

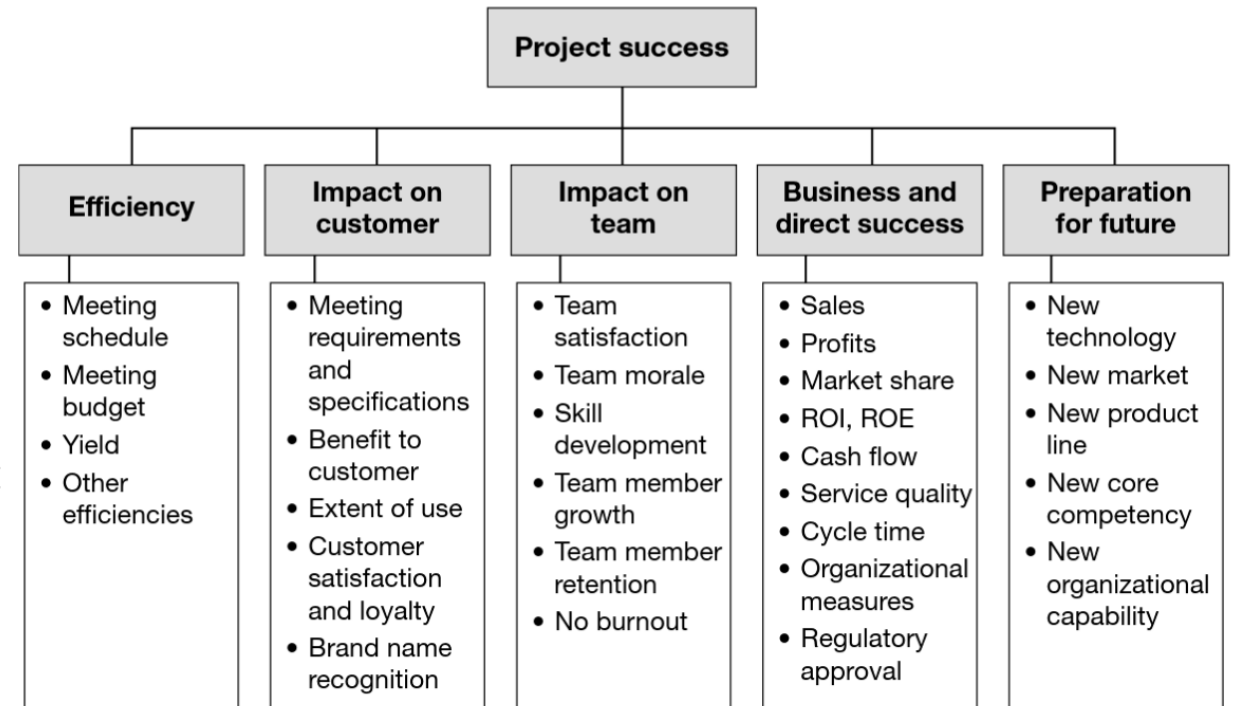
Multi Criteria Decision Analysis

Overview of this section

- Multi Criteria Decision Analysis
- Judging the Sydney Opera House
- Weighted sum model
 - Basic examples
- MCDA activity

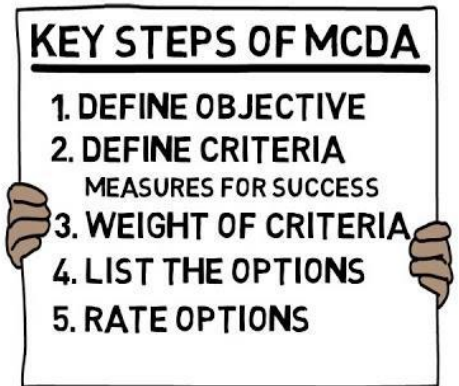
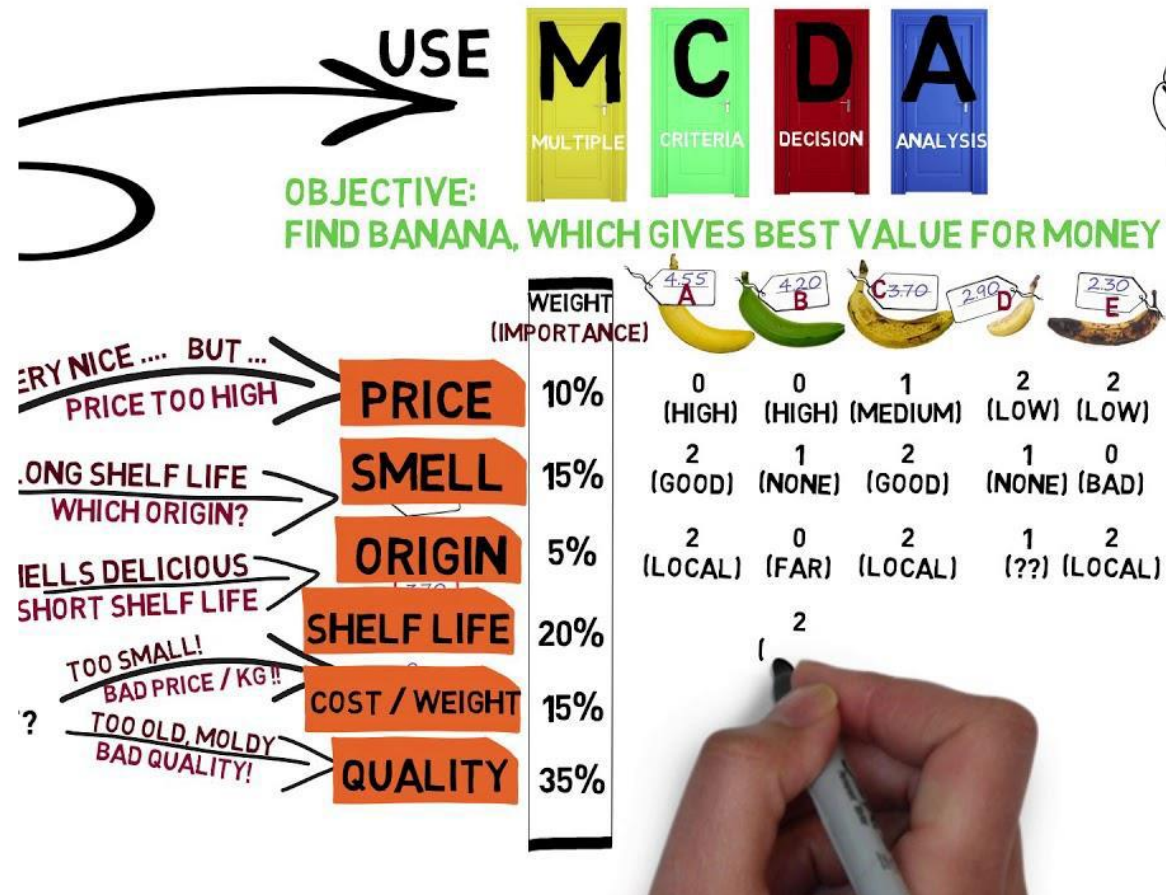
Multi Criteria Decision Analysis

- Example: Sydney Opera House was 16x over budget, years late, and ignored many details of the original brief...so was it a failure?
- How to define success?
 - This could apply to deciding between potential projects, organisational strategies, process improvements, suppliers, work plans, etc....
- Muti criteria methods attempt to include a wide range of criteria while maintaining some objectivity and structured decision making
 - Some criteria may be important but difficult to quantify
 - Structured approach helps to offset our biases and poor decision making abilities



MCDA – weighted sum model

- Weighted Sum Model
 - A simple MCDA tool
 - Many other exist, often more complex
- Criteria and weightings are selected based on the objectives.
- Options are scored under each criterion and ranked to produce an objective (sort of) comparison



Rank these projects using MCDA

Criteria Weight	Strong sponsor	Supports business strategy	Urgency	10% of sales from new products	Competition	Fill market gap	Weighted total
	2.0	5.0	4.0	3.0	1.0	3.0	
Project 1	9	5	2	0	2	5	
Project 2	3	7	2	0	5	1	
Project 3	6	8	2	3	6	8	
Project 4	1	0	5	10	6	9	
Project 5	3	10	10	1	8	0	

Project 1

Project 2

Project 3

Project 4

Project 5

Multi Criteria Decision Analysis

- Like any tool, is open to mis-use....principles should guide proper use of tools
- How do you generate effective, objective, criteria and weights?
- How do you manage pre-existing biases / preferred options?
- Who scores the options once the criteria and weights are set?
- Do you automatically select the highest ranked option?
 - What are the potential problems if you do / don't?

MCDA Example

- **Your company has recently completed a small trial of generative AI as an assistant to engineers in the design concept generation and selection phase of projects, and is considering wider adoption**
 - Designers report that it generates a lot of concepts quickly with a mix of low and high quality, and that they can get good results but need to take time to carefully review any AI suggestions as sometimes significant flaws are not obvious. They compare it roughly to a newly hired junior engineer in performance, but analysis from HR and Finance suggests that AI is a fraction of the cost of a new hire.
 - There are rumours that a competitor is further ahead on AI adoption and plans to publicly roll out wide AI use soon. Your marketing team are keen to promote some AI use as soon as possible. There is also general competition to speed up new project delivery, regardless of AI.
 - The AI systems requires heavy use of a custom LLM from an AI startup dedicated to engineering design. All of your data is securely processed on servers located in Ireland, that are leased by the startup from a large cloud solutions provider.

- What do you do next?

Add some relevant details of your company – e.g. industry, reputation, strategic priorities, management philosophy / principles.
Try to be fairly specific with options and criteria.

- Identify 3 options for the company's next move
- Identify at least 5 relevant criteria
- Use the weighted sum model to recommend one of the options
- **Individually submit MCDA table on Brightspace by the deadline**



Criteria for weighted sum?

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Nobody has responded yet.

Hang tight! Responses are coming in.