UoG / UESTC Joint School of Engineering

Engineering Project Management & Finance

Project Risk Management
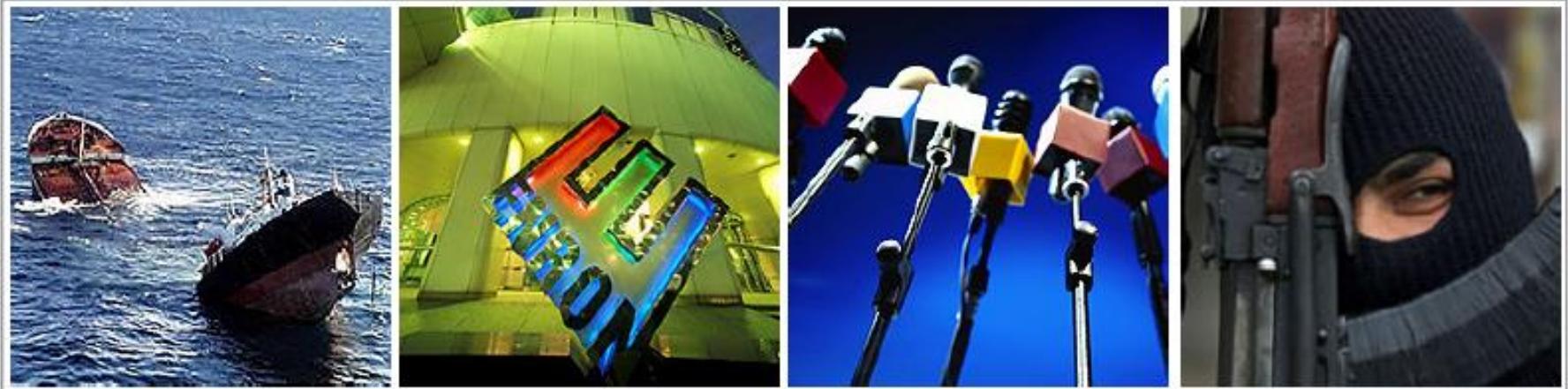
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VIA VERITAS VITA

Sometimes projects go wrong!!

- KPMG, a large consulting firm, published a study in 1995 that found that 55 percent of **runaway** projects—projects that have significant cost or schedule overruns—did *no risk* management at all, 38 percent did some (but half did not use their risk findings after the project was underway), and 7 percent did not know whether they did risk management or not

- The timing of risk management is also an important consideration

Risk Management is growing in importance because ...
Increasing complexity and uncertainty in the work space
Increasing opportunities
Increasing stakeholders expectations
Need to optimize management of Upside Risks & Downside Risks
Need to optimize management of Enterprise Risk & Operational Risks

Can be defined as….

- Art and Science of planning, organising, securing and managing resources (**Management**) to harness/control/manage the effects of uncertainties on objectives (**Risk**)of a **project**

- **All projects hit unforeseen problems**
  - The good project managers think about how to deal with problems **before** they happen

… Is a Comprehensive System that includes:

- Creating an appropriate risk management environment
- Maintaining an efficient Risk Measurement
- Mitigating and Monitoring Process
- Establishing an Adequate Internal Control Arrangement

 Core of the Strategic Management of the Company

- It is the process whereby organisations methodically address the risks attaching to their activities with the goal of minimising the impact of that risk on objectives

Class Discussion Scenario

- You have just bought a new laptop computer but the carry case has not yet arrived. It will not fit into your old carry case.

1. You must go to class tomorrow, the weather forecast says it might rain

   Risk

2. It is now tomorrow; you look out the window and you see it is raining

   Issue

3. It is five minutes until class starts, it is still raining. You grab your computer and try to run. Your computer gets wet and damaged

   Event

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INTERNAL	**EXTERNAL**

Resources	Processes	

| INTERNAL	EXTERNAL
• Inadequate internal controls, • Human errors (incompetence, inexperience, corruption) • IT failure • Inadequate or changing human resources • Operational Risks • Legal Risks??	• Political risk • Country Risk • Market Risk • Currency Risk • Environmental Risk
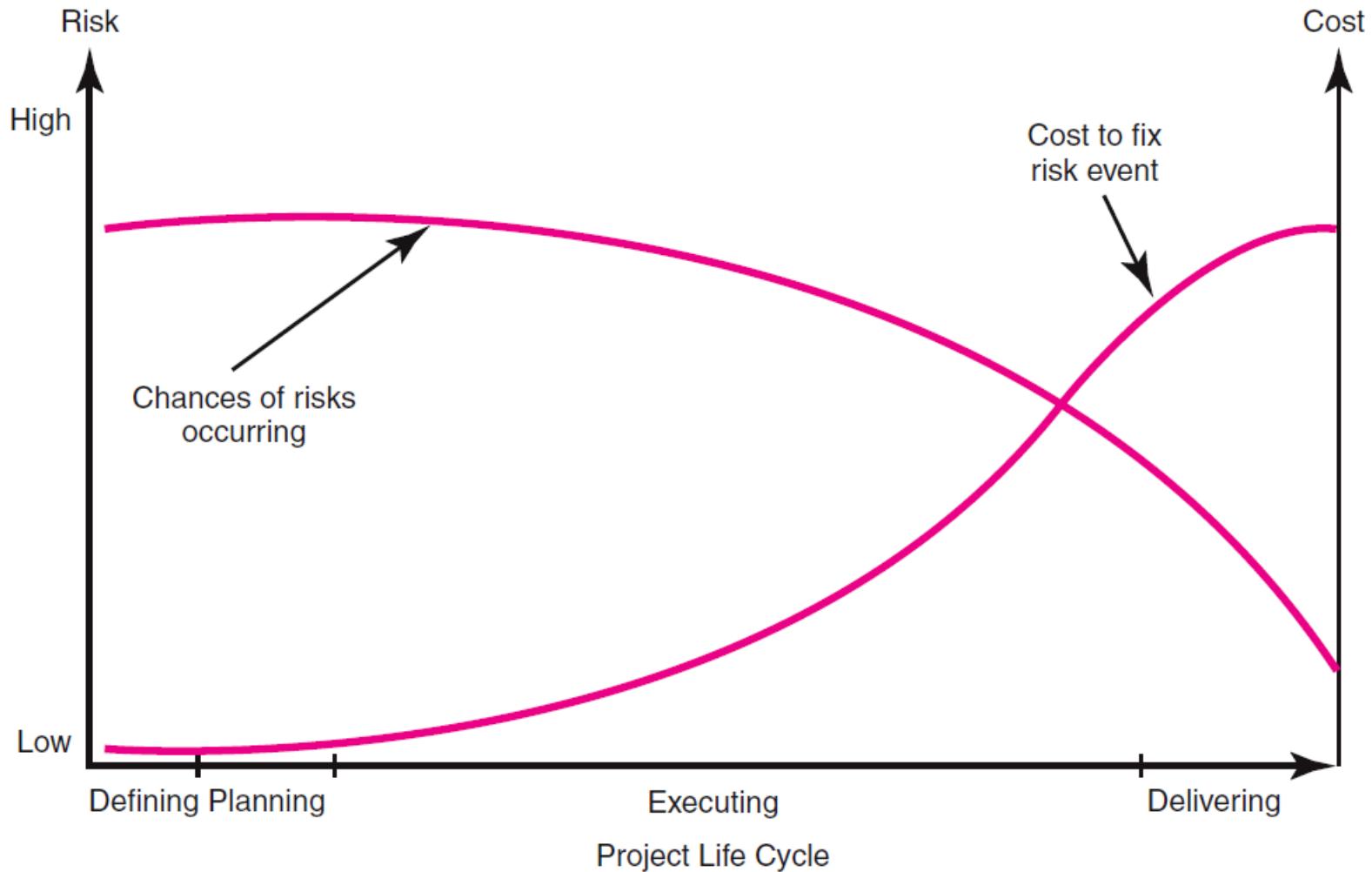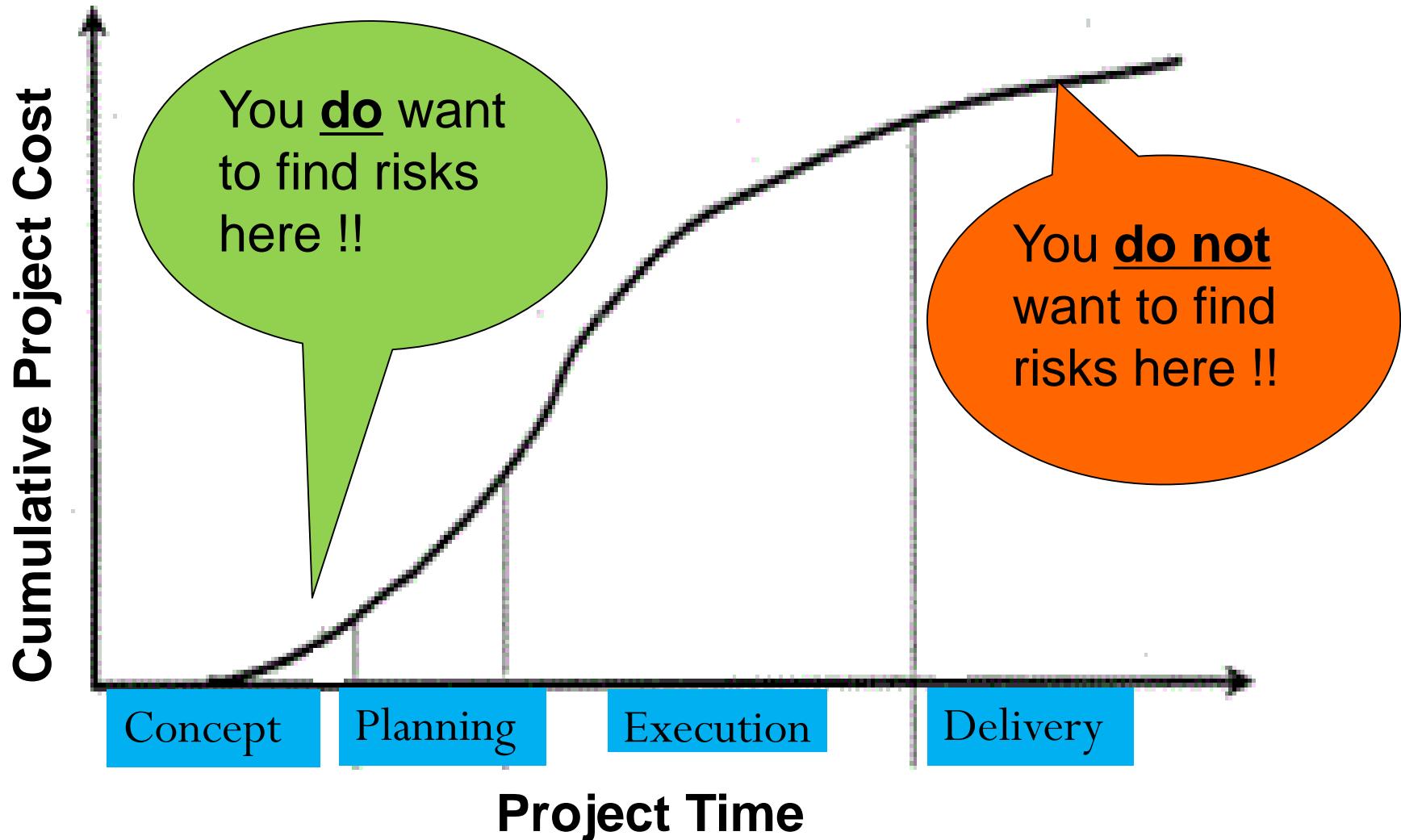
- Consider the following 3 scenarios and risks:-

- Risks in developing a software project
- Risks developing a fashion product
- Risks in developing a new technology product

- Consider a few risks and whether internal or external
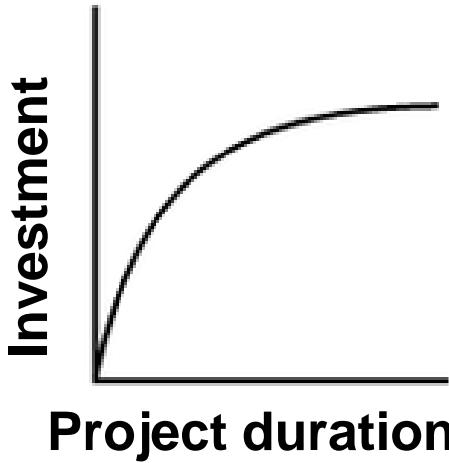
- Risk Identification

- Risk Appraisal

- Risk Management

- Focus of downside of risk

- Look for ways to avoid or reduce the risk

- Plan for recovery after risk event has occurred

**Risk-Averse** — Investment vs. Project duration

Risk-Neutral — Investment vs. Project duration

Risk-Seeking — Investment vs. Project duration
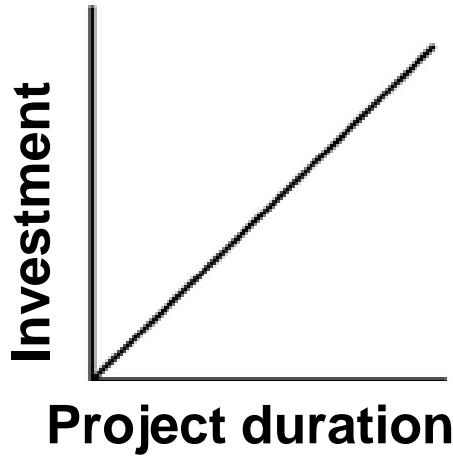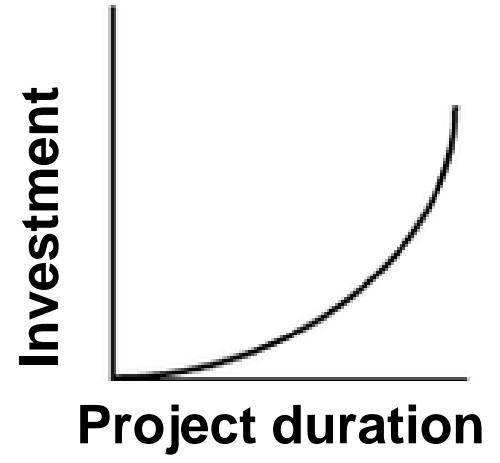
What risk profile do you think are best for:

a. new technology, b. Road building,   c. Safety system
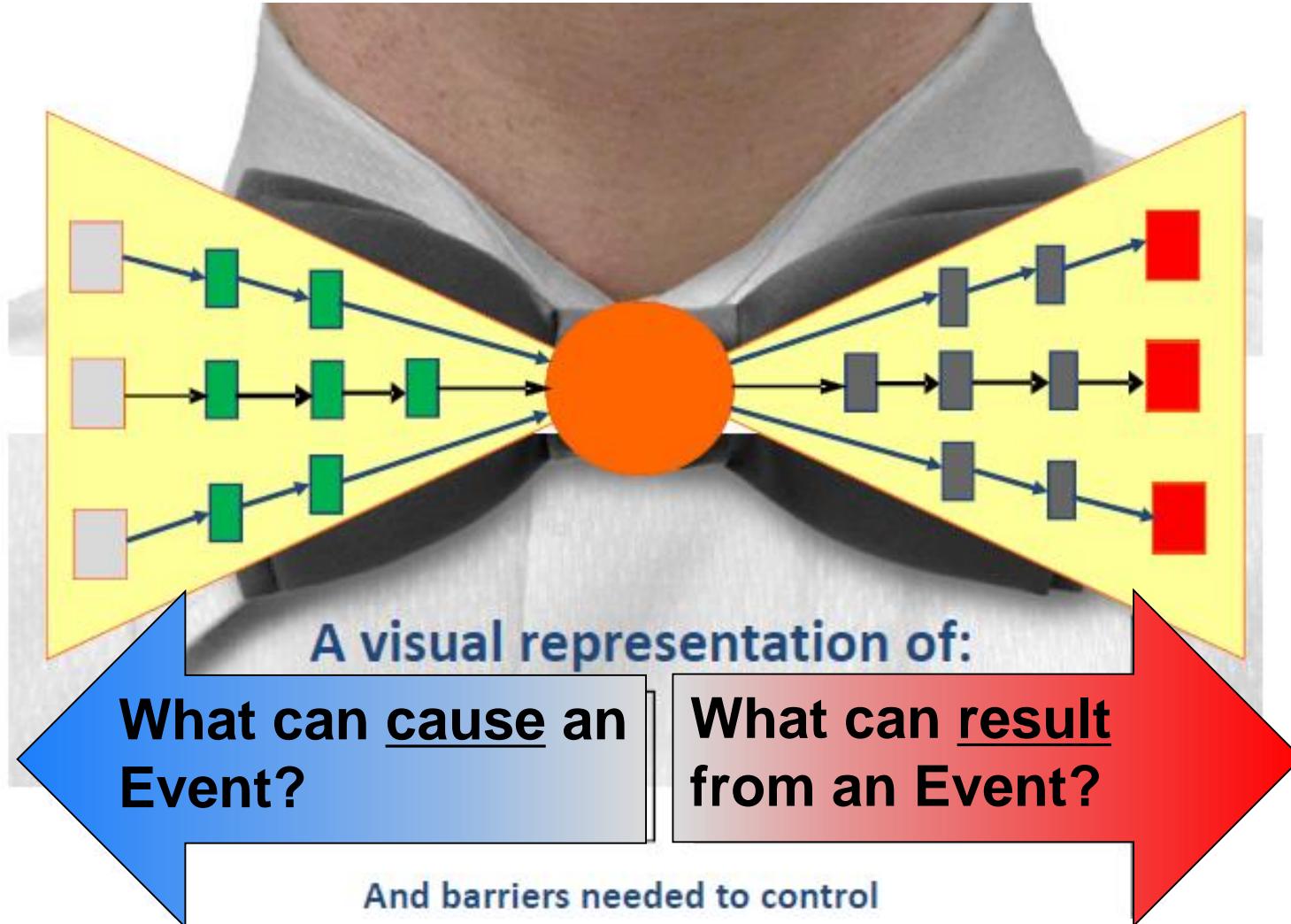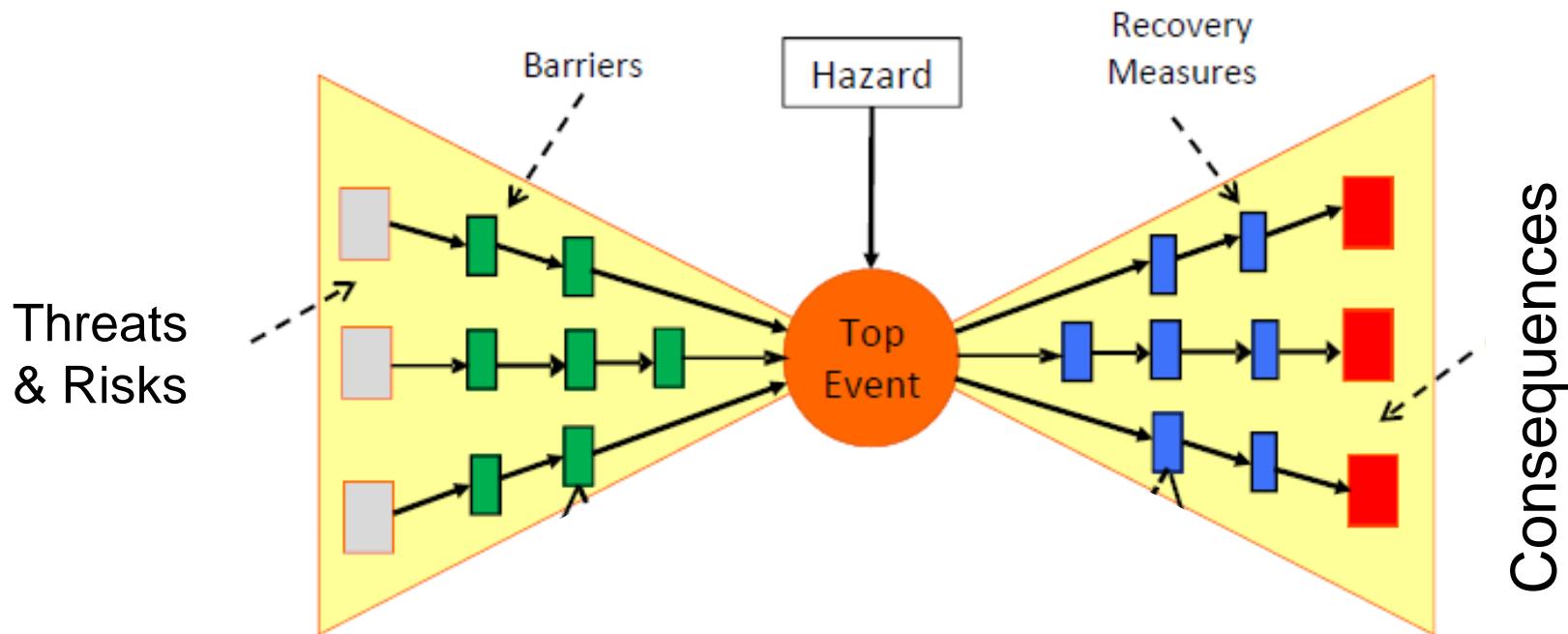
For this course we will look at the Bow Tie method

A visual representation of:

What can cause an Event?

What can result from an Event?

And barriers needed to control
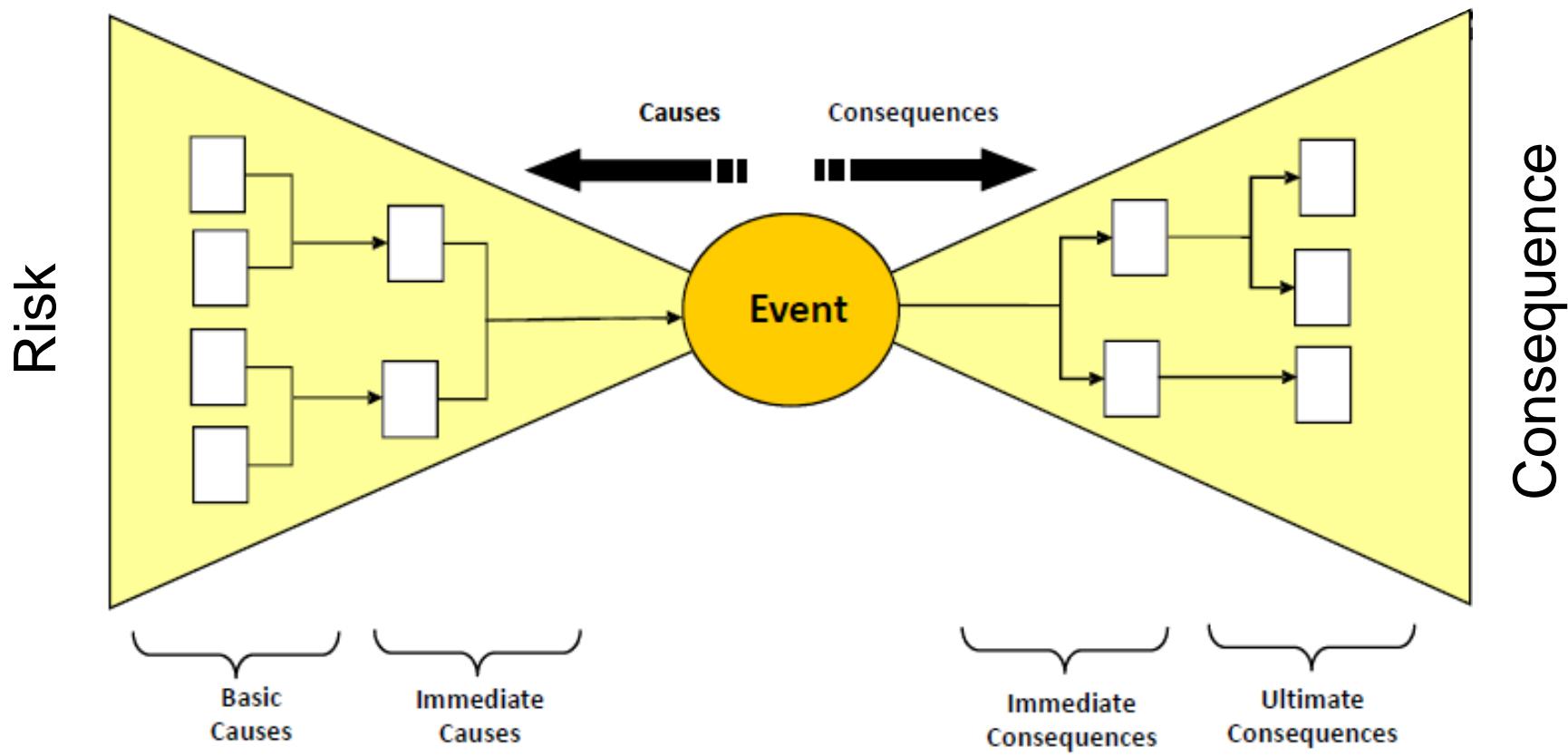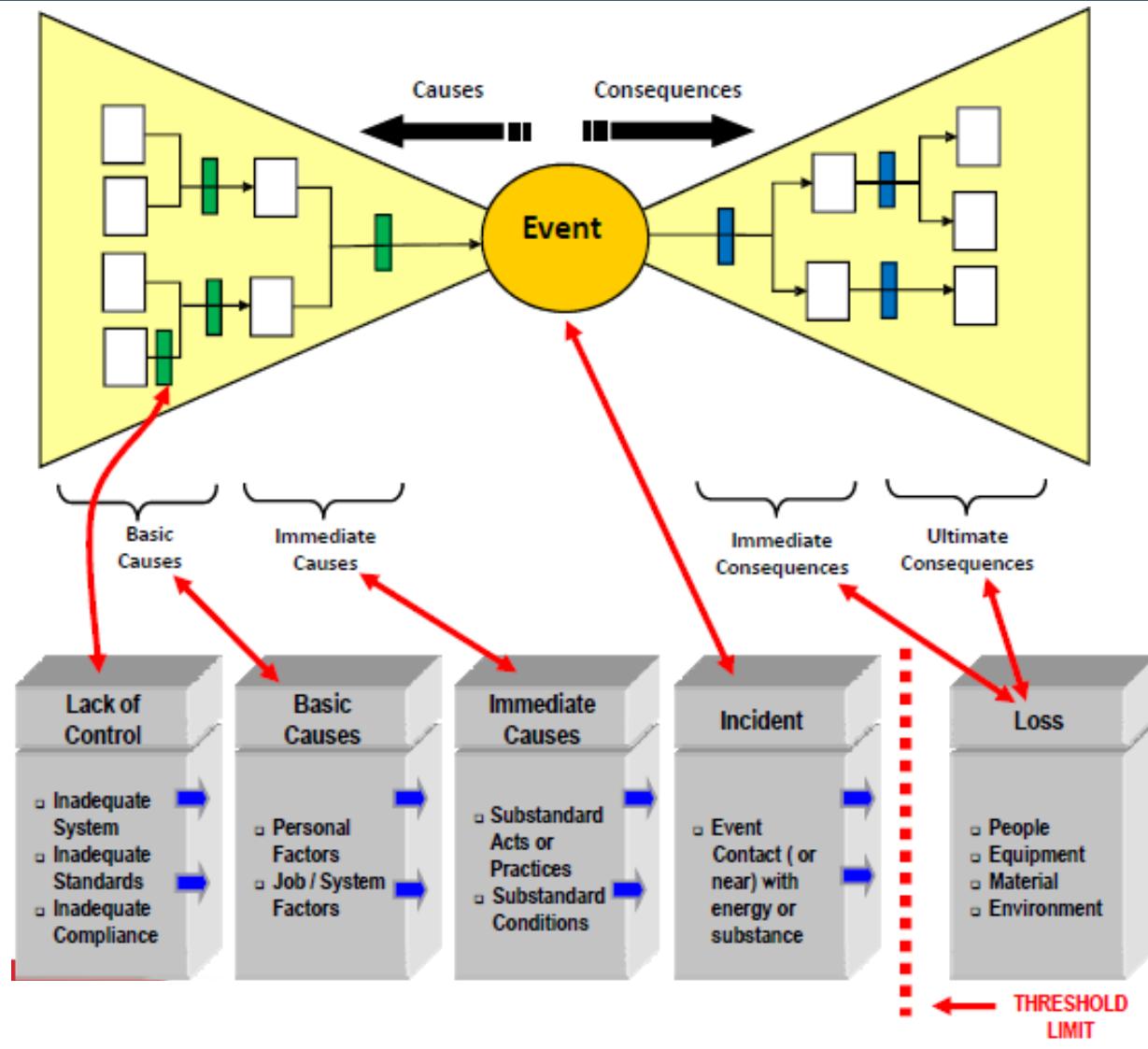
A simple visual method of understanding Risk & Consequences

The Bow Tie lets you think about the Risk-Consequence trade-off
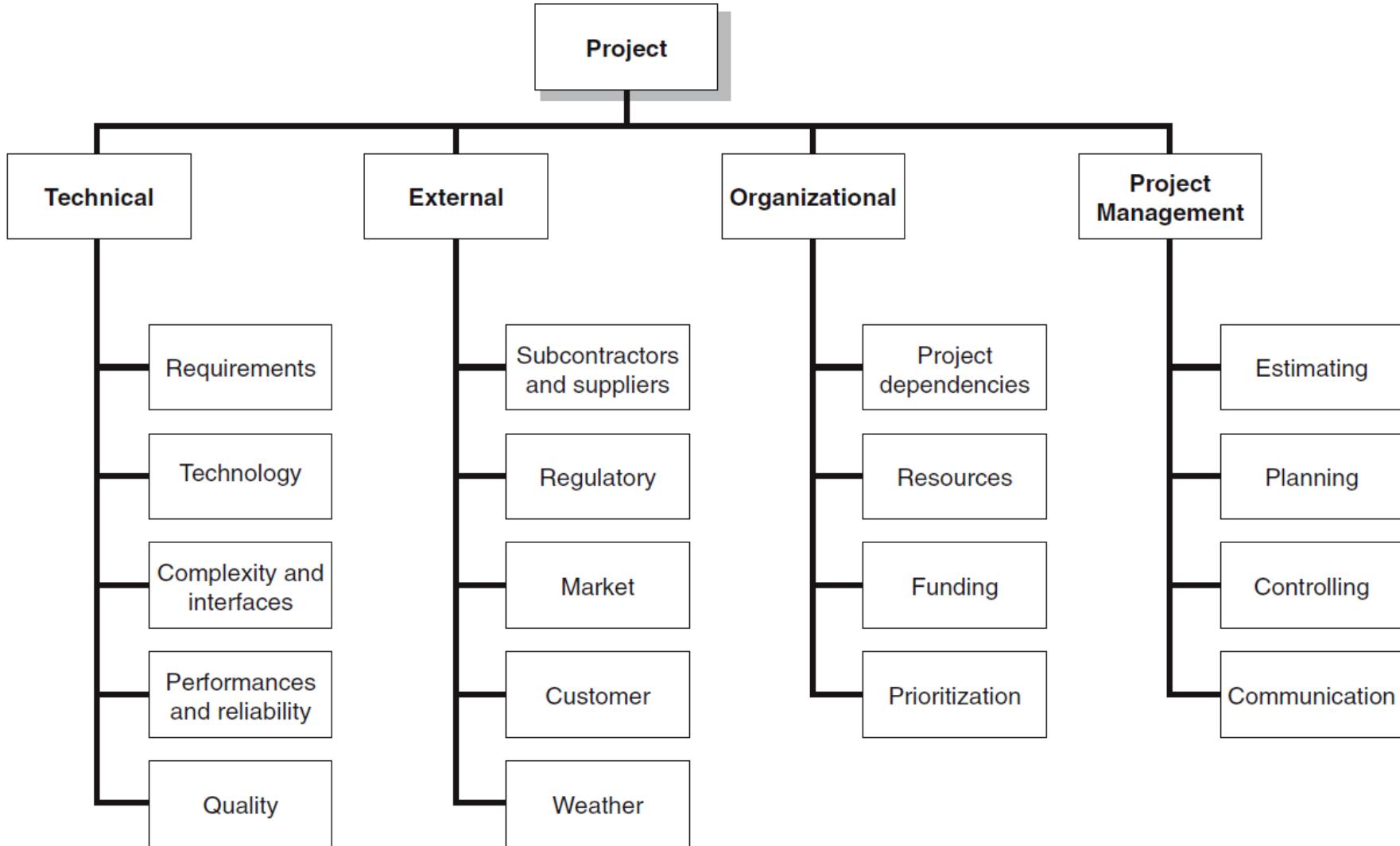
What are the risks?

What are the Consequencies?

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                              Project

   Technical          External        Organizational      Project
                                                          Management

  Requirements     Subcontractors      Project            Estimating
                   and suppliers       dependencies

  Technology       Regulatory          Resources          Planning

  Complexity and   Market              Funding            Controlling
  interfaces

  Performances     Customer            Prioritization     Communication
  and reliability

  Quality          Weather
```

Technical Requirements

Are the requirements stable?

Design

Does the design depend on unrealistic or optimistic assumptions?

Testing

Will testing equipment be available when needed?

Development

Is the development process supported by a compatible set of procedures, methods, and tools?

Schedule

Is the schedule dependent upon the completion of other projects?

Budget

How reliable are the cost estimates?

Quality

Are quality considerations built into the design?

Management

Do people know who has authority for what?

Work Environment

Do people work cooperatively across functional boundaries?

Staffing

Is staff inexperienced or understaffed?

Customer

Does the customer understand what it will take to complete the project?

Contractors

Are there any ambiguities in contractor task definitions?

Defined Conditions for Impact Scales of a Risk on Major Project Objectives (Examples for negative impacts only)

	Relative or Numerical Scale				
Project Objective	1 Very Low	2 Low	3 Moderate	4 High	5 Very High
Cost	Insignificant cost increase	< 10% cost increase	10–20% cost increase	20–40% cost increase	> 40% cost increase
Time	Insignificant time increase	< 5% time increase	5–10% time increase	10–20% time increase	> 20% time increase
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless

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Risk Severity is:-
Impact × Probability = Risk Value

Impact

	1	2	3	4	5
1					
2					
3					
4					
5					

Probability

Impact: If the risk was to happen, what would be the effect on the project

Probability (or Likelihood): The chances of the Risk occurring

Risk	Impact	Probability	Severity	Mitigation
Robot Battery Fails	5	2	10	Purchase extra battery
MBED Controller not fast enough	3	2	6	Carry out careful software requirements analysis
Bread not ejected	2	4	8	Use multiple eject sequences
4				
5				

- **Risk matrix is a tool to project risk management**

- **Risk matrix NOT designed to establish another list to do**

- **Its purpose is to help plan and schedule the project so that all contingencies are embedded into the project core.**

- After identifying and quantifying risk, you must decide how to respond to them
- Four main strategies:
  - Risk avoidance: eliminating a specific threat or risk, usually by eliminating its causes
  - Risk acceptance: accepting the consequences should a risk occur
  - Risk transference: shifting the consequence of a risk and responsibility for its management to a third party
  - Risk mitigation: reducing the impact of a risk event by reducing the probability of its occurrence

- Contingency Plan

  – An alternative plan that will be used if a possible foreseen risk event actually occurs.

  – A plan of actions that will reduce or mitigate the negative impact (consequences) of a risk event.

- Risks of Not Having a Contingency Plan

  – Having no plan may slow managerial response.

  – Decisions made under pressure can be potentially dangerous and costly.

- Technical Risks
  - Backup strategies if chosen technology fails.
  - Assessing whether technical uncertainties can be resolved.

- Schedule Risks
  - Use of slack increases the risk of a late project finish.
  - Imposed duration dates (absolute project finish date)
  - Compression of project schedules due to a shortened project duration date.

STEP-1

From WBS and team discussions, identify project risk/ tasks with inherent risks

STEP-2

Describe the risk in detail:- what is likely to happen and why

STEP-3

Determine **impact** on schedule, cost quality, customer satisfaction

STEP-4

Estimate the **chance** that the risk will happen; what is the probability

STEP-5

Rank risks in terms of severity-overall how severe is the risk

STEP-6

Prepare Contingency plan for high risks

- Unlike crisis management, good project risk management often goes unnoticed

- Well-run projects appear to be almost effortless, but a lot of work goes into running a project well

- Project managers should strive to make their jobs look easy to reflect the results of well-run projects

- **The Team** should prepare the Risk Matrix and Risk Register (table of Risks) when the project plan is complete

- Think through each risk and the consequences

- Continually monitor your project for existing and new risks

- Focus on the highest risks before addressing lower risks

- Try and resolve or mitigate high risks early