



Understand risk and the importance of good project risk management.

• Discuss the elements of planning risk management and the contents of a risk management plan.

List common sources of risks on information technology (IT) projects.

Describe the process of identifying risks and create a risk register.

# Learning Objectives (cont'd)

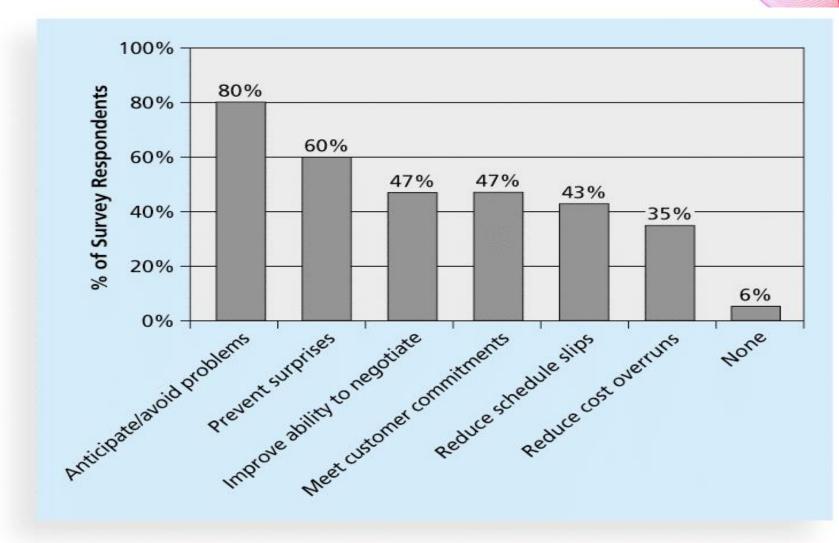
- Discuss qualitative risk analysis and explain how to calculate risk factors, create probability/impact matrixes, and apply the Top Ten Risk Item Tracking technique to rank risks.
- Explain quantitative risk analysis and how to apply decision trees, simulation, and sensitivity analysis to quantify risks.
- Provide examples of using different risk response planning strategies to address both negative and positive risks.
- Discuss how to control risks.

# The Importance of Project Risk Management

• Project risk management is the art and science of identifying, analyzing, and responding to risk throughout the life of a project and in the best in terests of meeting project objectives.

 Risk management is often overlooked in projects, but it can help improve project success by helping select good projects, determining project scope, and developing realistic estimates.

#### Benefits from Software Risk Management Practices\*



\*Source: Kulik and Weber, KLCI Research Group



A dictionary definition of risk is "the possibility of loss or injury".

 Negative risk involves understanding potential problems that might occur in the project and how they might impede project success.

Negative risk management is like a form of insurance; it is an investment.

#### Risk Can Be Positive

Positive risks are risks that result in good things happening;
 sometimes called opportunities.

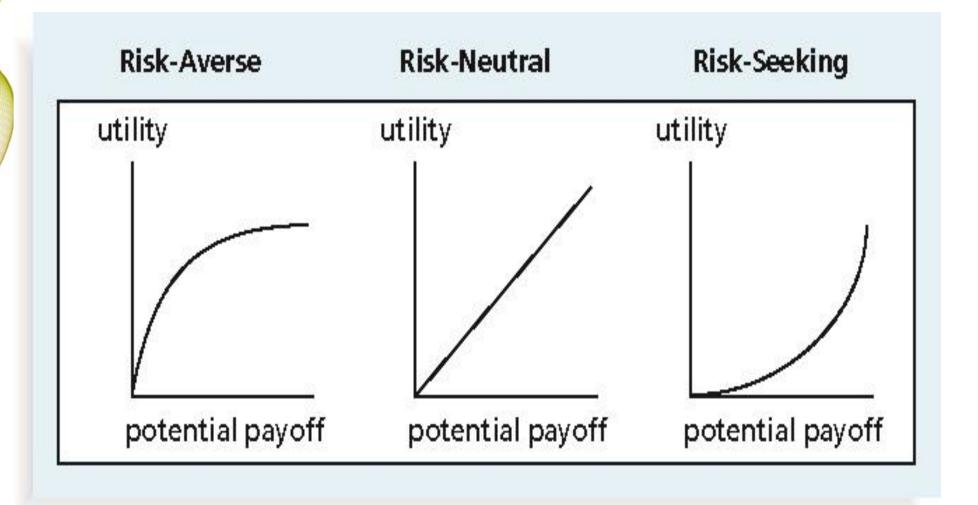
 A general definition of project risk is an uncertainty that can have a negative or positive effect on meeting project objectives.

• The goal of project risk management is to minimize potential negative risks while maximizing potential positive risks.

#### Risk Utility

- Risk utility or risk tolerance is the amount of satisfaction or pleasure received from a potential payoff
  - Utility rises at a decreasing rate for people who are risk-averse.
  - Those who are risk-seeking have a higher tolerance for risk and their satisfaction increases when more payoff is at stake.
  - The risk-neutral approach achieves a balance between risk and payoff.

# Risk Utility Function and Risk Preference



### Project Risk Management Processes

**Planning risk management**: Deciding how to approach and plan the risk management activities for the project.

- Identifying risks: Determining which risks are likely to affect a project and documenting the characteristics of each.
- Performing qualitative risk analysis: Prioritizing risks based on their probability and impact of occurrence.

#### Project Risk Management Processes (cont'd)

• Performing quantitative risk analysis: Numerically estimating the effects of risks on project objectives.

- **Planning risk responses**: Taking steps to enhance opportunities and reduce threats to meeting project objectives.
- **Controlling risk**: Monitoring identified and residual risks, identifying new risks, carrying out risk response plans, and evaluating the effectiveness of risk strategies throughout the life of the project.

# Project Risk Management Summary

#### Planning

Process: Plan risk management Outputs: Risk management plan

Process: Identify risks
Outputs: Risk register

Process: Perform qualitative risk analysis

**Outputs: Project documents updates** 

Process: Perform quantitative risk analysis

**Outputs: Project documents updates** 

Process: Plan risk responses

Outputs: Project management plan updates, project documents updates

#### **Monitoring and Controlling**

Process: Control risks

Outputs: Work performance information, change requests, project

management plan updates, project documents updates,

organizational process assets updates

Project Start

**Project Finish** 



The main output of this process is a **risk management plan**—a plan that documents the procedures for managing risk throughout a project.

 The project team should review project documents and understand the organization's and the sponsor's approaches to risk.

• The level of detail will vary with the needs of the project.



- Methodology
- Roles and responsibilities
- Budget and schedule
- Risk categories
- Risk probability and impact
- Revised stakeholders' tolerances
- Tracking
- Risk documentation

#### Contingency, Fallback Plans & Contingency Reserves

- Contingency plans are predefined actions that the project team
   will take if an identified risk event occurs.
- **Fallback plans** are developed for risks that have a high impact on meeting project objectives and are put into effect if attempts to reduce the risk are not effective.
- Contingency reserves or allowances are provisions held by the project sponsor or organization to reduce the risk of cost or schedule overruns to an acceptable level; management reserves are funds held for unknown risks.

# IT Success Potential Scoring Sheet

<b>Success Criterion</b>	Relative Importance
User Involvement	19
Executive Management support	16
Clear Statement of Requirements	15
Proper Planning	11
Realistic Expectations	10
Smaller Project Milestones	9
Competent Staff	8
Ownership	6
Clear Visions and Objectives	3
Hard-Working, Focused Staff	3
Total	100



# **Broad Categories of Risk**

Market risk

Financial risk

Technology risk

People risk

• Structure/process risk

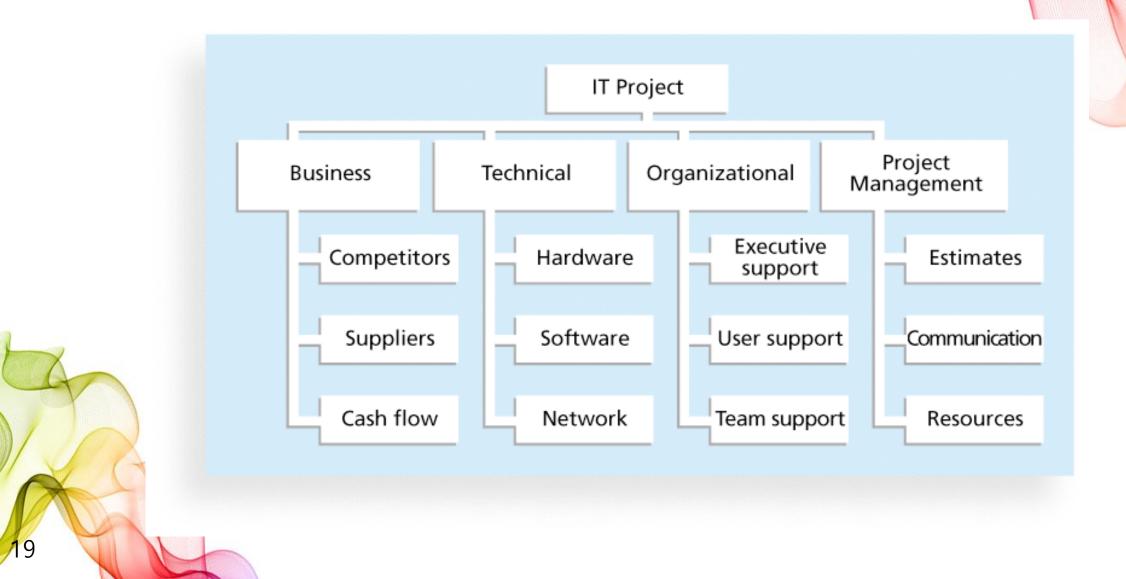


#### Risk Breakdown Structure

 A risk breakdown structure is a hierarchy of potential risk categories for a project.

 Similar to a work breakdown structure but used to identify and categorize risks.

## Sample Risk Breakdown Structure





- Identifying risks is the process of understanding what potential even ts might hurt or enhance a particular project.
- Another consideration is the likelihood of advanced discovery.
- Risk identification tools and techniques include:
  - Brainstorming
  - The Delphi Technique
  - Interviewing
  - SWOT analysis



**Brainstorming** is a technique by which a group attempts to generate ideas or find a solution for a specific problem by amassing ideas spontaneously and without judgment.

An experienced facilitator should run the brainstorming session.

- Be careful not to overuse or misuse brainstorming:
  - Psychology literature shows that individuals produce a greater number of ideas working alone than they do through brainstorming in small, face-to-face groups.
  - Group effects often inhibit idea generation.



 The Delphi Technique is used to derive a consensus among a panel of experts who make predictions about future developments.

Provides independent and anonymous input regarding future events.

 Uses repeated rounds of questioning and written responses and avoids the biasing effects possible in oral methods, such as brainstorming.



**Interviewing** is a fact-finding technique for collecting information in face-to-face, phone, e-mail, or instant-messaging discussions.

• Interviewing people with similar project experience is an important tool for identifying potential risks.



## **SWOT Analysis**

• SWOT analysis (strengths, weaknesses, opportunities, and threats) can also be used during risk identification.

 Helps identify the broad negative and positive risks that apply to a project.

#### Risk Register

• The main output of the risk identification process is a list of identified risks and other information needed to begin creating a risk register.

#### • A **risk register** is:

- A document that contains the results of various risk management processes and that is often displayed in a table or spreadsheet format.
- A tool for documenting potential risk events and related information.
- **Risk events** refer to specific, uncertain events that may occur to the detriment or enhancement of the project.



#### Risk Register Contents

- An identification number for each risk event
- A rank for each risk event
- The name of each risk event
- A description of each risk event
- The category under which each risk event falls
- The root cause of each risk

# Risk Register Contents (cont'd)

Triggers for each risk; **triggers** are indicators or symptoms of actual risk events.

- Potential responses to each risk.
- The **risk owner** or person who will own or take responsibility for each risk.
- The probability and impact of each risk occurring.
- The status of each risk.

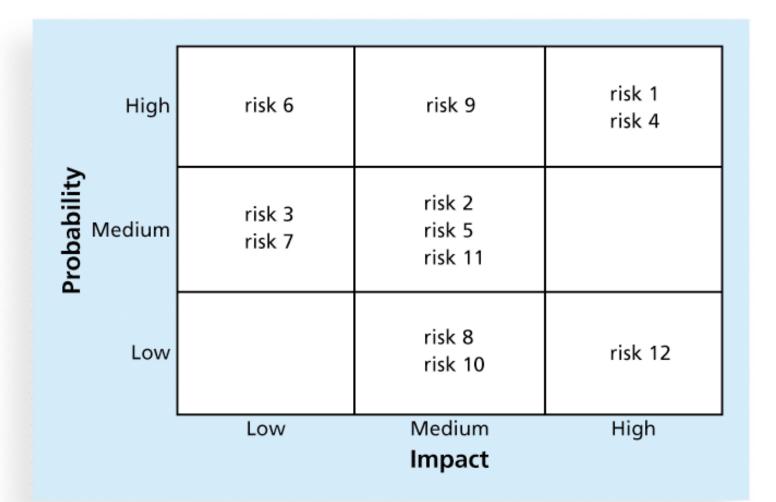
# Performing Qualitative Risk Analysis

- Assess the likelihood and impact of identified risks to determine their magnitude and priority.
- Risk quantification tools and techniques include:
  - Probability/impact matrixes
  - The Top Ten Risk Item Tracking
  - Expert judgment



- A **probability/impact matrix** or **chart** lists the relative probability of a risk occurring on one side of a matrix or axis on a chart and the relative impact of the risk occurring on the other.
- List the risks and then label each one as high, medium, or low in terms of its probability of occurrence and its impact if it did occur.
- Can also calculate risk factors:
  - Numbers that represent the overall risk of specific events based on their probability of occurring and the consequences to the project if they do occur.

# Sample Probability/Impact Matrix



# Performing Quantitative Risk Analysis

- Often follows qualitative risk analysis, but both can be done together.
- Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis.
- Main techniques include:
  - Decision tree analysis
  - Simulation
  - Sensitivity analysis

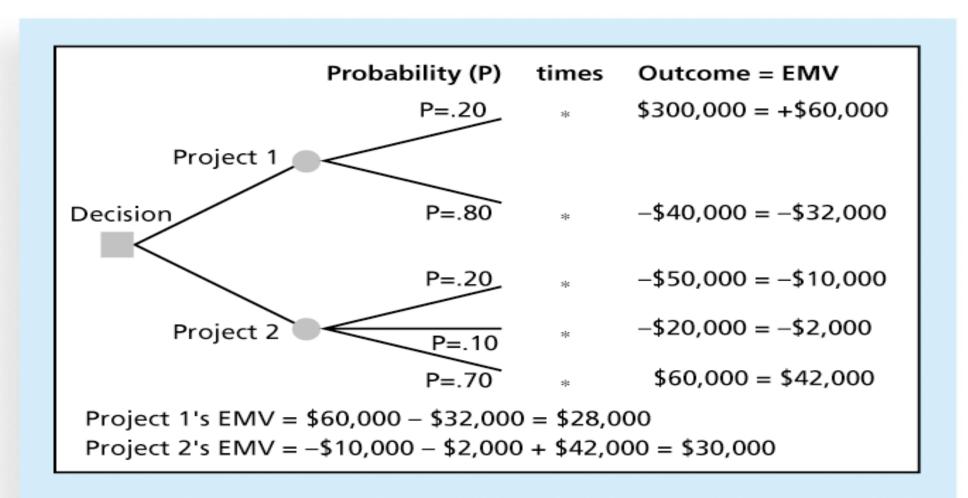
### Decision Trees and Expected Monetary Value (EMV)

• A decision tree is a diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain.

**Estimated monetary value (EMV)** is the product of a risk event probability and the risk event's monetary value.

You can draw a decision tree to help find the EMV.

#### Expected Monetary Value (EMV) Example



#### Planning Risk Responses

- After identifying and quantifying risks, you must decide how to respond to them.
- Four main response strategies for negative risks:
  - Risk avoidance
  - Risk acceptance
  - Risk transference
  - Risk mitigation



#### Response Strategies for Positive Risks

- Risk exploitation
- Risk sharing
- Risk enhancement

Risk acceptance

# Residual and Secondary Risks

It's also important to identify residual and secondary risks.

 Residual risks are risks that remain after all of the response strategies have been implemented.

• Secondary risks are a direct result of implementing a risk response.

## **Controlling Risks**

- Involves executing the risk management process to respond to risk events and ensuring that risk awareness is an ongoing activity performed by the entire project team throughout the entire project.
- Workarounds are unplanned responses to risk events that must be done when there are no contingency plans.
- Main outputs of risk control are:
  - Work performance information
  - Change requests
  - Updates to the project management plan, other project documents, and organizational process assets

## **Chapter Summary**

Project risk management is the art and science of identifying, analyzing, a nd responding to risk throughout the life of a project and in the best interests of meeting project objectives.

#### Main processes include:

- Plan risk management
- Identify risks
- Perform qualitative risk analysis
- Perform quantitative risk analysis
- Plan risk responses
- Control risks