Software Project Management (SPM)

Course Code: CACS407
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Credit Hours: 3hrs

Unit - 05: Risk Management

Class Load : 5 Hrs

TABLE OF CONTENTS

Unit -5

Risk Management **5 Hrs**

Risk Identification, Planning, Evaluation and Management, Categories of Risk, Framework for dealing with risk, evaluating Risks to the schedule.

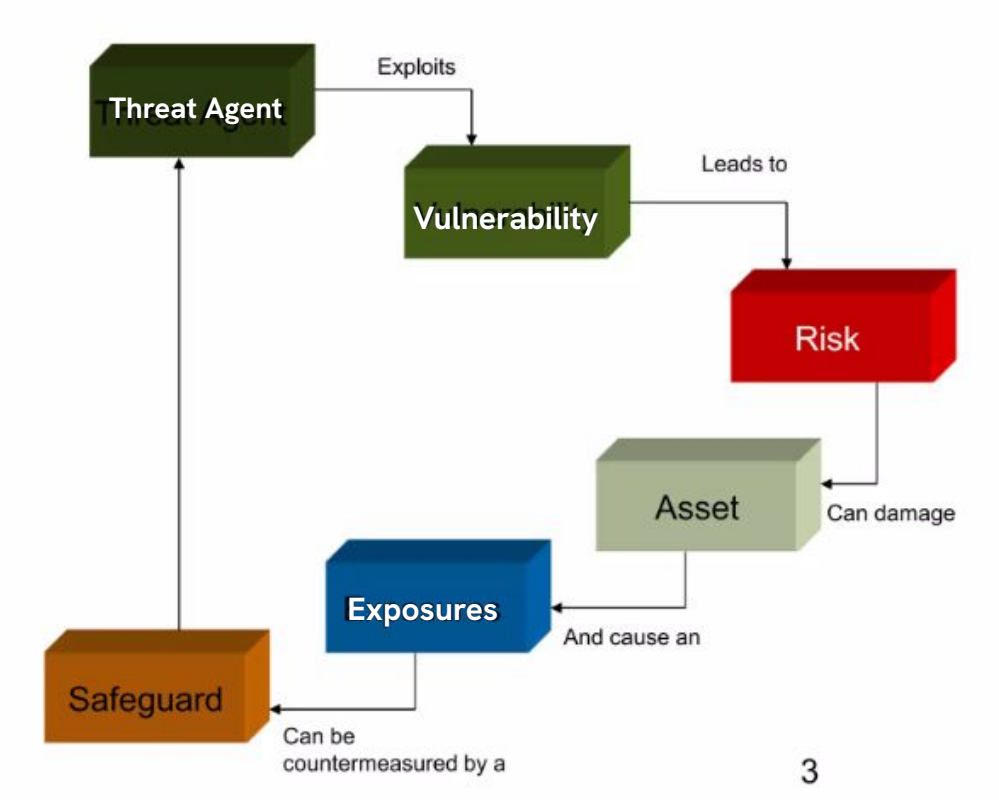
Risk

- Risk is an **expectation** of loss and a potential problem that **may or may not occur** in the future.
- In software development, it arises due to lack of information, control, or time.

Software Risk:

- Software Risk refers to the possibility of suffering from a loss during the software development process.
- **Causes:**
  - Uncertain future.
  - Incomplete or unknown factors that cannot be incorporated into the project plan.
- **Impact of Software Risks:**
  - Increase in production cost.
  - Development of poor-quality software.
  - Failure to complete the project on time.

Risk Life Cycle:



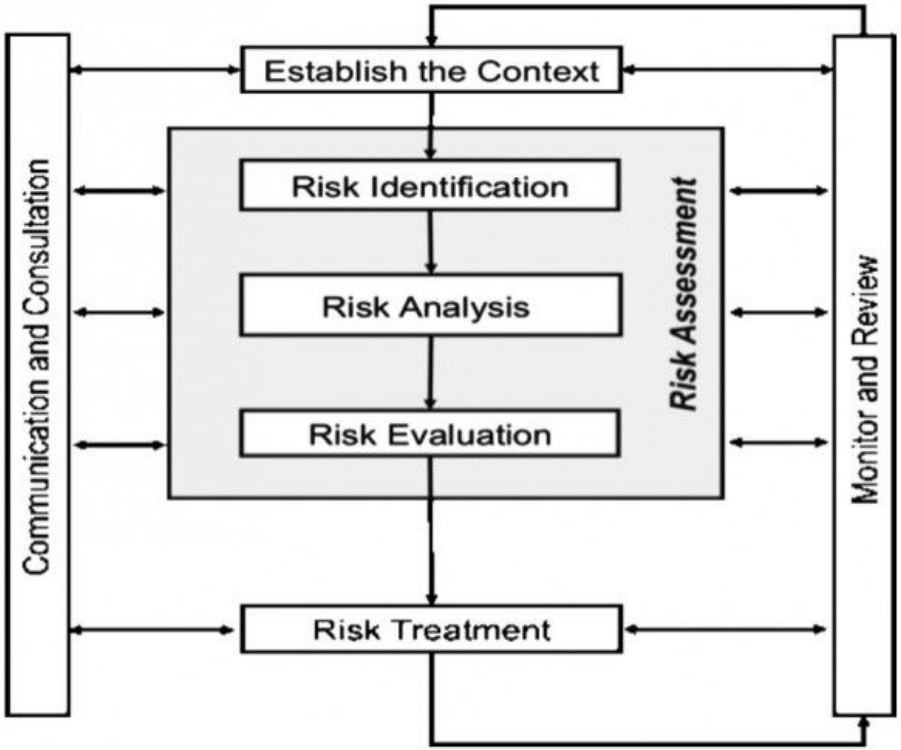
Risk Management:

- Risk management is defined as "the **systematic application** of management practices, policies, and procedures for identifying, analyzing, controlling, and monitoring risk."
- **Why is it important?**
  - Risk **affects all aspects of your project**—your budget, your schedule, your scope, the agreed level of quality, and so on.
  - **Increase** the probability of **positive** events.
  - **Reduce** the occurrence of **negative** events.

Risk Management:

- Risk Management comprises of **following processes**:
  - Software Risk Identification
  - Software Risk Analysis
  - Software Risk Evaluation
  - Software Risk Treatment
  - Software Risk Monitoring & Review

ISO 31000:2018 Risk Management Process:



Risk Identification 5.1

Risk Identification:

- Risk identification is the **foundational phase** of risk management, where potential risks are **recognized, documented, and analyzed** to minimize their impact on a software project.
- It involves a **comprehensive understanding** of the organization, the external and internal environments, and the project processes.
- If risk **isn't identified** it **can't be** evaluated and managed.

Risk Identification Steps:

- **Study Past Projects:**
  - Analyze problems from similar past projects to anticipate recurring risks.
- **Analyze the Project Plan:**
  - Review the project plan and convert it into a flowchart to identify critical workflows and areas of vulnerability.
- **Conduct Brainstorming Sessions:**
  - Collaborate with stakeholders and team members to identify potential risks, including known risks and known unknowns.
- **Evaluate Key Decisions:**
  - Assess technical, operational, legal, political, and financial decisions for their risk implications.
- **Document the Risk.**

Methods of Risk Identification:

Several proven techniques can be used for identifying risks in a project:

- **Brainstorming:**
  - Brainstorming involves group discussions where project stakeholders, team members, and experts come together to generate ideas about potential risks.
  - *Example:* Brainstorming sessions to identify possible delays due to dependencies on third-party vendors.
- **Delphi Technique:**
  - The Delphi technique is a structured, consensus-based method where experts provide risk insights anonymously in multiple rounds.
  - *Example:* Using Delphi to identify technical risks in developing new software features.

Methods of Risk Identification:

- **Interviewing:**
  - Interviews involve one-on-one or group discussions with stakeholders, subject matter experts, and team members to gather their perspectives on potential risks.
  - *Example:* Interviewing project managers to identify operational risks related to resource shortages.
- **SWOT Analysis (Strengths, Weaknesses, Opportunities, and Threats):**
  - SWOT analysis is a strategic tool that identifies risks by analyzing internal (strengths and weaknesses) and external (opportunities and threats) factors.
  - *Example:* Analyzing weaknesses like skill gaps in the team that could impact project timelines.

Other Methods of Risk Identification:

- **Checklists:** Predefined lists of risks based on past projects and industry standards.
- **Structured 'What-If' Technique (SWIFT):** Systematically analyzing "what-if" scenarios to explore possible risks.
- **Scenario Analysis:** Simulating various project situations to identify risks.
- **Fault Tree Analysis (FTA):** A systematic technique for identifying failures in processes or systems.
- **Bow Tie Analysis:** Visual representation linking risk causes, events, and consequences.
- **Direct Observations:** Observing processes and operations to uncover vulnerabilities.
- **Incident Analysis:** Learning from past incidents or near-miss events.
- **Surveys and Questionnaires:** Collecting risk data from stakeholders using structured tools.

Risk Planning

5.2

Risk Planning:

- Risk planning in software project management **involves identifying potential risks** that could impact the success of a project, assessing their **likelihood and potential impact**, and developing **strategies to mitigate** or manage those risks effectively.
- It aims to **anticipate and prepare** for any uncertainties that could arise during the project lifecycle, helping to **minimize negative** impacts and **maximize** the chances of project success.

Risk Planning > WHY? :

- **Defining Preventive Measures:**
  - Implement strategies to reduce the likelihood of risks.
  - Address vulnerabilities before they escalate.
  - ***Example:*** Use robust project estimation techniques to avoid schedule or budget risks.
- **Defining Impact-Reduction Measures:**
  - Plan actions to minimize the impact of materialized risks.
  - Mitigate severity and consequences.
  - ***Example:*** Regular data backups to handle system crashes.
- **Continuous Monitoring and Early Risk Identification:**
  - Monitor project activities to detect risks early.
  - Enable corrective actions before issues escalate.
  - ***Example:*** Track KPIs like cost variance or schedule delays.

Risk Planning > Key Steps :

1. **Identify Risks:** Spot potential problems that could affect the project.
2. **Analyze Risks:** Evaluate the likelihood and impact of these risks.
3. **Plan Risk Responses:** Develop strategies to mitigate or manage identified risks.
4. **Develop Contingency Plans:** Prepare backup plans in case risk events occur.
5. **Monitor and Control Risks:** Regularly review and adjust your risk management strategies as the project progresses.
6. **Communicate and Report:** Keep all stakeholders informed about risks and risk management activities.

Risk Planning:

- **Advantages:**
  - **Proactive Problem-Solving:** Prevents issues before they occur.
  - **Informed Decision-Making:** Enables better decisions on risks.
  - **Stakeholder Confidence:** Builds trust through preparedness.
  - **Cost and Time Savings:** Avoids unexpected delays and expenses.
- **Disadvantages:**
  - **Resource-Intensive:** Demands time and effort.
  - **Risk Overemphasis:** Diverts focus from opportunities.
  - **Unrealistic Expectations:** Creates false confidence.
  - **Risk Aversion:** Limits innovation by avoiding risks.

Evaluation & Management

5.3

Risk Evaluation and Management:

- Risk evaluation and management in software project management involves **assessing potential risks** that could affect the project's success, determining their **likelihood and impact**, and developing **strategies to mitigate** or manage them effectively.
- It aims to **proactively** identify and address uncertainties to **minimize** negative impacts and maximize the project's chances of success.
- Risk evaluation and management are **intertwined processes that are crucial for navigating the uncertainties and ensuring the success** of your software project.

Risk Evaluation:

- **Focus:** Identifies, analyzes, and prioritizes potential risks that could affect the project.
- **Steps:**
  - **Risk Identification:** Brainstorm and gather information to list potential threats to various aspects (technical, schedule, budget, etc.).
  - **Risk Analysis:** Assess the likelihood of each risk occurring and its potential impact on project objectives. This can involve qualitative methods like risk scoring matrices or quantitative analysis using historical data.
  - **Risk Prioritization:** Rank risks based on their severity and probability to focus on the most critical ones first.

Risk Management:

- **Focus:** Develops and implements strategies to address prioritized risks.
- **Steps:**
  - **Risk Response Planning:** For each high-priority risk, define a plan outlining actions to mitigate, avoid, transfer, or accept the risk.
  - **Risk Response Implementation:** Assign responsibilities, deadlines, and resources to execute the chosen response strategies.
  - **Risk Monitoring and Control:** Regularly track the status of risks, their likelihood, and potential impact. Update risk plans as needed and communicate changes to stakeholders.

Risk Evaluation and Management:

- **Advantages:**
  - **Better Project Outcomes:** Ensures smoother execution by addressing potential issues.
  - **Informed Decision-Making:** Enables strategic choices based on risk analysis.
  - **Stakeholder Confidence:** Reassures stakeholders with well-planned risk management.
  - **Cost and Time Savings:** Reduces unexpected costs and delays.
- **Disadvantages:**
  - **Resource-Intensive:** Requires significant time, effort, and expertise.
  - **Risk Overemphasis:** May divert focus from innovation and opportunities.
  - **Unrealistic Expectations:** Can lead to overconfidence in risk control.
  - **Risk Aversion:** Discourages taking calculated risks, limiting growth.

Categories of Risk

5.4

Categories of Risk:

- The various categories of risks associated with software project management are **listed below**:
  - Schedule / Time-Related / Delivery Related Planning Risks
  - Budget / Financial Risks
  - Operational / Procedural Risks
  - Technical / Functional / Performance Risks
  - Other Unavoidable Risks

Schedule / Time-Related / Delivery Related Planning Risks

- These risks are related to delays and time management, directly impacting the project timeline.
- **Causes:**
  - Incorrect time estimation and project schedule.
  - Improper or underutilized resource allocation.
  - Superficial understanding of project complexities.
  - Unexpected scope expansion (client approvals or external dependencies).
  - **Silo approach:** isolated team efforts causing integration issues.
- **Example:** A delay in a critical activity (e.g., client approvals) causes a domino effect on subsequent project phases.

Budget / Financial Risks:

- These are monetary risks leading to budget overruns.
- **Causes:**
  - Improper budget estimation.
  - Cost overruns due to underutilized/shared resources.
  - Unexpected project scope expansion.
  - Improper financial tracking.
  - Delay penalties.
- **Example:** Scope creep from additional client requirements increases costs beyond the original budget.

Operational / Procedural Risks:

- Risks related to day-to-day project operations.
- **Causes:**
  - Improper process implementation.
  - Silo approach causing team conflicts.
  - Conflicting priorities and lack of conflict resolution.
  - Poor communication and unclear responsibilities.
  - Insufficient training for team members.
- **Solution:** A robust communication structure, conflict resolution process, and clear task prioritization can mitigate these risks.

Technical / Functional / Performance Risks:

- These relate to software functionality and performance.
- **Causes:**
  - Reduced functionality due to budget/schedule overruns.
  - Insufficient software testing (shrinking test time to meet deadlines).
  - Trade-off between software functionality and performance.
- **Solution:** Define a cut-off date for freezing project requirements and prioritize subsequent releases for additional features.

Other Unavoidable Risks:

- These risks are beyond the project's direct control but can be anticipated.
- **Causes:**
  - Changes in government policies.
  - Technology obsolescence due to competition.
  - Contract losses from changes at the client's end.
- **Mitigation:**
  - Stay updated with policy changes and monitor competitors.
  - Focus on customer satisfaction to minimize contractual risks.

Framework for Dealing with Risk

5.5

Framework for Dealing with Risk (Risk Management Framework)

- The Risk Management Framework is a **template and guideline** used by companies to identify, eliminate, and minimize risks.
- It was originally developed by the **National Institute of Standards and Technology** to help protect the information systems of the United States government.
- An effective risk management framework **seeks** to protect an organization's capital base and earnings **without hindering growth**.
- Adopting a risk management framework that incorporates best practices into the firm's risk culture **can be the foundation** of a company's financial future.

5 Components of RMF:

- **Risk Identification:** Identifying potential risks that could impact the project, such as technical challenges, schedule delays, budget overruns, and resource constraints.
- **Risk Measurement and Assessment:** Analyzing the likelihood and impact of each identified risk using techniques like risk scoring matrices, historical data analysis, and expert judgment.
- **Risk Mitigation (Minimization):** Developing and implementing actions to reduce the likelihood or impact of risks through strategies like avoidance, mitigation, transference, and acceptance.
- **Risk Reporting and Monitoring:** Regularly tracking the status of risks and communicating updates to stakeholders using tools like risk registers, dashboards, and reports.
- **Risk Governance:** Establishing clear roles, responsibilities, and processes for managing risks, including oversight and approval of risk management activities.

Risk Management Framework Steps:

- **Prep:** Define project, roles, and communication plan.
- **Identify:** Brainstorm, categorize, and gather data on potential risks.
- **Analyze:** Assess likelihood and impact of each risk, prioritize them.
- **Respond:** Develop plans to mitigate, transfer, avoid, or accept key risks.
- **Implement & Monitor:** Implement plans, track risk status, adjust as needed.
- **Report & Communicate:** Share risk information with stakeholders regularly.
- **Improve:** Learn from experience and refine the framework for future projects.

Evaluating Risk to the Schedule

5.6

Evaluating Risk to the Schedule:

- **Risk Identification:** Identify factors that could impact the project schedule, such as scope changes, resource constraints, dependencies, or technical challenges.
- **Risk Analysis:** Assess the identified risks by considering their **probability of occurrence and the potential impact** on the project schedule. This involves analyzing the severity of each risk and its potential consequences on project milestones.
- **Quantitative Analysis:** Utilize quantitative techniques, such as Monte Carlo simulations or PERT analysis, to **quantify the impact of identified risks** on the project schedule. This provides a more accurate assessment of schedule uncertainty and helps prioritize risk response efforts.

Evaluating Risk to the Schedule:

- **Risk Response Planning:** Develop strategies to mitigate or manage schedule risks. This may involve allocating additional resources, adjusting task dependencies, or implementing contingency plans to address potential schedule delays.
- **Monitoring and Control:** Continuously monitor the project schedule for deviations and assess the effectiveness of risk response strategies. Regular progress tracking and milestone reviews help ensure proactive risk management throughout the project lifecycle.
- **Communication:** Communicate schedule-related risks and mitigation efforts to stakeholders, including project sponsors, team members, and clients. Transparent communication fosters collaboration and ensures alignment on schedule expectations and risk management priorities.

Evaluating Risk to the Schedule:

THANKS!

Do you have any questions?

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