

IT Project Management

CIS 8000


Session 7: Risk



Learning Objectives

- Describe the project risk management planning framework introduced in this chapter.
- Apply risk identification tools and understand the causes, effects, and the integrative nature of project risks.
- Apply several qualitative and quantitative analysis techniques that can be used to prioritize and analyze various project risks.
- Describe the various risk strategies, such as insurance, avoidance, or mitigation.
- Describe risk monitoring and control.
- Describe risk evaluation in terms of how the entire risk management process should be evaluated in order to learn from experience and to identify best practices.

Definitions

- Risk
 - ◆ An uncertain event or condition that, if occurs, has a positive or negative effect on the project objectives, such as scope, schedule, cost and quality.
 - Project Risk Management (PMBOK®)
 - ◆ Includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and control on a project; most of these processes are updated throughout the project.
-  The objectives of Project Risk Management are to increase the probability and impact of positive events and decrease the probability and impact of events adverse to the project.

Common Mistakes in Managing Project Risk

- Not understanding the benefits of risk management
- Not providing adequate time for risk management
- Not identifying and assessing risk using a standardized approach

Effective & Successful Risk Management Requires

- Commitment by all stakeholders
- Stakeholder responsibility
- Different risks for different types of projects

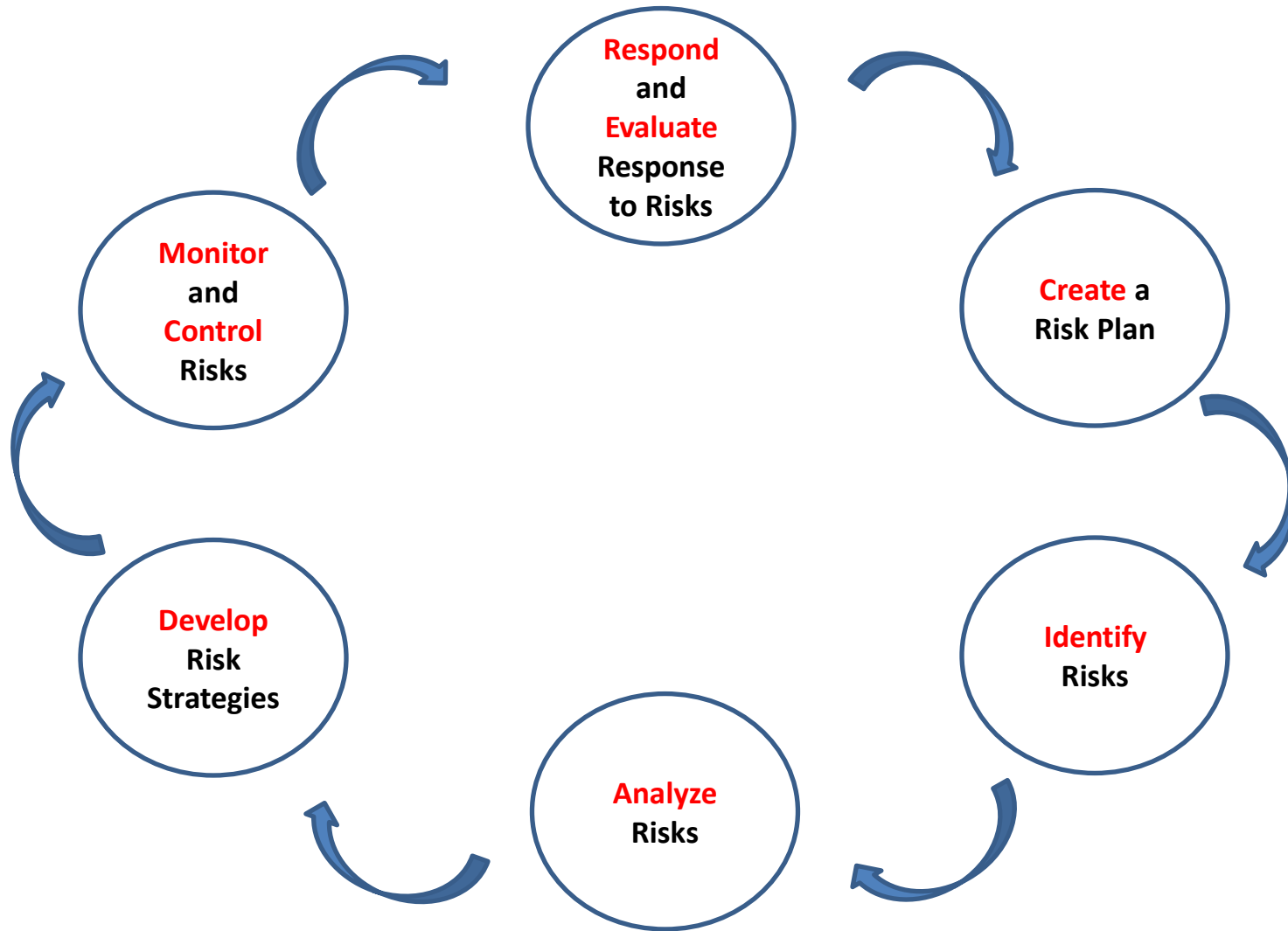
Assuming you have \$80K to invest:

Investment A: Potential return of \$1M at 25% probability

OR

Investment B: Potential return of \$100K at 90% probability

Project Risk Management Process



Project Risk Management Processes

1. Create a Risk Plan
2. Identify Risks
3. Analyze Risks
4. Develop Risk Strategies
5. Monitor and Control Risks
6. Respond and Evaluate Risk

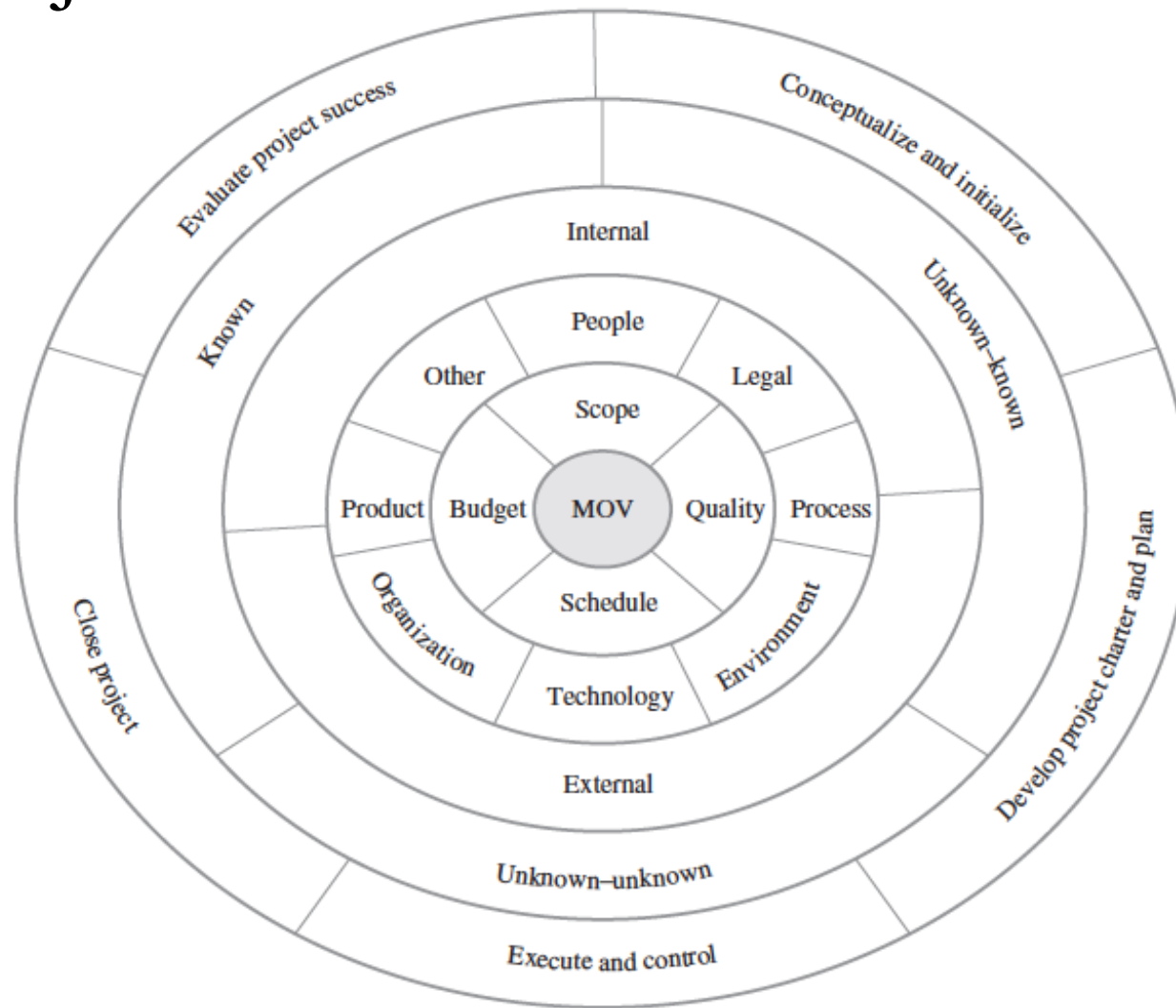


Step 1 – Create A Risk Plan

- Requires firm commitment by all stakeholders to the entire Risk Management (RM) approach
 - ◆ RM should align throughout the organization
- Risk Planning focuses on preparation
 - ◆ Systematic preparation and planning can help minimize adverse effects on the project while taking advantage of opportunities as they arise

STEP 2 – Identify Risks

Project Risk Identification Framework



STEP 2 – Identify Risks

Risk Identification Tools & Techniques

- Learning Cycles
- Brainstorming
- Nominal Group Technique
- Delphi Technique
- Interviews
- Checklists
- SWOT Analysis
- Cause & Effect (a.k.a. Fishbone/Ishikawa)
- Past Projects

STEP 2 – Identify Risks

Nominal Group Technique (NGT)

1. Each individual silently writes their ideas on a piece of paper
2. Each idea is then written on a board or flip chart one at a time in a round-robin fashion until each individual has listed all of his or her ideas
3. The group then discusses and clarifies each of the ideas
4. Each individual then silently ranks and prioritizes the ideas
5. The group then discusses the rankings and priorities
6. Each individual ranks and prioritizes the ideas again
7. The rankings and prioritizations are then summarized for the group

STEP 2 – Identify Risks

Dephi Technique

1. Get a group of **experts** together to identify potential risks or to discuss the impact of a particular risk (experts are not known to each other – could be done virtually)
2. To reduce bias, initially, the responses are collected and made available **anonymously** to each other
3. The experts are then asked to provide another response based on the previous round of responses
4. The process continues until a consensus is achieved

STEP 2 – Identify Risks

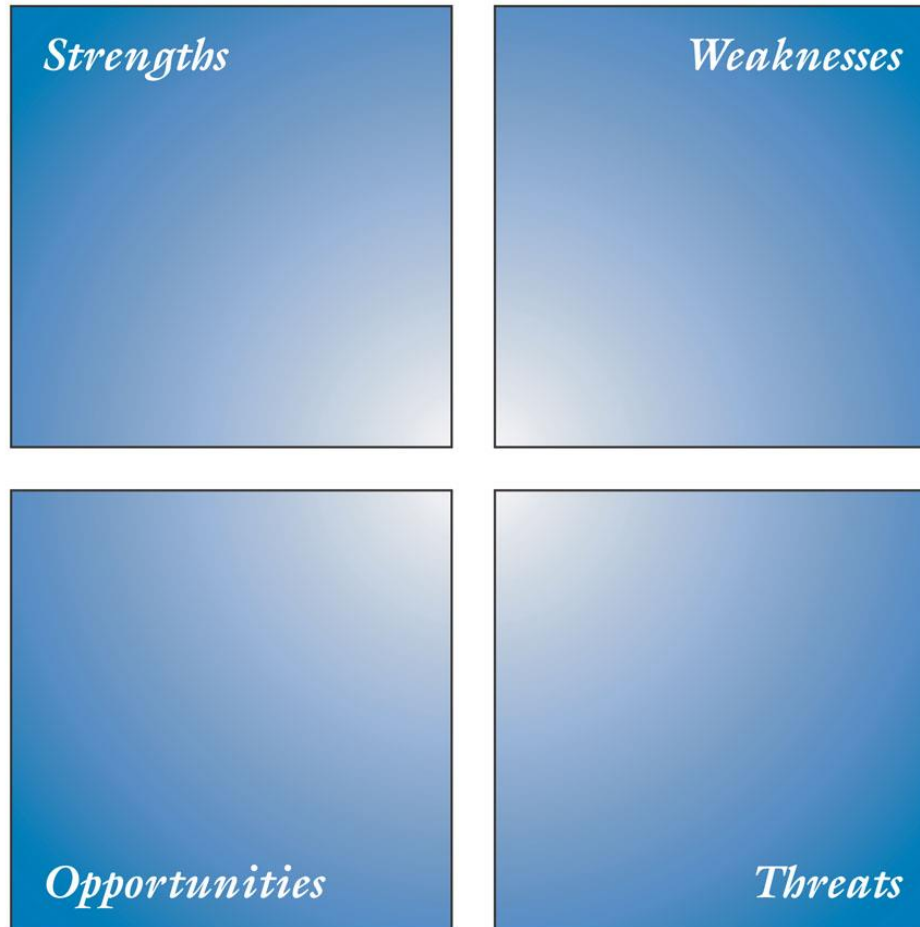
Risk Check List

Example -

- ☐ Funding for the project has been secured
- ☐ Funding for the project is sufficient
- ☐ Funding for the project has been approved by senior management
- ☐ The project team has the requisite skills to complete the project
- ☐ The project has adequate manpower to complete the project
- ☐ The project charter and project plan have been approved by senior management or the project sponsor
- ☐ The project's goal is realistic and achievable
- ☐ The project's schedule is realistic and achievable
- ☐ The project's scope has been clearly defined
- ☐ Processes for scope changes have been clearly defined

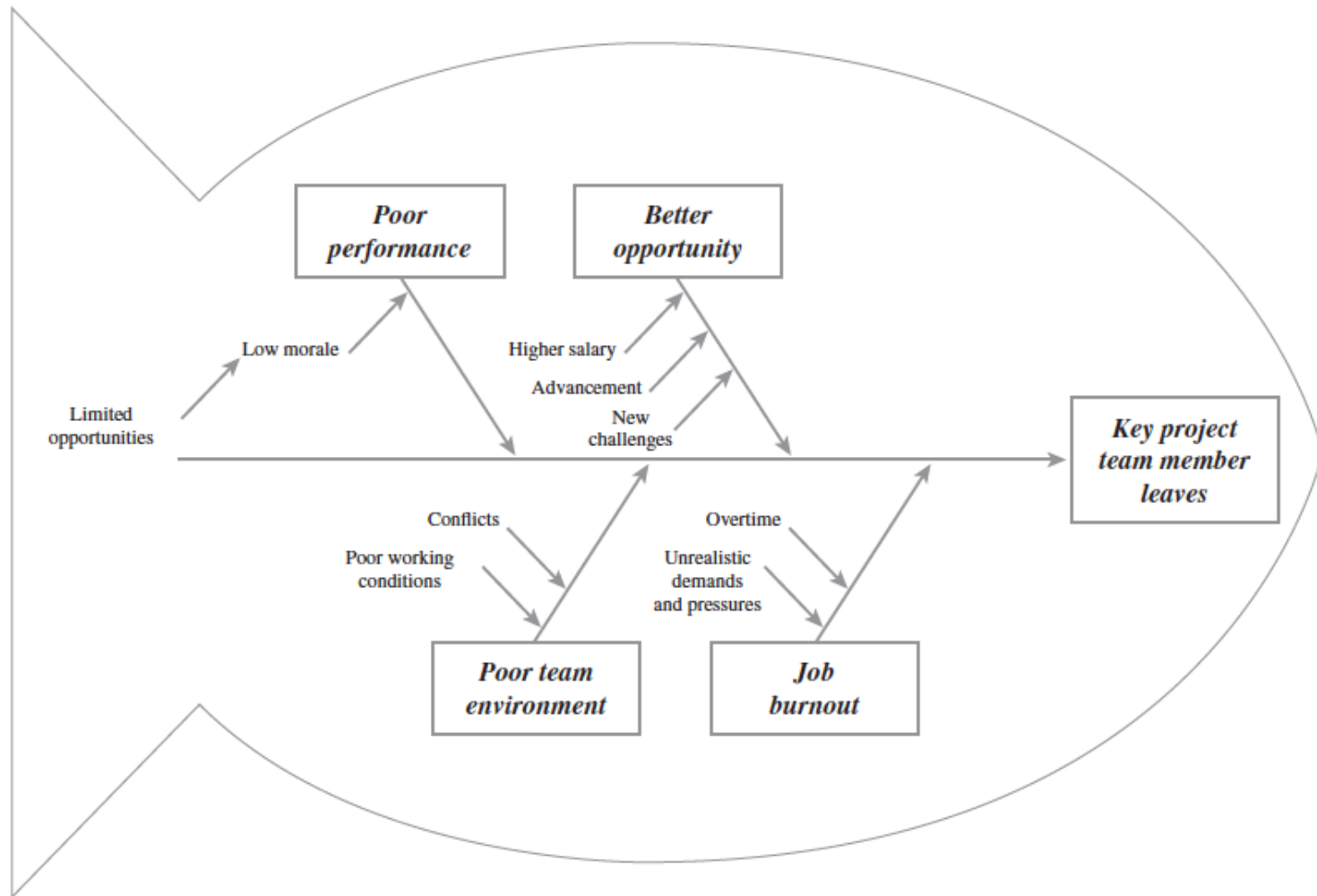
STEP 2 – Identify Risks

SWOT Analysis



STEP 2 – Identify Risks

Cause & Effect Diagram (Ishikawa)



STEP 3 – Analyze Risks

$$\text{Risk} = f(\text{Probability} * \text{Impact})$$

Risk assessment focuses on prioritizing risks so that an effective strategy can be formulated for those risks that require a response.



Qualitative Analysis: Risk Impact Table *(Risks Are Not Mutually Exclusive)*

	0 - 100%	0-10	P*I
Risk (Threats)	Probability	Impact	Score
Key project team member leaves project	40%	4	1.6
Client unable to define scope and requirements	50%	6	3.0
Client experiences financial problems	10%	9	0.9
Response time not acceptable to users/client	80%	6	4.8
Technology does not integrate with existing application	60%	7	4.2
Functional manager deflects resources away from project	20%	3	0.6
Client unable to obtain licensing agreements	5%	7	0.4

IT Project Risk Impact Analysis

Qualitative Analysis: Risk Rankings

Risk (Threats)	Score	Ranking
Response time not acceptable to users/client	4.8	1
Technology does not integrate with existing application	4.2	2
Client unable to define scope and requirements	3.0	3
Key project team member leaves project	1.6	4
Client experiences financial problems	0.9	5
Functional manager deflects resources away from project	0.6	6
Client unable to obtain licensing agreements	0.4	7

Team Assignment 5

Risk Analysis

(15 minutes for documentation)

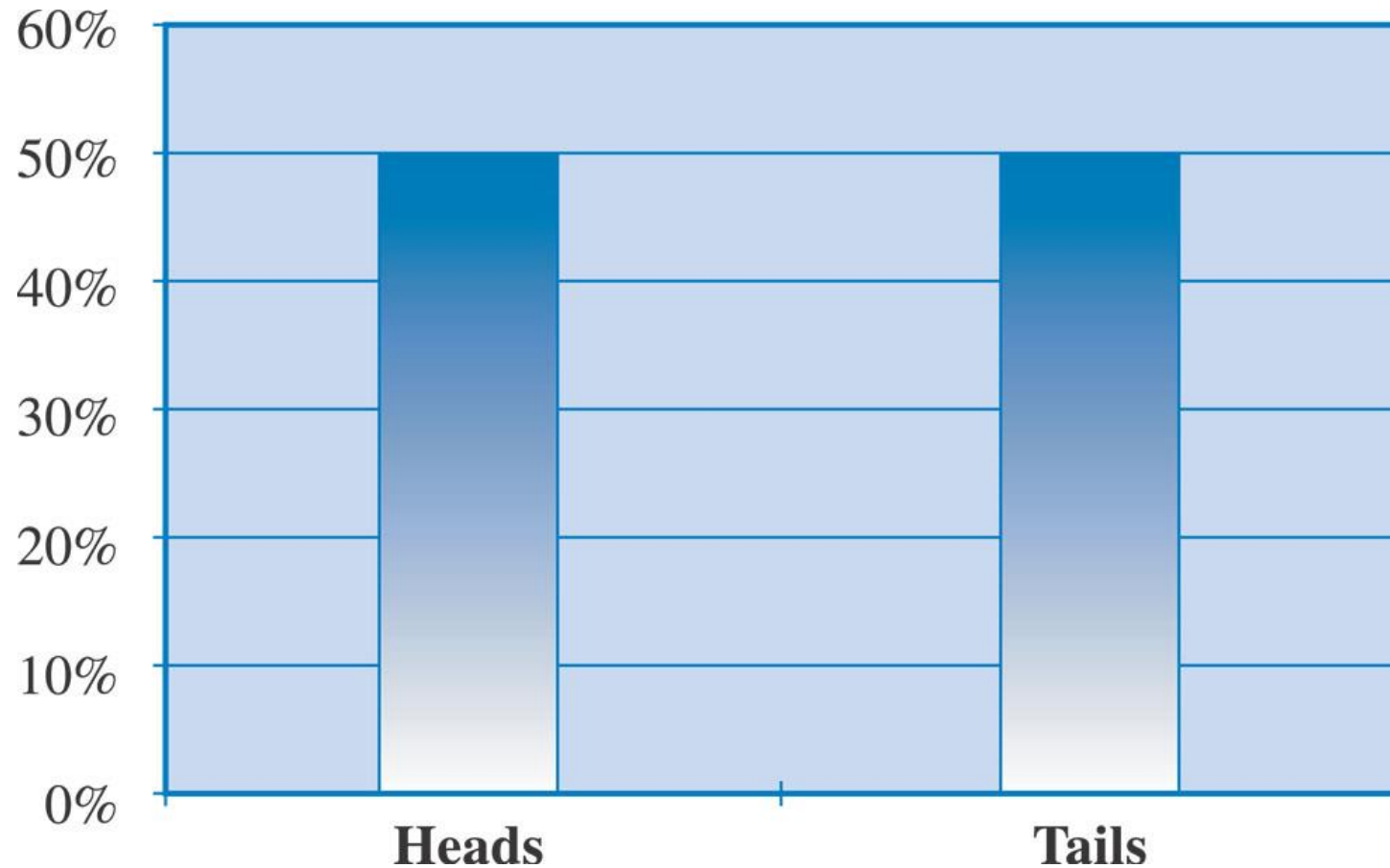
- Conduct risk analysis of your chosen project (i.e., Husky Air or MMA)
- Complete 2 Deliverables – (Power Point Submission)
 - Develop Risk Impact Table –
 - Choose top 5 risks (refer to risk identification framework)
 - Assign probability and impact score for each
 - Calculate P*I Score
 - Develop Risk Ranking Chart (highest to lowest)
- **List Team Members Participated** and submit before end of class.
- Submit in Team Assignment 5 Dropbox before midnight tonight.

STEP 3 – Analyze Risks

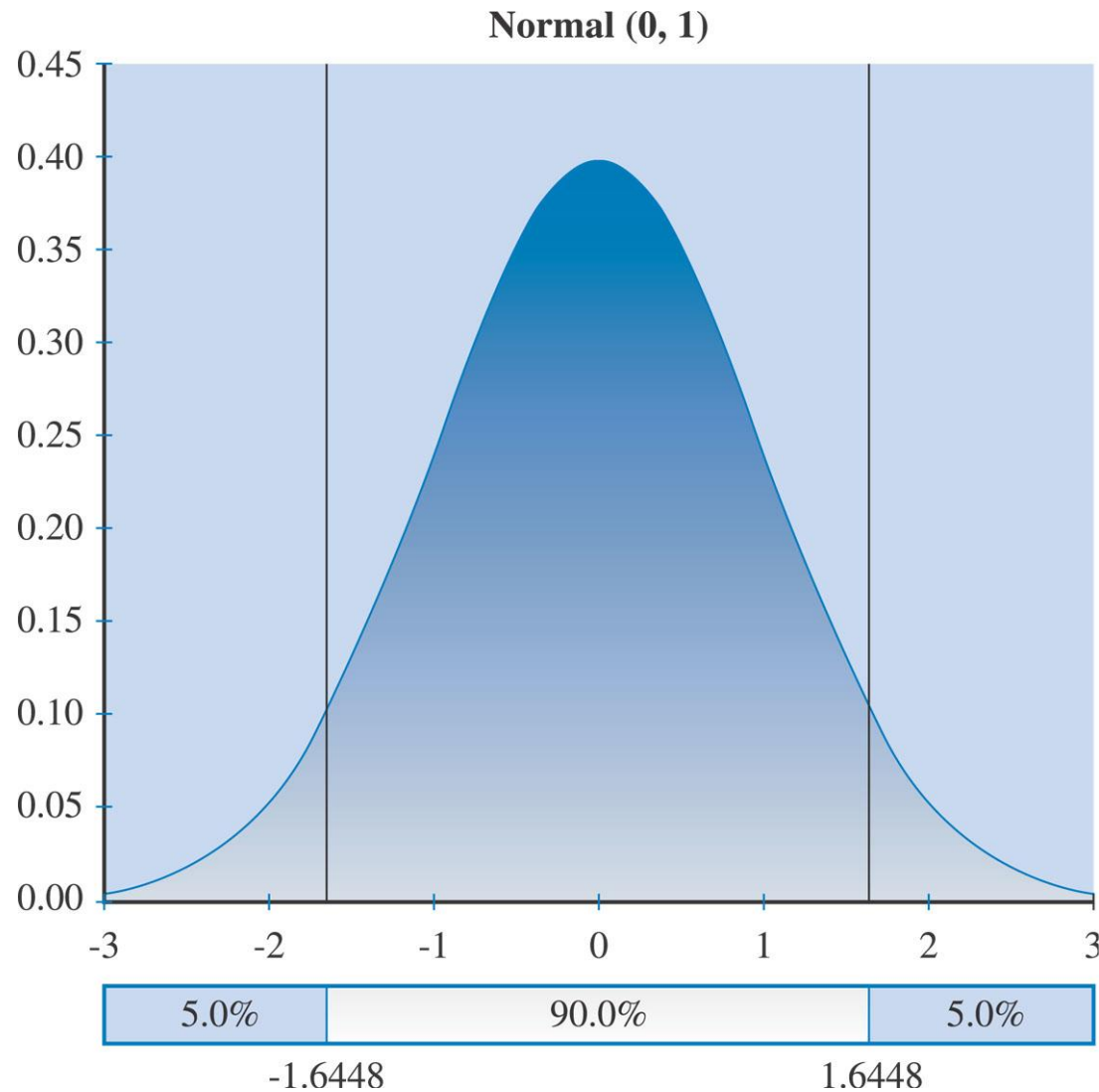
Quantitative Approaches

- Quantitative Probability Distributions
 - ◆ Discrete
 - Binomial
 - ◆ Continuous
 - Normal
 - PERT
 - TRIANG

Binomial Probability Distribution



Normal Distribution



Normal Distribution

- Rules of thumb with respect to observations
- Approximately....

68% \pm 1 standard deviations of mean

95% \pm 2 standard deviations of the mean

99% \pm 3 standard deviations of the mean

How would you convey the status to your executives?

“The task would be completed within 6 to 14 days with 2 standard deviation”

OR

“We’re 95% confident that the task will be completed within 6 to 14 days”

Normal Distribution

Formula for Finding the Range: $z = u \pm 2\sigma$

z = score (range)

u = mean

σ = standard deviation

If the mean (average) of completing home page design is 10 days, what is the range of probability based on certain standard deviations (confidence level)?

For **1 standard deviation (68% confidence level)**: $\sigma = 1$; mean (u) = 10

$$z = 10 + 2(1) = 12$$

$$z = 10 - 2(1) = 8$$

Range: 8 to 12 days (68% probability that the home page design will be completed within 8 to 12 days. Gap: 4 days between upper and lower bounds)

Normal Distribution

Formula for Finding the Range: $z = u \pm 2\sigma$

z = score (range)

u = mean

σ = standard deviation

If the mean (average) of completing home page design is 10 days, what is the range of probability based on certain standard deviations (confidence level)?

For **2 standard deviation (95% confidence level)**: $\sigma = 2$; mean (u) = 10

$$z = 10 + 2(2) = 14$$

$$z = 10 - 2(2) = 6$$

Range: 6 to 14 days (95% probability that the home page design will be completed within 6 to 14 days. Wider gap: 8 days between upper and lower bounds => more variability but higher confidence) Archery example

Normal Distribution

Formula for Finding the Range: $z = u \pm 2\sigma$

z = score (range)

u = mean

σ = standard deviation



If the mean (average) of completing home page design is 10 days, what is the range of probability based on certain standard deviations (confidence level)?

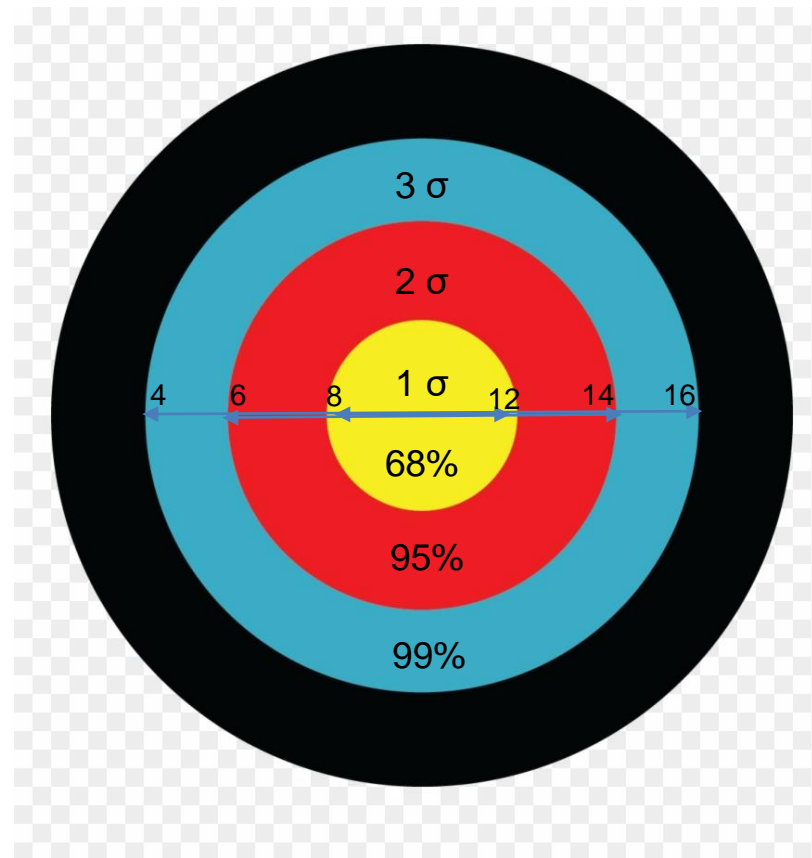
For **3 standard deviation (99% confidence level)**: $\sigma = 3$; mean (u) = 10

$$z = 10 + 2(3) = 16$$

$$z = 10 - 2(3) = 4$$

Range: 4 to 16 days (99% probability that the home page design will be completed within 4 to 16 days. Wider gap: 12 days between upper and lower bounds => more variability but higher confidence) Archery example

Normal Distribution



PERT Distribution

$$\text{PERT MEAN} = (a + 4b + c)/6$$

Where:

a = optimistic estimate

b = most likely

c = pessimistic

STEP 4 – Develop Risk Strategies –

Risk Strategies Depend On

- The nature of the risk itself
 - ◆ Really an opportunity or threat?
- Impact of the risk on the project's MOV and objectives
 - ◆ Likelihood? Impact?
- The project's constraints in terms of scope, schedule, budget, and quality requirements
 - ◆ Successful response possible with available resources?
- Risk tolerances or preferences of the project stakeholders

STEP 4 – Develop Risk Strategies – Strategies to respond to opportunities with potential positive impacts

- Exploitation – attempt to take advantage of the situation
- Sharing of Ownership – e.g. joint partnerships or joint ventures with customers or vendors
- Enhancement – increase the probability and/or impact of the opportunity
- Acceptance – PM and project team members' minds are open in order to take advantage of opportunities as they arise

STEP 4 – Develop Risk Strategies - Strategies to respond to threats with potential negative impacts

- Accept or Ignore
- Management Reserves
 - ◆ Released by senior management
- Contingency Reserves
 - ◆ Part of project's budget
- Contingency Plans
- Avoidance
- Mitigate
 - ◆ Reduce the likelihood or impact (or both)
- Transfer
 - ◆ E.g. insurance

STEP 5 – Monitor and Control Risk

- Risk Audits
 - ◆ External to project team
- Risk Reviews
 - ◆ Internal
- Risk Status Meetings & Reports

STEP 6 –Risk Response Plan that includes:

- The project **risk**
- A **trigger** which flags that the risk has occurred
- An **owner** of the risk (i.e., the person or group responsible for monitoring the risk and ensuring that the appropriate risk response is carried out)
- A **response** based on one of the four basic risk strategies
- Adequate **resources**

<i>Risk</i>	<i>Trigger</i>	<i>Owner</i>	<i>Response</i>	<i>Resources required</i>

STEP 6 –Risk Evaluation

- Lessons learned and best practices help us to:
 - ◆ Increase our understanding of IT project risk in general.
 - ◆ Understand what information was available to managing risks and for making risk-related decisions.
 - ◆ Understand how and why a particular decision was made.
 - ◆ Understand the implications not only of the risks, but also the decisions that were made.
 - ◆ Learn from our experience so that others may not have to repeat our mistakes.

New Assignment

- Team Assignment 6 – (Due Saturday, June 4th)
 - ◆ Part 1: DSC and UCD
 - Husky Air p. 140-141. Steps 1-5
 - Martial Arts Academy p.141-142. Steps 1-5
 - ◆ Part 2: WBS
 - Husky Air p. 141 Step 6
 - Martial Arts Academy p. 142 Step 6
 - ◆ *Do both DSC & UCD and WBS in sequence or parallel – Team decides!*
 - ◆ *Place in Team Assignment 6 dropbox*

Prepare for Next Class

- Review Chapter 6 & 7 (Bring your questions to class next week.)
- **Exam 2 (Rescheduled to Saturday, June 4th) – Chapters 5, 6, 7**
 - ◆ Starts at 1:15pm (We will meet virtually as a class @ 1:15pm first)
 - ◆ Exam Not Provided After 1:30pm
- **Reminder:**
 - ◆ Team Assignment 4 (In-Class): AON **Due Tonight before 11:59pm**
 - ◆ Team Assignment 5 (In-Class): Risk Analysis **Due Tonight before 11:59pm**
 - ◆ At-Home Assignment: MS Project Tutorial #2 – **Due May 25th**
 - ◆ **Team Assignment 6 (DSC, UCD, WBS) – Due June 4th**
 - ◆ Team Self-Select Project Presentation – Due June 10th
 - ◆ Team Text-Book Case Study Presentation & Project Book – Due June 10th