

CHAPTER 4:

DEFINING A PROJECT

1




CONTENTS

1. Defining a project


2. Estimating project times and costs

2



DEFINING A PROJECT

3



Defining the Project

- Step 1: Defining the Project Scope
- Step 2: Establishing Project Priorities
- Step 3: Creating the Work Breakdown Structure (WBS)
- Step 4: Integrating the WBS with the Organization
- Step 5: Coding the WBS for the Information System

4

Step 1: Defining the Project Scope

1. Project Scope
 - ❑ A definition of the end result or mission of the project—a product or service for the client/customer—in specific, tangible, and measurable terms.
2. Purpose of the Scope Statement
 - ❑ To clearly define the deliverable(s) for the end user.
 - ❑ To focus the project on successful completion of its goals.
 - ❑ To be used by the project owner and participants as a planning tool and for measuring project success.

5

Project Scope Checklist

1. Project objective
2. Deliverables
3. Milestones
4. Technical requirements
5. Limits and exclusions
6. Reviews with customer



6

Step 2: Establishing Project Priorities

1. Causes of Project Trade-offs
 - ❑ Shifts in the relative importance of criteria related to cost, time, and performance parameters
 - Budget–Cost
 - Schedule–Time
 - Performance–Scope
2. Managing the Priorities of Project Trade-offs
 - ❑ Constrain: a parameter is a fixed requirement.
 - ❑ Enhance: optimizing a parameter over others.
 - ❑ Accept: reducing (or not meeting) a parameter requirement.

7

Project Management Trade-offs

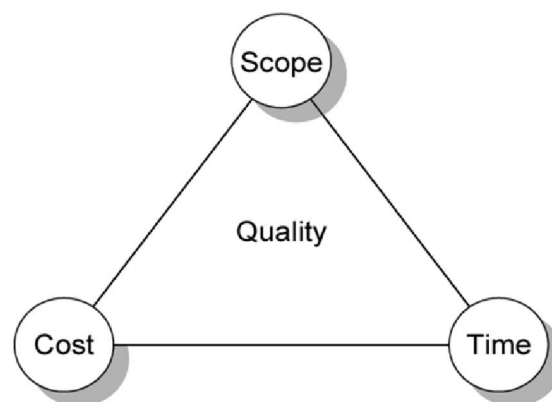
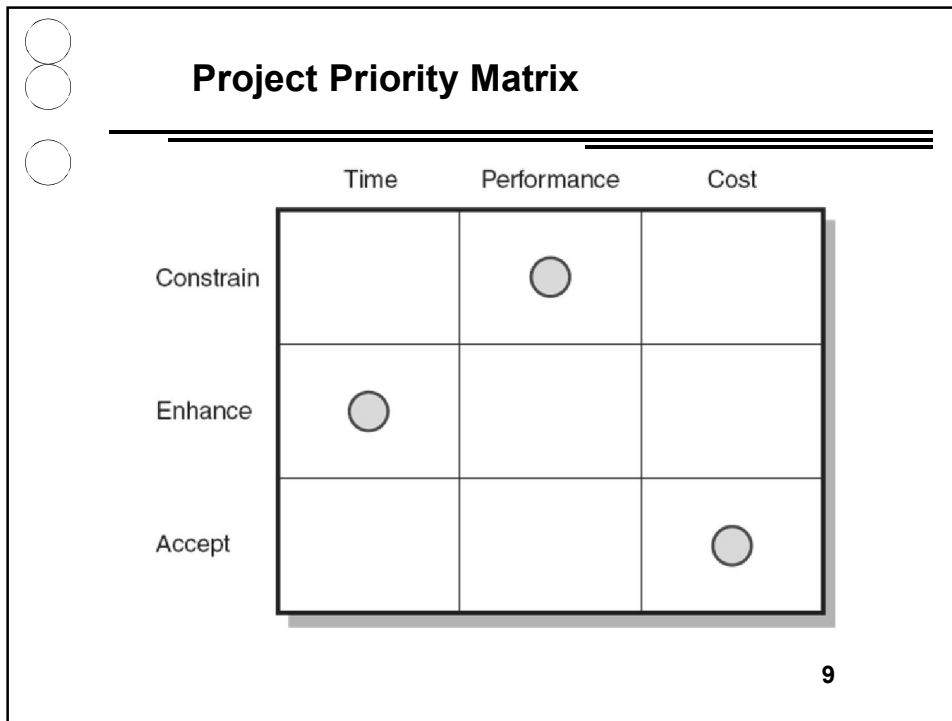


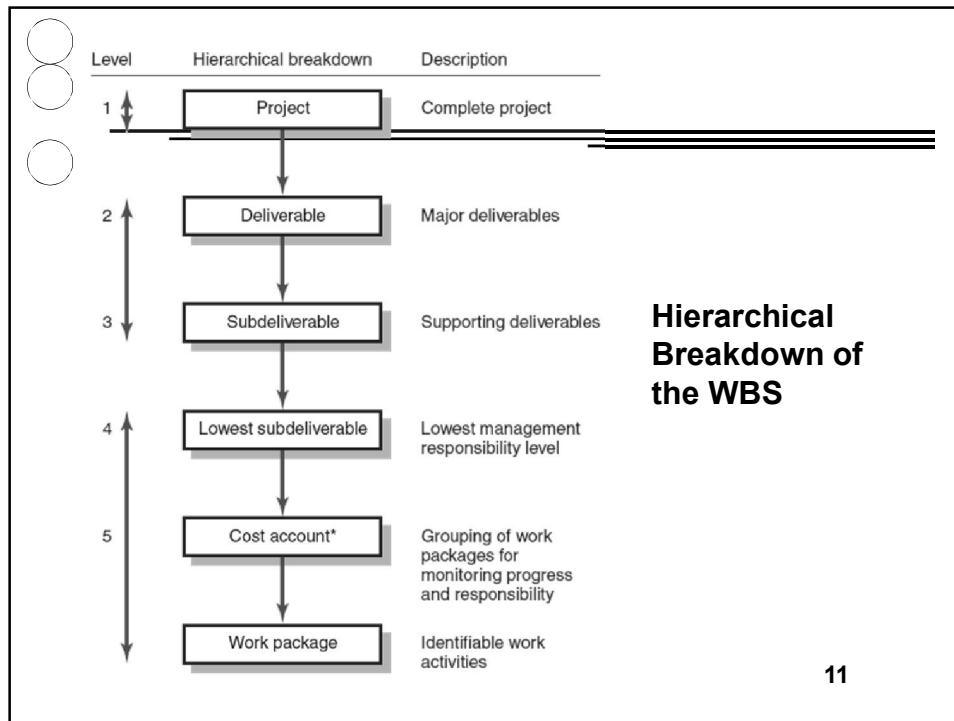
FIGURE 4.1



Step 3: Creating the Work Breakdown Structure

1. Work Breakdown Structure (WBS)
 - An hierarchical outline (map) that identifies the products and work elements involved in a project.
 - Defines the relationship of the final deliverable (the project) to its subdeliverables, and in turn, their relationships to work packages.
 - Best suited for design and build projects that have tangible outcomes rather than process-oriented projects.

10

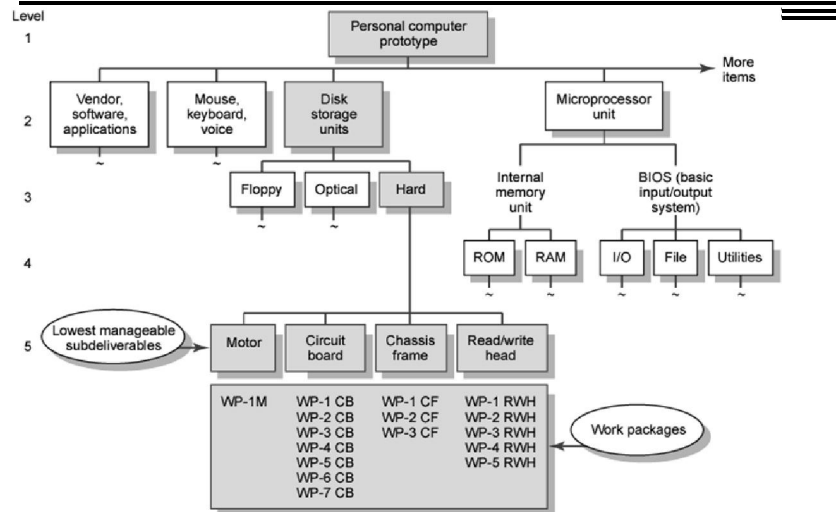


How WBS Helps the Project Manager

1. WBS

- ❑ Helps manage plan, schedule, and budget.
- ❑ Facilitates evaluation of cost, time, and technical performance of the organization on a project.
- ❑ Provides management with information appropriate to each organizational level.
- ❑ Helps in the development of the organization breakdown structure (OBS), which assigns project responsibilities to organizational units and individuals
- ❑ Defines communication channels and assists in coordinating the various project elements.

Work Breakdown Structure



13

Work Packages

1. A work package is the lowest level of the WBS.
 - ❑ It is output-oriented in that it:
 - Defines work (what).
 - Identifies time to complete a work package (how long)
 - Identifies a time-phased budget to complete a work package (cost)
 - Identifies resources needed to complete a work package (how much)
 - Identifies a single person responsible for units of work (who)
 - Identifies monitoring points (milestones) for measuring success.

14

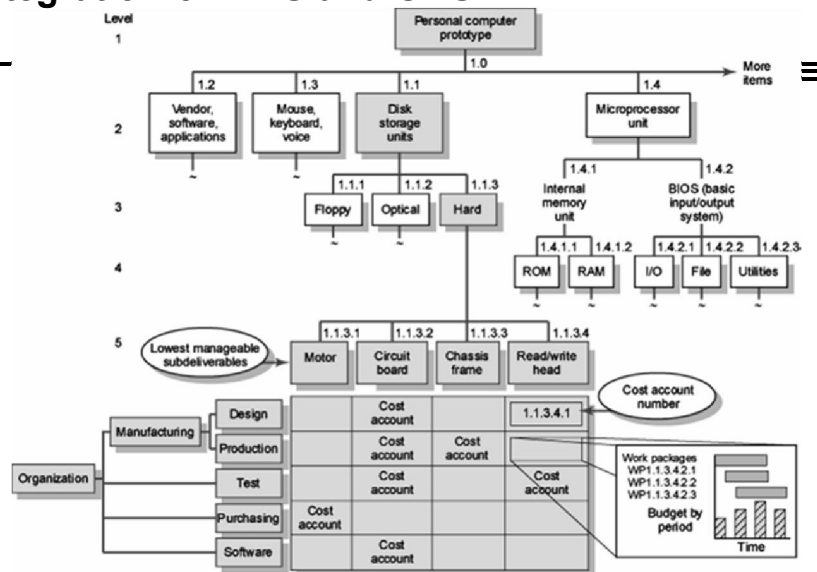
Step 4: Integrating the WBS with the Organization

1. Organizational Breakdown Structure (OBS)

- Depicts how the firm is organized to discharge its work responsibility for a project.
 - Provides a framework to summarize organization work unit performance.
 - Identifies organization units responsible for work packages.
 - Ties the organizational units to cost control accounts.

15

Integration of WBS and OBS



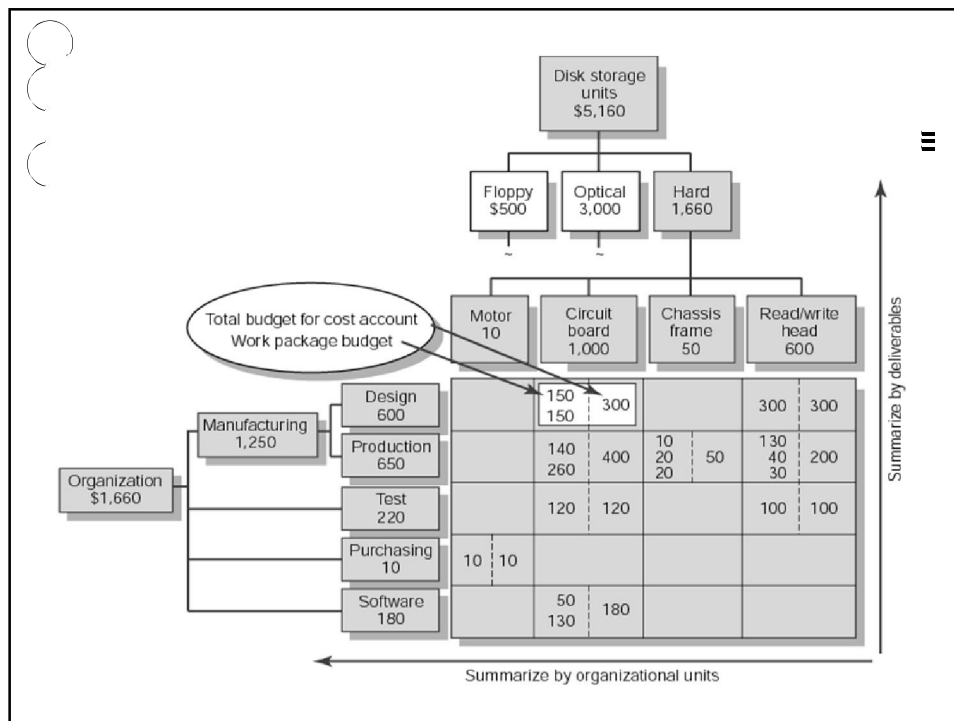
16

Project Roll-up

1. Cost Account

- ❑ The intersection of the WBS and the OBS that is a budgetary control point for work packages.
- ❑ Used to provide a roll-up (summation) of costs incurred over time by a work package across organization units and levels, and by deliverables.

17



Direct Labor Budget Sorted By WBS

Direct Labor Budget			
1.1.3	Hard drive	1,660	
1.1.3.1	Motor	10	
	Purchasing		10
1.1.3.2	Circuit board	1,000	
	Design		300
	Production		400
	Testing		120
	Software		180
1.1.3.3	Chassis frame	50	
	Production		50
1.1.3.4	Read/write head	600	
	Design		300
	Production		200
	Testing		100

19

Direct Labor Budget Sorted by OBS

Direct Labor Budget			
Design		600	
1.1.3.2	Circuit board		300
1.1.3.4	Read/write head		300
Production		650	
1.1.3.2	Circuit board		400
1.1.3.3	Chassis frame		50
1.1.3.4	Read/write head		200
Testing		220	
1.1.3.2	Circuit board		120
1.1.3.4	Read/write head		100
Purchasing		10	
1.1.3.1	Motor		10
Software		180	
1.1.3.2	Circuit board		180
Total		1,660	

20

Step 5: Coding the WBS for the Information System

1.

WBS Coding System

- Defines:
 - Levels and elements of the WBS
 - Organization elements
 - Work packages
 - Budget and cost information
- Allows reports to be consolidated at any level in the organization structure



21

1.

ID	Task Name
1	1 Computer project
2	1.1 Disk Storage units
3	1.1.1 Floppy
4	1.1.2 Optical
5	1.1.3 Hard
6	1.1.3.1 Motor
7	1.1.3.1.1 Sourcing work package
8	1.1.3.1.2*
9	1.1.3.1.3*
10	1.1.3.1.4*
11	1.1.3.2 Read/write head
12	1.1.3.2.1 Cost account
13	1.1.3.2.2 Cost account
14	1.1.3.2.3 WP
15	1.1.3.2.4 WP
16	1.1.3.2.5 WP
17	1.1.3.2.6 Cost account
18	1.1.3.2.7*
19	1.1.3.2.8*
20	1.1.3.2.9*

WBS Coding

22

Responsibility Matrices

1. Responsibility Matrix (RM)

- ❑ Also called a linear responsibility chart.
- ❑ Summarizes the tasks to be accomplished and who is responsible for what on the project.
 - Lists project activities and participants.
 - Clarifies critical interfaces between units and individuals that need coordination.
 - Provide an means for all participants to view their responsibilities and agree on their assignments.
 - Clarifies the extent or type of authority that can be exercised by each participant.

23

Responsibility Matrix for a Market Research Project

Project Team					
Task	Richard	Dan	Dave	Linda	Elizabeth
Identify target customers	R	S		S	
Develop draft questionnaire	R	S	S		
Pilot-test questionnaire		R		S	
Finalize questionnaire	R	S	S	S	
Print questionnaire					R
Prepare mailing labels					R
Mail questionnaires					R
Receive and monitor returned questionnaires				R	S
Input response data			R		
Analyze results		R	S	S	
Prepare draft of report	S	R	S	S	
Prepare final report	R		S		

R = Responsible
S = Supports/assists

24

Responsibility Matrix for the Conveyor Belt Project

Deliverables	Organization							
	Design	Development	Documentation	Assembly	Testing	Purchasing	Quality Assur.	Manufacturing
Architectural design	1	2			2		3	3
Hardware specifications	2	1				2	3	
Kernel specifications	1	3						3
Utilities specification	2	1			3			
Hardware design	1			3		3		3
Disk drivers	3	1	2					
Memory management	1	3			3			
Operating system documentation	2	2	1					3
Prototypes	5		4	1	3	3	3	4
Integrated acceptance test	5	2	2		1		5	5

1 Responsible
2 Support
3 Consult
4 Notification
5 Approval

25

ESTIMATING PROJECT TIMES AND COSTS

26



Estimating Projects

1. Estimating

- ❑ The process of forecasting or approximating the time and cost of completing project deliverables.
- ❑ The task of balancing the expectations of stakeholders and the need for control while the project is implemented

2. Types of Estimates

- ❑ Top-down (macro) estimates: analogy, group consensus, or mathematical relationships
- ❑ Bottom-up (micro) estimates: estimates of elements of the work breakdown structure

27



Why Estimating Time and Cost Are Important

- Estimates are needed to support good decisions.
- Estimates are needed to schedule work.
- Estimates are needed to determine how long the project should take and its cost.
- Estimates are needed to determine whether the project is worth doing.
- Estimates are needed to develop cash flow needs.
- Estimates are needed to determine how well the project is progressing.
- Estimates are needed to develop time-phased budgets and establish the project baseline.

28

Estimating Guidelines for Times, Costs, and Resources

1. Have people familiar with the tasks make the estimate.
2. Use several people to make estimates.
3. Base estimates on normal conditions, efficient methods, and a normal level of resources.
4. Use consistent time units in estimating task times.
5. Treat each task as independent, don't aggregate.
6. Don't make allowances for contingencies.
7. Adding a risk assessment helps avoid surprises to stakeholders.

29

Macro versus Micro Estimating

Conditions for Preferring Top-Down or Bottom-up Time and Cost Estimates

Condition	Macro Estimates	Micro Estimates
Strategic decision making	X	
Cost and time important		X
High uncertainty	X	
Internal, small project	X	
Fixed-price contract		X
Customer wants details		X
Unstable scope	X	

30

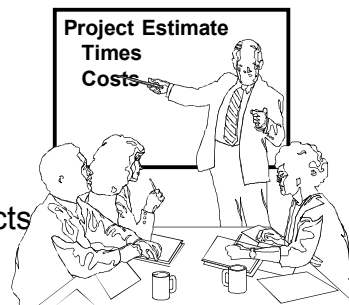
Estimating Projects: Preferred Approach

1. Make rough top-down estimates.
2. Develop the WBS/OBS.
3. Make bottom-up estimates.
4. Develop schedules and budgets.
5. Reconcile differences between top-down and bottom-up estimates

31

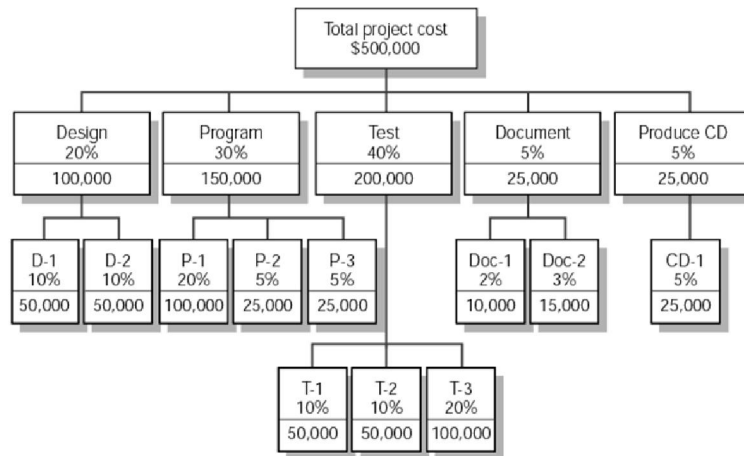
Methods for Estimating Project Times and Costs

1. Macro (Top-down) Approaches
 - ❑ Consensus methods
 - ❑ Ratio methods
 - ❑ Apportion method
 - ❑ Function point methods for software and system projects



32

Apportion Method of Allocating Project Costs Using the Work Breakdown Structure



33

Simplified Basic Function Point Count Process for a Prospective Project or Deliverable

Element	Complexity Weighting			Total
	Low	Average	High	
Number of <i>inputs</i>	_____ × 2 +	_____ × 3 +	_____ × 4	= _____
Number of <i>outputs</i>	_____ × 3 +	_____ × 6 +	_____ × 9	= _____
Number of <i>inquiries</i>	_____ × 2 +	_____ × 4 +	_____ × 6	= _____
Number of <i>files</i>	_____ × 5 +	_____ × 8 +	_____ × 12	= _____
Number of <i>interfaces</i>	_____ × 5 +	_____ × 10 +	_____ × 15	= _____

34 TABLE 5.2

Example: Function Point Count Method

Software Project 13: Patient Admitting and Billing

15	Inputs	Rated complexity as low	(2)
5	Outputs	Rated complexity as average	(6)
10	Inquiries	Rated complexity as average	(4)
30	Files	Rated complexity as high	(12)
20	Interfaces	Rated complexity as average	(10)

Application of Complexity Factor

Element	Count	Low	Average	High	Total
Inputs	15	$\times 2$			= 30
Outputs	5		$\times 6$		= 30
Inquiries	10		$\times 4$		= 40
Files	30			$\times 12$	= 360
Interfaces	20		$\times 10$		= 200
				Total	660

35

Methods for Estimating Project Times and Costs

1. Micro (Bottom-up) Approaches
 - ❑ Template method
 - ❑ Parametric Procedures Applied to Specific Tasks
 - ❑ Detailed Estimates for the WBS Work Packages
 - ❑ Phase Estimating: A Hybrid



36

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Types of Costs

1. **Direct Costs**
 - ❑ Costs that are clearly chargeable to a specific work package.
 - Labor, materials, equipment, and other
2. **Direct (Project) Overhead Costs**
 - ❑ Costs incurred that are directly tied to an identifiable project deliverable or work package.
 - Salary, rents, supplies, specialized machinery
3. **General and Administrative Overhead Costs**
 - ❑ Organization costs indirectly linked to a specific package that are apportioned to the project

39

Contract Bid Summary Costs

Direct costs	\$80,000
Direct overhead	\$20,000
G&A overhead (20%)	\$20,000
Profit (20%)	\$24,000
Total bid	\$144,000

40