



## Cybernetics and the Digital Transition

**Dr. John Beckford**

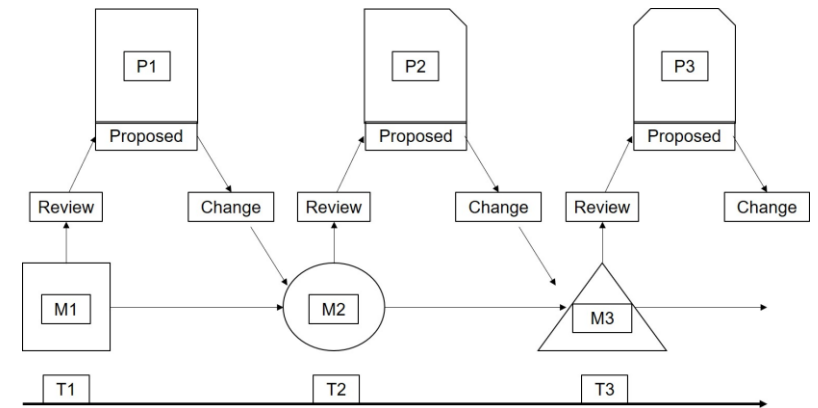
**4<sup>th</sup> October 2023**

# Cybernetics and the Digital Transition

- Survival of the most viable
- Cybernetics of Organisation
- The Homeostat
- Cases
- The Allostatic Organisation
- The Cybernetics of Cybernetics

# Survival of the most viable?

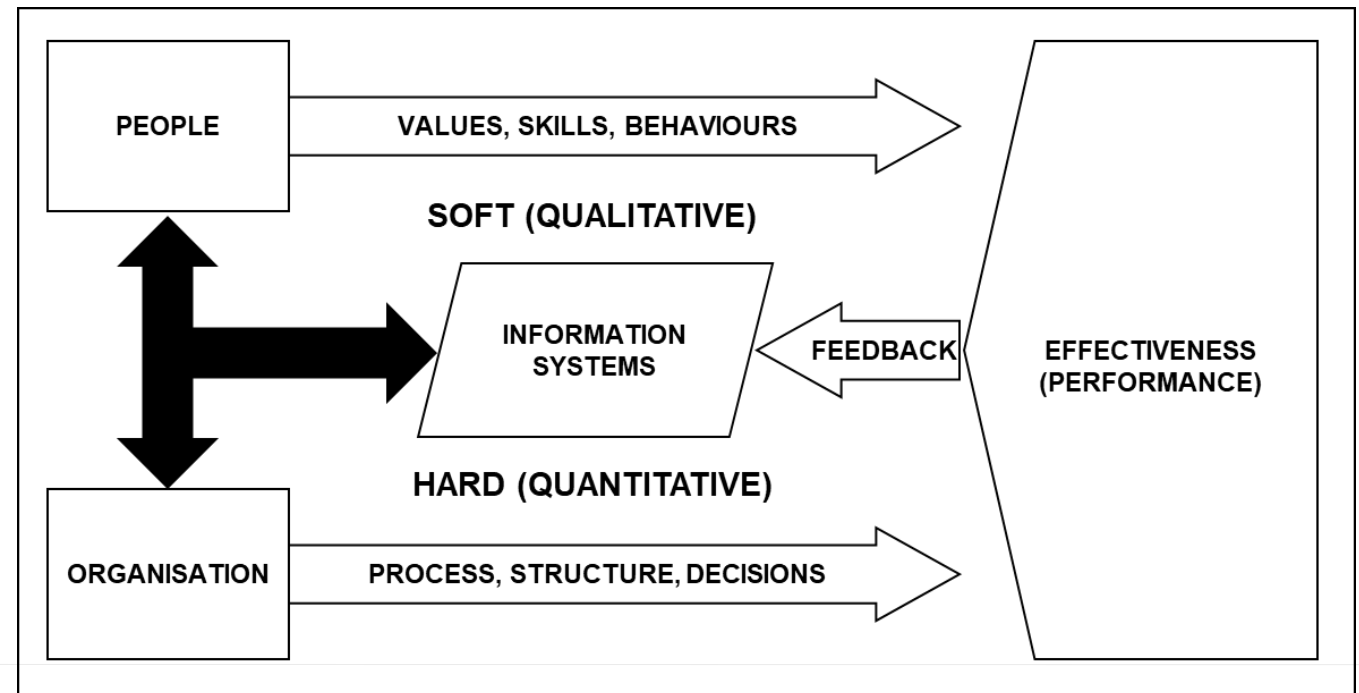
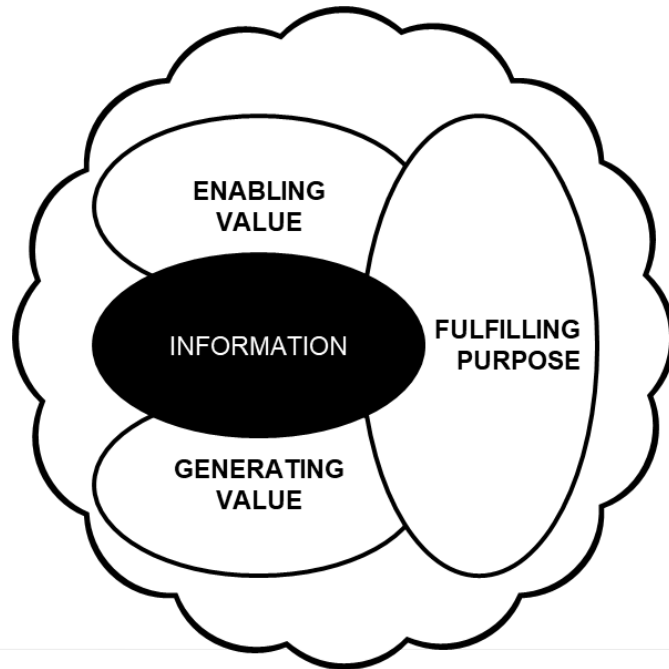
- Organisations that seek to survive and thrive need to address the substantial challenges of recognising and capturing the value of digital capabilities.
- Embedded IR1.0 bureaucratic mental model of organisation
  - Mechanistic, finite, non-adaptive, high latency, low autonomy, reactive
  - Out-dated technology AND understanding of technology capabilities
    - PCs/Tablets as typewriters
  - Unstructuring data into unuseable outputs
- IR4.0 mental model
  - Values, Behaviours, People, Process
  - Adaptive, infinite, pre-emptive, proactive
  - Organisation is its information system, technology enabled, information driven



Perpetually failing problem solving engine

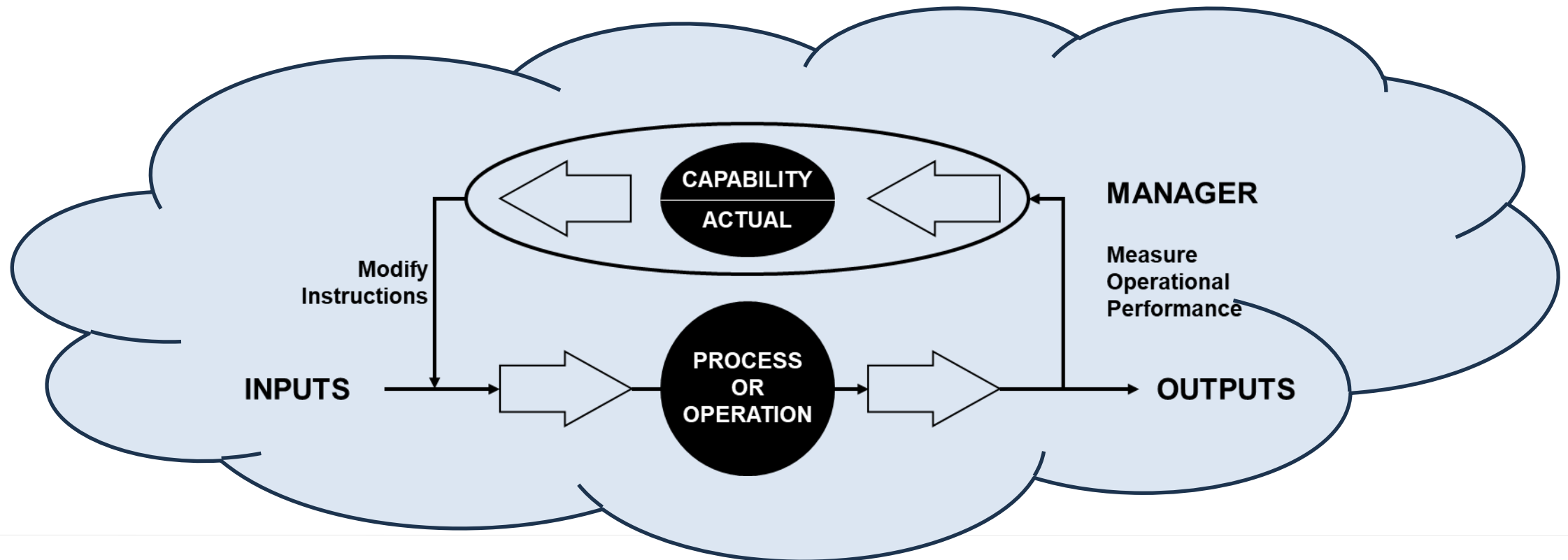
# Cybernetics of Organisation

- Cybernetics, offers insights and capabilities that enable the realisation of digital potential
- Challenge in the three dimensions of purpose, people and process, enabled by information
- What, how, why?



# Core Idea: The Homeostat

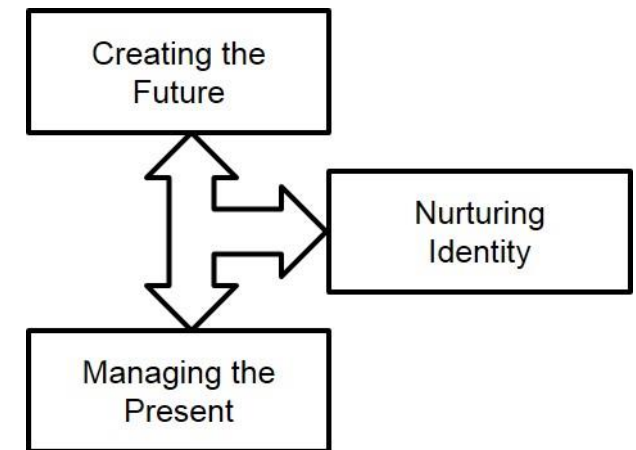
- Self-regulation, adaptation, stability, learning
- Complexity emerging from interactions



- Sisters of Nazareth
- Fusion21
- Network Rail
- Pathfinder Initiative

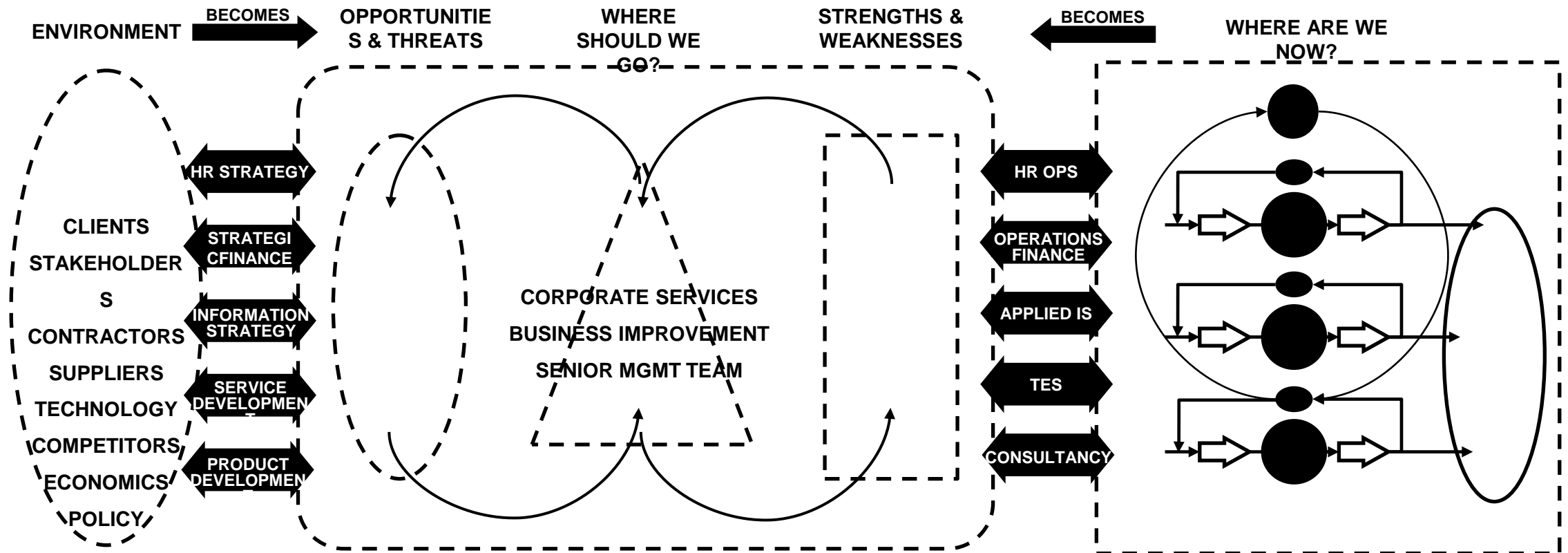
# Sisters of Nazareth: Dialogue for Decision

- Focus on Mission – ‘Care of the Poor and Needy’
  - Global Organisation, rooted in Hammersmith
  - 37 Care Homes, Schools, Nurseries, 7 Countries, each country its own charity, House autonomy
- Global change ‘Trust the Process’
  - Structure separation of ‘assets’ from ‘service delivery’
  - 300+ homeostatic adaptation events
  - Iterative process over 6+ years
  - Clarity of Purpose
  - The Trialogue: Manage the Present, Create the Future, Nurture Identity



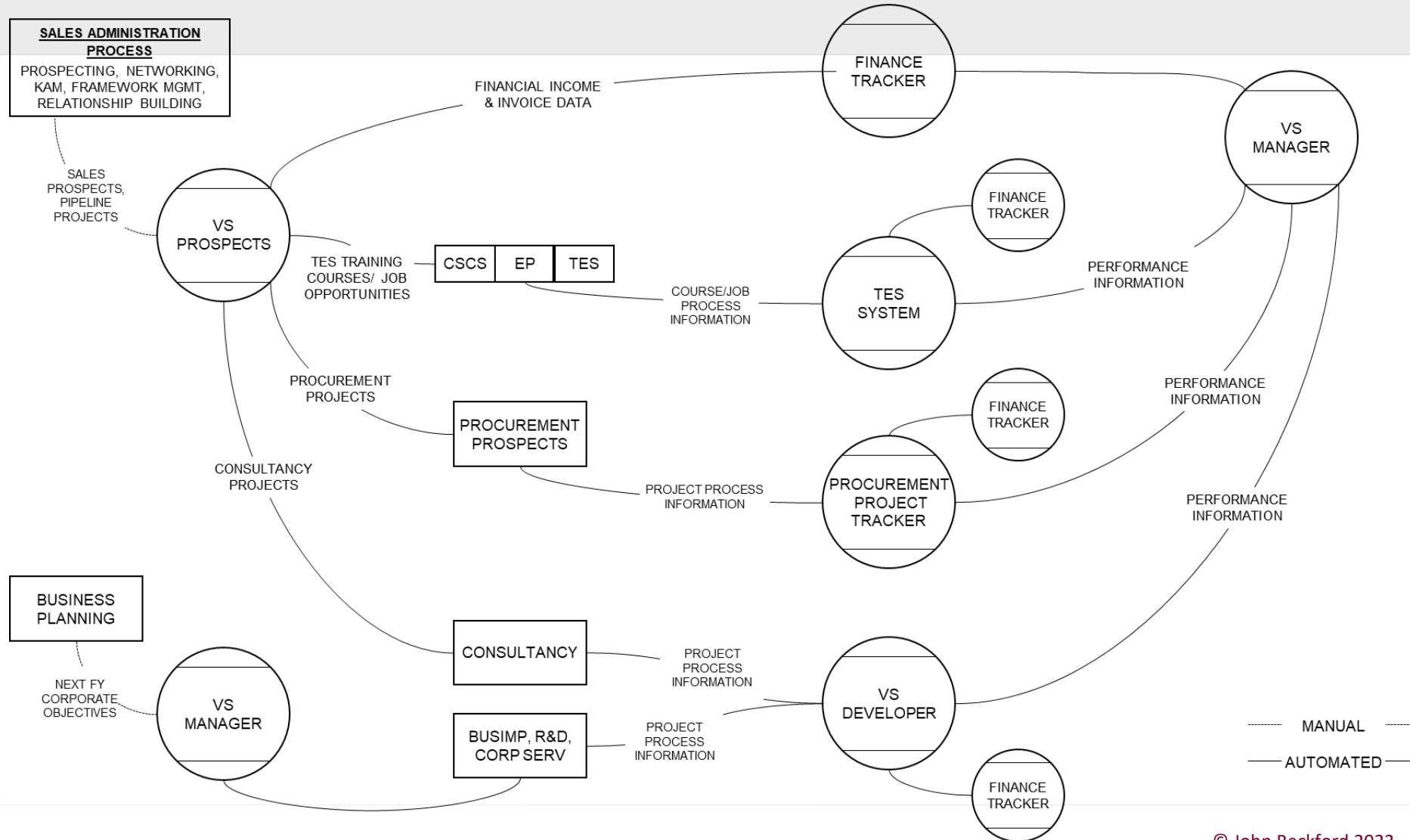
The Trialogue  
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# Fusion21: Managing the Present and Creating the Future

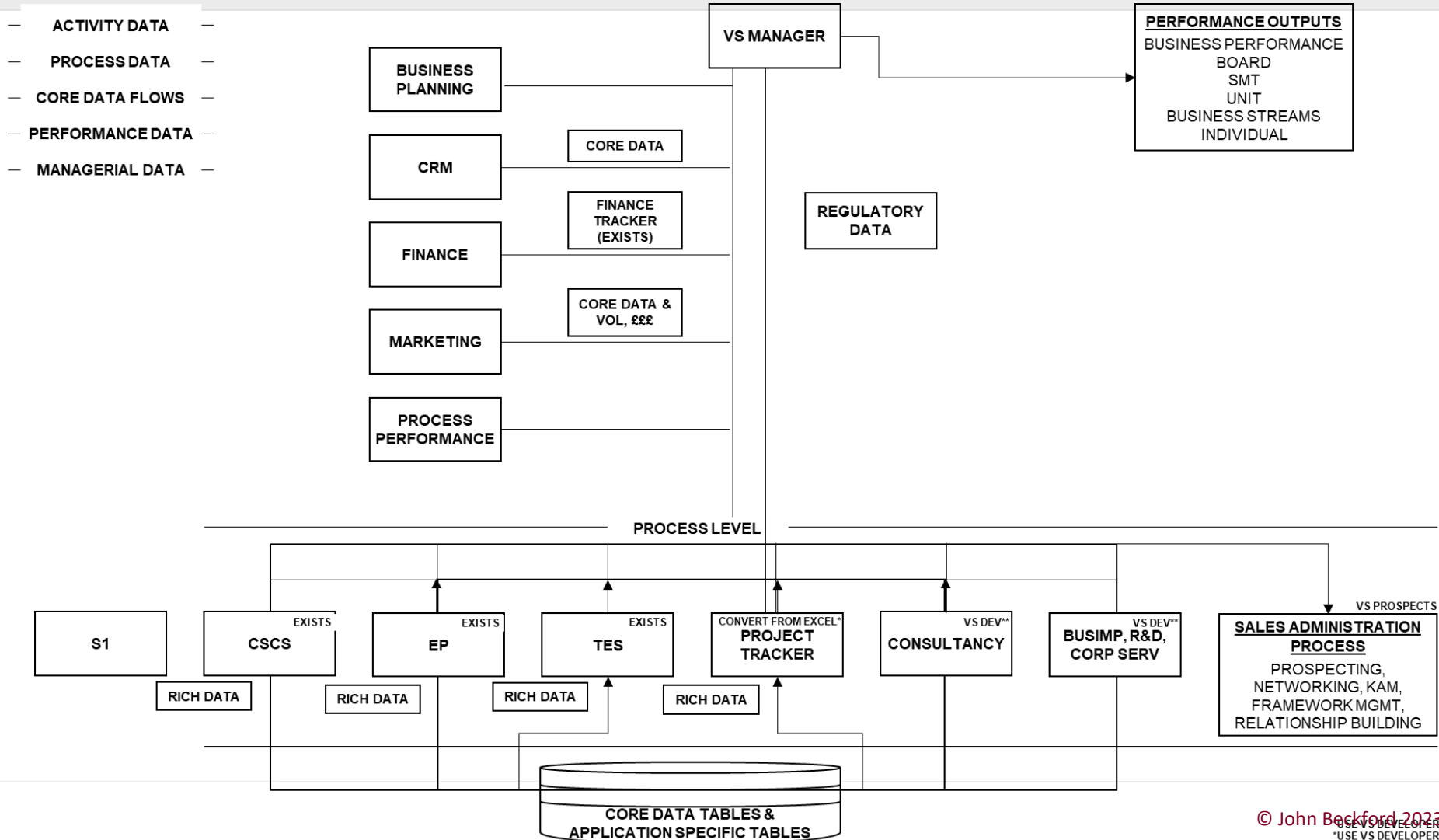




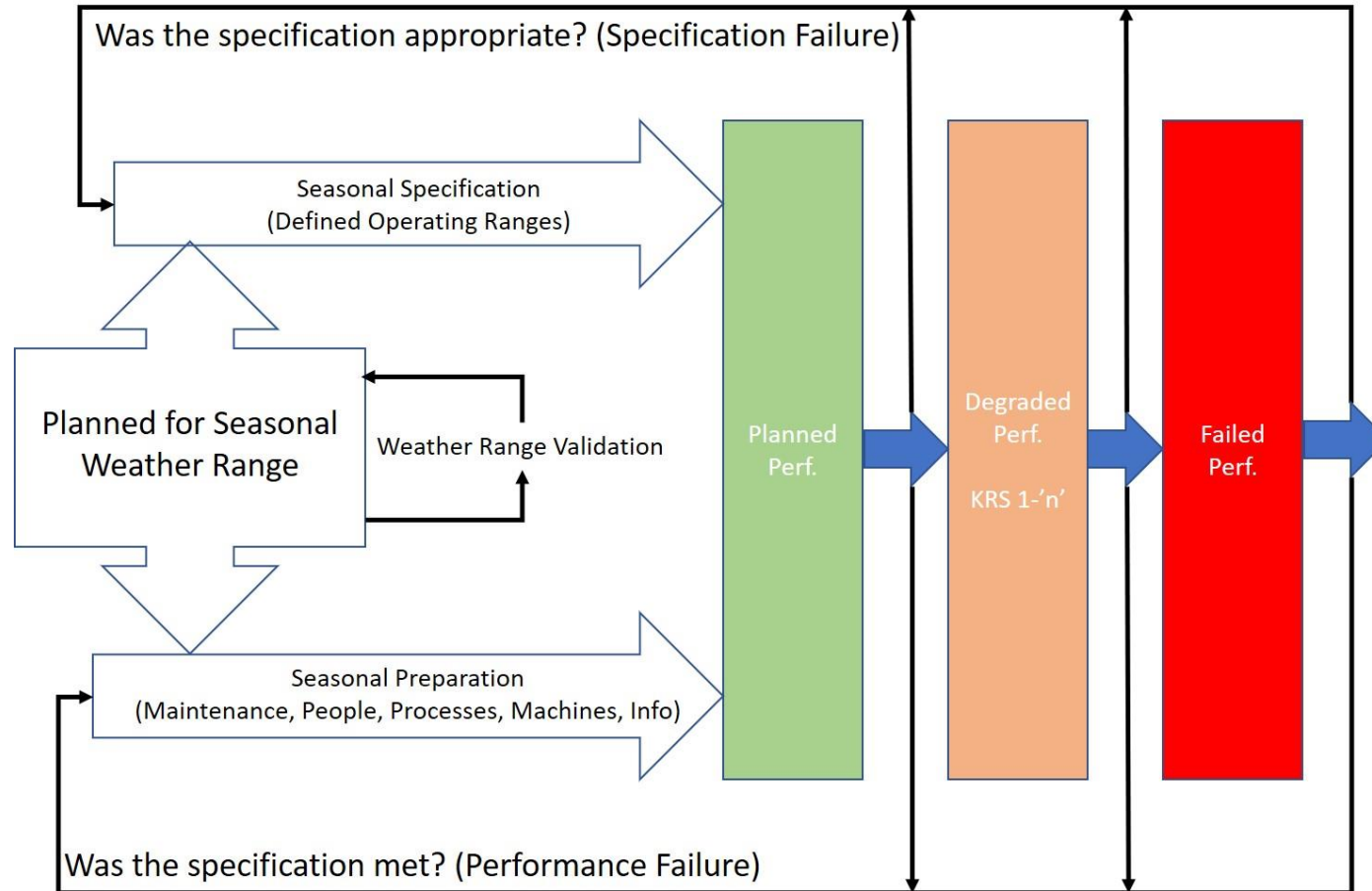
# Fusion21: Information Flow



# Fusion21: Lean Information System

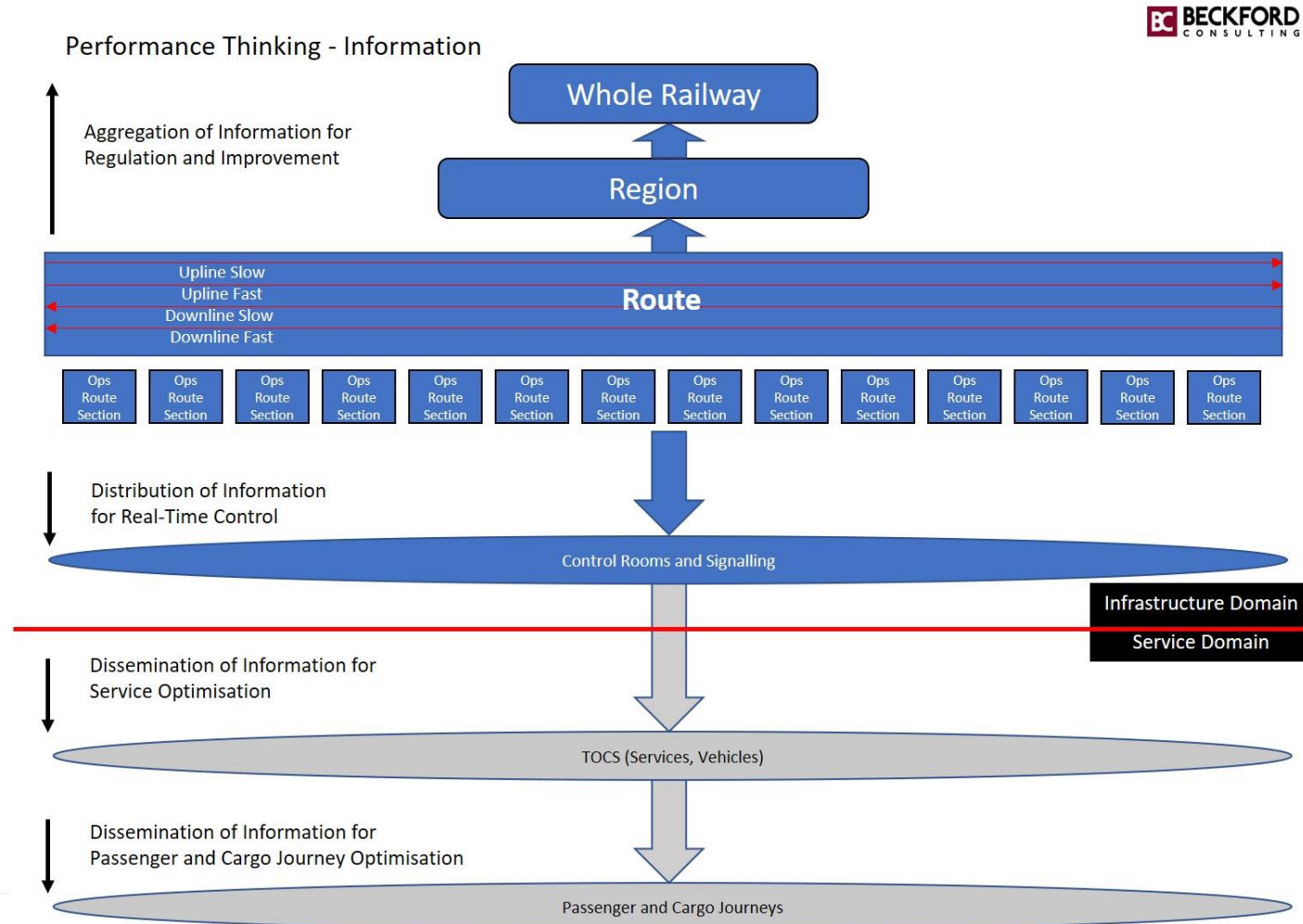


# Network Rail: Seasonally Agnostic Railway

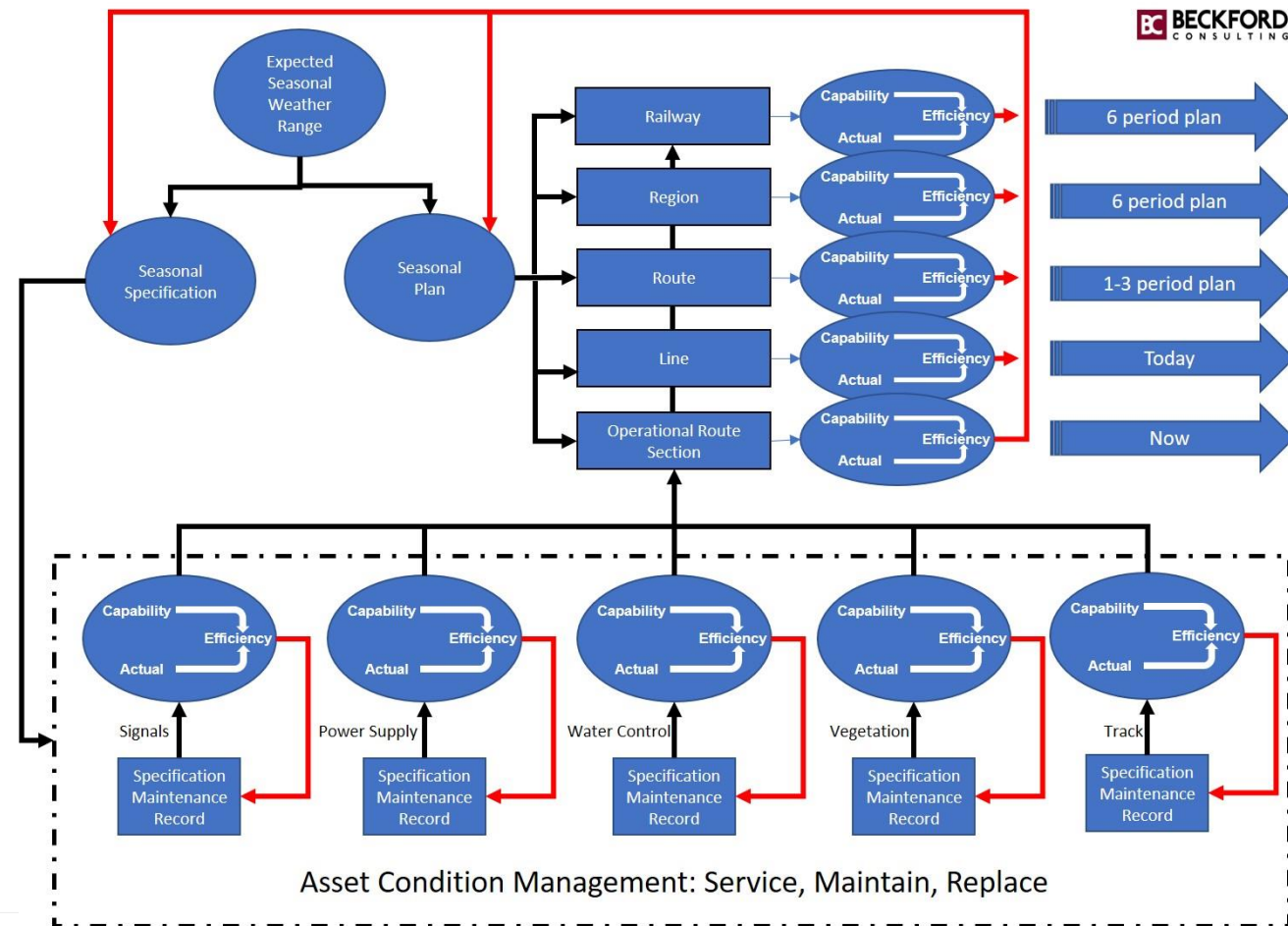


The Heisenberg-Schrodinger Railway

# Network Rail: Information Capture and Distribution



# Network Rail: Managing the Present and Creating the Future



# Network Rail: Managing the Present and Creating the Future

- 5 year programme
- Short term – deliver a working version
- Longer term – a new world for an intelligent railway
- Three doctoral students:
  - How good a decision can be made using the data available?
  - How do we scale up machine-learning to a multi-route, multi-regional model drawing data from around 36000 individual ‘learners’
  - How does the organisation develop a shift in culture from reliance on ‘whadilt’ (driven by tradition and convention) to near real-time information driven decisions

# The Pathfinder Initiative

- Pre-licence driver development
- All volunteer run
- 15 years
- Annual delivery of 9 events in four locations over 45 days
- Impact?
  - DfT Statistics 1 in 5 Reportable collision in first 12 months
  - Pathfinder statistics 1 in 19 (max 1 in 37)
  - Consistent over multiple surveys

# The Pathfinder Initiative: How?

- Balance of central and local control
  - Common ‘script’, individual delivery
  - Each student, working with parent, learning at own rate
  - Instructors start each session by understanding:
    - Progress, challenges, needs
- Three bodies of knowledge, synthesising learning in three dimensions:
  - What, How, Why
- Four homeostatic learning events, per student, per day
  - Practical Instruction, Driving Theory, Risk and Behaviour Comprehension, Underpinned by Practice
  - Progression against demonstrated learning
  - Building freedom on trust

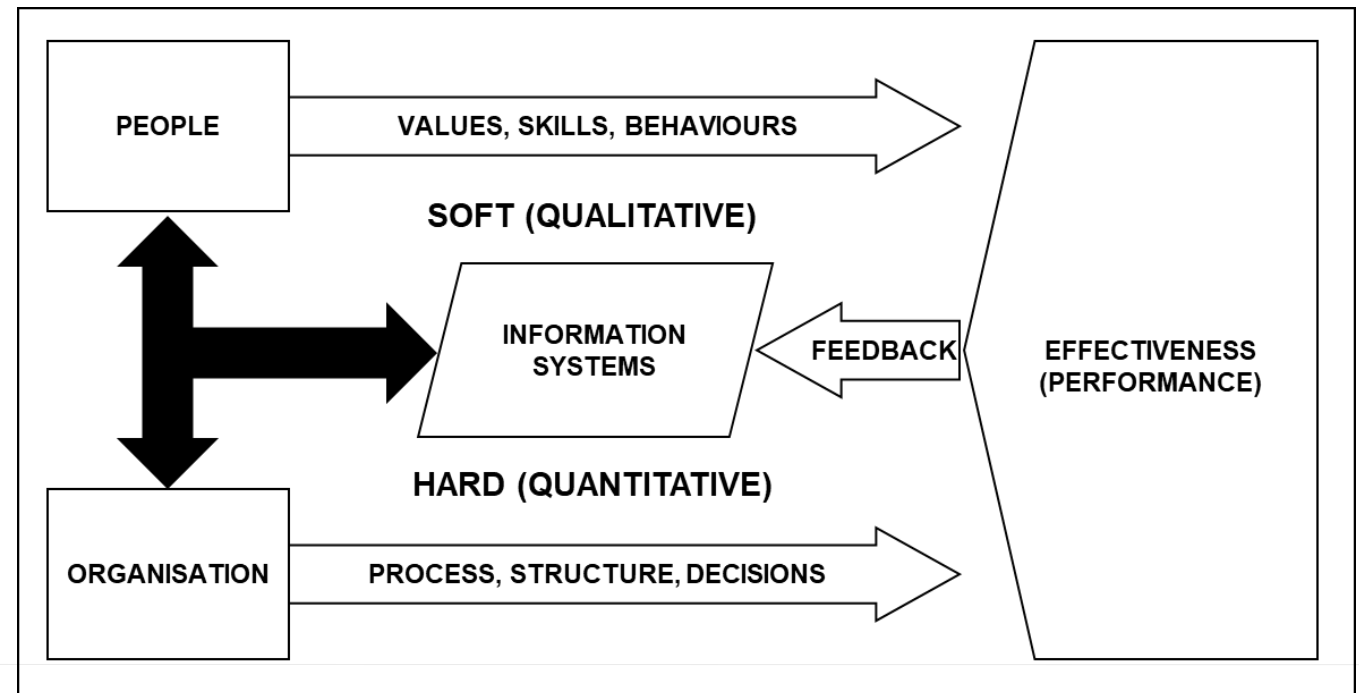
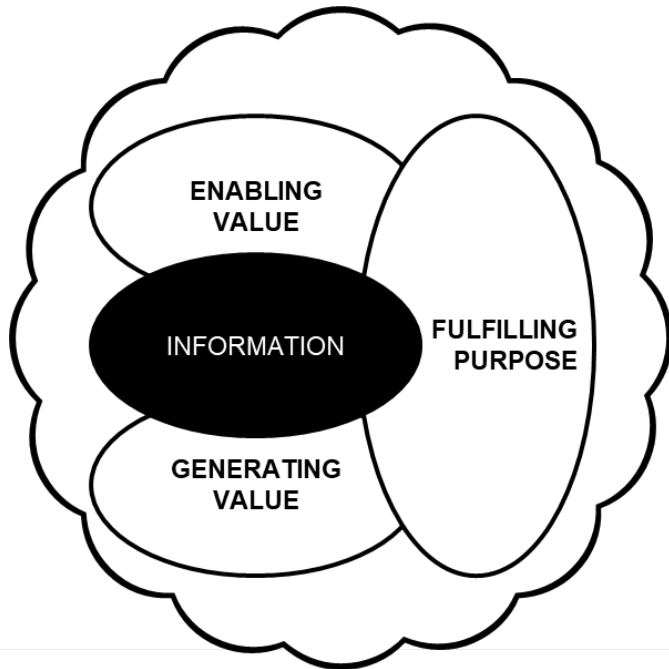


# Allostatic Organisation: Dynamic Stability

- Cybernetic
- Goal seeking
- Adaptive
- Learning
- Reflexive
- Requisite Bureaucracy:
  - balances stability and dynamism,
  - controlled, not stifled

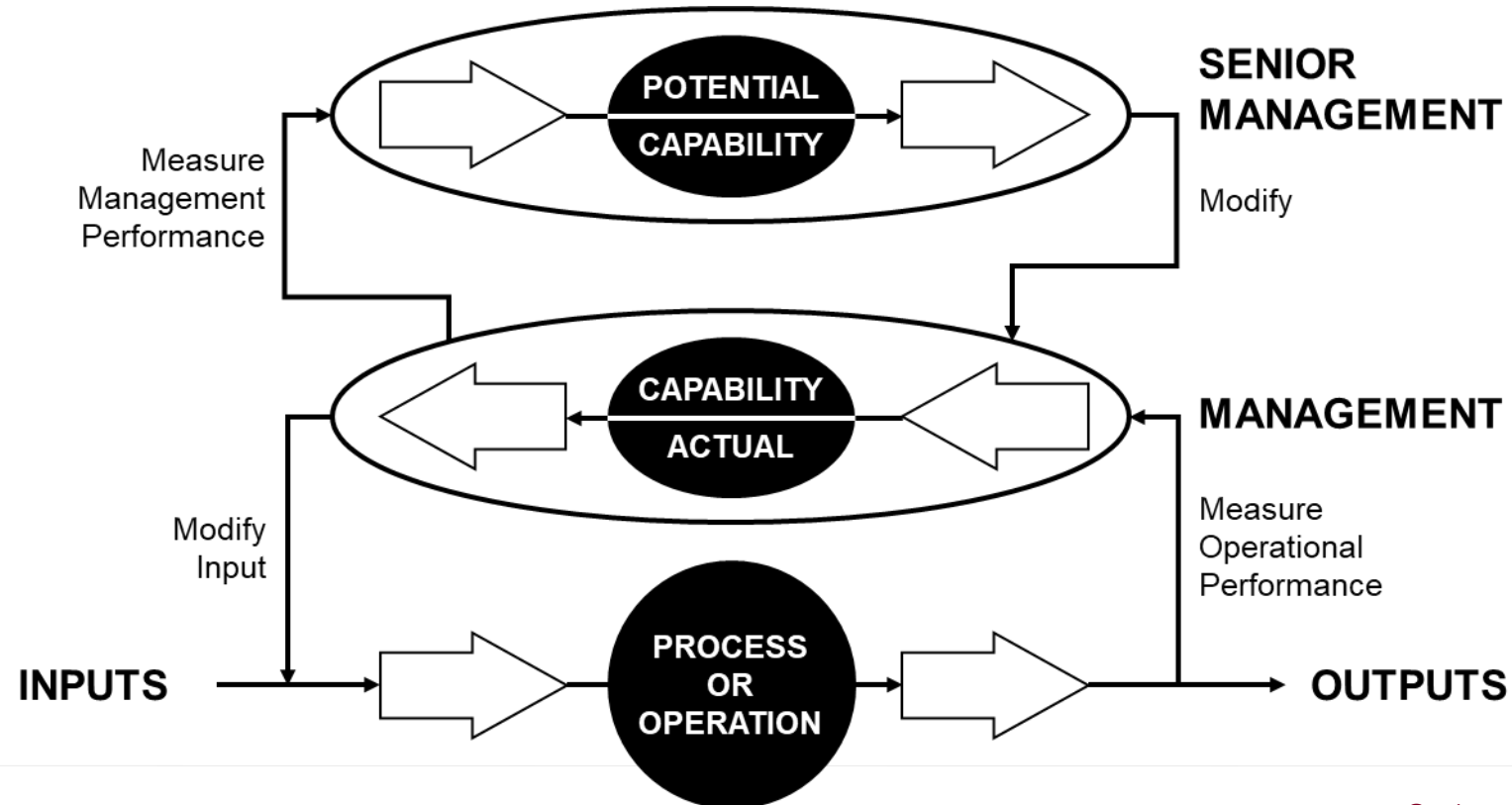
# Allostatic Organisation: Dynamic Stability

- Stability is an emergent property of a dynamical system, the transition to exploitation of digital capability must be complemented by a transition to adaptiveness as the basis of organisation.

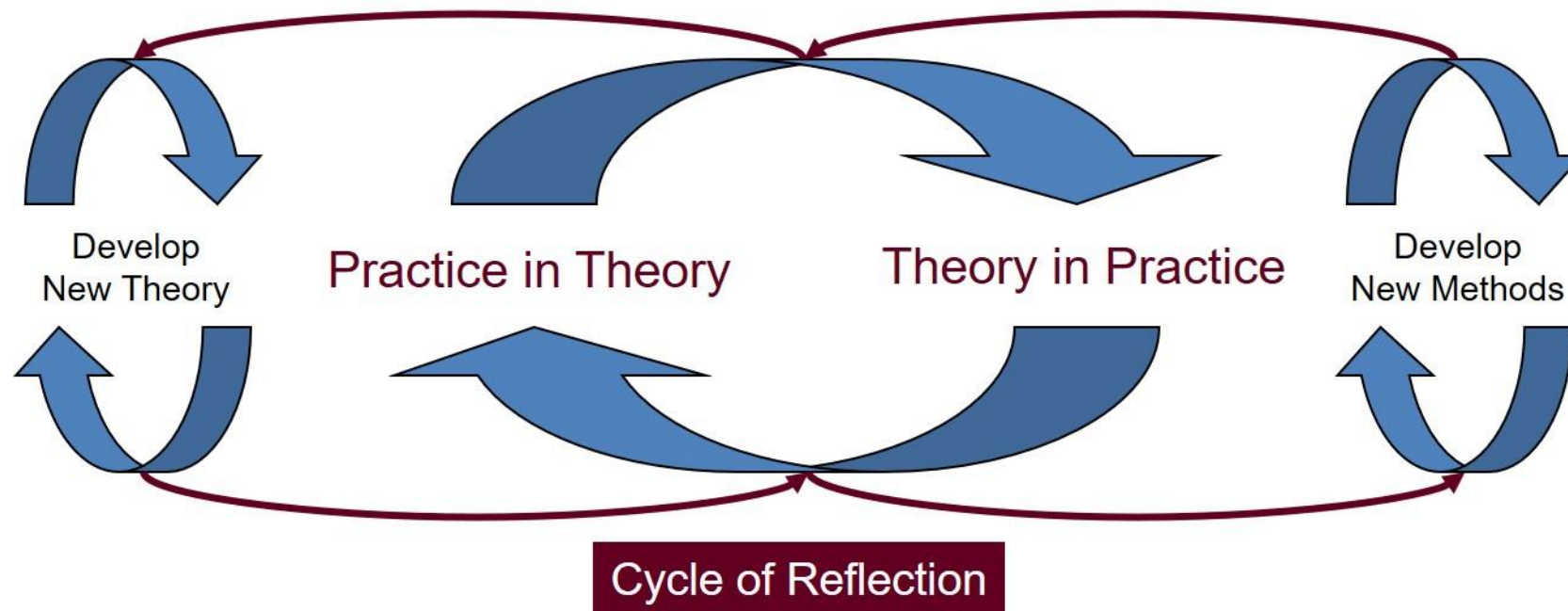


# The Cybernetics of Cybernetics

- Thus, we go one to the exploration of "the cybernetics of the cybernetics", a recognition of the allostatic nature of a viable organisation.



Continuous adaptation!



- Draw together the strands of thinking around:
  - people and behaviour
  - engagement
  - governance of organisations, autonomy and distributed power
  - need to rethink to exploit the power of technology
  - information systems (and the separation of data and information from the platforms on which they sit)
- Consider and develop the future of cybernetics as well as building on its past

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- Cases
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- The Cybernetics of Cybernetics
  
- The Cybernetics Conversation 2023
  - <https://www.eventbrite.co.uk/e/the-cybernetics-conversation-2023-tickets-691802518957?aff=ebdssbeac>



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**4<sup>th</sup> October 2023**

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