What is Risk?

- Problems that haven’t happened yet
- Characterized by:
  - Uncertainty \( (0 < \text{probability} < 1) \)
  - An associated loss (money, life, reputation, etc)
  - Manageable – some action can control it
- Needs to be actively identified and managed
  - Some choose to ignore – seen as negativity or too much worry
- Is a key element in project decision making – especially important for the *tough* decisions
- Proactive vs. Reactive
- Active **Risk Management** is a sign of a well-run project and a mature organization
Requirements Risks
- Incorrect
- Incomplete
- Unclear or inconsistent
- Volatile

Cost Risks
- Unreasonable budgets

Schedule Risks
- Schedule compression (customer, marketing, etc.)

Quality Risks

Life Cycle / Operational Risks

Most of the “Classic Mistakes”
Risk Management Process

Understanding the hierarchy of Risk Management = Understanding risks and how to deal with them
Get the team involved in this process
  - Don’t go it alone

Produces a list of risks with potential to disrupt your project’s cost or schedule

Use a checklist or similar source to brainstorm possible risks

Use a SWOT analysis process

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<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths</td>
<td>Opportunities</td>
</tr>
<tr>
<td>Weaknesses</td>
<td>Threats</td>
</tr>
</tbody>
</table>

Planning

Risk Management
### Risk Categories

#### Types

<table>
<thead>
<tr>
<th>Business Risk</th>
<th>Pure (Insurable) Risk</th>
<th>Known Unknowns</th>
<th>Unknown Unknowns</th>
</tr>
</thead>
</table>

#### Classification

<table>
<thead>
<tr>
<th>External</th>
<th>Internal</th>
<th>Technical</th>
<th>Unforeseeable</th>
</tr>
</thead>
</table>

#### Source

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Cost</th>
<th>Quality</th>
<th>Scope</th>
<th>Resources</th>
<th>Customer Satisfaction</th>
</tr>
</thead>
</table>

### Internal / Unique Classifications and Sources
Numerical analysis of risk allows:

- Make response decisions
- Determine overall project risk
- Add probability to predictions
- Prioritize risks
- Factor risk into cost, schedule, or scope targets

Calculating Risk Exposure

\[ RE = P \times I \]

- \( P \) = Probability
- \( I \) = Impact
Risk Analysis (Continued)

- Risk Exposure Examples
  - “Facilities not ready on time”
    - Probability is 25%, size is 4 weeks, RE is 1 week
  - “Inadequate design – redesign required”
    - Probability is 15%, size is 10 weeks, RE is 1.5 weeks

- How to Estimate
  - Impact: The size of the loss – break into chunks
  - Probability:
    - Use team member estimates and have a risk-estimate review
    - Use Delphi or group-consensus techniques
    - Use gambling analogy” “how much would you bet”
    - Use “adjective calibration”: highly likely, probably, improbable, unlikely, highly unlikely

- Sum all RE’s to get expected overrun
### Risk Prioritization

- Remember the 80-20 rule
- Often want larger-loss risks higher
  - Or higher probability items
- Possibly group ‘related risks’
- Helps identify which risks to ignore
  - Those at the bottom
- Use Risk Register

<table>
<thead>
<tr>
<th>Risk Number</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Category</td>
<td>External (Inevitable)</td>
</tr>
<tr>
<td>Risk Name</td>
<td>Zombie Apocalypse</td>
</tr>
<tr>
<td>Probability (Scale)</td>
<td>1%</td>
</tr>
<tr>
<td>Impact (Scale, Areas)</td>
<td>Delay project by 2 Weeks</td>
</tr>
<tr>
<td>Score/ Risk Impact (P*I)</td>
<td>.01 Weeks</td>
</tr>
<tr>
<td>Indicators</td>
<td>Moaning, Missing Brains</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Melee Weapons</td>
</tr>
<tr>
<td>Contingency</td>
<td>Start Robot War</td>
</tr>
<tr>
<td>Affected Stakeholders</td>
<td>Humanity</td>
</tr>
<tr>
<td>Resource/Response Time</td>
<td>Those not yet bitten / Young attractive people</td>
</tr>
</tbody>
</table>
Risk analysis and planning should continue throughout the project

Risks can be eliminated, but impact analysis should be completed first

Develop risk response strategies

McConnell’s Example – Section 5-5 of the Rapid Development Book
Risk Resolution

<table>
<thead>
<tr>
<th>Risk</th>
<th>Avoid</th>
<th>Mitigate</th>
<th>Transfer</th>
<th>Accept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity</td>
<td>Exploit</td>
<td>Enhance</td>
<td>Share</td>
<td></td>
</tr>
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</table>

- **Risk Avoidance**
  - Don’t do the project at all
  - Scrub from system
  - Off-load to another party
    - McConnell: design issue: have client design

- **Problem control**
  - Develop contingency plans
  - Allocate extra test resources

- **Knowledge Acquisition**
  - Investigate/ research
    - Ex: do a prototype
  - Buy information or expertise about it

- **Risk Transfer**
  - To another part of the project (or team)
  - Move off the critical path
Top 10 Risk List

- Rank
- Previous Rank
- Weeks on List
- Risk Name
- Risk Resolution Status

- A low-overhead best practice
- Interim project post-mortems
  - After various major milestones
- Communicate w/ Stakeholders!

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Monitor and Control Risks

Concepts
- Workarounds – unplanned corrective action for unanticipated problems
- Risk Reassessments – periodic risk review and adjustments
- Risk Audits – proves risk preparedness and provides lessons learned
- Reserve Analysis – accounting for risk reserves (financial and schedule), which are only for risk
- Status Meetings – should primarily focus on risks
- Closing Risks – the conditions surrounding a risk are in the past, and the risk should be closed

Outputs: Risk Register Updates, Change Requests, PM Plan Updates, Project Document Updates, Lessons Learned
Use of small goals within project schedule (1-2 days)

- **Reduces risk** of undetected project slippage
- Requires a detailed schedule, including early milestones
- Use binary milestones (done or not done)

**Pros**
- Enhances status visibility
- Good for project recovery
- Can improve motivation through achievements
- Encourages iterative development

**Cons**
- Increase project tracking effort
Avoid Common Errors
Risk Management should be the focus of Status Meeting
Risk Management is often not used in Project Management, but has high ROI
Risks are both good and bad
Funds/time set aside for risks are necessary
Communicate
Questions/Discussion