projectmanagement

Managing Project Risk

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Managing Project Risk

Notes

Course Objectives

By the end of this course, you will be able to—

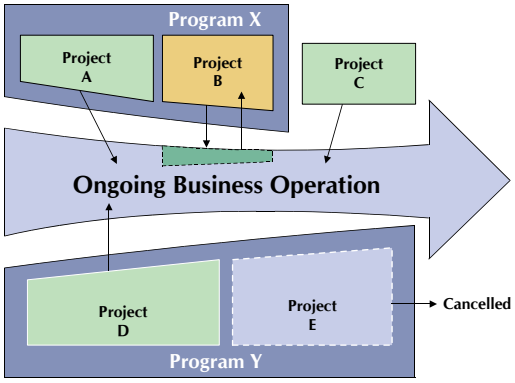
- Identify risks using various methods
- Assess the potential impact of risk factors
- Prioritize risks to determine the most important
- Develop effective risk response strategies
- Control risk during project execution using proven tools and techniques
- Use a practical 8-step process to manage project risk
- Integrate risk management into the overall project management process

Notes

What Is a *Project*?

"[A] temporary endeavor undertaken to create a unique product, service, or result"*

***—PMBOK® Guide*, p. 5**



*Source: Project Management Institute. A Guide to the Project Management Body of Knowledge. 3d ed. Newtown Square, Pa.: Project Management Institute, 2004.

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Notes

Project Management

- *[T]he application of knowledge, skills, tools and techniques to project activities to meet project requirements*
- *[A]ccomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling, and closing*

—PMBOK® Guide, p. 8

Sound project management helps ensure success.

Notes

Project Life Cycle

- Projects are usually divided into phases
- Collectively, these phases make up the *project life cycle*

I Initiation	P Planning	I Implementation	C Closeout

Notes

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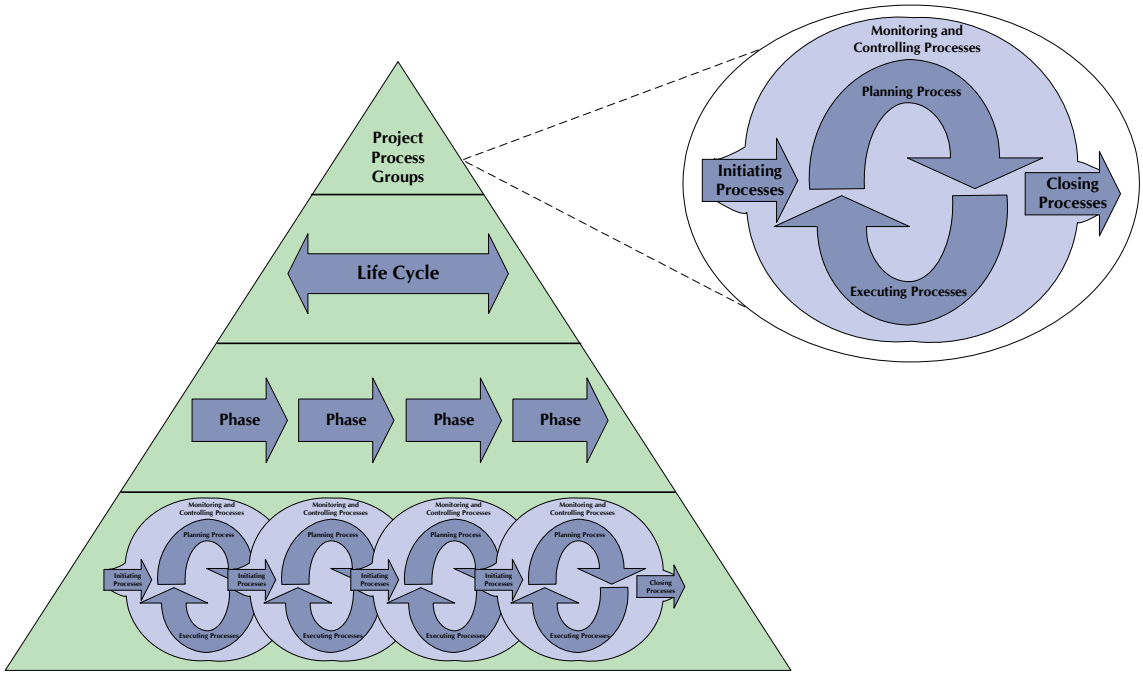
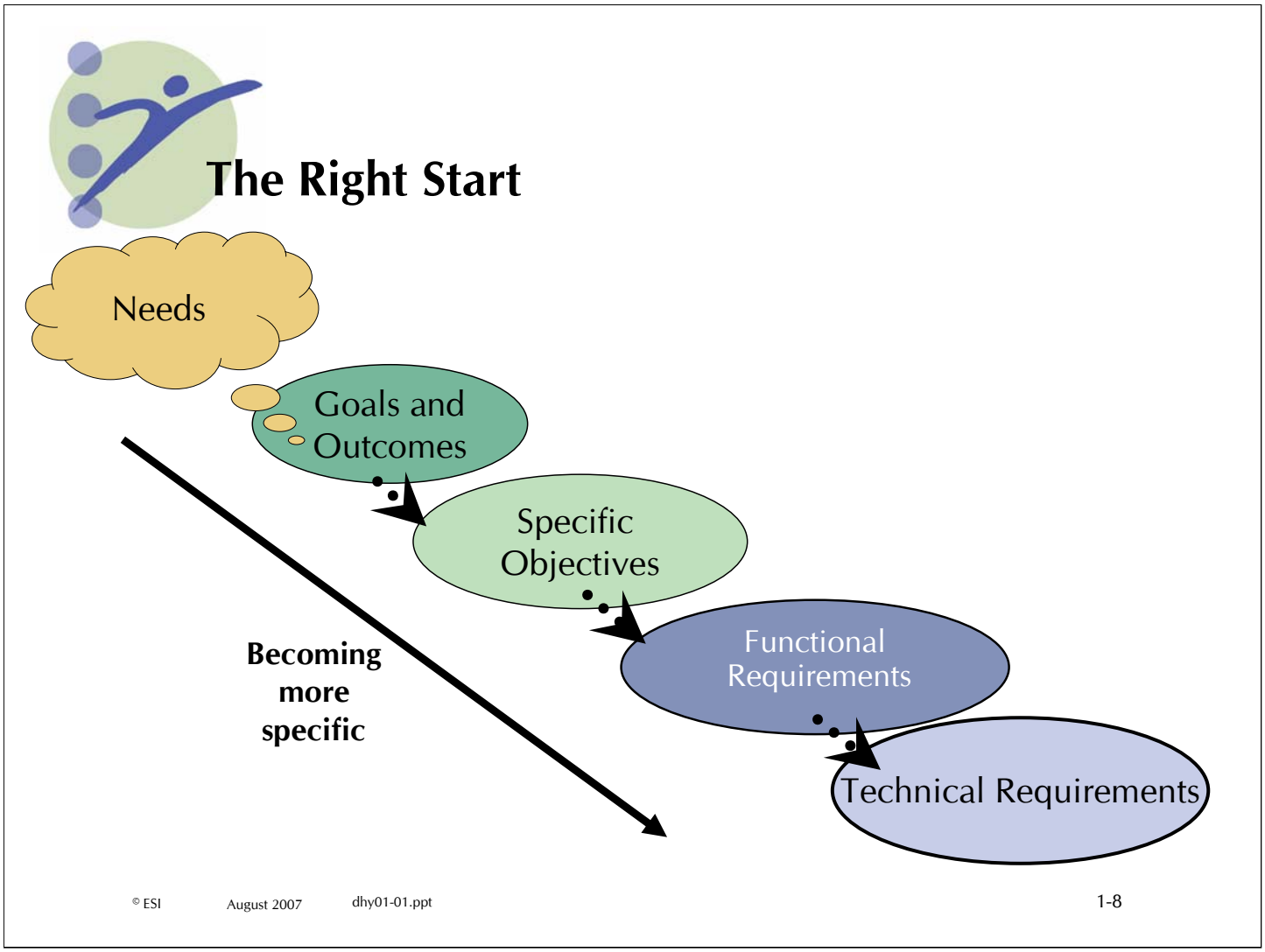
Project Management Process Groups

The *PMBOK® Guide's* five project process groups: Initiating, Planning, Executing, Monitoring and Controlling, and Closing



Source: PMBOK® Guide, *p. 69*

Notes


The Right Start
Needs
Goals and Outcomes
Specific Objectives
Functional Requirements
Technical Requirements
Becoming more specific
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Notes

Formulating Good Objectives

Objective

- An understanding between someone who needs something and someone who can provide it
- Exists at all levels (corporate, project, work team, specific task)
- Uses the SMART model
  - S = Specific
  - M = Measurable
  - A = Agreed-upon
  - R = Realistic
  - T = Time-based

Notes

Work Breakdown Structure (WBS)

The WBS—

- *[Is a] deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables*
- *[O]rganizes and defines the total scope of the project*
- *[Subdivides the project work into smaller, more manageable pieces of work, with] each descending level [of the WBS] represent[ing] an increasingly detailed definition of the project work*

—PMBOK® Guide, p. 379

Notes

Organizing the WBS

- Define the project—
  - Scope
  - Tasks
  - Work packages
  - Technical baseline
- Organize the WBS to allow—
  - For realistic estimating
  - Assignment to a single organizational unit or for exclusive responsibility
- Use tools consistent with your comfort level and project needs

Notes

WBS Review

The WBS should—

- Be consistent
- Be task oriented and start with a verb, ***or*** be deliverable oriented and start with a noun
- Be decomposed to your level of control
- Ensure that each work package accomplishes a discrete work element
- Make work packages SMART

Notes

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Key Definitions

Project risk

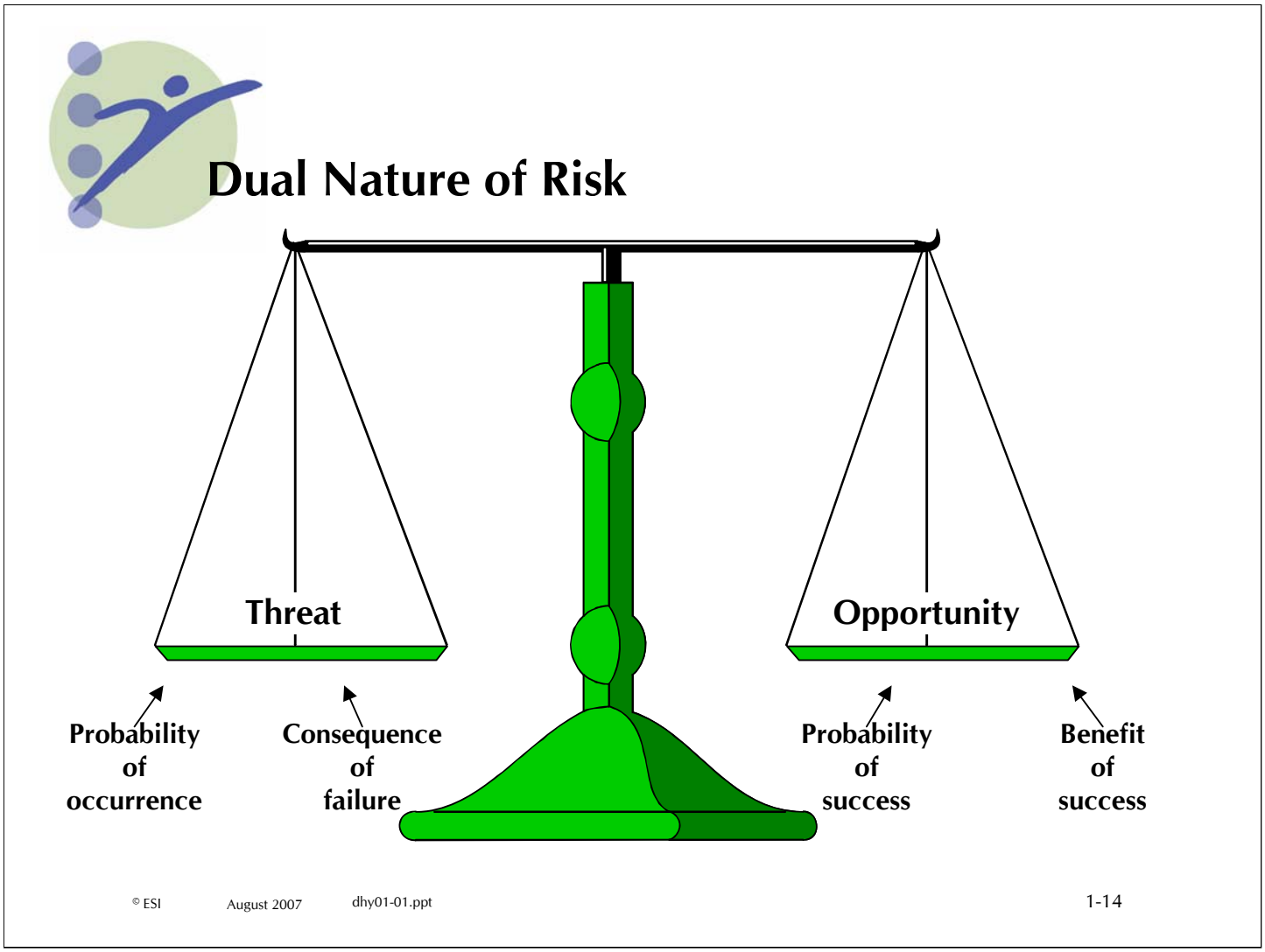
- "An uncertain event or condition that, if it occurs, has a positive or a negative effect on at least one project objective…"

Risk management

- "…includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project…"
- Includes "increas[ing] the probability and impact of positive events, and decreas[ing] the probability and impact of events adverse to the project"

Source: PMBOK® Guide, *pp. 237–238*

Notes


Dual Nature of Risk
Threat
Opportunity
Probability of occurrence
Consequence of failure
Probability of success
Benefit of success
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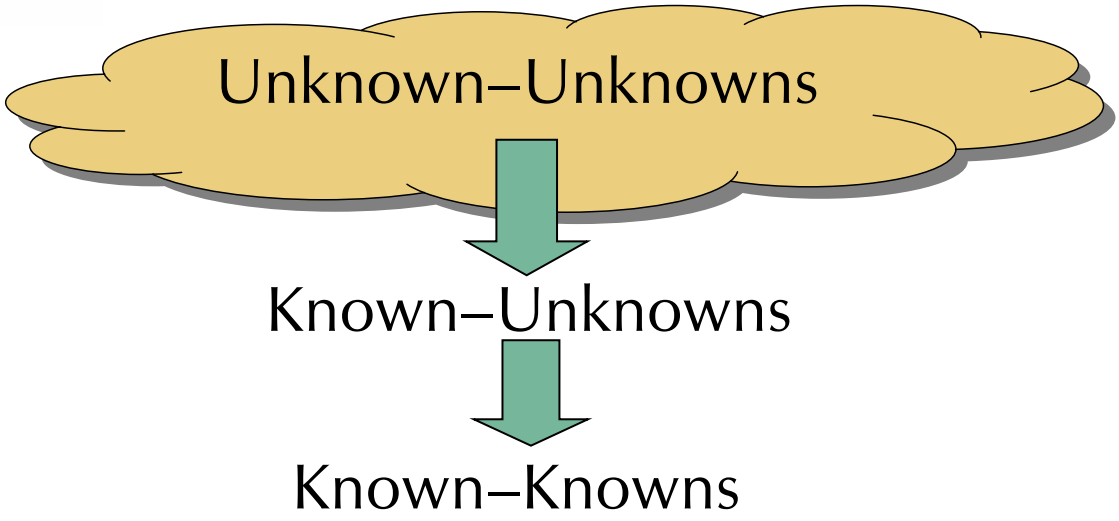
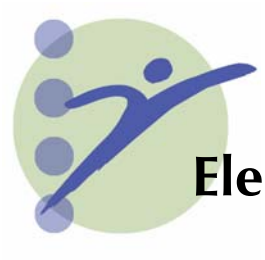
Notes

Uncertainty



- ***Known risks:*** Risks that were identified by the project team
- ***Unknown risks:*** Risks that were not identified

Notes



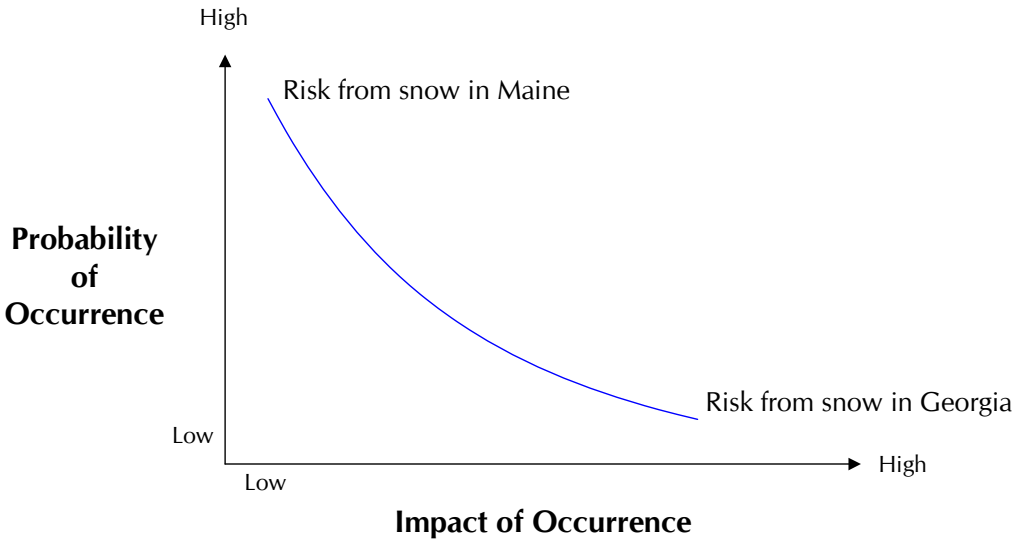
Elements of Risk

- A definable **event**
- **Probability** of occurrence
- **Impact** (consequence) of occurrence

Notes

Risk Is a Function of Its Elements

Expected value = (probability of occurrence) × (impact of occurrence)



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Benefits of Risk Management

- Minimize management by crisis
- Encourage proactive management
- Minimize surprises and problems
- Gain competitive advantage
- Decrease overall probability of project variances
- Increase probability of project success
- Increase profitability
- Focus on building the right product the first time
- Prevent problems from occurring, or if they occur, from escalating

Notes

Responsibilities in Risk Management

Project manager

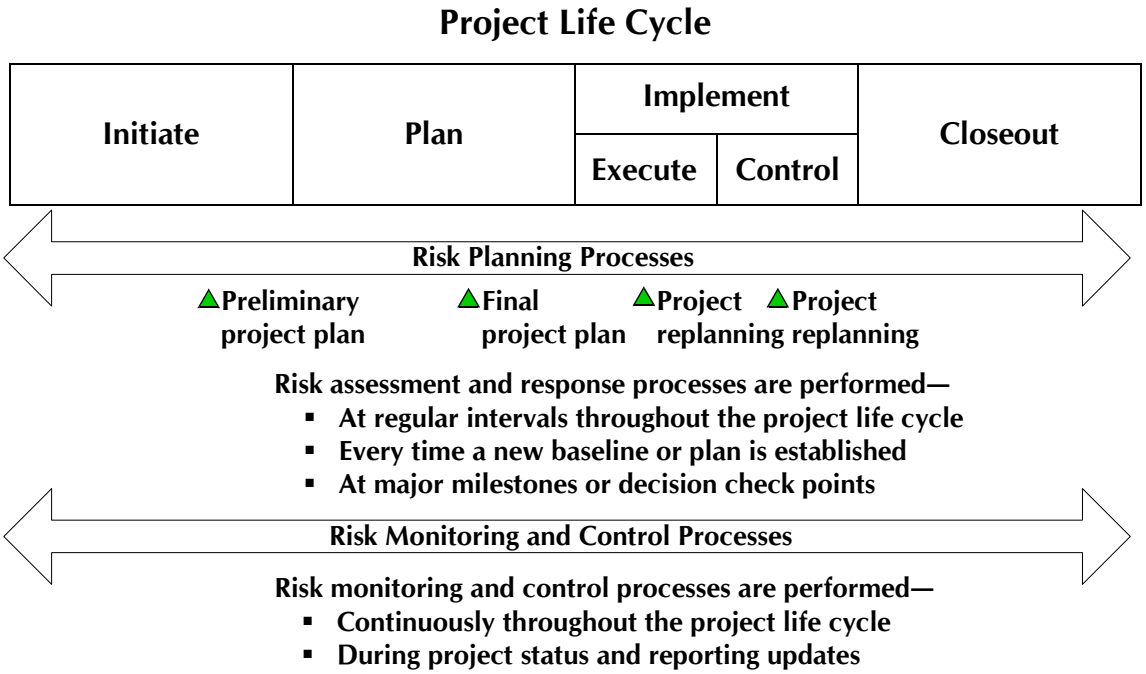
- Initiate and lead the risk management process
- Provide direction to the project team on the risk management process and tools

Project team

- Understand and follow the risk management process
- Execute risk management strategies
- Report status on the risk management process

Notes

Risk Management—A Full Project Life-Cycle Responsibility



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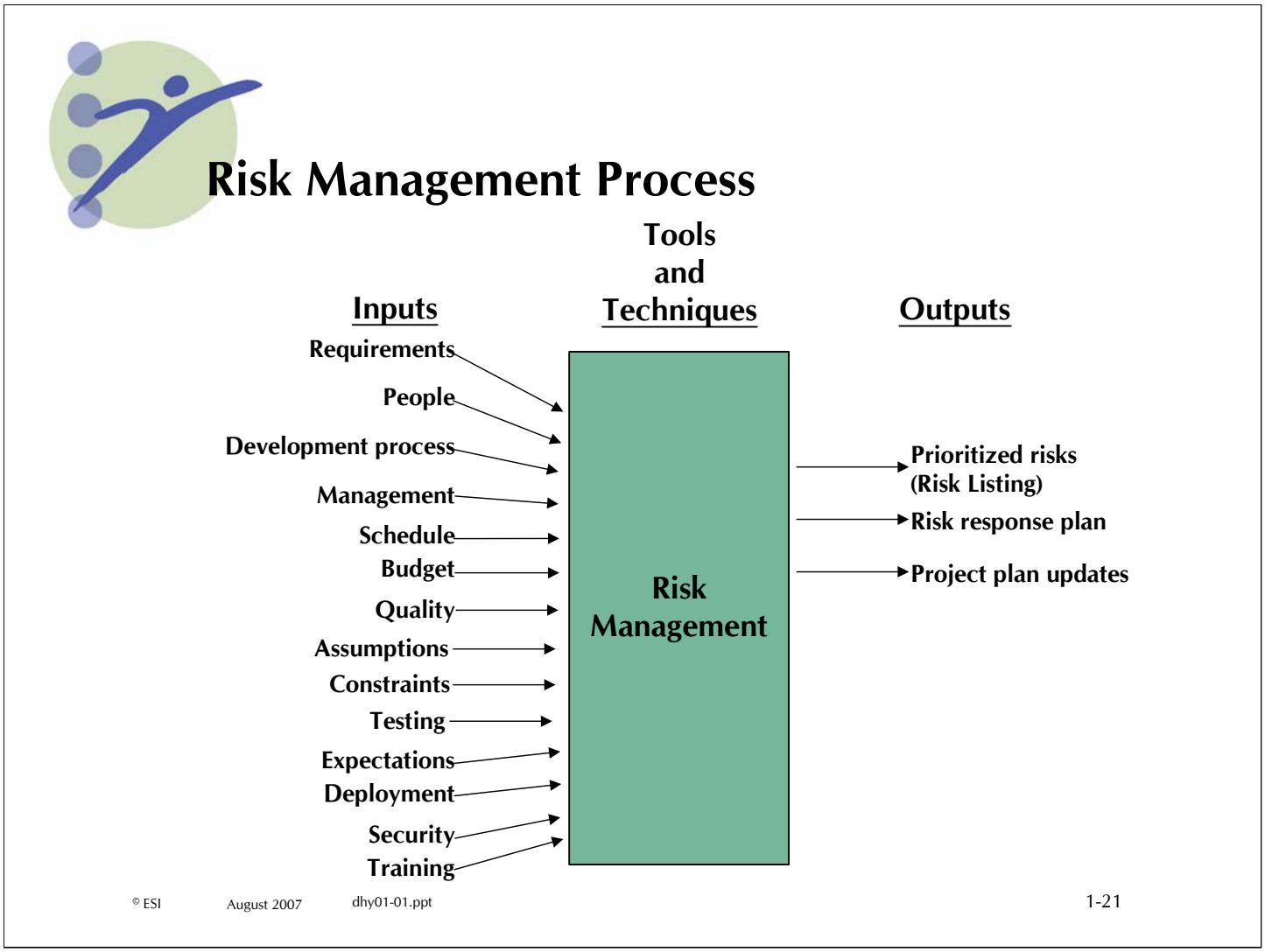
Risk Management Process
Tools and Techniques
Inputs
Outputs
Requirements
People
Development process
Management
Schedule
Budget
Quality
Assumptions
Constraints
Testing
Expectations
Deployment
Security
Training
Risk Management
Prioritized risks (Risk Listing)
Risk response plan
Project plan updates
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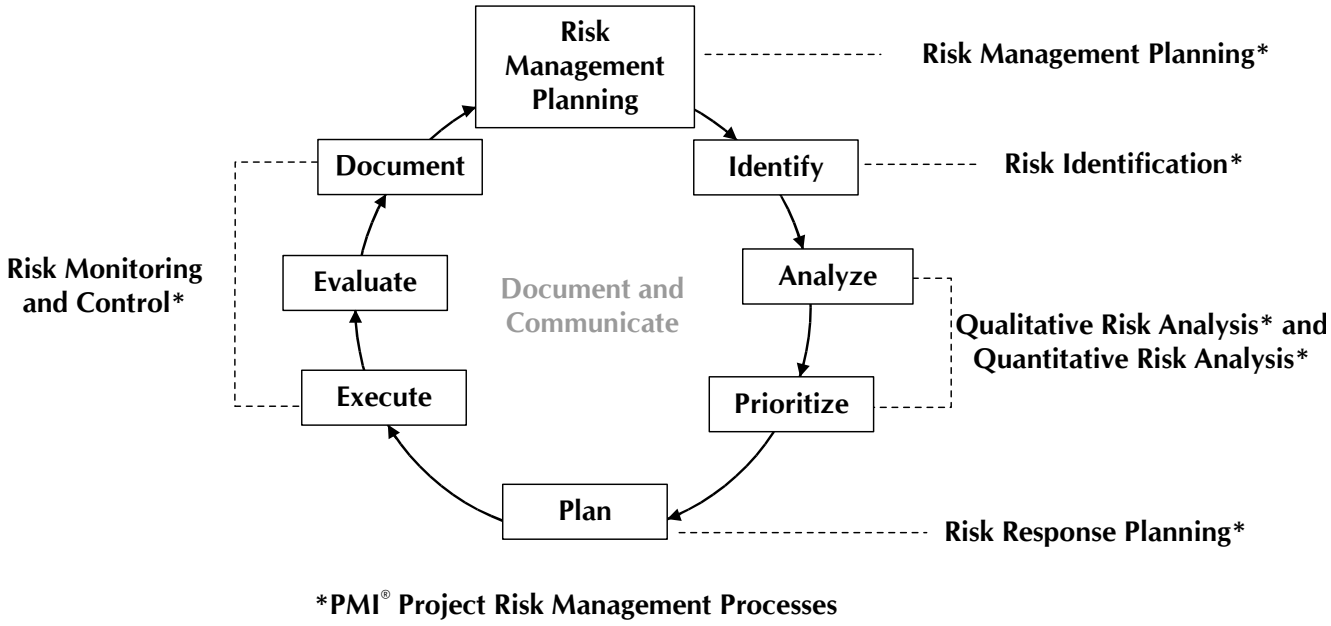
Notes

ESI's Risk Management Model



*PMI® Project Risk Management Processes

Source: PMBOK® Guide, *p. 239*

Notes

Step 1: Risk Management Planning

Risk management planning is the—

- Preliminary planning for addressing risk
- Initial development of a framework to be carried out during the project

Notes

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Risk Management Planning Outputs

Outputs include the following:

- Methodology
- Roles and responsibilities
- Budgeting
- Timing
- Risk categories
- Definitions of risk probability and impact
- Revised stakeholders' tolerances
- Reporting formats
- Tracking

Source: PMBOK® Guide, *pp. 243–246*

Notes

Step 2: Identify Risks

Risk identification is—

- A structured and consistent approach to the identification of potential risk events
- A clear and specific description of the risk event
- A comprehensive list of risk events

Notes

Risk Identification

Inputs	*Tools*
■ Work breakdown structure (WBS) ■ Contractual requirements (statement of work) ■ Cost and schedule estimates ■ Staffing plan ■ Lessons learned files ■ Scope statement ■ Product or deliverables description ■ Assumptions and constraints	■ Documentation reviews* ■ Risk identification techniques ■ Checklist, questionnaires, and templates ■ Assumption analysis* ■ Diagramming techniques*

**Source:* PMBOK® Guide*, pp. 247–248*

Notes

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Risk Identification Guidelines

- Ensure that risk events are specific and fully defined
- Use the WBS as a basis for risk identification
- Develop as comprehensive a list of risks as possible
- Perform risk identification tasks as a team or as groups of team members
- Focus on identifying all the risks; don't try to analyze at this point

Notes

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Outputs of Risk Identification

- A list of categorized risk events
- A documented source for each risk
- Potential risk indicators (triggers)

Notes

Exercise 1

Identify 20 Threats Associated with Your Project

Notes

Step 3: Analyze Risks

Risk analysis is—

- The systematic process of estimating probability of occurrence and magnitude of impact for each risk event from Step 2

Notes

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Risk Analysis

Inputs	*Tools*
■ Categorized list of identified risks ■ WBS ■ Contractual requirements (statement of work) ■ Cost and schedule estimates ■ Lessons learned files ■ Staffing plan ■ Other project-related plans ■ Rating system guidelines	■ Data-gathering and Representation Techniques ❑ Interviewing ❑ Probability distributions ❑ Expert judgment ■ Quantitative Risk Analysis and Modeling Techniques ❑ Sensitivity analysis ❑ Expected monetary value analysis ❑ Decision tree analysis ❑ Modeling and simulation ■ PERT

Source: PMBOK® Guide, *p. 239*

Notes

Presenting Risk

Risk information is typically expressed in 1 of 3 forms:

- **Qualitative:** Categorizes the risk using a rating system of adjectives or colors to rank probability and/or impact
- **Quantitative:** Quantifies risk using a percentage to indicate probability of occurrence and a dollar value to indicate impact
- **Descriptive:** Uses text to explain the risk in some depth, including what might happen, why, and ideas for controlling it; used when neither qualitative or quantitative are available

Notes

Comparison of Approaches

Qualitative	*Quantitative*	*Descriptive*
■ Fast and easy to administer and understand ■ Difficult to enforce uniformly across organization and projects ■ Requires definitions, rules, standards, and processes	■ Preferred methodology, often mandated by management ■ More time-consuming; requires estimation ■ Misleading in that numbers may give appearance of precision and specificity, unless the precision of the estimate is given ■ Difficult if team resists deriving the numbers ■ Easier to forecast ■ Able to use trends ■ Substantially more valuable in developing risk response strategies and reserves	■ Difficult to quantify ■ Usually based on experience ■ Used when quantitative and/or qualitative are not readily apparent or available

Notes

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Probability Analysis

- Purpose
  - To understand the likelihood of the occurrence of a risk event
- Sources of probability data
  - Theoretical distributions
  - Subjective judgment
  - Simulations
  - Historical data

Notes

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Impact Analysis

- Purpose: Understand how the project is affected if a risk event occurs
  - Project cost
  - Project schedule
- Sources of impact data
  - Historical data
  - Estimates
  - Expert judgment
  - Simulations
- Impact assessment is basically an estimation process

Notes

Project Cost Impacts

- Each risk event must be analyzed to assess potential impacts to project costs resulting from such factors as—
  - Level of effort
  - Labor rates
  - Task duration
  - Direct materials
  - Equipment and tools

Notes

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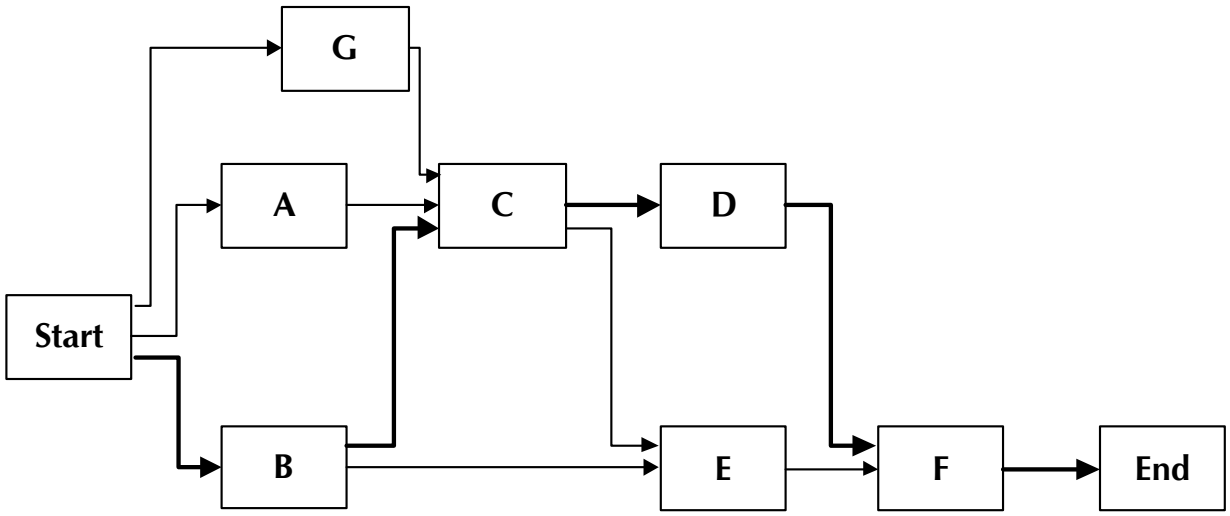
Project Schedule Impacts

- Each risk event must be analyzed to assess potential impacts to the project schedule resulting from such factors as—
  - Resource shortages
  - Duration expansions
  - Other delays
- The network diagram must be analyzed to assess the impacts due to—
  - Path convergence (parallel activities)
  - Dependent activities

Notes

Analyzing Schedule Risks



Notes

Tools and Techniques for Risk Analysis

- Expert judgment
- Expected value
- Decision trees
- Statistical sums
  - Program Evaluation and Review Technique (PERT)
- Computer simulation
  - Monte Carlo

Notes

Exercise 2

Analyze the 20 Risks You Identified in Exercise 1

Notes

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Step 4: Prioritize Risks

- Risk prioritization is the process of ranking identified risks
- The project team must decide which risks will be addressed, based on the premise that there never will be enough time and resources to respond to all risks

Notes

Risk Prioritization

Inputs	*Tools*
■ List of analyzed risks	■ Qualitative assessment
■ Prioritization structure	■ Quantitative assessment
	■ Comparative risk ranking

Notes

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Risk Prioritization Guidelines

- Rank analyzed risks highest to lowest, based on Step 3, "Analyze"
- Prioritize threats and opportunities separately
- Prioritize risks as a team
- Use quantitative rankings when possible, and use qualitative ranking if necessary
- ***Do not*** plan risk response strategies at this time

Notes

Exercise 3

Prioritize Your Top-5 Risks from Highest to Lowest

Notes

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Step 5: Risk Response Planning

Risk response planning involves—

- Creating risk response strategies separately for both threats and opportunities
- Evaluating and selecting a primary response
- Incorporating responses into the risk and project plans

Notes

Risk Response Planning Process

Inputs	*Tools*
■ Prioritized risk listing ❑ Opportunities to pursue, threats to respond to ❑ Opportunities to accept, threats to accept ■ Project plan	■ Specific tools ❑ Risk response development worksheet ❑ Comparative risk ranking (CRR) ❑ Risk Response Analysis Matrix ■ Idea-generation tools ❑ Group techniques ❑ Analogy comparisons ■ Decision-making tools ❑ Decision trees ❑ Life-cycle cost analysis ❑ Financial measures ❑ Probability functions

Notes

Response Strategies for Threats

- **Accept** (accepting the consequences)
- **Mitigate** (reducing the expected value of a threat)
  - Minimizing the probability of the threat event
  - Minimizing the impact of the threat event
- **Transfer** (shifting some or all of the threat to another)
- **Avoid** (eliminating a specific threat, usually by eliminating the cause)

Source: PMBOK® Guide, *pp. 261–263*

Notes

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Response Strategies for Opportunities

- **Accept:** Active or passive
- **Enhance**
  - Maximize the probability of the opportunity event
  - Maximize the impact of the opportunity event
- **Exploit** (ensure opportunity is realized)
- **Share** (allocate all or part of the ownership to third party)

Source: PMBOK® Guide*, pp. 262–263*

Notes

Risk Response Escalation

- If appropriate risk response strategies for severe threats or significant opportunities cannot be developed—
  - The project manager is responsible for escalating to senior management

Notes

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Exercise 4

Conduct a Threat Response for Your Top-5 Risks You Identified in Exercise 3

Notes

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Definition of Reserves

- ***Reserves:*** *"*A provision in the project management plan to mitigate cost and/or schedule risk"
- ***Management reserves:*** A separately planned quantity used to allow for future situations that are impossible to predict, "unknown unknowns"
- ***Contingency reserves:*** *"*The amount of funds, budget, or time needed above the estimate to reduce the risk of overruns of project objectives to a level acceptable to the organization," "known unknowns"
- Reserves are intended only for "in scope" risks

Source: PMBOK® Guide*, pp. 372, 169, 355*

Notes

Update Risk Management Plan

- Represents the final output of all the risk response work
- Contains results of the preceding steps of risk identification, analysis, and prioritization
- Includes how contingency plans will be implemented and executed
- Includes how reserves will be allocated
- Provides structure for future risk management updates
- Provides a good basis for lessons learned

Notes

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Risk Monitoring and Control

"[T]he process of identifying, analyzing, and planning for newly arising risks, keeping track of the identified risks and those on the watchlist, reanalyzing existing risks…and reviewing the execution of risk responses while evaluating their effectiveness"*

- Integrated with project plan, execution, and control processes
- Related to the accomplishment of project objectives
- Performed continuously during the project
- Composed of 3 steps
  - Execute the risk management plan (RMP)
  - Evaluate the RMP
  - Update documentation in the RMP

**Source:* PMBOK® Guide, *p. 264*

Notes

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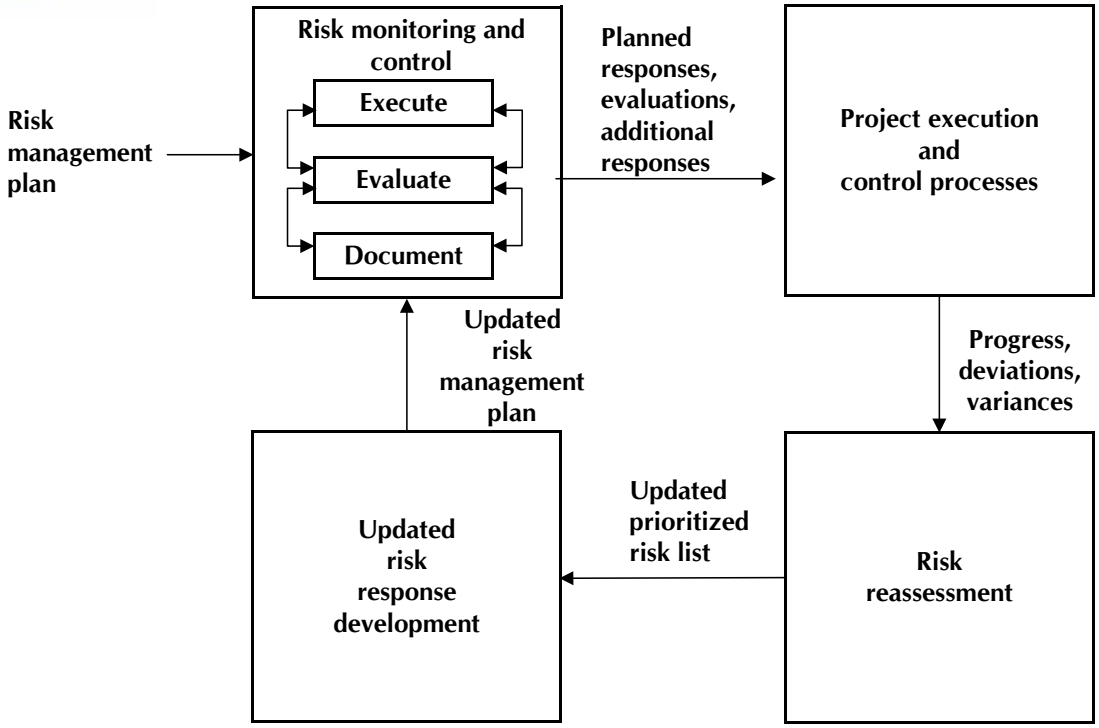
Risk Monitoring and Control Overview



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Notes

Step 6: Execute Risk Strategy

Risk executing involves—

- Implementing risk response strategies in the project plan
- Monitoring and reacting to risk triggers, symptoms, indicators, and residual risks
- Communicating plan status to project stakeholders

Notes

Execute Risk Strategies

Inputs	*Tools*
■ Project plan ■ Risk management plan ■ Risk list ■ Approved change requests ■ Work performance information ■ Performance requests	■ Technical performance measurement ■ Status reports and meetings ■ Early warning system

Notes

Risk Execution Terms

Problem—*A negative risk event, either known or unknown, that materializes*

Windfall—*A positive risk event, either known or unknown, that materializes*

Workaround—*A response, not defined in advance, to a negative risk event that has materialized*

Corrective action—*Performing the response to a negative risk event, either planned or unplanned, when the threat materializes*

Notes

Establish an Early Warning System

Establish an early warning system to detect deviations from plan that may be or may cause risk triggers.

- Exposure increases as cost and schedule variances increase
- Examples of early warning include—
  - Cost variance
  - Schedule variance
  - Changes in forecasted project end date
  - Changes in float
  - Changes in stakeholder attitude
  - Emergence of additional critical paths

Notes

Step 7: Evaluate Results

Evaluating risk response results involves—

- Monitoring the effectiveness of risk response strategies
- Evaluating corrective actions taken
- Reanalyzing existing risks
- Reassessing the risk environment
- Evaluating project assumption validity
- Identifying new risks
- Adjusting the plan accordingly

Notes

Risk Evaluation

Inputs	*Tools*
■ Risk management plan and project plan ■ Cost and schedule performance ■ All relevant event information ■ Corrective actions ■ Change requests	■ Risk reassessment ■ Risk audits ■ Variance and trend analysis ■ Assumptions analysis ■ Technical performance measurement ■ Reserve and contingency analysis ■ Status meetings

Notes

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Evaluation Guidelines

- Identify opportunities to refine the risk management plan
- Identify any additional action required
- Reassess risks and response strategies
- Determine whether the consequences of the strategy were the same as envisioned

Notes

Step 8: Risk Management Plan Documentation

Risk updating involves—

- Recording outcomes of risk reassessments
- Closing out risks no longer applicable
- Documenting changes to probability and impact matrixes and the risk breakdown structure (RBS)
- Creating lessons learned
- Revising and reissuing the project management plan

Notes

Update Risk Documentation

Inputs	*Tools*
■ Risk identification and analysis data ■ Risk management results ■ Project results ■ Assumptions and impressions ■ Interpretations and analysis	■ Documentation tools ❑ Simple reporting format ❑ Routine project reports ❑ ESI risk tools

Notes

Benefits of Updating the Risk Management Plan

- Provides a valuable historical reference for future projects (lessons learned)
- Provides a project chronology of events for audit and other reasons
- Provides a communications mechanism

The Risk Management Plan should be updated by the project team members.

Notes

Risk—The Final Steps During Project Closeout

Risk response control and risk management conclude with—

- Final risk assessment
- Cost, schedule, and performance
- Goal achievement assessment
  - Determine whether the customer is satisfied
- Evaluation for lessons learned
  - Identify implications for the future

Notes

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Workshop Review

By now you should be able to—

- Define risk and risk management
- Identify risks using various methods
- Assess the potential impact of risk factors
- Prioritize risks to determine the most important
- Develop effective risk response strategies
- Control risk during project execution using proven tools and techniques
- Use a practical 8-step process to manage project risk
- Integrate Risk Management into the overall Project Management process

Notes

Bibliography and Suggested Reading

- Project Management Institute. *A Guide to the Project Management Body of Knowledge*. Newtown Square, Pa.: Project Management Institute, 2004.
- Ward, LeRoy, ed. *Project Management Terms: A Working Glossary*. Arlington, Va.: ESI International, 2000.

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