

Course: Software Project Management

Week 8: Risk Management, Identification and Assessment

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Contents

- Introduction
- Risk management Planning Process
- Risk Identification
- Risk Assessment

Learning Outcomes

After completing this lesson, you will be able to:

- Explain the Risk Management Planning Process
- Identify Risks in a Project Environment
- Assess and Prioritize Identified Risks

Introduction

What is the
Objective of Project
Management?

Successfully

✓ **Completing the Software projects**

✓ **On time**

✓ **Within budget**

✓ **By fulfilling all the requirements (scope)**

✓ **While managing risks and maintaining quality**

Introduction

- Failure to meet any project objective could have a negative impact on the business case for the project.
- In the realm of software development, risk management is a critical component that ensures the successful delivery of projects.
- It enables teams to
 - Foresee potential issues and
 - Take proactive measures to mitigate their impact.

What is Risk?

- PM-BOK (PMI, 2013) defines risk as
 - An uncertain event or condition that, if it occurs,
 - has a **positive** or **negative** effect on a project's **objectives**
 - Scope, schedule, cost and quality.
 - It relates to the future.
 - Project risks are those that could **prevent** the achievement of the **project's objectives** given to the project manager and the project team.

What is Risk?

- Risk involves
 - **Cause and effect**
- **Example: cost overrun**
 - **What are the causes?**
 - **Inaccurate estimate of effort**
 - **Use of untrained staff**
 - **Poor specification**

What is Project Risk Management?

- It is the process of identifying, assessing, and controlling potential problems that could threaten the success of a software project.
- These problems are called **risks** and they might:
 - **Delay the project**
 - **Increase costs**
 - **Reduce software quality**
 - **Affect customer satisfaction**

What is Project Risk Management?

- The goal of project risk management is not to eliminate all risks (which is impossible), but to understand them and plan for them.
 - It is an ongoing process that requires constant attention and adaptation as the project evolves.
 - Effective risk management helps teams to
 - Anticipate challenges
 - Allocate resources efficiently, and
 - Maintain project timelines.

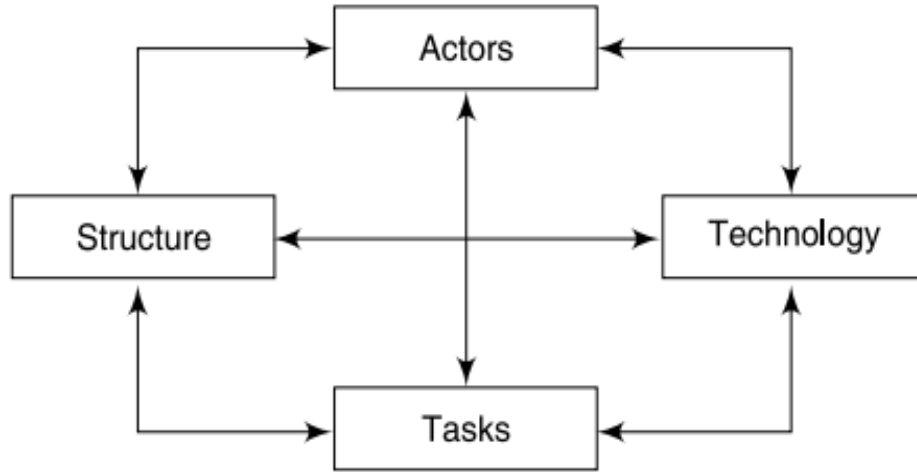
What is Project Risk Management?

- Its essential to
 - Improve decision making
 - Reduce surprise
 - Balance risks and opportunities
 - Increases stakeholder confidence

Categories of Risks

- In project management
 - Risks are classified into different categories to help teams
 - systematically identify, analyze, and manage them.
 - The categories are:
 - **Technical, operational, project management**
 - **Financial, security and compliance**
 - **Organizational, External**

Categories of Risks



Risk Framework (Bob Hughes, 2011)

Categories of Risks

- **Actor: People-Related Risks**

- all the people involved in the development of the software.
- Risks involving stakeholders, team members, skills & communication

- **Technology: Technical Risks**

- the technology used to implement the application and that embedded in the delivered products
- Risks related to tools, frameworks, platforms, and technical feasibility

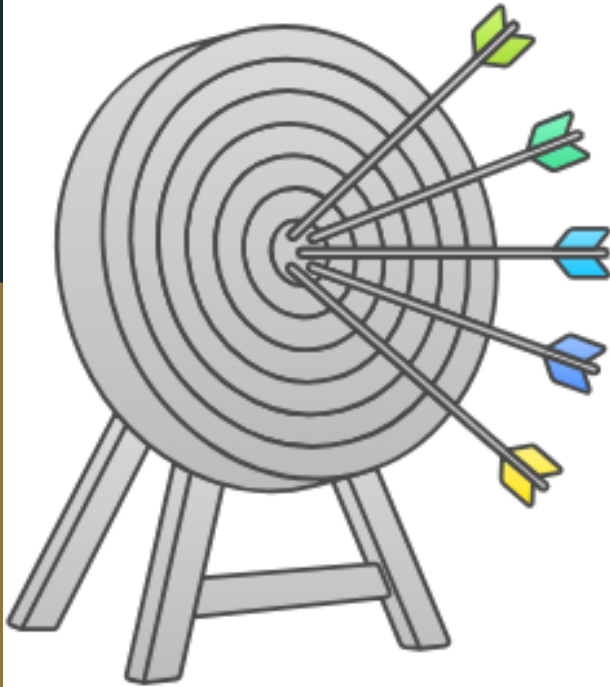
Categories of Risks

- **Structure: Organizational & Process Risks**
 - management structures and systems, including those affecting planning and control
 - Risks related to project organization, governance, and methodologies
- **Tasks: Work & Execution Risks**
 - the work planned
 - Risks in task estimation, scheduling, dependencies, and execution.

Categories of Risks

- Organizations perceive risk as the effect of uncertainty on projects and organizational objectives.
- Organizations and stakeholders are willing to accept varying degrees of risk depending on their risk attitude.
- The risk attitudes may be influenced by a number of factors
 - **Risk appetite:** level of uncertainty or acceptable risk → general
 - **Risk tolerance:** degree or level of acceptance from risk appetite
 - **Risk threshold:** unacceptable point → impact, requires action

Project Risk Management Process



Successful Project Delivery

The ultimate goal of risk management



Risk Monitoring & Controlling

Continuous oversight and review



Risk Strategies

Actions to reduce risk impact



Risk Assessment

Evaluating potential risks



Risk Identification

Recognizing potential issues



Project Risk Management Process

The processes or the stages are:

1. **Risk Management Planning**
2. **Risks Identification**
3. **Risk Assessment (Perform risk Analysis)**
4. **Risk Strategies (Plan risk Responses)**
5. **Risk Monitoring and Controlling**

Project Risk Management Process

The processes or the stages are:

- ✓ Risk Management Planning
- ✓ Risks Identification
- ✓ Risk Assessment (Perform risk Analysis)
- 🕒 Risk Strategies (Plan risk Responses)
- 🕒 Risk Monitoring and Controlling

Week/Lecture #9

Project Risk Management Process

Risk Management Planning

- The process of defining how to conduct risk management activities for a project.
- The objective is
 - To define how to approach, structure, and perform risk management activities for a project.
- Key Activity
 - **Develop the Risk Management Plan.**

Project Risk Management Process

Risk Management Planning

- **Develop the Risk Management Plan** includes:
 - **Methodology:** How risk management will be done (qualitative, quantitative, etc.)
 - **Roles and Responsibilities:** Who's responsible for managing risks.
 - **Budgeting:** Funding for risk management.
 - **Timing:** When risk activities will happen.

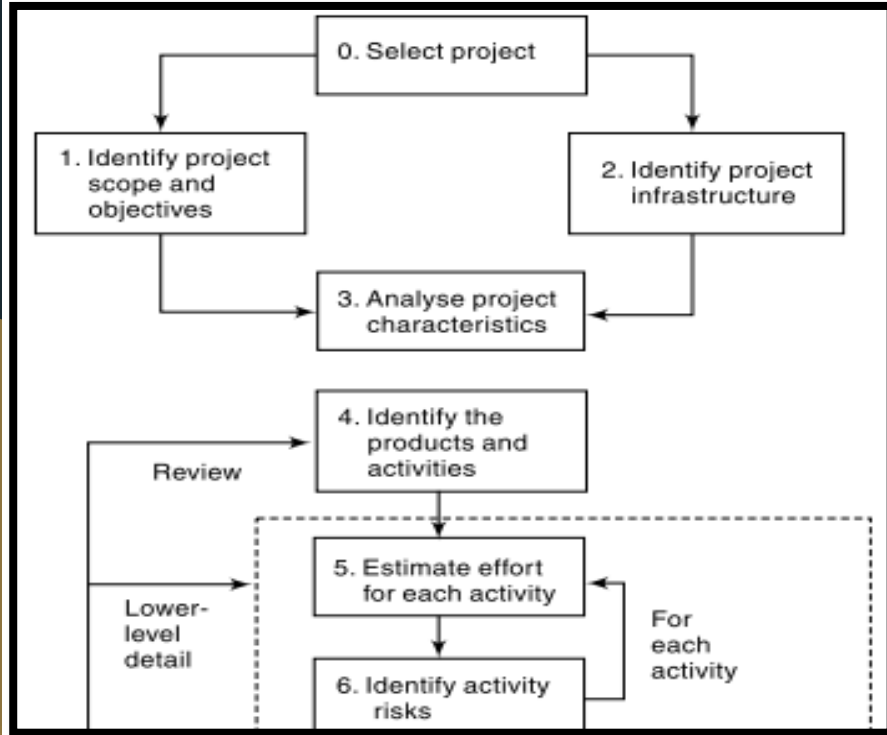
Project Risk Management Process

Risk Management Planning

- **Develop the Risk Management Plan** includes:
 - **Risk Categories:** Use of Risk Breakdown Structure (RBS) to categorize risks.
 - **Stakeholder Tolerances:** How much risk is acceptable.
 - **Reporting formats:** How results will be documented and communicated.
 - **Tracking:** How risk activities will be recorded and audited.

Project Risk Management Process

Risk Management Planning



- In stepwise approach
 - Risk planning is carried out in Steps 3 and 6

Project Risk Management Process

Risk Management Planning → Structure

1. Introduction
2. Risk management objectives
3. Risk management methodology
4. Roles and responsibilities
5. Risk categories
6. Risk identification Process
7. Risk Analysis and Assessment
8. Risk response plan

Project Risk Management Process

Risk Management Planning → Structure

9. Risk monitoring and controlling
10. Communication plan
11. Risk register (Appendix)
12. Optional
 - Lessons Learned from Past Projects
 - Assumptions & Constraints related to risk
 - Risk Audit Plan

Project Risk Management Process

Risk Identification - Finding What Could Go Wrong?

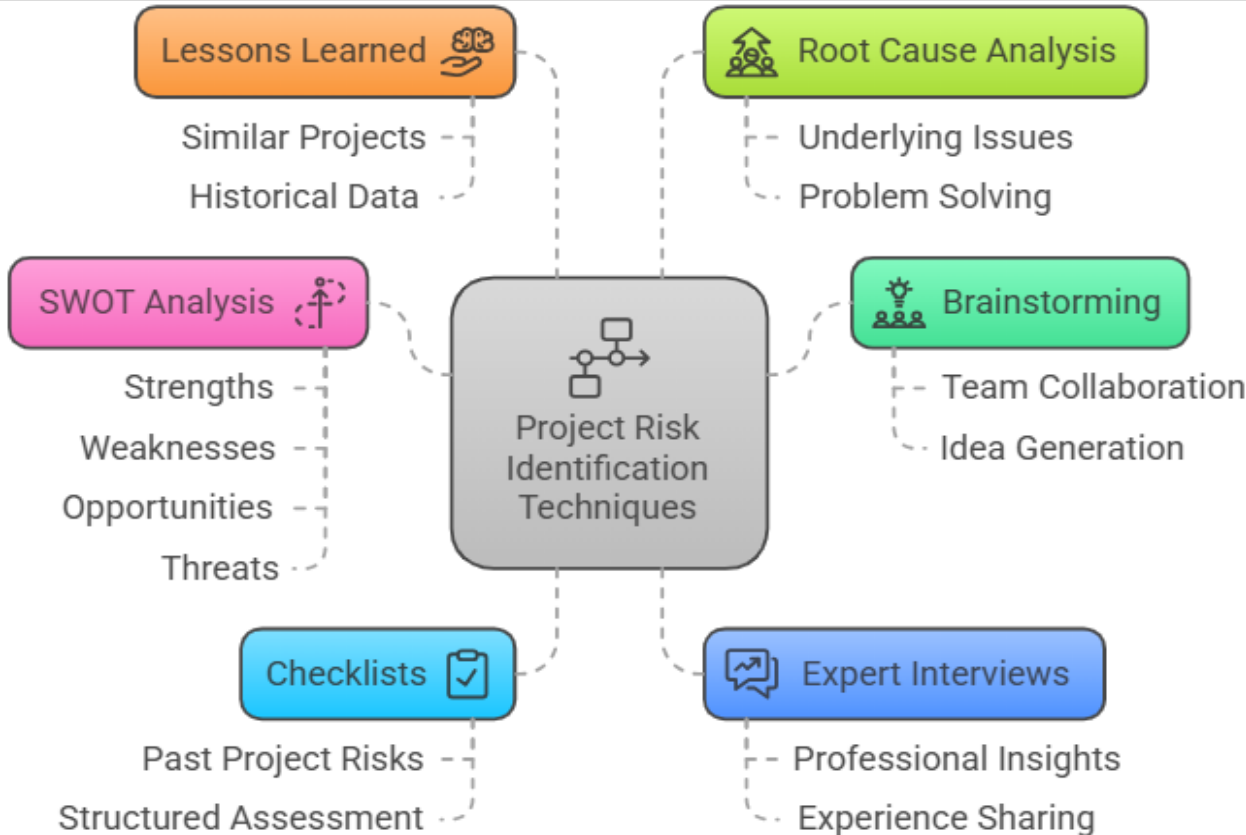
- The process of determining which risks may affect the project and documenting their characteristics.
- It is about spotting potential risks before they become real problems.
- Its objective is
 - To pinpoint potential individual project risks and sources of overall project risk.

Project Risk Management Process

Risk Identification - Activities

- The activities during risk identifications are:
 - Use **techniques**
 - Identify:
 - Threats (negative impact)
 - Opportunities (positive impact)
 - Document each risk in
 - **Risk register**

Project Risk Management Process



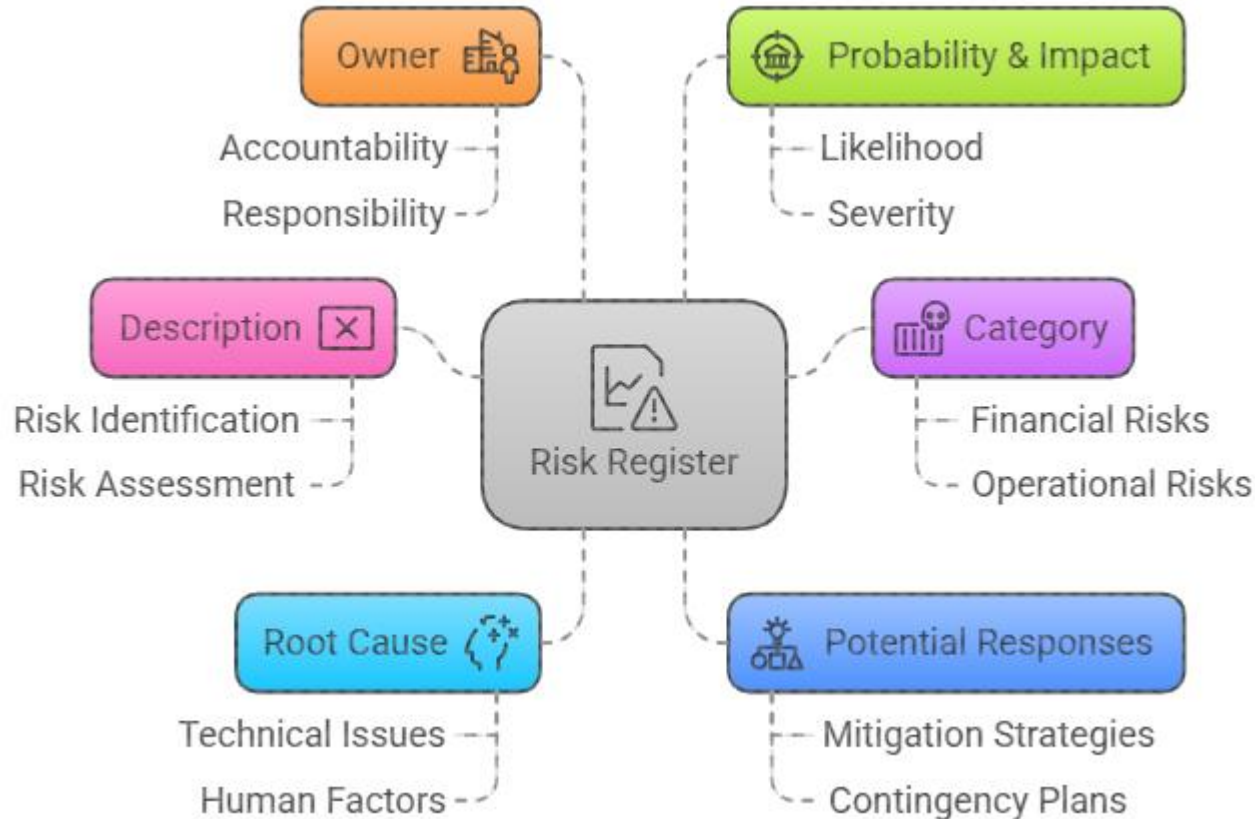
**Risk Identification -
Techniques**

Project Risk Management Process

Risk Identification – Risk Register

- A document used in project management
 - To identify, assess, track, and manage potential risks that could impact a software project.
- It serves as a central repository for all
 - identified risks
 - their characteristics, and
 - planned responses

Project Risk Management Process



Risk Register
Components and
Structure

Project Risk Management Process

Risk Identification – Common Risks in Software Projects

Risk Type	Example
Technical	New technology fails to work as expected
Project management	Poor planning leads to missed deadlines
Organizational	Changes in company structure or policy
External	New government regulations or market changes

Project Risk Management Process

Risk Assessment/Analysis - Overview

- Once risks are identified, analyzing their impact and likelihood is required for intervention.
- Key Factors:
 - **Likelihood / Probability:** How likely is the risk to occur?
 - **Impact:** If it happens, how bad will it be?
 - **Exposure:** Combination of likelihood and impact (also called risk magnitude)

Project Risk Management Process

Risk Assessment/Analysis - Processes

- This is split into two sub-processes:
 - **Qualitative** and **Quantitative**.
- **Qualitative:**
 - The process of prioritizing risks for
 - Further analysis or
 - Action by assessing and combining their probability of occurrence and impact.



Project Risk Management Process

Risk Matrix – 5x5 Scale

- A visual tool used to assess and prioritize risks based on
 - Likelihood (probability of occurrence) and
 - Impact (potential consequences).
- It helps project teams focus on high-priority risks that require immediate attention.

$$\text{Risk Score} = \text{Likelihood (L)} \times \text{Impact (I)}$$

- **Higher scores indicate greater priority**

Project Risk Management Process

Risk Matrix - Probability (Likelihood)

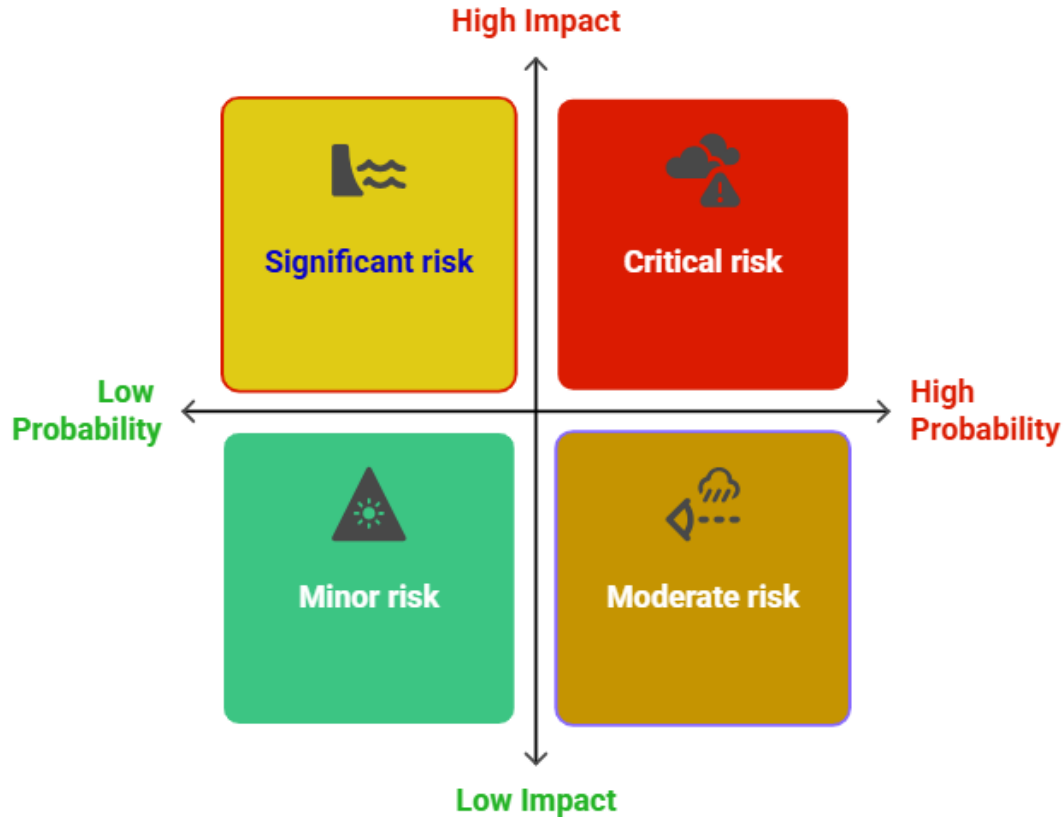
Likelihood	Score	Description
Very Low	1	Unlikely to occur (<10% chance)
Low	2	Possible but rare (10-30%)
Medium	3	Moderate chance (30-50%)
High	4	Likely to occur (50-70%)
Very High	5	Almost certain (>70%)

Project Risk Management Process

Risk Matrix - Impact (Severity)

Impact	Score	Description
Negligible	1	Minimal impact; easily manageable
Low	2	Minor delays or cost overruns
Medium	3	Noticeable impact on schedule/budget
High	4	Major delays, budget overruns, or reputation damage
Critical	5	Project failure, legal issues, or security breach

Project Risk Management Process



Project Risk Management Process



Risk Prioritization Matrix

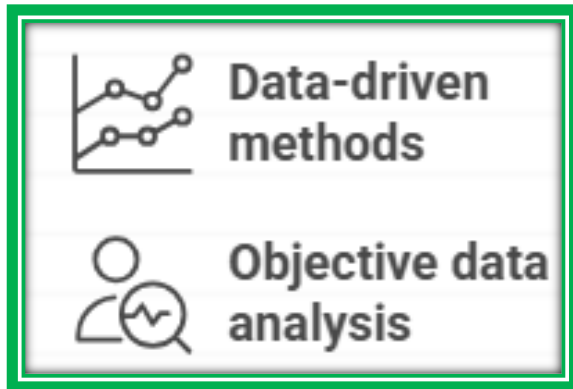
Risk Priority Levels:

- ✓ **Low (1-5)** → Monitor, no urgent action needed.
- ✓ **Medium (6-12)** → Plan mitigation strategies.
- ✓ **High (15-20)** → Immediate action required.
- ✓ **Extreme (25)** → Critical risk; may require project re-evaluation.

Project Risk Management Process

Risk Assessment/Analysis - Processes

- **Quantitative:**
 - The process of numerically analyzing the effect of identified risks on overall project objectives.



Project Risk Management Process

Risk Assessment/ Analysis - Types

Moderate Risk

Needs monitoring as probability is high but severity is low.



Critical Risk

Requires immediate attention due to high impact and likelihood.



Low Risk

Minimal concern due to low impact and likelihood.



Significant Risk

Important to address despite low probability due to high severity.



Summary

- Effective risk management is not just about identifying threats, it's about proactively planning for uncertainty.
- By integrating structured planning, thorough identification, and clear assessment, organizations can make informed decisions, minimize surprises, and increase project success rates.
- Risk Management Planning
 - Defines how risk activities will be conducted.
 - Produces the Risk Management Plan outlining methodology, roles, and tools.

Summary

- Risk Identification
 - Systematic process to detect potential risks.
 - Uses techniques like brainstorming, checklists, and expert input.
 - Results in a documented Risk Register.
- Risk Assessment
 - Qualitative: Assesses risk probability and impact using risk matrix.
 - Quantitative: Uses data-driven methods to evaluate overall project risk.
 - Helps prioritize risks for response planning.

References

1. *PMI. (2013). A Guide to the Project Management Body of Knowledge (5th ed.). PMI, Inc.*
2. *Bob Hughes, M. C. (2011). Software Project Management (5th ed.). McGraw-Hill.*