

CTIS411

Senior Project I

**Project Scope, Stakeholder and
Risk management.**

PMBok Core Concepts

- **Identify Stakeholders (P M B o K 13.1)**
- **Plan Stakeholder Management (P M B o K 13.2)**
- **Manage Stakeholder Engagement (P M B o K 13.3)**
- **Develop Project Charter (P M B o K 4.1)**
- **Plan Scope Management (P M B o K 5.1)**
- **Collect Requirements (P M B o K 5.2)**
- **Define Scope (P M B o K 5.3)**
- **Create W B S (P M B o K 5.4)**
- **Validate Scope (P M B o K 5.5)**
- **Control Scope (P M B o K 5.6)**
- **Plan Risk Management (P M B o K 11.1)**
- **Identify Risks (P M B o K 11.2)**
- **Perform Qualitative Risk Analysis (P M B o K 11.3)**
- **Perform Quantitative Risk Analysis (P M B o K 11.4)**
- **Plan Risk Responses (P M B o K 11.5)**
- **Control Risks (P M B o K 11.6)**

Stakeholder Management

Stakeholder analysis is a useful tool for demonstrating some of the seemingly irresolvable conflicts that occur through the planned creation and introduction of new projects.

Project stakeholders are defined as all individuals or groups who have an active stake in the project and can potentially impact, either positively or negatively, its development.

Identifying Project Stakeholders

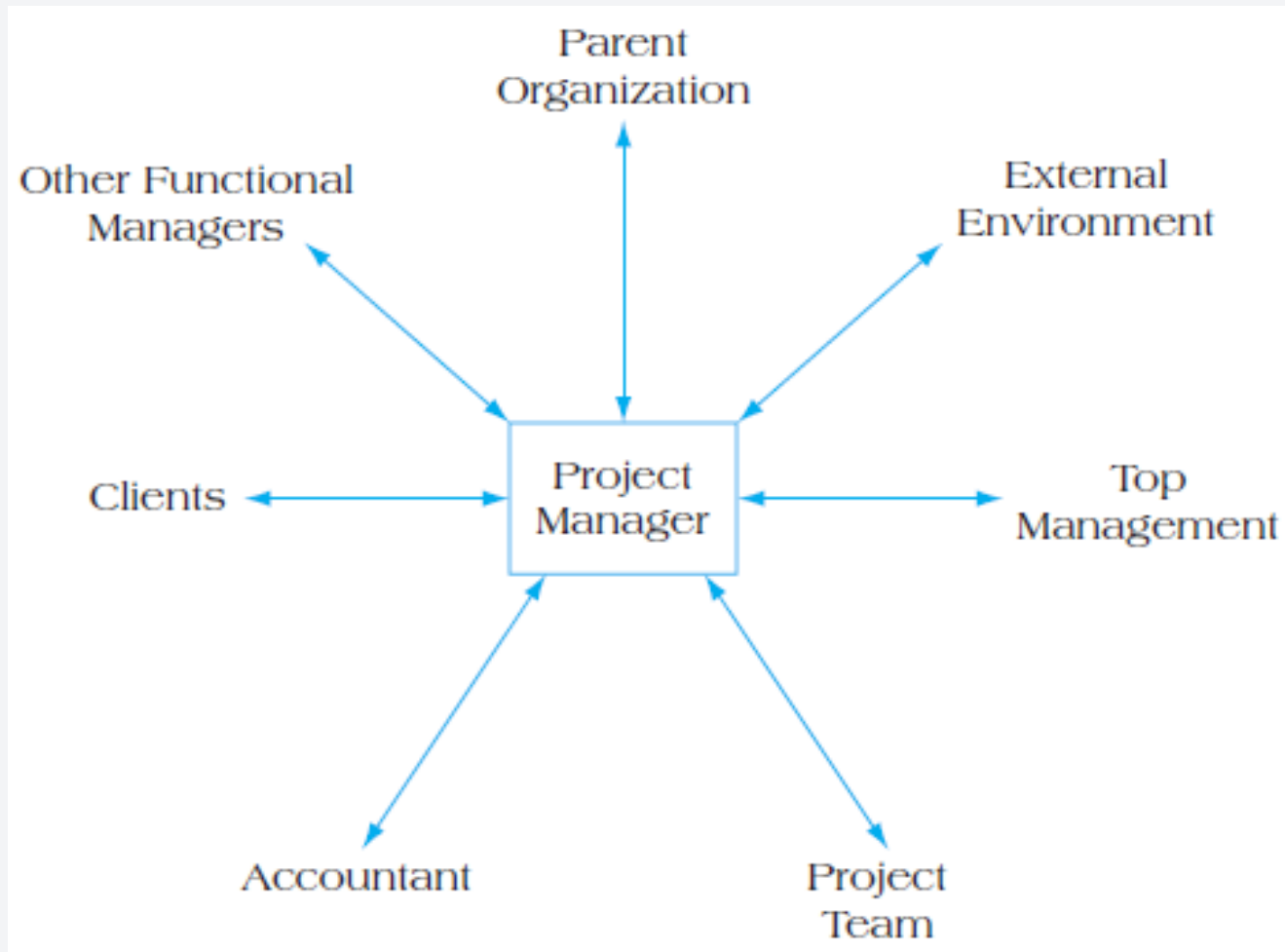
Internal Stakeholders

- Top management
- Accountant
- Other functional managers
- Project team members

External Stakeholders

- Clients
- Competitors
- Suppliers
- Environmental, political, consumer, and other intervener groups

Figure 2.3 Project Stakeholder Relationships



Managing Stakeholders

1. Assess the environment.
2. Identify the goals of the principal actors.
3. Assess your own capabilities.
4. Define the problem.
5. Develop solutions.
6. Test and refine the solutions.

Project Scope

Project scope is **everything about a project**—work content as well as expected outcomes.

Scope management is the function of **controlling a project** in terms of its goals and objectives and consists of:

1. Conceptual development
2. Scope statement
3. Work authorization
4. Scope reporting
5. Control systems
6. Project closeout

Conceptual Development

The **process** that addresses **project objectives** by finding the best ways to meet them.

Key steps in information development:

- Problem or need statement
- Requirements gathering
- Information gathering
- Constraints
- Alternative analysis
- Project objectives
- Business case

Problem or Need Statement

- Scope management for a project begins with a statement of goals: why there is a need in search of a solution, what the underlying problem is, and what the project intends to do.

Requirements Gathering

- Requirements are the demands, needs, and specifications for a product (project outcome) **as outlined by project stakeholders**. It is the list of customer needs. Once a problem has been articulated (where we are now), the next step is to determine—in the words of the customer—where we wish to be. There can be many different types of requirements that an organization collects from a potential customer, including (1) product-related requirements— what features the customer desires the project to possess, (2) quality requirements— the absolute minimum expectations for overall project quality, and (3) performance requirements—the expectations for how well the project performs or the standards it maintains.

- **It is critical that during requirements gathering, project teams do not overtly or unintentionally substitute their own interpretations for those of the customer.** Many project organizations in the IT industry, for example, consider themselves the experts on what new software can do and the ways in which a customer would be expected to use it. In overestimating their own role in requirements gathering, these organizations run the very real risk of creating systems that they imagine customers must have when in reality, they are either not useful or are so overdesigned that customers only use them to the most limited degree.

Information Gathering

- Research to gather all relevant data for the project is the next step. A project can be effectively initiated only when the project manager has a clear understanding of the current state of affairs—specific target dates, alternative supplier options, degree of top management support for the project, and so forth. At any step along the way, project managers should take care that they have not limited their information search.

Constraints

- In light of the goal statement, project managers must understand **any restrictions that may affect project development. Time constraints, budget shrinkages, and client demands can all become** serious constraints on project development.

Alternative Analysis

- Problems usually offer alternative methods for solution. In project management, alternative analysis consists of first clearly understanding the nature of the problem statement and then working to generate alternative solutions. This process serves two functions: it provides the team with a clearer understanding of the project's characteristics, and it offers a choice of approaches for addressing how the project should be undertaken. It may be as a result of alternative analysis that an innovative or novel project development alternative suggests itself. Alternative analysis prevents a firm from initiating a project without first conducting sufficient screening for more efficient or effective options.

Project Objectives

- Conceptual development concludes with a clear statement of the final objectives for the project in terms of outputs, required resources, and timing. All steps in the conceptual development process work together as a system to ultimately affect the outcome. When each step is well done, the project objectives will logically follow from the analysis

Business Case

- The **business case** is the organization's justification for committing to the project. Whenever a company intends to commit capital or its resources to a project, it should be clearly in support of a demonstrable business need.

Scope Statement

1. Establish project **goal criteria** to include:
 - a. cost
 - b. schedule
 - c. performance
 - d. deliverables
 - e. review and approval "gates"
2. Develop **management plan** for project
3. Establish a **Work Breakdown Structure**
4. Create a **scope baseline**

Work Breakdown Structure (WBS)

The WBS is a **hierarchical decomposition** of the total scope of work to be carried out by the project team to accomplish the project objectives and create the project deliverables. Each deliverable is decomposed, or broken down, into specific “bite-sized” pieces representing work to be completed.

Work Breakdown Structure Purpose

WBS serves six main purposes:

1. Echoes project objectives
2. Organization chart for the project
3. Creates logic for tracking costs, schedule, and performance specifications
4. Communicates project status
5. Improves project communication
6. Demonstrates control structure

WBS Hierarchy

- The logic of hierarchy for the WBS follows this form:

Level	WBS Term	Description
Level 1 (Highest)	Project	The overall project under development
Level 2	Deliverable	The major project components
Level 3	Subdeliverable	Supporting deliverables
Level 4 (Lowest)	Work package	Individual project activities

Breakdown	Description	WBS	Code
IT Installation Project			1.0
Deliverable 1	Match IT to organizational tasks and problems		1.1
WP 1	Conduct problem analysis	1.1.1	
WP 2	Develop information on IT technology	1.1.2	
Deliverable 2	Identify IT user needs		1.2
WP 1	Interview potential users	1.2.1	
WP 2	Develop presentation of IT benefits	1.2.2	
WP 3	Gain user "buy-in" to system	1.2.3	
Deliverable 3	Prepare informal proposal		1.3
WP 1	Develop cost/benefit information	1.3.1	
WP 2	Gain top management support	1.3.2	
Deliverable 4	Seek and hire IT consultant		1.4
WP 1	Delegate members as search committee	1.4.1	
WP 2	Develop selection criteria	1.4.2	
WP 3	Interview and select consultant	1.4.3	
Deliverable 5	Seek staff and departmental support for IT		1.5
Deliverable 6	Identify the appropriate location for IT		1.6
WP 1	Consult with physical plant engineers	1.6.1	
WP 2	Identify possible alternative sites	1.6.2	
WP 3	Secure site approval	1.6.3	
Deliverable 7	Prepare a formal proposal for IT introduction		1.7
Deliverable 8	Solicit RFPs from vendors		1.8
WP 1	Develop criteria for decision	1.8.1	
WP 2	Contact appropriate vendors	1.8.2	
WP 3	Select winner(s) and inform losers	1.8.3	
Deliverable 9	Conduct a pilot project (or series of projects)		1.9
Deliverable 10	Enter a contract for purchase		1.10
Deliverable 11	Adopt and use IT technology		1.11
WP 1	Initiate employee training sessions	1.11.1	
WP 2	Develop monitoring system for technical problems	1.11.2	

FIGURE 5.4 Example of a Project WBS

Defining a Work Package

- Lowest level in WBS
- Deliverable result
- One owner
- Miniature projects
- Milestones
- Fits organization
- Trackable

Project Task Description Form

Task Identification

Project Name: IT Installation Project Code: IS02 Project Manager: Williams

WP Name: Delegate members as search committee

WP Code: 1.4.1 WP Owner: Susan Wilson

Deliverables: Assignment of personnel to IT vendor search committee

Revision no.: 3 Date: 10/22/12 Previous revision: 2 (on file)

Resources Required

Labor		Other Resources		
Type	Labor Days	Type	Quantity	Cost
Systems manager	5	Software A	1	\$15,000
Senior programmer	3	Facility	N/A	
Hardware technician	2	Equipment	1	\$500
Procurement manager	3	Other	N/A	
Systems engineer	5			

Required prerequisites: Deliverables 1.1, 1.2, and 1.3 (on file)

Acceptance tests: None required

Number of working days required to complete task: 5

Possible risk events, which may impair the successful completion of the task: _____

TO BE COMPLETED AFTER SCHEDULING THE PROJECT:

Earliest start on the task: 1/15/13 Earliest finish on the task: 2/15/13

Review meeting according to milestones:

Name of milestone	Deliverables	Meeting date	Participants
Identify IT user needs	IT work requirements	8/31/12	Wilson, Boyd, Shaw
_____	_____	_____	_____
_____	_____	_____	_____

Design approval of the task:

Task Owner: Sue Wilson Signature: _____ Date: _____

Customer contact: Stu Barnes Signature: _____ Date: _____

Project Manager: Bob Williams Signature: _____ Date: _____

Figure 5.3 Partial Work Breakdown Structure

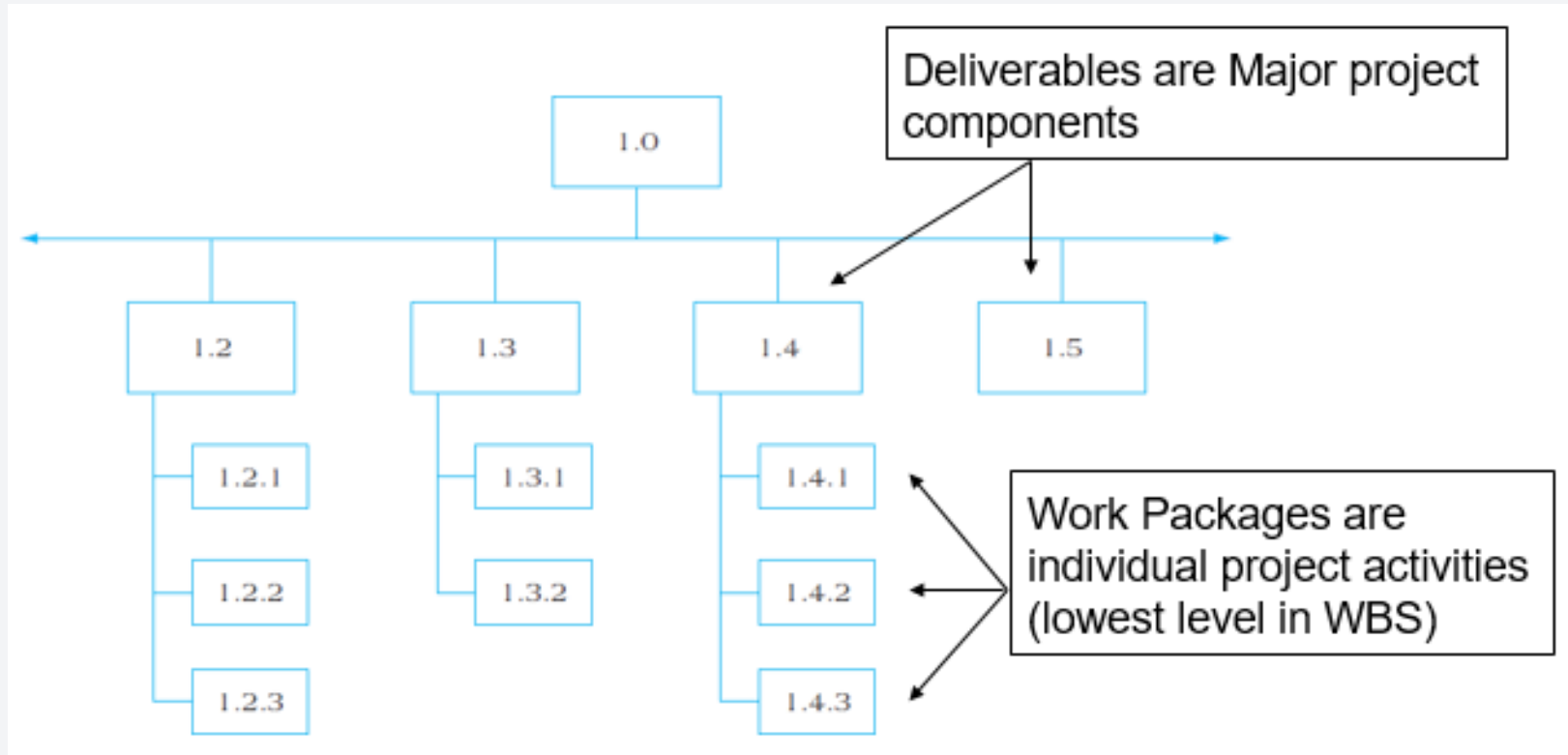


Figure 5.6 Sample WBS Development Using MS Project 2016

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Organizational Breakdown Structure

Organizational Breakdown Structure (OBS) allows

- work definition
- owner assignment of work packages
- budget assignment to departments

OBS links cost, activity, and responsibility.

Figure 5.7 The Intersection of the WBS and OBS

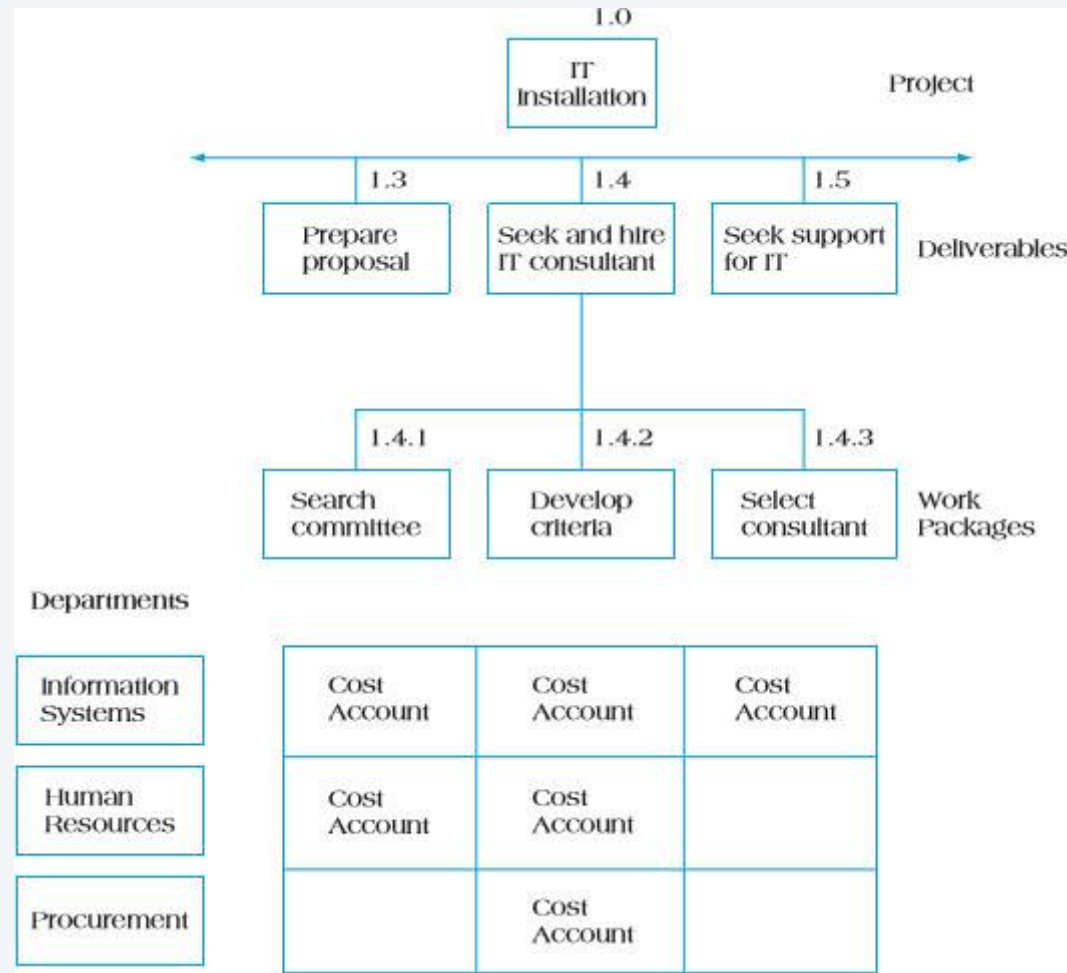


Figure 5.9 Cost Account Rollup Using OBS

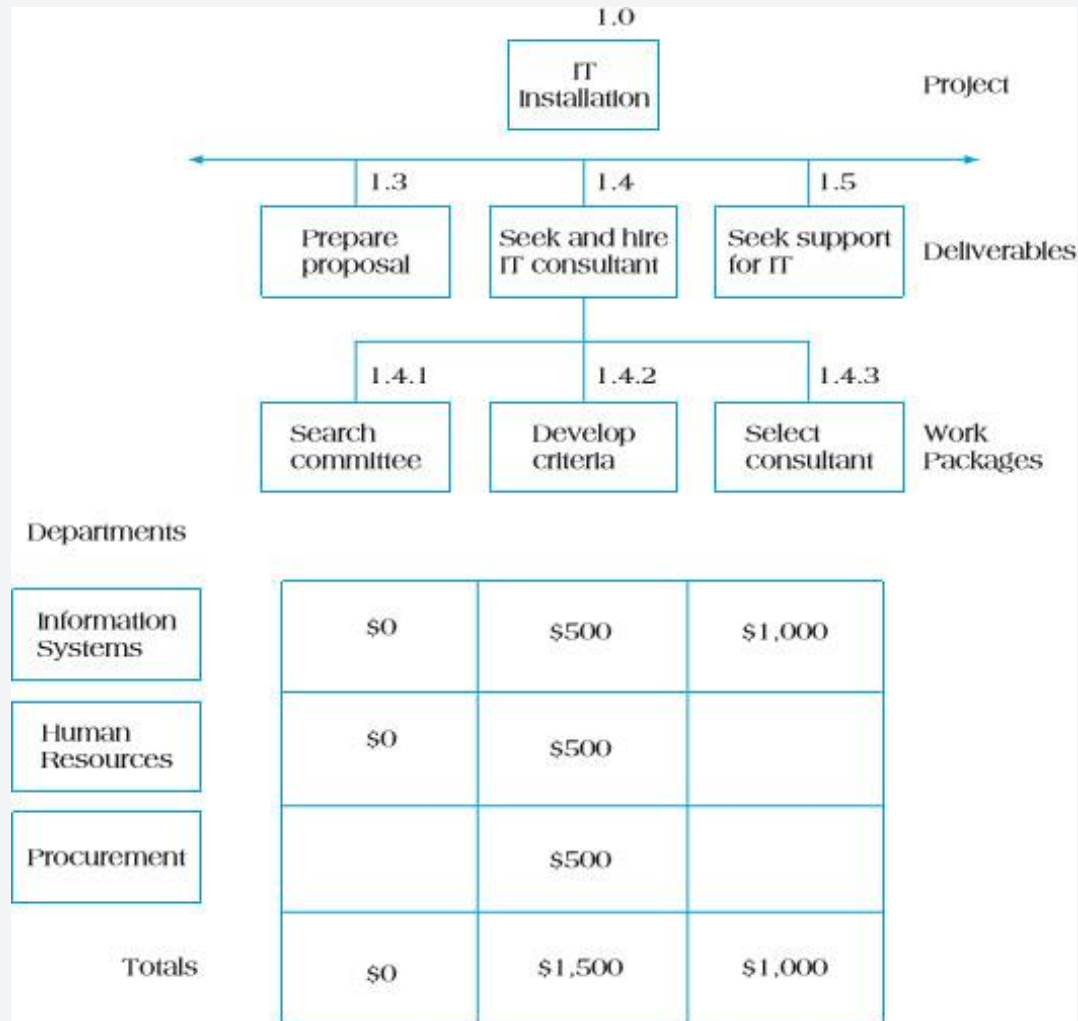


Figure 5.10 Responsibility Assignment Matrix

Deliverable	Task & Code	Lead Project Personnel					
		Bob IT	David IT	Susan HR	Beth Procurement	James Engineering	Terry Legal
Match IT to Org. Tasks—1.1	Problem Analysis—1.1.1	○	■			☆	□
	Develop info on IT technology—1.1.2	☆	○	■			
Identify IT user needs—1.2	Interview potential users—1.2.1	□		○	☆		
	Develop presentation—1.2.2	○	☆			■	
	Gain user "buy-in"—1.2.3			☆	■	○	
Prepare proposal—1.3	Develop cost/benefit info—1.3.1	□			○		☆

○ Responsible

☆ Support

■ Notification

□ Approval

Defining a Project Work Package

1. Work package forms lowest level in WBS.
2. Work package has a deliverable result.
3. Work package has one owner.
4. Work package may be considered by its owner as a project in itself.
5. Work package may include several milestones.
6. Work package should fit organizational procedures and culture.
7. The optimal size of a work package may be expressed in terms on labor hours, calendar time, cost, reporting period, and risks.

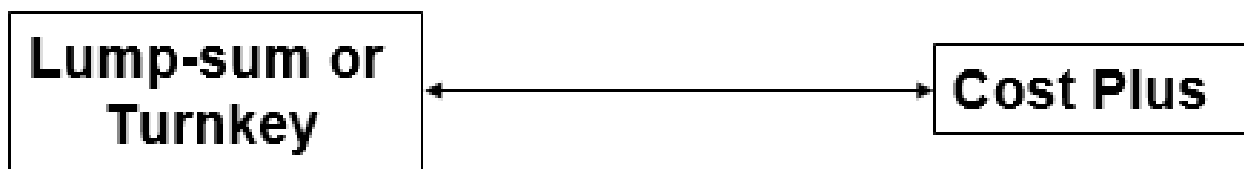
Work Authorization

The formal “**go ahead**” to begin work.

Contractual documentation possesses some key identifiable features:

- Contractual requirements
- Valid consideration
- Contracted terms

Contracts range from:



Scope Reporting

At the project's kickoff, the project team and key clients should make **decisions about the need for project updates**. How many will be required, and how frequently? Scope reporting determines **what** types of information reported, **who** receives copies, and **when** and **how** information is acquired and disseminated.

Typical project reports contain:

1. Cost status
2. Schedule status
3. Technical performance status

Reasons Why Projects Fail

- Politics
- Naïve promises
- Naïve optimism of youth
- Startup mentality of fledgling entrepreneurial companies
- “Marine Corps” mentality
- Intense competition caused by globalization
- Intense competition caused by appearance of new technologies
- Intense pressure caused by unexpected government regulations
- Unexpected and/or unplanned crises

Types of Control Systems

- Configuration control
- Design control
- Trend monitoring
- Document control
- Acquisition control
- Specification control

Configuration Management

Configuration management is defined as:

A collection of formal documented procedures used to apply technical and administrative direction and surveillance to: identify and document the functional and physical characteristics of a product, result, service, or component; control any changes to such characteristics; record and report each change and its implementation status; and support the audit of the products, results, or components to verify conformance to requirements.

Baseline is defined as:

The project's scope fixed at a specific point in time—for example, the project's scheduled start date.

Project Changes

Occur for one of several reasons:

- **Initial planning errors, either technological or human**
- **Additional knowledge of project or environmental conditions**
- **Uncontrollable mandates**
- **Client requests**

Project Closeout

The job is not over until the paperwork is done . . .

Closeout documentation is **used to**:

- Resolve disputes
- Train project managers
- Facilitate auditing

Closeout documentation **includes**:

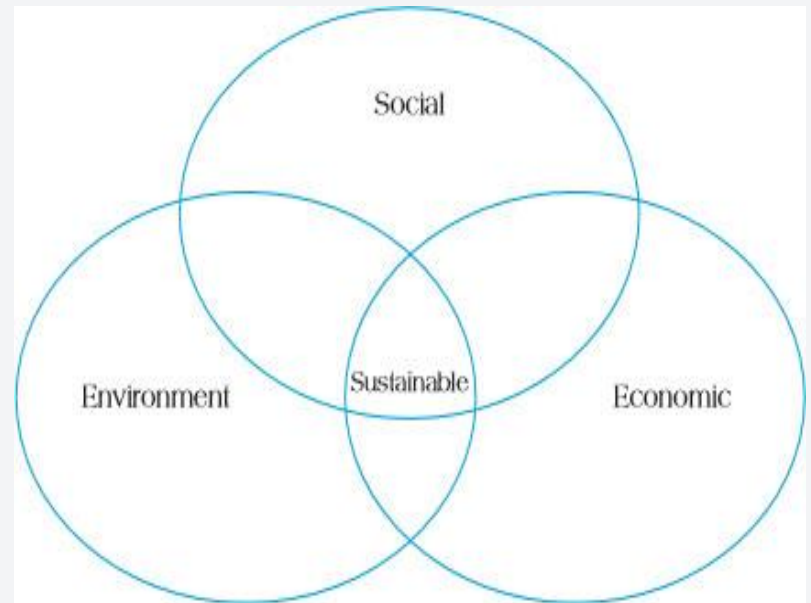
- Historical records
- Post-project analysis
- Financial closeout

Sustainability

Sustainable development involves efforts to promote harmony among human beings and between humanity and nature.

Sustainability involves efforts to promote the triple bottom line of social sustainability, environmental sustainability, and economic sustainability.

Figure 5.12 The Triple Bottom Line of Sustainability



Sustainability Concepts

Sustainability is about:

- Harmonizing the triple bottom line
- Integrating short-term and long-term
- Consuming income, not capital
- Including local and global perspectives
- Values and ethics
- Transparency and accountability
- Stakeholder participation
- Risk reduction
- Waste elimination

Sustainable Project Management Practices

Project management sustainable practices include:

- **Engaging in sustainable projects that will not cause harm to the planet or its inhabitants**
- **Employing sustainable practices while undertaking the projects themselves**
- Developing sustainable supplier practices
- **Emphasizing sustainability in project design**

Sustainable project management practices require organizations to pay attention to all aspects of the project life cycle from conceptualization through termination.

TABLE 5.3 Sustainability Considerations Across the Project Lifecycle

Life Cycle Stage	Sustainability Considerations		
	Social	Environment	Economic
Conceptualization	<p>Is the project objective in the interest of the public?</p> <p>Does the project scope meet the needs and expectations of all stakeholders?</p> <p>Does the project charter conform to sustainability regulations with regard to fair labor practices?</p>	<p>Does the project objective enhance or deplete the environment?</p> <p>Is there a short- or long-term risk to the environment?</p> <p>Does the project charter conform to sustainability regulations with regard to environmental practices?</p>	<p>Does the project consume excessive capital?</p>
Planning	<p>Does the project scope and schedule conform to social well-being in both the short and long terms?</p> <p>Is project staff sufficiently trained and allocated?</p>	<p>Are project resources procured through sustainable means?</p> <p>Is the design environmentally "green"?</p> <p>Does the risk mitigation plan account for the well-being of the environment?</p> <p>Does the change control process consider the environment as a factor?</p> <p>Does the project possess sufficient resources to carry out the promised deliverable?</p>	<p>Is the cost spent on adapting sustainable methods economical to the company?</p> <p>What alternatives can be utilized and the project remain a profitable endeavor?</p>
Execution	<p>Is the project staff managed in a fair way?</p> <p>Are project staff part of the communication loop?</p> <p>Are stakeholders part of the communication loop?</p> <p>Is regular feedback taken from staff about work-life balance?</p>	<p>Are environmental indicators such as carbon footprint being measured?</p>	<p>Is the cost of measuring environmental and social indexes included within the budget?</p>
Termination	<p>Are all stakeholders in agreement on project outcomes?</p> <p>Are all conflicts resolved in a fair manner?</p> <p>Are any improvements in staff handling documented in lessons learned?</p>	<p>Are any improvements in project activities documented in lessons learned?</p>	<p>Was the overall cost of the project comparable to its initial projection?</p>

Questions to Consider in Risk Management

- What is likely to happen (the probability and impact)?
- What can be done to minimize the probability or impact of these events?
- What cues will signal the need for such action (i.e., what clues should I actively look for)?
- What are the likely outcomes of these problems and my anticipated reaction?

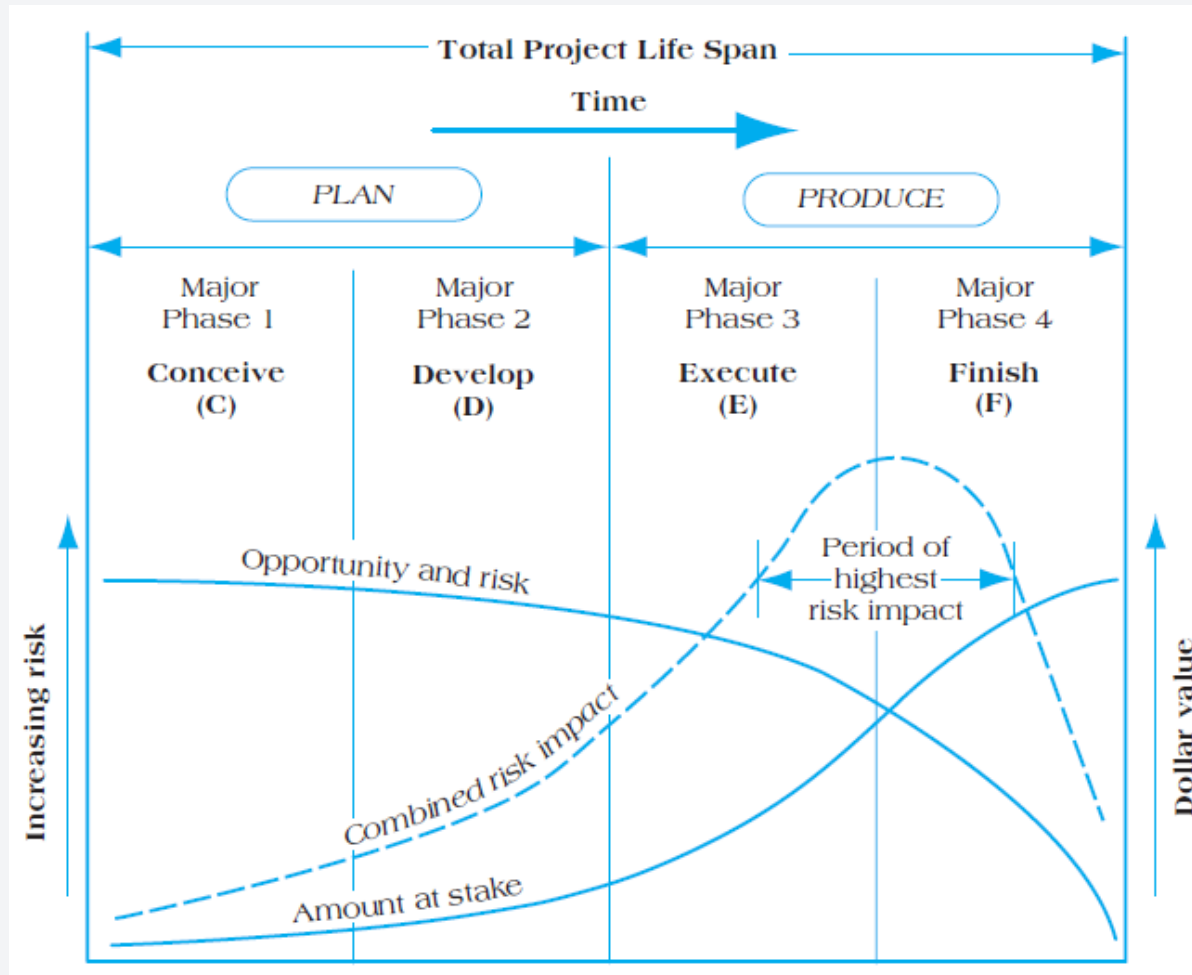
Risk Management

Risk management—the **art** and **science** of **identifying, analyzing, and responding** to risk factors throughout the **life of a project** and in the best interest of its objectives.

Project risk—an **uncertain event** or **condition** that, if it occurs, has a **positive** or **negative** effect on one or more **project objectives** such as scope, schedule, cost, or quality.

$$\text{Risk} = (\text{Probability of Event}) (\text{Consequences of Event})$$

Figure 7.2 Risk Versus Amount at Stake: The Challenge in Risk Management



Four Stages of Risk Management

1. Risk **identification**
2. **Analysis** of probability and consequences
3. Risk **mitigation** strategies
4. **Control** and documentation

Risk Clusters

- Financial
- Technical
- Commercial
- Execution
- Contractual or legal risk

Common Types of Risks

- **Absenteeism**
- Resignation
- Staff pulled away
- Time overruns
- **Skills unavailable**
- Ineffective training
- **Specs incomplete**
- Change orders

Risk Factor Identification

- Brainstorming meetings
- Expert opinion
- Past history
- Multiple (or team-based) assessments

Figure 7.4 Risk Breakdown Structure (RBS)

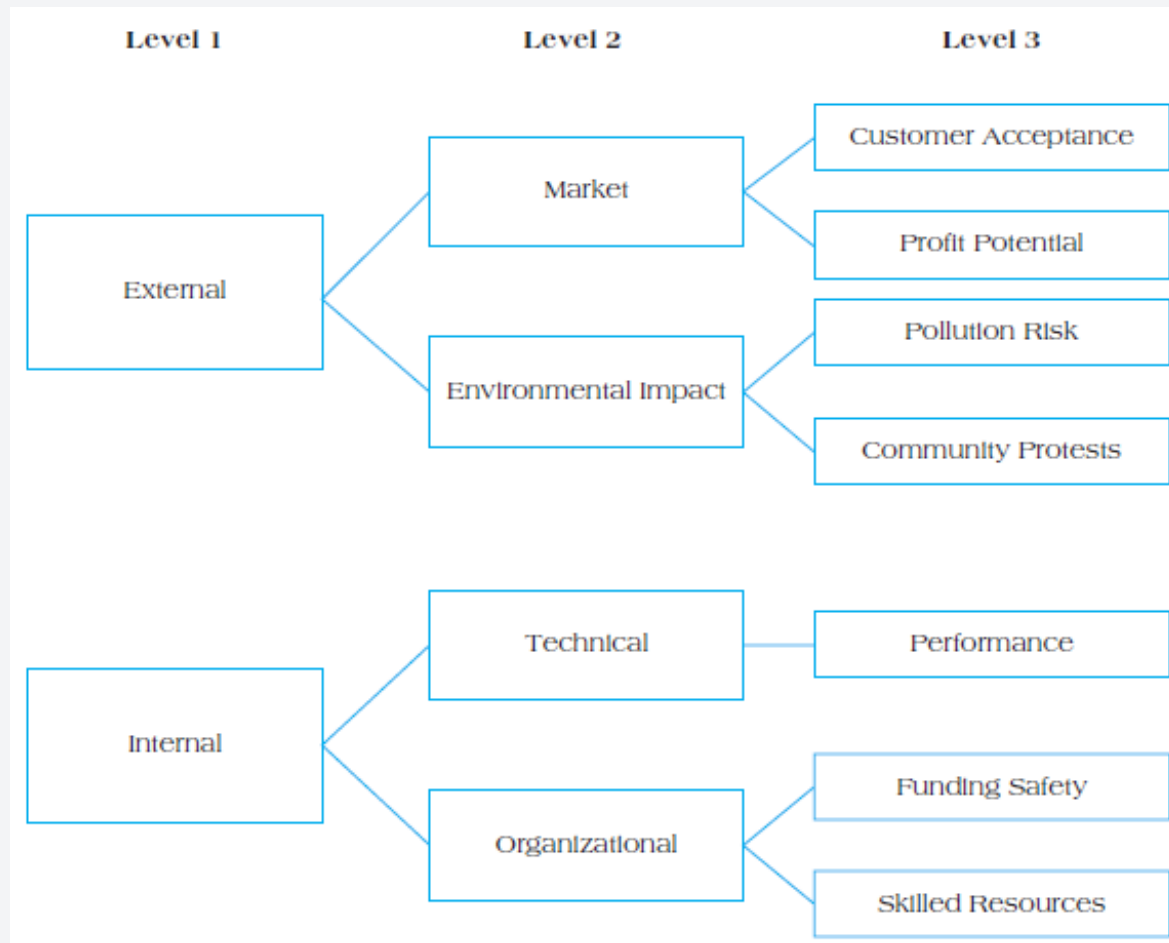


Figure 7.5 Risk Impact Matrix

		Consequences	
		Low	High
Likelihood	High		
	Low		

		Consequences		
		Low	Medium	High
Likelihood	High			D
	Medium			B
	Low		C	A

FIGURE 7.6 Classifying Project Risks

Project Risk Scoring

- The following example illustrates a quantitative method for a firm developing a new software product for the retail market. The scenario considers both probability of failure and consequences of failure.
- In probability of failure, we are interested in identifying any factors that can significantly affect the probability that the new project can be successfully completed. Think of this category as requiring us to focus on the potential causes of failure. For the example, let us assume that the issues identified as potential contributors are (1) maturity of the software design — is it a new product or based on an existing software platform? (2) complexity of the product — is the design relatively simple or is it highly complex in structure? and (3) dependency — can the product be developed independently of any system currently in place in the company or is it tied to current operating systems or practices? Several factors can have an impact on the probability of a new project's successful completion. Although the example identifies three (maturity, complexity, and dependency), depending upon the project, a team may identify many unique issues or factors that will increase the probability of failure.

Project Risk Scoring

- Under the dimension of consequences of failure, we are concerned with the issues that will highlight the effects of project failure. The consequences of failure require us to critically evaluate the results of a project's success or failure along several key dimensions. For this example, the organization has identified four elements that must be considered as critical effects of project failure: (1) cost—budget adherence versus overruns, (2) schedule—on time versus severe delays, (3) reliability—the usefulness and quality of the finished product, and (4) performance—how well the new software performs its designed functions. As with items shown under probability of failure, the set of issues related to the consequences of failure that should be clearly identified will be unique to each project.

Probability of Failure (P_f)

Score	Maturity	Complexity	Dependency
Low (0.1)	Existing software	Simple design	Not limited to existing system or clients. No external or uncontrollable events are likely to have an impact on the project.
Minor (0.3)	Minor redesign	Minor increase in complexity	Schedule or performance depends on an existing system. Effect on cost or schedule is minor.
Moderate (0.5)	Major change	Moderate increase	Moderate risk to schedule or performance due to dependence on existing system, facility, or processes. Effect on cost is moderate.
Significant (0.7)	Technology is available, but complex design	Significant increase	Schedule or performance depends on new system or process. Significant cost or schedule risk.
Major (0.9)	State of art, some research complete	Extremely complex	Schedule and performance depend on new system and process. Very high cost or schedule risk.

Score	Cost	Consequence of Failure (C_f)		
		Schedule	Reliability	Performance
Low (0.1)	Budget estimate not exceeded	Negligible impact on program, no impact on critical path	Minimal or no reliability consequence	Minimal or no performance consequence.
Minor (0.3)	Cost estimate exceeds budget by < 5%	Minor slip in schedule (less than 5%)	Small reduction in reliability	Small reduction in system performance.
Moderate (0.5)	Cost estimate exceeds budget by < 15%	Small slip in schedule starting to impact critical path	Some reduction in reliability	Some reduction in system performance. May require moderate debugging.
Significant (0.7)	Cost estimate exceeds budget by < 30%	Development time slips in excess of 1 month, requires readjustment of critical path	Significant degradation in reliability	Significant degradation in system performance. Guarantees are at risk. Serious debugging required.
Major (0.9)	Cost estimate exceeds budget by > 50%	Large schedule slips ensure the system will miss client time frame	Reliability goals cannot be achieved under current plan	Performance goals cannot be achieved. Results may not be usable.

Project Risk Scoring

1. Use project team's consensus to determine the score for each Probability of Failure category: Maturity (P_m), Complexity (P_c), and Dependency (P_d).
2. Calculate overall probability.

$$P_f = \frac{P_m + P_c + P_d}{3}$$

3. Use project team's consensus to determine the score for each Consequence of Failure category: Cost (C_c), Schedule (C_s), Reliability (C_r), and Performance (C_p).

Project Risk Scoring

4. Calculate C_f by adding the four categories and dividing by 4:

$$C_f = \frac{C_c + C_s + C_r + C_p}{4}$$

5. Calculate Overall Risk Factor for the project by using the formula:

$$RF = P_f + C_f - (P_f)(C_f)$$

Rule of Thumb:

Low Risk	$RF < 0.30$
Medium Risk	$RF = 0.30 \text{ to } 0.70$
High Risk	$RF > 0.70$

Risk Mitigation Strategies

- Accept
- Minimize
- Share
- Transfer
- Contingency Reserves
 - Task contingency
 - Managerial contingency
- Insurance
- Workaround
- Other Mitigation Strategies
 - Mentoring
 - Cross training
- Control and Documentation
 - Change management

Control and Documentation

Helps managers classify and codify risks, responses, and outcomes

Change management report system answers:

- What?
- Who?
- When?
- Why?
- How?

Project Risk Analysis and Management (PRAM)

PRAM presents a **generic methodology** that can be applied to multiple project environments, and encompasses the key components of project risk management.

Key Features of PRAM

- Risk management follows a **life cycle**.
- Risk management **strategy changes** over the project life cycle.
- **Synthesized, coherent** approach.

Nine Phases of Risk Assessment in PRAM

1. Define
2. Focus
3. Identify
4. Structure
5. Clarify ownership of risks
6. Estimate
7. Evaluate
8. Plan
9. Manage

References

1. Project Management: Achieving Competitive Advantage, Jeffrey K. Pinto, 5th edition, Pearson, 2019.