Chapter 11

Project Risk Management

erga

Project Management

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Erga Academy

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EPDM & ESM tracks

20 credits

Plan


1. Introduction
2. Environment in which projects operate
3. The role of the Project Manager
4. Project Integration Management
5. Project Scope Management
6. Project Schedule Management
7. Project Cost Management
8. Project Quality Management
9. Project Resource Management
10. Project Communications Management
11. Project Risk Management
12. Project Procurement Management
13. Project Stakeholder Management
14. Professional Responsibility

Plan

- Chapter 11- Project Risk Management

The Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation and monitoring on a project.

The **Objectives** is to:
Increase probability and impact of positive events
Decrease those of negative events

The **uncertainty** is present in all projects

Plan

- Chapter 11- Project Risk Management
  - 11.1 Plan Risk Management
  - 11.2 Identify Risks
  - 11.3 Perform Qualitative Risk Analysis
  - 11.4 Perform Quantitative Risk Analysis
  - 11.5 Plan Risk Responses
  - 11.6 Implement Risk Responses
  - 11.7 Monitor Risks

	Project Management Process Groups				
Knowledge Areas	Initiating	Planning	Executing	Monitoring & Controlling	Closing
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	

Plan

Chapter 11- Project Risk Management

- **11.1 Plan Risk Management** (*planning*): The process of defining how to conduct risk management activities for a project.
- **11.2 Identify Risks** (*planning*): The process of identifying individual project risks as well as sources of overall project risk, and documenting their characteristics.
- **11.3 Perform Qualitative risk analysis** (*planning*): The process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.
- **11.4 Perform Quantitative risk analysis** (*planning*): The process of numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.
- **11.5 Plan Risk Response** (*planning*): The process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.
- **11.6 Implement Risk Responses** (*Executing*): The process of implementing agreed-upon risk response plans.
- **11.7 Monitor Risks** (*M&C*): The process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk process effectiveness throughout the project.

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Key Concepts	Trends & Practices	Tailoring considerations	Considerations for Agile/Adaptive environments

All projects are risky since they are unique undertakings with varying degrees of complexity that aim to deliver benefits. They do this in a context of constraints and assumptions, while responding to stakeholder expectations that may be conflicting and changing. Organizations should choose to take project risk in a controlled and intentional manner in order to create value while balancing risk and reward.

Project Risk Management aims to identify and manage risks that are not addressed by the other project management processes. When unmanaged, these risks have the potential to cause the project to deviate from the plan and fail to achieve the defined project objectives. Consequently, the effectiveness of Project Risk Management is directly related to project success.

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Risk exists at two levels within every project:

- **Individual** project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
- **Overall** project risk is the effect of uncertainty on the project as a whole, arising from all sources of uncertainty including individual risks, representing the exposure of stakeholders to the implications of variations in project outcome, both positive and negative.

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- Individual project risks can have a positive or negative effect on project objectives if they occur. Project Risk Management aims to exploit or enhance positive risks (opportunities) while avoiding or mitigating negative risks (threats). Unmanaged threats may result in issues or problems such as delay, cost overruns, performance shortfall, or loss of reputation. Opportunities that are captured can lead to benefits such as reduced time and cost, improved performance, or reputation.

- Overall project risk can also be positive or negative. Management of overall project risk aims to keep project risk exposure within an acceptable range by reducing drivers of negative variation, promoting drivers of positive variation, and maximizing the probability of achieving overall project objectives.

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Risks will continue to emerge during the lifetime of the project, so Project Risk Management processes should be conducted iteratively. Risk is initially addressed during project planning by shaping the project strategy. Risk should also be monitored and managed as the project progresses to ensure that the project stays on track and emergent risks are addressed.

In order to manage risk effectively on a particular project, the PT needs to know what level of risk exposure is acceptable in pursuit of the project objectives. This is defined by measurable risk thresholds that reflect the risk appetite of the organization and project stakeholders. Risk thresholds express the degree of acceptable variation around a project objective. They are explicitly stated and communicated to the PT and reflected in the definitions of risk impact levels for the project.

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The focus of project risk management is broadening to ensure that all types of risk are considered, and that project risks are understood in a wider context. Trends and emerging practices include:

- **Non-event risks**. Most projects focus only on risks that are uncertain future events that may or may not occur. Examples of event-based risks include: a key seller may go out of business during the project, the customer may change the requirement after design is complete, or a subcontractor may propose enhancements to the standard operating processes.

  There is an increasing recognition that non-event risks need to be identified and managed. There are two main types of non-event risks:

  - *Variability risk*. Uncertainty exists about some key characteristics of a planned event or activity or decision. Examples: productivity may be above or below target, the number of errors found during testing may be higher or lower than expected, or unseasonal weather conditions may occur during the construction phase.

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- *Ambiguity risk*. Uncertainty exists about what might happen in the future. Areas of the project where imperfect knowledge might affect the project's ability to achieve its objectives include: elements of the requirement or technical solution, future developments in regulatory frameworks, or inherent systemic complexity in the project.

Variability risks can be addressed using Monte Carlo analysis, with the range of variation reflected in probability distributions, followed by actions to reduce the spread of possible outcomes.
Ambiguity risks are managed by defining those areas where there is a deficit of knowledge or understanding, then filling the gap by obtaining expert external input or benchmarking against best practices. Ambiguity is also addressed through incremental development, prototyping, or simulation.

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- **Project resilience**. The existence of emergent risk is becoming clear, with a growing awareness of so-called unknowable-unknowns. These are risks that can only be recognized after they have occurred. Emergent risks can be tackled through developing project resilience. This requires each project to have:
  - Right level of budget and schedule contingency for emergent risks, in addition to a specific risk budget for known risks;
  - Flexible project processes that can cope with emergent risk while maintaining overall direction toward project goals, including strong change management;
  - Empowered PT that has clear objectives and that is trusted to get the job done within agreed-upon limits;
  - Frequent review of early warning signs to identify emergent risks as early as possible;
  - Clear input from stakeholders to clarify areas where the project scope or strategy can be adjusted in response to emergent risks.
- …

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- ...
- **Integrated risk management.** Projects exist in an organizational context, and they may form part of a program or portfolio. Risk exists at each of these levels, and risks should be owned and managed at the appropriate level. Some risks identified at higher levels will be delegated to the PT for management, and some project risks may be escalated to higher levels if they are best managed outside the project. A coordinated approach to enterprise-wide risk management ensures alignment and coherence in the way risk is managed across all levels. This builds risk efficiency into the structure of programs and portfolios, providing the greatest overall value for a given level of risk exposure.

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Considerations for tailoring include:

- **Project size.** Does the project's size in terms of budget, duration, scope, or team size require a more detailed approach to risk management? Or is it small enough to justify a simplified risk process?
- **Project complexity**. Is a robust risk approach demanded by high levels of innovation, new technology, commercial arrangements, interfaces, or external dependencies that increase project complexity? Or is the project simple enough that a reduced risk process will suffice?
- **Project importance**. How strategically important is the project? Is the level of risk increased for this project because it aims to produce breakthrough opportunities, addresses significant blocks to organizational performance, or involves major product innovation?
- **Development approach**. Is this a waterfall project, where risk processes can be followed sequentially and iteratively, or does the project follow an agile approach where risk is addressed at the start of each iteration as well as during its execution?

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High-variability environments, by definition, incur more uncertainty and risk. To address this, projects managed using adaptive approaches make use of frequent reviews of incremental work products and cross-functional PTs to accelerate knowledge sharing and ensure that risk is understood and managed. Risk is considered when selecting the content of each iteration, and risks will also be identified, analyzed, and managed during each iteration.

Additionally, the requirements are kept as a living document that is updated regularly, and work may be reprioritized as the project progresses, based on an improved understanding of current risk exposure.

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What is Risk?

An uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective.

The severity of any risk can be defined by:

- **Likelihood (Probability):**
  The extent to which the risk effects are likely to occur.

- **Impact (Consequence):**
  The effect that a risk will have on the project if it occurs.

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Project risk management is the art and science of planning, identifying, analyzing, and responding to risk throughout the life of a project and in the best interests of meeting project objectives

Risk is everywhere !!!

Within a project, risks are uncertain events or conditions that can have a positive or negative effect on its success.

Positive risks are called opportunities & Negative risks are called Threats.

Risk Factors: When looking at risk, one should determine:

1. The probability that it will occur (what)
2. The range of possible outcomes (impact or amount at stake)
3. Expected timing (when) in the project life cycle
4. The anticipated frequency of risk events from that source (how often)

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Risk Averse: Someone who does not want to take risks

Risk Tolerances and Thresholds

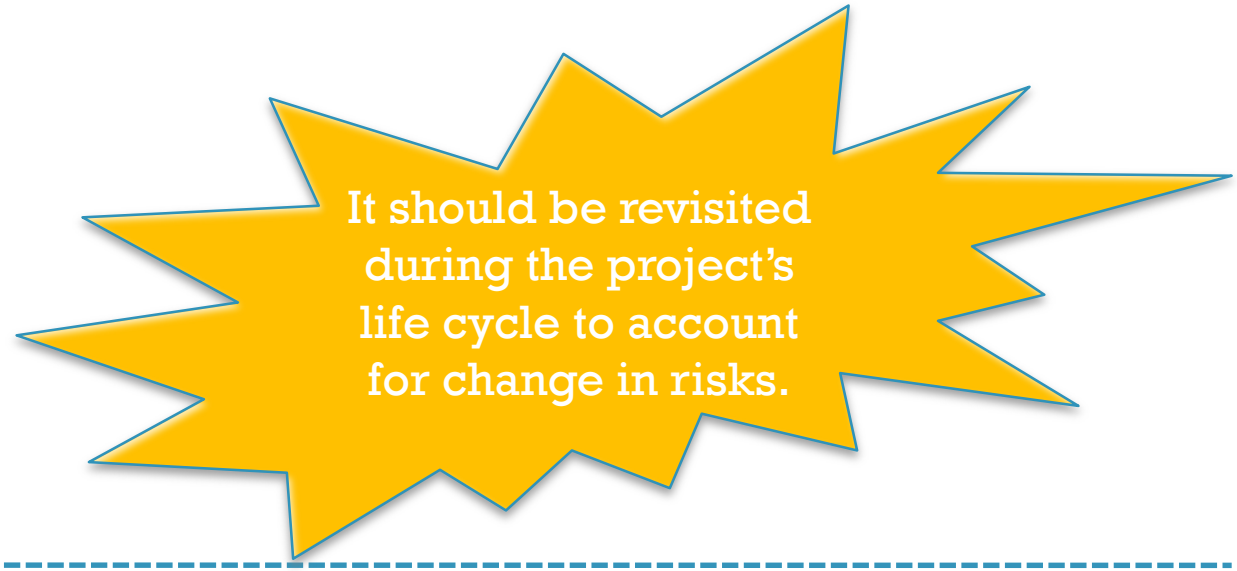
Tolerances are the areas of risk that are acceptable or unacceptable. Example: " a risk that affects our reputation will not be tolerated".

Tolerance areas can include any project constraints (such as scope, time, cost, quality, etc.) as well as reputation and other intangibles that may affect the customer.

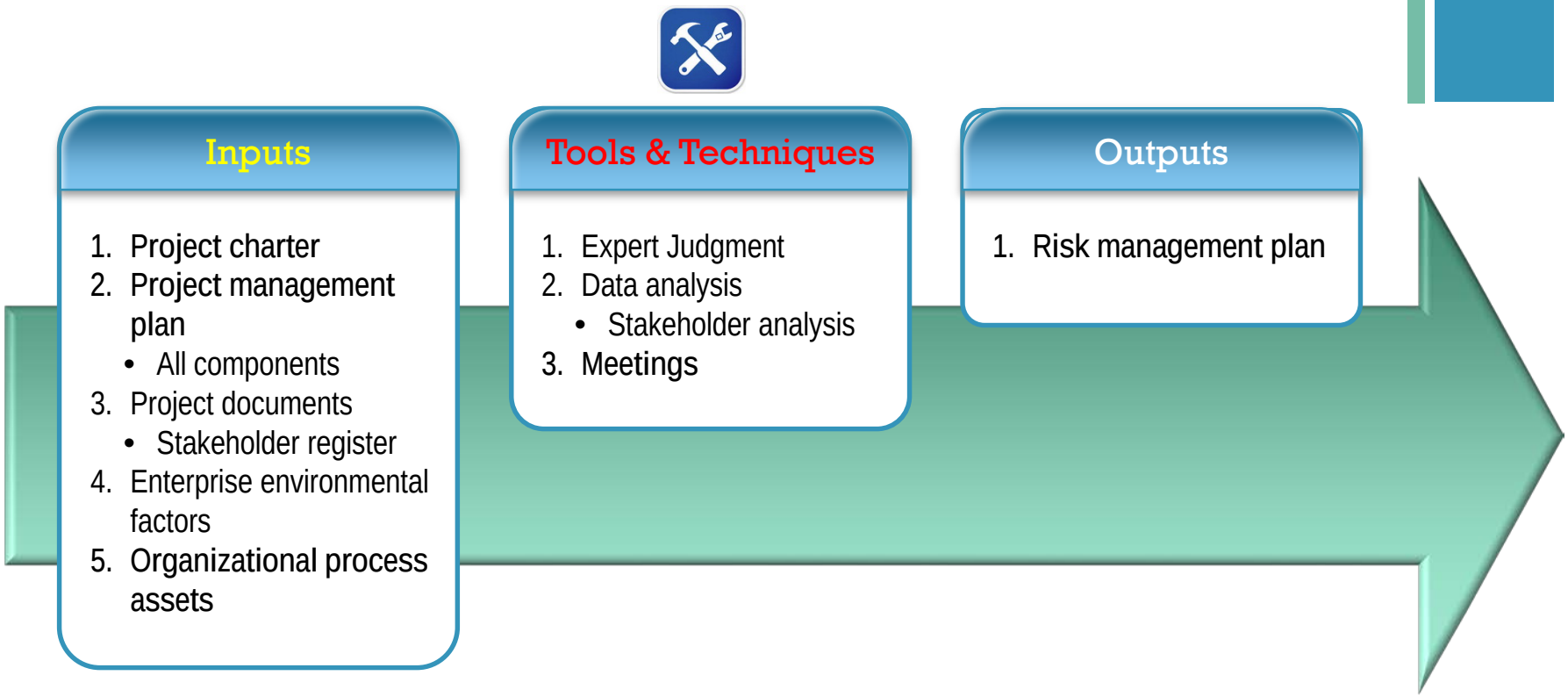
A **threshold** is the point at which a risk becomes unacceptable. Example: " if there is delay, it can be no longer than two weeks"

11.1 Plan Risk Management

Defining how to conduct risk management activities for a project.



11.1 Plan Risk Management



11.1 Plan Risk Management

1. **Project Charter:** Project Charter includes high level details, high level project description and high level requirements.

2. **Project Management Plan (PMP):** In planning risk management, all subsidiary plans and other baselines should be taken into consideration in order to make risk management plan consistent with them. The PMP provides baseline or current risk affected areas like scope, time and cost.

11.1 Plan Risk Management

5. Organizational Process Assets

The OPA that can influence the *Plan Risk Management* process include:

- Organizational risk policy;
- Risk categories, possibly organized into a risk breakdown structure;
- Common definitions of risk concepts and terms;
- Risk statement formats;
- Templates for the risk management plan, risk register, and risk report;
- Roles and responsibilities;
- Authority levels for decision making;
- Lessons learned repository from previous similar projects.

11.1 Plan Risk Management

3. Meetings

The risk management plan may be developed as part of the project kick-off meeting or a specific planning meeting may be held.

- Attendees may include the PM, selected PT members, key stakeholders, or team members who are responsible to manage the risk management process on the project. Others outside the organization may also be invited, as needed, including customers, sellers, and regulators.
- A skilled facilitator can help participants remain focused on the task, agree on key aspects of the risk approach, identify and overcome sources of bias, and resolve any disagreements that may arise.

Plans for conducting risk management activities are defined in these meetings and documented in the risk management plan.

11.1 Plan Risk Management

1. Risk Management Plan

The risk management plan is a component of the PMP that describes how risk management activities will be structured and performed. for the project It may include:

- ✓ Risk strategy
- ✓ Methodology
- ✓ Roles and responsibilities
- ✓ Funding
- ✓ Timing
- ✓ Risk categories
- ✓ Tracking
- ✓ Reporting formats
- ✓ Stakeholder risk appetite
- ✓ Definitions of risk probability and impacts
- ✓ Probability and impact matrix

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

- **Risk strategy**. Describes the general approach to managing risk.
- **Methodology**. Defines the specific approaches, tools, and data sources that will be used to perform risk management.
- **Roles and responsibilities**. Defines the lead, support, and risk management team members for each type of activity described in the risk management plan, and clarifies their responsibilities.
- **Funding**. Identifies the funds needed to perform activities related to Project Risk Management. Establishes protocols for the application of contingency and management reserves.
- **Timing**. Defines when and how often the Project Risk Management processes will be performed throughout the project life cycle, and establishes risk management activities for inclusion into the project schedule…

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

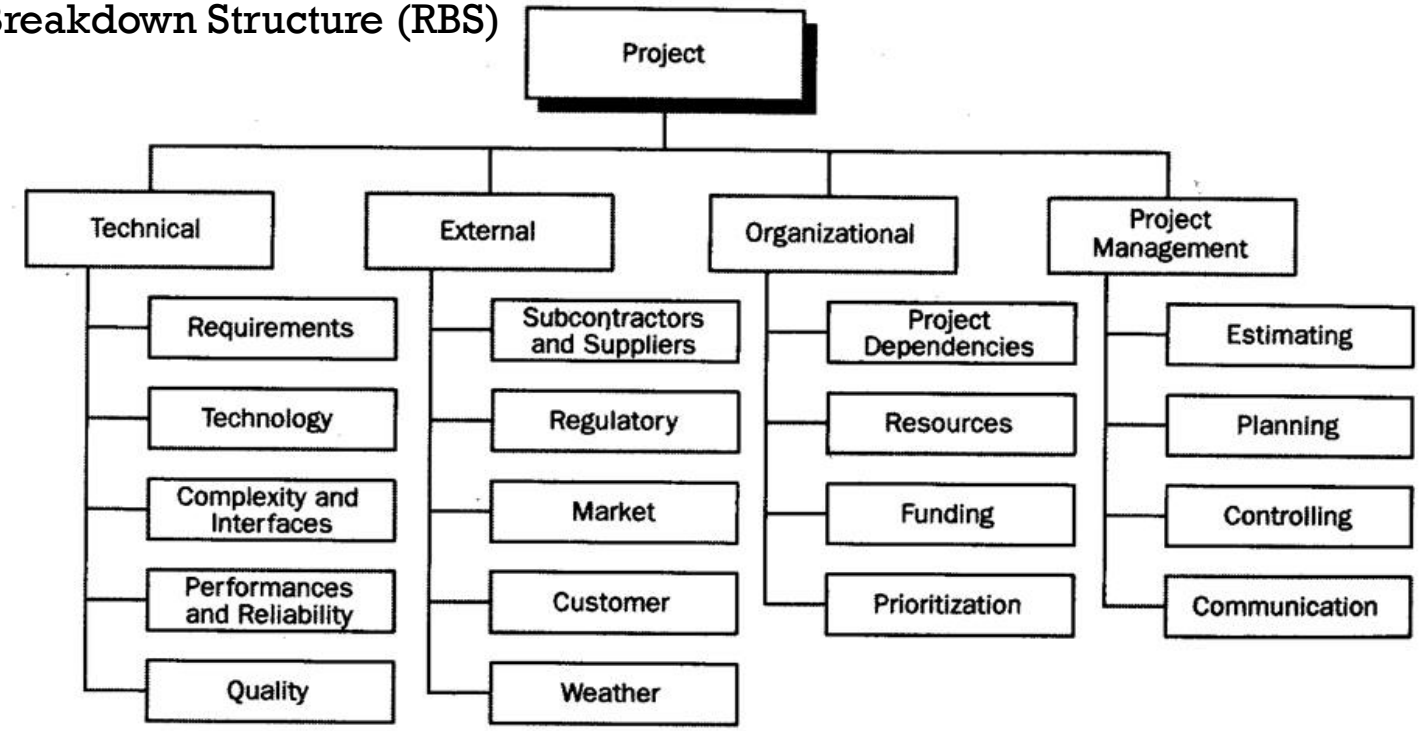
- …
- **Risk categories.** Provide a means for grouping individual project risks. A common way to structure risk categories is with a ***risk breakdown structure (RBS)***, which is a hierarchical representation of potential sources of risk. An RBS helps the PT consider the full range of sources from which individual project risks may arise. The organization may have tailored or generic RBS for different types of projects. Where an RBS is not used, an organization may use a custom risk categorization framework, which may take the form of a simple list of categories or a structure based on project objectives.
- **Tracking**. Tracking documents how risk activities will be recorded and how risk management processes will be audited…

11.1 Plan Risk Management

Input → Tools & Techniques → Output

1. Risk Management Plan (cont'd)

Risk Breakdown Structure (RBS)



The Risk Breakdown Structure (RBS) lists the categories and sub-categories within which risks may arise for a typical project. Different RBSs will be appropriate for different types of projects and different types of organizations. One benefit of this approach is to remind participants in a risk identification exercise of the many sources from which project risk may arise.

11.1 Plan Risk Management

Input → Tools & Techniques → Output

1. Risk Management Plan (cont'd)

Risk Breakdown Structure (RBS)

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
0. ALL SOURCES OF PROJECT RISK	1. TECHNICAL RISK	1.1 Scope definition
		1.2 Requirements definition
		1.3 Estimates, assumptions, and constraints
		1.4 Technical processes
		1.5 Technology
		1.6 Technical interfaces
		Etc.
	2. MANAGEMENT RISK	2.1 Project management
		2.2 Program/portfolio management
		2.3 Operations management
		2.4 Organization
		2.5 Resourcing
		2.6 Communication
		Etc.
	3. COMMERCIAL RISK	3.1 Contractual terms and conditions
		3.2 Internal procurement
		3.3 Suppliers and vendors
		3.4 Subcontracts
		3.5 Client/customer stability
		3.6 Partnerships and joint ventures
		Etc.
	4. EXTERNAL RISK	4.1 Legislation
		4.2 Exchange rates
		4.3 Site/facilities
		4.4 Environmental/weather
		4.5 Competition
		4.6 Regulatory
		Etc.

Figure 11-4. Extract from Sample Risk Breakdown Structure (RBS)

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

- …
- **Reporting formats**. It define how the outcomes of the Project Risk Management process will be documented, analyzed, and communicated. This section describes the content and format of the risk register and the risk report, as well as any other required outputs from the Project Risk Management processes.
- **Stakeholder risk appetite**. The risk appetites of key stakeholders on the project are recorded in the risk management plan. In particular, stakeholder risk appetite should be expressed as measurable risk thresholds around each project objective. These thresholds will determine the acceptable level of overall project risk exposure, and they are also used to inform the definitions of probability and impacts to be used when assessing and prioritizing individual project risks…

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

- …
- **Definitions of risk probability and impacts.** Definitions of risk probability and impact levels are specific to the project context and reflect the risk appetite and thresholds of the organization and key stakeholders. The project may generate specific definitions of probability and impact levels or it may start with general definitions provided by the organization. The number of levels reflects the degree of detail required for the Project Risk Management process, These scales can be used to evaluate both threats and opportunities by interpreting the impact definitions as negative for threats (delay, additional cost, and performance shortfall) and positive for opportunities (reduced time or cost, and performance enhancement)…

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

- **Definitions of risk probability and impacts.**(cont'd)

Table 11-1. Example of Definitions for Probability and Impacts

SCALE	PROBABILITY	+/– IMPACT ON PROJECT OBJECTIVES		
		TIME	COST	QUALITY
Very High	>70%	>6 months	>$5M	Very significant impact on overall functionality
High	51-70%	3-6 months	$1M-$5M	Significant impact on overall functionality
Medium	31-50%	1-3 months	$501K-$1M	Some impact in key functional areas
Low	11-30%	1-4 weeks	$100K-$500K	Minor impact on overall functionality
Very Low	1-10%	1 week	<$100K	Minor impact on secondary functions
Nil	<1%	No change	No change	No change in functionality

11.1 Plan Risk Management

1. Risk Management Plan (cont'd)

- …
- **Probability and impact matrix**. Prioritization rules may be specified by the organization in advance of the project and be included in OPA, or they may be tailored to the specific project. Opportunities and threats are represented in a common probability and impact matrix using positive definitions of impact for opportunities and negative impact definitions for threats. Descriptive terms (such as very high, high, medium, low, and very low) or numeric values can be used for probability and impact. Where numeric values are used, these can be multiplied to give a probability-impact score for each risk, which allows the relative priority of individual risks to be evaluated within each priority level.

11.1 Plan Risk Management

Input → Tools & Techniques → Output

1. Risk Management Plan (cont'd)

❖ **Probability and impact matrix.** (cont'd)

Probability	Threats					Opportunities					Probability
Very High 0.90	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05	Very High 0.90
High 0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04	High 0.70
Medium 0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03	Medium 0.50
Low 0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02	Low 0.30
Very Low 0.10	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01	Very Low 0.10
	Very Low 0.05	Low 0.10	Moderate 0.20	High 0.40	Very High 0.80	Very High 0.80	High 0.40	Moderate 0.20	Low 0.10	Very Low 0.05	
	Negative Impact					Positive Impact					

Figure 11-5. Example Probability and Impact Matrix with Scoring Scheme

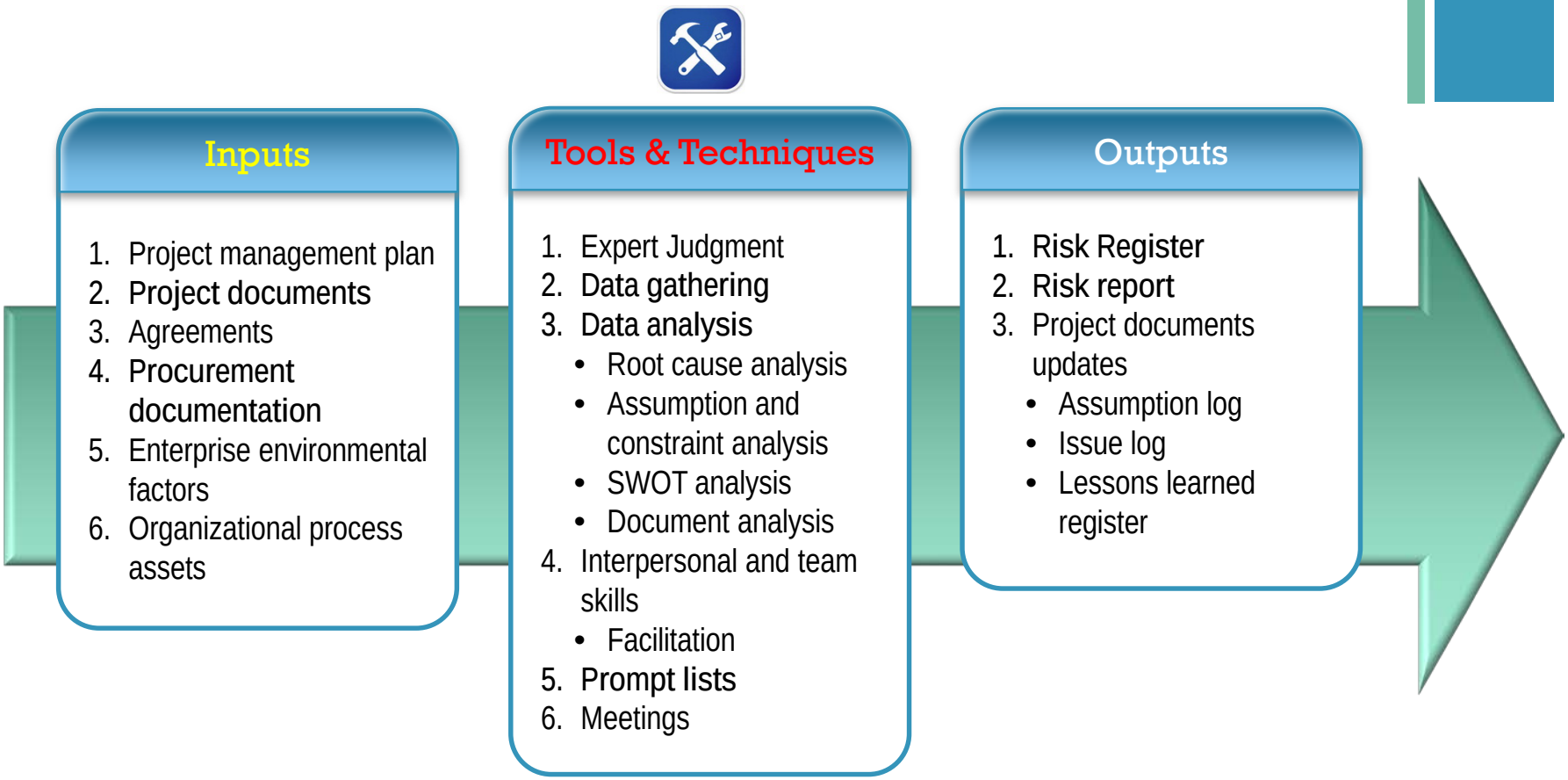
11.2 Identify Risks

Identifying individual project risks as well as sources of overall project risk, and documenting their characteristics.

Two major sources of risk to look at:
- Assumptions made by the team and other stakeholders.
- Dependencies between activities and work packages.

This is an iterative process as new risks may evolve or become known

11.2 Identify Risks



11.2 Identify Risks

2. Project Documents that can be useful in this process, include:

- Assumptions Log.
- Cost estimates.
- Duration estimates.
- Issue log.
- Lessons learned register.
- Requirements documentation.
- Resource requirements.
- Stakeholder register.

4. Procurement documentation

If the project requires external procurement of resources, the initial procurement documentation should be reviewed as procuring goods and services from outside the organization may increase or decrease overall project risk and may introduce additional individual project risks.

11.2 Identify Risks

2. Data gathering

- **Brainstorming**
- **Interviewing**
- **Checklists**. ***A checklist is a list of items, actions, or points to be considered.*** It is often used as a reminder. Risk checklists are developed based on historical information and knowledge that has been accumulated from similar projects and from other sources of information. They are an effective way to capture lessons learned from similar completed projects, listing specific individual project risks that have occurred previously and that may be relevant to this project. The PT should also explore items that do not appear on the checklist, and be reviewed from time to time to update new information as well as remove or archive obsolete information.

11.2 Identify Risks

3. Data analysis

- **Root cause analysis**
- **Document analysis**. Risks may be identified from a structured review of project documents, including, but not limited to, plans, assumptions, constraints, previous project files, contracts, agreements, and technical documentation.
- **Assumption and constraint analysis**. Every project and its PMP are conceived and developed based on a set of assumptions and within a series of constraints. These are often already incorporated in the scope baseline and project estimates. This analysis explores the validity of assumptions and constraints to determine which pose a risk to the project. Threats may be identified from the inaccuracy, instability, inconsistency, or incompleteness of assumptions. Constraints may give rise to opportunities through removing or relaxing a limiting factor that affects the execution of a project or process…

11.2 Identify Risks

Input → **Tools & Techniques** → Output

3. Data analysis (cont'd)

❖ **SWOT analysis - Definition**

SWOT means strengths, weaknesses, opportunities, and threats.

Strengths: 'the technology to be installed in the project has been installed by other large companies in our industries'.

Weaknesses: 'we have never installed this technology before'.

Opportunities: 'the new technology will allow us to reduce our cycle time for time-to-market on new products'.

Threats: like IT Security Threats & Vulnerabilities involved in the project…

11.2 Identify Risks

3. Data analysis (cont'd)

- …
- **SWOT analysis**. This technique examines the project from each of the strengths, weaknesses, opportunities, and threats (SWOT) perspectives.
  - For risk identification, it is used to increase the breadth of identified risks by including internally generated risks. The technique starts with the identification of strengths and weaknesses of the organization, focusing on either the project, organization, or the business area in general. SWOT analysis then identifies any opportunities for the project that may arise from strengths, and any threats resulting from weaknesses.
  - The analysis also examines the degree to which organizational strengths may offset threats and determines if weaknesses might hinder opportunities…

11.2 Identify Risks

5. Prompt lists

A prompt list is a predetermined list of risk categories that might give rise to individual project risks and that could also act as sources of overall project risk. The prompt list can be used as a framework to aid the PT in idea generation when using risk identification techniques. The risk categories in the lowest level of the RBS can be used as a prompt list for individual project risks.

- Some common strategic frameworks are more suitable for identifying sources of overall project risk, for example:
  - **PESTLE** *(political, economic, social, technological, legal, environmental)*,
  - **TECOP** *(technical, environmental, commercial, operational, political)*,
  - **VUCA** *(volatility, uncertainty, complexity, ambiguity)*.

11.2 Identify Risks

1. Risk Register

The main output of *Identify Risks* process is a list of identified risks needed to begin creating a detailed risk register. It contains:

- ✓ An identification number 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.
- ✓ 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.

11.2 Identify Risks

1. Risk Register

Sample

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

11.2 Identify Risks

2. Risk Report

The risk report presents information on sources of overall project risk, together with summary information on identified individual project risks. It is developed progressively throughout the Project Risk Management process. The results of *Perform Qualitative Risk Analysis*, *Perform Quantitative Risk Analysis*, *Plan Risk Responses*, *Implement Risk Responses*, and *Monitor Risks* are also included in the risk report as those processes are completed. On completion of the *Identify Risks* process, the risk report include:

- ✓ Sources of overall project risk, indicating which are the most important drivers of overall project risk exposure;
- ✓ Summary information on identified individual project risks, such as number of identified threats and opportunities, distribution of risks across risk categories, metrics and trends, etc.
- ✓ Additional information may be included, depending on the reporting requirements specified in the risk management plan.

11.2 Identify Risks

Exam Focus

- Note that an updated risk register is the only output of several of the risk management processes.
- Read exam questions carefully, as the risk register contains different information depending on when in the risk management process the question is referencing.
- For example, if the project has just started and you are in the Identify Risks process, the risk register will only contain the identified risks & response plans (if applicable).

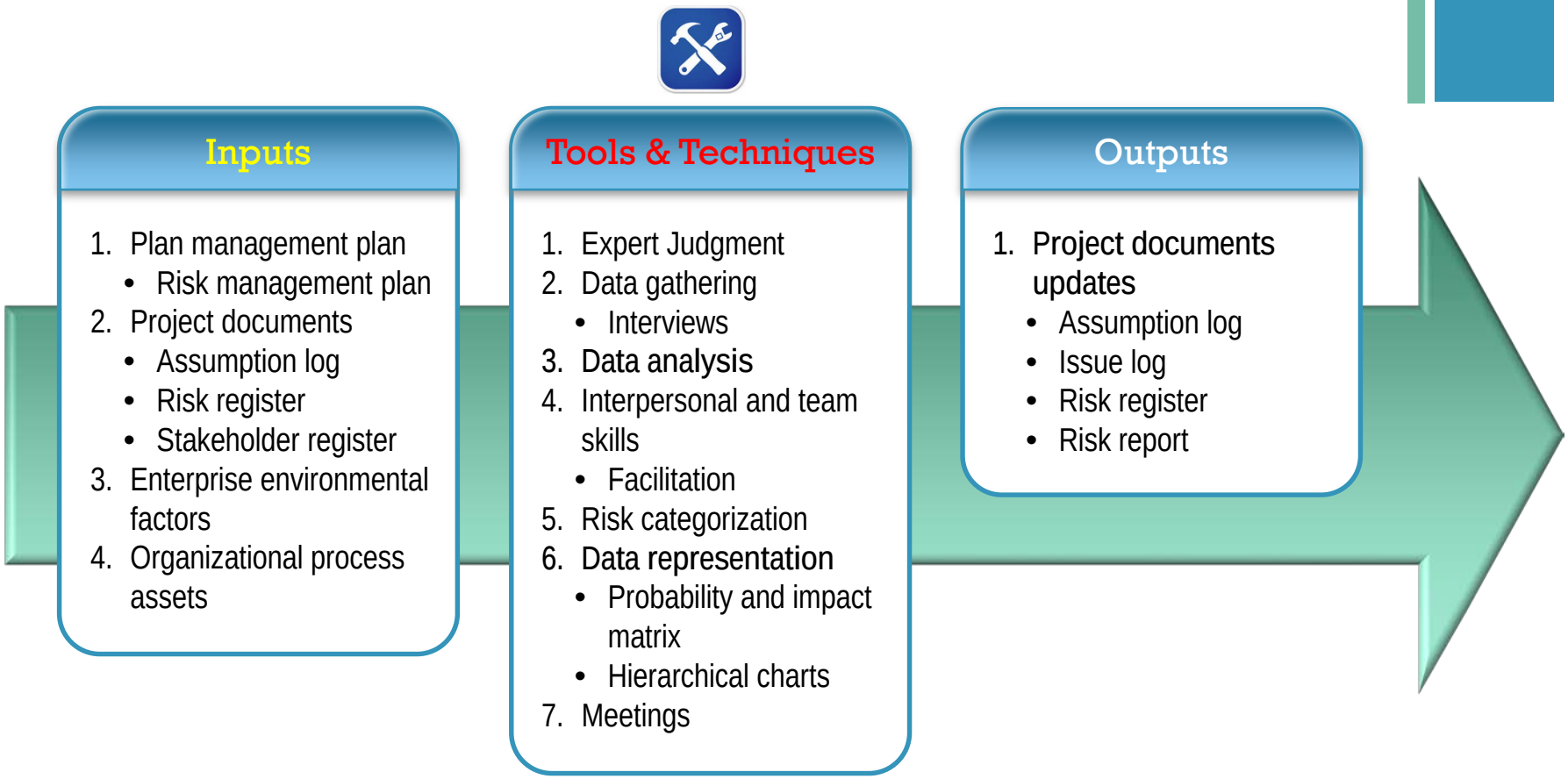
11.3 Perform Qualitative Risk Analysis

Prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.

It ranks the risks in priority order according to their effect on the project objectives.

It should be revisited during the project's life cycle to account for change in risks.

11.3 Perform Qualitative Risk Analysis



11.3 Perform Qualitative Risk Analysis

3. Data analysis

Data analysis techniques that can be used include:

- ✓ Risk data quality assessment
- ✓ Risk probability and impact assessment
- ✓ Assessment of other risk parameters

❖ **Risk data quality assessment.** Risk data quality assessment evaluates the degree to which the data about individual project risks is accurate and reliable as a basis for qualitative risk analysis.

- ➢ The use of low-quality risk data may lead to a qualitative risk analysis that is of little use to the project.
- ➢ If data quality is unacceptable, it may be necessary to gather better data…

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

- …
- **Risk probability and impact assessment**. Risk probability assessment considers the likelihood that a specific risk will occur. Risk impact assessment considers the potential effect on one or more project objectives such as schedule, cost, quality, or performance. Impacts will be negative for threats and positive for opportunities.
  - Probability and impact are assessed for each identified individual project risk.
  - Differences in the levels of probability and impact perceived by stakeholders are to be expected, and such differences should be explored.
  - Risks with low probability and impact may be included within the risk register as part of a **watch list** for future monitoring…

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

- **…**
- **Assessment of other risk parameters**. The PT may consider other characteristics of risk (in addition to probability and impact) when prioritizing individual project risks for further analysis and action. These characteristics may include:
  - *Urgency*. The period of time within which a response to the risk is to be implemented in order to be effective. A short period indicates high urgency.
  - *Proximity*. The period of time before the risk might have an impact on one or more project objectives. A short period indicates high proximity.
  - *Dormancy*. The period of time that may elapse after a risk has occurred before its impact is discovered. A short period indicates low dormancy…

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

❖ **Assessment of other risk parameters**. (cont'd)

- …
- *Manageability*. The ease with which the risk owner (or owning organization) can manage the occurrence or impact of a risk. Where management is easy, manageability is high.
- *Controllability*. The degree to which the risk owner is able to control the risk's outcome. Where the outcome can be easily controlled, controllability is high.
- *Detectability*. The ease with which the results of the risk occurring, or being about to occur, can be detected and recognized. Where the risk occurrence can be detected easily, detectability is high.
- *Connectivity*. The extent to which the risk is related to other individual project risks. Where a risk is connected to many other risks, connectivity is high…

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

❖ **Assessment of other risk parameters**. (cont'd)

- …
- *Connectivity*. The extent to which the risk is related to other individual project risks. Where a risk is connected to many other risks, connectivity is high.
- *Strategic impact*. The potential for the risk to have a positive or negative effect on the organization's strategic goals. Where the risk has a major effect on strategic goals, strategic impact is high.
- *Propinquity*. The degree to which a risk is perceived to matter by one or more stakeholders. Where a risk is perceived as very significant, propinquity is high.

The consideration of some of these characteristics provide a more robust prioritization of risks than by only assessing probability and impact.

11.3 Perform Qualitative Risk Analysis

Input → **Tools & Techniques** → Output

3. Data analysis (cont'd)

Risk Probability and Impact examples

Probability Scale example

Probability scales are defined in the Risk Management Plan

Probability scale table

Very Low	→ 10% estimated probability
Low	→ 30% estimated probability
Medium	→ 60% estimated probability
High	→ 80% estimated probability
Very High	→ 95% estimated probability

	Very Low	Low	Medium	High	Very High
Shipment delayed			X		
Long lead-time for Hardware		X			
Resource unavailability				X	

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

Risk Probability and Impact examples (cont'd)

Impact Scale Example

Impact scales are defined in the 'Risk Management Plan'

IMPACT SCALE TABLE

	Very Low	Low	Medium	High	Very High
Cost	< 1,000$	< 1,500$	< 3,000$	< 5,000$	> 4,999$
Time	< 3 days	< 7 days	< 10 days	< 15 days	> 14 days
Scope	< 10hrs effort	< 20hrs effort	< 35hrs effort	< 50hrs effort	> 49hrs effort
Quality	Minor Degradation	Restricted areas affected	Requires sponsor approval	Unacceptqable to sponsor	Deliverable unusable

11.3 Perform Qualitative Risk Analysis

Input → **Tools & Techniques** → Output

3. Data analysis (cont'd)

Risk Probability and Impact examples (cont'd)

Impact Scale Example (cont'd)

Cost	Very Low 1	Low 2	Medium 4	High 6	Very High 8
Shipment delayed	x				
Long lead-time for Hardware			x		
Resource unavailability		x			
Time	**Very Low 1**	**Low 2**	**Medium 3**	**High 4**	**Very High 5**
Shipment delayed		x			
Long lead-time for Hardware		x			
Resource unavailability			x		
Scope	**Very Low 1**	**Low 2**	**Medium 3**	**High 4**	**Very High 5**
Shipment delayed	x				
Long lead-time for Hardware		x			

Impact of Risk:
'Long lead-time for Hardware'
b=4+2+2=8

11.3 Perform Qualitative Risk Analysis

3. Data analysis (cont'd)

Risk Probability and Impact examples (cont'd)

The risk RATING rule is defined in the Risk Management Plan.

- We calculate for each risk its RATE

  Ex: Rate of Risk "Long lead-time for Hardware" = 8 * 0.3=2.4

	Impact	Probability	Rate
Shipment delayed	4	60%	2.4
Long lead-time for Hardware	8	30%	2.4
Resource unavailability	7	80%	5.6

11.3 Perform Qualitative Risk Analysis

6. Data representation

Data representation techniques that can be used include:

- **Probability and impact matrix**. Risks can be prioritized for further analysis and planning of risk responses based on their probability and impacts. Individual project risks are assigned to a priority level based on the combination of their assessed probability and impact, using a probability and impact matrix.
  - An organization can assess a risk separately for each objective (cost, time, and scope) by having a separate probability and impact matrix for each. Alternatively, it may develop ways to determine one overall priority level for each risk, either by combining assessments for different objectives, or by taking the highest priority level regardless of which objective is affected…

11.3 Perform Qualitative Risk Analysis

Input → **Tools & Techniques** → Output

6. Data representation (cont'd)

Risk Probability and Impact Matrix

RISK IMPACT	RISK PROBABILITY 10%	30%	60%	80%	95%
3	0.3	0.9	1.8	2.4	2.85
4	0.4	1.2	2.4	3.2	3.8
5	0.5	1.5	3	4	4.75
6	0.6	1.8	3.6	4.8	5.7
7	0.7	2.1	4.2	5.6	6.65
8	0.8	2.4	4.8	6.4	7.6
9	0.9	2.7	5.4	7.2	8.55
10	1	3	6	8	9.5
11	1.1	3.3	6.6	8.8	10.45
12	1.2	3.6	7.2	9.6	11.4
13	1.3	3.9	7.8	10.4	12.35
14	1.4	4.2	8.4	11.2	13.3
15	1.5	4.5	9	12	14.25
16	1.6	4.8	9.6	12.8	15.2
17	1.7	5.1	10.2	13.6	16.15
18	1.8	5.4	10.8	14.4	17.1

RISK RATING	
Very Low priority risk	<1
Low priority risk	<4
Medium priority risk	<8
High priority risk	<12
Very High risk	<18

11.3 Perform Qualitative Risk Analysis

6. Data representation (cont'd)

- **…**
- **Hierarchical charts**. Where risks have been categorized using more than two parameters, the probability and impact matrix cannot be used and other graphical representations are required. For example, a bubble chart displays three dimensions of data, where each risk is plotted as a disk (bubble), and the three parameters are represented by the x-axis value, the y-axis value, and the bubble size. An example bubble chart is shown in Figure 11-10, with detectability and proximity plotted on the x and y axes, and impact value represented by bubble size…

11.3 Perform Qualitative Risk Analysis

Input → **Tools & Techniques** → Output

6. Data representation (cont'd)

❖ **Hierarchical charts.** (cont'd)

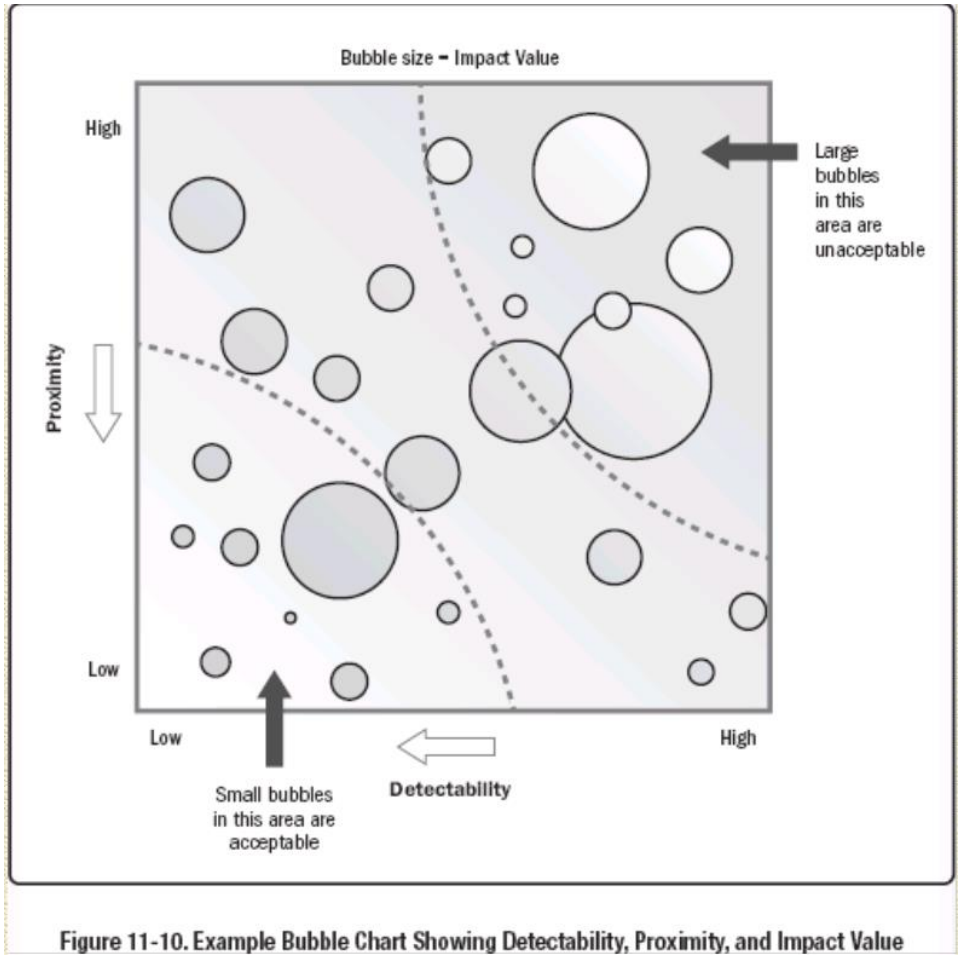


Figure 11-10. Example Bubble Chart Showing Detectability, Proximity, and Impact Value

11.3 Perform Qualitative Risk Analysis

1. Project documents updates

The goal of the Qualitative Risk Analysis process is to rank the risks and determine which ones need further analysis and, eventually, risk response plans.

- ❖ Assumption log.
- ❖ Issue log.
- ❖ Risk register will be updated with the following information:
  - Risk ranking (or priority) for the identified risks.
  - Risks grouped by categories.
  - List of risks requiring near-term responses.
  - List of risks for additional analysis and response.
  - Watch list of low-priority risks.
- ❖ Risk report.

11.4 Perform Quantitative Risk Analysis

Numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.

Involves the numerical measurement of the effects of quantified risks on the project.

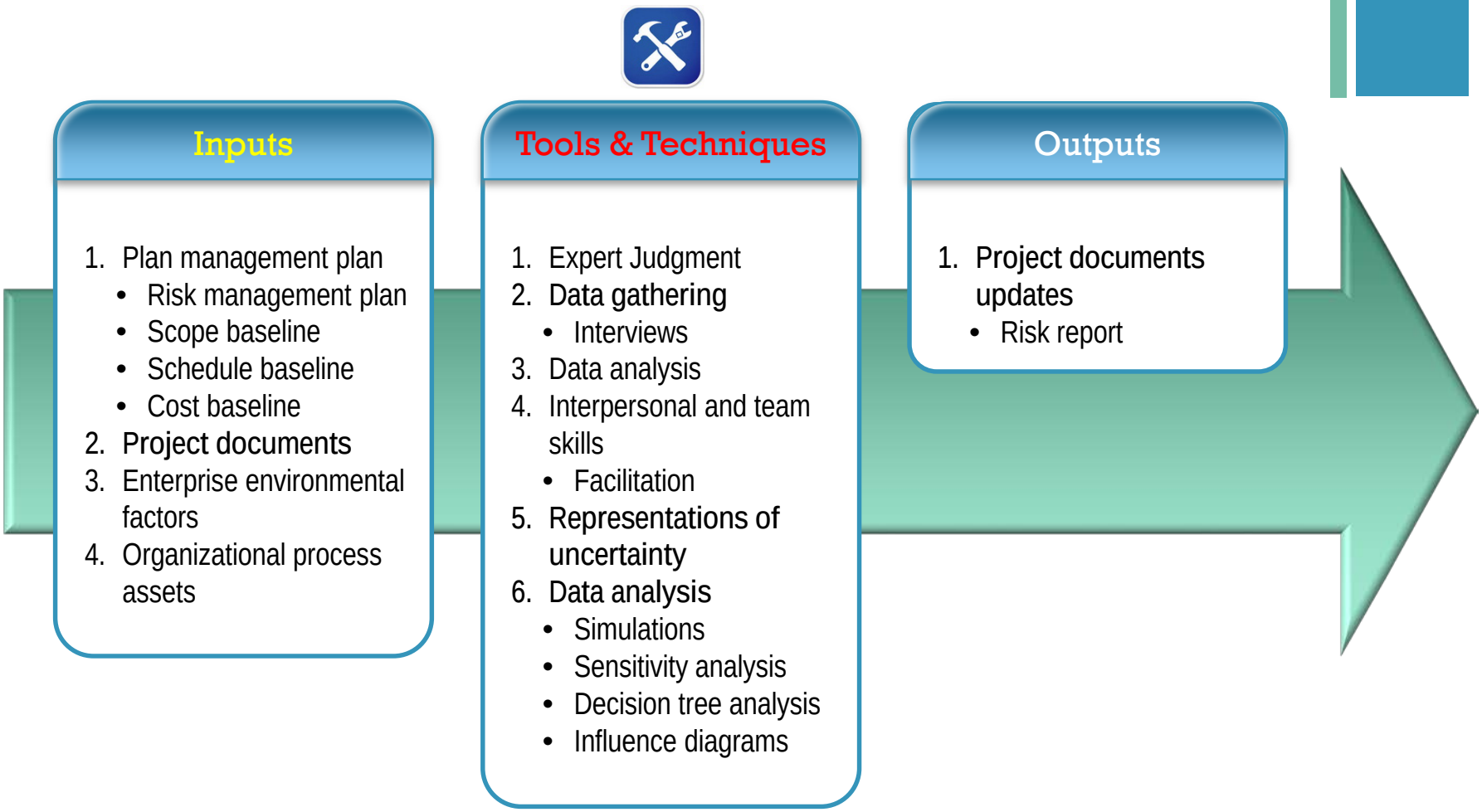
Involves using sophisticated mathematical modeling techniques to create forecasts and trend analysis such as Monte Carlo and decision tree.

11.4 Perform Quantitative Risk Analysis

- The Quantitative Risk Analysis process evaluates the impacts of risks prioritized during the Qualitative Risk Analysis process and quantifies risk exposure for the project by assigning numeric probabilities to each risk and their impacts on project objectives.

- This quantitative approach is accomplished using techniques like Monte Carlo simulation and decision tree analysis.

11.4 Perform Quantitative Risk Analysis



11.4 Perform Quantitative Risk Analysis

2. Project documents

Project documents that can be considered as inputs include:

- Assumption log.
- Basis of estimates.
- Cost estimates.
- Cost forecasts.
- Duration estimates.
- Milestone list.
- Resource requirements.
- Risk register.
- Risk report.
- Schedule forecasts.

11.4 Perform Quantitative Risk Analysis

Input → **Tools & Techniques** → Output

2. Data gathering

Interviewing: Draw on experience and historical data to quantify the probability and impact of risks on project objectives. Information can be gathered on the optimistic (low), pessimistic (high), and most likely scenarios for some commonly used distributions.

Range of Project Cost Estimates

WBS Element	Low	Most Likely	High
Design	$4M	$6M	$10M
Build	$16M	$20M	$35M
Test	$11M	$15M	$23M
Total Project	$31M	$41M	$68M

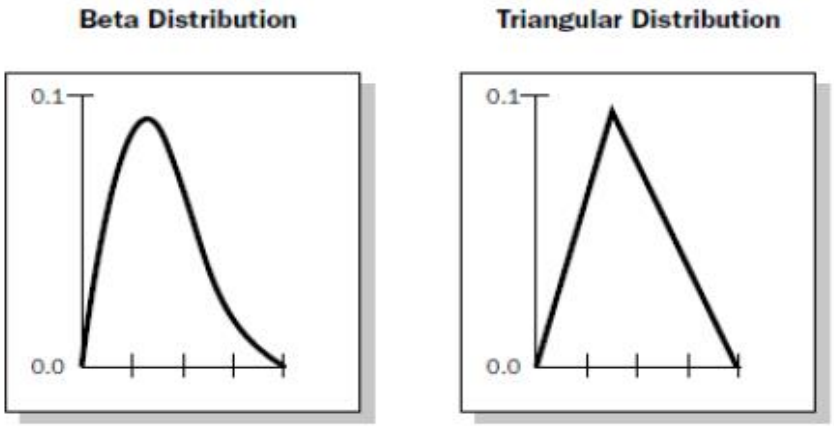
Interviewing relevant stakeholders helps determine the three-point estimates for each WBS element for triangular, beta or other distributions. In this example, the likelihood of completing the project at or below the most likely estimate of $41 million is relatively small

11.4 Perform Quantitative Risk Analysis

Input → **Tools & Techniques** → Output

5. Representations of uncertainty

Where the duration, cost, or resource requirement for a planned activity is uncertain, the range of possible values can be represented in the model as a ***probability distribution***. This may take several forms. The most commonly used are triangular, normal, lognormal, beta, uniform, or discrete distributions.



Beta and triangular distributions are frequently used in quantitative risk analysis. The data shown in the figure on the left (Beta Distribution) is one example of a family of such distributions determined by two "shape parameters". Other commonly used distributions include the uniform, normal and lognormal. In these charts the horizontal (X) axes represent possible values of time or cost and the vertical (Y) axes represent relative likelihood.

11.4 Perform Quantitative Risk Analysis

6. Data analysis

Data analysis techniques that can be used include:

- ✓ Simulation
- ✓ Sensitivity Analysis.
- ✓ Decision Tree Analysis.
- ✓ Influence diagrams

11.4 Perform Quantitative Risk Analysis

6. Data analysis (cont'd)

- **Simulation.** Quantitative risk analysis uses a model that simulates the combined effects of individual project risks and other sources of uncertainty to evaluate their potential impact on achieving project objectives.
  - Simulations are typically performed using a Monte Carlo analysis. When running a Monte Carlo analysis for cost risk, the simulation uses the project cost estimates.
  - When running a Monte Carlo analysis for schedule risk, the schedule network diagram and duration estimates are used.
  - An integrated quantitative cost-schedule risk analysis uses both inputs. The output is a quantitative risk analysis model.

…

11.4 Perform Quantitative Risk Analysis

6. Data analysis (cont'd)

…

Computer software is used to iterate the quantitative risk analysis model several thousand times. The input values (cost estimates, duration estimates, or occurrence of probabilistic branches) are chosen at random for each iteration. Outputs represent the range of possible outcomes for the project (project end date, project cost at completion). Typical outputs include a histogram presenting the number of iterations where a particular outcome resulted from the simulation, or a cumulative probability distribution (S-curve) representing the probability of achieving any particular outcome or less. Figure 11-13 shows an example S-curve from a Monte Carlo cost risk analysis .

It is also possible to conduct a criticality analysis that determines which elements of the risk model have the greatest effect on the project critical path. A criticality index is calculated for each element in the risk model, which gives the frequency with which that element appears on the critical path during the simulation, usually expressed as a percentage. The output from a criticality analysis allows the PT to focus risk response planning efforts on those activities with the highest potential effect on the overall schedule performance of the project.

11.4 Perform Quantitative Risk Analysis

Input → **Tools & Techniques** → Output

6. Data analysis (cont'd)

…

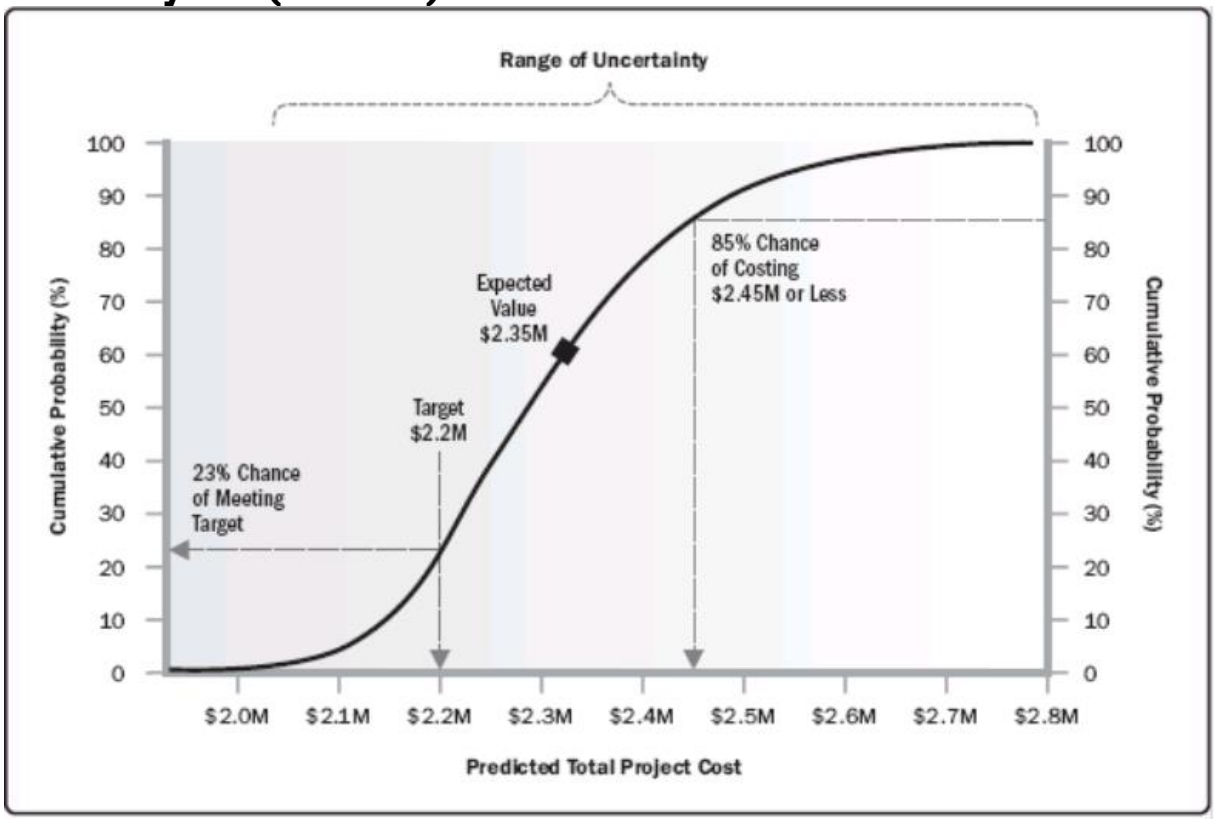


Figure 11-13. Example S-Curve from Quantitative Cost Risk Analysis

11.4 Perform Quantitative Risk Analysis

6. Data analysis (cont'd)

…

- **Sensitivity analysis** helps to determine which individual project risks or other sources of uncertainty have the most potential impact on project outcomes. It correlates variations in project outcomes with variations in elements of the quantitative risk analysis model.
  - One typical display of sensitivity analysis is the **tornado diagram**, which presents the calculated correlation coefficient for each element of the quantitative risk analysis model that can influence the project outcome. This can include individual project risks, project activities with high degrees of variability, or specific sources of ambiguity.
  - Items are ordered by descending strength of correlation, giving the typical tornado appearance. An example tornado diagram is shown in Figure 11-14.

11.4 Perform Quantitative Risk Analysis

Input → **Tools & Techniques** → Output

6. Data analysis (cont'd)

…

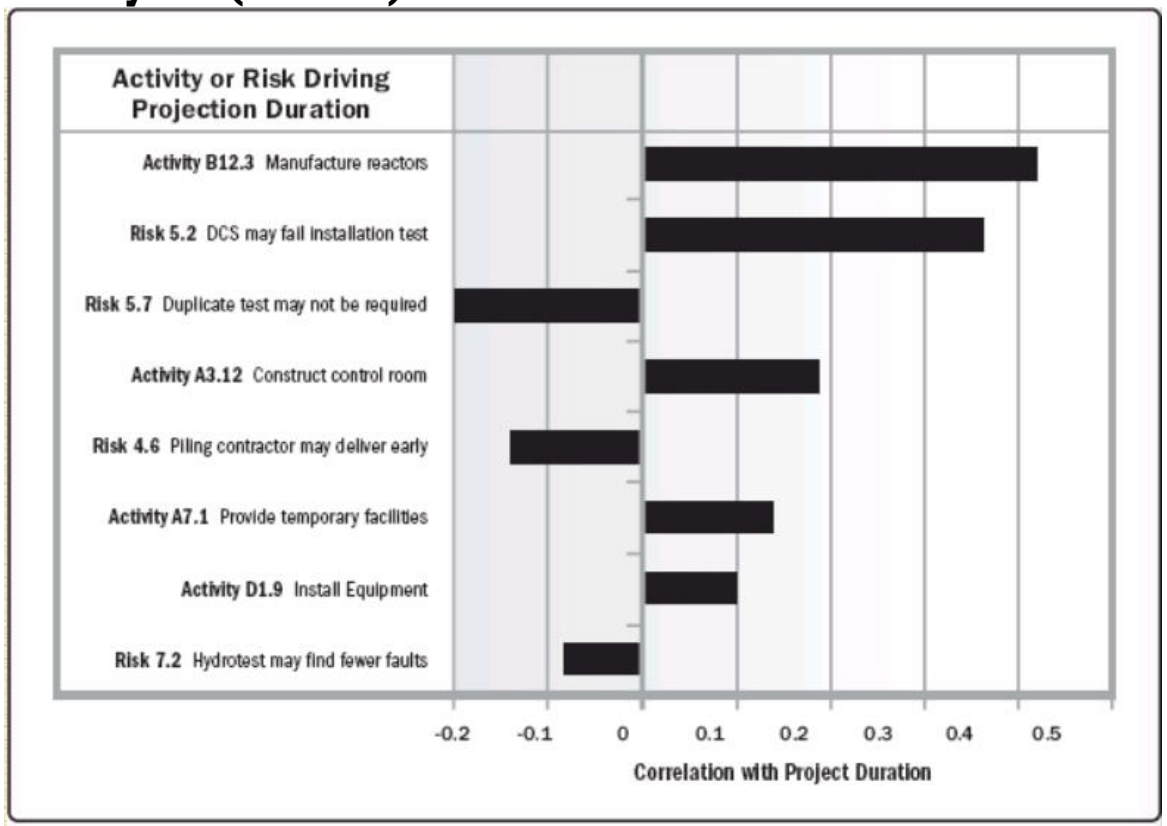


Figure 11-14. Example Tornado Diagram

11.4 Perform Quantitative Risk Analysis

6. Data analysis (cont'd)

…

- **Decision tree analysis**. Decision trees are used to support selection of the best of several alternative courses of action. Alternative paths through the project are shown in the decision tree using branches representing different decisions or events, each of which can have associated costs and related individual project risks (including both threats and opportunities). The end-points of branches in the decision tree represent the outcome from following that particular path, which can be negative or positive.

The decision tree is evaluated by calculating the **expected monetary value (EMV)** of each branch, allowing the optimal path to be selected. An example decision tree is shown in Figure 11-15.

11.4 Perform Quantitative Risk Analysis

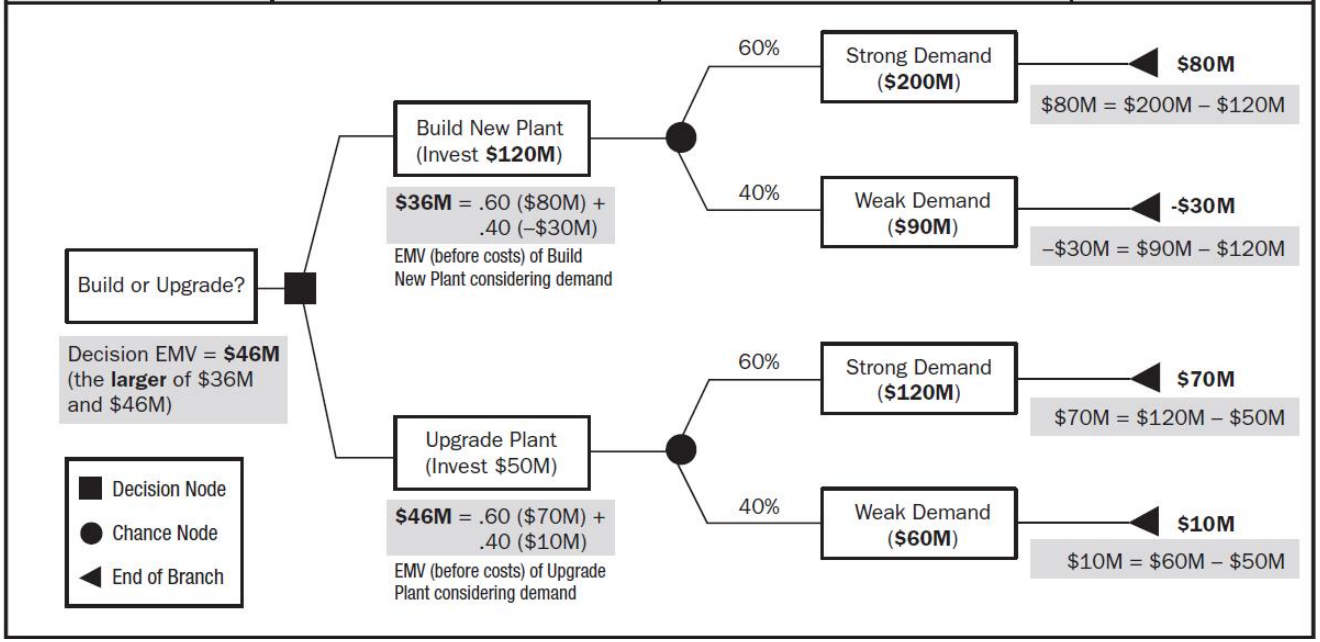
Input → **Tools & Techniques** → Output

6. Data analysis (cont'd)

...

Fig 11-15 Decision Tree

Decision Definition	Decision Node	Chance Node	Net Path Value
Decision to be Made	**Input:** Cost of Each Decision **Output:** Decision Made	**Input:** Scenario Probability, Reward if it Occurs **Output:** Expected Monetary Value (EMV)	**Computed:** Payoffs minus Costs along Path



11.4 Perform Quantitative Risk Analysis

6. Data analysis (cont'd)

…

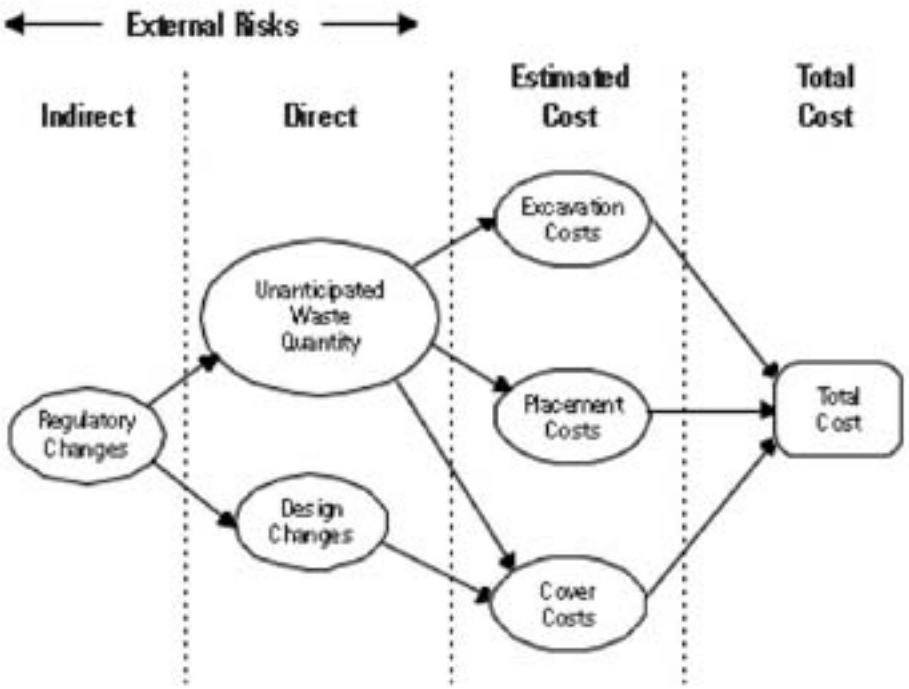
- **Influence diagrams.** Influence diagrams are graphical aids to decision making under uncertainty. An influence diagram represents a project or situation within the project as a set of entities, outcomes, and influences, together with the relationships and effects between them. Where an element in the influence diagram is uncertain as a result of the existence of individual project risks or other sources of uncertainty, this can be represented in the influence diagram using ranges or probability distributions. The influence diagram is then evaluated using a simulation technique, such as Monte Carlo analysis, to indicate which elements have the greatest influence on key outcomes. Outputs from an influence diagram are similar to other quantitative risk analysis methods, including S-curves and tornado diagrams.

11.4 Perform Quantitative Risk Analysis

Input → **Tools & Techniques** → Output

6. Data analysis (cont'd)

- **Influence diagrams – Example.**



11.4 Perform Quantitative Risk Analysis

1. Project documents updates

Project documents include the **risk report** described in Sec.11.2, updated to reflect the results of the quantitative risk analysis, and include:

- ✓ **Assessment of overall project risk exposure**. Overall project risk is reflected in two key measures:
  - Chances of project success, indicated by the probability that the project will achieve its key objectives (required end date or interim milestones, required cost target, etc.) given the identified individual project risks and other sources of uncertainty;
  - Degree of inherent variability remaining within the project at the time the analysis was conducted, indicated by the range of possible project outcomes…

11.4 Perform Quantitative Risk Analysis

1. Project documents updates (cont'd)

- ✓ …
- ✓ **Detailed probabilistic analysis of the project.** Key outputs from the quantitative risk analysis are presented, such as S-curves, tornado diagrams, and criticality analysis, together with a narrative interpretation of the results. Possible detailed results of a quantitative risk analysis may include:
  - Amount of contingency reserve needed to provide a specified level of confidence;
  - Identification of individual project risks or other sources of uncertainty that have the greatest effect on the project critical path;
  - Major drivers of overall project risk, with the greatest influence on uncertainty in project outcomes…

11.4 Perform Quantitative Risk Analysis

1. Project documents updates (cont'd)

- ✓ …
- ✓ **Prioritized list of individual project risks**. This list includes those individual project risks that pose the greatest threat or present the greatest opportunity to the project, as indicated by sensitivity analysis.
- ✓ **Trends in quantitative risk analysis results**. As the analysis is repeated at different times during the project life cycle, trends may become apparent that inform the planning of risk responses.
- ✓ **Recommended risk responses**. The risk report may present suggested responses to the level of overall project risk exposure or key individual project risks, based on the results of the quantitative risk analysis. These recommendations will form inputs to the *Plan Risk Responses* process.

11.5 Plan Risk Responses

Developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.

11.5 Plan Risk Responses

Inputs

1. Plan management plan
   - Resource management plan
   - Risk management plan
   - Cost baseline
2. Project documents
3. Enterprise environmental factors
4. Organizational process assets

Tools & Techniques

1. Expert judgment
2. Data gathering
   - Interviews
3. Interpersonal and team skills
   - Facilitation
4. Strategies for threats
5. Strategies for opportunities
6. Contingent response strategies
7. Strategies for overall project risk
8. Data analysis
9. Decision making
   - Multicriteria decision analysis

Outputs

1. Change requests
2. PMP update
3. Project documents updates
   - Assumption log
   - Cost forecasts
   - Lessons learned register
   - Project schedule
   - PT assignments
   - Risk register
   - Risk report

11.5 Plan Risk Responses

General Info

- **Risk Triggers.** Indications that a risk has occurred or is about to occur. Triggers may be discovered in the *Identify Risk* process and watched in the *Monitoring and control Risks* process. Triggers are sometimes called risk symptoms or warning signs.

- **Issue Workaround.** Response strategy which is used to respond to an issue which occurred. A **workaround**, in contrary to the contingency plan, is not planned in advance of the occurrence of the risk event.

- **Residual Risk.** A risk that remains after risk responses have been implemented for the other risks.

- **Secondary Risk.** A new risk that arises as a direct result of implementing a risk response.

11.5 Plan Risk Responses

Risk Response Strategies

THREATS	OPPORTUNITIES
Escalate	Escalate
Avoid	Exploit
Transfer	Share
Mitigate	Enhance
Accept	Accept

11.5 Plan Risk Responses

4. Strategies for negative risks or Threats

Escalate	Outside the scope of the project or that the proposed response would exceed the PM's authority.
Avoid	Involve **eliminating** the risk **entirely**. Exp. change the plan, buy expertise, …
Transfer	Involve **shifting** part or all of the negative impact to a third party. Exp. Use of insurance, sub-contractor, buyer, performance bond, guarantee, …
Mitigate	Involve **reduction** in the probability and/or impact. Exp. Conduct more tests, change supplier, …
Accept	Involve **accepting** the risk. Passive (no action) acceptance & active (contingency reserve) acceptance

11.5 Plan Risk Responses

5. Strategies for positive risks or opportunities

Escalate	Outside the scope of the project or that the proposed response would exceed the PM's authority.
Exploit	Involve **ensuring** the occurrence of the opportunity, such as: Assign the most adequate resource, …
Share	Involve **allocating** part or all of the positive impact to a third party best capable of capturing the opportunity. Exp. Creation of a join-venture, a risk-share partnership, …
Enhance	Involve **increasing** the probability and/or the positive impact. Exp. Adding more resources, …
Accept	Involve **accepting** the opportunity when it occurs.

11.5 Plan Risk Responses

6. Contingent Response Strategies

A "**contingency plan**" is a predefined set of actions the PT will take should certain events occur. Events that trigger the contingency plan should be tracked.

A "**fallback plan**" is a reaction to a risk that has occurred when the primary response proves to be inadequate. By implementing fall back plan it helps the PT fall back to the safest point possible.

- **Example:** The annual employee recognition is taking place in a park as an outdoor event. The is a risk of rain on the day of the event but with low probability. You decide not to take proactive action on the risk, but rather develop a 'contingent response strategy' in case it rains.
  a. to move the event to the covered gymnasium in case of rains
  b. as a fallback plan: move to the park offices if the gymnasium is not available.

11.5 Plan Risk Responses

6. Contingent Response Strategies (cont'd)

A contingency allowance is the amount of money the project will likely need in the contingency reserve based on the impact, probability, and expected monetary value EMV of a risk event.

Risk	Probability	Impact	EMV
A	20%	-$4,000	-$800
B	45%	$3,000	$1,350
C	10%	$2,100	$210
D	65%	-$2,500	-$1,625
Contingency Reserve Fund			$865
Management Reserve (say 10%)			$86,5

11.5 Plan Risk Responses

7. Strategies for overall project risk

Risk responses should be planned and implemented not only for individual project risks but also to address overall project risk. The same risk response strategies that are used to deal with individual project risks can also be applied to overall project risk.

THREATS	OPPORTUNITIES
Avoid	Exploit
Transfer	Share
Mitigate	Enhance
Accept	Accept

11.5 Plan Risk Responses

3. Project documents updates

Project documents that may be updated as a result include:

- **Assumption log.** During the Plan Risk Responses process, new assumptions may be made, new constraints may be identified, and existing assumptions or constraints may be revisited and changed. The assumption log should be updated with this new information.
- **Cost forecasts.**
- **Lessons learned register.**
- **Project schedule.**
- **Project Team assignments.** Once the responses are confirmed, the necessary resources should be allocated to each action associated with a risk response plan.
- **Risk report.**
- … Risk register

11.5 Plan Risk Responses

3. Project documents updates (cont'd)

- **Risk register**. The risk register is updated when appropriate risk responses are chosen and agreed upon and may include:
  - Agreed-upon response strategies;
  - Specific actions to implement the chosen response strategy;
  - Trigger conditions, symptoms, and warning signs of a risk occurrence;
  - Budget and schedule activities required to implement the chosen responses;
  - Contingency plans and risk triggers that call for their execution;
  - Fallback plans for use when a risk that has occurred and the primary response proves to be inadequate;
  - Residual risks that are expected to remain after planned responses have been taken, as well as those that have been deliberately accepted;
  - Secondary risks that arise as a direct outcome of implementing a risk response.

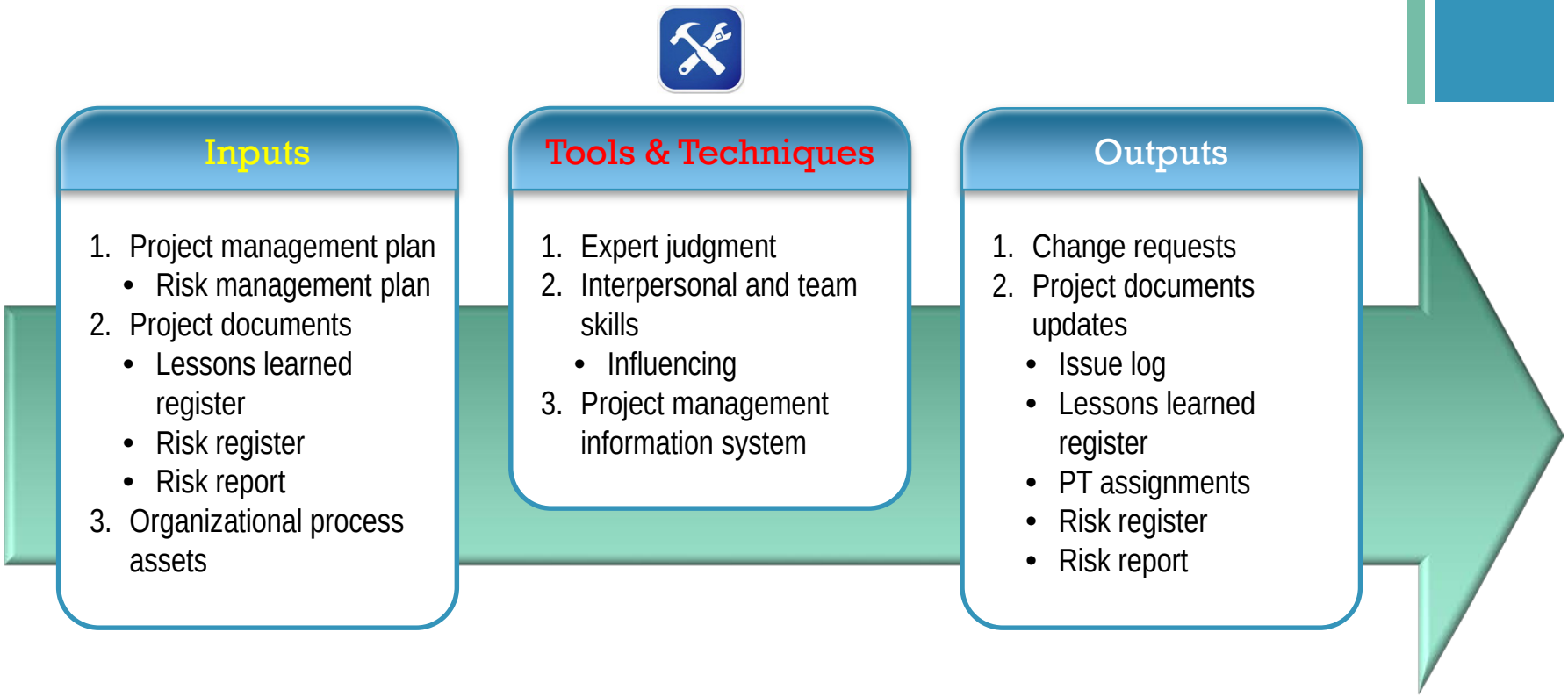
11.6 Implement Risk Responses

Implementing agreed-upon risk response plans.

Re-assessment of an existing risk can show if modification or retirement is needed.

agreed-upon risk responses are executed as planned in order to address overall project risk exposure, minimize individual project threats, and maximize individual project opportunities

11.6 Implement Risk Responses



11.7 Monitor Risks

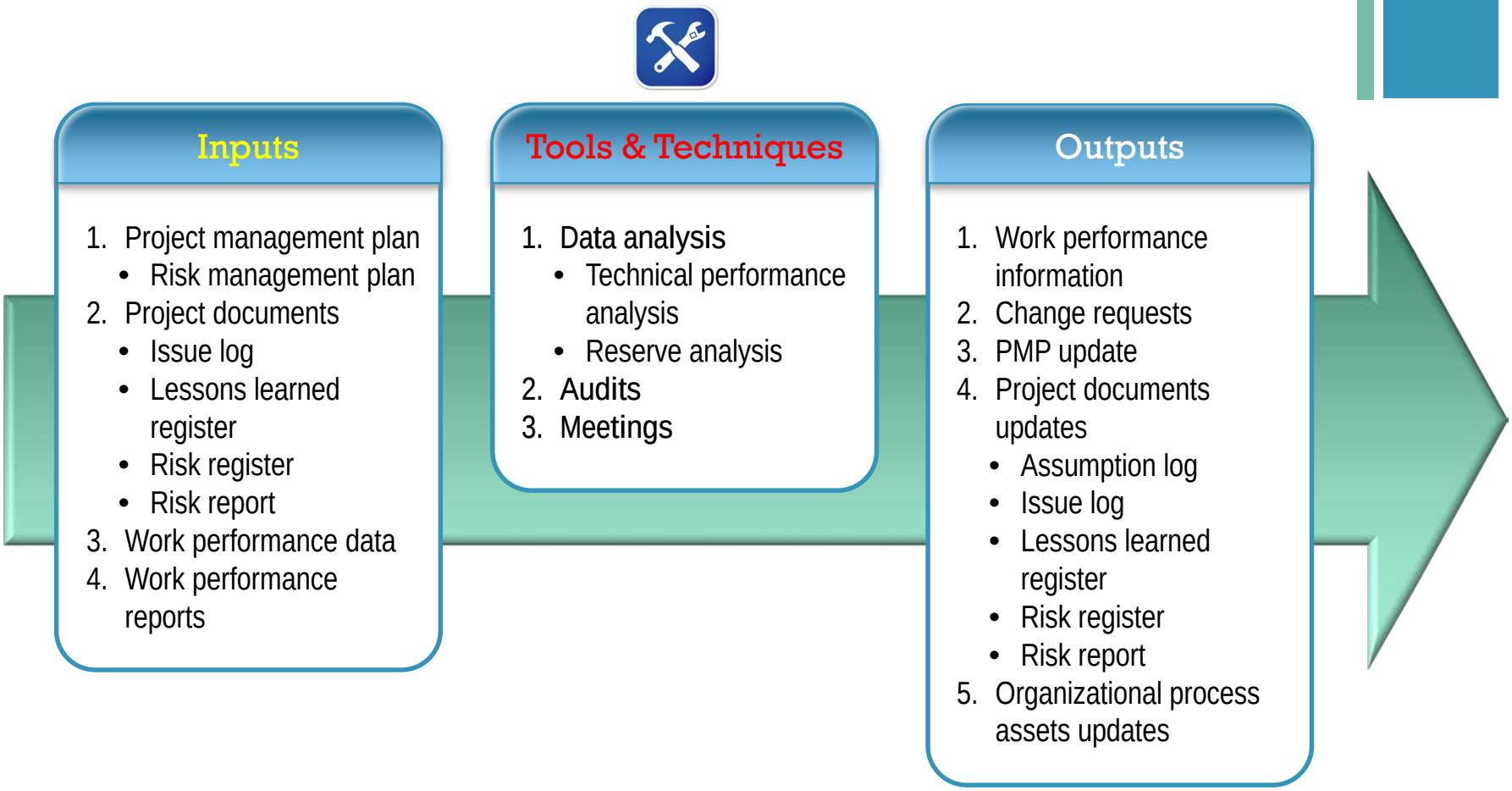
monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk process effectiveness throughout the project.

Re-assessment of an existing risk can show if modification or retirement is needed.

New risks can be identified, existing modified, updated or executed.

Contingency reserves updated to reflect the current risks assessment.

11.7 Monitor Risks



11.7 Monitor Risks

- In order to ensure that the PT and key stakeholders are aware of the current level of risk exposure, project work should be continuously monitored for new, changing, and outdated individual project risks and for changes in the level of overall project risk by applying the *Monitor Risks* process.
- The *Monitor Risks* process uses performance information generated during project execution to determine if:
  - Implemented risk responses are effective,
  - Level of overall project risk has changed,
  - Status of identified individual project risks has changed,
  - New individual project risks have arisen,
  - Risk management approach is still appropriate,
  - Project assumptions are still valid,
  - Risk management policies and procedures are being followed,
  - Contingency reserves for cost or schedule require modification,
  - Project strategy is still valid.

11.7 Monitor Risks

1. Data analysis

Data analysis techniques that can be used include:

- **Technical performance analysis**. Technical performance analysis compares technical accomplishments during project execution to the schedule of technical achievement.
  - It requires the definition of objective, quantifiable measures of technical performance, which can be used to compare actual results against targets. Such technical performance measures may include weight, transaction times, number of delivered defects, storage capacity, etc.
  - Deviation can indicate the potential impact of threats or opportunities.
- …

11.7 Monitor Risks

1. Data analysis (cont'd)

- …
- **Reserve analysis**. Throughout execution of the project, some individual project risks may occur with positive or negative impacts on budget or schedule contingency reserves.
  - Reserve analysis compares the amount of the contingency reserves remaining to the amount of risk remaining at any time in the project in order to determine if the remaining reserve is adequate.
  - This may be communicated using various graphical representations, including a burndown chart.

11.7 Monitor Risks

Input → **Tools & Techniques** → Output

2. Audits

Risk audits are a type of audit that may be used to consider the effectiveness of the risk management process.

- The PM is responsible for ensuring that risk audits are performed at an appropriate frequency, as defined in the project's *risk management plan*.
- Risk audits may be included during routine project review meetings or may form part of a risk review meeting, or the team may choose to hold separate risk audit meetings.
- The format for the risk audit and its objectives should be clearly defined before the audit is conducted.

11.7 Monitor Risks

Input → **Tools & Techniques** → Output

3. Meetings

Periodic Risk Reviews & Status Meetings

The periodic risk review is a regularly scheduled discussion throughout the project to ascertain the level of foreseeable risks, the success of risk responses in the project to date, and a review of pending risks.

11.7 Monitor Risks

3 . Meetings (cont'd)

- Risk reviews are scheduled regularly and should examine and document the effectiveness of risk responses in dealing with overall project risk and with identified individual project risks.
- Risk reviews may also result in:
  - Identification of new individual project risks, (including secondary risks that arise from agreed-upon risk responses),
  - Reassessment of current risks,
  - The closing of risks that are outdated,
  - Issues that have arisen as the result of risks that have occurred,
  - Identification of lessons to be learned for implementation in ongoing phases in the current project or in similar projects in the future.
- The risk review may be conducted as part of a periodic project status meeting or a dedicated risk review meeting may be held.

11.7 Monitor Risks

Results of Good Project Risk Management

- Unlike crisis management, good project risk management often goes unnoticed.
- Well-run projects appear to be almost effortless, but a lot of work goes into running a project well.
- PMs should strive to make their jobs look easy to reflect the results of well-run projects.

Thank you

Knowledge area

- You can find the whole Project Management Professional course on Z:\eLibraries\eBooks\Management\PMP 6 Course
- You can also visit www.pmi.org for more information

Please call us for any support