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Whole System Thinking©

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RailAdapt

June 2017

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The Context

- Changing – climate, demographics, economics, technology
- Railways – growing networks (scale, volume) electrification, signalling and ticketing technology, business models
- Transport key to modern society, fundamental to personal mobility, most sustainable
- Not a technical issue – engineers can solve
- A managerial issue
- Adaptation hard – financial, technical, political, societal
- Complex, dynamic, needs a ‘whole system’ appreciation to solve it

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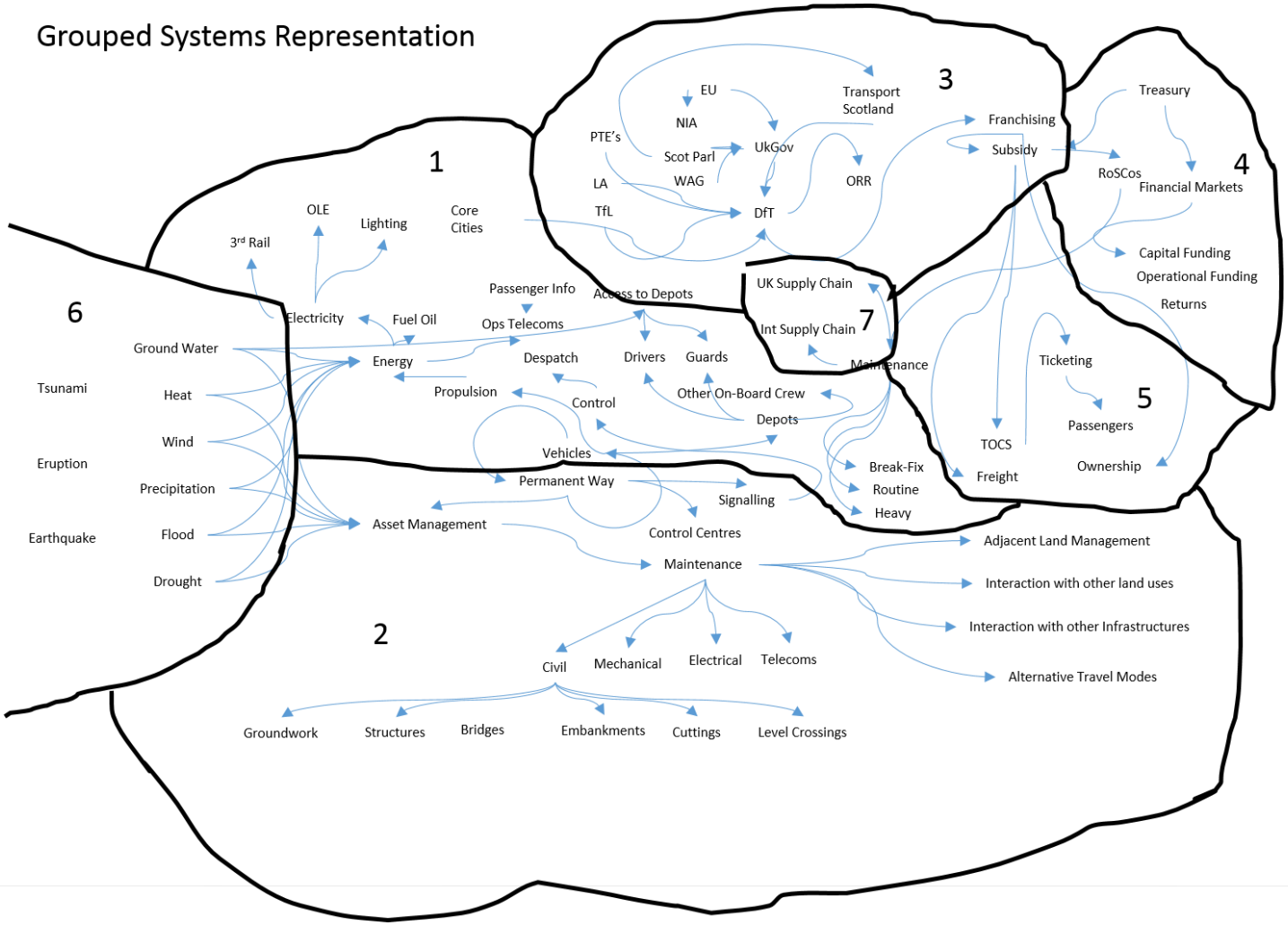
GB Railway



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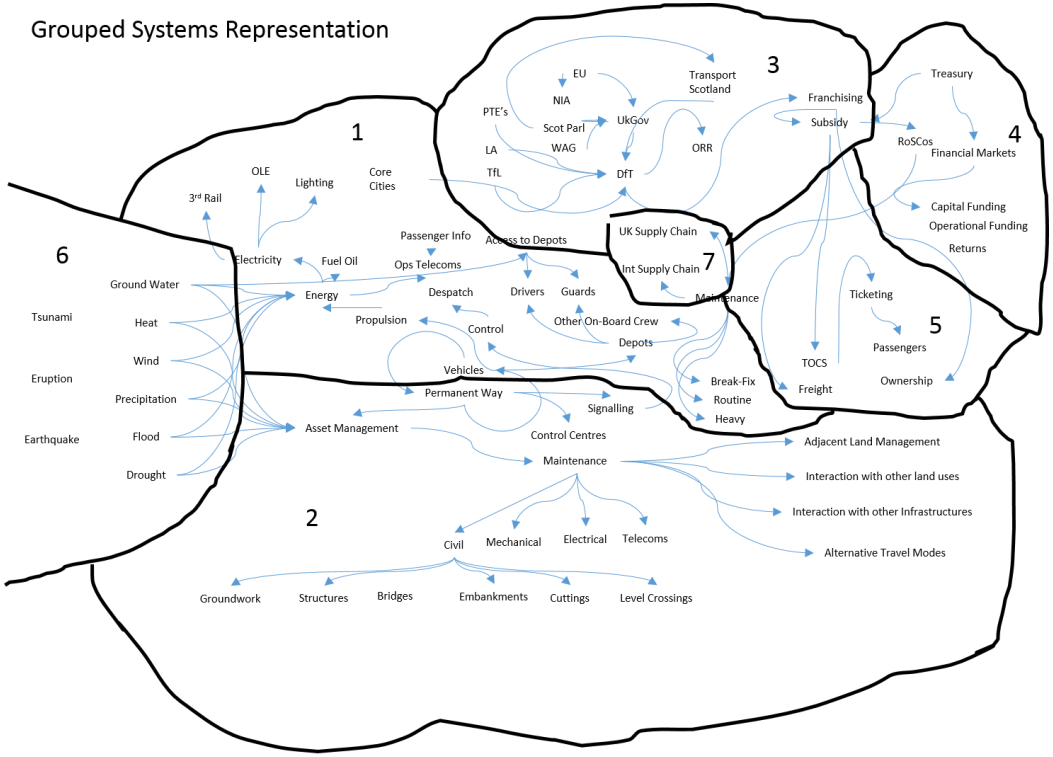
GB Railway

Seven Inter-acting Sub Systems

1: Rail Services
2: Rail Infrastructure
3: Political Governance
4: Finance and Funding
5: The Business Model
6: Climate and Weather
7: Supply Chain



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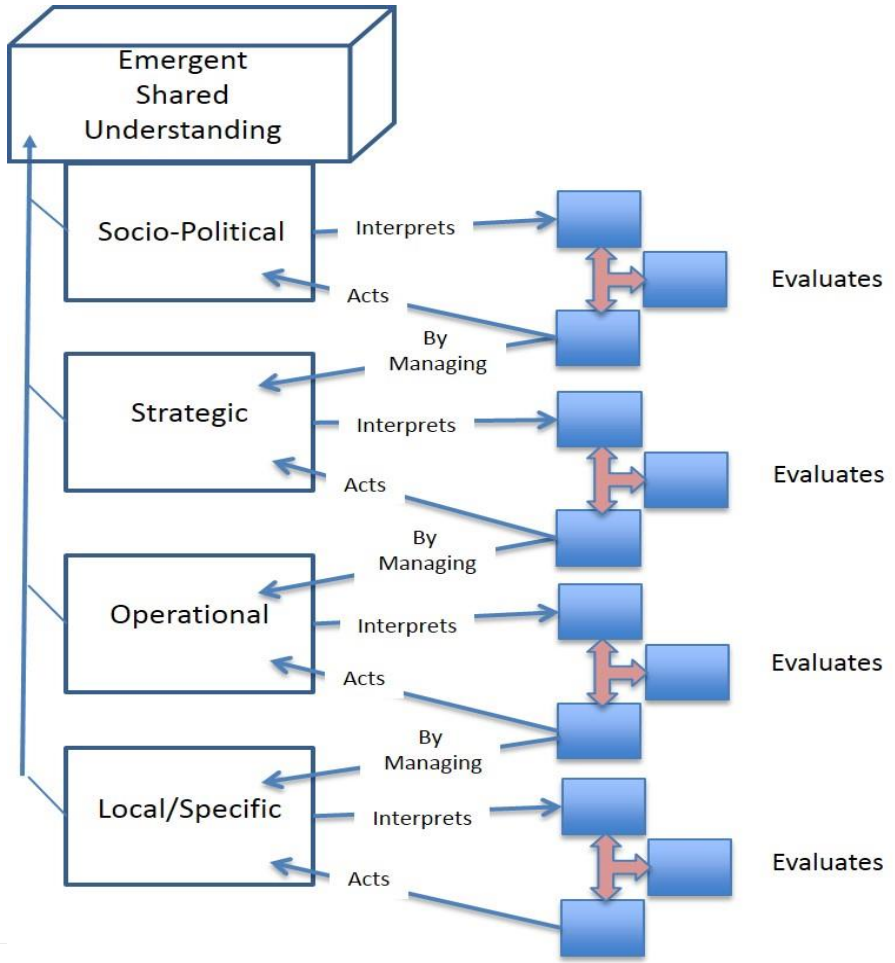
Integrated Management

Management at ALL levels

Each level contains and constrains the level below

Socio-Political conditions
Strategic
Strategic conditions Operational
Operational conditions
Local/Specific



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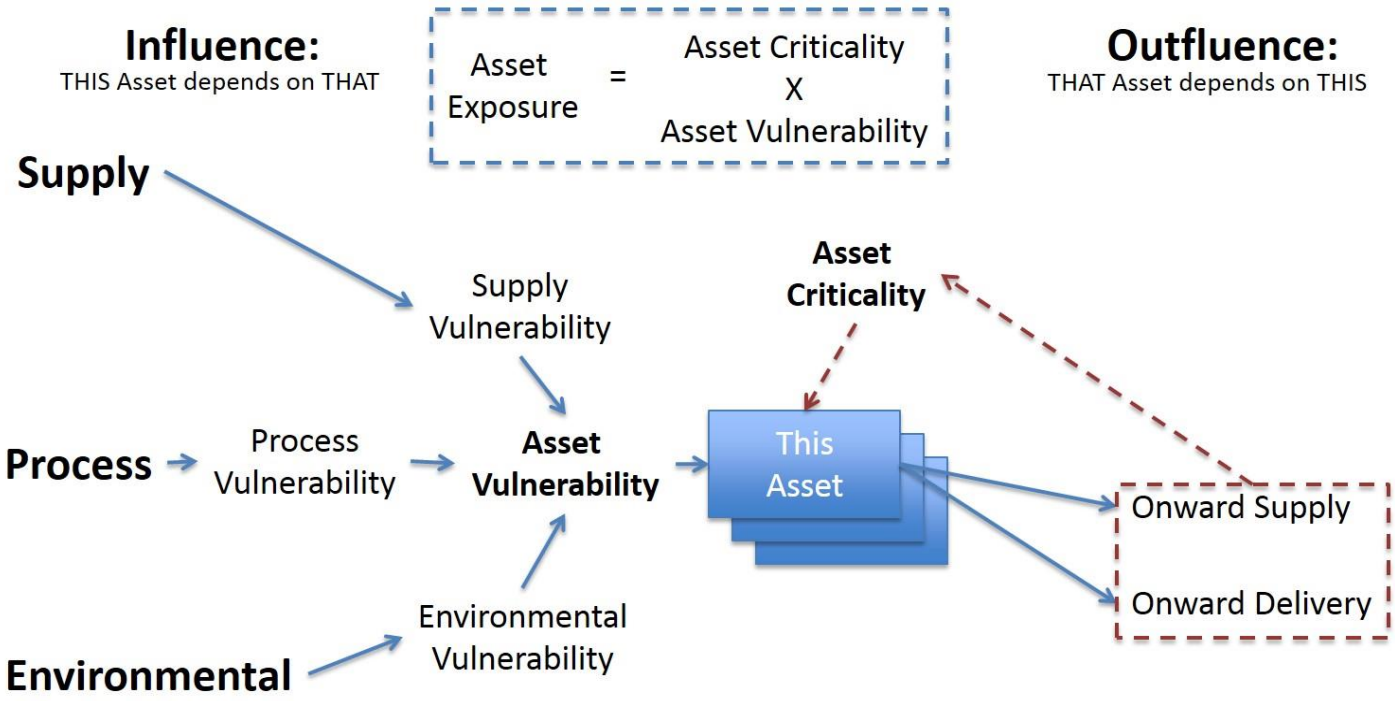
Asset Criticality and Network Resilience



Asset Criticality = Σ (Onward Asset Dependence X Onward Asset Criticality)
Supply Criticality = Asset Criticality X Supply Vulnerability
Process Criticality = Asset Criticality X Process Vulnerability
Environmental Criticality = Asset Criticality X Environmental Vulnerability
Asset Vulnerability = Max of Supply/Maintenance/Environmental Vulnerability

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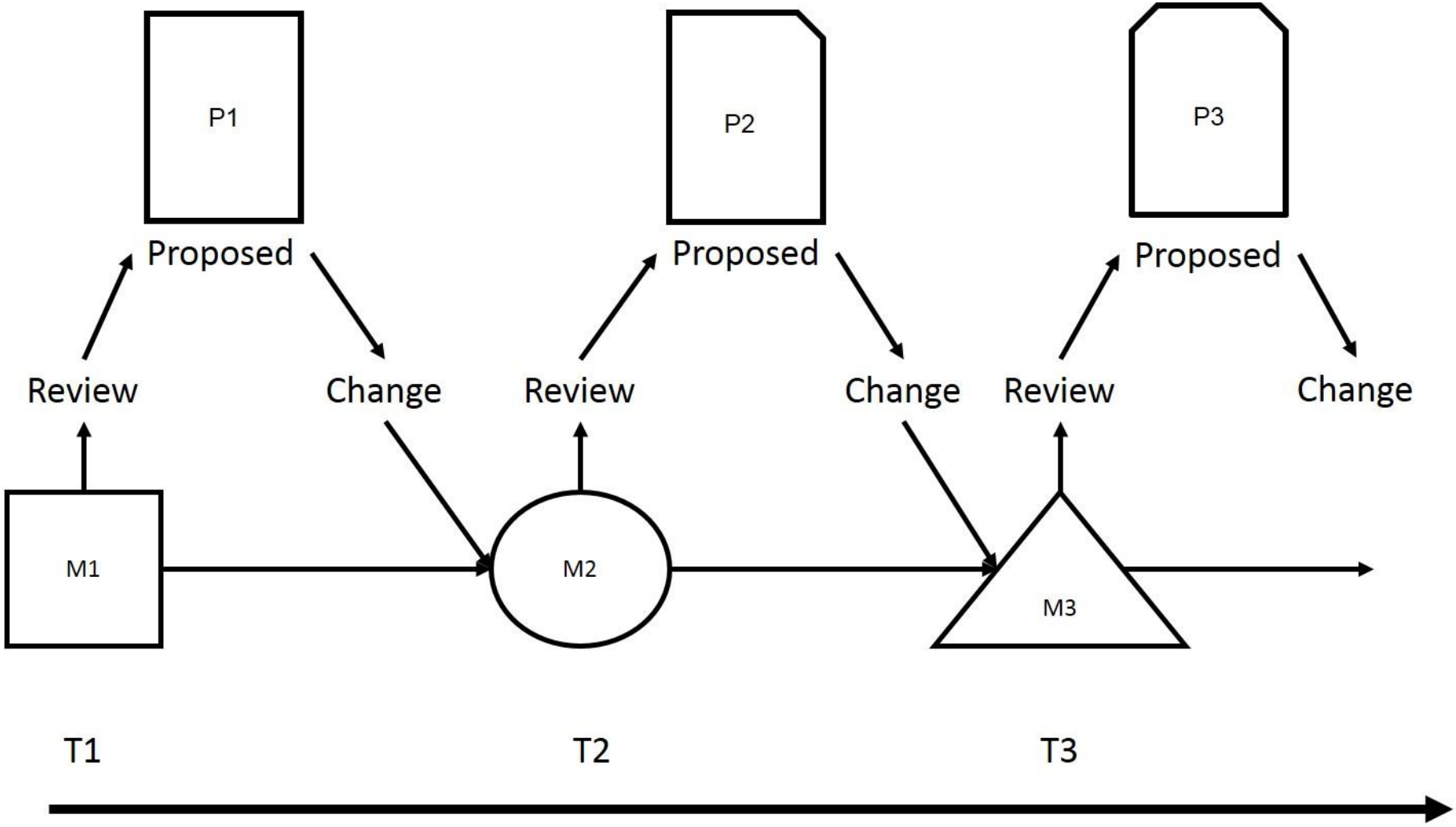
The Perpetually Failing Problem Solving Engine



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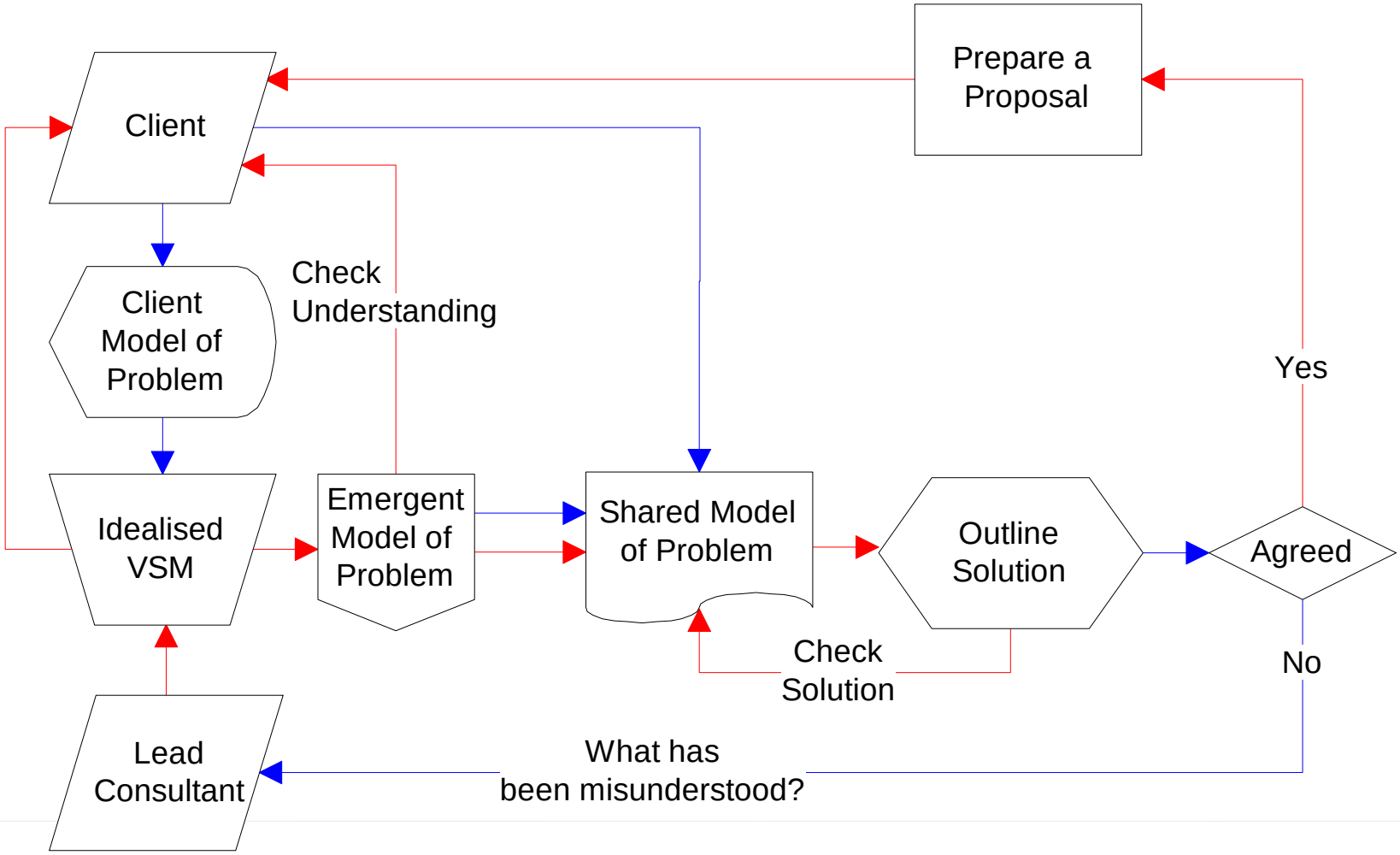
Continuously Dissolving The Problem



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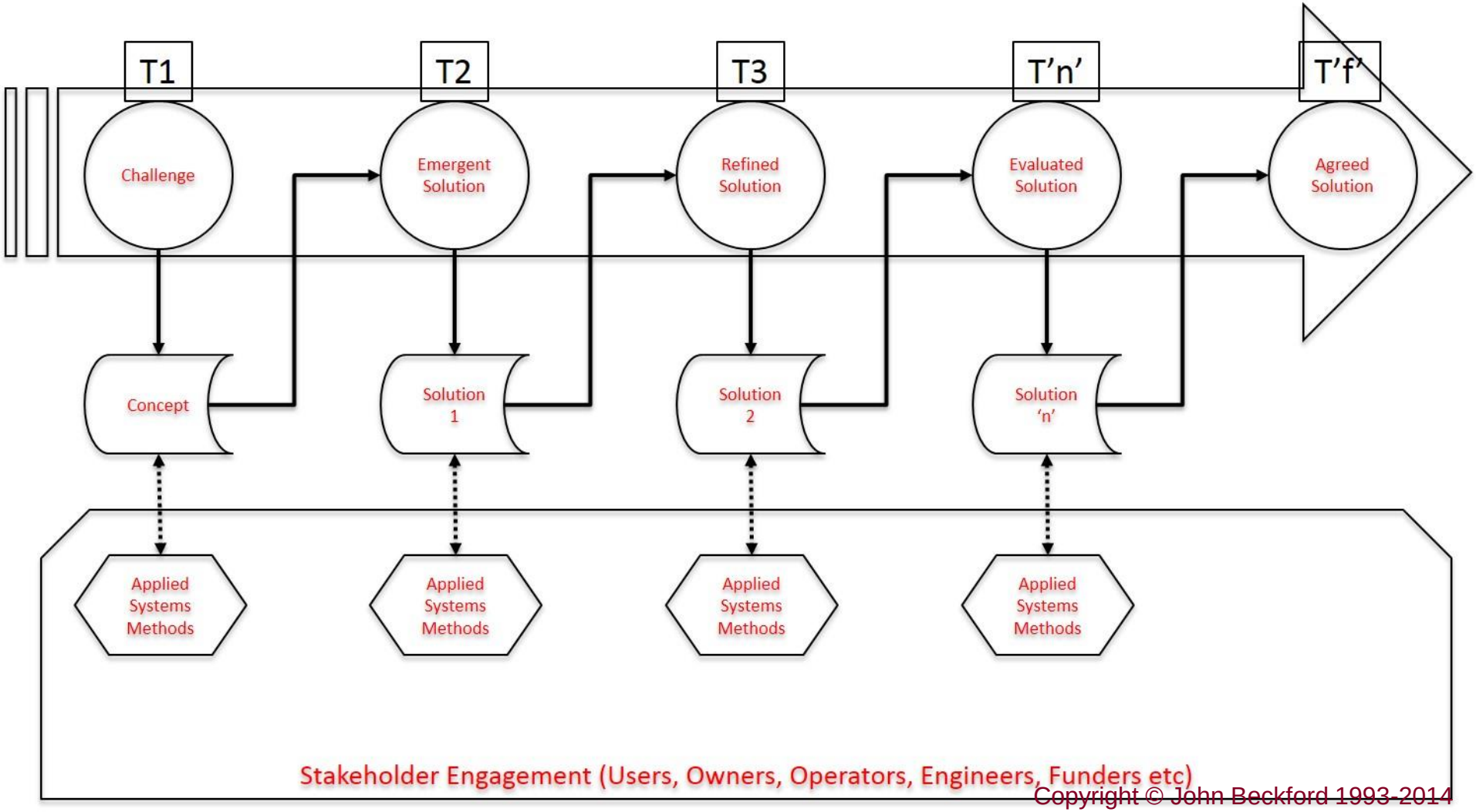
Continuously Dissolving The Problem



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Synthesis

- Railways must be managed as ‘whole systems’
- Challenges and opportunities cannot be addressed in isolation from each other

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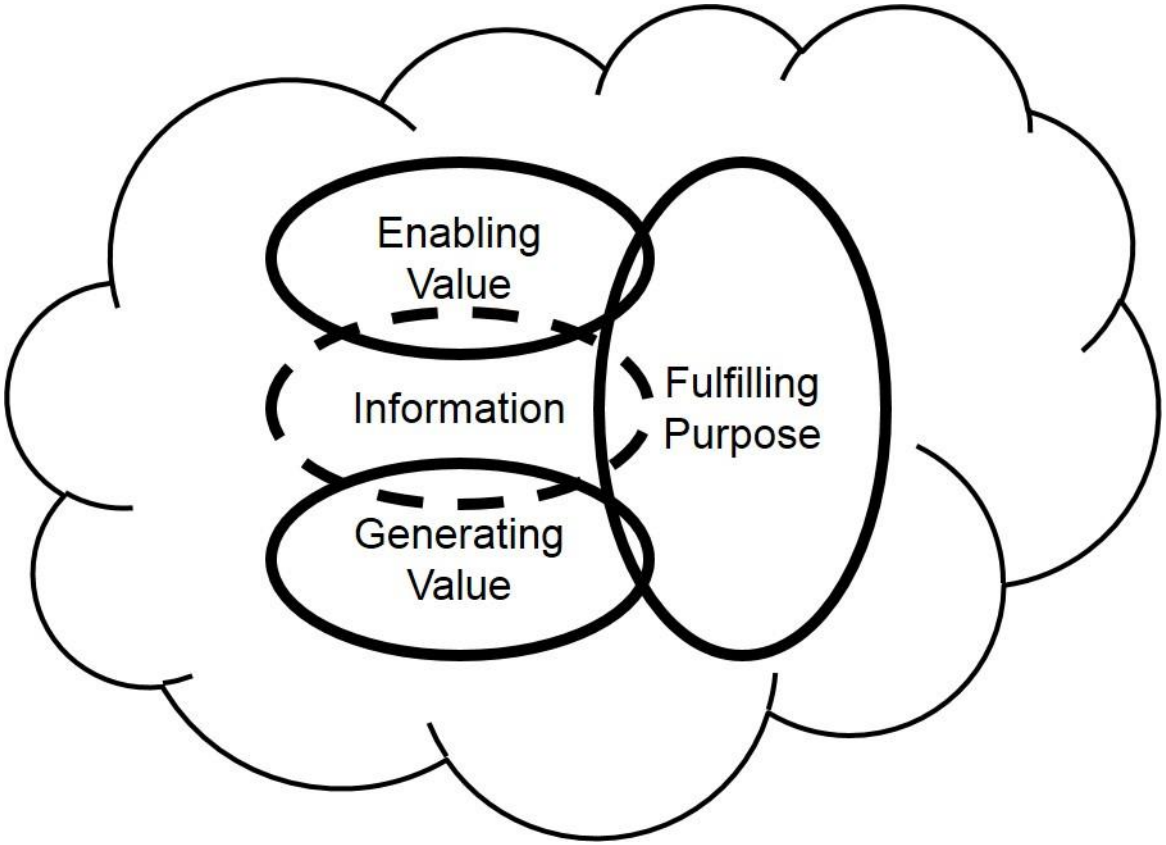
The Intelligent Organisation