

# PMBok 6<sup>th</sup> Edition - Project Risk Management

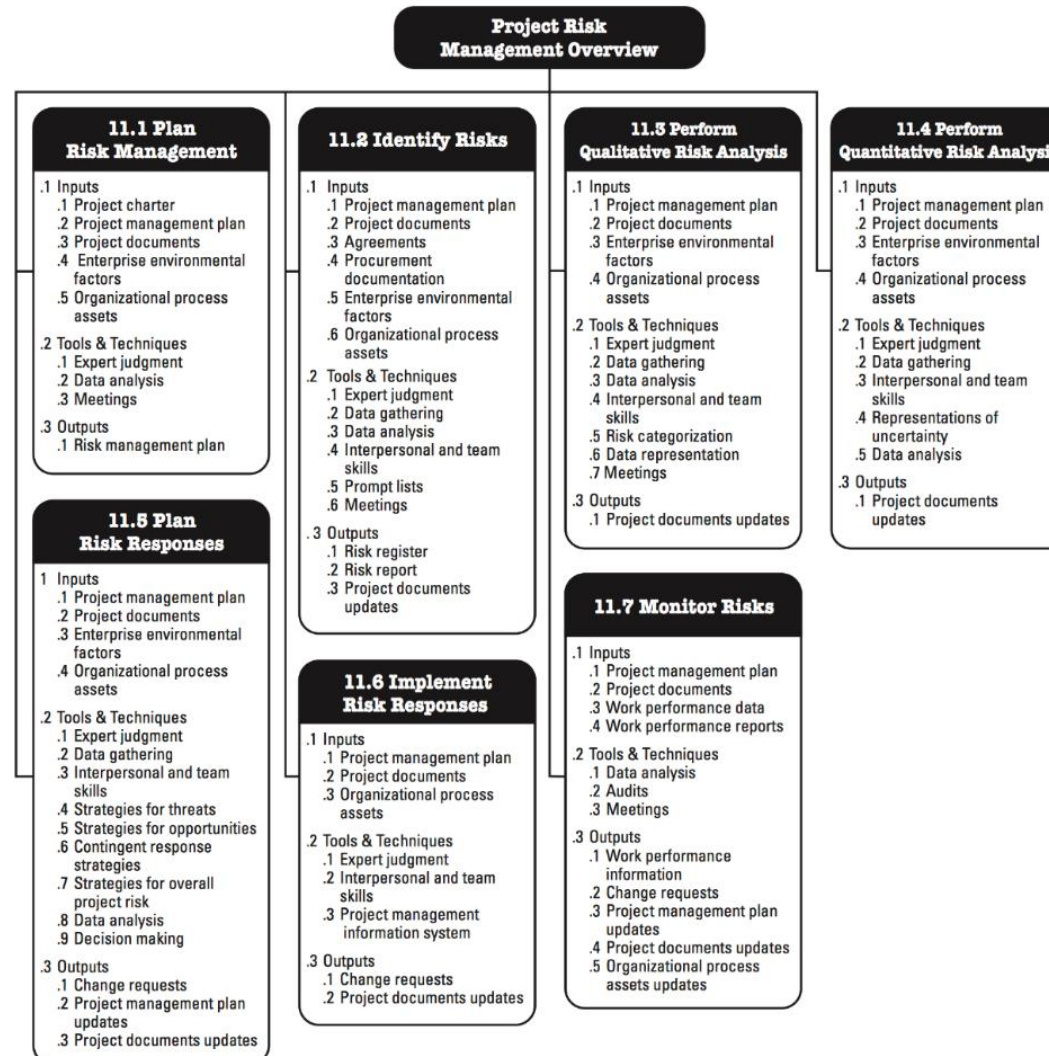
Paolo Cecchini, PMP, PMI-RMP



Project risk will find you if you don't find it first

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

The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success



Ref. PMBOK Guide 6th Edition , Pag.396

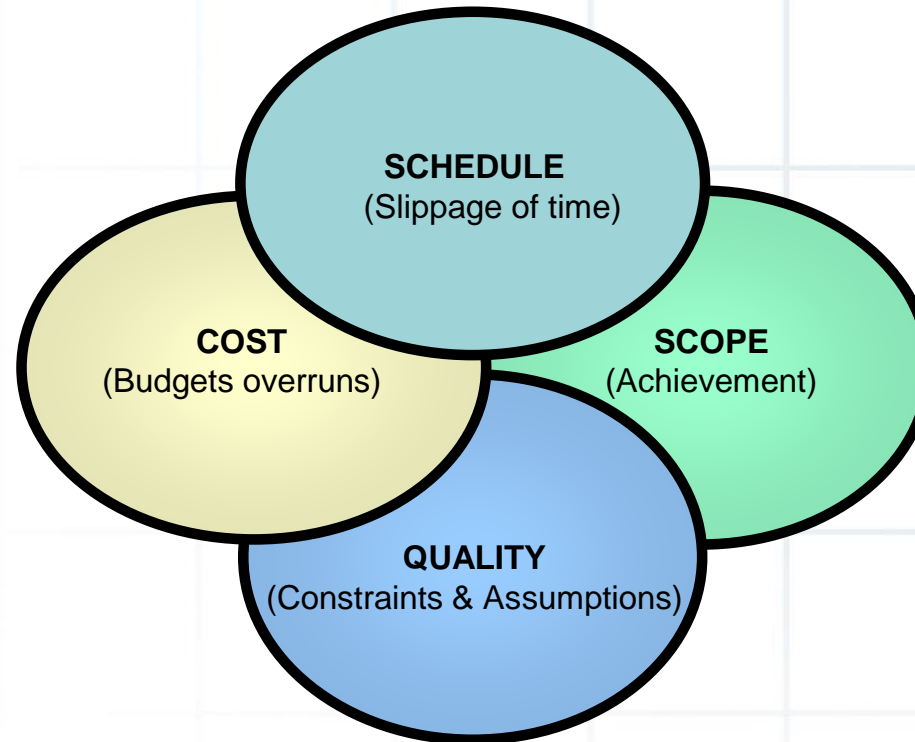
## Key Concepts

**All projects are risky!!!**

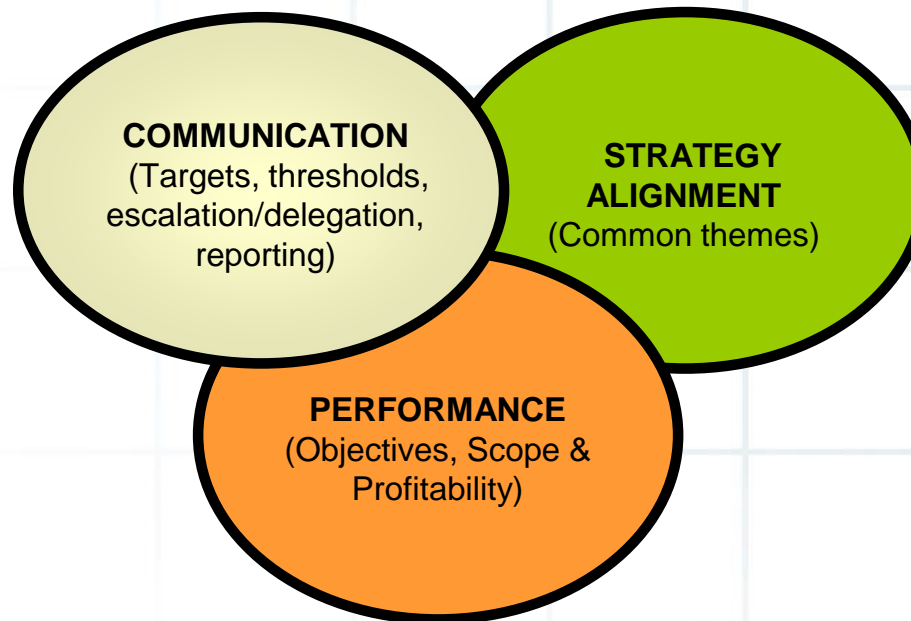
**Individual project risk:** is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives

**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.

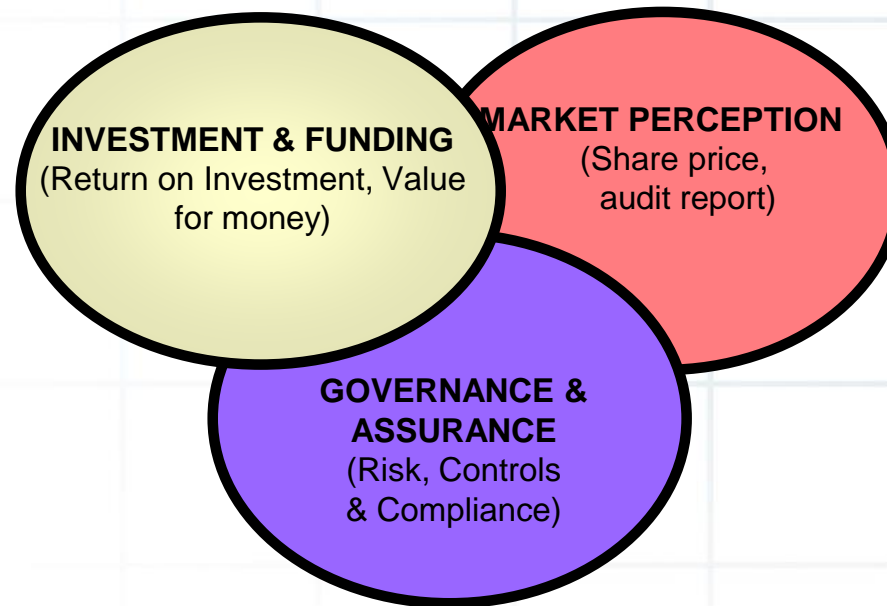
## Projects, Programs, Supply Chain



## Business Units, Managers, Board of Directors



## Customers, Funders, Shareholders





- **Risk Appetite** – degree of uncertainty an entity is willing to take in anticipation of a reward
- **Risk Tolerance** – degree, amount or volume of risk that an organization or individual will withstand
- **Risk Threshold** – risk will be accepted below a certain level of uncertainty or impact

## Trends and emerging practices

- **Non-event risks**
  - Variability risks: uncertainty exists about some key characteristics of a planned event or activity or decision (productivity below or above target, number of errors found during testing, etc.)
  - Ambiguity risks: uncertainty exists about what might happen in the future (future development of regulatory frameworks, inherent complexity of the project, etc.)
- **Project Resilience:** the existence of emergent risk is becoming clear, with a growing awareness of so-called unknowable-unknowns
  - Right level of budget and schedule contingency for emergent risks
  - Flexible project processes
  - Empowered project team
  - Frequent review of early warning signs
  - Clear input from stakeholders to clarify areas where the project scope or strategy can be adjusted in response to emergent risks
- **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

## Tailoring considerations

- Project Size
- Project Complexity
- Project Importance
- Development Approach

# Project Risk Management Data Diagram



# Project Risk Management Process Chart

Where are we in the project management process groups?

Knowledge Areas	Project Management Process Groups					
	Initiating	Planning	Executing	Monitoring and Controlling	Closing	
[4] Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work <b>4.4 Manage Project Knowledge</b>	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase	7
[5] Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope		6
[6] Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule		6
[7] Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs		4
[8] Project Quality Management		8.1 Plan Quality Management	<b>8.2 Manage Quality</b>	8.3 Control Quality		3
[9] Project Resource Management		9.1 Plan Resource Management <b>9.2 Estimate Activity Resources</b>	9.3 Acquired Resources 9.4 Develop Team <b>9.5 Manage Team</b>	<b>9.6 Control Resources</b>		6
[10] Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	<b>10.3 Monitor Communications</b>		3
[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	<b>11.6 Implement Risk Responses</b>	<b>11.7 Monitor Risks</b>		7
[12] Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements		3
[13] Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement		4
	2	24	10	12	1	49

Plan Risk Management is the process of defining how to conduct risk management activities for a project



## Inputs

- Project Charter
- Project Management Plan
- Project Documents:
  - Stakeholder register
- Enterprise environmental factors
  - Overall risk thresholds

- **Organizational Process Assets**

- 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

## Tools and techniques

- Expert Judgment:
  - Familiarity with the organization's approach to managing risk, including enterprise risk management where this is performed
  - Tailoring risk management to the specific needs of a project
  - Types of risk that are likely to be encountered on projects in the same area
- Data analysis:
  - Stakeholder Analysis
- Meetings



## Outputs:

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

## Risk breakdown structure

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.		

*Ref. PMBOK Guide 6th Edition , Pag.406*

## Probability and impact scales

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

*Ref. PMBOK Guide 6th Edition , Pag.407*

Identify Risks is the process of identifying individual project risks as well as sources of overall project risk, and documenting their characteristics



## Inputs

- **Project Management Plan**
  - Requirements Management Plan
  - Schedule Management Plan
  - Cost Management Plan
  - Quality Management Plan
  - Resource Management Plan
  - Risk Management Plan
  - Scope Baseline
  - Schedule Baseline
  - Cost Baseline
- **Agreements**
- **Procurement Documentation**
- **Project Documents**
  - Assumption Log
  - Cost Estimates
  - Duration Estimates
  - Issue Log
  - Lessons Learned Register
  - Requirements Documentation
  - Resource Requirements
  - Stakeholder Register
- **Enterprise Environmental Factors**
  - Published material, including commercial risk databases or checklists, Academic studies, Benchmarking results, Industry studies of similar projects
- **Organizational Process Assets**
  - Project files including actual data, organizational and process controls, risk statement formats, checklists

## Tools and techniques

- Expert Judgment
- Data Gathering
  - Brainstorming
  - Checklists
  - Interviews
- Data Analysis
  - Root cause analysis
  - Assumption and constraints analysis
  - Swot Analysis
  - Document Analysis
- Interpersonal and team skills
- Prompt lists
- Meetings

## Tools & Techniques

<p><b>Strengths</b> Natural priorities that are obvious</p> <ul style="list-style-type: none"><li>• What are your points of advantage?</li><li>• What do you do well?</li><li>• What are the resources you can count on?</li></ul>	<p><b>Weaknesses</b> Options potentially interesting</p> <ul style="list-style-type: none"><li>• What could you improve?</li><li>• What do you do badly?</li><li>• What should you avoid?</li></ul>
<p><b>Opportunities</b> Problems easy to defend and counter</p> <ul style="list-style-type: none"><li>• What good deals are you facing?</li><li>• What are the interesting trends you are familiar with?</li></ul> <p>Good deals can result from such things as:</p> <ul style="list-style-type: none"><li>• Changes in technology or in the market on a large or small scale</li></ul>	<p><b>Threats</b> Potentially high-risk situations</p> <ul style="list-style-type: none"><li>• What obstacles did you face?</li><li>• What are your competitors doing?</li><li>• The requirements and specifications of your business, products or services changing?</li><li>• Changes in technology threaten your position?</li></ul>

## Tools & Techniques

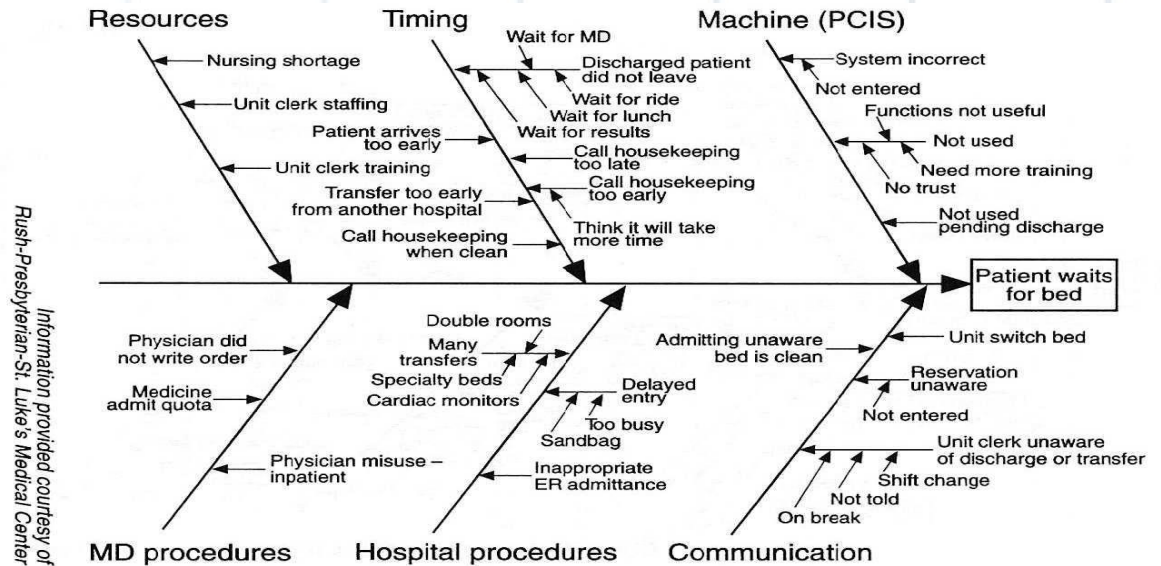
### ISHIKAWA Diagram –

Three phases of research

- Identification of the effect that you want to study
- Construction of cause and effect diagram
- Analysis of the cause-and-effect diagram constructed

Three phases to solve

- Surveys on probable causes
- Decide most appropriate corrective action
- Verification of the effectiveness of action





## Outputs

- Risk Register
  - List of identified risks
  - Potential Risk Owners
  - List of potential risk responses
- Risk Report
  - Sources of overall project risk
  - Summary information on identified individual project risks
- Project Documents Updates
  - Assumption Log
  - Issue Log
  - Lessons Learned Register

Perform Qualitative Risk Analysis is 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. The key benefit of this process is that it focuses efforts on high-priority risks



## Inputs

- **Project Management Plan**
  - Risk Management Plan
- **Project Documents**
  - Assumption log
  - Risk Register
  - Stakeholder register
- **Enterprise Environmental Factors**
  - Industry studies of similar projects
  - Published material, including commercial risk databases or checklists
- **Organizational Process Assets**
  - Information from similar completed projects

## Tools and techniques

- Expert Judgment
    - Previous similar projects
    - Qualitative risk analysis
  - Data Gathering
    - Interviews
  - Data Analysis
    - Risk Data Quality Assessment
    - Risk Probability and Impact Assessment
    - Assessment of other risk parameters:
      - Urgency, proximity, dormancy, etc.
  - Interpersonal and team skills
    - Facilitation
  - Risk Categorization
- Enterprise Environmental Factors
    - Probability and impact matrix
    - Hierarchical charts
  - Meetings

## Probability and impact matrix

		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	Probability	
	High 0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04		
	Medium 0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03		
	Low 0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02		
	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 0.05	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							

Ref. PMBOK Guide 6th Edition , Pag.408

## Outputs

- Project Documents Updates
  - Assumption log
  - Issue log
  - Risk register
  - Risk report

Perform Quantitative Risk Analysis is the process of numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives. The key benefit of this process is that it quantifies overall project risk exposure, and it can also provide additional quantitative risk information to support risk response planning



## Inputs

- **Project Management Plan**
  - Risk Management Plan
  - Scope Baseline
  - Schedule Baseline
  - Cost Baseline
- **Project Documents**
  - Assumption log
  - Basis of estimates
  - Cost estimates
  - Cost forecasts
  - Duration estimates
  - Milestone list
  - Resource requirements
  - Risk register
  - Risk report
  - Schedule forecast
- **Enterprise Environmental Factors**
  - Industry studies of similar projects
  - Published material, including commercial risk databases or checklists
- **Organizational Process Assets**
  - Information from similar completed projects

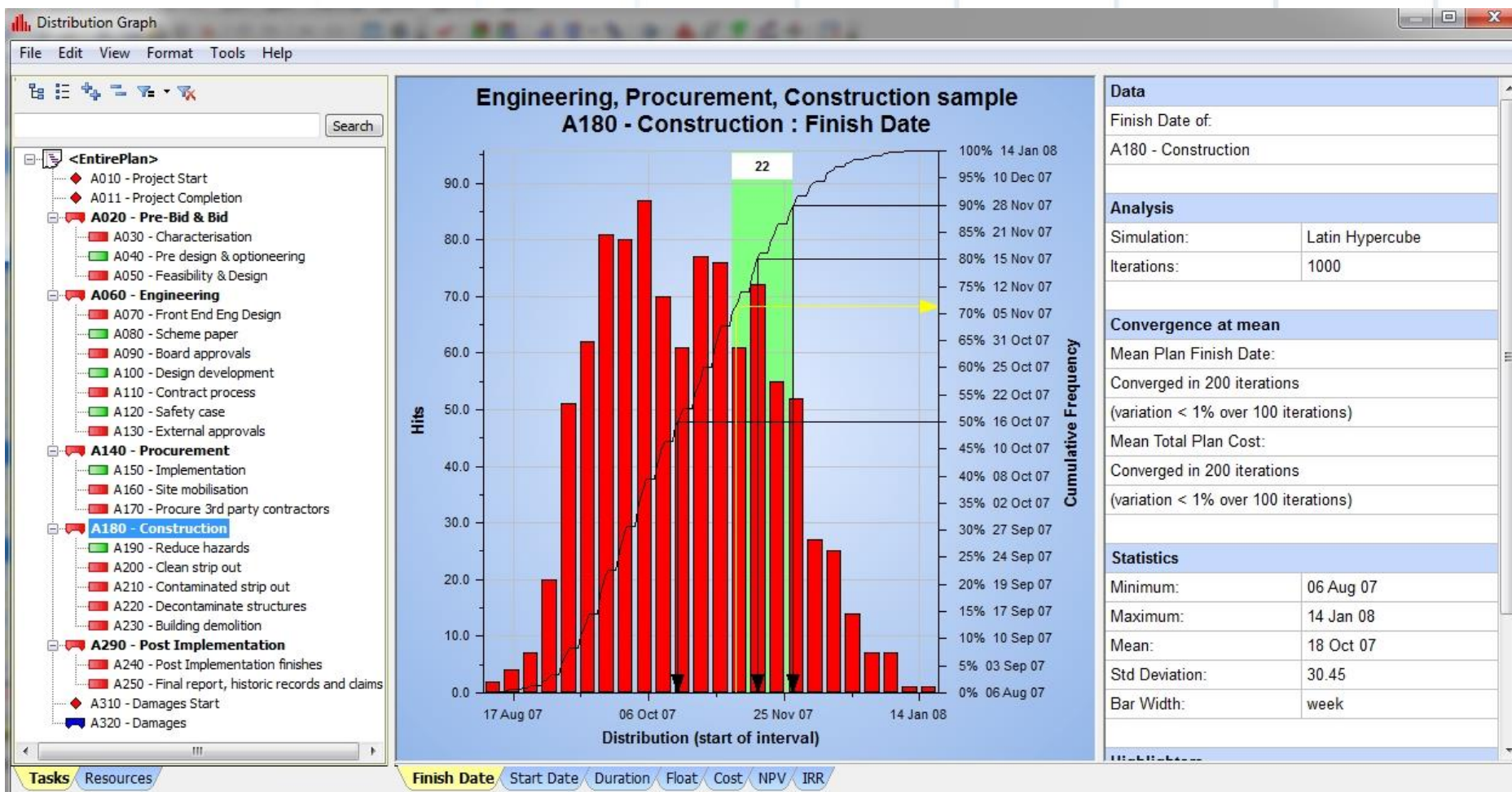


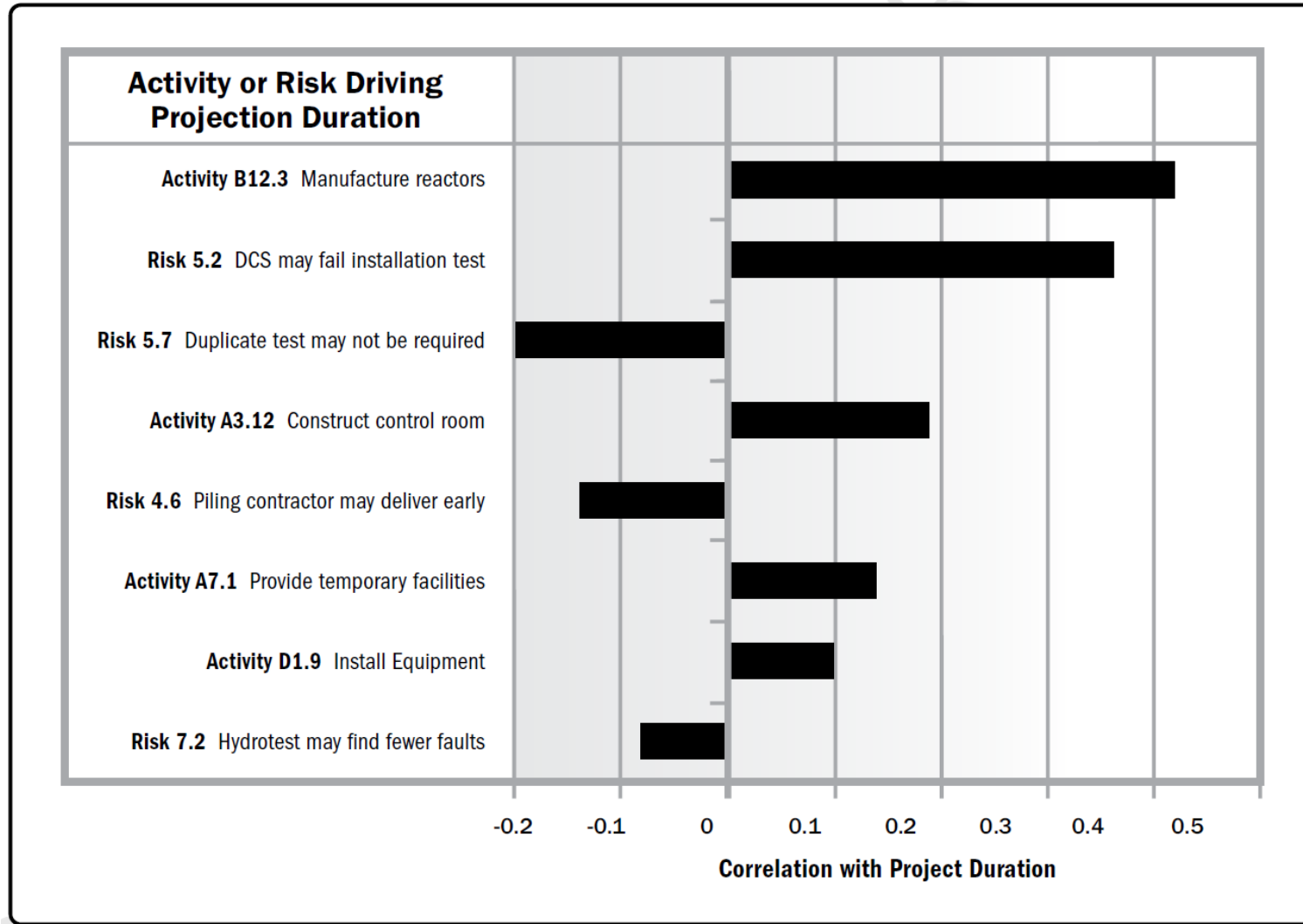
## Tools and techniques

- **Expert Judgment**
    - Numeric inputs (three values estimates)
    - Representation of uncertainty
    - Modeling techniques
    - Best tools
    - Output interpretation
  - **Data Gathering**
    - Interviews (three values estimates)
  - **Interpersonal and team skills**
    - Facilitation
  - **Representation of uncertainty**
    - Probability distribution
- **Data Analysis**
    - Simulation (Monte Carlo)
    - Sensitivity analysis (Tornado diagram)
    - Decision tree analysis

# Perform Quantitative Risk Analysis

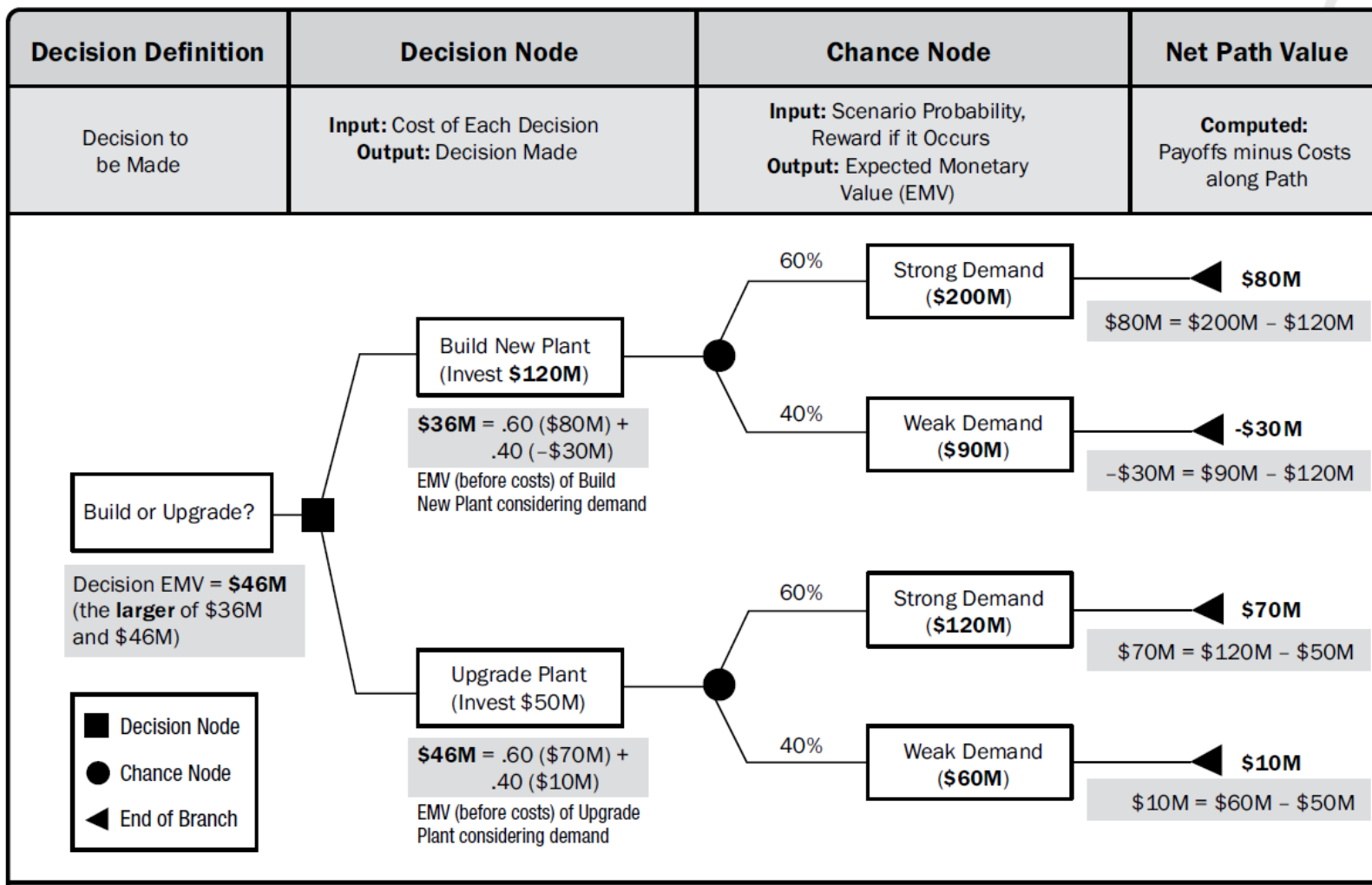
Risk	Probability	Impact €	EMV €
1	15%	2000	300
2	40%	5000	2000
3	30%	1000	300
4	55%	-4000	-2200
5	20%	6000	1200
	Total	10000	1600





Ref. PMBOK Guide 6th Edition , Pag.434

# Perform Quantitative Risk Analysis



Ref. PMBOK Guide 6th Edition , Pag.435

## Outputs

- Project Documents Updates
  - Risk report:
    - Assessment of overall risk exposure
    - Detailed probabilistic analysis of the project
    - Prioritized list of individual project list
    - Trends in quantitative risk analysis results
    - Recommended risk responses

Plan Risk Responses is 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



## Inputs

- **Project Management Plan**
  - Resource Management Plan
  - Risk Management Plan
  - Cost Baseline
- **Project Documents**
  - Lessons learned register
  - Project schedule
  - Project team assignments
  - Resource calendars
  - Risk register
  - Risk report
  - Stakeholder register
- **Enterprise Environmental Factors**
  - risk appetite and thresholds of key stakeholders
- **Organizational Process Assets**
  - Templates for the risk management plan, risk register, and risk report
  - Historical databases
  - Lessons learned repositories from similar projects



## Tools and techniques

- Expert Judgment
  - Threat response strategies
  - Opportunity response strategies
  - Contingent response strategies
  - Overall project risk response strategies
- Data gathering
  - Interviews
- Interpersonal and team skills
  - Facilitation
- Strategies for threats
  - Escalate
  - Avoid
  - Transfer
  - Mitigate
  - Accept
- Strategies for opportunities
  - Escalate
  - Exploit
  - Share
  - Enhance
  - Accept
- Contingent response strategies
  - Contingency plans
- Strategies for overall project risks
  - As above
- Data analysis
  - Alternative analysis
  - Cost-benefit analysis
- Decision making
  - Multi criteria decision analysis

## Outputs

- Change requests
- Project Management Plan Updates
  - Schedule management plan
  - Cost management plan
  - Quality management plan
  - Resource management plan
  - Procurement management plan
  - Scope baseline
  - Schedule baseline
  - Cost baseline
- Project Documents Updates
  - Assumption log
  - Cost forecasts
  - Lessons learned register
  - Project schedule
  - Project team assignments
  - Risk register
  - Risk report

Implement Risk Responses is the process of implementing agreed-upon risk response plans



## Inputs

- Project Management Plan
  - Risk Management Plan
- Project Documents
  - Lessons learned register
  - Risk register
  - Risk report
- Organizational Process Assets
  - Lessons learned repositories from similar projects

## Tools and Techniques

- Expert Judgment
  - Response implementation
- Interpersonal and team skills
  - Influencing
- Project management information system (PMIS)

## Outputs

- Change requests
  - Response implementation
- Project documents updates
  - Issue log
  - Lessons learned register
  - Project team assignments
  - Risk register
  - Risk report

Monitor Risks is 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



## Inputs

- Project Management Plan
  - Risk Management Plan
- Project Documents
  - Issue log
  - Lesson learned register
  - Risk register
  - Risk report
- Work performance data
- Work performance report



## Tools and techniques

- Data analysis
  - Technical performance analysis
  - Reserve analysis
- Audits
- Meetings

## Outputs

- Work Performance Information
- Change Requests
- Project Management Plan Updates
- Project Document Updates
  - Assumption log
  - Issue log
  - Lessons learned register
  - Risk register
  - Risk Report
- Organizational Process Assets Updates
  - Templates for the risk management plan, risk register, and risk report
  - Risk breakdown structure

- ✓ References
  - ✓ PMI, PMBoK Guide 6<sup>th</sup> Edition
  - ✓ PMI, Practice standard for project risk management, 2009

# *Grazie per l'attenzione!*

**Project Management Institute – Central Italy Chapter**

**Sito Web: <https://www.pmi-centralitaly.org/>**

**Email: [eventi@pmi-centralitaly.org](mailto:eventi@pmi-centralitaly.org)**

**Riferimenti speaker: Paolo Cecchini**

**[paolo.cecchini@gmail.com](mailto:paolo.cecchini@gmail.com)**

**[pmief.liaison@pmi-centralitaly.org](mailto:pmief.liaison@pmi-centralitaly.org)**

