Lecture 2b

Risk Management

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Definitions

- “The chance of exposure to the adverse consequences of future events” PRINCE2
- “An uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives” PM-BOK
- Risks relate to possible future problems, NOT current ones.
- They involve a possible cause and it’s effect(s) eg: developer leaves > task delayed

Risk Management Basics

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The necessity of risk & risk mgt

- A risk is a potential adverse circumstance
  - has a *likelihood* and *impact*
  - a *transition indicator* tells you that a risk is *materialising*
- Risk Management
  - Identifying risks and drawing up plans to deal with them

Why risk is inevitable

- In many organisations, projects with real benefits but no risk are rare – they've already been done
- In addition, s/w development inevitably encounters risk due to complexity & novelty (technology, client, staff, application domain)
- Developing new products that beat the competition is probably going to take you into unchartered waters … hence risk

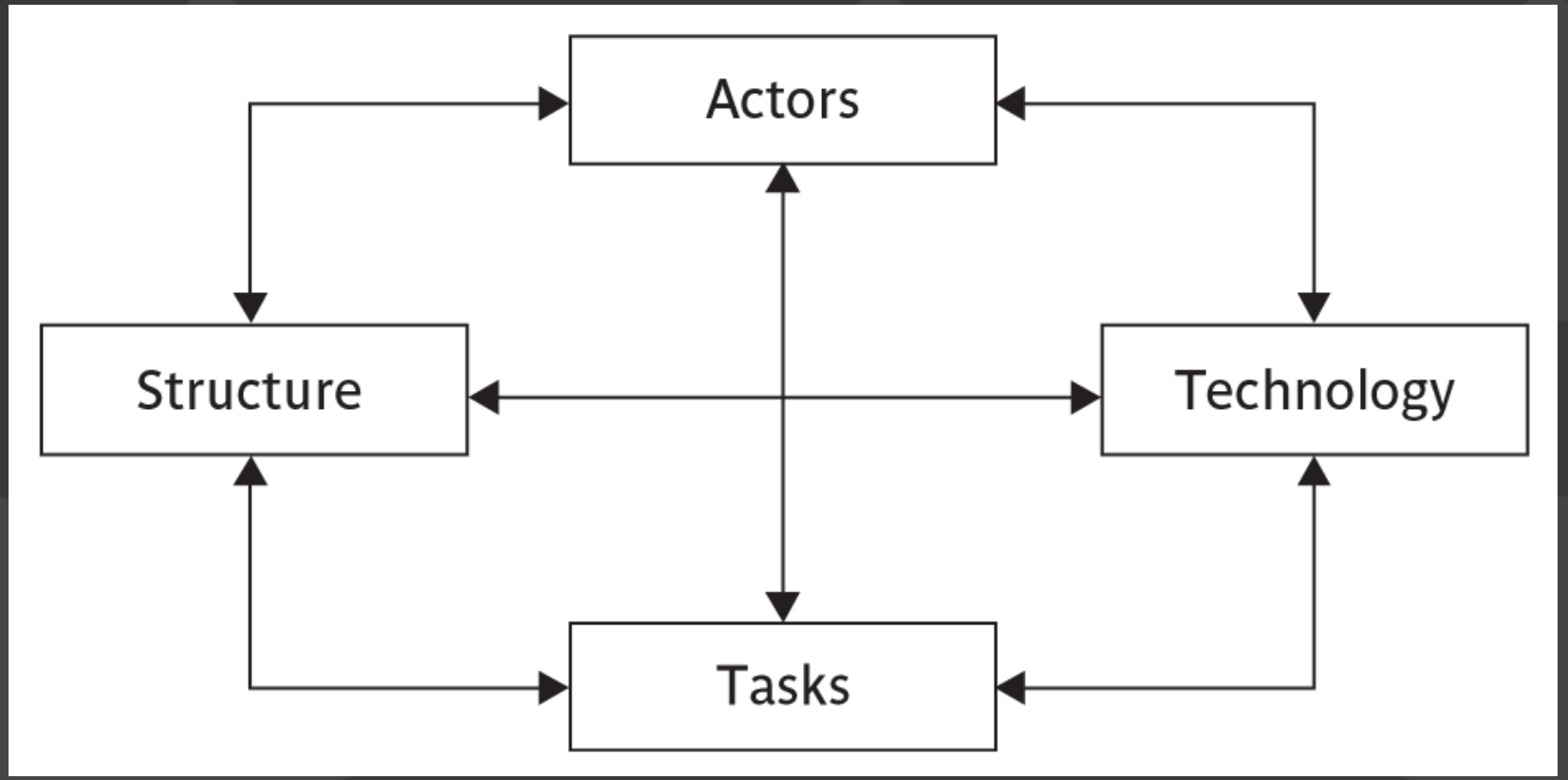
Evading risk

- We can *evade* a project's risk by not undertaking the project!
- When significant risks are unmanaged or not properly understood, this may (seem to) be the easiest/only sensible approach
- Companies that adopt this strategy may stagnate and lose ground to their competition
  - e.g., Sainsbury ~ reward cards

Ignoring risk

- … at least partially
- A natural human condition?
  - “I’d rather not think about that one …”
  - facing up to risk requires us to act
- A consequence of “can-do” thinking?
- … leads to crisis management
- … not a serious option

Categories of risk



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Examples

- Denver Airport Baggage handling software was 18 months late. This delayed the airport opening by 18 months which cost a further $500M
- Software delivery was critical as a result of the way the airport was built
- There was no prior consideration of risk to the project being delayed despite there being some clues

Risk Management : Process

risk identification

risk assessment

risk mitigation

risk monitoring & control

- What are the risks?
- What is the probability of loss that results from them?
- How much are the losses likely to cost?
- What might the losses be if the worst happens?
- What are the alternatives?
- How can the losses be reduced or eliminated?
- Will the alternatives produce other risks?

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Risk Management : Risk Identification

- Technical risks
- Project management risks
- Organizational risks
- External risks

What risks might there be?

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Risk Identification Approaches

- Checklists : usually based on the experience of past projects
- Brainstorming : Getting knowledgeable stakeholders together to pool concerns
- Causal mapping : identifying possible chains of cause and effect

Difficulties in risk identification

- Natural human tendency
- Culture
  - can do
  - Management edict
- Overcome using
  - Devil’s advocate
  - Risk officers
  - Identification techniques

Identifying risks: catastrophe analysis

- What are the potential *catastrophic outcomes*?
- What *scenarios* can lead to these outcomes?
- The *root causes* of these scenarios are then risks

Catastrophe analysis: Example

E.g., Denver Airport

- Catastrophe: Software is late
- Scenario1 Integration causes delay
- Root1 Intro of poor quality code
- Scenario2 Coding productivity less than required
- Root2a Estimation errors
- Root2b Staff illness
- ...

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Risk Assessment

- What is the probability of loss that results from them?
- How much are the losses likely to cost?
- What might the losses be if the worst happens?

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Risk Exposure

- Lists of risks is potentially endless
- So work out ones ought to deal with
  - Risk Exposure (RE) = Potential damage x probability of occurrence
- Potential damage needs a value
  - Eg a flood would cause 0.5millions of damage
- Probability a value given to the chance of it happening
  - 0 = no chance
  - 1 = definite
  - 0.01 = one in a hundred chance

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Probability

Probability level	Range
High	Greater than 50% chance of happening
Significant	30-50% chance of happening
Moderate	10-29% chance of happening
Low	Less than 10% chance of happening

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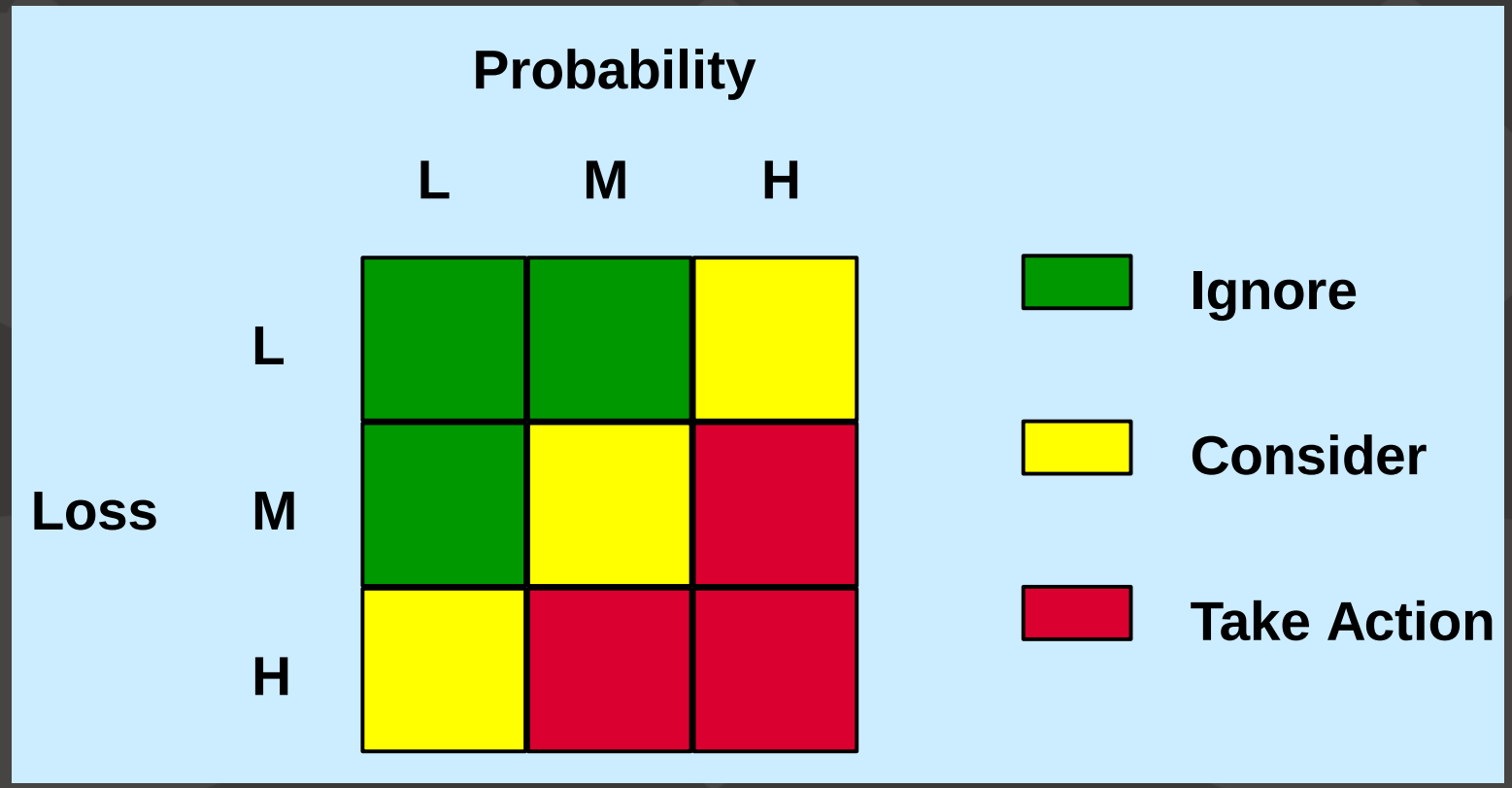
Eg:

Ref	Event	Likeli-hood	Impact	Risk Expo-sure
R1	Changes to requirements specification during coding	8	8	64
R2	Specification takes longer than expected	3	7	21
R3	Significant staff sickness affecting critical path activities	5	7	35
R4	Significant staff sickness affecting non-critical activities	10	3	30
R5	Module coding takes longer than expected	4	5	20
R6	Module testing demonstrates errors or deficiencies in design	4	8	32

Risk Assessment Matrix



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Risk Mitigation

- What are the alternatives?
- How can the losses be reduced or eliminated?
  - Accept
  - Avoid
  - Contingency planning
  - Mitigate
  - Transfer
- Will the alternatives produce other risks?

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Planning Mitigation

- Accept it – the cost of avoiding the risk might be greater than the actual cost of the damage inflicted
- Avoid it – avoid the environment where this would happen
- Reduce the risk – steps taken to reduce the likelihood
- Transfer the risk – eg: fixed price contracts to reduce risk of incorrect estimates
- Reduce impact if it does occur – put in place contingency measures

Examples - avoidance

- Staff may leave - pay them more
- Software contains critical fault (and we get sued) - do more testing, inspections, etc
- Each of these incurs a (possibly unnecessary) cost

Examples - minimisation

- Staff may leave - ensure that everyone's work is familiar to someone else
- Disk crash - backup
- Task XYZ may be late - reorganise work to ensure that XYZ isn't on the project's critical path

Example - contingency

- Key developer may leave - develop alternative “staffing allocation” plan
- Disk crash – backup restoration procedure

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Risk Monitoring and Control

Risk Log

- ID number
- Risk description
- Risk owner
- Action to be taken
- Outcome

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Risk monitoring

- Examine the risk list to
  - decide whether or not risk probabilities/ impacts have changed
  - identify risks that can be removed
    - careful!
- Are risks about to materialise?
  - Monitor the transition indicators
- Identify new risks for inclusion on the risk list

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Some common (but poor) reasons for not doing risk management

- Our stakeholders aren't mature enough to face up to risk/uncertainty
- Explicit windows of uncertainty excuse/ encourage poor performance - Parkinson's law
  - … don't need to embed contingency at the task level
- Managing for success is preferable
  - "make sure the risks don't materialise"
  - unfortunately the risks are many & inherent … some of them *will* materialise
- The data needed is lacking
  - … but many risks are common/core

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Some implausible reasons

Some plausible reasons for not doing risk management

- Risk mgt is dangerous in isolation
- The extent of uncertainty is just too much: organisational culture does not allow you to admit to uncertainty (of the given proportions!)

  “It’s OK to be wrong, but not OK to be uncertain”

  “Organisations yearn to be in control – they’d rather have the illusion of being in control than be faced with the reality of the uncertainties”

Agile

- Risk management and mitigation is built into the approach
- Greater all-round visibility for who is doing what reduces the risks
- Communication is essential
  - Leaving information out is as bad as misleading information
- Avoid large work items
  - The larger the requirements are, the harder they are to understand. Break them down into manageable chunks
- Keep talking in the team

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Any Questions?

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