

Software Engineering

Change and Risk Management

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Chair of Programming Methodology

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12. Change and Risk Management

12.1 Change Management

12.2 Risk Management

Baseline

- Definition:
The originally approved plan plus or minus approved changes.
- Baselines are used to compare the actual performance and forecasts of the project with the original plan

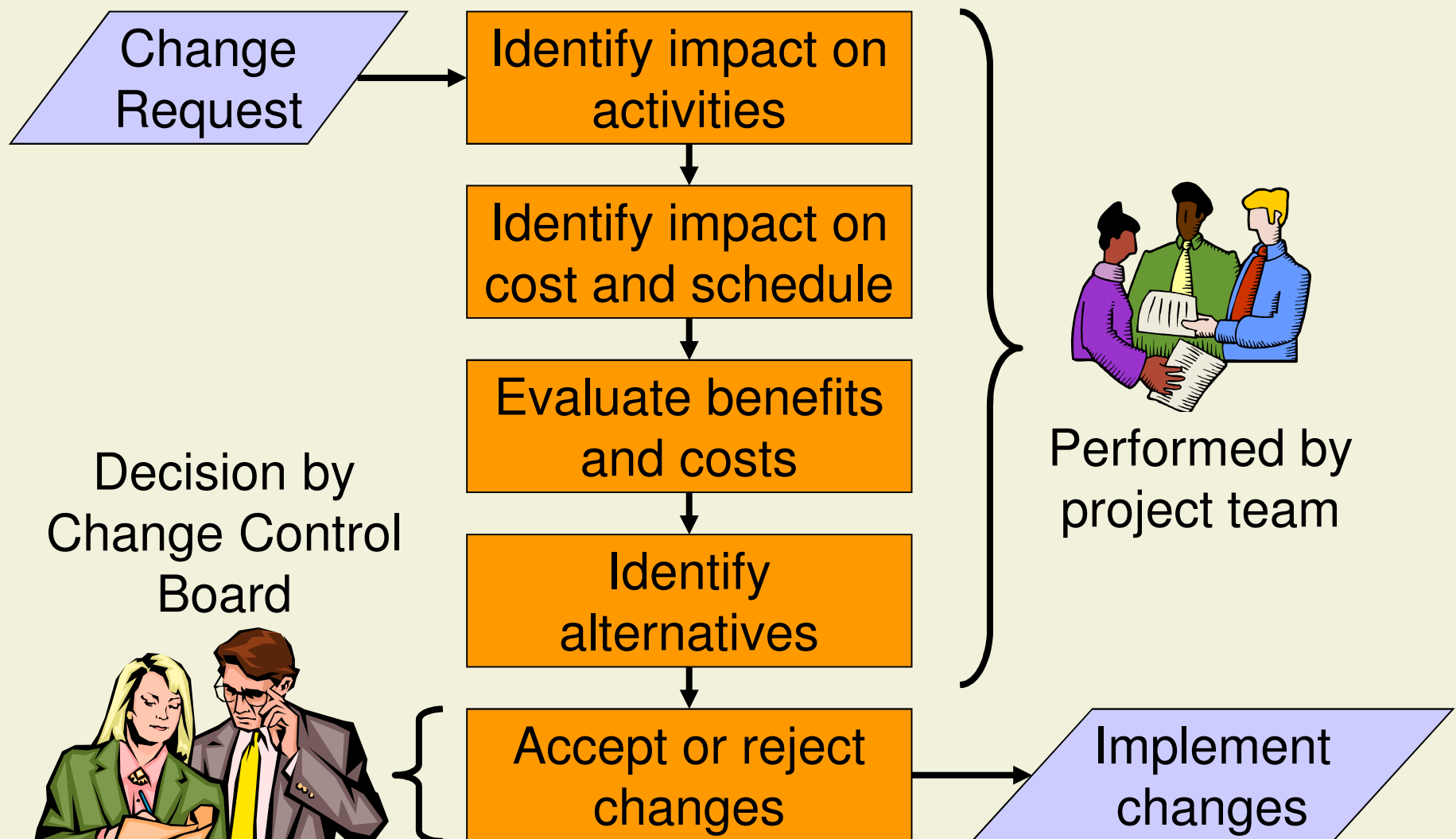
Change

- Definition:
Any deviation from a previously approved baseline.
- Internal origins of changes
 - Design, implementation, cost, etc.
- External origins of changes
 - Scope of work, requirements, schedule, cost
- Other origins: Issues, Risks

Why Change Management?

- Prevent scope creep
- Allow the impact of all changes to be understood and managed
 - Impact on triple constraint
- Allow each change to be accepted, rejected, or deferred by the appropriate authority
 - Management
 - Customer
 - Contractual partners

Change Control Process



Follow-Up Actions

- If accepted
 - Plan incorporation into the system
 - Create new baselines
 - Modify the schedule and allocate resources
- If rejected
 - Communicate and document the decision
- If deferred
 - Perform further analysis
 - Consider further alternatives
 - Hold until a specified time

Scope Change Control: Summary

■ Purpose

- To influence the factors that create scope changes to ensure changes are agreed upon
- To determine that a scope change has occurred
- To manage the actual changes when and if they occur

Inputs	Tools & Techniques	Outputs
<ol style="list-style-type: none">1. Work breakdown structure2. Performance reports3. Change requests4. Scope management plan	<ol style="list-style-type: none">1. Scope change control2. Performance measurement3. Additional planning	<ol style="list-style-type: none">1. Scope changes2. Corrective action3. Adjusted baseline

Examples

- Change Request



- Change Process



12. Change and Risk Management

12.1 Change Management

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Risk

- Definition:

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

- Risks have three components

- A possible future event (uncertainty)
- Probability of the occurrence of that event (likelihood)
- Impact of that event (consequence)

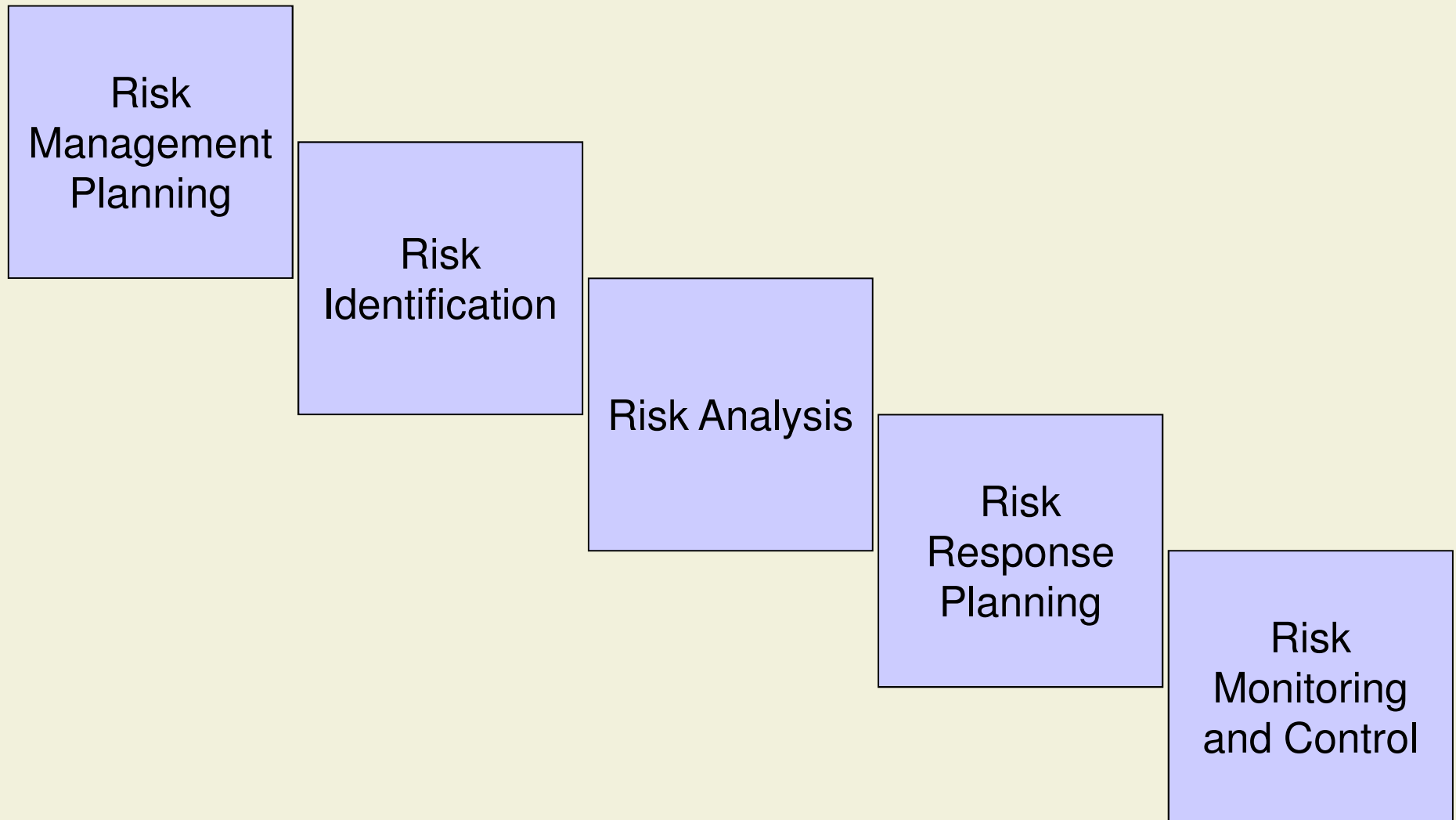
"Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns — the ones we don't know we don't know."

Donald Rumsfeld, 2003

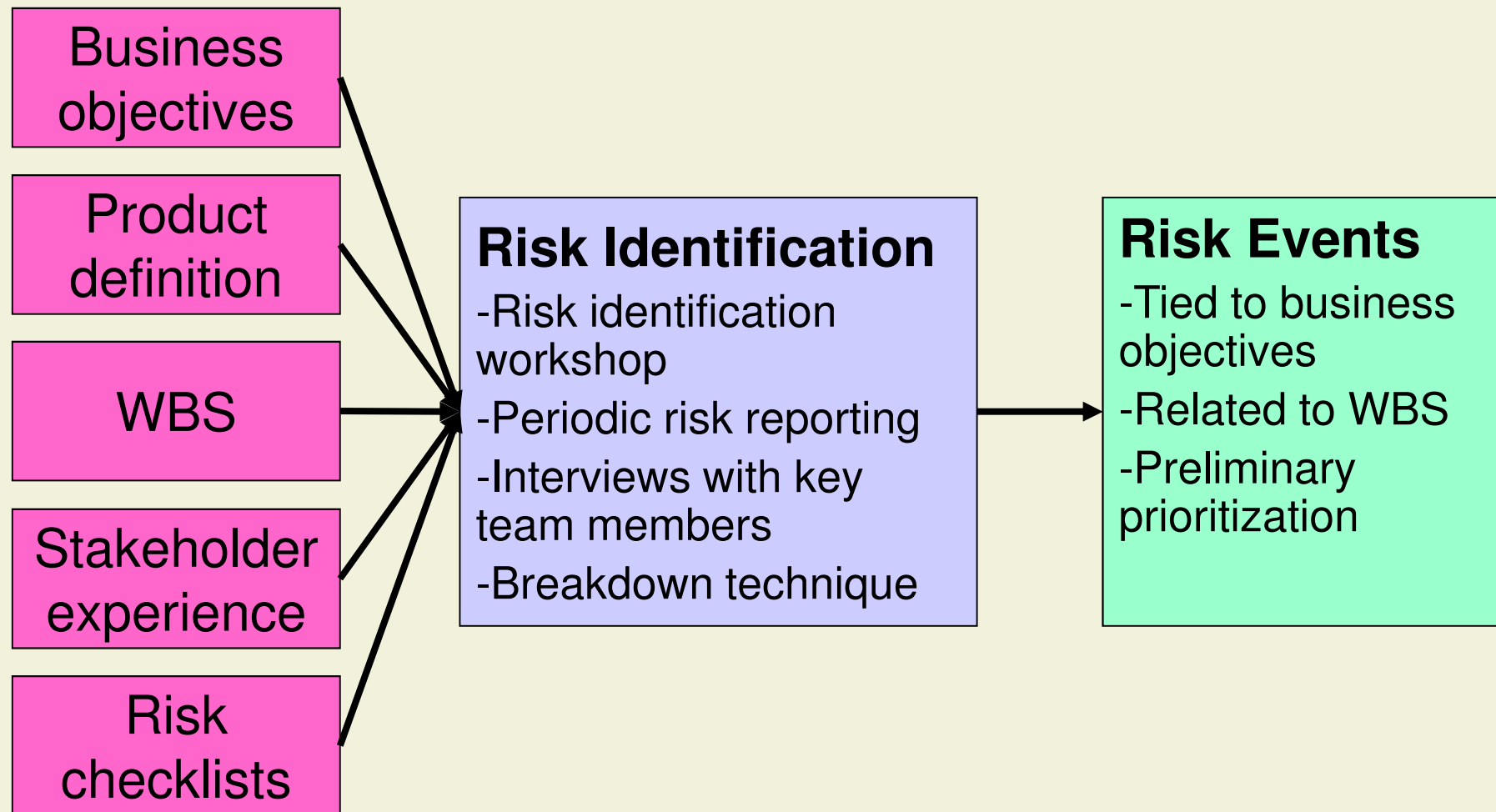
Risk Classification

- Known risks
 - Unclear requirements
 - Inexperienced team
- Unknown risks: Foreseen based on experience
 - Difficult communication with customer
 - Fluctuation within team
- Unknowable risks: Cannot be foreseen
 - Half of the team gets fish poisoning at first social event
 - Earthquake wipes out production plant

Risk Management

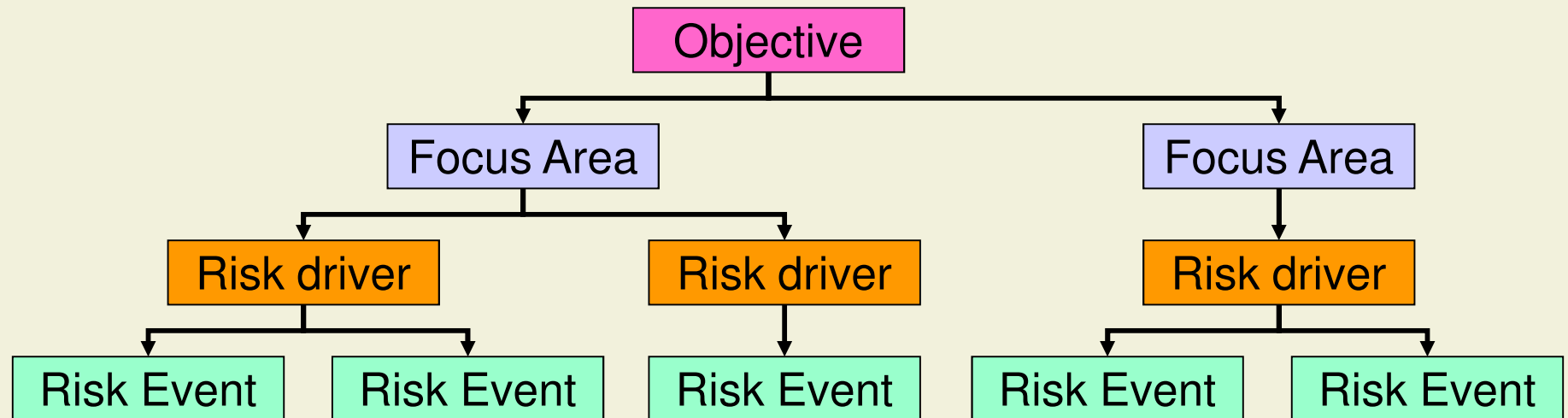


Risk Identification

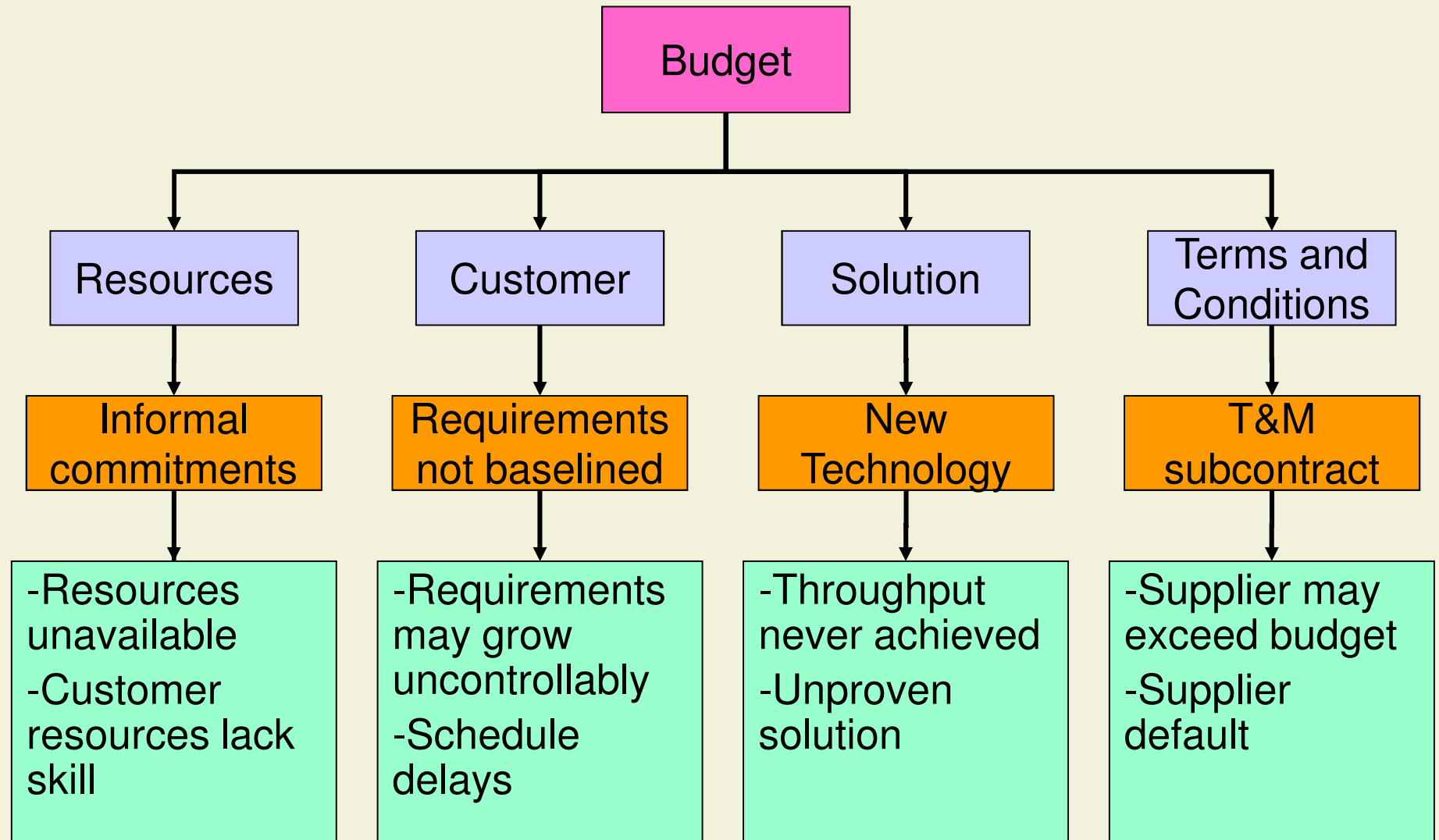


Breakdown Technique

- Identify risks systematically
 - Project objectives: Win, Budget, Satisfy
 - Focus area: A breakdown of the project's potential sources of risk
 - Risk driver: A condition that increases the probability that a risk event will be present



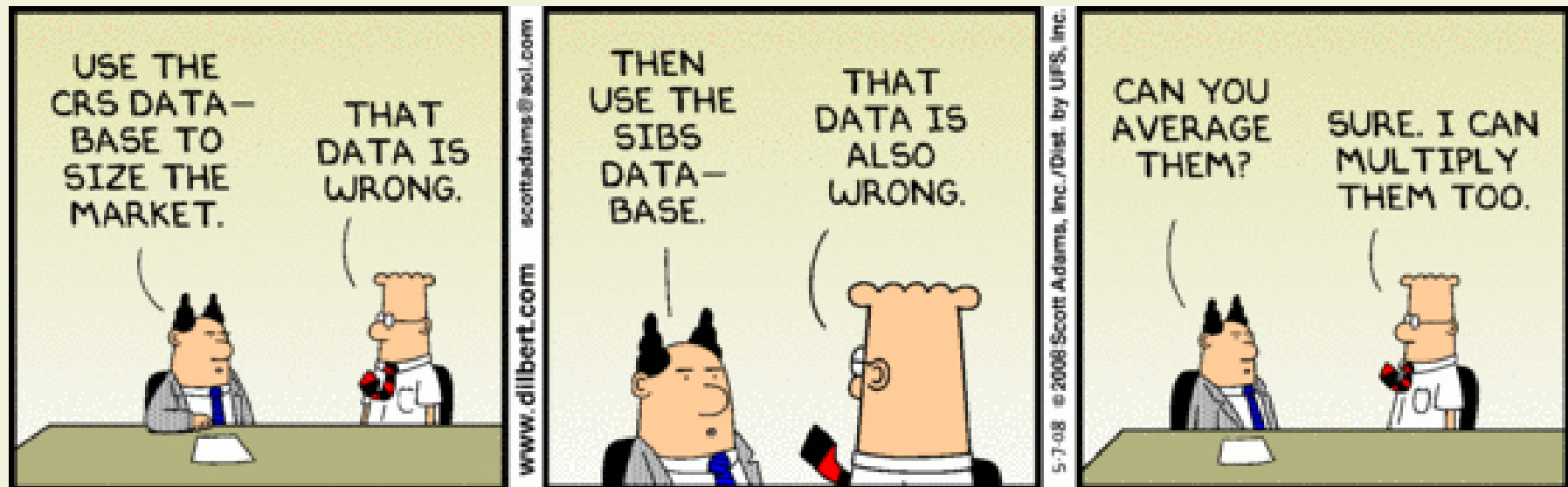
Breakdown Example

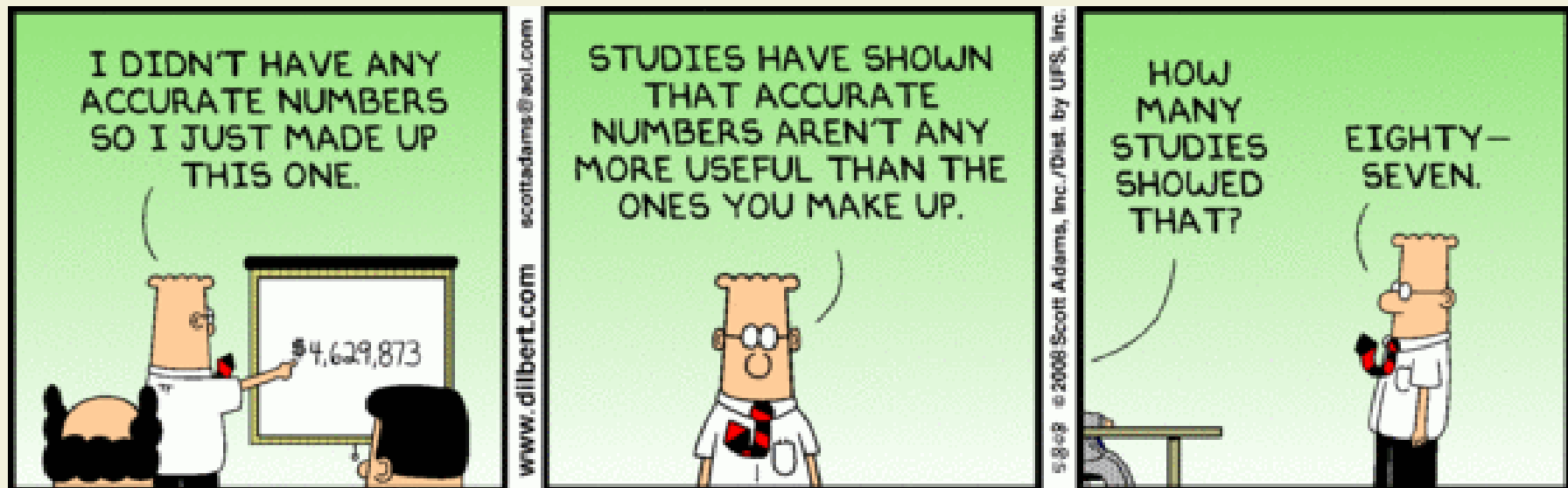


Risk Analysis

- Often called risk assessment or risk evaluation
- Determine
 - **Probability** of the risk to occur
 - **Impact** on the project objectives in case the risk occurs
 - **Severity** (Severity = Probability x Impact)
- Identify risks to be mitigated

- Qualitative analysis
- Quantitative analysis
 - Based on estimates and simulations





Probability Criteria

Qualitative Rating	Quantitative Rating	Description
Very High	>84%	Almost assured to happen
High	60-84%	Likely to happen
Medium	35-59%	Somewhat likely to happen
Low	10-34%	Not very likely to happen

Impact Criteria

Risk Rating	Description
Very High	Has potential to cause cancellation of the project
High	Likely to cause significant disruption to schedule, increase in cost, or degradation of performance
Medium	Has potential to cause some disruption to schedule, increase in cost, or degradation of performance
Low	Has little potential to cause some disruption to schedule, increase in cost, or degradation of performance

Severity of Individual Risks

Severity		Impact			
		Very High	High	Medium	Low
Probability	Very High	Unacceptable	Very High	High	High
	High	Very High	High	High	Medium
	Medium	High	High	Medium	Medium
	Low	High	Medium	Medium	Low

Risk Ranking

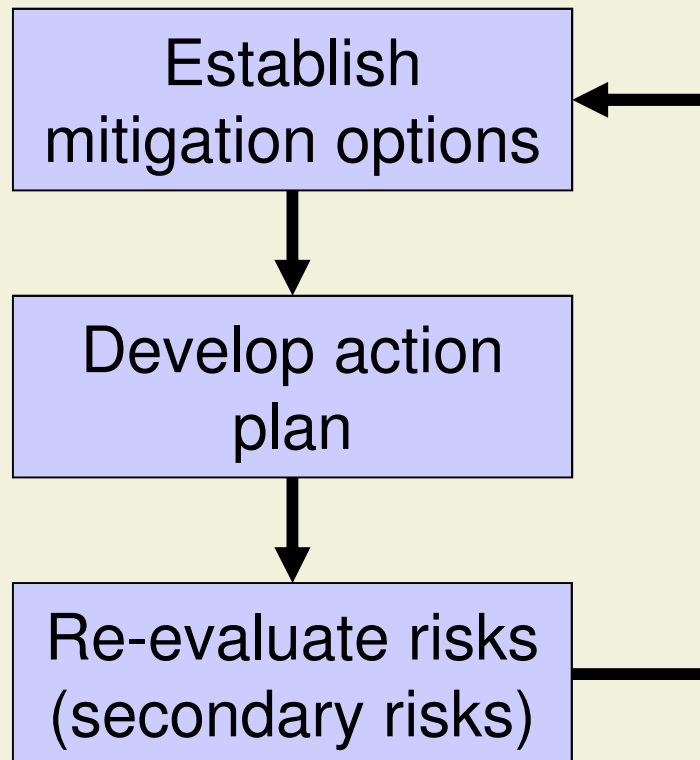
- Prioritize risk according to
 - Severity
 - Timing
 - Time required to mitigate (preliminary estimate)
 - Etc.
- “Top 10” Approach
 - Develop mitigation strategies for top 10 risks
 - Use the top 10 as an agenda item for regular project meetings

Risk Documentation

Risk ID	WBS Number	Risk Event	Owner	Area of Impact (W/B/S)
1	2.04.05	Requirements will grow uncontrollably	PM	B/S

Probable Impact Date	Risk Probability	Risk Impact	Severity	Rank
20.07.2004	High	Very high	Very high	1

Risk Response Planning



- Risk Response Planning is often called **risk mitigation**

Mitigation Strategies

- **Avoid** the path or project to eliminate the risk
- **Ignore / Accept** the risk and its consequences if it occurs
- **Transfer** all or part of the risk to another party
- **Contain** the risk by specific actions to lower the probability and / or impact
- **Establish contingency**: Set funds aside to be used if the risk occurs or when later containment is deemed appropriate


Extended Documentation

Risk ID	Mitigation Strategy	Mitigation Task	Responsible	Status
1	Contain	Use phased approach	PM	in progress

Execution and Post Mitigation

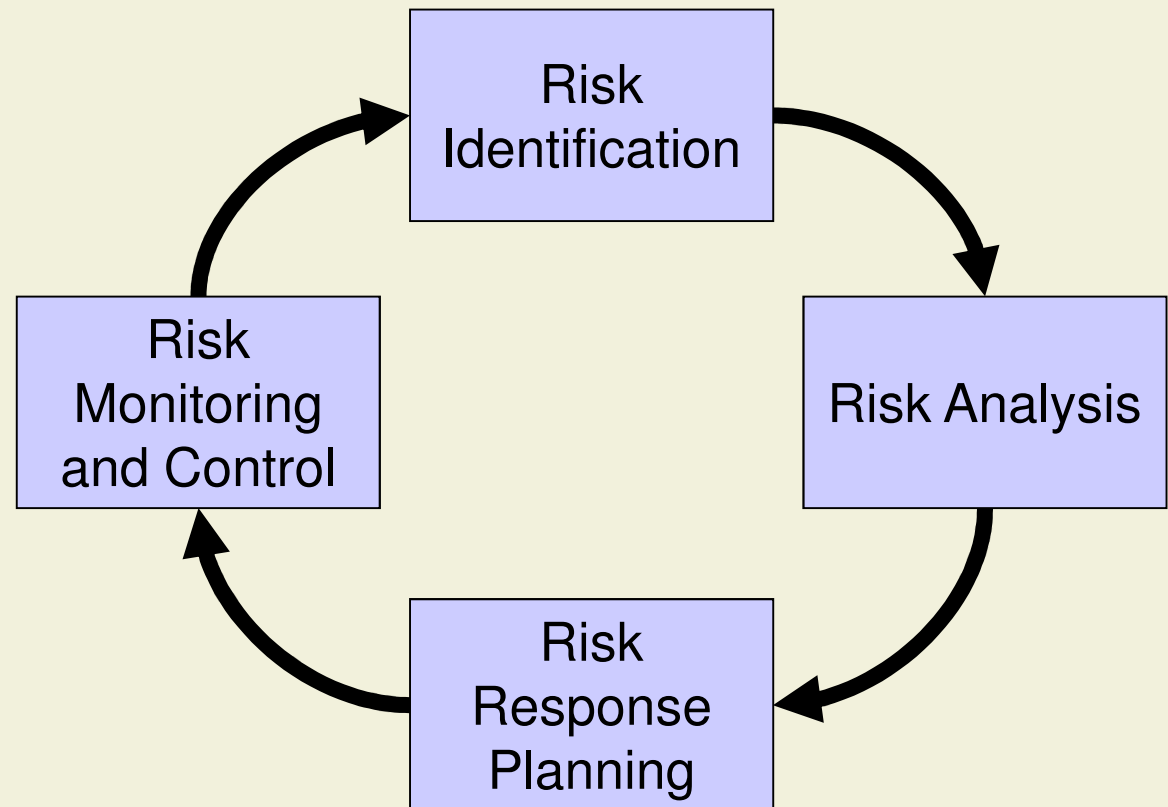
- Mitigation tasks have to be **integrated into project plan** (WBS)
- Execution has to be **closely monitored**
- Risk has to be **re-assessed** to check whether mitigation is successful

Severity		Impact			
		Very High	High	Medium	Low
Probability	Very High	Very High	Very High	High	High
	High	Very High	High	High	Medium
	Medium	High	High	Medium	Medium
	Low	High	Medium	Medium	Low

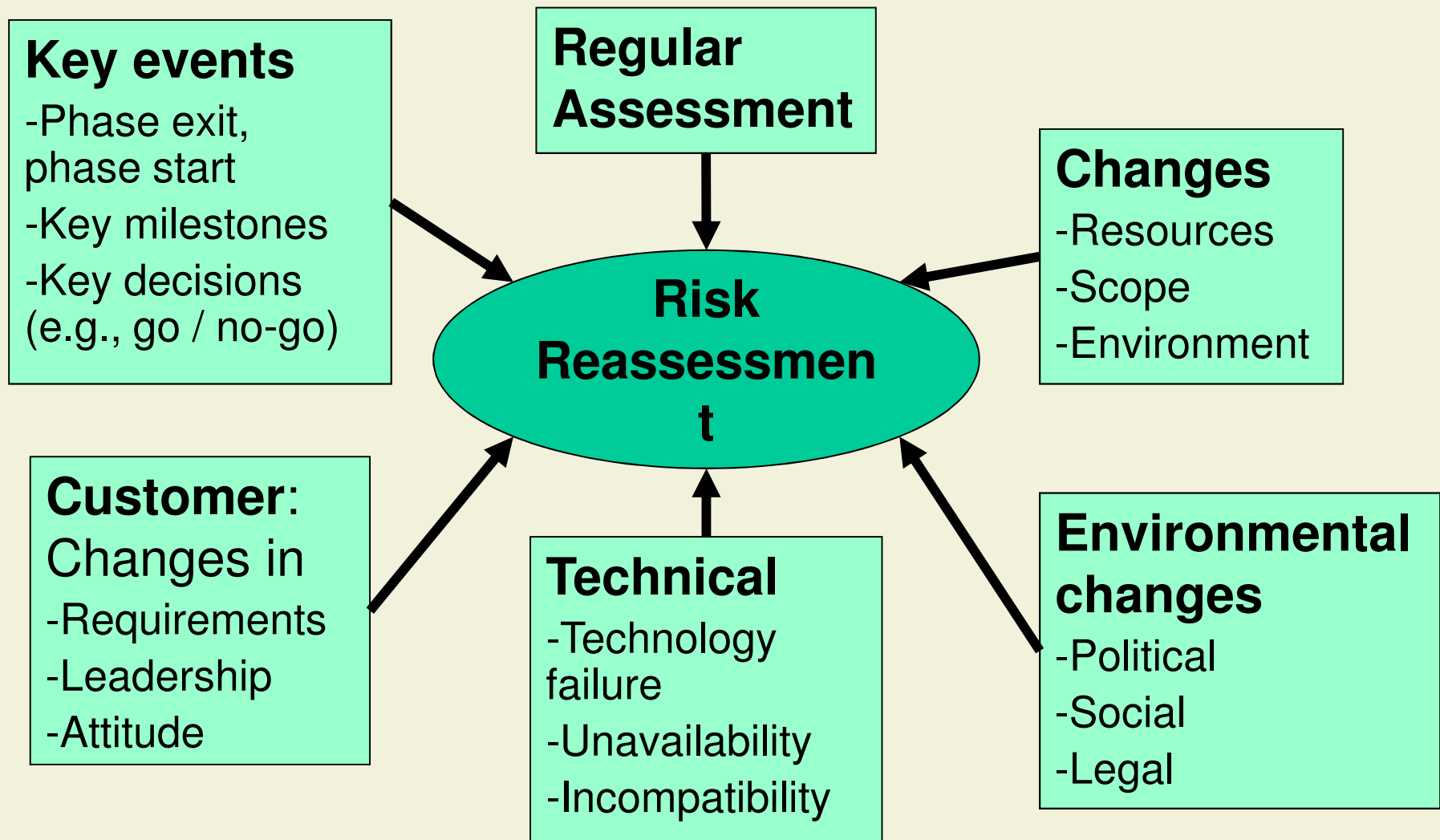


Risk Monitoring

- **Implement, track, and reassess** mitigation strategies
- **Communicate** risk plan status to stakeholders
- **Update** documents



Triggers for Risk Reassessment



Examples

- Risk Process



- Risk Inventory

