Structured Expert Judgement – context and methodology

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Introduction

- Major objective of this Action is to be able to encourage senior policy/DMs to use SEJ
- Discussions indicate
  - awareness of EJ, low understanding of SEJ
  - Some awareness of different approaches
- Academic literature
  - Much work on EJ/SEJ from different disciplines
  - Entrenched positions create confusion in users
  - Limited empirical research
  - Limited attempts to incorporate contextual issues into selection of appropriate methods

Questions being asked

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- "What is my problem?"
- "What question should I be asking? "
- "How can we influence the outcome [of a complex system]?"
- "What are my options?"
- "How likely is it that…[some outcome]?"
- "What aspects should I prioritize?"
- *"What should I do?"*

The Decision Makers job, not the experts job, or the analysts

Examples…

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- Keeping the lights on – cognitive maps to capture significant concepts and relationships in the energy sector
- What should we investigate? – Lots of potential transmissible agents in biological tissue, and uncertainties about transmission
- How likely are the ice-sheets to melt, given current CO2 emissions?
- How likely is (was) the Euro-Swiss Franc exchange rate to deviate more than 10% in the next month?

Characteristics

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- Structuring problems
- Identifying strategies/options
- Screening options
- Categorising and ranking
- Making predictions (Assessing outcomes and likelihoods, or point value assessments)
- …

Or more simply…

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- Scoping
- Simplifying
- Predicting

- We are (or have been) primarily concerned with *predicting* (assessing outcomes and likelihoods) in support (ultimately) of decision makers

Context

- Considering *predictions* area, can we usefully define different contextual factors that would allow us to differentiate between “good practice” SEJ approaches?

Making predictions…

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- (S)EJ is not the only game in town for this
- Typically use models (statistical and/or deterministic) plus possibly some elements of judgement

- Can we understand context for SEJ approaches through understanding high level approaches to modelling?

Thinking about *Modelling*

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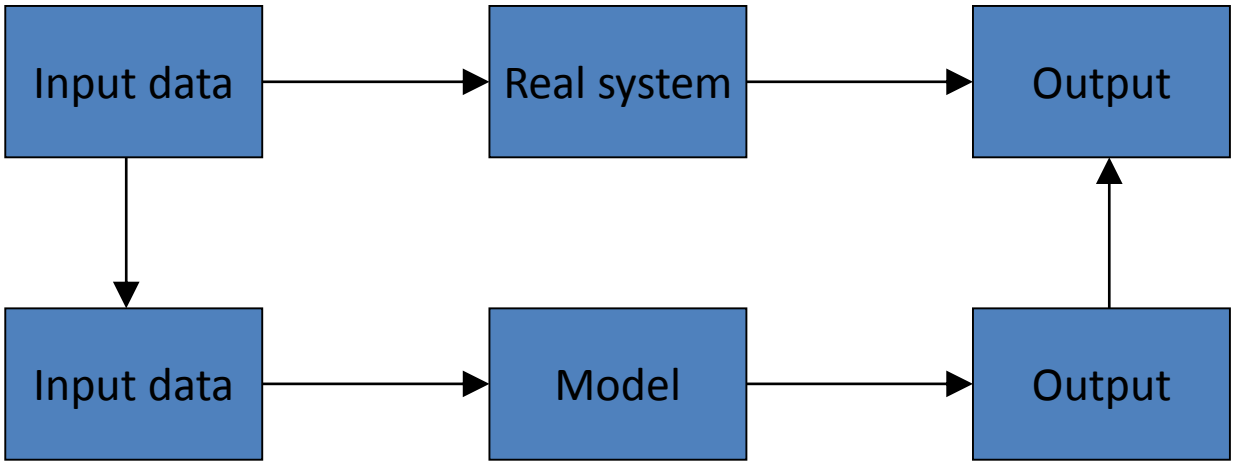
- What is a model?
  - Device for making predictions
    - Help focus beliefs to select problem-solving actions
  - A statement of beliefs and assumptions
    - Help form the beliefs by forcing stakeholders to think through important details and gain understanding

(Mitchell, Pidd and others)

The model as device

- Model takes real world inputs and transforms to real world outputs…



Model as a statement of beliefs

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- Focus is not on the model, but on the model-building process…
- Understand reality and effect of actions, find areas of lack of knowledge and focus research
- Model building is actually data collection and analysis
- Subjective choices about where to stop…

Model classification

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- Consider Mitchells 7 dimensions for understanding model typology
  - Model typology looks at model types, not at classification of model requirements…. But these are linked since model types evolved to meet model requirements
  - (Mitchell was former President of UK OR Society and model building practitioner)

- Analogy between models and experts is not perfect at all… experts could be considered “meta-models” as they can select appropriate models, switch assumptions etc etc

Actuality	⟷	Abstract
Black box Predictive	⟷	Structural Explanatory
Off the shelf	⟷	Purpose built
Absolute	⟷	Relative
Passive	⟷	Behavioural
Private	⟷	Public
Part of system	⟷	Whole of system

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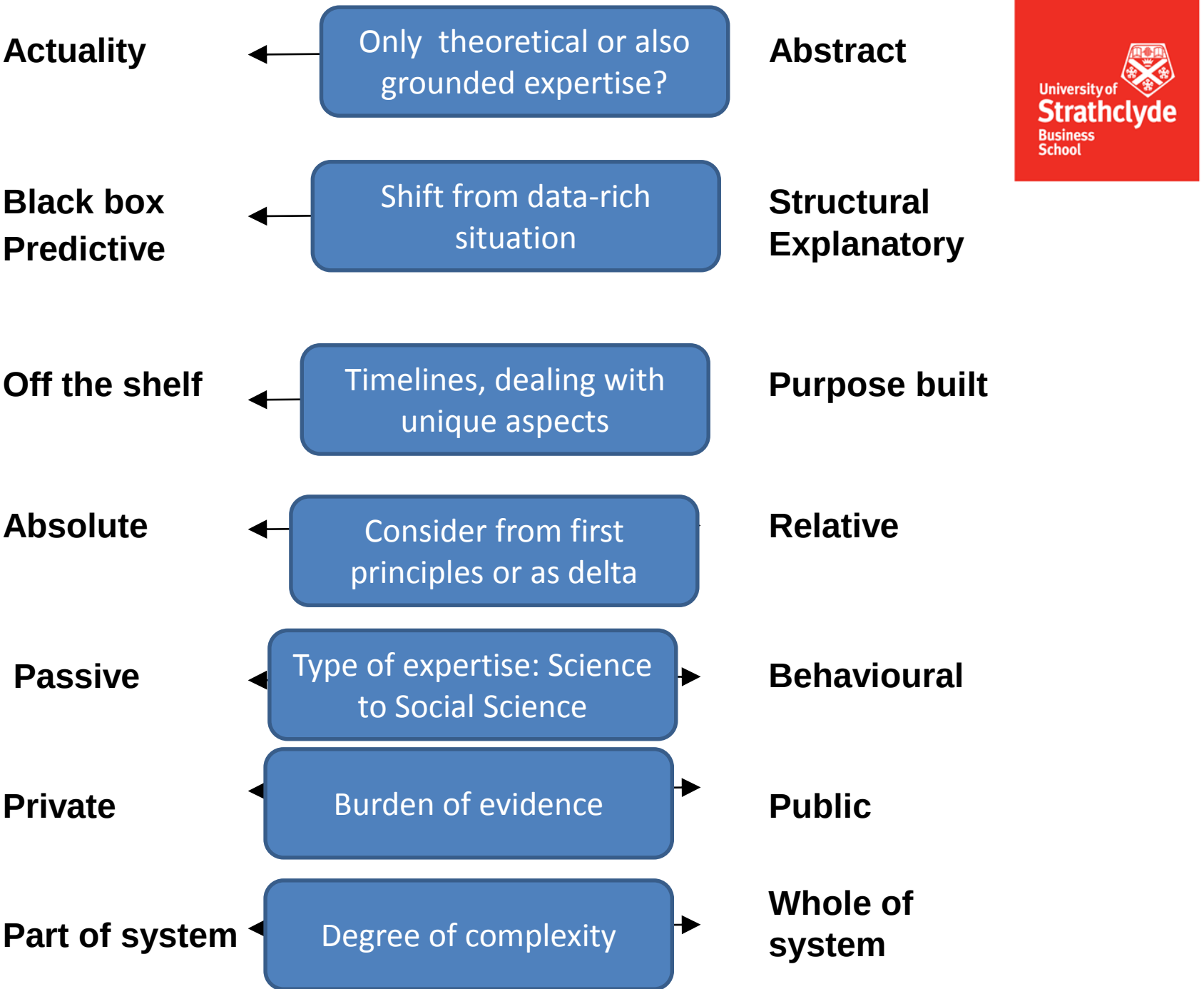
Actuality
Only theoretical or also grounded expertise?
Abstract
Black box
Predictive
Shift from data-rich situation
Structural
Explanatory
Off the shelf
Timelines, dealing with unique aspects
Purpose built
Absolute
Consider from first principles or as delta
Relative
Passive
Type of expertise: Science to Social Science
Behavioural
Private
Burden of evidence
Public
Part of system
Degree of complexity
Whole of system

Some important contextual issues

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- Extent to which (standard) modelling approach(es) and/or data exists and is relevant
- Timeliness
- Many experts available or highly specialised
- Societal accountability (eg private company/public authority)
- Game-playing, adversarial and other behavioural responses

- …*are there more?*

Plus…

- We always ask that models are validated/verified where possible

- Why not for experts?
  - In many cases *consensus* is rated more highly than validation….
  - Is consensus an indicator of validation? Or is it there mainly as a way of short-cutting external validation through process? Or a way of getting everyone onside even if the conclusion is not right?

Some important contextual issues

- Extent to which (sta
  approach(es) and/o
  relevant
- Speed of application
- Many experts availa lised
- Societal accountability (e.g.
  company/public authority)
- Game-playing, adversarial and oth
  behavioural responses
- Consensus- validation onside, speed

Understanding

Speed of application

Legitimation burden

Understanding

Legitimation burden

Speed of application

Summarizing…

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- Proposed contextual dimensions for expert judgement methods:
  - Degree of understanding (model/data-based)
  - Time available for application (on an absolute scale, where decision context determines constraints)
  - Legitimation burden (degree to which the process provides validation)

Degree of understanding

Low ——————————————————————————— High

Lack of relevant data or models with explanatory value

Competing models with explanatory value

Models with explanatory value and some relevant empirical data

Excellent explanatory models and relevant empirical data, giving good predictive power in relevant contexts

Time available for application

Low ——————————————————————— High

Hours Days Months Years

Legitimation burden

Low ——————————————————————————— High

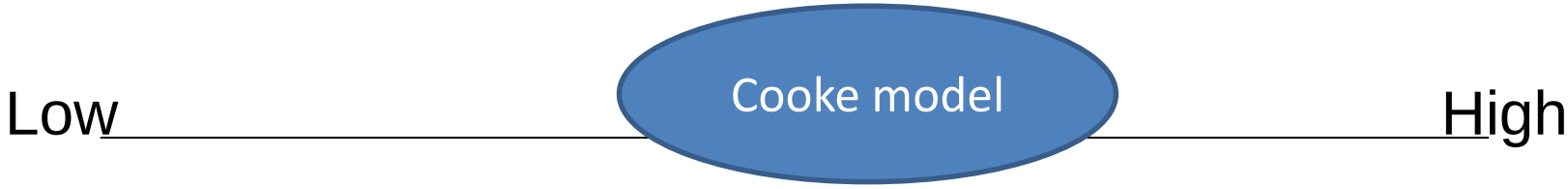
Internal expertise, small numbers of experts with an interest in outcome and no external validation

Consensus driven, but with experts who have no interest in outcome

External validation and quality process but small number of experts

External validation and evidence of quality of the process and validators

Degree of understanding



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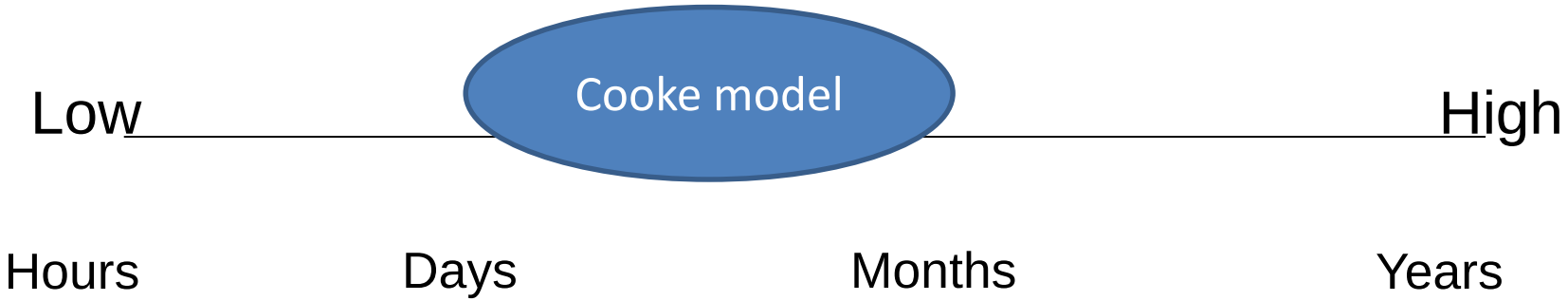
Time available for application



Legitimation burden

Internal expertise, small numbers of experts with an interest in outcome and no external validation

Consensus driven, but with experts who have no interest in outcome

External validation and quality process but small number of experts

External validation and evidence of quality of the process and validators

- Immediate criticism
  - An EJ method might be able to operate at different levels on these scales by incorporating different phases of analysis

Final questions

- Does this approach help explain to policy and decision makers?
- Are the dimensions broadly reasonable? Are the subdimensions adequately captured?
- Could we validate/test?
- Where do other approaches sit? Does this approach enable us to identify critical differences in underlying objectives?
- Does it allow us to critique and improve approaches by identifying gaps/lack of clarity?
- Can we move academics from entrenched positions?