The Meaning of Risk in an Uncertain World

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Session # GBS03

Introduction

• Structure of Presentation
  – Understanding Risk
  – Variability & Risk Events
  – Case Studies
    • Wembley Stadium
    • Terminal 5 – Heathrow
  – Risk Attitudes (People and Organisations)
  – Conclusions
Understanding Risk

• PMBOK Definition:
  An uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives

• Key elements
  – Uncertainty + Effect
  – Risks = Uncertainties that matter!

Understanding Risk

• Dimensions of uncertainty
  – Positive -v- Negative (manage both)
  – Variability -v- Events (or ‘knowns’)

• Understanding & managing ‘knowns’
  – Known knowns (treat or accept risk / contingencies)
  – Unknown knowns (make into ‘known knowns’)
  – Known unknowns (contingencies or mitigate)
  – Unknown unknowns (organisational reserves)
Understanding Risk

- Understanding and managing variability
  - Every process has inherent variability
    - Variability in cost estimating
    - Variability in scheduling (time estimating)
  - Variability is not a ‘risk’!
    - The uncertainty is how much variability?
    - And the ‘risk’ is the level at which the variability starts to matter

A Standard Deviation, or $\sigma$ identifies the degree of error in a set of data, not the reliability of one measurement!
Understanding Risk

• Precision -v- Accuracy

The ‘target’ is the circle in the middle

Group 1: This grouping is ‘on average’ accurate but is not consistent

Group 2: This grouping is consistent but not accurate

Case Study #1

Wembley Stadium

The owner WNSL entered into a ‘Guaranteed Maximum Price’ contract with ‘Multiplex’ to design and build the stadium for £326 million.
Case Study #1
Wembley Stadium

• The consequences of Multiplex’s ‘low bid’
  – £150 million loss
  – Multiple disputes with subcontractors
• The failure of ‘contracting out’ of all risk
  – WNSL lost £430 million
  – Stadium completed 18 month late
  – Everyone ‘walked away’ from the fight!

• The detrimental impact of ‘feedback loops’
  making a bad situation worse:
  – Multiplex’s management became focused on
    ‘the fight’ to save/recover time and cost
  – The GMP contract “left no flexibility for
    problem-solving” (WNSL)
• **But the opening was a great success!!**
Case Study #2
BAA ‘Terminal 5’ (Heathrow)

- BAA accepted **ALL** construction risks
  - Innovative project wide insurance
  - Paid for builders errors and mistakes
- The BAA ‘risk attitude’ (alliance contracts)
  - Confront and manage risks early
  - Invest in communication and team building
  - Reward success (but don’t punish mistakes)
Case Study #2
BAA ‘Terminal 5’ (Heathrow)

• Focus on the terminal roof

Case Study #2
BAA ‘Terminal 5’ (Heathrow)

• Terminal roof identified as a Major Risk
  – BAA paid for a prototype built early off site to understand ‘the risks’ (cost £2.4 million)
  – Improved erection processes were identified (serendipity)
  – Major cost and time savings achieved in the erection of main roof (3 months and £millions)
Case Study #2
BAA ‘Terminal 5’ (Heathrow)

• During construction BAA worked to mitigate Negative issues and exploit opportunities
• Construction risks were managed proactively
  – But these are tangible
  – The industry understands its risk profile

• Then there was the opening!!!!

Case Study #2
BAA ‘Terminal 5’ (Heathrow)

• What went wrong?
  – BAA (builder) has problems with the baggage handling software (control systems)
    • Inadequate testing under full load
  – BA (operator)
    • Did not train staff properly
    • Did not test peripheral systems (staff car parking)
    • Did not have fallback plans and spare staff

? New owners saving costs???
Case Study #2
BAA ‘Terminal 5’ (Heathrow)

• **What went wrong and why?**
  – The ‘Halo Effect’ – great project, nothing can go wrong (but it did)
  – BA management appear risk averse / ignorant
    • Did not plan properly (where were the contingencies?)
    • Ignored warning from staff (not adequately trained)
    • Appeared to focus on ‘saving money’
  – The cost to date – over £20 million + Reputation

The Case Studies

• During construction:
  – BAA actively managed its risks
  – WNSL tried to avoid ‘all risk’

• At the opening:
  – WNSL celebrated a great stadium (but stadiums are relatively simple)
  – BA and BAA created a disaster through
    • inadequate planning and testing, and
    • inadequate risk management
The Case Studies

- Both are great buildings: but the **Risk Attitudes** of the three organisations heavily influenced outcomes
- One of the key problems with most management cultures is their inability to live with uncertainty (risk agnostics?).
- They expect people working for them to guarantee the future……

Managing Variability In Estimates

- Every estimate is wrong!
- But how many managers expect accuracy?
- Identifying the likely range of outcomes
  - Based on the PMBOK
    - ROM = -50% to +100%
    - Detailed cost estimate -10% to +15%
  - Schedule estimates are significantly less accurate

Managing Variability In Estimates

- Factors to reduce variability
  - Knowledge of the work being estimated (data)
  - Well defined processes (precision)
  - Time to check evaluate and review (QA)
- Realistic acceptable risk limits
  - +/- 5% is not realistic
  - Proper contingencies are needed

Managing Variability In Estimates

- The cost of a ‘Standard Deviation’
- 1 SD is a fixed measure in any ‘population’
- To reduce the ‘size’ of 1 SD the process creating the ‘population’ needs to be improved (greater precision)
- This **ALWAYS** costs money!
- It should generate greater savings
Managing Variability In Estimates

• The cost of greater security is directly related to the ‘size’ of a ‘Standard Deviation’

If 1 SD = 5 days, a one week contingency = 85% probability of completing ‘on or before time’

If 1 SD is reduced to 2 days, the same contingency improves the chance to over 98%

Managing Variability In Estimates

• How ‘safe’ is acceptable?
  – Too safe and you don’t get the job
  – Too optimistic and you lose $$$$$$$
Managing Variability In Estimates

- The cost of reducing variability -v- the value of contingencies
- Consider the value of converting a ‘budget estimate’ to a ‘detailed estimate’ for a $500,000 project:
  - Budget    +25% / -10%
  - Detailed  +10% / -5%
  - 80% certainty required by management

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**The 'Budget Estimate':**

- Optimistic cost = $500,000 - 10% = $450,000
- Most Likely cost = $500,000
- Pessimistic cost = $500,000 + 25% = $625,000

Therefore the expected Mean (50% probability of being achieved) = (a + 4b + c)/6 = ($450,000 + 4 * $500,000 + $625,000)/6 = $512,500

The Standard Deviation for the set = (c - a)/6 = ($625,000 - $450,000)/6 = $29,167

And an 84.13% probability of the project completing at or below a planned cost is achieved by adding one standard deviation to the Mean = $512,500 + $29,167 = $541,667
Managing Variability In Estimates

The 'Detailed Estimate':

- Optimistic cost = $500,000 - 5% = $475,000
- Most Likely cost = $500,000
- Pessimistic cost = $500,000 + 10% = $550,000

Therefore the expected Mean (50% probability of being achieved) = \( \frac{(a + 4b + c)}{6} = \frac{($475,000 + 4 * $500,000 + $550,000)}{6} = $504,167 \)

The Standard Deviation for the set = \( \frac{(c - a)}{6} = \frac{($550,000 - $475,000)}{6} = $12,500 \)

And an 84.13% probability of the project completing at or below a planned cost is achieved by adding one standard deviation to the Mean = $504,167 + $12,500 = $516,667

Managing Variability In Estimates

- Required Contingency =
  - Budget Est. $541,667 - $500,000 = $41,667
  - Detailed Est. $516,667 - $500,000 = $16,667

- Reduction in Contingency = $25,000

- But what if doing the detailed estimate was going to cost $30,000?
Managing Uncertain Events (The Risk Register)

- Risk Registers are totally useless… Unless
- All of the risks are listed and prioritised
- And Action is taken to treat the key risks
  - Avoid / Exploit
  - Mitigate / Transfer
  - Share / Enhance
  - Accept (Reserves / Contingencies)

And there’s a regular review of the current risk profile

Managing Uncertain Events (The Risk Register)

- The PMBOK risk processes
  - Plan / Identify / Analyse / Plan Response / Control
- Potential enhancements
  - Add an overt step to ‘treat’ risks (implied in RP)
    - Focus on the ‘action’ of treatment and the risks associated with implementing this ‘action’
  - Integrate the requirements to update cost plans and schedules, etc
Managing Uncertain Events
(The Risk Register)

- Managing contingencies and reserves
  - Policies required to allow
    - Project Manager to manage known risks
    - The organisation to support unknown risks
  - This is better than blaming people
- Linking Risk to Earned Value Management for complete visibility

Interfacing Risk & Earned Value Management, draft guide by the UK EV-Risk working Group (UK, 2007).
Different Focuses

• Risk Attitudes need to be adjusted for different levels of an organisation

• Internally:
  – At the portfolio level, total risk avoidance = no business
  – The project level needs to focus on minimising uncertainty

Different Focuses

• In a Contract situation (eg T5):
  – The project team should focus on achieving an ‘optimistic’ outcome (stretch target)
  – The contracting organisation on achieving the ‘Mean’ or most likely outcome
  – The client on a ‘safe outcome’ including appropriate contingencies

• But in an open and trusting relationship
The Human Dimensions of Risk

- Understanding your stakeholders
  - People are the source of many risks
    - In business projects, over 90%
    - Engineering projects ????
  - Stakeholder identification and mapping
    - Standardised process (e.g., Stakeholder Circle®)
    - Requires organisational maturity (e.g., SRMM®)
  - Risk tolerance and ‘risk -v- reward’ tradeoffs

The Human Dimensions of Risk

- Utility theory

People tend to be:
- Loss averse (always)
- Risk accepting in ‘familiar’ situations
- Risk averse in unfamiliar situations
- Emotional (asbestos)
- ‘Blind’ (car accidents)

Groups act differently to their individuals!
The Human Dimensions of Risk

• Managing stakeholder expectations
  – Identifying and managing expectations
  – Effective communications are the key
  – The importance of trust in developing confidence

• The benefits of ‘open engagement’
  – Unrealistic expectations are unlikely to be fulfilled

The Human Dimensions of Risk

• Effective communications influence expectations and change actions / outcomes
  – Schedule changes work performance
  – Cost plan changes procurement options

• ‘Complexity Theory’ offers new insights
• But in the end, it’s still all about people

See: A Simple View of ‘Complexity’ in Project Management,
The Human Dimensions of Risk

Conclusions

- All projects are ‘risky’ ie, the outcome is uncertain
- Attempts to avoid ‘all risk’ are impossible and doomed to fail
- Managing risk is safer than ignoring risk
- Balancing risks and rewards is the key to success
Conclusions
• Organisations need to aim to win overall, attempting to win every time is impossible
• The primary commercial advantage of any organisation is its ability to manage the risks inherent in its environment better than its competitors

Conclusions
• The key is a mature risk attitude
  – At all levels of management
  – But appropriate to the organisation
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