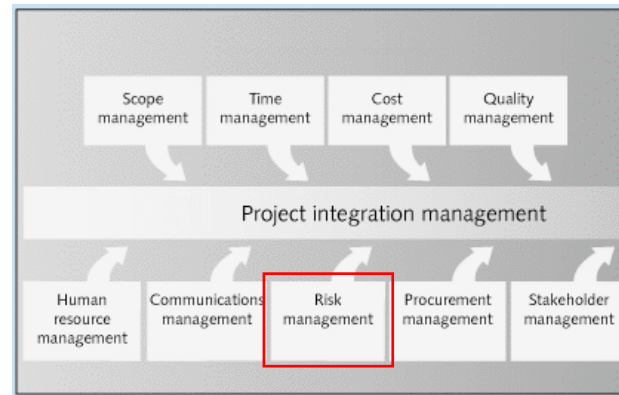


Project Risk Management

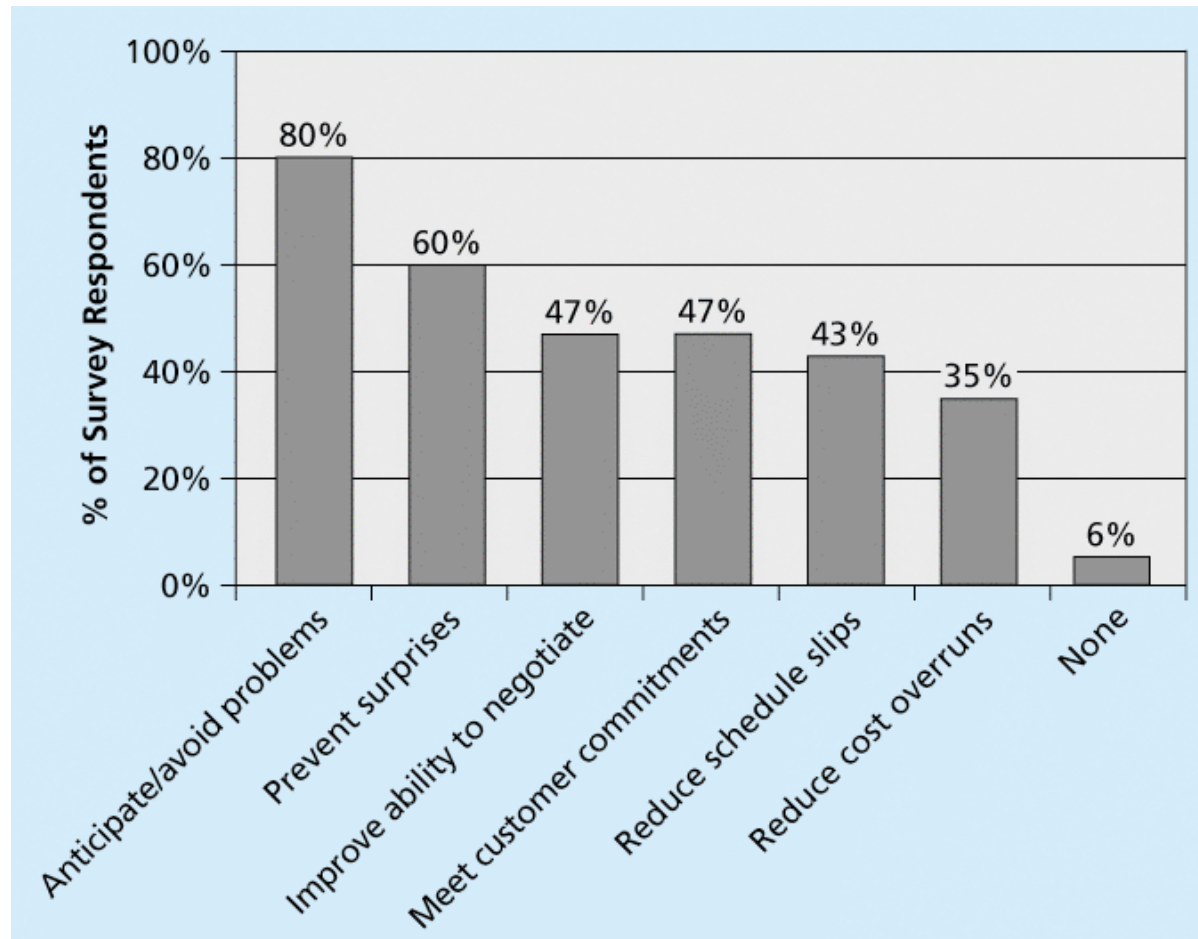


The Importance of Project Risk Management

- ▶ 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 interests of meeting project objectives
- ▶ Importance of risk management is often undervalued, but it can help improve project success by helping
 - select right projects
 - determine project scope
 - develop realistic plans
 - anticipate and prevent problems



Figure 11-1. Benefits from Software Risk Management Practices*



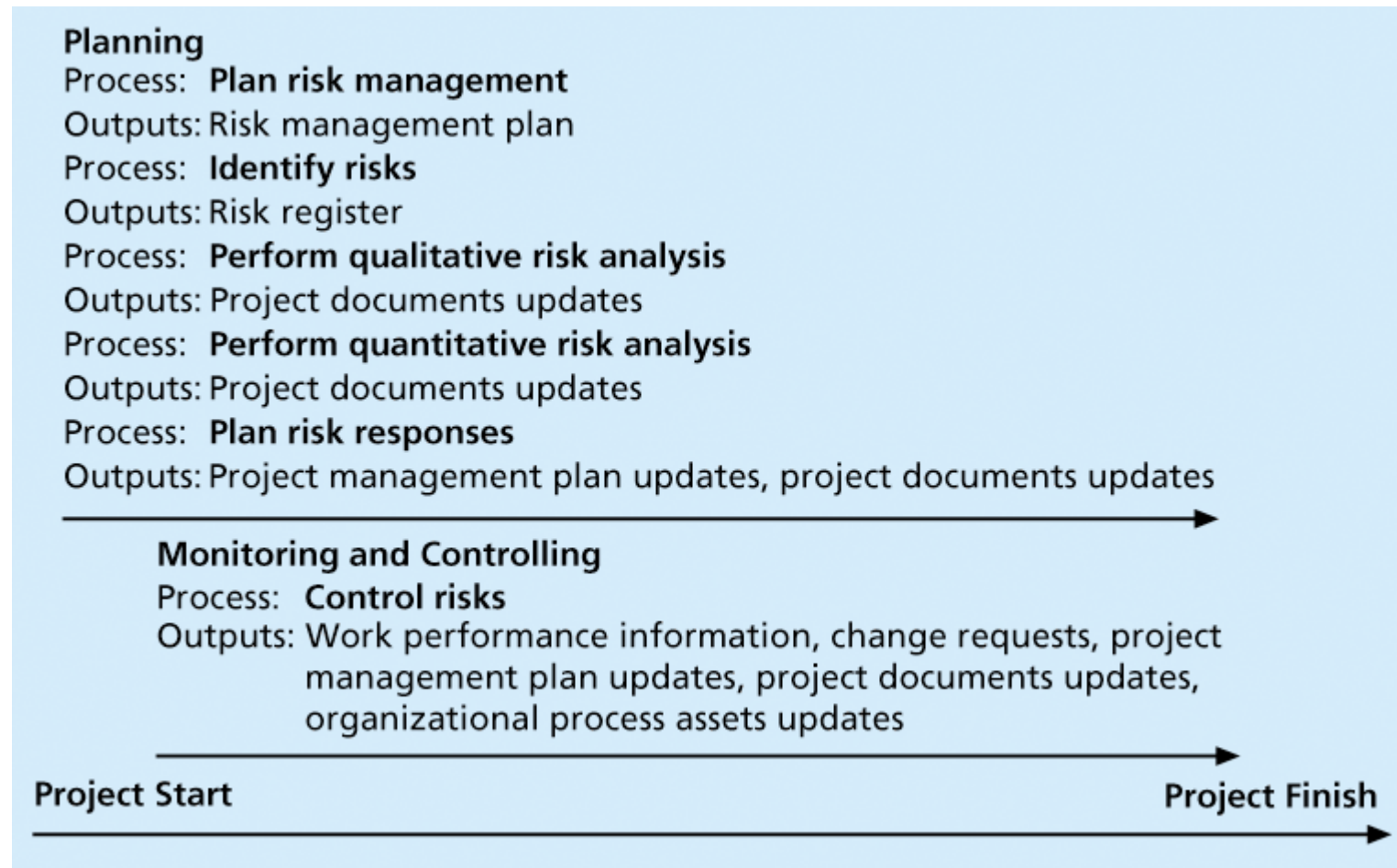
*Source: Kulik and Weber, KLCI Research Group

What is risk?

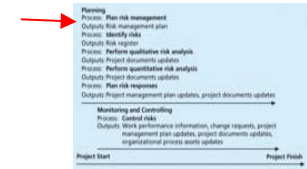
- ▶ A general definition of project risk is an uncertainty that can have a negative or positive effect on meeting project objectives
- ▶ Negative risk involves understanding potential problems that may happen in the project and how they can impede project success
- ▶ Positive risks (opportunities) result in good things happening
- ▶ The goal of project risk management is to minimize potential negative risks while maximizing potential positive risks



Figure 11-3. Project Risk Management Summary

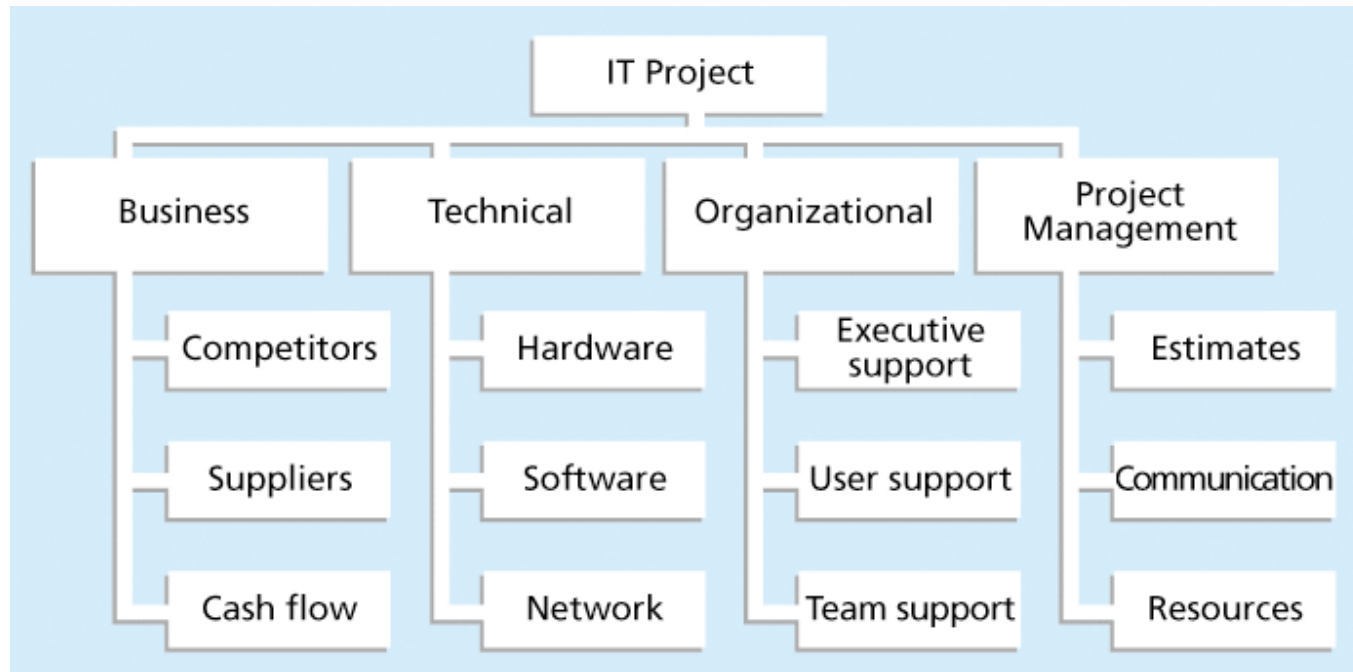
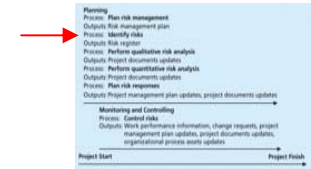


Planning Risk Management



- ▶ **Risk Management Plan**— a plan that documents the procedures for managing risk throughout a project
- ▶ Types of risk vary from project to project, but preparing a Risk Management Plan involves a common process
- ▶ Your plan should detail your own strategy for dealing with risks, but at the same time it should also reflect the organization's approaches to managing risk
- ▶ The level of detail may vary depending of the project
 - Stakeholders responsible for risks management activities
 - Methods of risk identification and analysis to be used
 - Plans to be prepared
 - Risk categories that are relevant to the project
 - Budget items reserved for risk management
 - Documentation of risk management actions and outcomes

Identifying Risks



- ▶ You need to be very specific about the project risks. Before you can identify all potential risks, you need to outline relevant risk categories.
- ▶ **Risk Breakdown Structure** is a hierarchy of potential risk categories for a project

Identifying Risks

- ▶ Identifying risks is the process of understanding what potential events may affect a particular project
- ▶ It's important to use systematic approach and think broadly rather than just looking at obvious concerns
- ▶ Identification of potential risks can be done
 - by categories using the Risk Breakdown Structure
 - by project management areas (scope, cost, time,... quality)
- ▶ Most common Risk identification techniques:
 - Brainstorming
 - The Delphi Technique
 - SWOT analysis



Table 11-4. Potential Negative Risk Conditions Associated With Each Knowledge Area

Knowledge Area	Risk Conditions
<i>Integration</i>	Inadequate planning; poor resource allocation; poor integration management; lack of post-project review
<i>Scope</i>	Poor definition of scope or work packages; incomplete definition
<i>Time</i>	Errors in estimating time or resource availability; errors in determining the critical path; poor allocation and management of float; early release of competitive products
<i>Cost</i>	Estimating errors; inadequate productivity, cost, change, or contingency
<i>Quality</i>	Poor attitude toward quality; substandard design, materials, and workmanship; inadequate quality assurance program
<i>Human resource</i>	Poor conflict management; poor project organization and definition of responsibilities; absence of leadership
<i>Communications</i>	Carelessness in planning or communicating
<i>Risk</i>	Ignoring risk; unclear analysis of risk; poor insurance management
<i>Procurement</i>	Unenforceable conditions or contract clauses; adversarial relations
<i>Stakeholders</i>	Lack of consultation with key stakeholder

- ▶ A similar table can be created based upon risk categories defined in the Risk Breakdown Structure

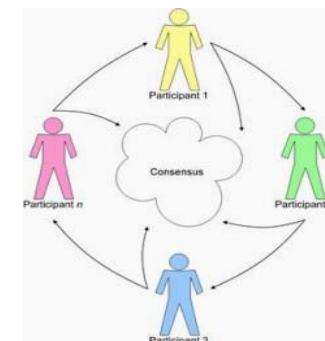
Brainstorming



- ▶ Brainstorming with different people, such as project staff, accountants, suppliers, project champions, project sponsors may help you get many different perspectives on risks to your project
- ▶ An experienced facilitator should run the brainstorming session
- ▶ Be careful not to overuse or misuse brainstorming
 - Psychology literature shows that individuals generate more valuable ideas working alone than they do through brainstorming in small, face-to-face groups
- ▶ The facilitator decides what goes into the final list

Delphi Technique

- ▶ The Delphi Technique is a multistep method
 - a group of experts exchange views attempting to identify risks and then each individually submits a list of risks and assumptions to a facilitator who reviews all submissions and issues a summary report
 - the summary report is discussed and then each expert submits a revised list of risks and assumptions to the facilitator
 - this process continues until all participants reach a consensus
- ▶ Although this is not a formal analytical approach, it can benefit from subjective judgments on a collective basis



SWOT Analysis

- ▶ SWOT Analysis (strengths, weaknesses, opportunities, and threats) can also be used during risk identification
 - Negative Risks are viewed as threats
 - Positive Risks are viewed as opportunities
- ▶ SWOT analysis can be done by individuals or in groups through brainstorming
- ▶ Invite key stakeholders who have a strong knowledge of the project and experience in risk management

SWOT matrix

O Opportunities	T Threats
Packaging: New generation of consumers appreciate high-end bottling and labeling. Craft beer niche: There is a growing community of craft beer appreciators in Botswana. Government programs: Promotions of and initiatives to support Botswana exports.	Vertical integration: Major breweries have control of supply and distribution channels to corner the market. Price fluctuation: Fluctuations in prices of supplies may occur. Competitive market: Expensive new marketing campaigns.



Knowledge Area	Risk Conditions
Integration	Inadequate planning; poor resource allocation; poor integration management; lack of post-project review
Scope	Poor definition of scope or work packages; incomplete definition
Time	Errors in estimating time or resource availability; errors in determining the critical path; poor allocation and management of float; early release of competitive products
Cost	Estimating errors; inadequate productivity; cost, change, or contingency
Quality	Poor attitude toward quality; substandard design, materials, and workmanship; inadequate quality assurance program
Human resource	Poor conflict management; poor project organization and definition of responsibilities; absence of leadership
Communications	Carelessness in planning or communicating
Risk	Ignoring risk; unclear analysis of risk; poor insurance management
Procurement	Unenforceable conditions or contract clauses; adversarial relations
Stakeholders	Lack of consultation with key stakeholder

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
- ▶ **Risk Register** a document that contains the outcomes of various risk identification processes and that is often displayed in a table or spreadsheet format

Contents:

- An identification number for each identified risk
- A rank assigned to each risk (1 – the highest risk)
- 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
- The risk owner (the person in charge)

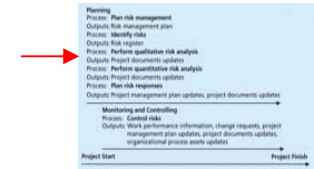
See the textbook chapter 11 for more details)

Table 11-5. Sample Risk Register

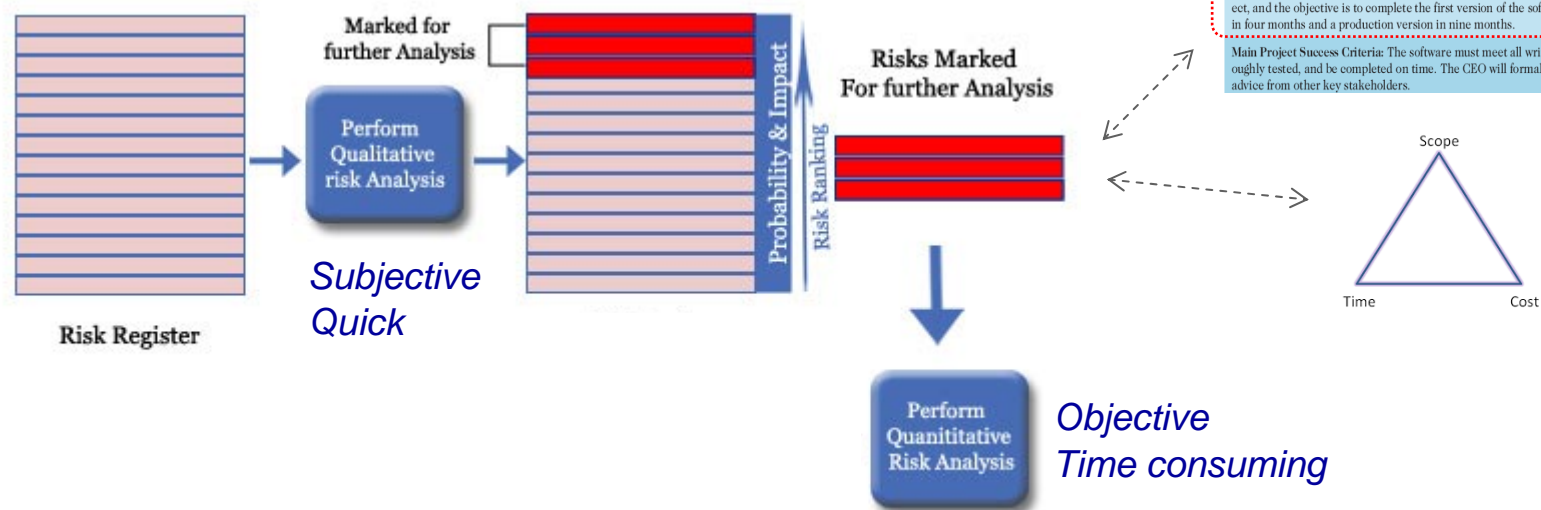
NO.	RANK	RISK	DESCRIPTION	CATEGORY	ROOT CAUSE	TRIGGERS	POTENTIAL RISK RESPONSES	RISK OWNER	PROBABILITY	IMPACT	STATUS
R44											
R21											
R7											

- No : R44
- Rank: 1 (to be entered after qualitative risk analysis)
- Risk: New customer
- Description: We have never done a project for this organization before and don't know too much about them. One of our company's strengths is building good customer relationships, which often leads to further projects with that customer. We might have trouble working with this customer because they are new to us.
- Category: Stakeholders
- *etc.*

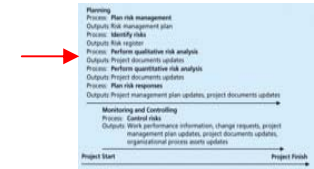
Risk Analysis



- It's not practical to spend time dealing with all risks recorded in the Risk Register, because money spent on risk management may outweigh the actual risk impact



Performing Qualitative Risk Analysis



- ▶ The main purpose of the qualitative risk analysis is prioritizing risks
- ▶ Priorities are set based upon the **likelihood** and **impact** of identified risks
- ▶ The scale used for the analysis is usually limited to three categories: low, medium and high
- ▶ Risk quantification tools and techniques include:
 - Probability/impact matrixes
 - The Top Ten Risk Item Tracking
 - Expert judgment

Probability/Impact Matrix

Probability	High	risk 6	risk 9	risk 1 risk 4
	Medium	risk 3 risk 7	risk 2 risk 5 risk 11	
	Low		risk 8 risk 10	risk 12
		Low	Medium	High
		Impact		

- ▶ A **Probability/Impact Matrix** lists the probability of a risk occurring on one side of a matrix and the impact of the risk occurring on the other
- ▶ Project teams usually define their own methods how to calculate Rank based upon the probability and the impact grades

Top Ten Risk Item Tracking

- ▶ **Top Ten Risk Item Tracking** is a qualitative risk analysis tool that helps to identify risks and maintain an awareness of risks throughout the life of a project
- ▶ Establish a periodic review of the top ten project risk items
- ▶ List the current ranking, previous ranking, number of times the risk appears on the list over a period of time, and a summary of progress made in resolving the risk item

Table 11-6. Example of Top Ten Risk Item Tracking

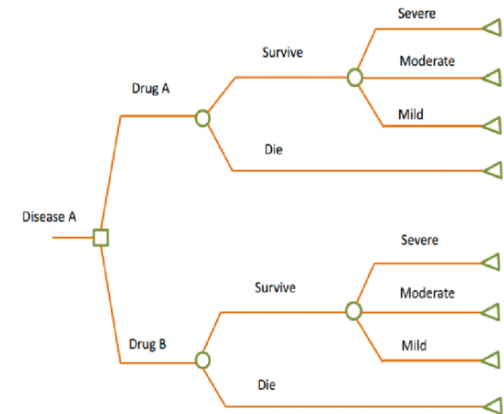
RISK EVENT	MONTHLY RANKING			RISK RESOLUTION PROGRESS
	RANK THIS MONTH	RANK LAST MONTH	NUMBER OF MONTHS IN TOP TEN	
Inadequate planning	1	2	4	Working on revising the entire project management plan
Poor definition	2	3	3	Holding meetings with project customer and sponsor to clarify scope
Absence of leadership	3	1	2	After previous project manager quit, assigned a new one to lead the project
Poor cost estimates	4	4	3	Revising cost estimates
Poor time estimates	5	5	3	Revising schedule estimates

Performing Quantitative Risk Analysis

- ▶ The quantitative analysis allows project managers to evaluate a potential impact on the project objectives and constraints from the individual top ranked risks
- ▶ Translate the probability and impact of a risk into a measurable quantity (the project cost, time, quality)
- ▶ More data about the project should be available to perform the evaluation
- ▶ Main techniques include:
 - Decision tree analysis
 - Simulation
 - Sensitivity analysis

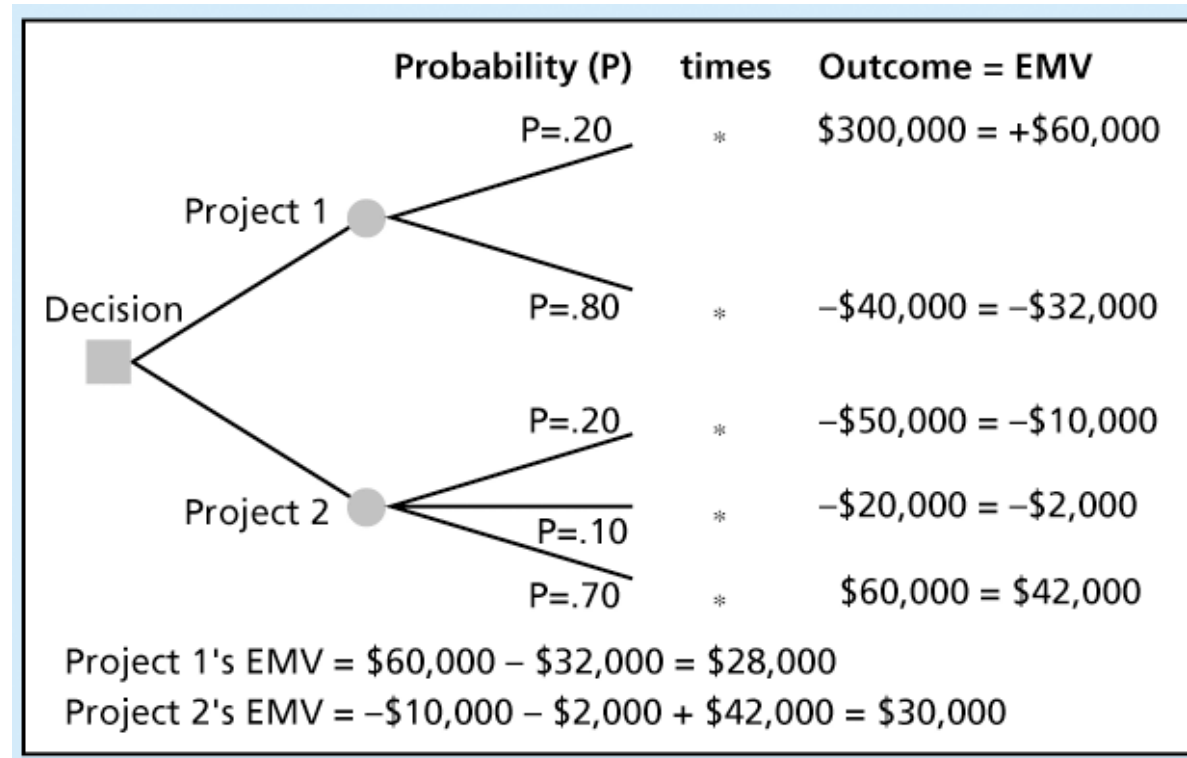
Decision Trees and Expected Monetary Value (EMV)

- ▶ 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



- ▶ **Expected Monetary Value (EMV)** is the product of a risk event probability and the risk event's monetary value $EMV = Probability \times Cost Impact$
Example: Risk probability: 20% Cost impact: -\$10 000
 $EMV = 0.2 \times -\$10\,000 = -\$2\,000$
- ▶ You can use decision trees to find the EMV

Figure 11-7. Expected Monetary Value (EMV) Example



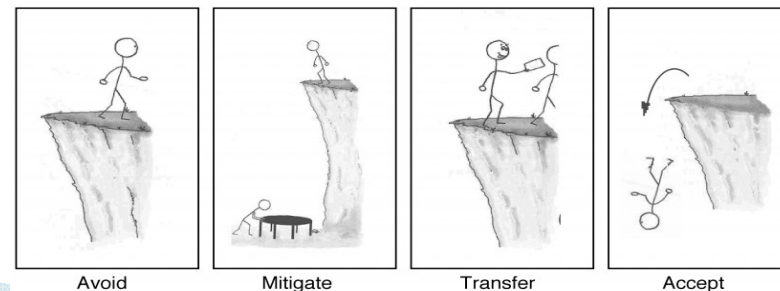
The higher the EMV, the better

- ▶ Although Project 1 profit is high (\$300,000), the chance to win it is only 20% and the chance of losses is 80% that results in a moderate EMV

Planning Risk Responses



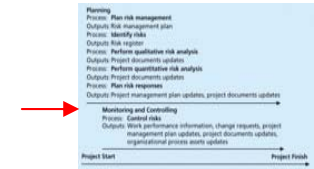
- ▶ After identifying and analyzing risks, you need to decide how to act
- ▶ Four main response strategies for negative risks:
 - **Avoid**: If you can prevent risk factors from happening, they will not impact your project.
 - **Mitigate**: If you can't avoid the risk, mitigate it by taking appropriate actions to minimise damage to your project (or its probability)
 - **Transfer**: Assign a third party to deal with a risk – e.g. hardware suppliers, internet service providers, insurance companies.
 - **Accept**: When you can't avoid, mitigate, or transfer a risk, then you have to accept it. But even when you accept a risk, at least you've looked at the alternatives and you know what will happen.



Contingency and Fallback Plans, Contingency Reserves

- ▶ **Contingency plans** define actions that the project team should take when identified risk events occur
- ▶ **Fallback plans** are developed for risks that have a high impact on meeting project objectives, and are put into effect if all attempts to reduce the risk are not effective
- ▶ **Contingency reserves** 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 that are NOT part of the cost baseline but ARE part of the budget and funding requirements

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 and policies

Chapter Summary

- ▶ 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 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

Chapter 11: Project Risk Management
Chapter 3: A Case Study

