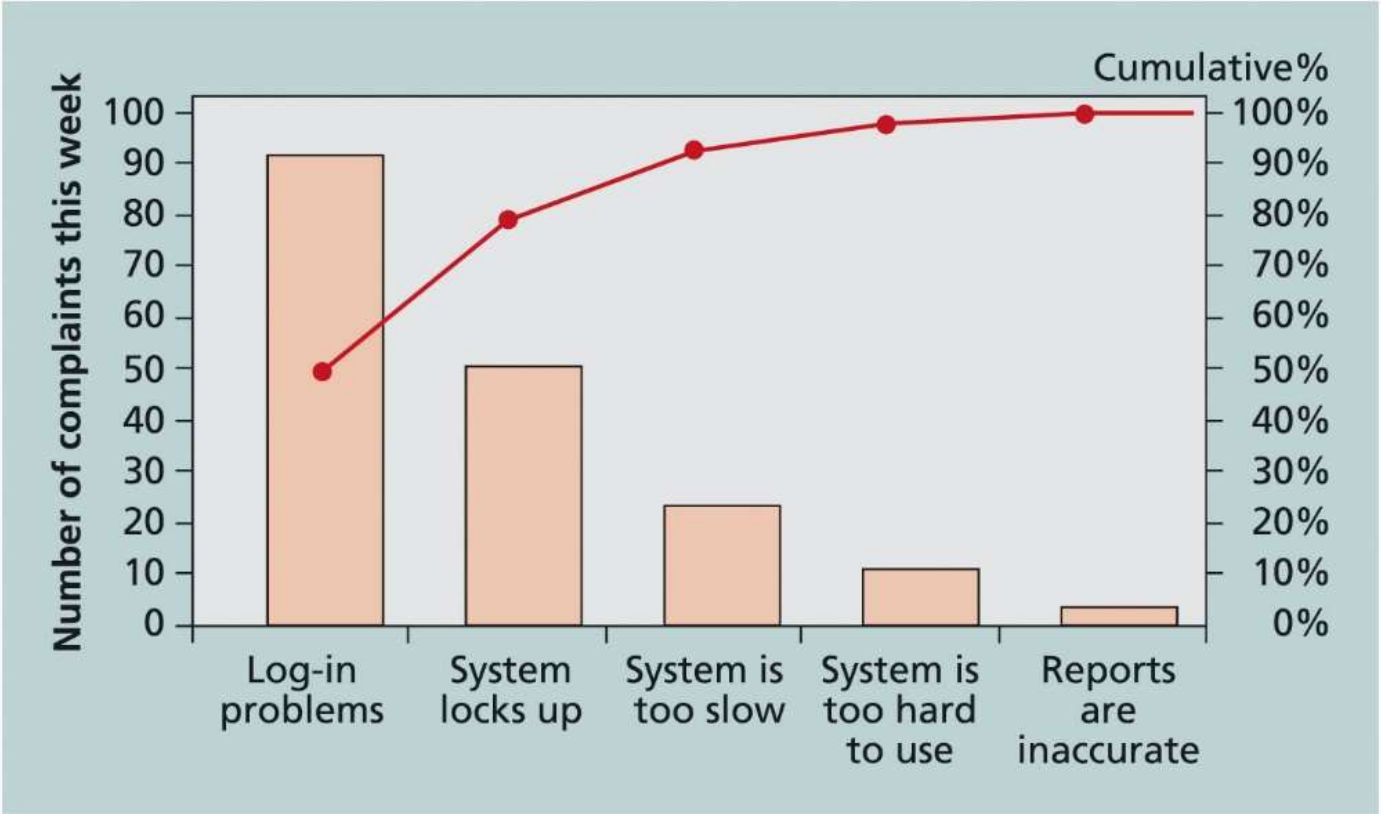


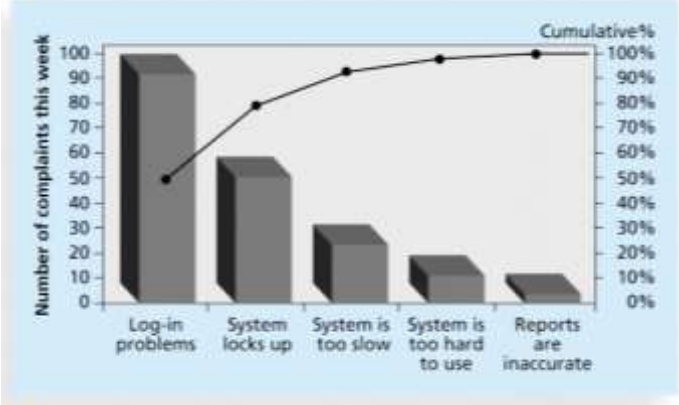
FIGURE 8-7 Sample Pareto chart

Tools and Techniques for Quality Control
6- Pareto Charts

- For example, given a detailed history of user complaints. The project team could create a Pareto chart of data.
- Notice that login problems are most frequent user complaint, then the system locking up, the system being too slow, the system being hard to use, and the reports being inaccurate.
- The first complaint accounts for 55% of the total complaints. The first and second account for ~80% of the total complaints.
- Hence, the company must focus on making it easier to log in to the system to improve quality, because most complaints fall under that category

Tools and Techniques for Quality Control
6- Pareto Charts

- The company must also address why the system locks up. The diagram shows inaccurate reports are rarely mentioned; The project manager must investigate who made such complaint before spending a lot of effort on addressing the problem.
- The project manager should also find out if complaints about the system being too slow were due to user not being able to log in or the system locking up



Tools and Techniques for Quality Control

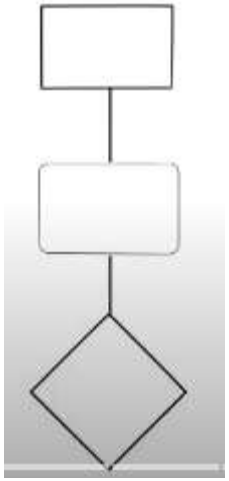
7-Flowchart

رسوم بيانية تعرض منطق و تدفق العمليات بحيث تساعد في

- Flowcharts are graphic displays of the logic and flow of processes that help analyzes how problems occur and how processes can be improved

تحليل حدوث المشكلات وكيفية تحسين العمليات .

- They show activities, decision points, and the order of how information is processed



Tools and Techniques for Quality Control
7-Flowchart

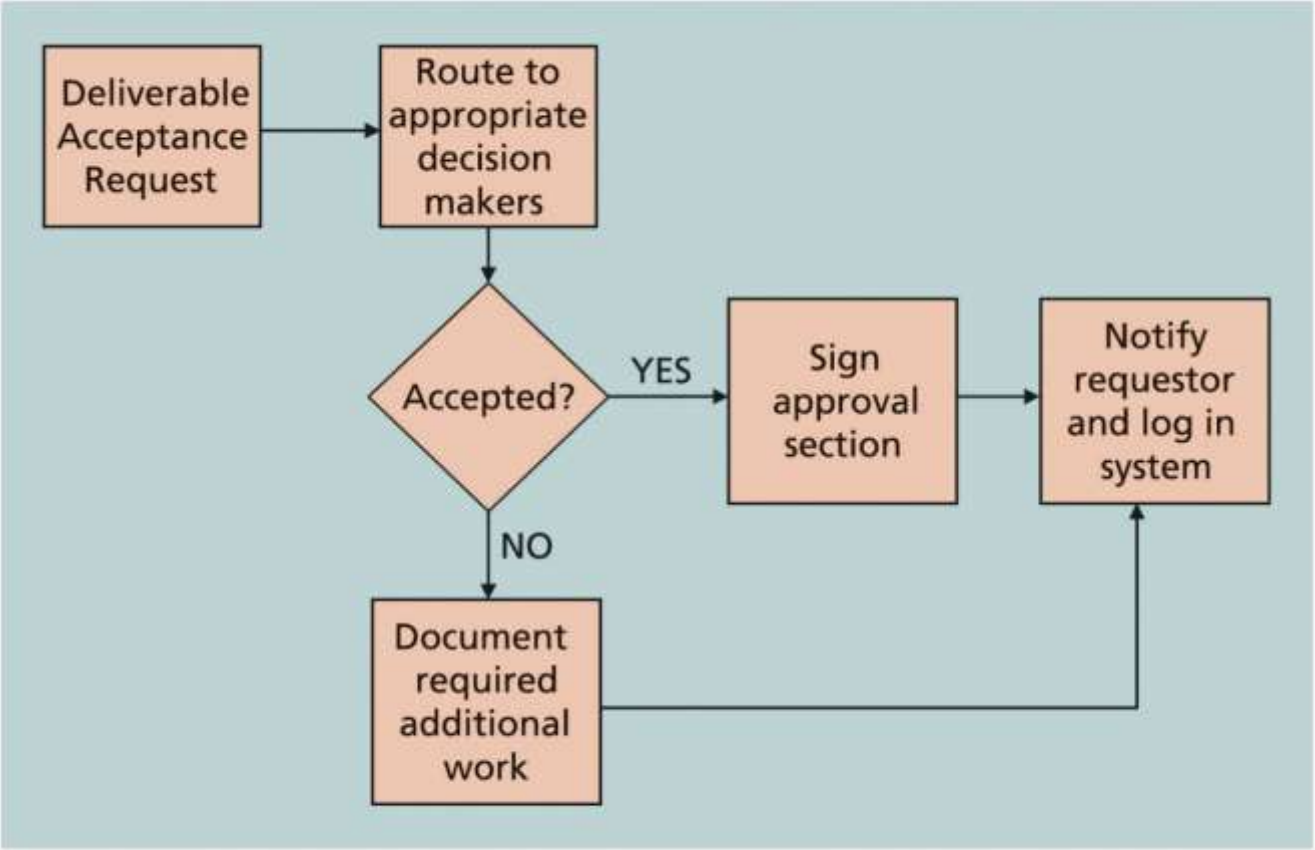


FIGURE 8-8 Sample flowchart

تكلفة الجودة

The Cost of Quality

هي مجموع تكلفة الامتثال وعدم الامتثال.

- The cost of quality is the cost of conformance plus the cost of nonconformance

تعد بيم منتجات تلبي المتطلبات و تكون هالحة

1- Conformance means delivering products that meet requirements and fitness for use

تحمل المسؤولية عن الأخطاء أو عدم تلبية التوقعات بالجودة

2- Cost of nonconformance means taking responsibility for failures or not meeting quality expectations

- A study reported that software bugs cost the U.S. economy $59.6 billion each year and that one third of the bugs could be eliminated by an improved testing infrastructure

Five Cost Categories Related to Quality

تكلفة الوقاية

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

التقييم

2. **Appraisal cost**: Cost of evaluating processes and their outputs to ensure quality

الفشل الداخلي

3. **Internal failure cost**: Cost incurred to correct an identified defect before the customer receives the product

الخارجي

4. **External failure cost**: Cost that relates to all errors not detected and corrected before delivery to the customer

معدات القياس والاختبار

5. **Measurement and test equipment costs**: Capital cost of equipment used to perform prevention and appraisal activities

Considerations For Agile/Adaptive Environments

- Agile methods can be used on all types of projects, not just software development
  - Several projects use a hybrid approach where some deliverables are created using more traditional approaches
- Quality is a very broad topic, and it is only one of the ten project management knowledge areas
  - Project managers must focus on defining how quality relates to their specific projects and ensure that those projects satisfy the needs for which they were undertaken

Chapter Summary

- Quality is a serious issue
  - Project quality management includes
    - planning quality management,
    - performing quality assurance,
    - controlling quality
  - Many **tools and techniques** are related to project quality management
  - Quality Cost (five categories)