Competing within Ecosystems: sustaining ways of creating indirect value

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Background Experience:

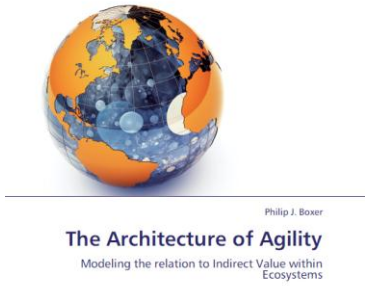
focusing on indirect value

	Project	Direct Customers	Multi-sided platform	Indirect Customers	Potential Indirect Value
Quantifying Indirect Value	MoD surface capability	MoD acquisition	C4ISTAR platform	Mission Commanders	40% saving on operational costs, 15% from reduced variation
	Swiss e-Government	Federal Chancellery	Search engine platform	Respondents to citizens	80% saving, 50% from reduced variation
	Uninhabited Aerial Systems	Royal Artillery	UAS platform	Mission Commanders	40% saving, 30% from reduced variation
Identifying Risks	BT customer service	Area management	Customer services platform	Phone user	70% of errors from failures to align properly
	Network Enabled Capability	MoD acquisition	Collaborative SoS	Mission Commanders	Unable to assess impact of mission thread variability
	AWACS capability	NATO acquisition	Mission systems of systems	Mission commanders	Architecture restricting adaptation to new types of mission
Mitigating Risks	Wildland Fire	Federal Agencies	Collaboration support	Fire fighters	Needed focus on variation in forms of collaboration
	XSEDE	Supercomputing centers	Research SoS	Research collaborations	Needed focus on variation in forms of collaboration
	NHS Orthotics	Healthcare Trusts	Clinician support platform	Patients	Managing treatment through-life means $1 now = $4 saved

Outline

- Introduction
- A closer look at the problem
- The quantum metaphor
- Modeling risk and indirect value
- Implications

This metaphor provides a way of understanding the nature of the 'disconnect' between individual behaviors and organized complexity



Boxer, P.J. (2012) Evaluating platform architectures within ecosystems: modeling the relation to indirect value within ecosystems. Lambert, ISBN: 978-3-659-25536-6

Why this interest

Why it matters

Major challenges

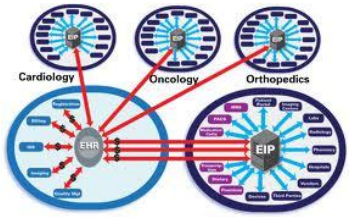
Main themes

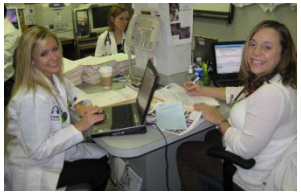
I am going to use healthcare as my running example

INTRODUCTION

Why this interest?

What kind of organizational challenge is presented by the *tempo* at which a clinic's patients expect *care pathways* particular to their condition?





Why does it matter?

- Competitive organizations must achieve new levels of value for their customers *continuously* if they are to survive in the long run.
  - As this pursuit of value moves them further and further away from products towards services,
    - value becomes increasingly specific to the customer's context-of-use, and dependent on the organization's capacity to learn from those contexts.
  - The complexity involved in delivering this value must to some extent be organized,
    - not just emergent from amongst the interactions within an ecosystem of multiple organizations and stakeholders.
  - Organizing this complexity presents unprecedented challenges to the forms of conversation demanded between the actors within these ecosystems,
    - not only in defining relevant relationships between socio-technical systems and their environments, but also in defining the supporting system-of-system architectures

Patients always want 'more'.

Their conditions are increasingly chronic and difficult to diagnose.

Their treatment demands increasingly complex collaborations between specialists.

Managing outcomes challenges existing ways of organizing care pathways

Major challenges

- Comparing Healthcare with Manufacturing suppliers*
  - 'the expectations of customers'. *The unknowable aspects of customers' needs in healthcare emerge as new forms of demand at a much faster tempo.*

'Value Deficit' drives demand.

  - 'their knowledge of the (near-term) future'. *The closer to the patient's condition, the more unpredictable the demand.*
  - 'the variability in their work processes'. *Variability is driven by the need to align processes to patients' particular conditions.*
  - 'the traceability between performance and the result for the customer'. *The effects of a particular treatment on patient outcome depends on the context.*
  - 'duration of production process'. *The availability of treatments has to be timely.*
  - 'the ability to buffer the production process against variability in levels of demand'. *Treatment protocols have to be applied on a just-in-time basis.*
  - 'the costs of production'. *The complexity of the alignment process is itself a major driver of outcome costs.*
  - 'the connection between cost of production and revenue from the customer'. *There is no direct link between patient outcome and cost recovery.*

Run-time generation of outcomes and design-time diagnosis are 'entangled'

* Rouse, W. B., L. F. McGinnis, et al. (2009). Models of Complex Enterprise Networks. Second International Symposium on Engineering Systems, MIT Cambridge, Massachusetts.

Main themes…

- What approach to creating value does this imply?
  - An approach that creates *indirect value* driven by the individual customer's *value deficit*.

Managing the through-life cost of the patient's condition to the patient as well as to the insurance company.

- What forms of collaboration does this demand between the actors within these ecosystems?
  - Collaboration within an approach to governance that assumes run-time and design-time conversations are necessarily *entangled*.

Governance aimed at scaling learning about alignment of care pathways as much as at scaling efficiencies.

- How is the resultant complexity to be supported?
  - System-of-system platforms *agile* enough to support a variety of multi-sided demands.

System-of-systems platforms supporting multiple forms of alignment by those collaborating

Multi-sided Demand

Indirect Value

Managing Multi-sidedness

A CLOSER LOOK AT THE PROBLEM

Multi-sided Demand:

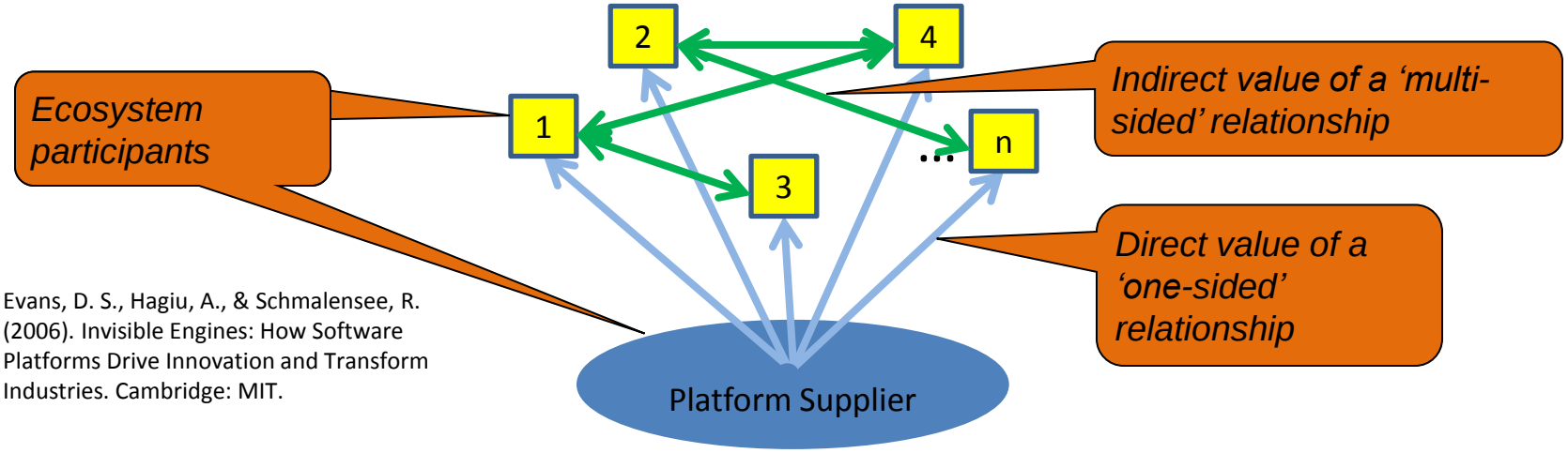
counting the value of indirect customers

- Multi-sided demand supported by a platform is demand for which:
  - There is direct value in the platform's direct 'one-sided' relationship with a participant
  - The customer of a collaboration between ecosystem participants is an indirect customer
  - With multi-sided demand, there is indirect value in the 'multi-sided' relationships the platform supports between collaborating ecosystem participants

direct provision of treatment of a patient's condition

the patient-in-their-life needing a collaboration between specialists responding to their condition

the way a hospital provides support to collaboration between its clinicians



Evans, D. S., Hagiu, A., & Schmalensee, R. (2006). Invisible Engines: How Software Platforms Drive Innovation and Transform Industries. Cambridge: MIT.

Indirect Value:

the value is in supporting the collaborations

	Orthotics Clinics	e-Government	UAS	iPhone
Supplier	Orthotics supplier	IT Department	Thales	Apple
Platform	Orthotics clinic	Research engine	UAS	iPhone+Cloud
Direct Customers	Clinicians, Orthotics Manufacturers etc	Departmental & Agency users	Royal Artillery	Service Providers, App developers etc
Collaboration supported by Platform	Between clinicians' episodes of care	Between Departments and external Agencies	Between Force Elements and Mission Command	Between users and their apps
Indirect Customer Situation	The patient managing their diabetic condition	The citizen with a question	Interdicting fleeting targets	The phone user arranging to meet a blind date
Indirect Value to be captured	Costs to the patient and insurer of failing to manage their condition	Costs to the citizen and Government of responding mistakenly	Costs of aligning more expensive capabilities by other means	Costs to the user of having to use less direct methods of organizing
Demand tempo for the Supplier	Month-by-month	Week-by-week	Hour-by-hour	Minute-by-minute

Managing Multi-sidedness

- Capturing indirect value at demand tempo
  - The supplier has to consider their relationship to indirect forms of demand, and the organizational processes by which their own products and services can be aligned with those of others to support multi-sided demands.

The clinic has to understand the variety of clinical collaborations needed in responding to the variety of conditions they are meeting

- Defining the economics at the level of the ecosystem
  - The value lies in reducing the costs that fall ultimately on the indirect customer of aligning suppliers' products and services to multi-sided demands.

It becomes critical to analyze the cost to the patient of their condition over its life, and what are its drivers

- Developing the platform architecture capable of capturing indirect value
  - The architecture has to be 'agile' in the sense that it can support a sufficient variety of forms of multi-sided demand.

The agility of the platform is defined by the variety of care pathways that it can support

Each collaboration defines a Quantum State

‘Classical’ versus ‘Quantum State’ Organization

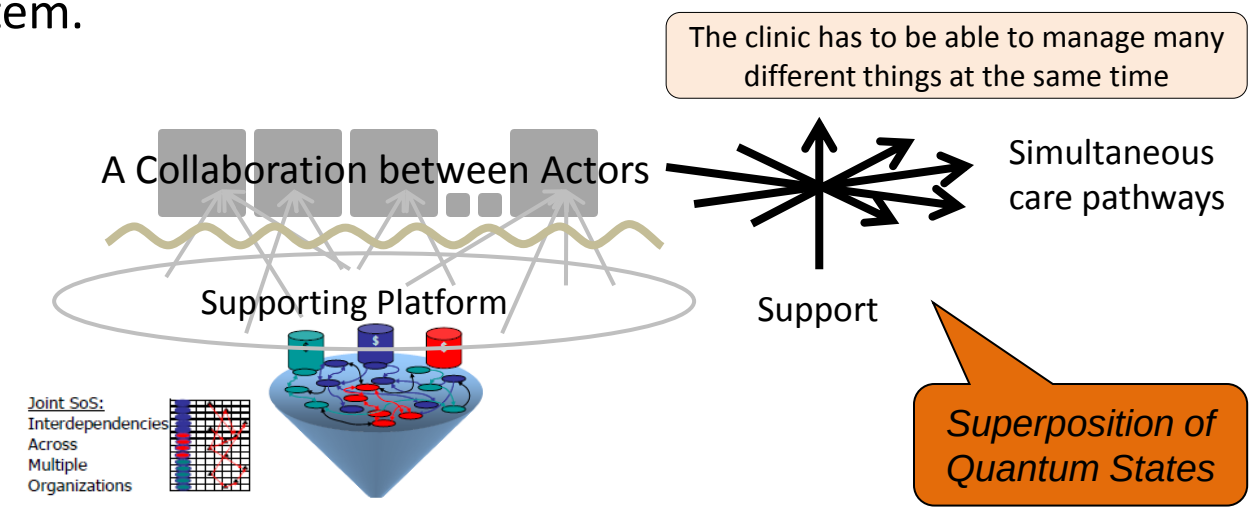
Platforms supporting multi-sidedness

THE QUANTUM METAPHOR

The Quantum Metaphor:

each collaboration defines a quantum state

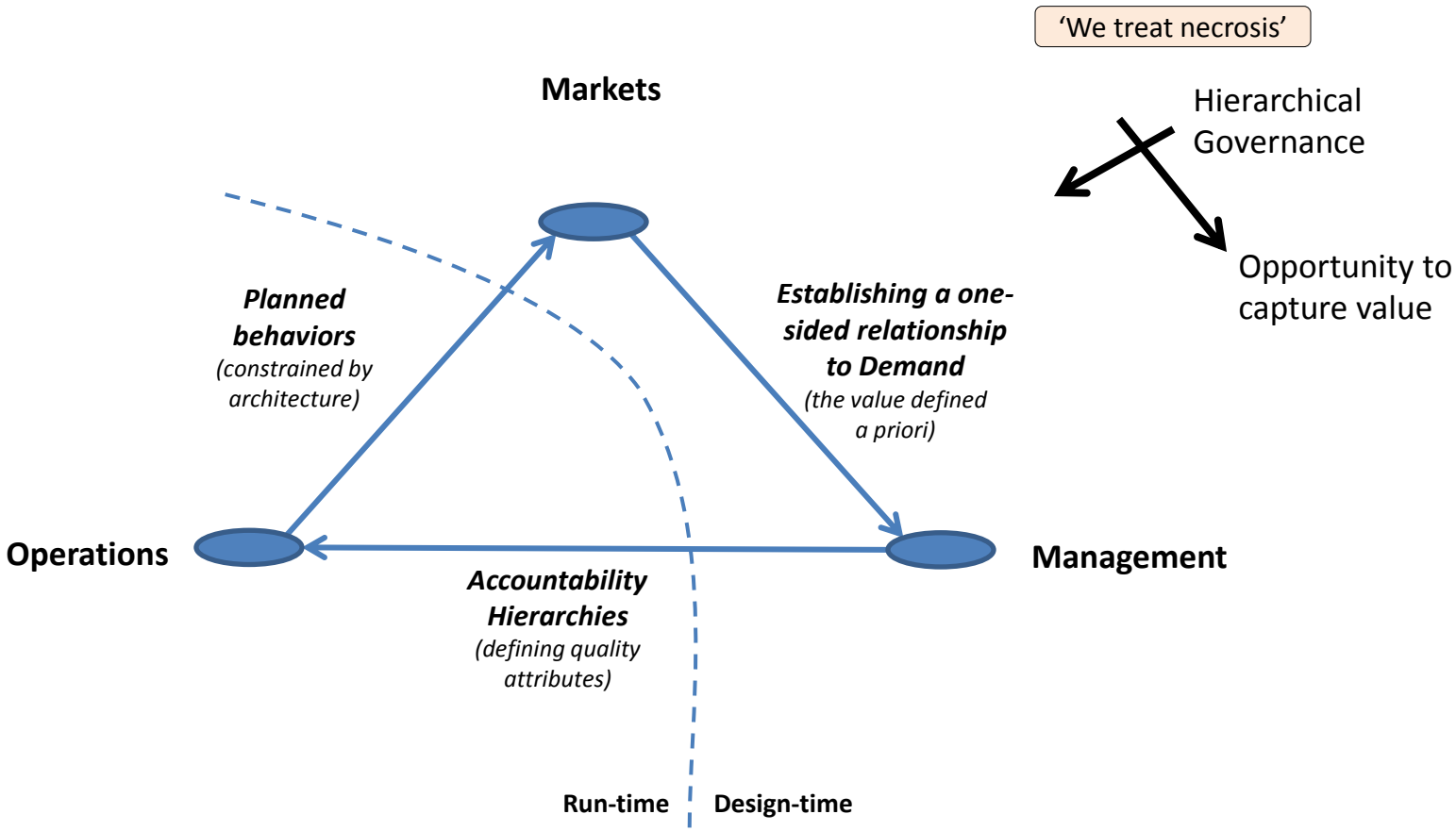
- It is the actors participating in a particular collaboration who will define the way they want their collaboration to be supported by the platform.
- The form of the collaboration will be determined by the conversations through which the actors understand the multi-sided demand.
- The actors in a collaboration can be spread across multiple organizations within an ecosystem.



Source: Fig 2-1 on the Management Challenge: Systems Engineering Guide for Systems of Systems, OSD, Version 1.0 August 2008.

‘Classical’ organization:

design-time conversations separated from run-time conversations



‘Quantum State’ organization:

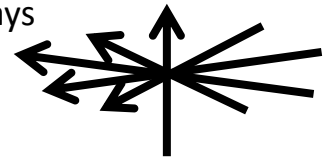
design-time conversations entangled with run-time conversations

Each collaboration has to be able to collapse out a different Quantum State

It is all going on at run-time for each demand

‘We enable our patients to manage their diabetes’

Simultaneous care pathways



Support

Demand-in-its-context
(describes the variety of indirect demands)

Modularity of behaviors
(constrained by technical architecture)

Cohesion of the response to multi-sided Demands
(the experience of the value provided)

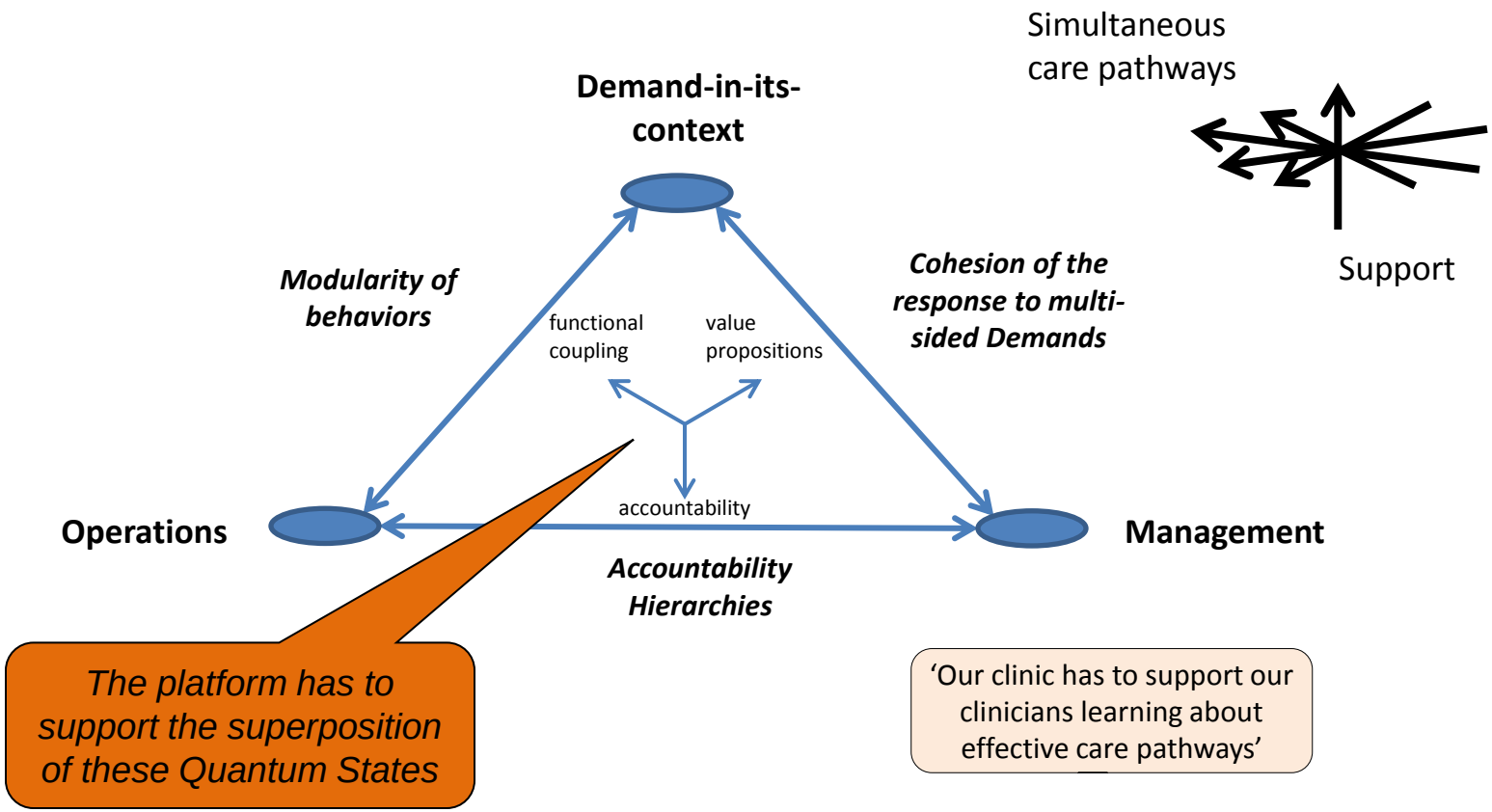
Operations
(the multi-sidedness which the supporting platforms are capable of supporting at a given tempo)

Accountability Hierarchies
(defining quality attributes)

Management
(organizes the alignment processes)

Platforms supporting multi-sidedness:

the platform has to be able to support superposition



Triple Articulation

Conceptual Modeling

Structure Analysis and Monte Carlo simulation

MODELING RISK AND INDIRECT VALUE

Triple Articulation:

the articulation of constraints

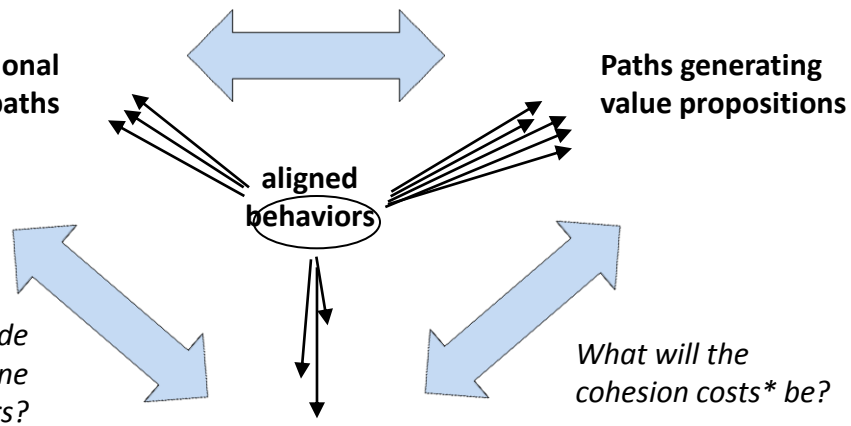
What are the available treatments and how do they interact?

Constraints on functional granularity & coupling

How can pathways be aligned to the contexts-of-use?

What variety of care pathways can be aligned to patients' conditions?

Demand-side Constraints on cohesion



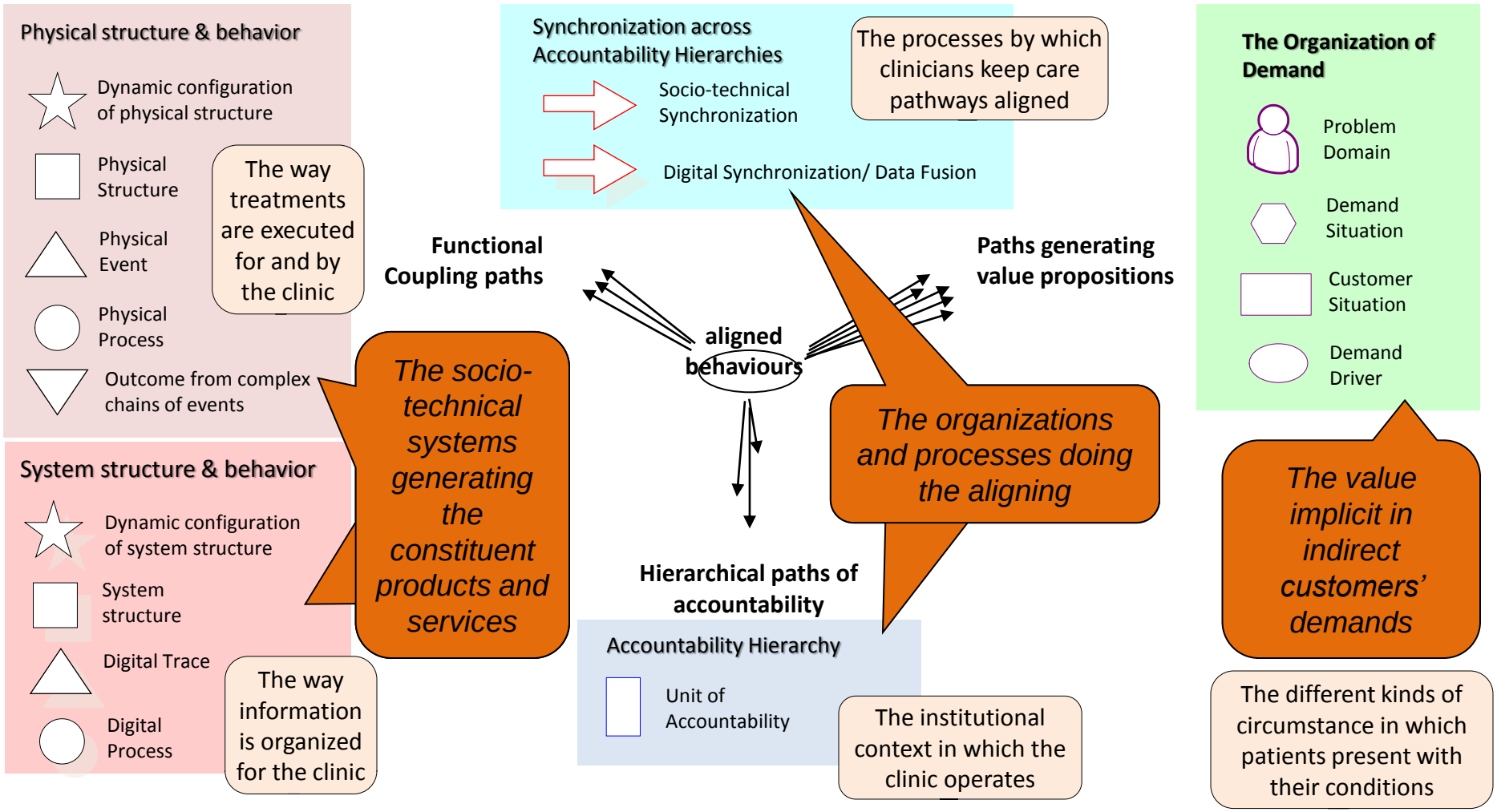
Constraints on non-functional characteristics

Who is accountable for cost/quality trade-offs and securing funding?

* **Cohesion cost** =
costs of use of particular components + costs of alignment to situation.

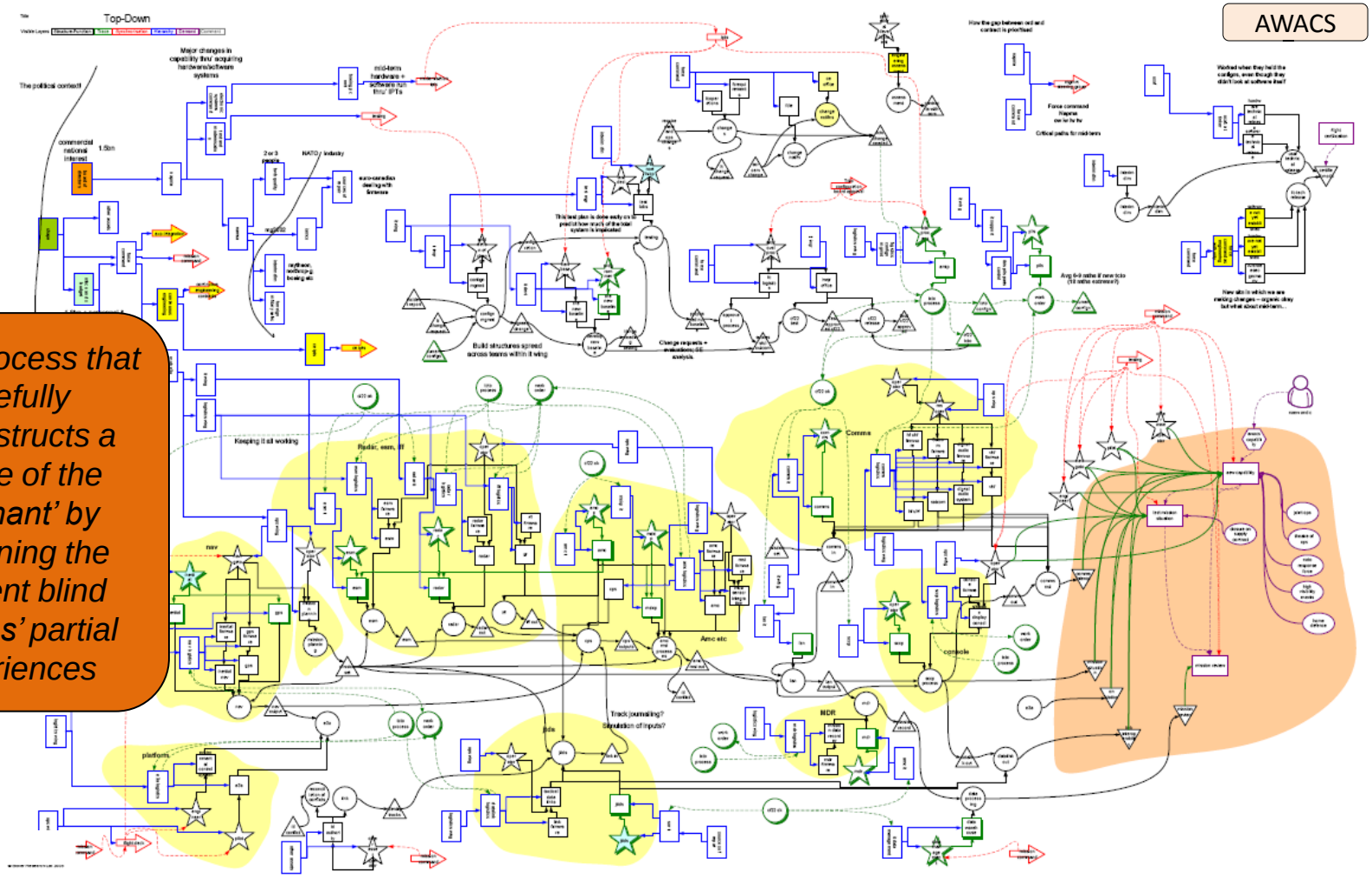
Conceptual Modeling:

modeling the relationships between three types of model



Eliciting relational knowledge:

these models emerge from actors within the ecosystem

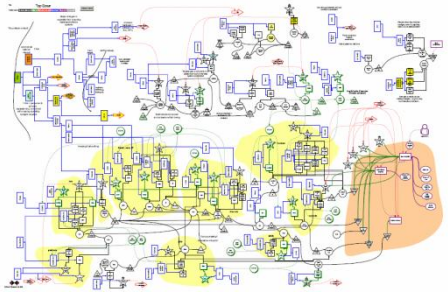


It is a process that carefully re-constructs a picture of the 'elephant' by combining the different blind persons' partial experiences

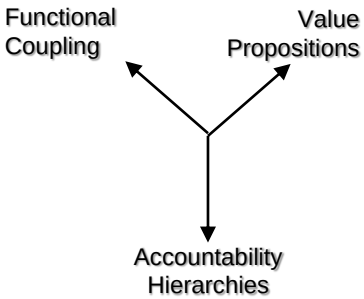
Structure Analysis:

identifying structural gaps creating risks to dynamic alignment

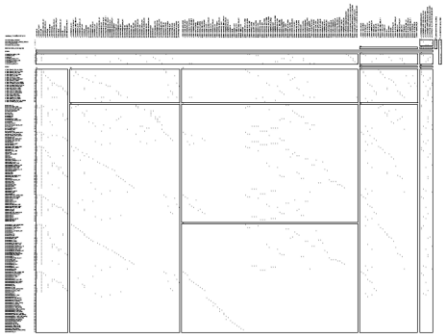
Ecosystem alignment to Indirect Demands



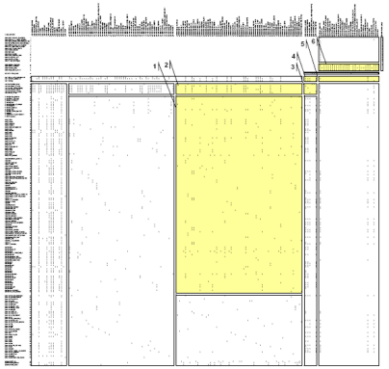
Distinguishing the different kinds of path



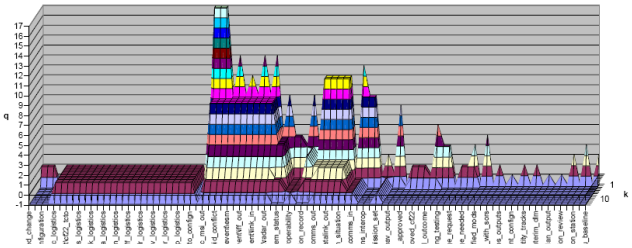
Defining alignment processes across strata



Analysis of Modularity within strata



Identifying Structural Gaps within the different strata



AWACS

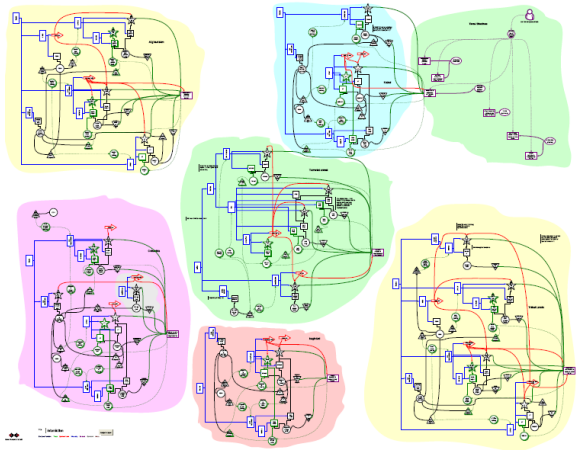
Mitigation Strategies

Source: Anderson, Boxer & Browsword (2006) *An Examination of a Structural Modeling Risk Probe Technique*, Special Report, Software Engineering Institute, Carnegie Mellon University, CMU/SEI-2006-SR-017.

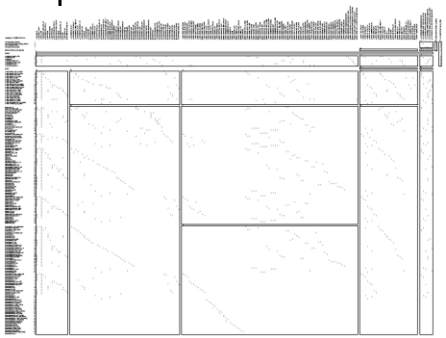
Monte Carlo Simulation:

The impact of variation in Indirect Demand on Cohesion Costs

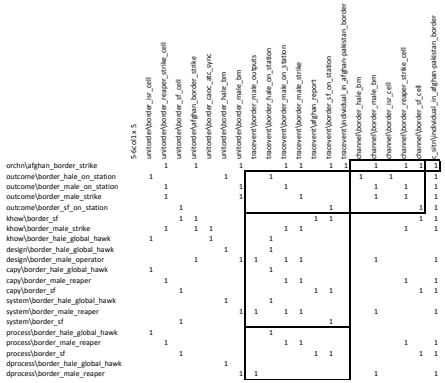
Ecosystem alignment to Indirect Demands



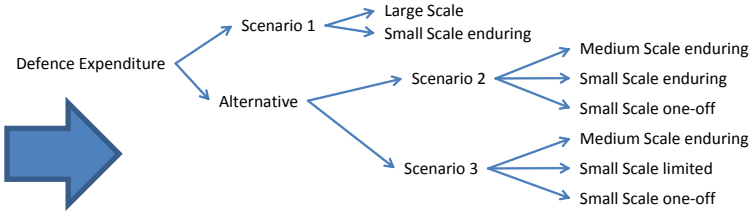
Defining alignment processes across strata



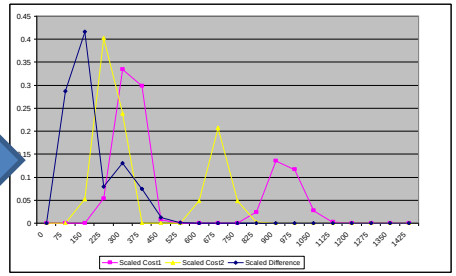
Costing Cohesion of Value Propositions



Monte Carlo Simulation of impact of Variations in Indirect Demand on cohesion cost range



Real Option Valuation of impact of investment on cohesion cost range



UAS

Increased Agility = Reduced Cohesion Costs

Boxer, P.J. (2009) *What Price Agility? Managing Through-Life Purchaser-Provider Relationships on the Basis of the Ability to Price Agility*, Special Report, Software Engineering Institute, Carnegie Mellon University, CMU/SEI-2009-SR-031.

Managing entangled conversations

Supporting superposition

IMPLICATIONS

Implications:

doing more with the same resources

- Responding to multi-sided demands at demand tempo means dynamically aligning many value propositions to many different local environments. This means
  - Managing entangled conversations
    - Dynamic alignment entangles design-time and run-time conversations, changing the supplier's unit of analysis from one-sided markets to the multi-sided contexts with which the supplier is interacting.
    - There has to be conversation with each local environment through which *local coherence* can align pathways.
    - Each conversation must *collapse out* a singular local pathway that need not be correlated with pathways demanded in other local environments.

The Quantum Metaphor helps us to understand the challenge these environments present to Leadership

  - Supporting superposition
    - Platforms have to be engineered that are agile enough to support dynamic alignment to the variety of local environments encountered.
    - This variety of simultaneous pathways supported at demand tempo are a *superposed* set of states.
    - Engineering such platforms involves identifying risks to agility and quantifying the value of increases in agility.

Shifting the focus to managing cohesion cost across the variety of indirect demands led to 30-50% reductions in operating costs

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THANK YOU