

Risk Management Process-02

Lecture 06

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Risk Analysis



Qualitative Risk Analysis

- Risk Register
- Probability-Impact (PI) Matrix
- Risk Categorization
- Expert Judgement

Quantitative Risk Analysis

- Sensitivity Analysis
- Decision Tree Analysis
- Scenario Analysis
- Latin Hyper Cube Simulation
- Monte Carlo Simulation

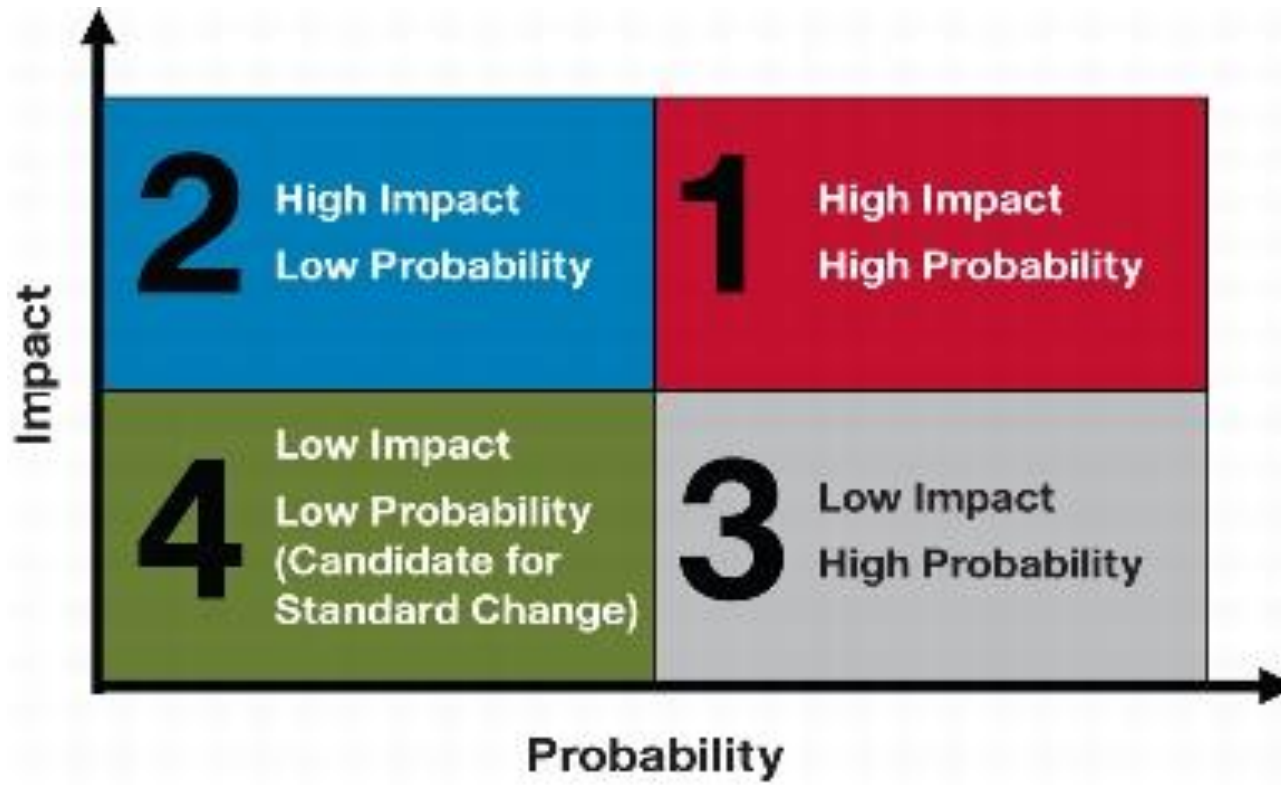
Risk Register

- The main output of the risk identification process is a list of identified risks and other information needed to begin creating a risk register
- A **risk register** is:
 - A document that contains the results of various risk management processes and that is often displayed in a table or spreadsheet format
 - A tool for documenting potential risk events and related information
- **Risk events** refer to specific, uncertain events that may occur to the detriment or enhancement of the project
 - Negative risks: delays in completing work as scheduled, increases in estimated costs, supply shortages, litigation, strikes, etc.
 - Positive risks: completing work sooner and/or cheaper than planned, collaborating with suppliers to produce better products, good publicity, etc.

PI Matrix

- A **probability/impact matrix** or **chart** lists the relative probability of a risk occurring on one side of a matrix or axis on a chart and the relative impact of the risk occurring on the other
- List the risks and then label each one as high, medium, or low in terms of its probability of occurrence and its impact if it did occur
- Deal first with those risks in the high probability/high impact cell

PI Matrix (2 x 2)



Risk Assessment Matrix (3 x 3)

IMPACT	High	Minimum Risk	High Risk	Critical Risk
	Medium	Low Risk	Minimum Risk	High Risk
	Low	Low Risk	Low Risk	Minimum Risk
		Low	Medium	High
		PROBABILITY		

Definition

	Scale	Probability	Impact
1	Very Low	Unlikely to occur	Negligible Impact
2	Low	May occur occasionally	Minor impact on time, cost or quality
3	Medium	Is as likely as not to occur	Notable impact on time, cost or quality
4	High	Is likely to occur	Substantial impact on time, cost or quality
5	Very High	Is almost certain to occur	Threatens the success of the project

Seriousness of Risk

- $P \times I$

Top Ten Risk Item Tracking

- **Top Ten Risk Item Tracking** is a qualitative risk analysis tool that helps to identify risks and maintain an awareness of risks throughout the life of a project
- Establish a periodic review of the top ten project risk items
- List the current ranking, previous ranking, number of times the risk appears on the list over a period of time, and a summary of progress made in resolving the risk item

Top Ten Risk Item Tracking

- Keeps management and the customer aware of the major influences that could prevent or enhance the project's success
- By involving the customer, the project team may be able to consider alternative strategies for addressing the risks
- It's a means of promoting confidence in the project team by demonstrating to management and the customer that the team is aware of the significant risks, has a strategy in place and is effectively carrying out that strategy

Example of Top Ten Risk Item Tracking

MONTHLY RANKING				
RISK EVENT	RANK THIS MONTH	RANK LAST MONTH	NUMBER OF MONTHS IN TOP TEN	RISK RESOLUTION PROGRESS
Inadequate planning	1	2	4	Working on revising the entire project management plan
Poor definition	2	3	3	Holding meetings with project customer and sponsor to clarify scope
Absence of leadership	3	1	2	After previous project manager quit, assigned a new one to lead the project
Poor cost estimates	4	4	3	Revising cost estimates
Poor time estimates	5	5	3	Revising schedule estimates

Watch List

- A **watch list** is a list of risks that are low priority, but are still identified as potential risks
- Qualitative analysis can also identify risks that should be evaluated on a quantitative basis

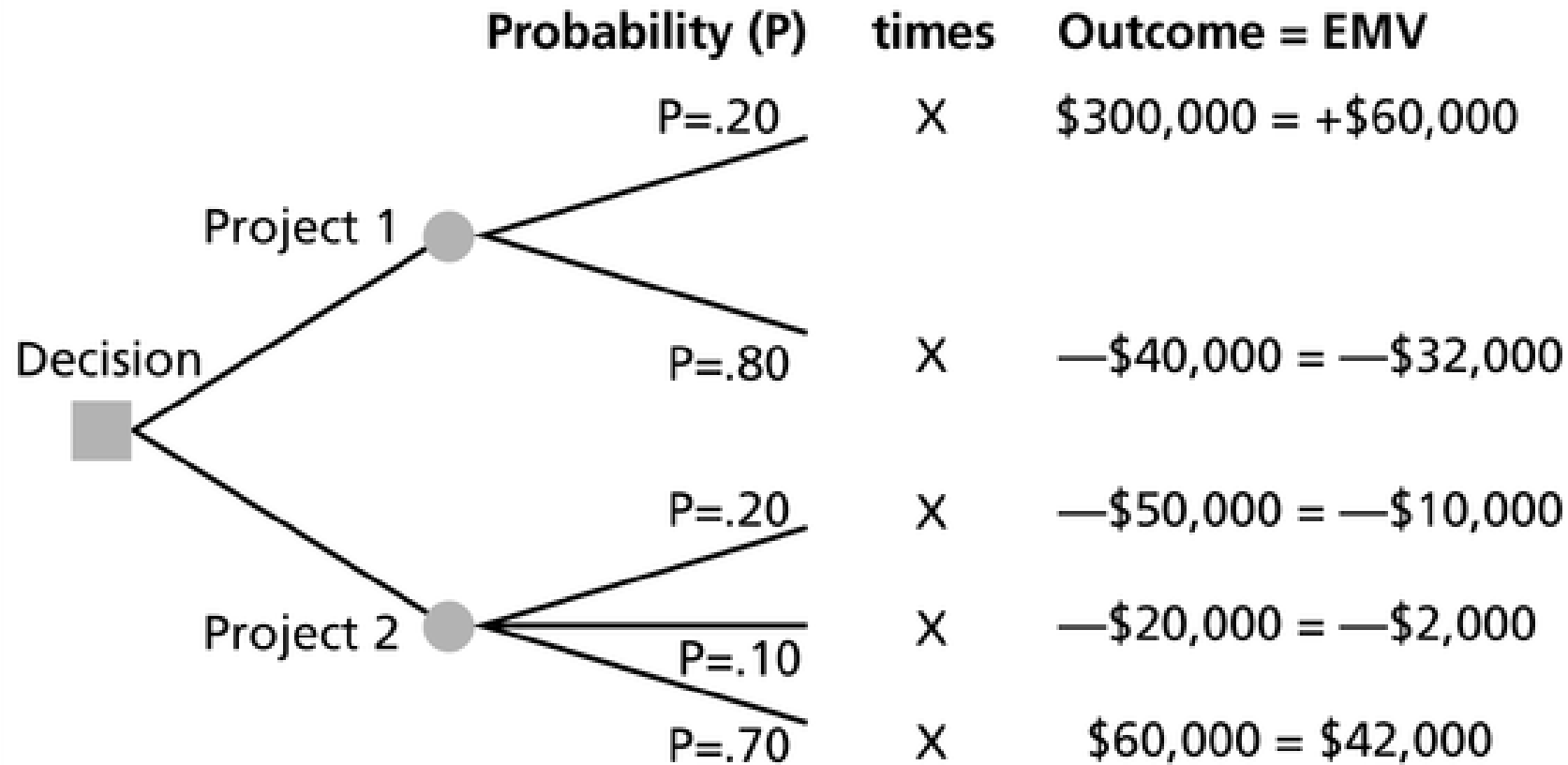
Quantitative Risk Analysis

- Often follows qualitative risk analysis, but both can be done together
- Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis
- Main techniques include:
 - Decision tree analysis
 - Simulation
 - Sensitivity analysis

Decision Trees and Expected Monetary Value (EMV)

- A **decision tree** is a diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain
- **Estimated monetary value (EMV)** is the product of a risk event probability and the risk event's monetary value
- You can draw a decision tree to help find the EMV

Expected Monetary Value (EMV)



Project 1's EMV = \$60,000 - 32,000 = \$28,000

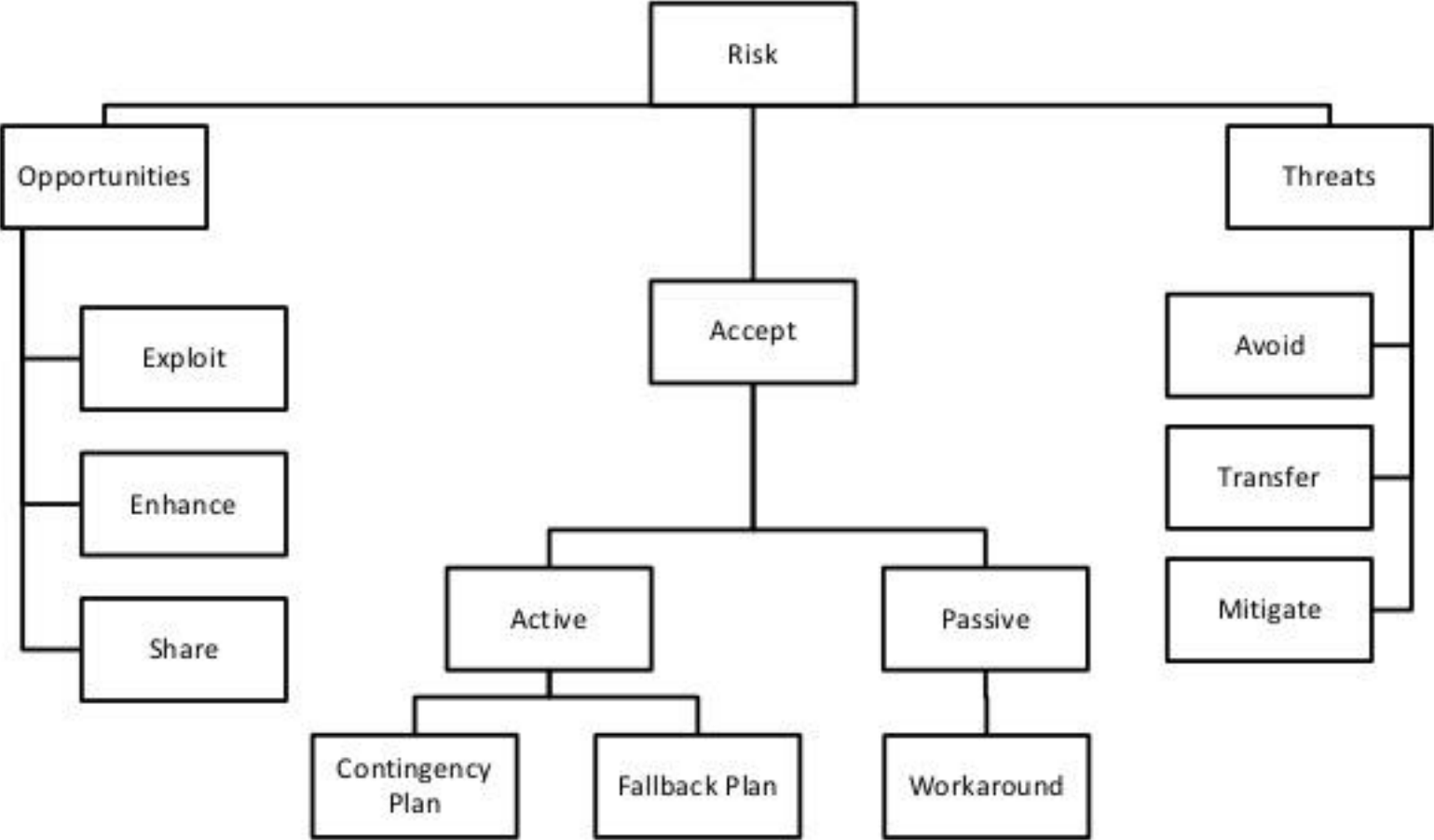
Project 2's EMV = -\$10,000 - 2,000 + 42,000 = \$30,000

Risk Control/Response Strategy

The process of developing options and actions to enhance opportunities and to reduce threats to the project objectives

- *Proactive, not reactive*
- *Appropriate to significance of risk*
- *Cost effective*
- *Timely*
- *Realistic within project context*
- *Agreed upon by project team and all parties involved*
- *Assigned to / owned by a responsible person*

Risk Response



Types of Responses (Threats)

Avoidance-

Changing a project objective to eliminate the threat posed by an adverse risk event

Transference –

Shifting the negative impact of a threat, along with the ownership of the response, to a third party

Mitigation –

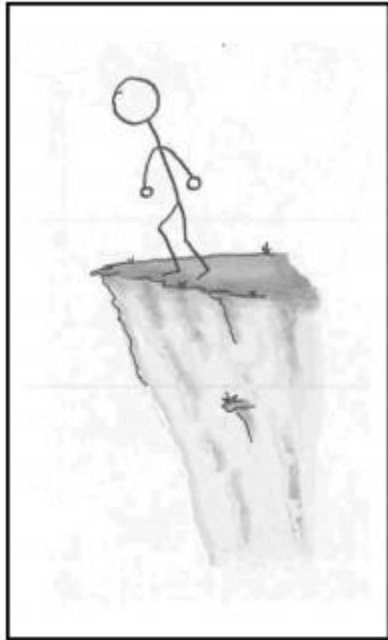
Reducing the Probability or Impact of an adverse risk event (threat) to an acceptable threshold

Acceptance –

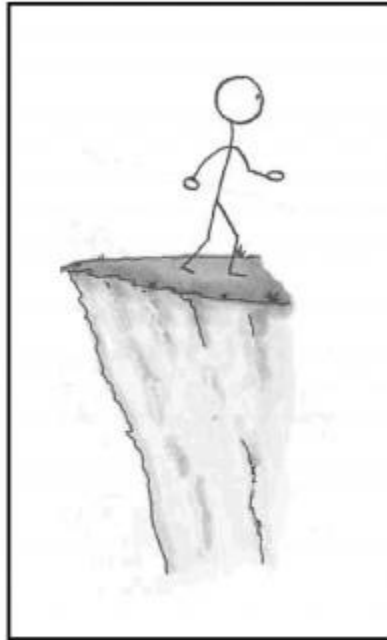
The project team decides not to change project objectives to deal with the risk.

- Passive acceptance: no action , deal with threats as they occur (workarounds)
- Active acceptance: establish a contingency reserve to handle

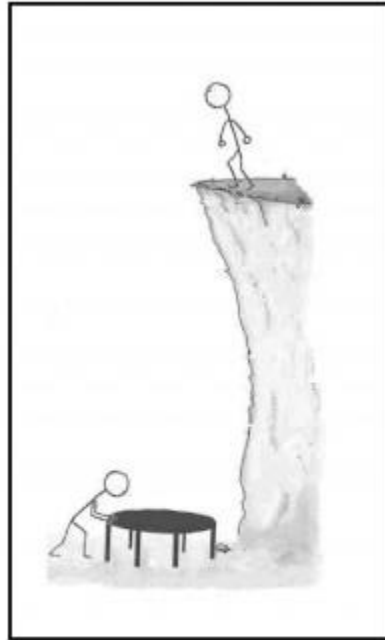
Example.....



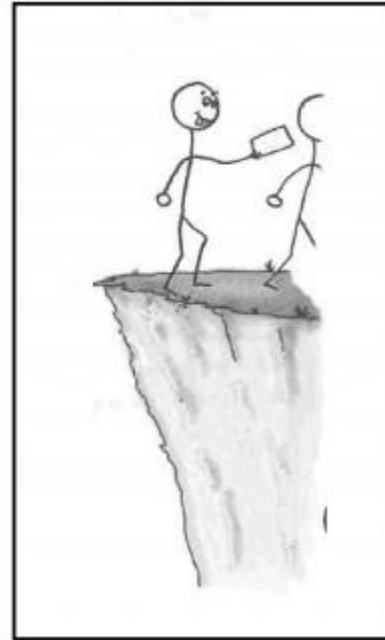
Your project



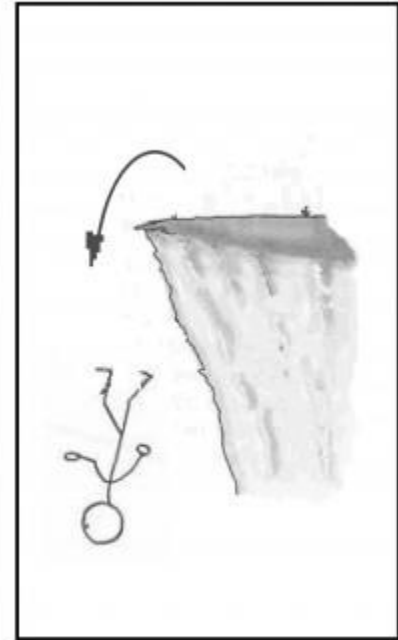
Avoid



Mitigate



Transfer



Accept

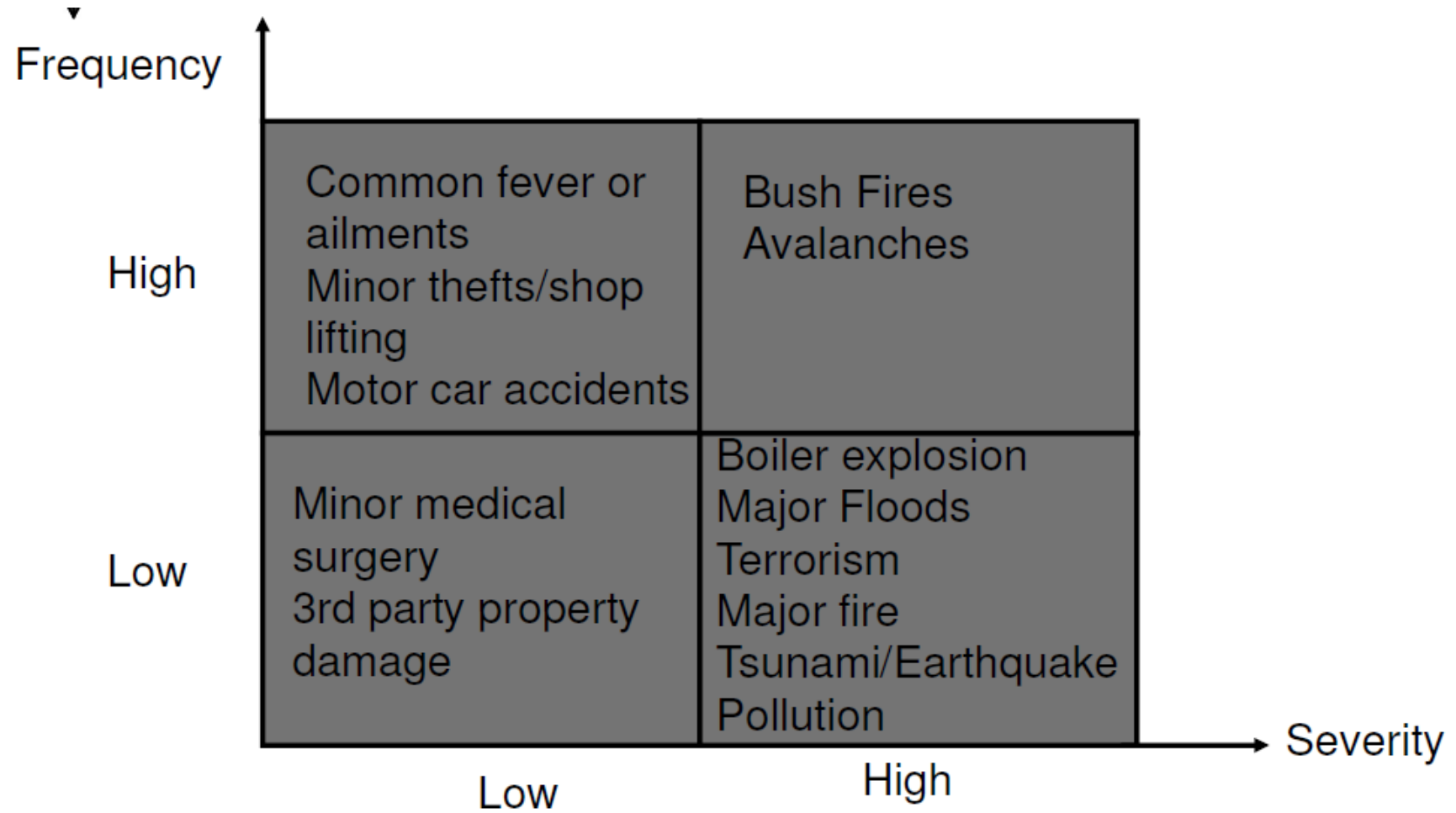
4T Process



Frequency Vs Severity...



Example.....



Type of Responses (Opportunities)

Exploit –

This strategy seeks to eliminate the uncertainty with an opportunity by changing a project objective to ensure it happens

Share –

Allocating ownership of the positive risk event to a third party who is best able to capture the opportunity for the project

Enhance –

Increasing the probability and/or positive impact of an opportunity

Residual and Secondary Risks

- It's also important to identify residual and secondary risks
- **Residual risks** are risks that remain after all of the response strategies have been implemented
 - Even though used stable h/w platform, it still may fail
- **Secondary risks** are a direct result of implementing a risk response
 - Using stable h/w may have caused a risk of peripheral devices failing to function properly

Contingency

- Creating a plan B?