RISK MANAGEMENT

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OUTLINE OF THIS TALK

- Risk Management

FAILURE STATISTICS

17% of IT projects go so badly they threaten the very existence of the company

On average, projects run 45% over budget and 7% over time, while delivering 56% less value

-- McKinsey & Co. + Oxford University (2012, Study on large-scale IT projects)

WHY DO SOFTWARE PROJECTS FAIL?

- *Bad Software Engineering*
  - Late
  - Over-budget
  - Incomplete functionality, bugs, performance ...
- *Environmental Changes*
  - Markets change
  - Technological obsolescence
  - Change in management

RISK OF FAILURE

Risk is an expectation of loss, a potential problem that may or may not occur in the future. It is generally caused due to lack of information, control or time. A possibility of suffering from loss in software development process is called a software risk.

-- Intl. Software Test Institute

CLASSIFICATION OF RISK

A software risk can be classified into:

- *Internal Risk*: Under the control of the project manager
  - Resources available
  - Technological in-experience
- *External Risk*: Beyond the control of the project manager
  - Change of management
  - Change of markets

ANOTHER CLASSIFICATION

Knowledge Availability	Example
Known knowns	Too many features, too little time, too few resources, ...
Known unknowns	Have we captured all the requirements?
Unknown unknowns	Technological, environmental, political, ...

RISK MANAGEMENT

Processes Involved	What it does
Risk Identification	List precisely all risk events possible in a project
Risk Analysis	Define probability of occurrence, potential for loss
Risk Planning	Preventive measures to reduce likelihood or impact of risk event
Risk Monitoring	Match measures to re-calculated probabilities

RISK IDENTIFICATION

Spontaneous and sporadic risk identification is usually not enough. Some techniques to systematically elicit risks:

- Team Meeting (dev + marketing + customer)
- Comparison with past projects
- Decomposition (of risk events)
- Checklists / taxonomies

RISK IDENTIFICATION - II

Try and list risks using the condition-transition-consequence format. E.g.,

> Given that `<condition>` then there is a concern that (possibly) `<transition>` could `<consequence>`

- Condition is a description of current condition causing concern
- Transition is the part that involves change
- Consequence is a description of the potential outcome

RISK IDENTIFICATION - III

Given that our senior architect has left, there is a concern that the project design will take longer and hence delivery will be late

RISK ANALYSIS

Transform the identified risks into decision-making information.

- Assess the *probability* of risk: Some are very likely, some are unlikely.
  Assign a numerical probability value, based on perceived likelihood
- Assess the *impact* of risk event actually occurring: Assign a numerical value (1..10, monetary-value of loss, ...)

RISK EXPOSURE

Calculate Risk-Exposure by multiplying the two

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Exposure = Probability * Impact
```

Risk	Probability	Impact	Exposure
R1	10%	3500	350
R2	90%	2000	1800
R3	10%	1	0.1
R4	90%	8	7.2

PRIORITIZE

- All risks are not created equal
  - Sort risks by exposure
- Define a cut-off line
  - Only risks above the line are attended to
  - The rest *stay in the table* and are monitored

RISK PLANNING

For each risk above the cut-off line, *action must be taken*.

- *Information Buying*: Throw-away prototype to check out new technology
- *Contingency Plan*: Agree on action to take, if certain event happens
- *Risk Reduction*: Change budget/resource/feature to reduce risk
- *Risk Acceptance*: Consciously choose to live with consequences of risk

RISK PLANNING - II

Mitigation activities to eliminate or resolve risk events:

- *Risk avoidance*: Given a choice between two alternatives, choose the less risky one
- *Risk protection*: Protect against data loss through redundancy, checksumming.

RISK LEVERAGE

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Risk Leverage = (Exposure before
mitigation - exposure after mitigation) /
cost of mitigation
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If *Risk Leverage* is not high enough, either exposure is incorrect or cost of mitigation is too high

MANAGE YOUR RISK

- Continually review requirements against what you're doing
- Prioritize risk avoidance/amelioration in your task-list
- Be willing to modify your project plan

RISK EXPOSURE TABLE - II

Risk	Probability	Impact	Exposure	Action	Perso
R1	10%	3500	350	-	-
R2	90%	2000	1800	Prototype	Perso X
R3	10%	1000	100	-	-
R4	90%	800	720	Try out two alternatives	Perso Y

COMMUNICATE

Three stakeholders of Risk Management:

- Developer: Systematically and continually enumerate all technical risk
- Manager: Follow risk mgmt practices to alleviate risk
- Customer: Participate in risk identification

THE MINI-PROJECT

- Meet the client
  - *Email* for appointment
  - Check https://www.scss.tcd.ie/Vivek.Nallur/teaching/client-meetings/ for availability
- Schedule for deliverables
  - https://www.scss.tcd.ie/Vivek.Nallur/teaching/scrum-schedule/

THAT'S ALL, FOLKS!

Questions? Comments?