Decision Making in a Constrained Environment

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Introduction

- Decision making
- Capital investment challenges
- Prioritisation approaches
- Advancing decision making - What we have learned
**Decision Making Context**

**Key Themes**
- Strategy and Direction
- Culture
- Communication
- Structure
- External Influences
**Capital Investment Challenges**

- Requirements far greater than budget
- Decreasing overall budgets or need to find cost savings
- Multiple budget holders
  - each wanting the maximum from the overall budget
  - Some shouting louder than others
- Diverse, seemingly incomparable projects
- Quality of data/business cases
  - Uncertainty of outcomes (risk)
  - Understanding of costs/outcomes
- Greater scrutiny of investment decisions
- More pressure for ‘must do’
- Providing best value for money in a constrained environment
**Capital Investment: The Need**

- **What?**
  - Prioritise all capital projects – single order of priority across organisation
  - Select portfolio of projects within budget constraint – delivering best value
  - Accommodate ‘must do’ projects
  - Respond to changes over year – revised budgets, overspend, urgent requests etc.
  - Accommodate uncertainty

- **How?**
  - Appropriate process using available data/information
  - Robust process inspiring confidence
  - Transparent and auditable
  - Engaging to ensure committed outcome and ownership
  - Taking into account all outcomes organisation needs
**Prioritisation Approaches**

- **Monetary-based**
  - Financial analysis
  - Cost-Effectiveness Analysis (CEA)
  - Cost-Benefit Analysis (CBA)

- **Multi-Criteria (MCA)**
  - Analytic Hierarchy Process (AHP)
  - Multi-Attribute Utility Theory (MAU)
  - Multi-Criteria Decision Analysis (MCDA)


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**Multi-Criteria Analysis**

*Table 4.1 Performance matrix*

<table>
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<tr>
<th>Options</th>
<th>Price</th>
<th>Reheat setting</th>
<th>Warming rack</th>
<th>Adjustable slot width</th>
<th>Evenness of toasting</th>
<th>Number of drawbacks</th>
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**Decision Analysis References**

- Decision Analysis for Management Judgement
  - Paul Goodwin and George Wright
  - ISBN 0470861088

- Multiple Criteria Decision Analysis: An Integrated Approach
  - Valerie Belton and Theodore Stewart
  - Kluwer Academic Publisher, 2001
  - ISBN 079237505X

  - John Hammond, Ralph Keeney, Howard Raiffa
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- Decisions with Multiple Objectives: Preferences and Value Trade-Offs
  - Ralph Keeney and Howard Raiffa
  - Cambridge University Press
  - ISBN 0521438837

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**Capital Investment: MCDA**

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Care with Prioritisation

Multi Criteria Decision Analysis
Multi-Criteria Decision Analysis Process

1. Establish the Decision Context
2. Identify Objectives & Criteria
3. Identify the options
4. Score Options against Criteria
5. Create Value Functions
6. Weight Criteria
7. Examine the Results
8. Perform Sensitivity Analysis

GROUP INVOLVEMENT

MCDA Core Components

- **Criteria**
  - Strategic, non-redundant, differentiate decision, etc.
  - Agreed at the highest level
  - Benefits – financial and non-financial

- **Options/Project**
  - With appropriate supporting information
  - Grouped appropriately

- **Scoring options/projects against criteria**
  - Relative preference scoring

- **Weighting areas and criteria**
  - Swing weighting

- **Gut-feel test and sensitivity analysis**
**Decision Science**

- **Tasks for models:**
  - Provide structure for group deliberation
  - Separate facts from value judgements
  - Combine the decision variables into an overall evaluation
  - Allow experts to see the consequences of imprecision in judgements and differences of opinion

- **Tasks for experts:**
  - Select the decision variables
  - Judge the value contributed by those variables
  - Assess the uncertainty of consequences
  - Explore the evaluation model
  - Make the final decision

**Putting the Ingredients Together**

- **Multi-criteria model**
- **Group judgement**

\[ \text{Multi-criteria model} \quad + \quad \text{Group judgement} \quad = \quad \text{Smart decisions!} \]
**Decision Making**

Decision making is a social process….

….the tools just support the evaluation

**Scoring Criteria**

- Five different categories (wastewater, stormwater, etc)
- Assessment criteria group headings
- Indicator
- "Weightings" given to each assessment criteria for each of the five categories
- Scores given to each scenario

<table>
<thead>
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<th>Scenario</th>
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<th>Technical</th>
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<tr>
<td>Scenario 4</td>
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</tr>
</tbody>
</table>

Total Score = sum of individual scores times their respective weightings
Criteria and scoring

- The things an organisation cares about
- The things that influence them

- Fixed Scales as per IIMM example
- Relative preference
- Weighting

Why Not Prioritise Just On Benefit?

- If budget is 8,000, all options can be pursued
- If budget is 4,000, then 80% more benefit is realised by funding options on the basis of benefit/cost

Average increase 30%
Good Decisions About Projects

Ask three questions:

- What is the benefit, assuming success?
- What is the probability of success?
- What is the resource required to deliver the benefits?

Good decisions are based on: Risk-adjusted benefit ÷ Cost

Cost: Benefit

Which of these projects would you select?
Select Projects With The highest Cost/Benefit

Interpreting the Results
Making Costs **Transparent**

- $11 million Capital Cost in 2013
- What does this mean?
- 1.3% increase in rates is more transparent and easier to comprehend
- Can compare opex versus capex

**MCDA in summary?**

- A theoretically sound approach and a set of techniques
- A way of looking at complex problems with mixed monetary and non-monetary objectives
- Breaks the problem into manageable pieces
- Enables apples and oranges to be compared using the common metric of value added
- Structures business judgement
- Serves as an aid to decision-making, but not to take a decision
Care with Prioritisation

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Key Messages

- Leadership and ownership
- Bring others into your decision-making process
- Support long-term plans with strong communications
- Use risk management to plan for scenarios
- Find clever ways to link strategic and operational planning in tighter times

Capital Investment: Monetary Analysis

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A Little Example

- How many bones are there in the adult human body?
  - Write down a range within which you are 100% confident the correct answer lies

Key messages

“If you are not clear on where you are going, decision-making is harder.”

“A group always comes out with a better decision than an individual.”
Where Can **Decision Conferencing** Help?

- **Strategic planning**
  - Identifying best strategic initiatives to deliver vision
- **Budgeting/resource allocation**
  - Where to invest limited budget/resource
- **Rationalisation/cost reduction**
  - What to stop doing
- **Investment case development**
  - Demonstration of value for money and best option
- **Option development**
  - Testing possibilities to find the best
  - Requirements identification
- **Supplier selection**
  - Transparently ensuring best value for money

**A social (group) process to:**
- Establish a shared understanding of project issues
- Develop a sense of common purpose
- Understand different perspectives and objectives
- Gain agreement & commitment to the way forward from those implementing the decisions

**A technical process (MCDA) to:**
- Support the social process
- Provide real-time modeling
- Conform to the axioms of decision theory
- Perform sensitivity and robustness analysis
- Act as knowledge repository or 'corporate memory'
**Advantages of Decision Conferencing**

- Creating a set of clear priorities
  - Achieves understanding and buy-in across the leadership team
  - Throughout the organisation and across multiple stakeholder groups
- Delivers benefit
  - Reduced time to reach aligned conclusion
- Creating Alignment and Commitment to the way forward
  - Compromise is not necessary as the impact of different perspectives is fully examined
- Auditable decisions
- Qualitative & Quantitative; Transparent; Inclusive
- Proven – in use worldwide