Information Technology Project Management – Fifth Edition

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Project Planning: Scope and the Work Breakdown Structure

Chapter 5

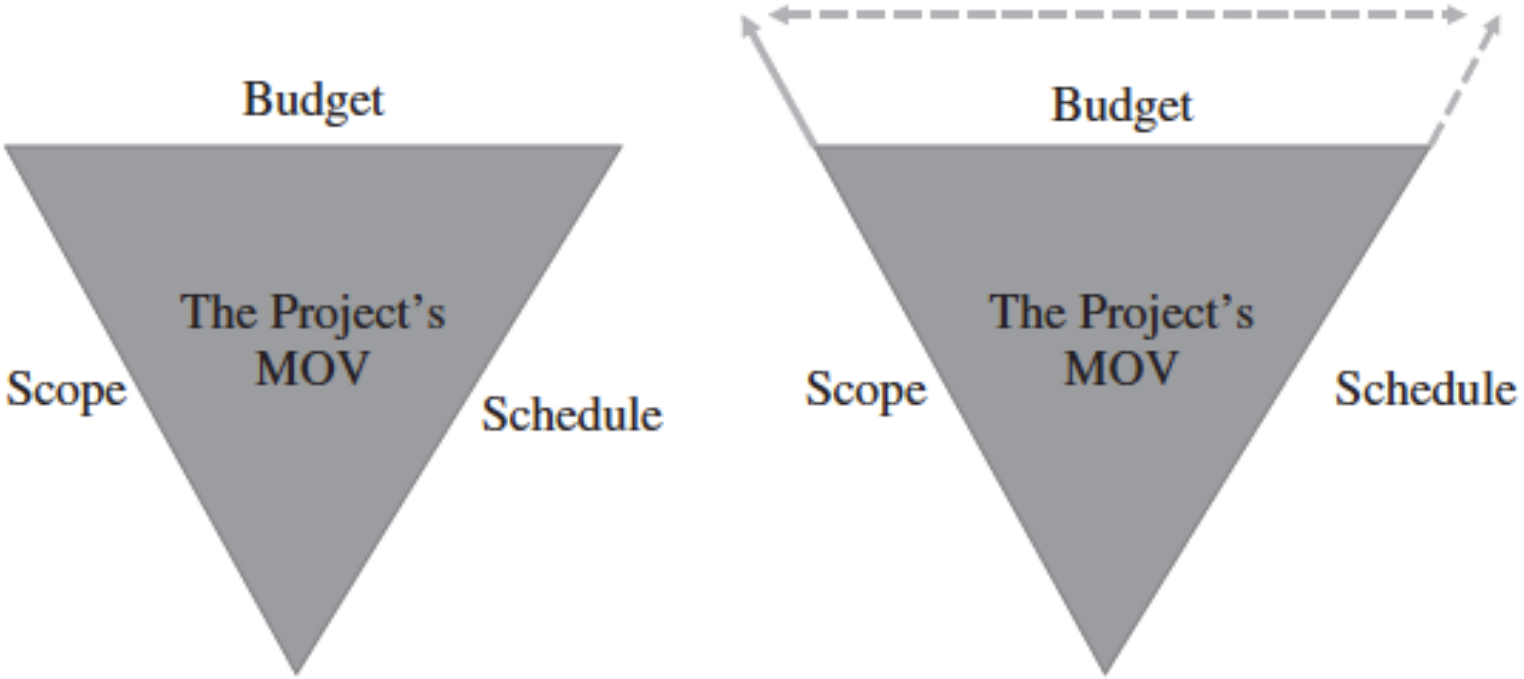
Learning Objectives

- Understand and describe the relationship among scope, schedule, and budget.
- Understand the processes and apply several tools for defining and managing the scope of a project.
- Understand the difference between project scope (i.e. project deliverables) and product scope (i.e. features and functionality of the product or system).
- Develop a Work Breakdown Structure (WBS).
- Differentiate between an deliverable and a milestone.
- Describe and apply several project estimation methods.

Introduction

- **Scope** –
  - defines the work boundaries and deliverables of the project so what needs to get done, gets done – *and only* what needs to get done, gets done.
  - is determined directly by the project's MOV.
  - Defines all the work, activities, and deliverables that the project team much provide for the project to achieve its MOV
- **Work Breakdown Structure** – a project management tool that provides a hierarchical structure that acts as a bridge, or link, between the project's scope and the detailed project plan that will be created.

Figure 5.1 – The Triple Constraint



The project is balanced or "in harmony" when the schedule and budget support the project's scope in order to achieve the MOV.

The project becomes imbalanced when scope increases without adjusting schedule and budget accordingly.

Scope Management Processes

- **Plan Scope Management**
  - Defines and Documents how the project and product scope will be defined, verified, and changed if necessary.
- **Collect Requirements**
  - Defining and documenting the customer, sponsor, or stakeholder needs and expectations. This may be a formal document.
- **Define Scope**
  - A detailed description of the product, service, or information system to be designed, built and implemented. A detailed scope statement defines what work will and will not be part of the project and will serve as a basis for all future project decisions
- **Create the Work Breakdown Structure**
  - The decomposition or dividing of the major project deliverables (i.e., scope) into smaller and more manageable components
- **Validate Scope**
  - Confirmation and formal acceptance that the project's scope is accurate, complete, and supports the project's MOV. The project team and sponsor must agree to all deliverables
- **Control Scope**
  - Ensuring that controls are in place to manage proposed scope changes once the project's scope is set. Must be communicated to all project stakeholders.

Figure 5.2 – Scope Management Plan

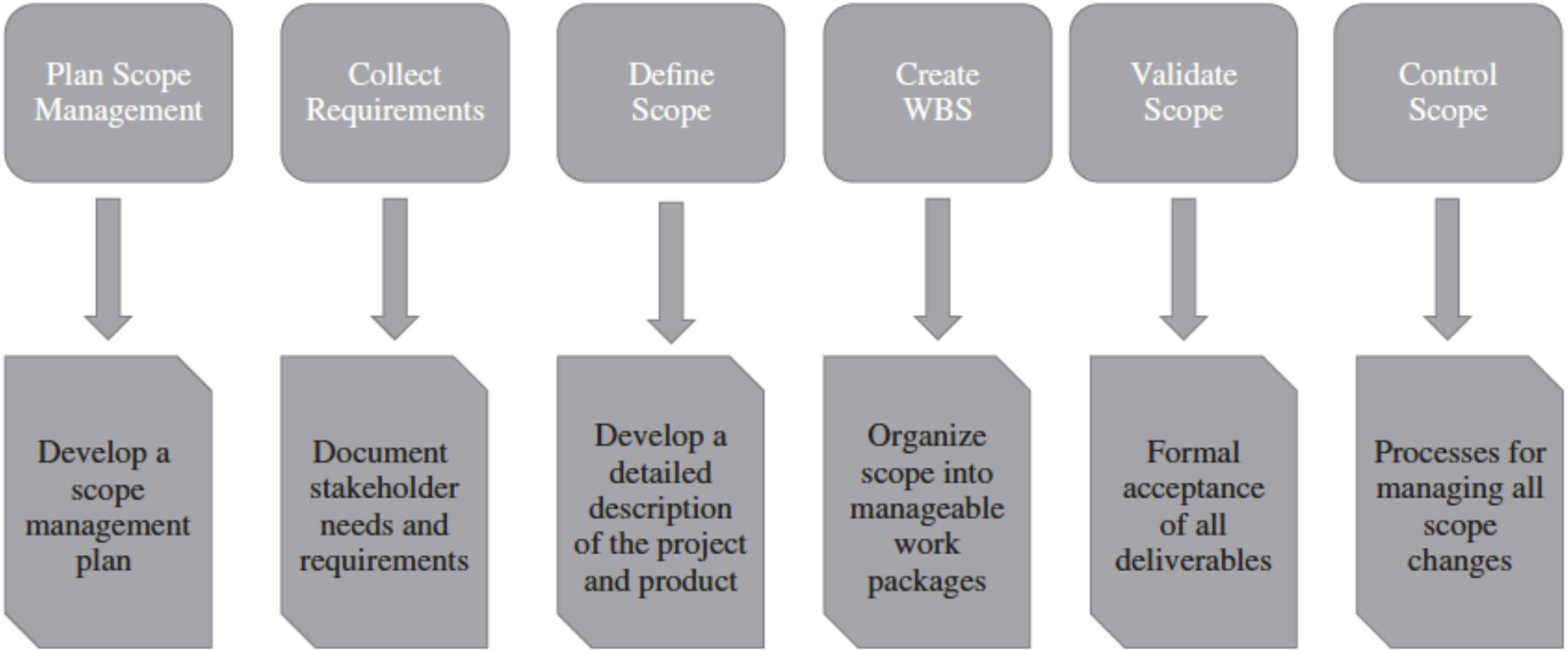
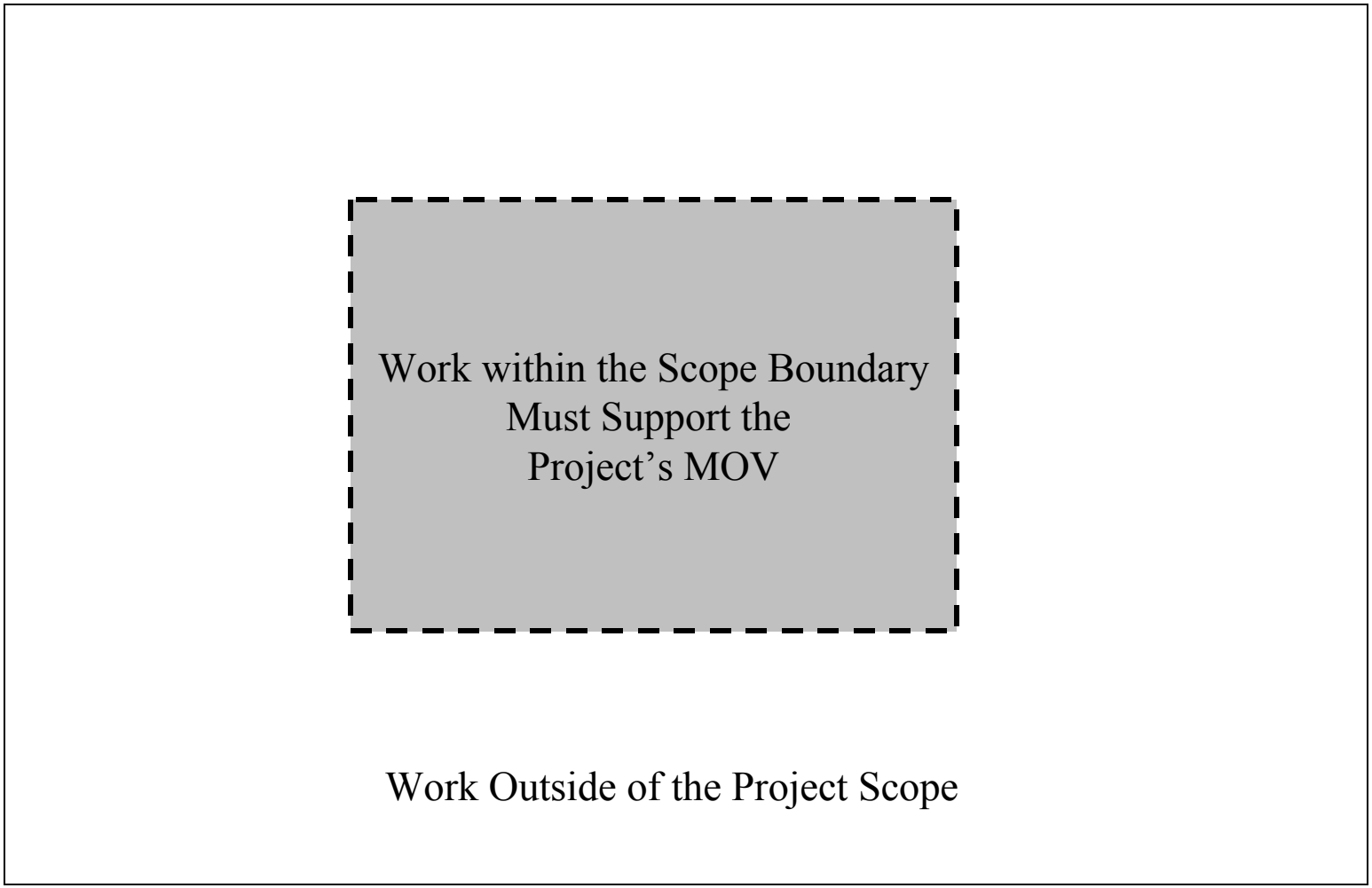


Figure 5.3 – Scope Boundary



Statement of Work (SOW)

- Narrative description of the product, service, or information system.
- For internal projects, this is tied to the business need
- For external projects,
  - this would include specifications, quantities, quality standards, and performance requirements for prospective bidders and
  - The SOW is often included in a document that may be called a request for proposal (RFP), request for information (RFI), or request for bid (RFB).

Scope Statement

A **scope statement** is another way to define the scope boundary; it is a detailed documentation of the sponsor's needs and expectations.

Examples of Scope Statements

1. Develop a proactive electronic commerce strategy that identifies the processes, products and services to be delivered through the World Wide Web.
2. Develop an application system that supports all of the processes, products, and services identified in the electronic commerce strategy.
3. The application system must integrate with the bank's existing enterprise resource planning system.

Scope

- Project-Oriented Scope
  - Support the project management processes defined by the Project Life Cycle (PLC) and the chosen project methodology.
  - Deliverable Structure Chart (Figure 5.4 – DSC) – a tool used by the project manager and team.
- Product-Oriented Scope
  - Specific features and functionality of the application system
  - First cut of requirements definition
  - Use Case Diagram (Figure 5.5) – a system modeling tool used for refining the scope boundary and defining what the system must do.

Out of Scope

1. *Technology and organizational assessment of the current environment*
2. *Customer resource management and data mining components*

Project Scope Definition

- The scope boundary and scope statement provide a useful first step
- The project's scope must now be defined in more detail in terms of specific deliverables that provide a basis for developing the project's work breakdown structure (WBS)
- Tools:
  - Deliverable Definition Table
  - Deliverable Structure Chart
  - Context Level Data Flow Diagram
  - Use Case Diagram

Figure 5.4 – Deliverable Structure Chart

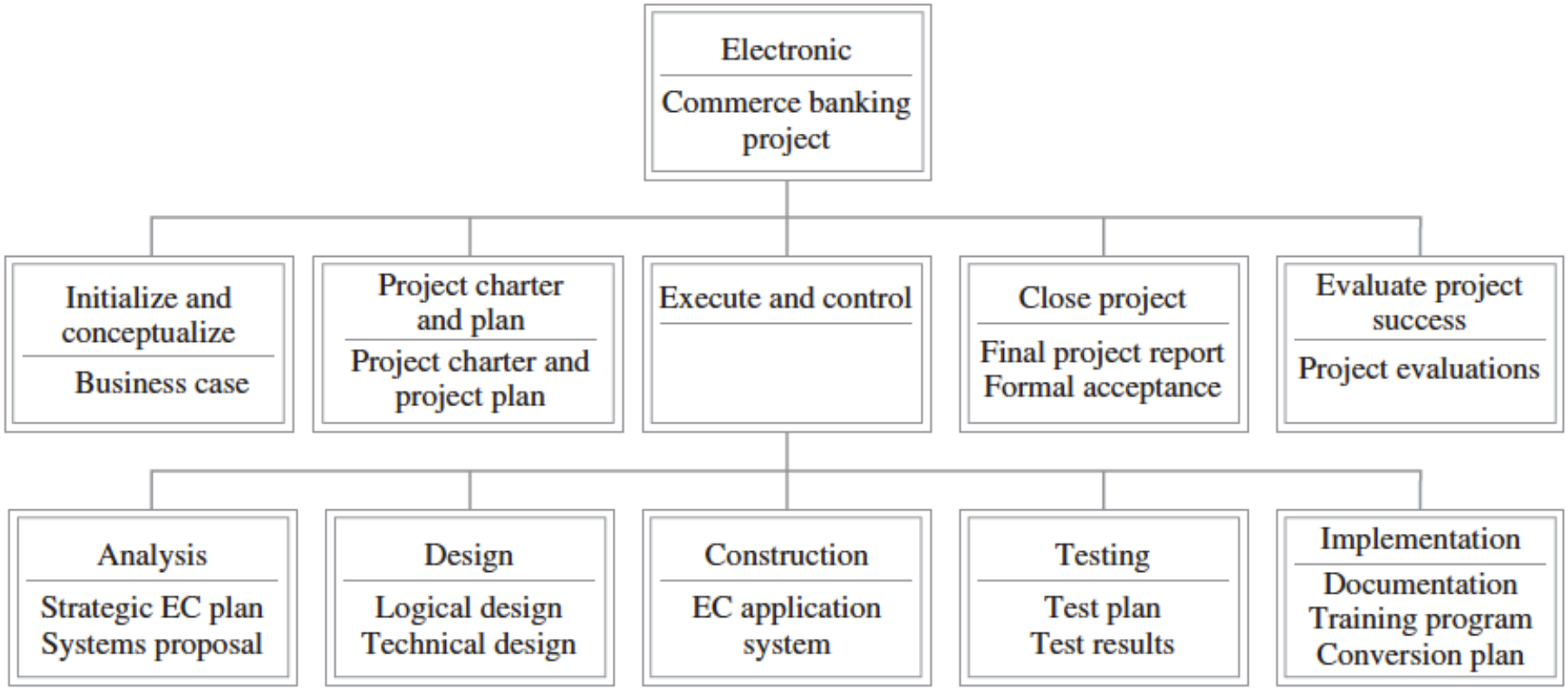
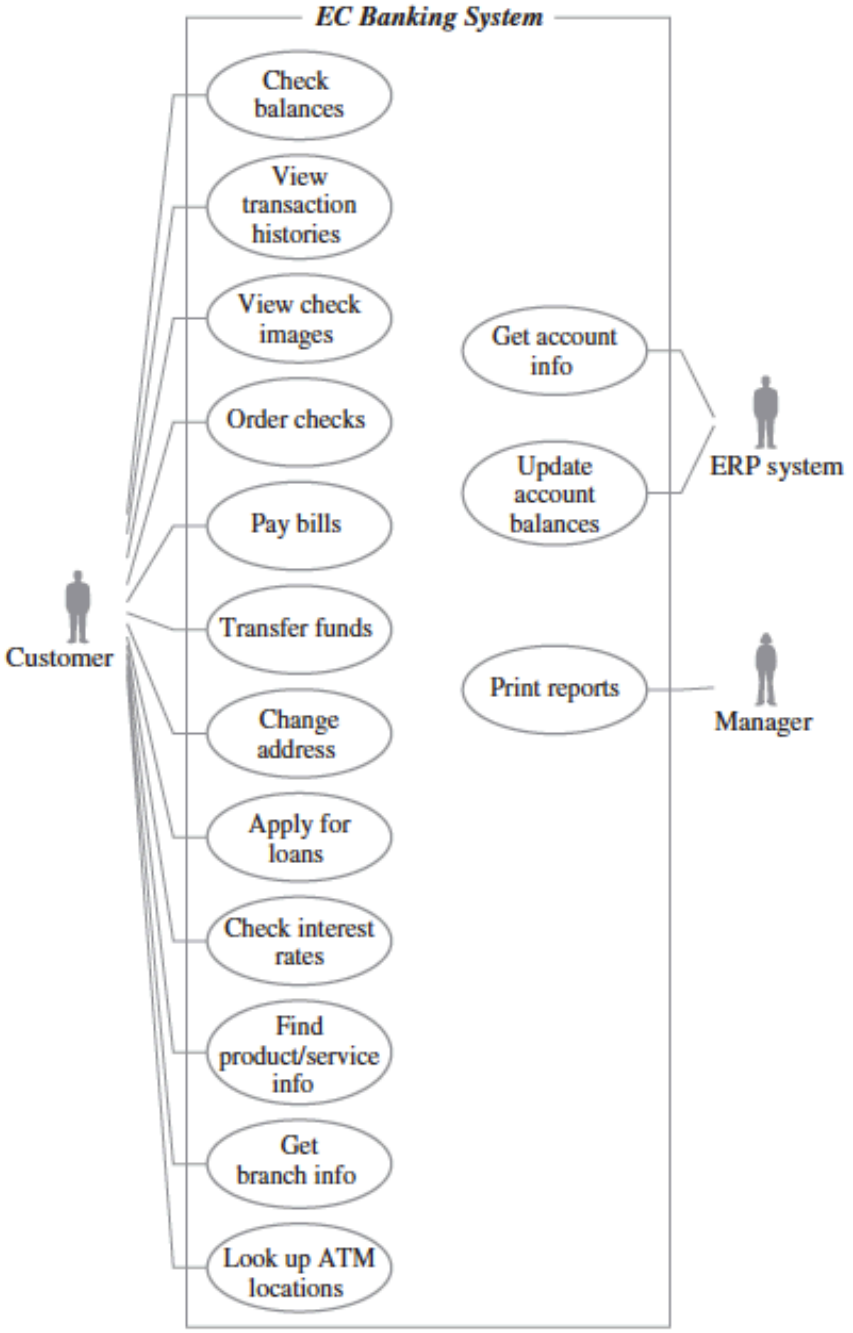


Figure 5.5 – Use Case Diagram



Validate Scope

- **Verification of the MOV**
  - Has the project's MOV been clearly defined and agreed upon?
- **Documentation of All Deliverables**
  - Are the deliverables tangible and verifiable?
  - Do they support the project's MOV?
- **Specification of Quality Standards**
  - Are controls in place to ensure that the work was not only completed but completed to meet specific standards?
- **Identification of Milestones**
  - Are milestones defined for each deliverable?
- **Review and Acceptance**
  - Are both sides clear in their expectations?

Control Scope and Scope Change Control Procedures

- Concerned with managing changes to the project's scope and to ensure that these changes are beneficial when they occur
- Potential Issues:
  - Scope Grope
  - Scope Creep
  - Scope Leap
- Procedures:
  - Scope Change Request Form (Figure 5.6)
  - Scope Change Request Log (Figure 5.7)

Figure 5.6 – Scope Change Request Form

Scope change request form

Requestor name: _____ Request date: _____

Request title: _____ Request number: _____

Request description:

Justification:

Possible alternatives:

Impacts	*Alternative 1*	*Alternative 2*	*Alternative 3*
Scope			
Schedule			
Resources required			
Cost			

Recommendation:

Authorized by ***Date***

_____ _____

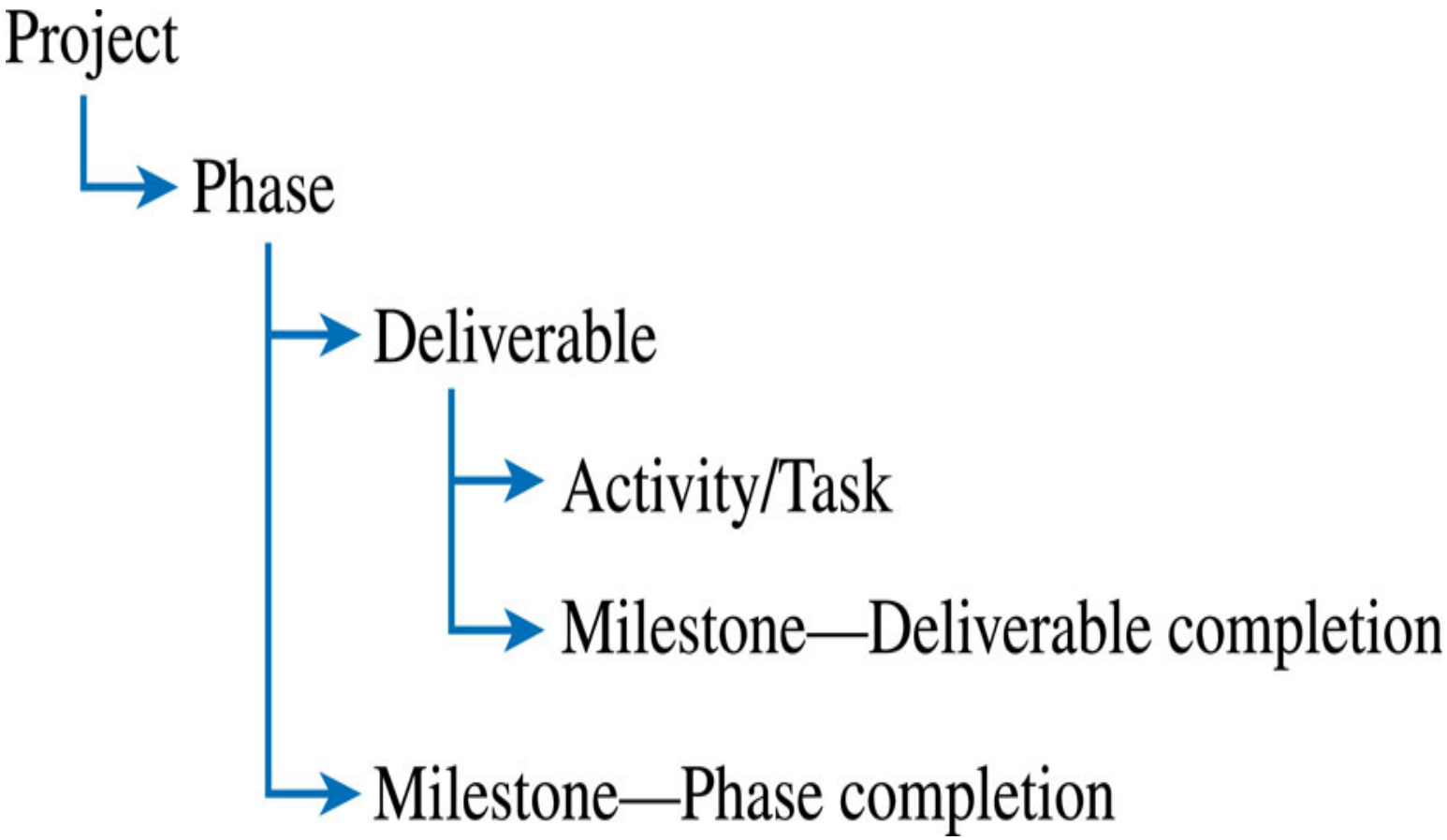
Figure 5.7 – Scope Change Request Log

Request Number	*Request Title*	*Date of Request*	*Requested by*	*Priority (L, M, H)*	*Authority to Approve Request*	*Expected Response Date*	*Scope Change Approved? (Y/N)*

Work Breakdown Structure (WBS)

- The PMBOK® Guide states that the WBS represents a logical decomposition of the work to be performed and focuses on how the product, service, or result is naturally subdivided. It is an outline of what work is to be performed.

Figure 5.8 – Work Package

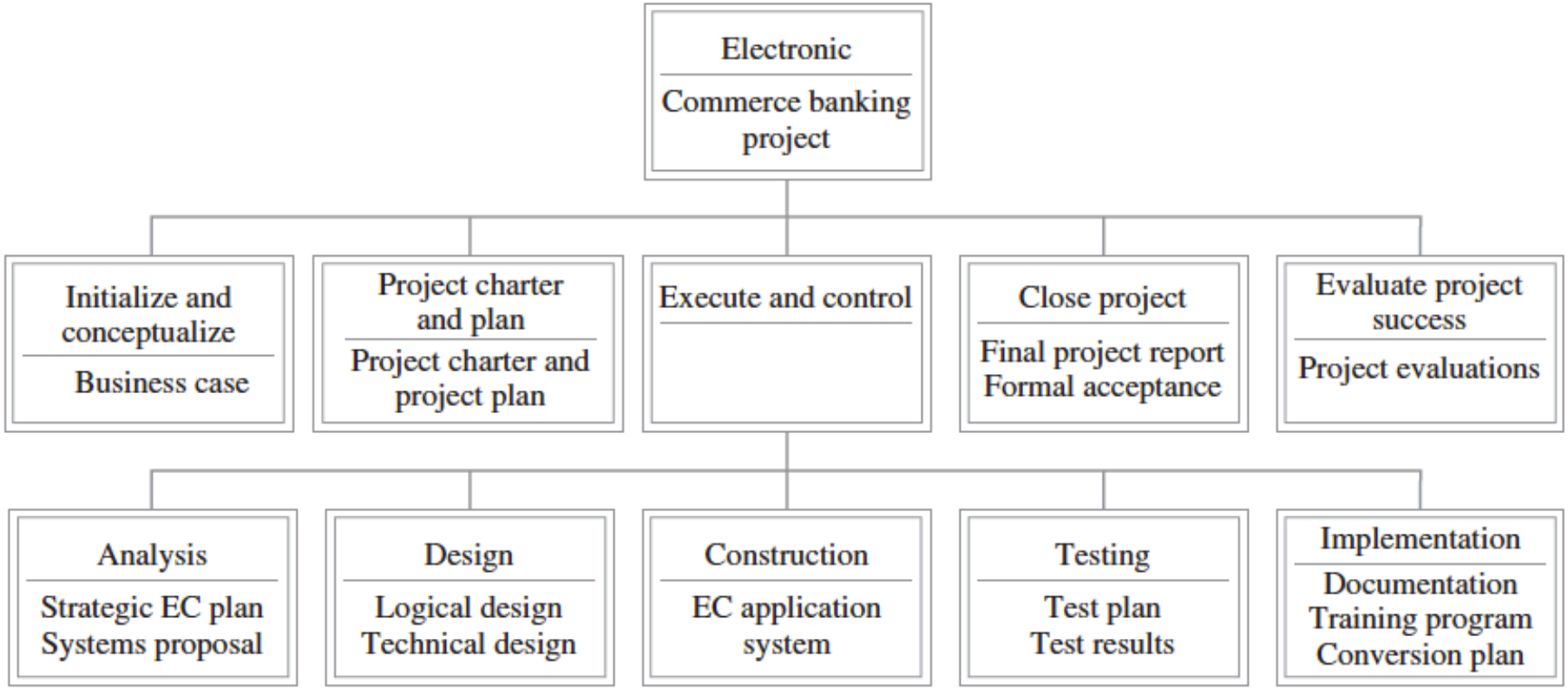


Deliverables versus Milestones

- Deliverables
  - Tangible, verifiable work products
    - Reports, presentations, prototypes, etc.
- Milestones
  - Significant events or achievements
  - Acceptance of deliverables or phase completion
  - Cruxes (proof of concepts)
  - Quality control
  - Keeps team focused

Developing the WBS (Figure 5.4 repeated)

- A work package is developed for each of the phases and deliverables defined in the Deliverable Structure Chart (DSC)



Deliverable: Test Results Report

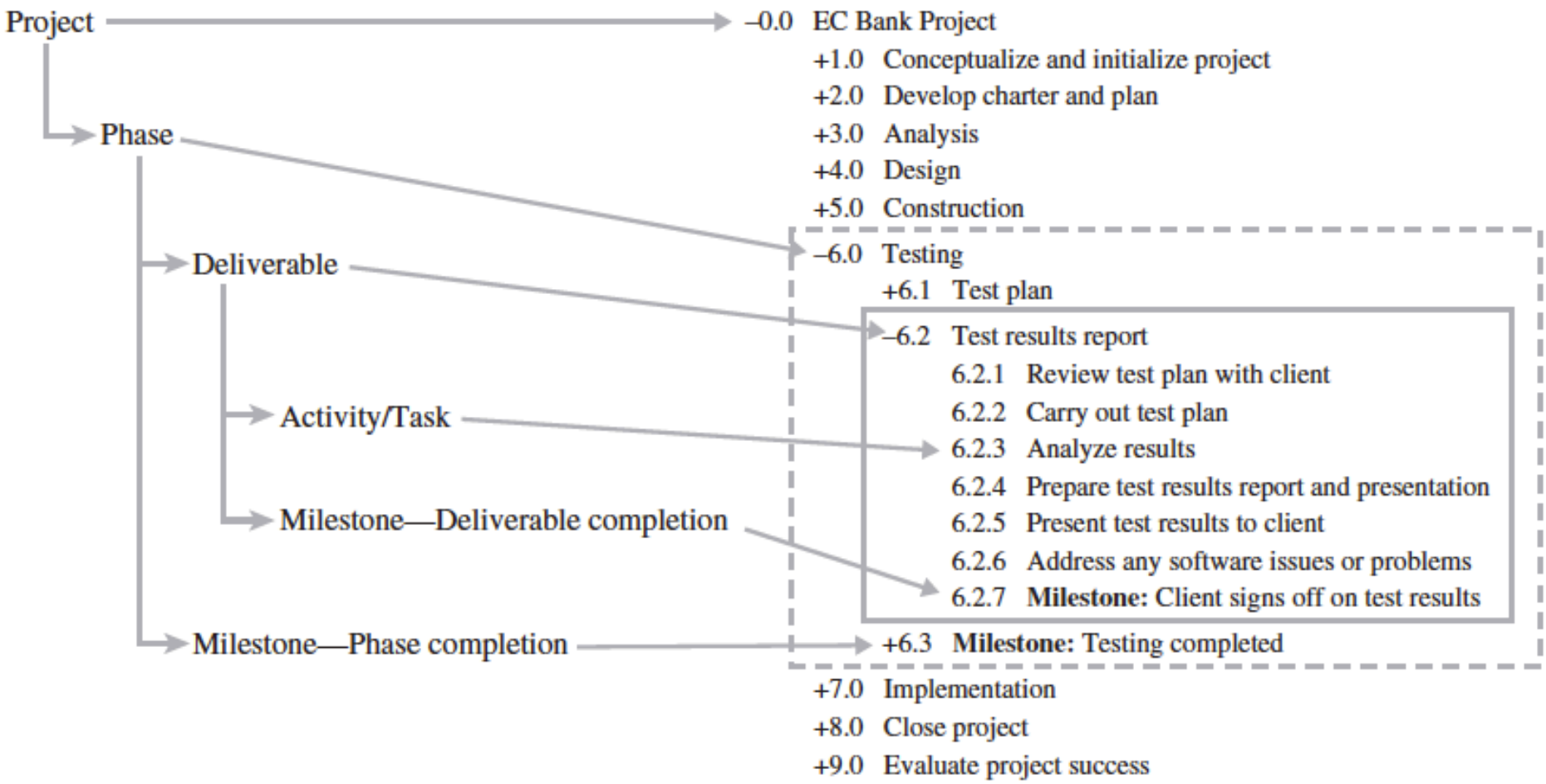
- Logical Activities:
  1. Review the test plan with the client so that key stakeholders are clear as to what will be tested, how the tests will be conducted, and when the tests will be carried out.
  2. Carry out the tests as outlined in the plan.
  3. Once the test results are collected, we need to analyze them.
  4. The results should be summarized in the form of a report and presentation to the client.
  5. If all goes well, the client will sign-off or approve the test results and then we can move on to the implementation phase of the project. If not, then we need to address and fix any problems.

What are the deliverables? Milestones?

Example Work Breakdown Schedule

–0.0 EC Bank Project
- +1.0 Conceptualize & initialize project
- +2.0 Develop charter & plan
- +3.0 Analysis
- +4.0 Design
- +5.0 Construction
- –6.0 Testing
  - +6.1 Test plan
  - –6.2 Test results report
    - 6.2.1 Review test plan with client
    - 6.2.2 Carry out test plan
    - 6.2.3 Analyze results
    - 6.2.4 Prepare test results report and presentation
    - 6.2.5 Present test results to client
    - 6.2.6 Address any software issues or problems
    - 6.2.7 **Milestone:** client signs off on test results
  - +6.3 **Milestone:** testing completed
- +7.0 Implementation
- +8.0 Close project
- +9.0 Evaluate project success

Figure 5.9 – Work Package and Work Breakdown Structure



Things to Keep in Mind When developing the WBS…

- Should support the project's MOV
- Should be "deliverable-oriented"
- The level of detail should support planning and control
- Developing the WBS should involve those who will be doing the work

Estimation Questions

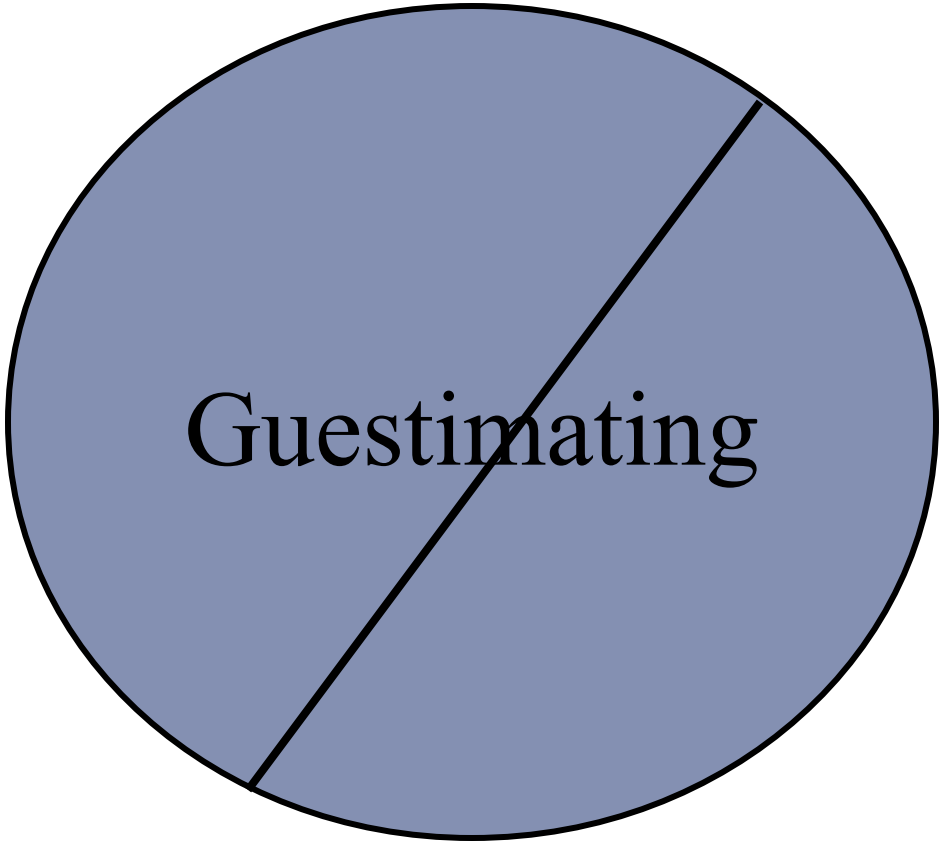
What are you going to estimate?

Where do you start?

How do you estimate?

Estimation Techniques - Traditional Project Management Approaches

- Guesstimating
- Delphi Technique
- Time Boxing
- Top-Down
- Bottom-Up
- Poker Planning



Estimation by guessing or just picking numbers out of the air is not the best way to derive a project's schedule and budget. Unfortunately, many inexperienced project managers tend to **guesstimate, or guess at the estimates**, because it is quick and easy.

Delphi Technique

- Involves multiple, anonymous experts
- Each expert makes an estimate
- Estimates compared
  - If close, can be averaged
  - If not, do another iteration until consensus is reached

Time Boxing

- Often used on Agile projects
- A "box" of time is allocated for a specific activity, task, or deliverable
- Can focus a team if used effectively
- Can demoralize a team if not used effectively

Top-Down

- Top & middle managers determine overall project schedule &/or cost
- Lower level managers are expected to breakdown schedule/budget estimates into specific activities (WBS)

Bottom-Up

- Schedules & budgets are constructed from WBS
- Starts with people who will be doing the work
- Schedules & budgets are the aggregate of detailed activities & costs
- May use *analogous estimation* – developing estimates based on one's opinion that there is a significant similarity between the current project and others.

Poker Planning

- Variation of Delphi Technique
- Uses a deck of cards that represents an estimate in days
- Moderator describes particular task, feature, deliverable, or user story to be estimated.
- Attempts to reach consensus in a few rounds of “play”