Module 4 : Planning Projects
Software Risk Management

Mrs. Priya R L
Faculty Incharge for PM
Department of Computer Engineering
VES Institute of Technology, Mumbai

ILOC: Project Management (Autonomy)

Agenda : Planning Projects

- Crashing project time
- Resource loading and leveling
- Goldratt's critical chain
- Project Stakeholders and Communication plan.
- **Software Risk Management:**
- Identify IT Project Risk
- Risk Analysis and Assessment
- Risk Strategies
- Risk Monitoring and Control
- Risk Response and Evaluation.

What is Risk?

- **Risk :** The effect of uncertainty on objectives.
- Typically related to one of four areas:
  - Strategy
  - Change management
  - Operations
  - Finance
- Risks can be positive, negative, or neutral.

What is Project Risk Management?

- Includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control of 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.

What is Project Risk Management?

- Principles and processes that help minimize the negative impacts of risks and maximize the positive impacts.
- Process should be PACED:
  - **Proportionate**
  - **Aligned**
  - **Complete**
  - **Embedded**
  - **Dynamic**

Examples of Risks

- Business interruptions
- Changes in business relationships
- Changing labor market conditions
- System issues
- Access to information
- Security conditions

Understanding Risks

- **Quantitative risks** are those that can clearly be quantified.
- **Qualitative risks** are those that cannot easily be clearly quantified.
- You should always strive to make all qualitative risks quantitative, if possible,
- By collecting and analyzing data.

Understanding Risks

- Positive risks are risks that result in good things happening; sometimes called opportunities.
- Negative risk management is like a form of insurance; it is an investment.

Common Mistakes in Managing Project Risk

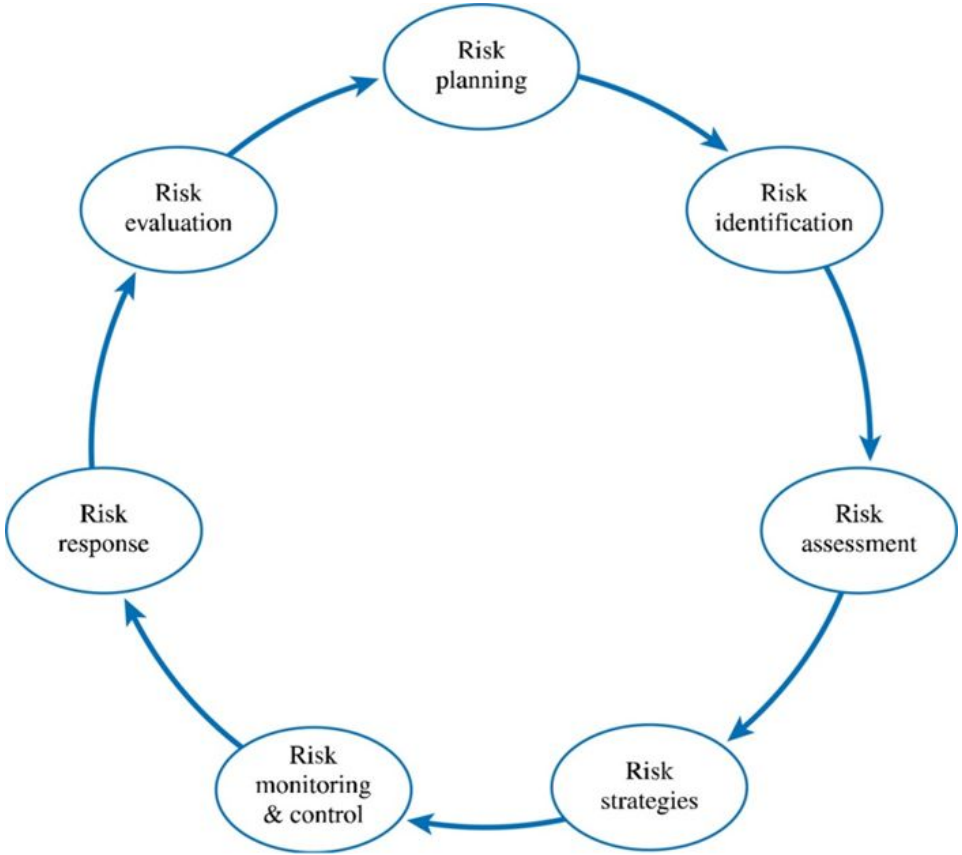
- Not understanding the benefits of risk management
- Not providing adequate time for risk management
- Not identifying and assessing risk using a standardized approach

Understanding Risks

Effective & Successful Risk Management Requires

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

Project Risk Management Processes



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

- **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
- **Monitoring and controlling risks**: 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 Processes

- **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
- **Monitoring and controlling risks**: 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 Activities

1. Risk Management Planning

- It involves deciding How to approach & plan the risk management activities for the project.
- By reviewing the project scope statements, project management plan, environment factors, & organizational process assets, project team can discuss & analyze risk management activities for their particular project.
- **OUTPUT: -**The main output of this process is a risk management plan.

1. Risk Management Planning

Following are **topics addressed in a RMP:**

- **Methodology:** how will risk management be performed on project & what tools & data sources are available & applicable?
- **Roles & responsibilities**: who are individuals responsible for a implementing specific task related to risk management?
- **Risk budget & schedule**: what are estimate costs & schedule for performing risk related activities?
- **Risk categories**: what are the main categories of risks that should be addressed on this project?
- **Risk probability & impact**: how will be probabilities & impact of risk items be accessed?
- **Risk documentation**: what reporting formats & processes will be used for risk management activities?

1. Risk Management : Common Sources of Risk

- Many organizations develop their own risk questionnaires, categories of risk described on these questionnaires might include:
  - Market risk
  - Financial risk
  - Technology risk
  - People risk
  - Structure / process risk

1. Risk Management : Risk Questionnaires

Market Risk

- If the information technology project is to produce a new product or service, will it be useful to the organization or marketable to others?
- Will users accept & use the product or service?
- Will someone else create a better product or service faster, making the project waste of time & money?

1. Risk Management : Risk Questionnaires

Financial Risk

- Can the organization afford to undertake the project?
- How confident are the stakeholders in the financial projections?

Financial projections:-

- Will the project meet the NPV, ROI & payback estimation?
- If not, can the organization afford to continue the project ?
- Is this project the best way to use the organization's financial resources?

1. Risk Management : Risk Questionnaires

Technology Risk

- Is the project technically feasible ?
- Will it use mature, leading edge technologies ?
- When will decisions be made on which technology to use ?
- Will the technology be available in time to meet project objectives ?
- Will hardware, software, & networks function properly ?
- Could the technology be obsolete before a useful product can be produced?
- You can also break down the technology risk category into hardware, software and network technology if desired

1. Risk Management : Risk Questionnaires

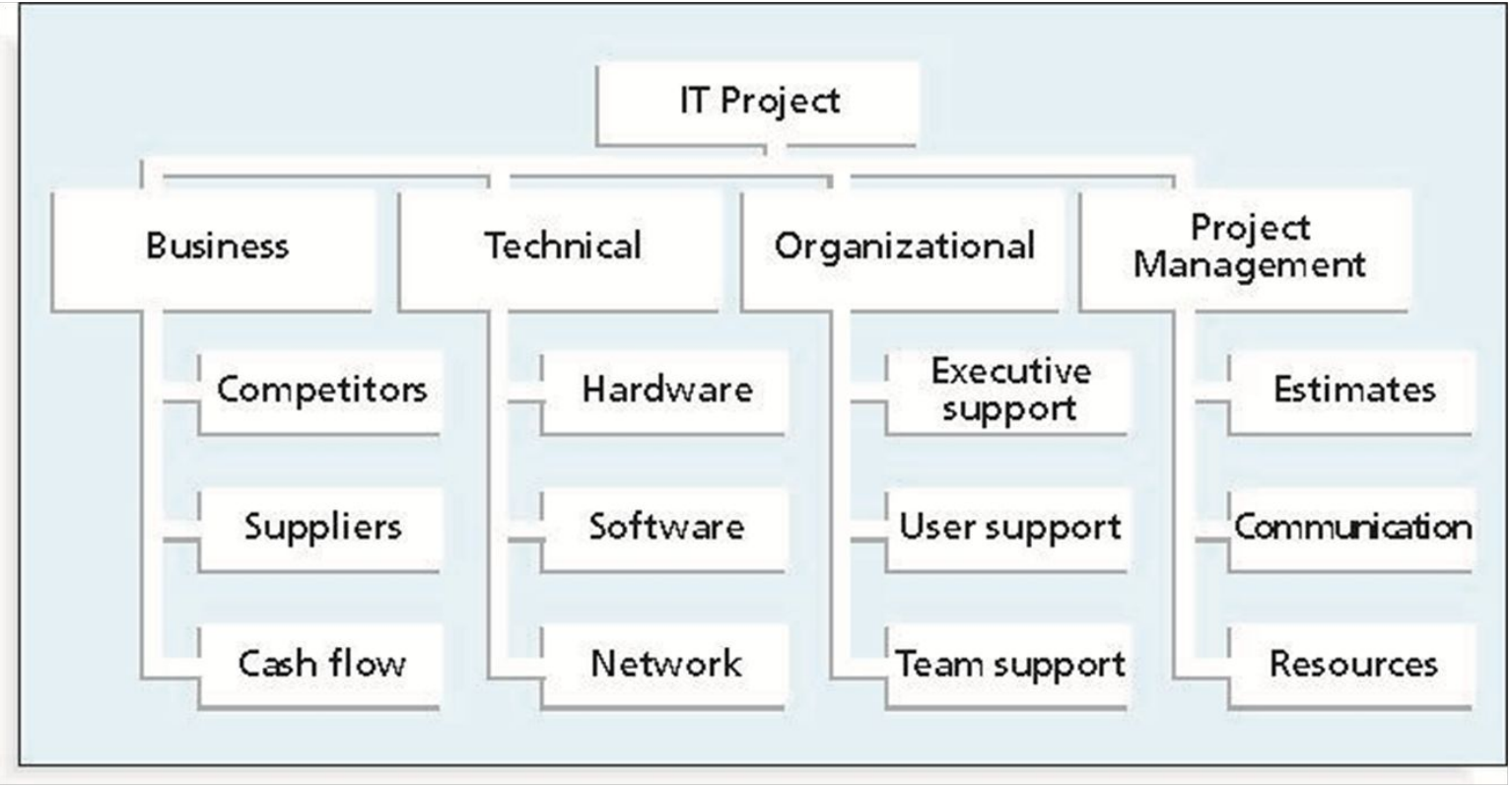
Structure / Process Risk

- What is the degree of change the new project will introduce into user areas and business procedures?
- How many distinct user groups does the project need to satisfy?
- With how many other systems does the new project/system need to interact?
- Does the organization have processes in place to complete the project successfully?
- Reviewing a proposed project in terms of a risk questionnaires or any other similar tool is a good method for understanding common sources of risk on information technology projects.

1. Risk Management : Risk Breakdown Structure

- A risk breakdown structure is useful tools that can help project managers consider potential risks in different categories.
- Similar in structure to a WBS, a RBS is a hierarchy of potential risk categories for a project
- Highest level categories are business, technical, organizational, and project management.
- Under business risks are the categories of competitors, suppliers and cash flow.
- Under technical risks are the categories of h/w, s/w and network.
- The RBS provides a simple, one page chart to help ensure a project team is considering important risk categories related to all information technology projects

1. Risk Management : Risk Breakdown Structure



ILOC: Project Management (Autonomy)

1. Risk Management : Risk Breakdown Structure

Table 11-4: Potential Negative Risk Conditions Associated with Each Knowledge Area

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/workmanship; inadequate quality assurance program
Human Resources	Poor conflict management; poor project organization and definition of responsibilities; absence of leadership
Communications	Carelessness in planning or communicating; lack of consultation with key stakeholders
Risk	Ignoring risk; unclear analysis of risk; poor insurance management
Procurement	Unenforceable conditions or contract clauses; adversarial relations

2. Risk Identification

- It involves determining which risk are likely to affect a project & documenting the characteristics of each.
- OUTPUT:- The main output of this process is the start of a **risk register**.
- **First step** in risk management is to recognize and identify risks.
- Your risk assessment process should be proportionate to your organization
- You should have a template to track and record all information.
- Information gathering should always be a group activity. Gather hard data whenever possible.

2. Risk Identification : Gathering Tech

Five common information gathering techniques include

- Brainstorming
- Delphi technique
- Interviewing
- Root cause analysis
- SWOT Analysis

2. Risk Identification : Brainstorming

- Brainstorming is a technique by which a group attempts to generate ideas or find a solution for a specific problem.
- This approach can help the group create a comprehensive list of risks to address later in the qualitative and quantitative risk analysis process.
- An experienced facilitator should run the brainstorming session and introduce new categories of potential risks to keep the ideas flowing.
- After the ideas are collected, the facilitator can group and categorize the ideas to make them more manageable.
- Group effects, such as fear of social disapproval, the effects of authority hierarchy and domination of the session by one or two very vocal people often inhibit idea generation for many participants.

2. Risk Identification : Delphi Technique

- An approach to gathering information that helps prevent some of the negative group effects found in brainstorming is the Delphi technique.
- The basic concept of the Delphi technique is to derive a consensus among a panel of experts who make prediction s about future developments.
- The Delphi Technique is a systematic, interactive forecasting procedure based on independent input regarding future events.
- The Delphi Technique uses repeated rounds of questioning and written responses, including feedback to earlier-round responses to take advantage of group input while avoiding the biasing effects possible in oral panel deliberations.
- To use the Delphi technique, you must select a panel of experts for the particular area in question.
- E.g.:- Delphi technique, can be used to understand why particular organization is no longer winning many contracts.

2. Risk Identification : Interviewing

- 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.
- For example, if a new project involves using a particular type of hardware or software, someone with recent experience with that hardware or software could describe problems he/she had on past project.
- If someone has worked with a particular customer, he or she might provide insights into potential risks involved in working for that group again.

2. Risk Identification : Root Cause analysis

- It is not uncommon for the people to identify problems or opportunities without really understanding them.
- Before suggesting course of action, it is important to identify the root cause of a problem or opportunity.
- Root Cause Analysis often results in identifying even more potential risks for the project.

2. Risk Identification : SWOT analysis

- SWOT Analysis (**Strength, Weakness, Opportunities and Threats**) which is often used in strategic planning.
- SWOT Analysis can also be used during risk identification by having project teams focus on the broad perspectives of potential risks for particular projects.
- Ex: Before writing a particular proposal, a group of employees discuss in detail what their company's strength are, what their weaknesses are related to that project and what opportunities and threats exist.
- Applying SWOT to specific potential projects can help identify the broad risks and opportunities that apply in that scenario.

2. Risk Identification : SWOT analysis

Open with

S

- Unique solution
- No need of app installation at employees' end
- Centralized solution (Authorities have total control)
- Gamification based on captured trend

O

- Demand for workplace-related solutions in the unlock phase
- Need for a centralized solution to limit the violation of guidelines on the employers' part

W

- Data handling (Large volumes of data would be stored in the long run)
- Cannot function in case of physical barriers
- Area restriction

T

- Complete workplace solution already provided by companies
- Existing solutions featuring precautionary and after measures
- Obsolete in the absence of a pandemic

Problem Statement : Social distancing and mask detection

ILOC: Project Management (Autonomy)

2. Risk Identification : 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

2. 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

2. 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

2. Sample Risk Register

No.	Rank	Risk	Description	Category	Root Cause	Triggers	Potential Responses	Risk Owner	Probability	Impact	Status
R44	1										
R21	2										
R7	3										

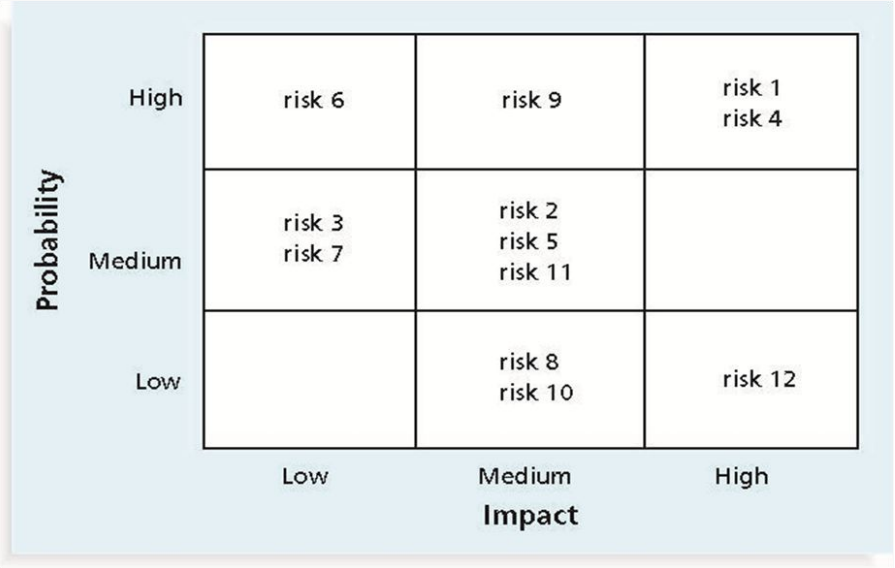
3. Qualitative Risk Analysis

- It involves prioritizing risks based on their probability and impact of occurrence.
- After identifying risks, project teams can use various tools and techniques to rank risks and update information in the risk register.
- **Output: -** The main output is updates to the risk register.

3. Qualitative Risk Analysis

- Qualitative risk analysis involves assessing the **likelihood and impact of identified risks**, to determine their magnitude and priority.
- A project manager can make a chart the probability and impact of risks on a **probability / impact matrix or chart.**
- A probability/ impact matrix or chart lists the relative probability of a risk occurring an one side of a matrix on a chart and relative impact of the risk occurring on the other.

3. Qualitative Risk Analysis



- Risk 1 and 4 are listed as Impact high in both categories of probability and impact
- Risk 6 is high in probability category but low in impact.
- Risk 9 is high in probability category but medium in impact.
- Risk 12 is low in probability category but high in impact.
- The team should then discuss how they plan to respond to those risks if they occur.

4. Quantitative Risk Analysis

- It involves numerically estimating the effects of risks on project objectives.
- **Output: -** The main output of this process is also updates to the risk register.

4. Quantitative Risk Analysis

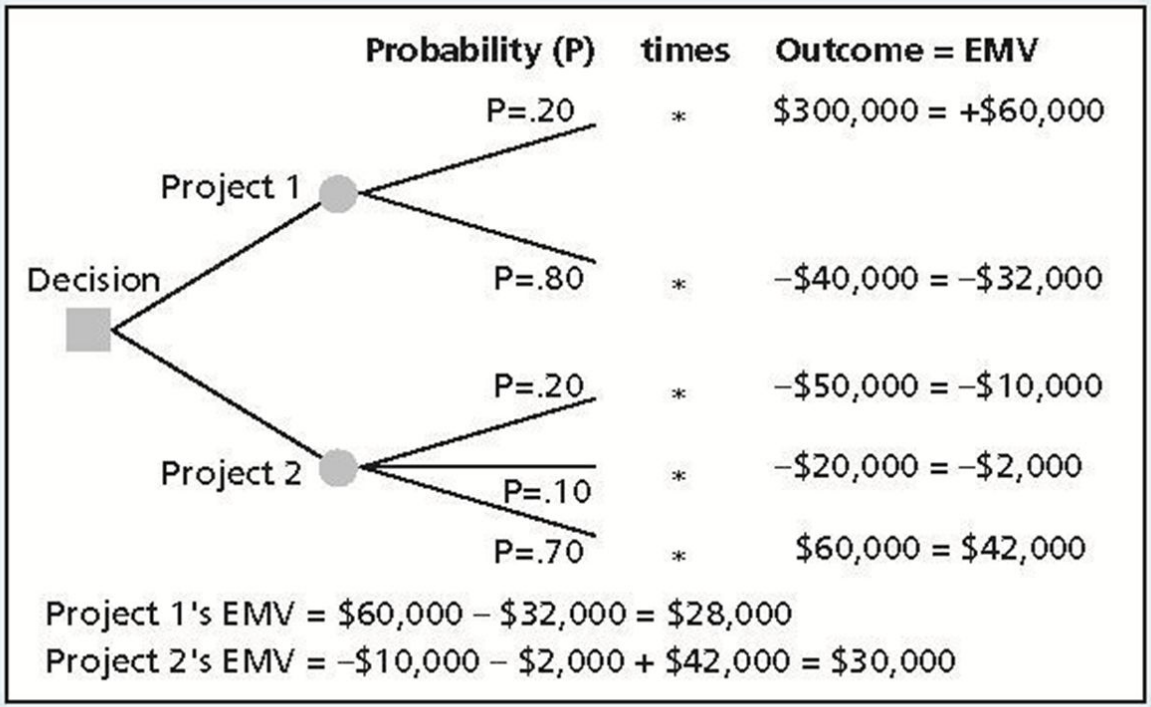
- Quantitative risk analysis often follows qualitative risk analysis, yet both can be done together or separately.
- The main techniques for quantitative risk analysis include data gathering, and modeling techniques.
- Data gathering often involves interviewing, expert judgment, and collection of probability distribution information.
- And modeling techniques' includes decision tree analysis.

4. Quantitative Risk Analysis

- A decision tree is a diagramming analysis technique used to help select the best course of action in situation in which **future outcome are uncertain**.
- A common application of decision tree analysis involves calculating expected monetary value.
- **Expected monetary value (EMV)** is the product of risk event probability and risk events evaluates monetary value.
- Organization was trying to decide if it should submit a proposal for project 1, project 2, both project or one project or neither project.
- The team could draw a decision tree with two branches ,one for project 1 and one for project 2 and firm could then calculate the EMV to help make this decision .

4. Quantitative Risk Analysis

Decision tree and Expected monetary value (EMV):



4. Quantitative Risk Analysis

- Project 1 EMV= $60,000-$32,000=$28,000.
- Project 2 EMV=-$10,000-$2,000+$42,000=$32,000.
- In fig, – there is 20 % probability or chance (p=0.20) that firm will win the contract for project1 which is estimated to be worth $300,000 in profits.
- There is 80% probability (p=0.80) that it will not win the contract for project1 and the outcome is estimated to be -$40,000, meaning that the firm have to invest $40,000 into project1 with no reimbursement if it is not awarded the contract.
- The sum of the probabilities for outcome for each project must equal one.

5. Risk Response Planning

- Involves taking steps to enhance opportunity and reduce threats to meeting project objectives.
- Using o/p from the preceding risks management processes, project teams can develop risk response processes, project teams can develop risk response strategies that often result in updates to the risk register and
- project management plan as well as a risk related contracted agreement.

5. Risk Response Planning

Table 11-7: General Risk Mitigation Strategies for Technical, Cost, and Schedule Risks

Technical Risks	Cost Risks	Schedule Risks
Emphasize team support and avoid stand-alone project structure	Increase the frequency of project monitoring	Increase the frequency of project monitoring
Increase project manager authority	Use WBS and CPM	Use WBS and CPM
Improve problem handling and communication	Improve communication, project goals understanding, and team support	Select the most experienced project manager
Increase the frequency of project monitoring	Increase project manager authority	
Use WBS and CPM		

5. Risk Response Planning

Strategies for Positive Risks or Opportunities

- Exploit
- Share
- Enhance
- Accept

5. Risk Response Planning

- 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

Risk	*Trigger*	*Owner*	*Response*	*Resources required*

6. Risk Monitoring and Control

- It involves monitoring identified risks, identifying new risks, carrying out risk response plans, and evaluating the effectiveness of risk strategies throughout the life of the project.
- **Output: -** The main outputs of this process include recommended corrective and preventive actions, requested changes, and updates to the risk register, project management plan, and organizational process assets.