

Using System Dynamics in the Legal Arena: A Modeller's and Lawyer's Perspective

Susan Howick, University of Strathclyde
Ralph Goodchild, White & Case LLP

Susan Howick

- Part of a team who has worked on 10 claims over 20 years
- Using SD alongside other modelling methods to understand, and quantify, the impact of disruption and delay on costs and schedules in large engineering/construction projects
- Extensive research on the anatomy of complex projects leading to research and consultancy work in developing new risk assessment tools

Ralph Goodchild

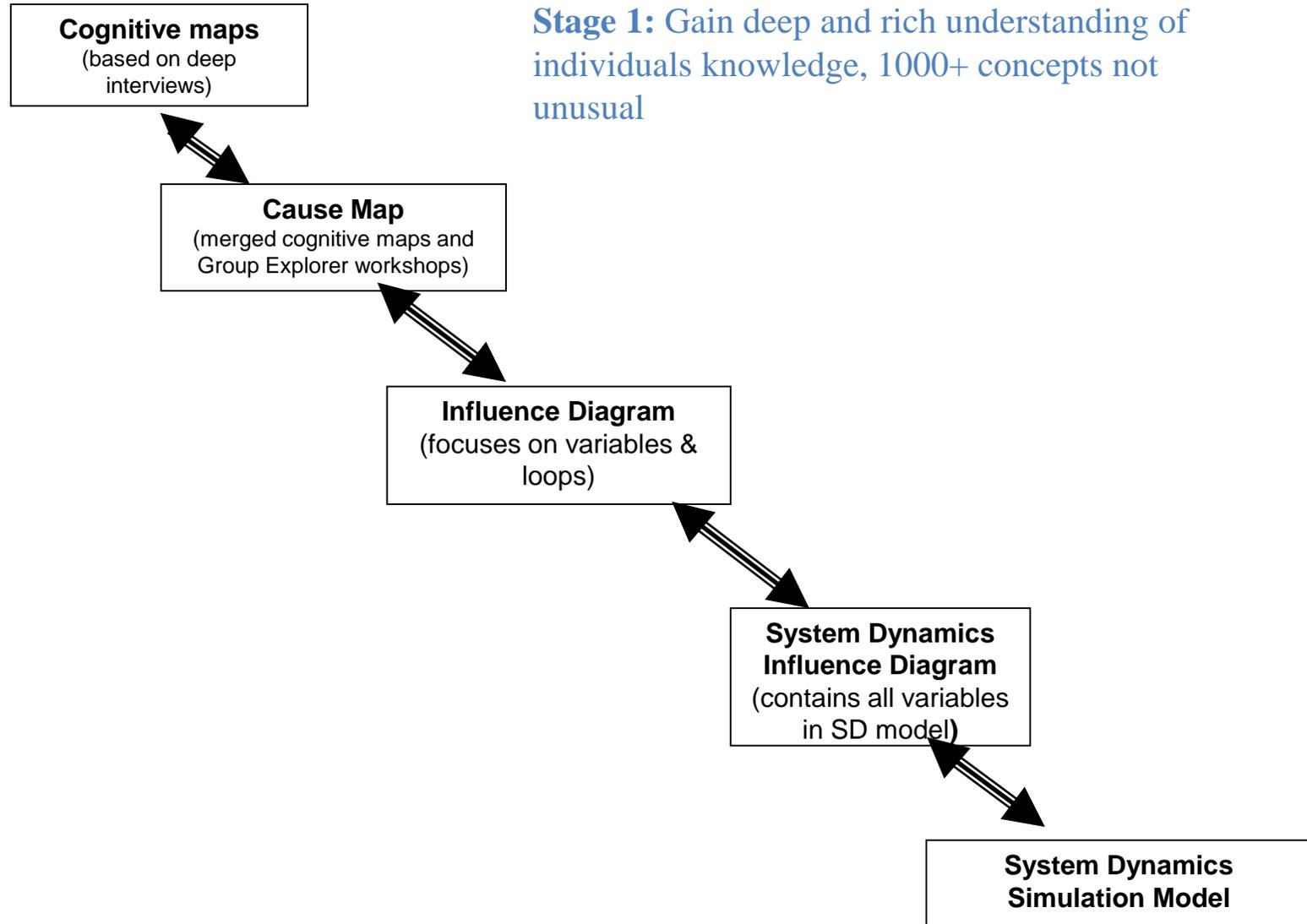
A Modeller's Perspective



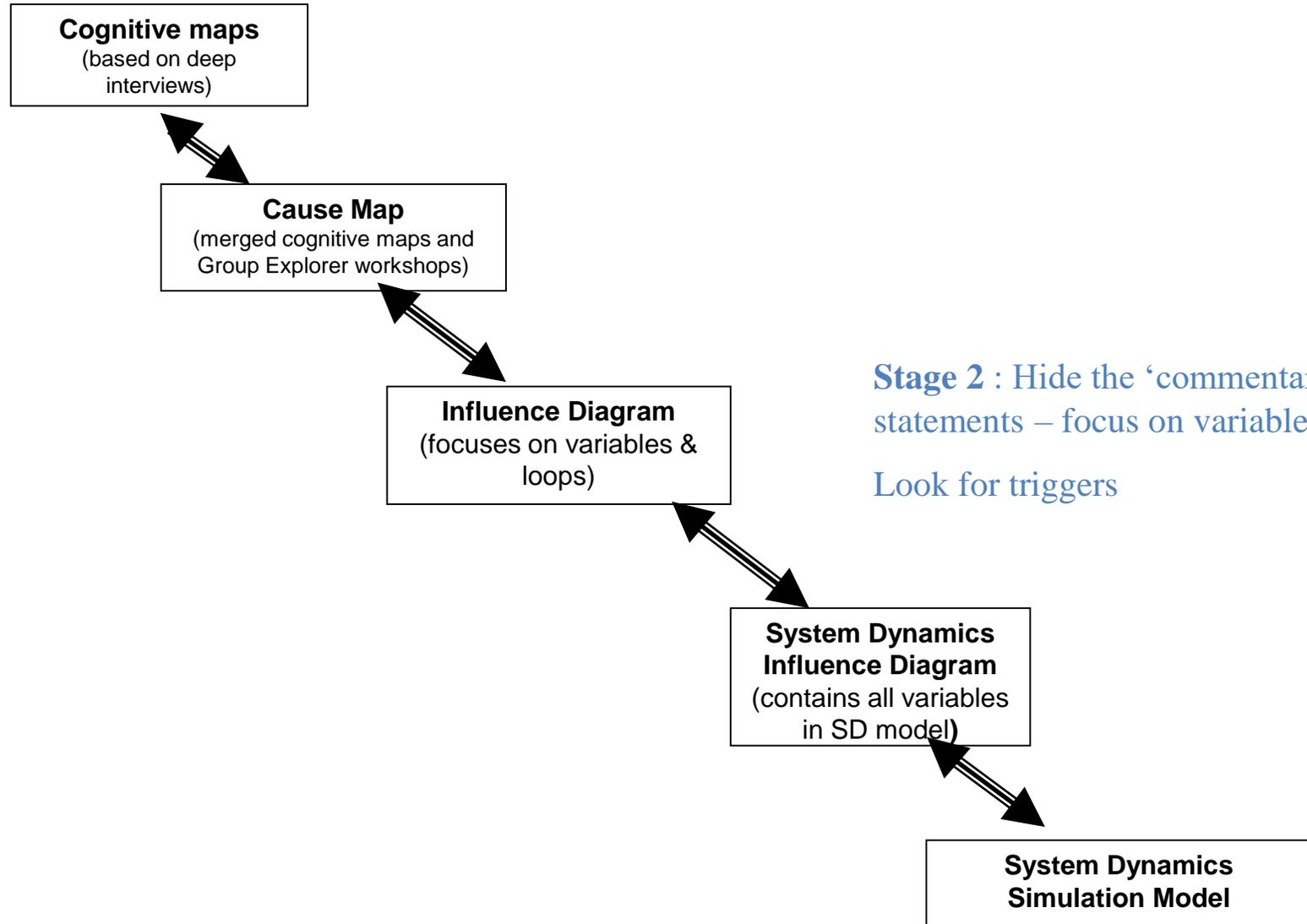
Model Requirements

- Structured, auditable/transparent process
- Needs to be convincing to the many audiences
- From interviews, witness statements and documents to a model that could demonstrate the causes of the time and cost overruns experienced on the project

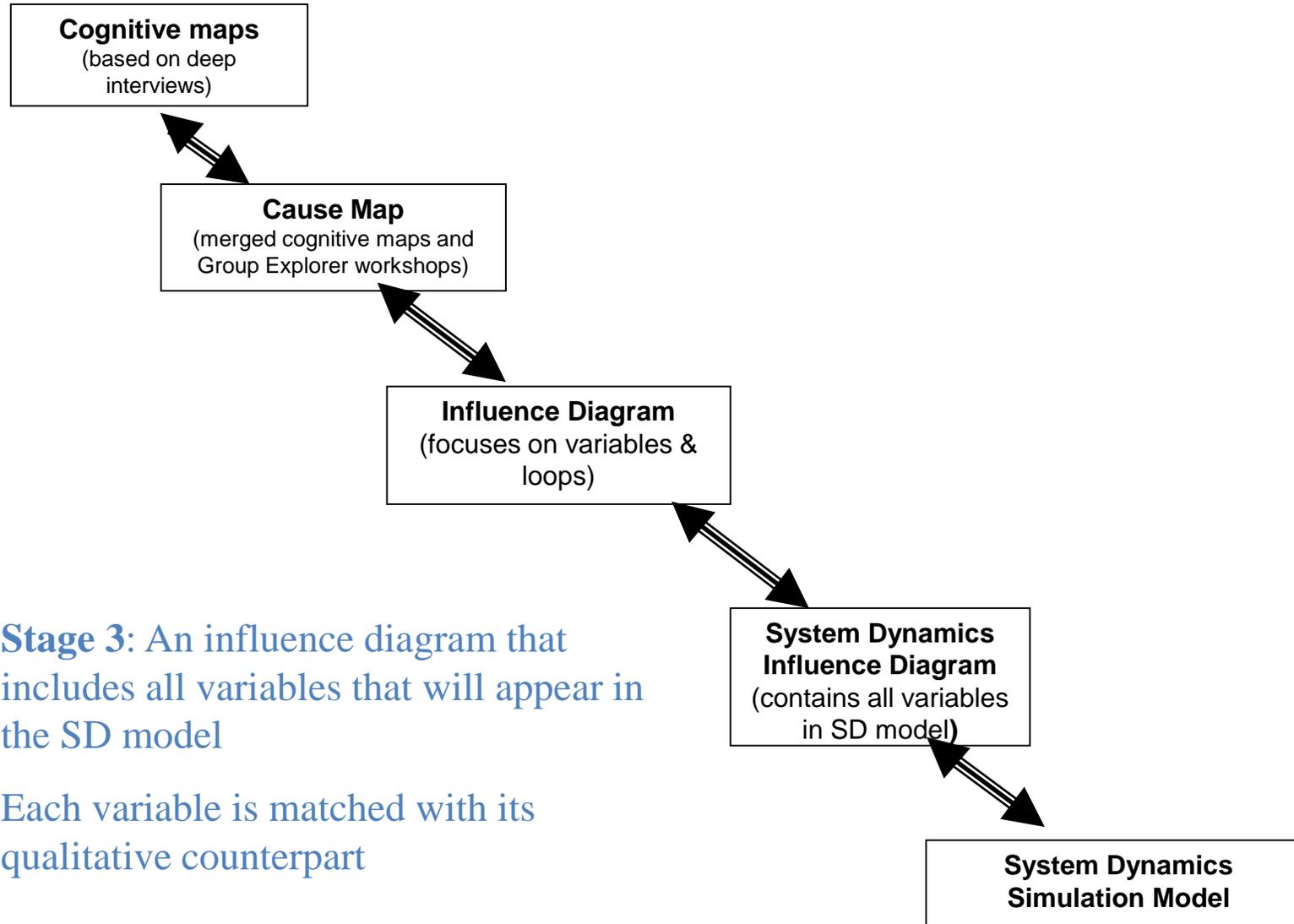
The Modelling Cascade



The Modelling Cascade



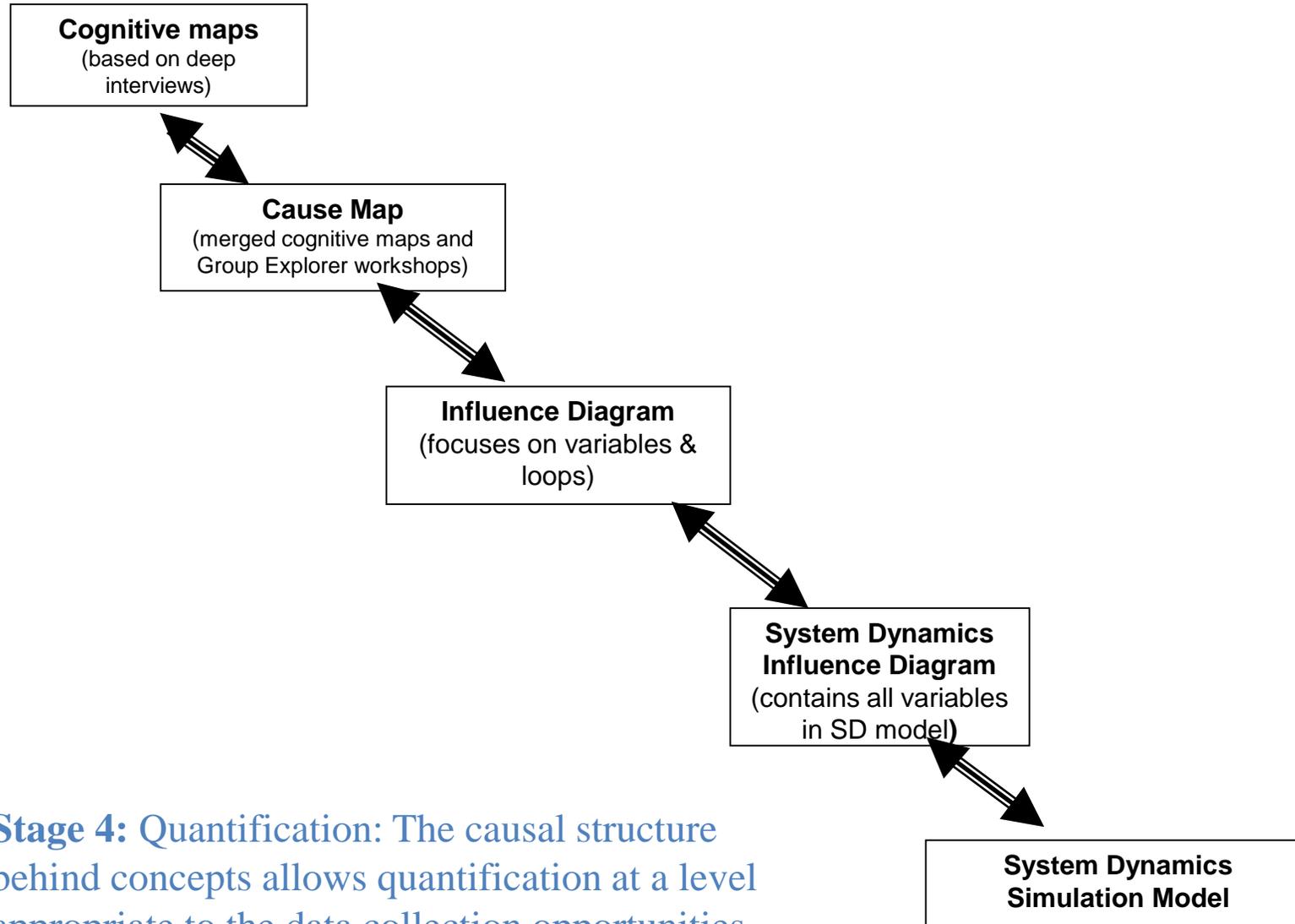
The Modelling Cascade



Stage 3: An influence diagram that includes all variables that will appear in the SD model

Each variable is matched with its qualitative counterpart

The Modelling Cascade



Stage 4: Quantification: The causal structure behind concepts allows quantification at a level appropriate to the data collection opportunities

SD Model Approach

- Develop basic project structure: stocks and flows
- Analysis of initial estimate/plan
- Modelling of 'as-planned' project
 - Possibility of inability to make model work
 - Under-estimate = disruption from initial compression
- Build the story through continually adding all significant disruptions (inc self-inflicted)
 - Assumes lawyers/tribunal determine claims

Modelling in the Legal Arena

- Transparency & Coherence
 - From witness statement to model and back
- Requisite Modelling
 - Managing model complexity and opaqueness
- Variety of audiences that need understanding
- Provide a convincing story of the project
 - what is important to the stakeholders
- Significant learning opportunity for the organisation
 - Causes of project overruns, inadequacy of info systems, understanding productivity, impact of decision making

A Lawyer's Perspective



Why system dynamics?

- Disruption claims are still considered 'difficult'
- Projects getting more complex
- 'Death by a thousand cuts' effect
- Harder to keep effective records
- Hard to prove claimed scale of disruption

Challenges of using system dynamics(1)

- Why use such an esoteric method?
 - Impression that a party may have something to hide
 - But – ‘death by a thousand cuts’ claims very difficult otherwise
- Inscrutability
 - Thousands of feedback mechanisms
 - But – assumptions about model structure / input data may be shown to be accurate

Challenges of using system dynamics(2)

- Tensions with fact witness evidence?
 - Premised that disruption impacts are counterintuitive
 - But – witnesses can speak to general impact / scale of disruption
- Tension with delay analysis
 - High level of aggregation
 - Likely not to match delay analysis perfectly
 - But – don't use model if it contradicts delay case

Challenges of using system dynamics(3)

- Tensions with project plans and procedures
 - Experts may seek to model ‘how the project really worked’
 - Need to ensure model structure is rooted in planned processes
- Tensions with quantum evidence
 - Impossible for traditional expert to verify whole disruption claim
 - But – expert firms increasingly offering system dynamics
- But it isn’t real evidence!
 - And yet... sampling approved in *Amey v Cumbria*

Conclusion

- It is possible to use system dynamics to prove a claim
- For the right kind of claim only
- Choose the expert carefully
- Get the structure right
 - Model the project not the claim
- Need evidence for input data
- Results must ‘make sense’