



Systems Thinking

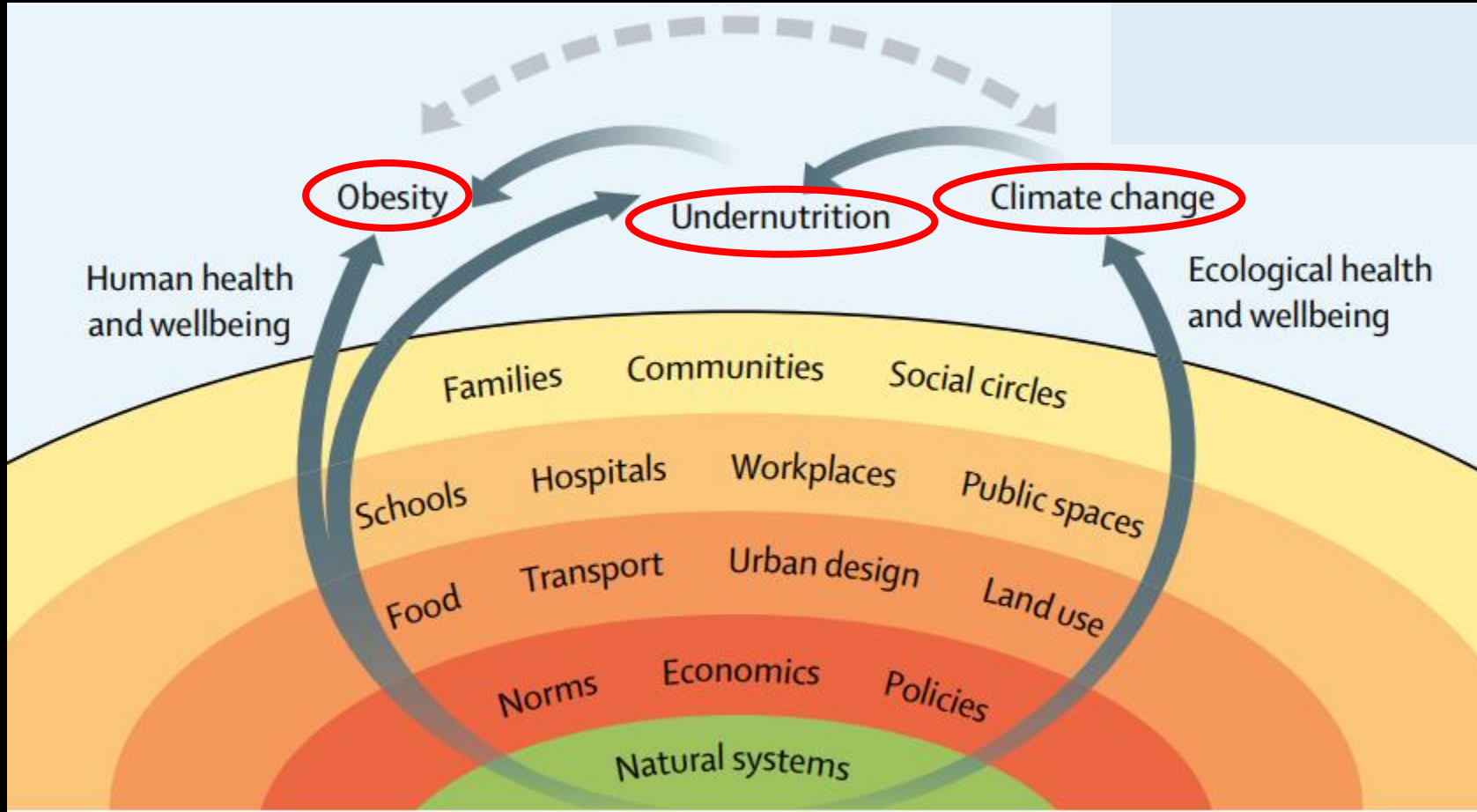
From theory to practice

Rajneesh Chowdhury

July-2019



Source: NATO Association of Canada



Wicked Problems



Ambiguous
Volatile & Unpredictable
Nonlinear
Unique

From theory...

SYSTEMS THINKING

Sunistanai = to cause to stand together

Interconnection *Dependency* *Bonding*

Systems is an integrated discipline that transcends all knowledge dimensions and looks at the interactions between parts of the system that leads to emergent behaviour.

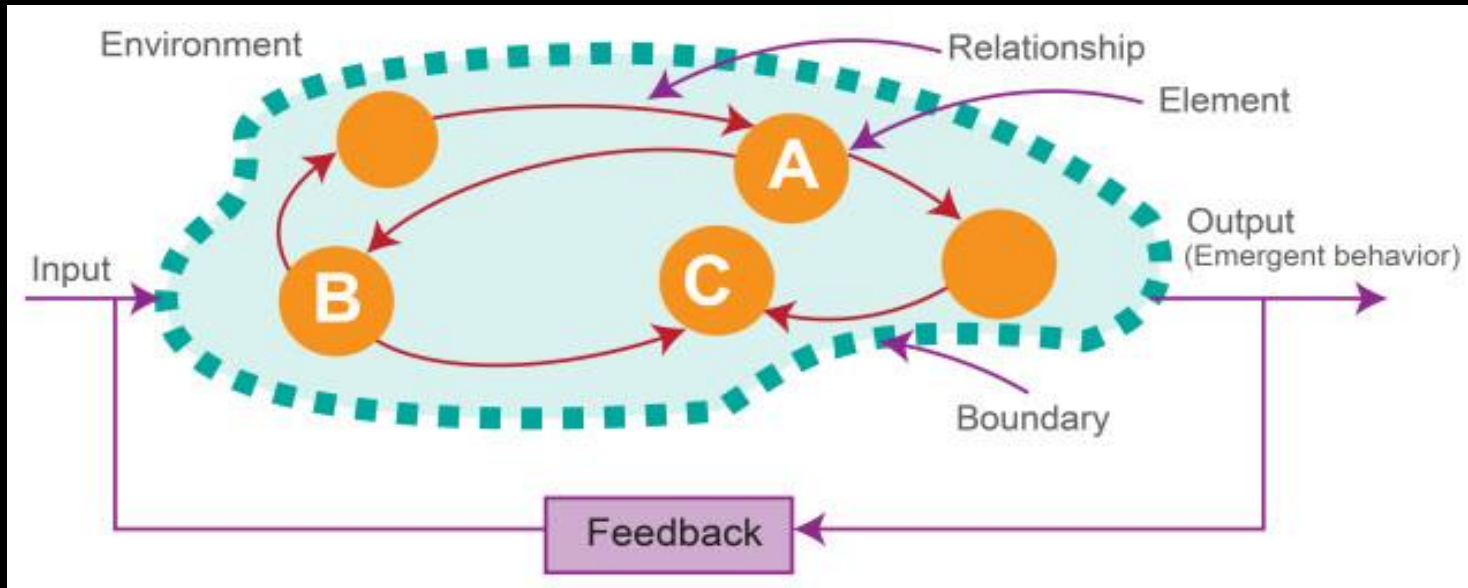
It is the network and interaction between the parts (or subsystems) that give rise to the character of the system as a whole.



Ludwig von Bertalanffy

Biologist

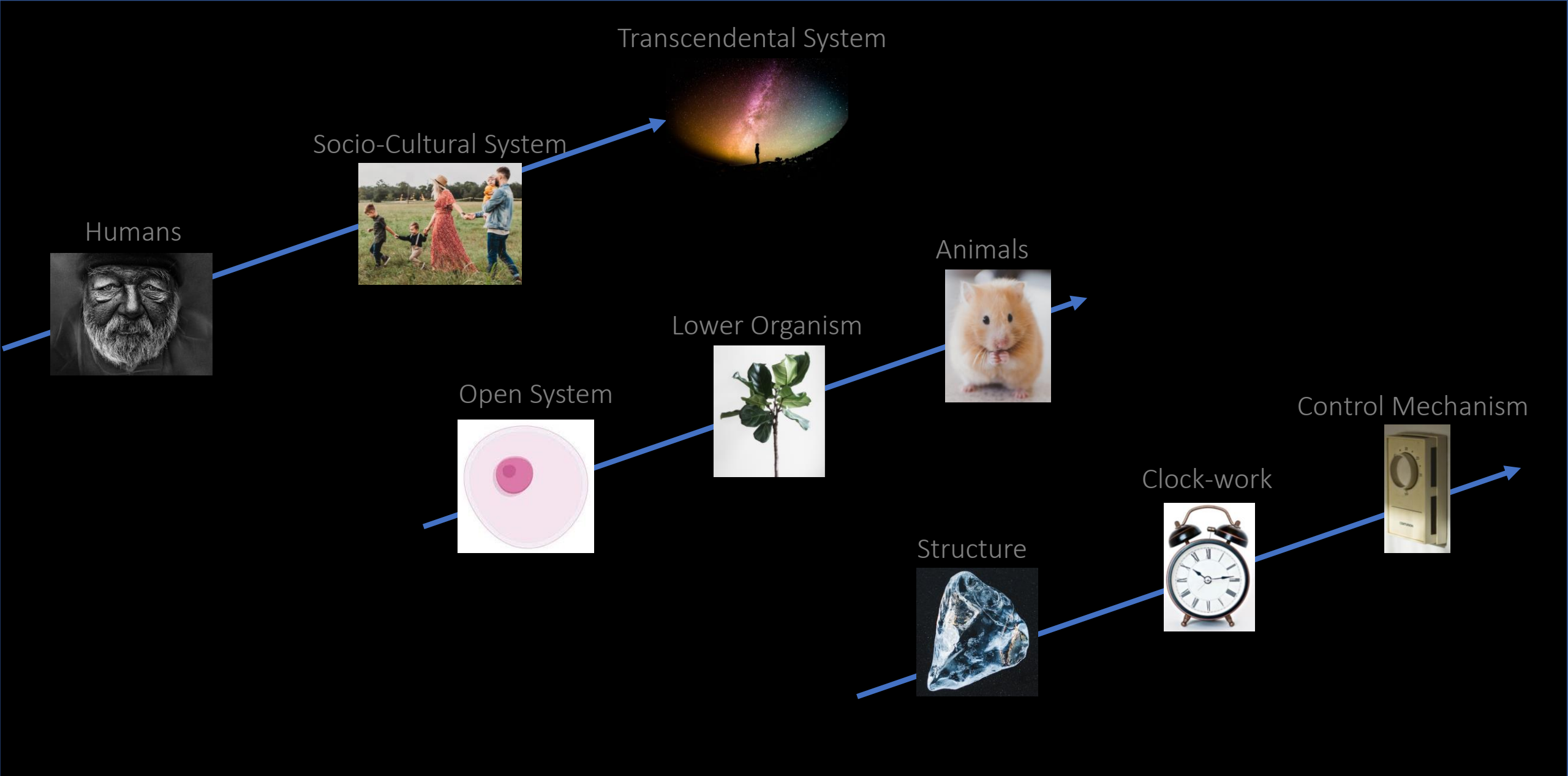
A System



Open System

Homeostasis

Equifinality



Hierarchy of Systemic Complexity

Boulding

A close-up photograph of a mechanical engine component, possibly a piston or valve, with various metal parts and bolts visible. The lighting is dramatic, highlighting the metallic textures and shadows.

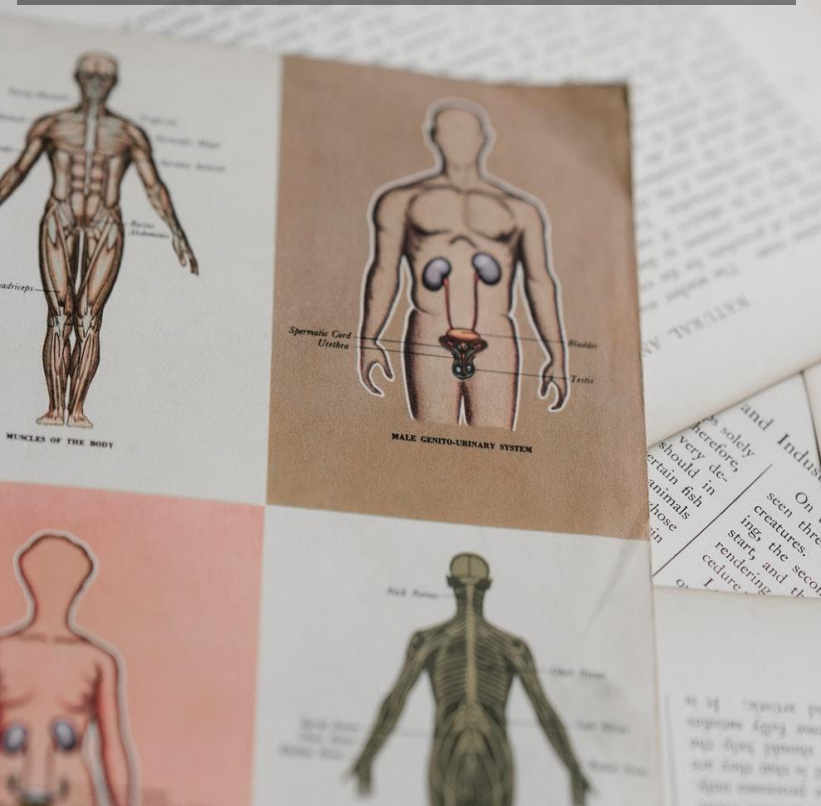
**Reductionist
Approach**

An aerial photograph of a river winding through a deep, rugged canyon. The river is a vibrant blue-green color, contrasting with the reddish-brown rock walls. The canyon walls are steep and layered, showing signs of erosion. The sky is clear and blue.

**Systems
Approach**

Two fundamentally different ways of problem solving

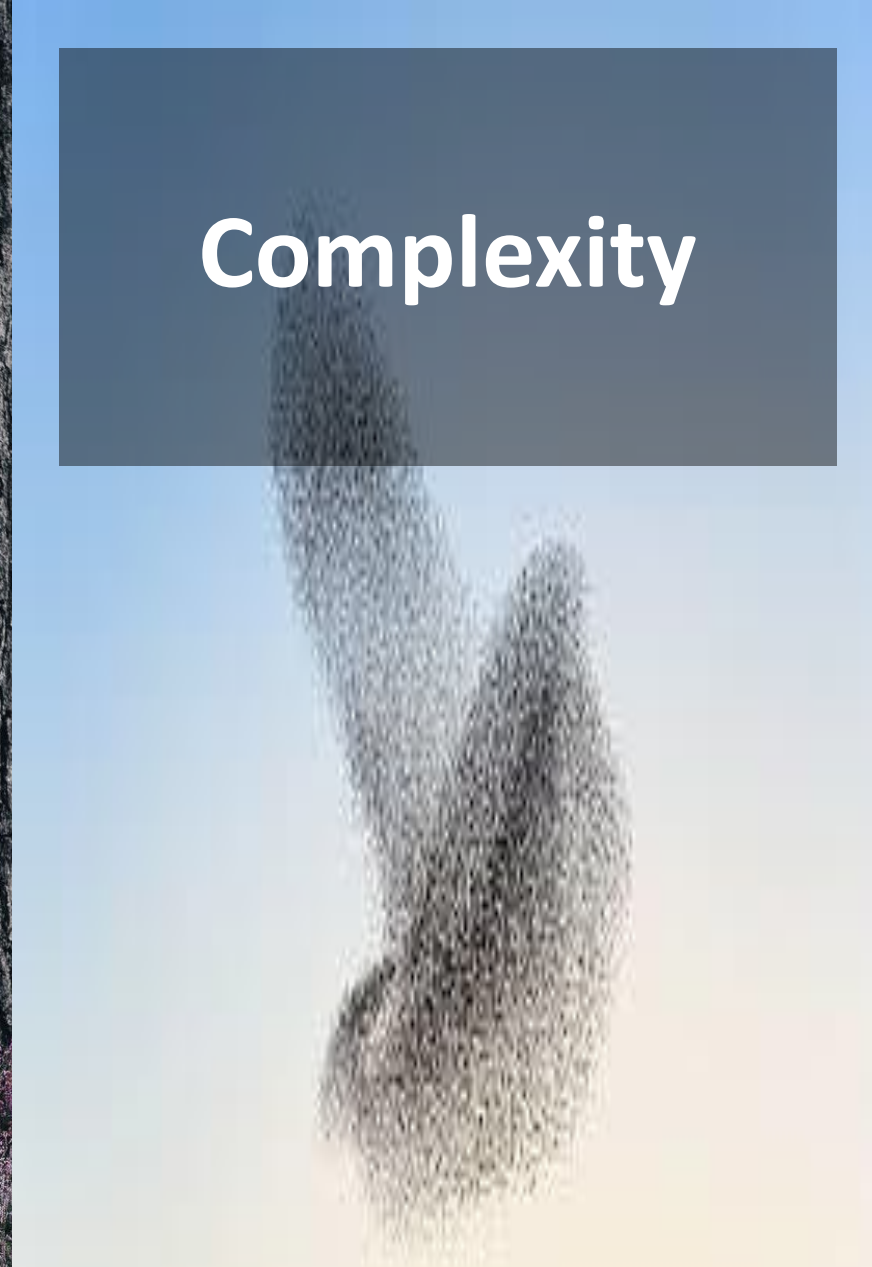
Biology



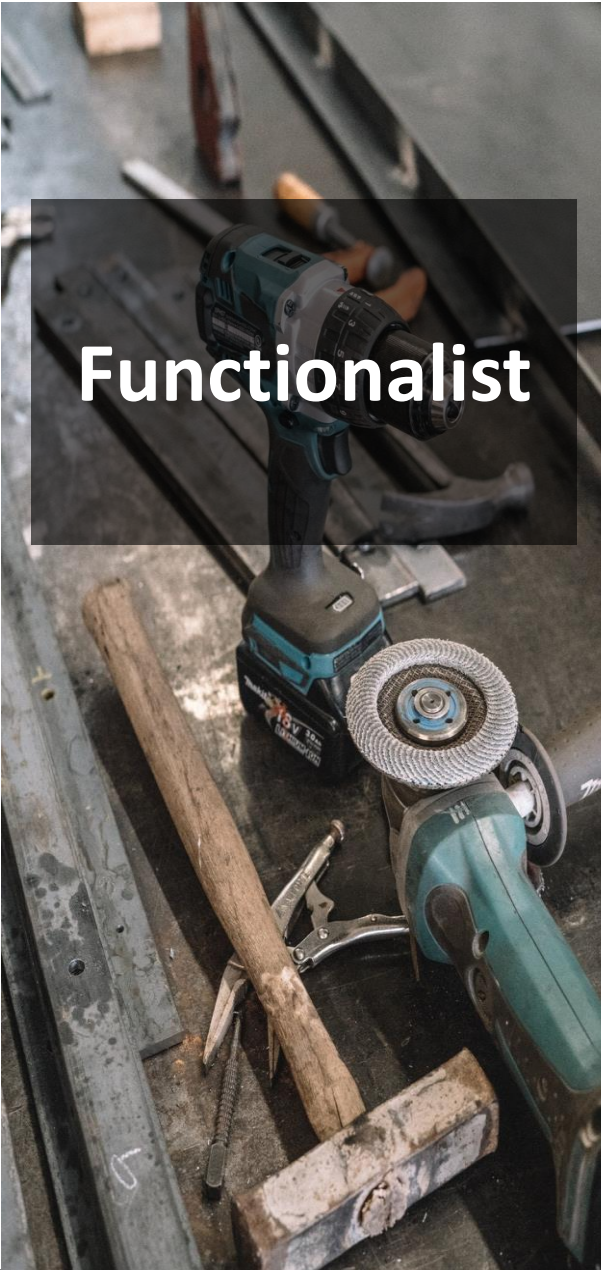
Ecology



Complexity



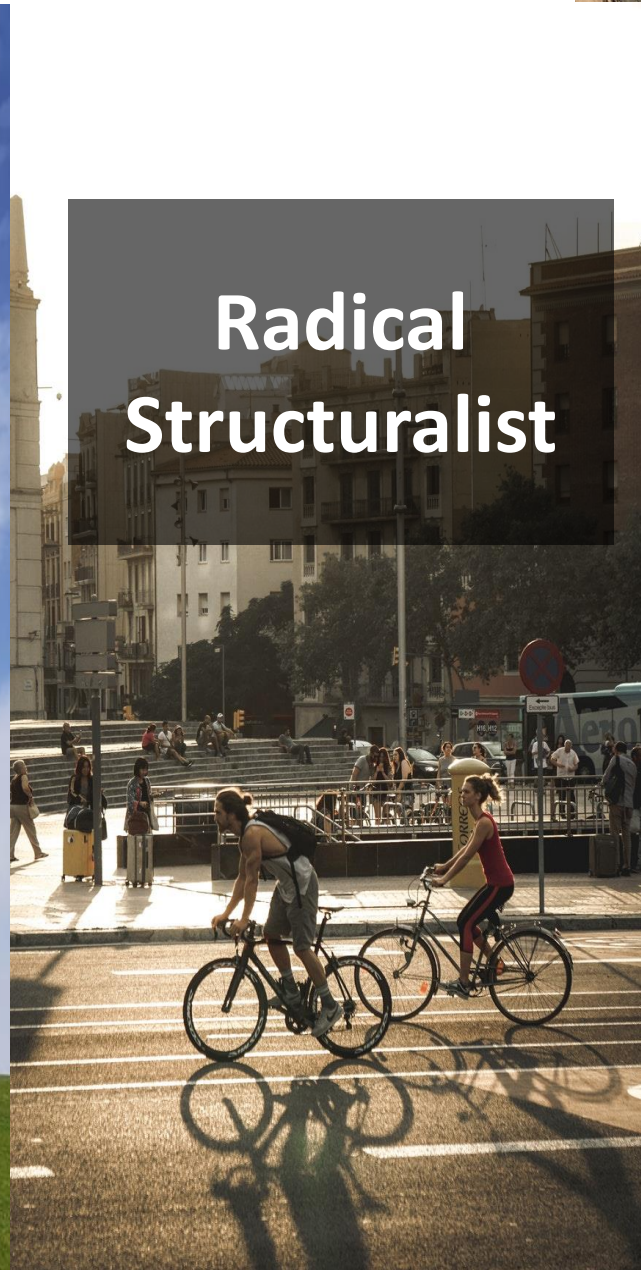
Inspiration



Functionalist



Interpretive

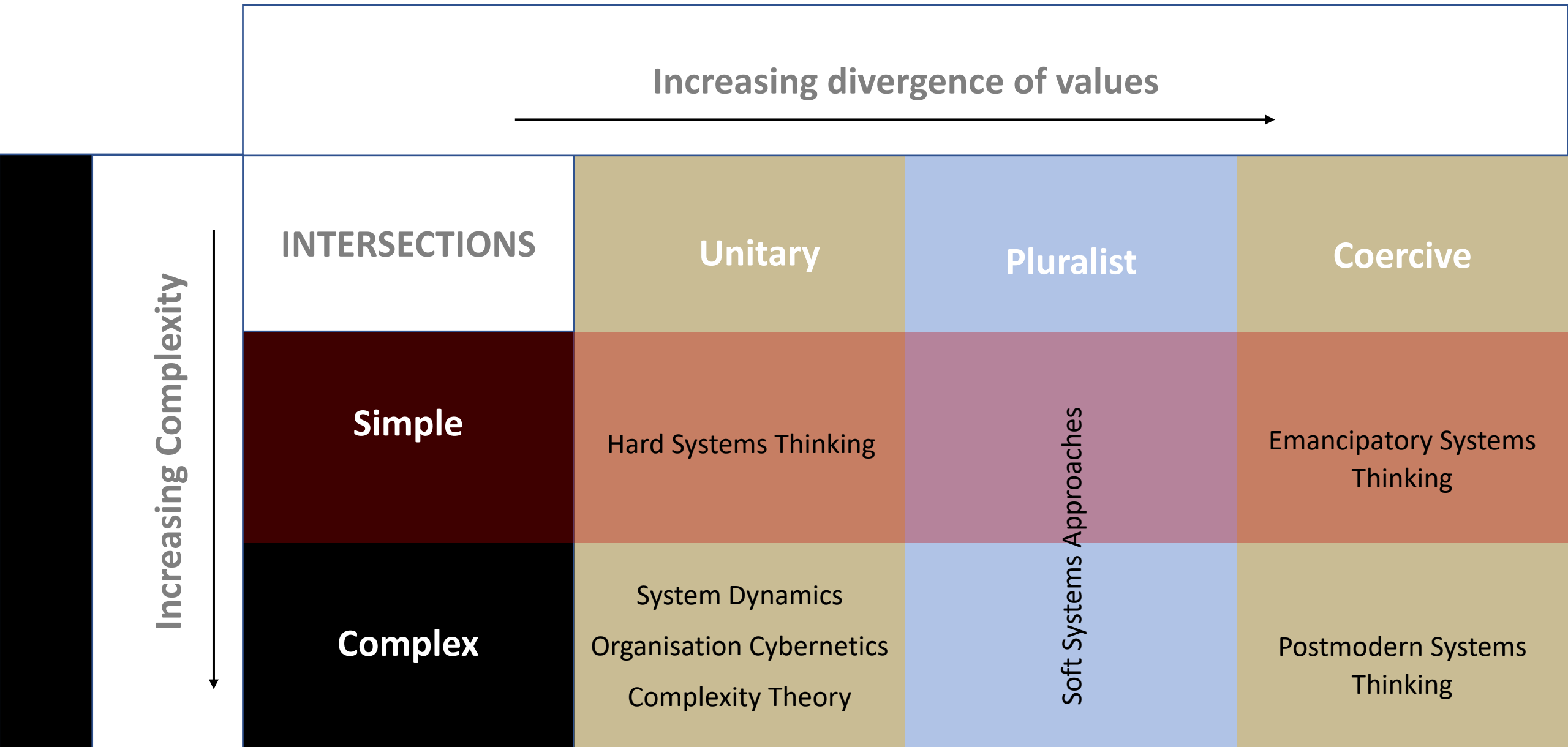


**Radical
Structuralist**



**Radical
Humanist**

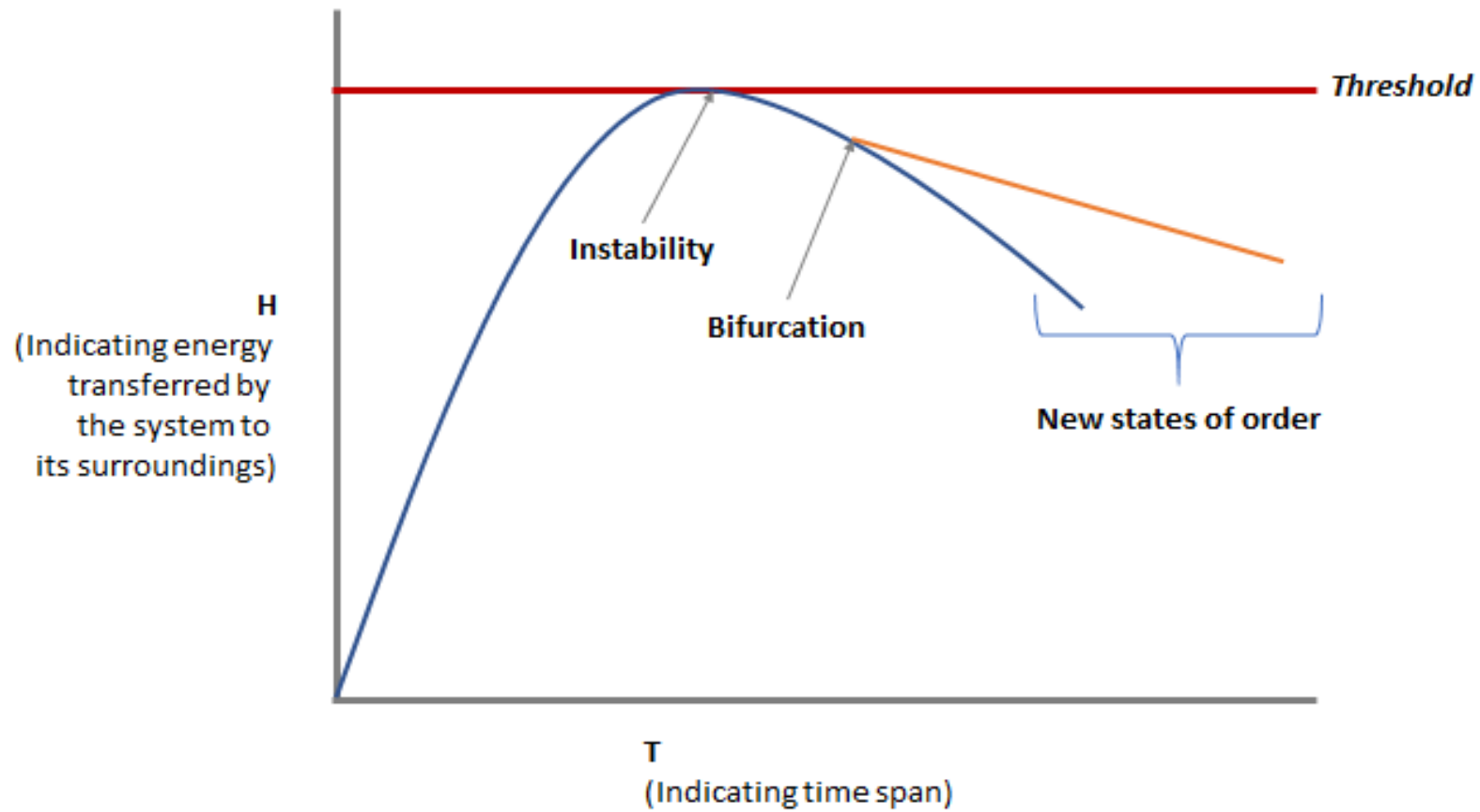
**Paradigms in Social Science influencing systems approaches
(Burrell and Morgan)**



System of Systems Methodologies (SOSM) (Flood and Jackson)

Flexibility is the ability to stay **nimble** and **adaptive** at the wake of changing situations or being able to **reinvent** oneself in thought and action within the same situation. It is the ability to be comfortable with change, to seamlessly think and apply with great **variety**, to be **agile**, and to appreciate and **absorb** unforeseen circumstances without creating shock for the system. **Openness** and **freedom** to choose are aspects that characterise flexibility.

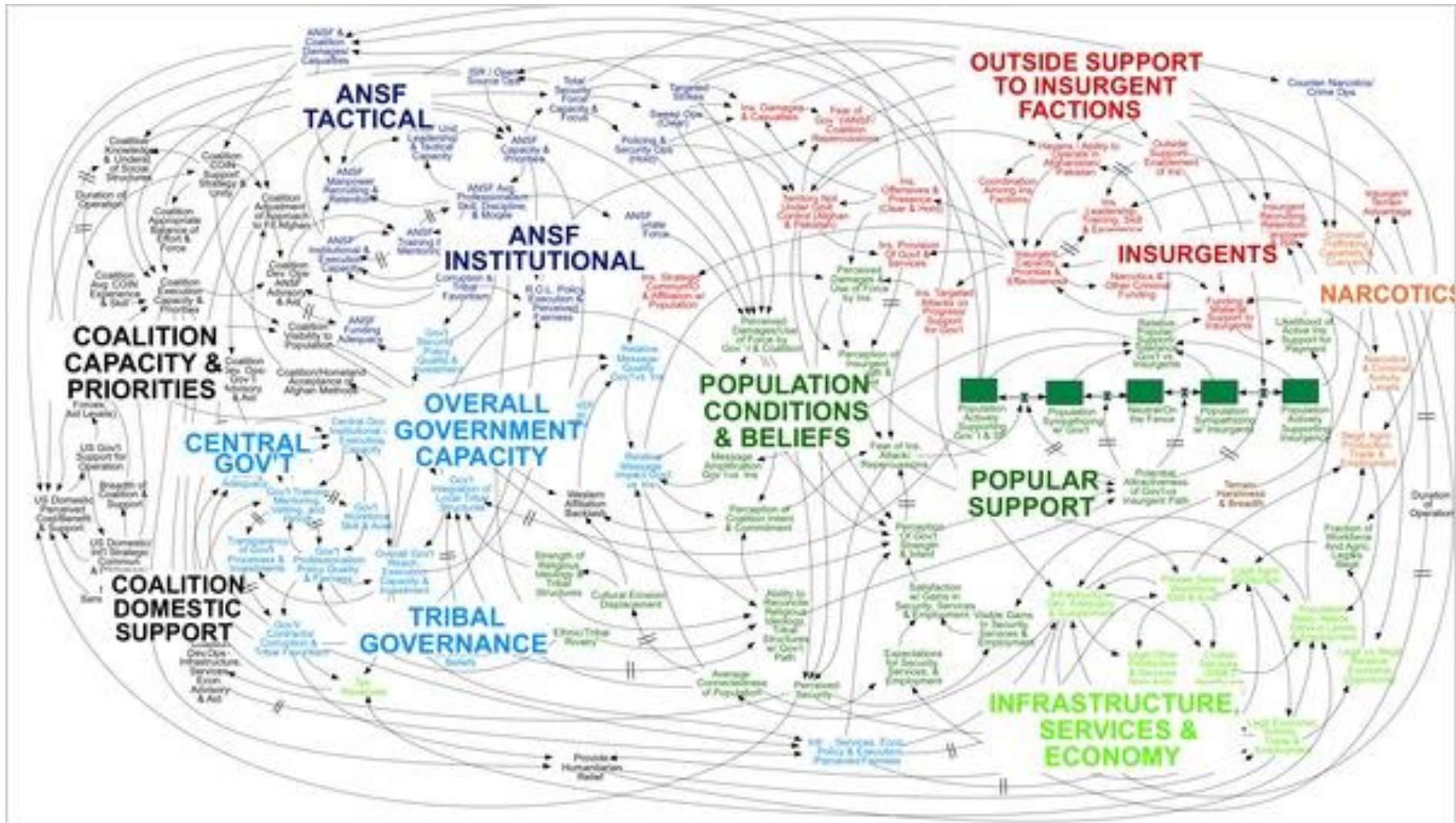




Informational bifurcation and emergence of new states of order (Capra)

... to practice

STRATEGIC CONVERGENCE



Afghan Strategy Map (Source: New York Times)



Clinicians



Managers

Conventional conflict between clinicians and managers



Supporters



Protesters



Fence-sitters

An information system is not seen as a computer system, but as a **human activity system**: the combination of purposeful human activity which may or may not be supported by computer-based technology. The idea of a system is based upon a holistic understanding of human interactions, where the whole is greater than the sum of its parts: by examining the separate functions of a computer-based accounting system, one cannot appreciate the tasks performed by all of the people in an accounting department.

(Gasson, 1994)

The London Ambulance Service (LAS) computer-aided dispatch system failed on 26 October 1992, its first day in operation. From its inception, the system has been treated as a technical problem, to which a viable solution could be found. But **LAS exhibited social and political dimensions** which the technology-based approach proved ill-equipped to address.

(Clarke, 2001)

Problem Structuring

(Simon, 1976)

Substantive Rationality

Soft Systems Methodology
(SSM)

(Checkland)

INTERSECTIONS	Unitary	Pluralist	Corecive
Simple	Hard Systems Thinking	Soft Systems Approaches	Emancipatory Systems Thinking
Complex	System Dynamics Organisation Cybernetics Complexity Theory	Soft Systems Approaches	Postmodern Systems Thinking

Procedural Rationality

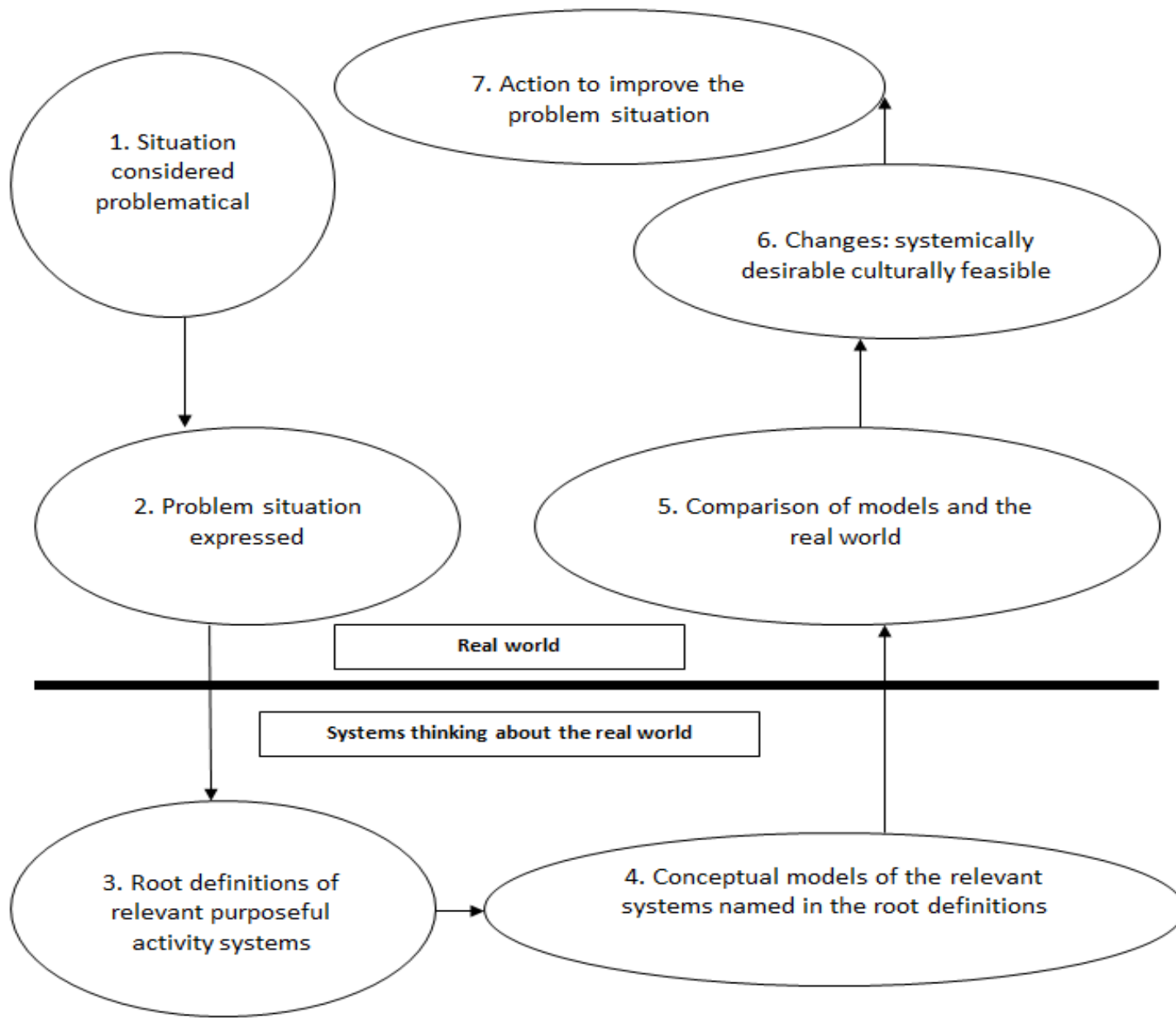
Strategic Assumption
Surfacing & Testing (SAST)

(Mason & Mitroff)

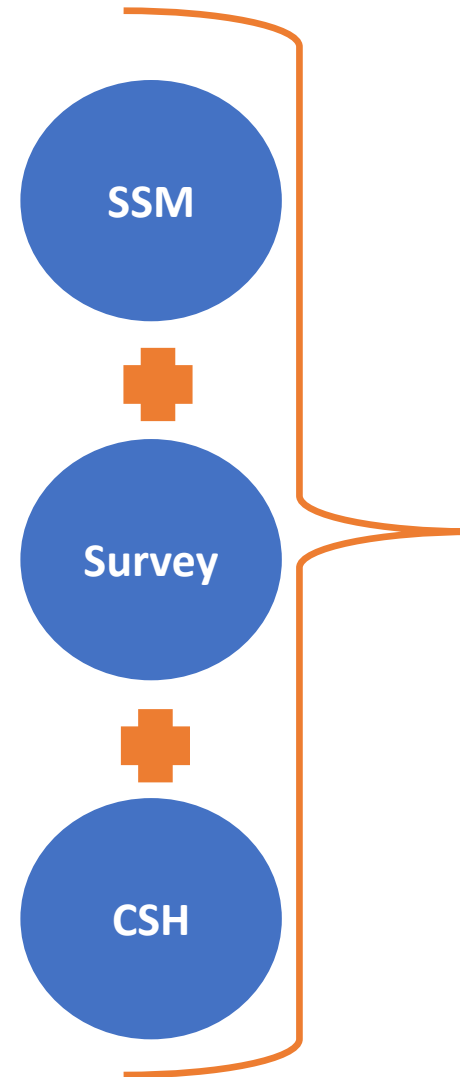
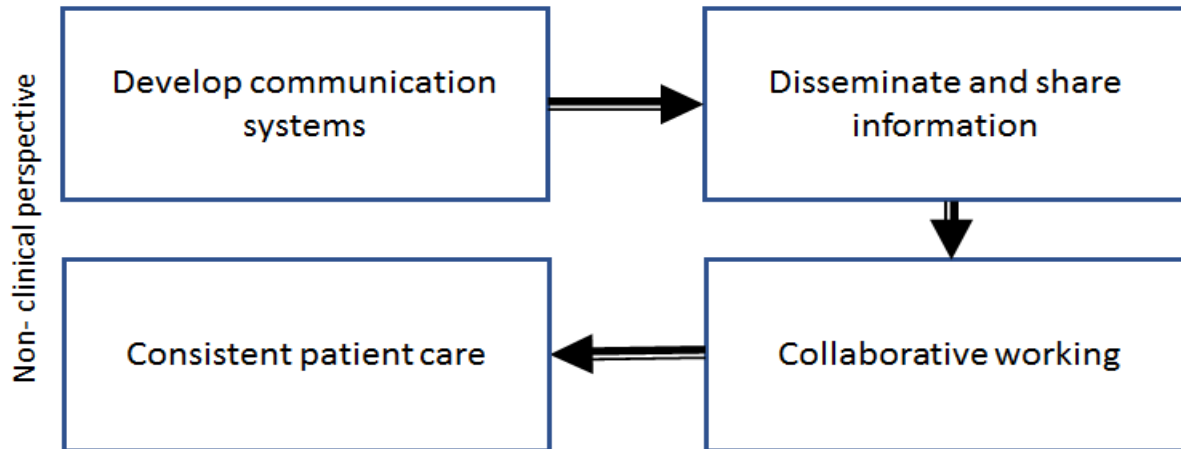
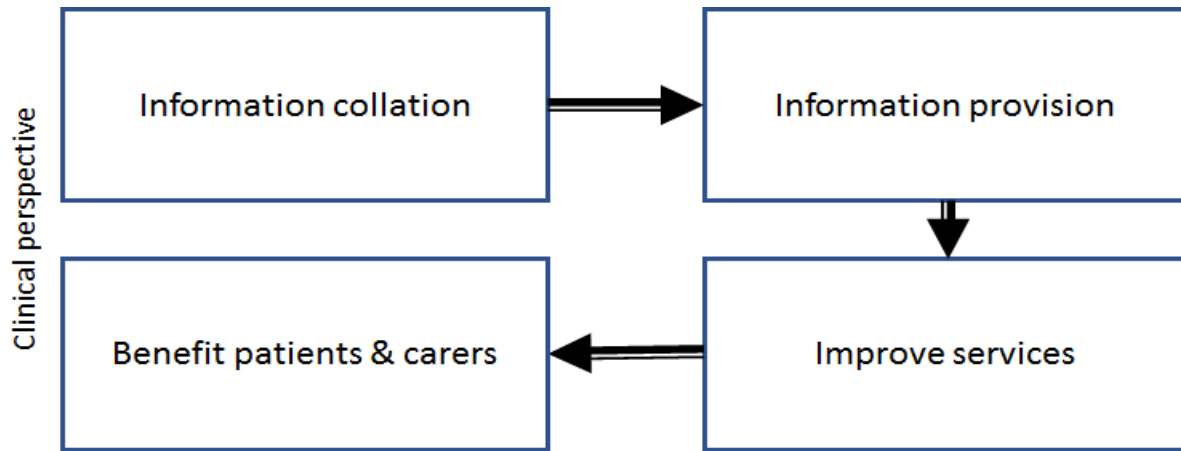
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Problem Dissolving

The intervention



Conceptual Models



- Significant gaps
- Hidden tension
- Seemingly irreconcilable differences

But intent was the same!

Change that is **systemically desirable** and **culturally viable**

We agreed on the common vision for a **collaborative approach** to healthcare IS that would support both clinicians and non-clinicians alike to work seamlessly in a knowledge-environment for better patient outcomes.

Problem Structuring

(Simon, 1976)

Substantive Rationality

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Procedural Rationality

Strategic Assumption
Surfacing & Testing (SAST)

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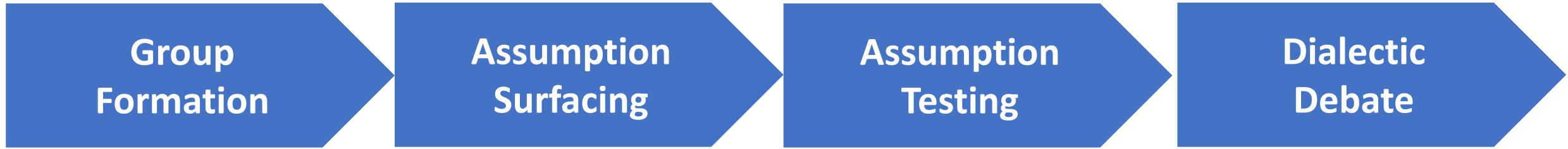
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Problem Dissolving

The intervention

- A **satisficing** rather than optimising rationale
- An acceptance of **conflict** over goals
- Different objectives measured in their **own terms**
- The employment of **transparent methods** that clarify conflict and facilitate negotiation
- The use of analysis to **support judgement** with no aspiration to replace it
- The treatment of human elements as **active subjects**
- Problem formulation on the basis of a **bottom-up** process
- Decision taken as **far down the hierarchy** as there is expertise to resolve them
- Acceptance of **uncertainty** as an inherent characteristic of the future

An organisation only really begins to learn when its most cherished assumptions are challenged by counterassumptions. Assumptions underpinning existing policies and procedures should therefore be unearthed and alternatives put forward based on counterassumptions.



Thesis **+** Anti-Thesis **=** Synthesis

Group-1

Top-down Approach

1. IT industry has vested interest in personal gains.
2. Media wants to portray a negative image.
3. The media should be more positively engaged by CfH.
4. The general public have a one-sided view, as portrayed by the media.
5. The general public has a lack of confidence in CfH.
6. The IT industry has a conflict of interest.
7. The general public has a lack of understanding of the aims of CfH.
8. The general public believes that money should rather be spent on healthcare and on professionals, than on IT.
9. The government expects too much too soon from a complicated project.
10. The government has an unrealistic time-frame for delivery of the project.
11. The government is politically driven and does things that are locally irrelevant.
12. The healthcare sector has a lack of expertise and lack adequate IT staff to deliver the project.
13. Finance department underestimated resources needed for the national and local delivery of the project.
14. Clinicians believe that they have not been consulted.
15. Clinicians have an unrealistic expectation of participation.
16. Clinicians have a fear of their IT skills.
17. Patients are mostly not interested in getting involved.
18. There is lack of training capacity to ensure skills for delivery.

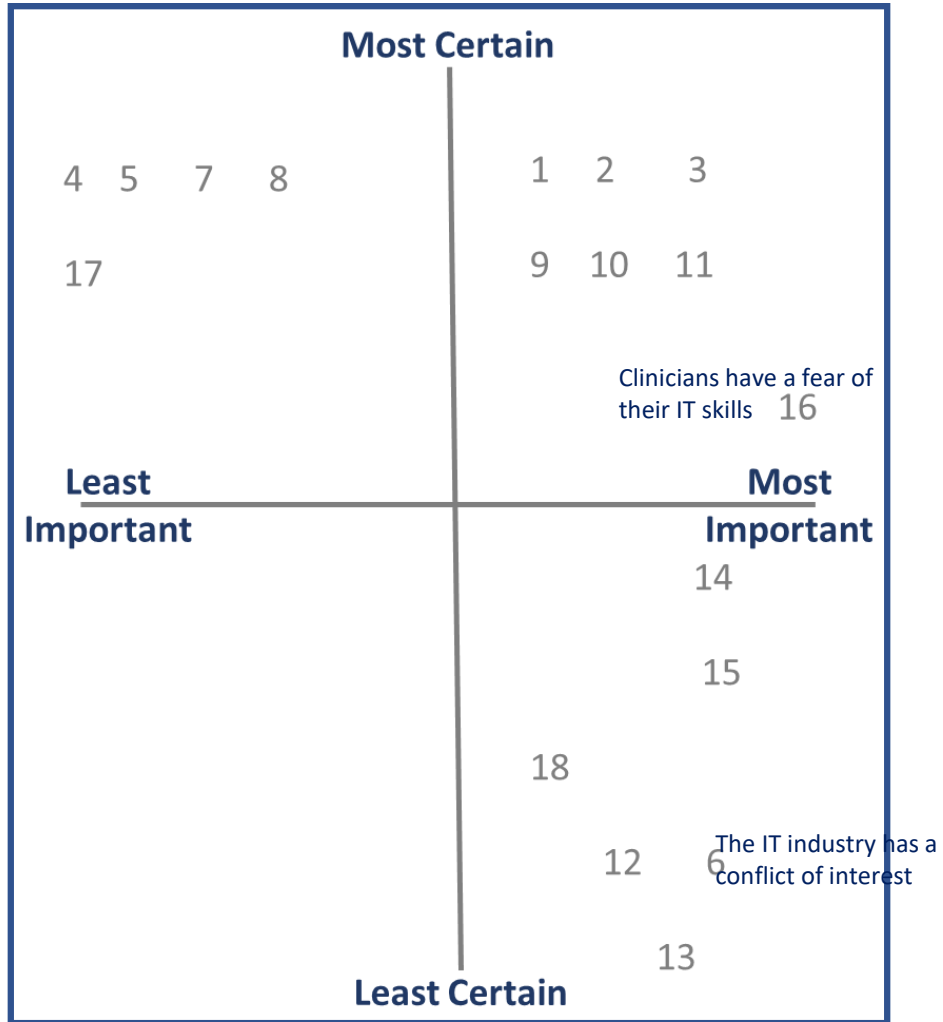
Group-2

Bottom-up Approach

1. CfH will go over cost. It is a white elephant.
2. Administrative staff will be resistant to change.
3. Administrative staff has no time to work with the new systems.
4. Clinicians are not computer literate.
5. Clinicians are time limited to work with the new systems.
6. Patients are not computer literate.
7. Clinicians are conservative to accept change.
8. Government is control freak.
9. Clinicians are sceptical about success of CfH.
10. Patients want local treatment.
11. Private healthcare services are only interested in profit.
12. Clinicians are sceptical about patient confidentiality in the new system.
13. NHS managers need numbers.
14. Suppliers see CfH as an opportunity for profit.
15. Administrative staff will find it difficult to use the new system.
16. The treasury wants to keep costs under control.
17. Patients lack knowledge about the system.
18. The government wants to impose solutions all the time.
19. Universities need to do more research for information and funding.
20. Private healthcare services are always after more NHS work.
21. Government will blame someone else when the system does fails.

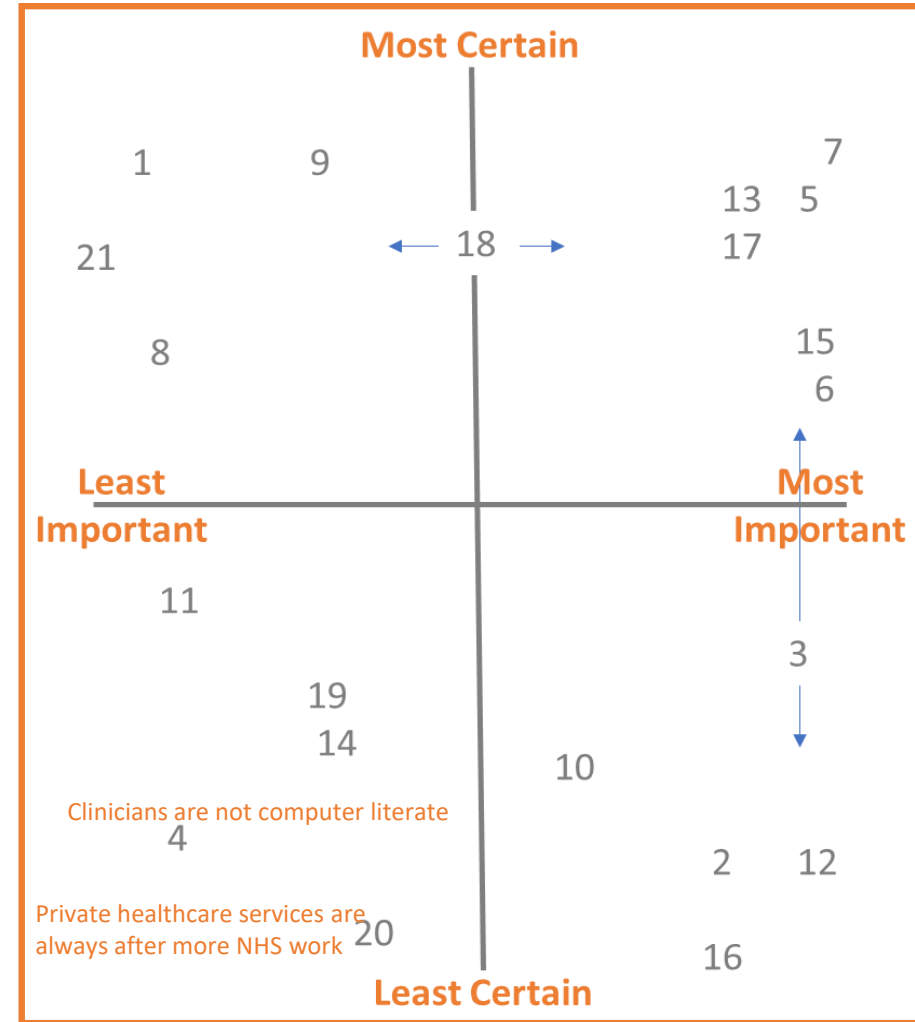
Group-1

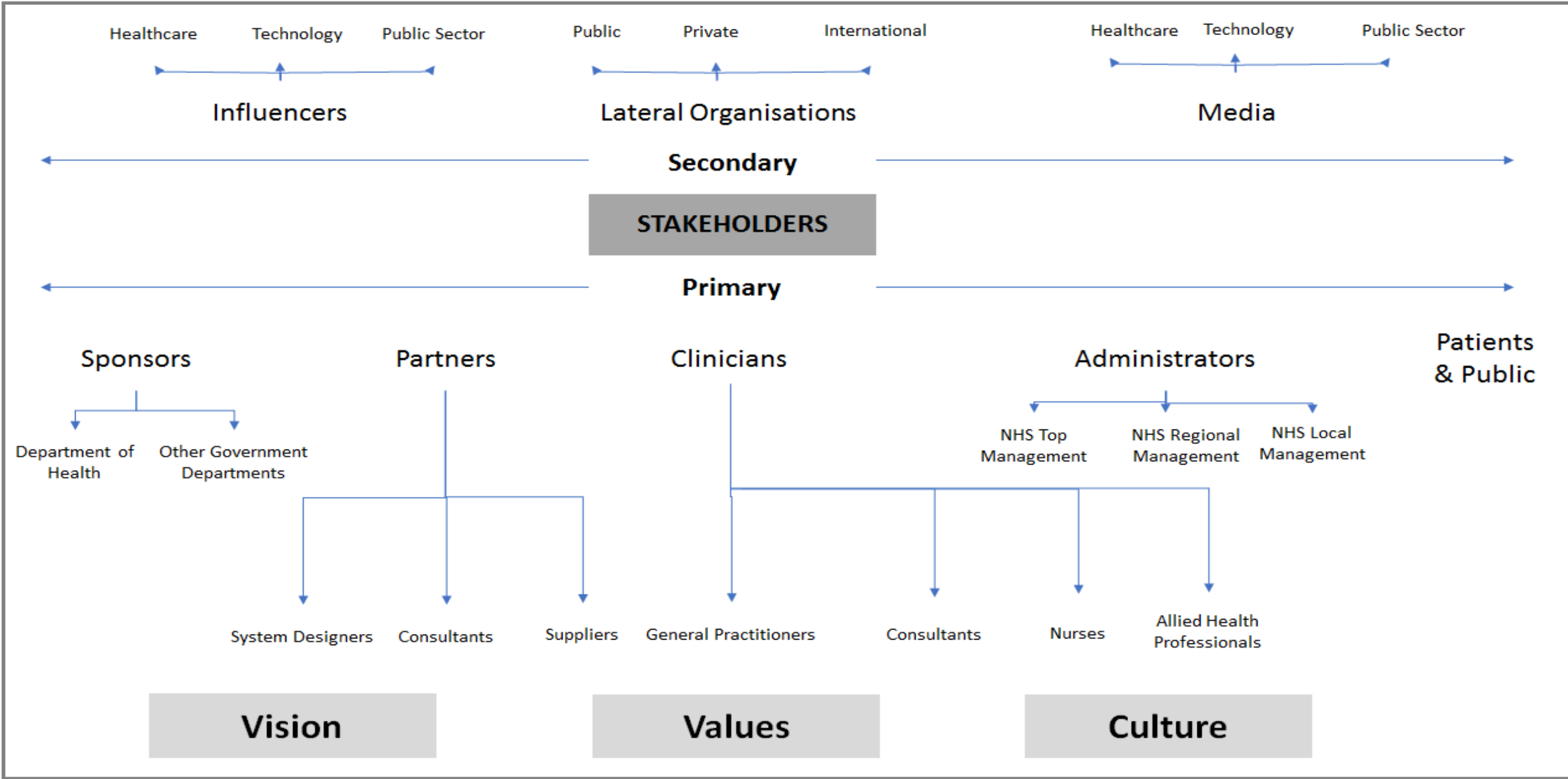
Top-down Approach



Group-2

Bottom-up Approach

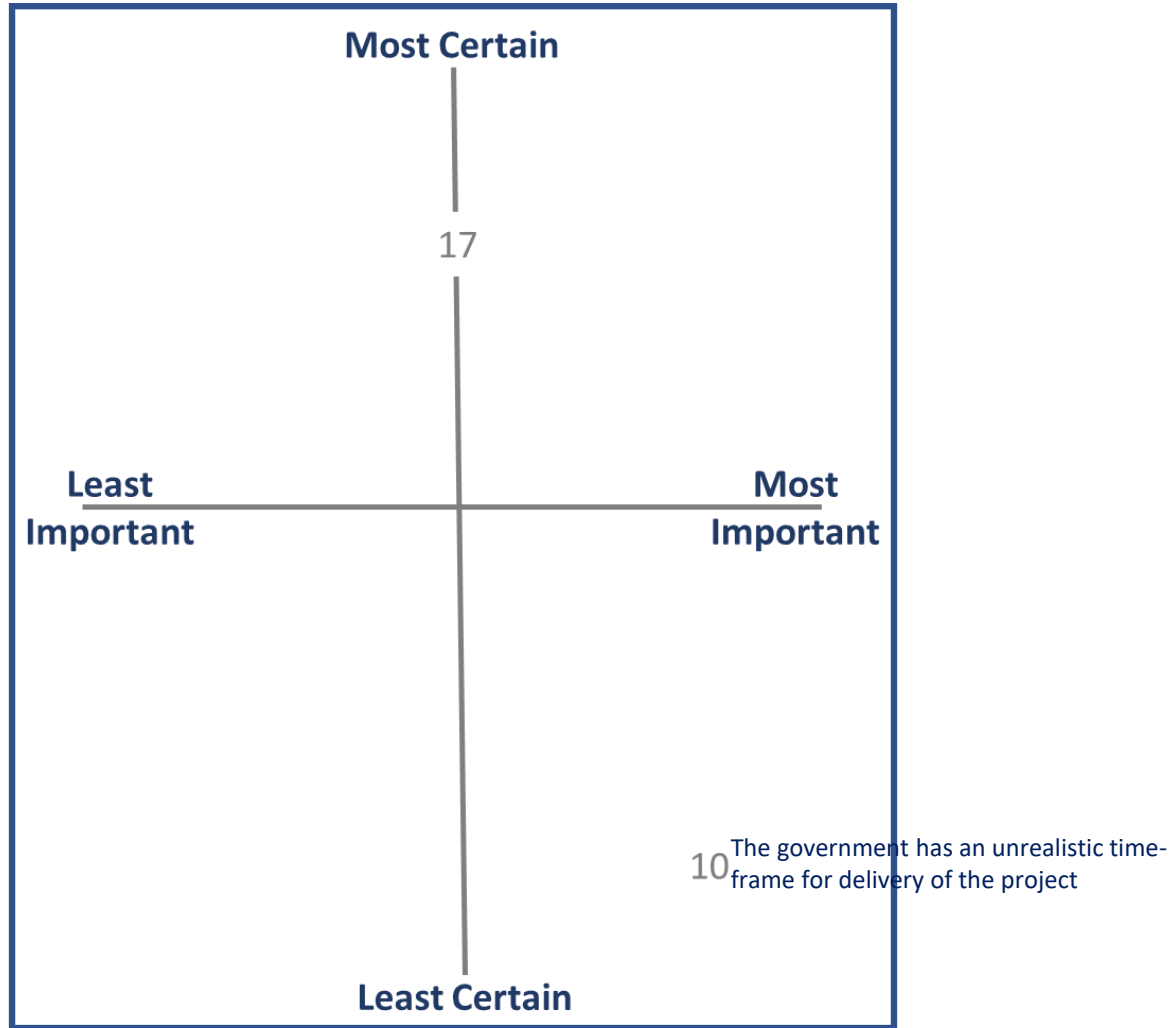




Stakeholder Map

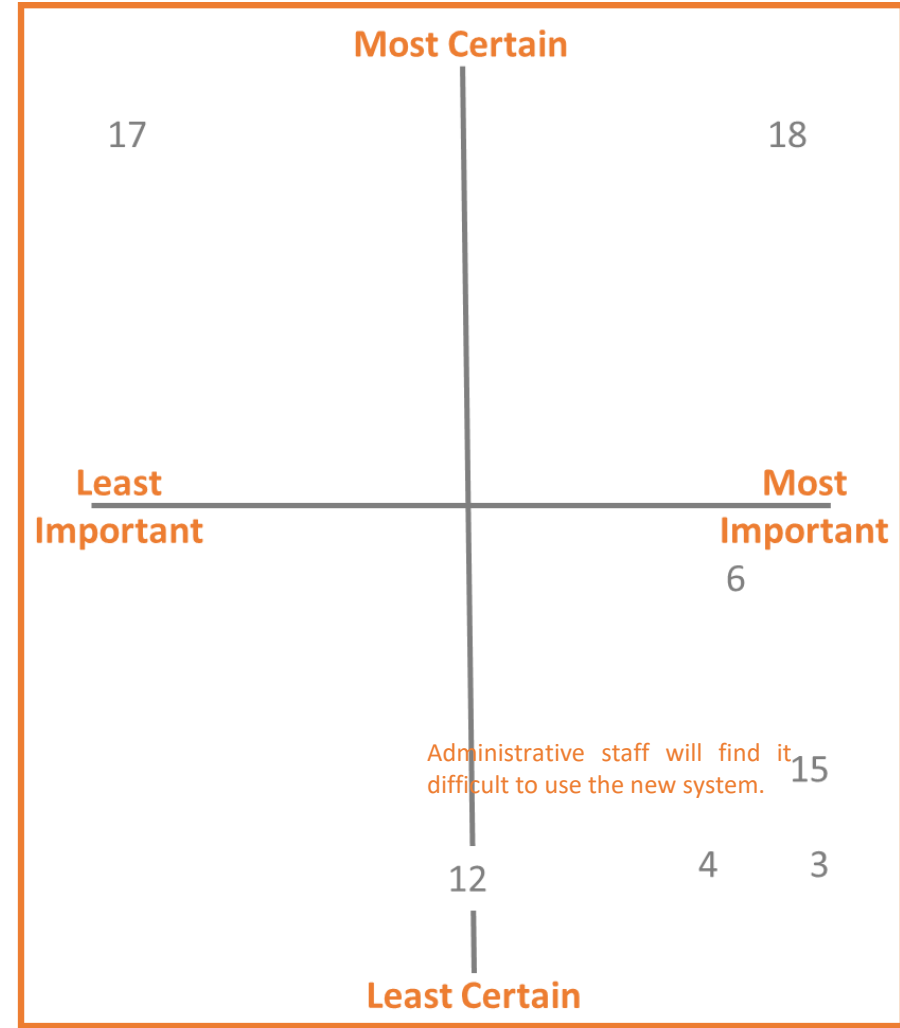
Group-1

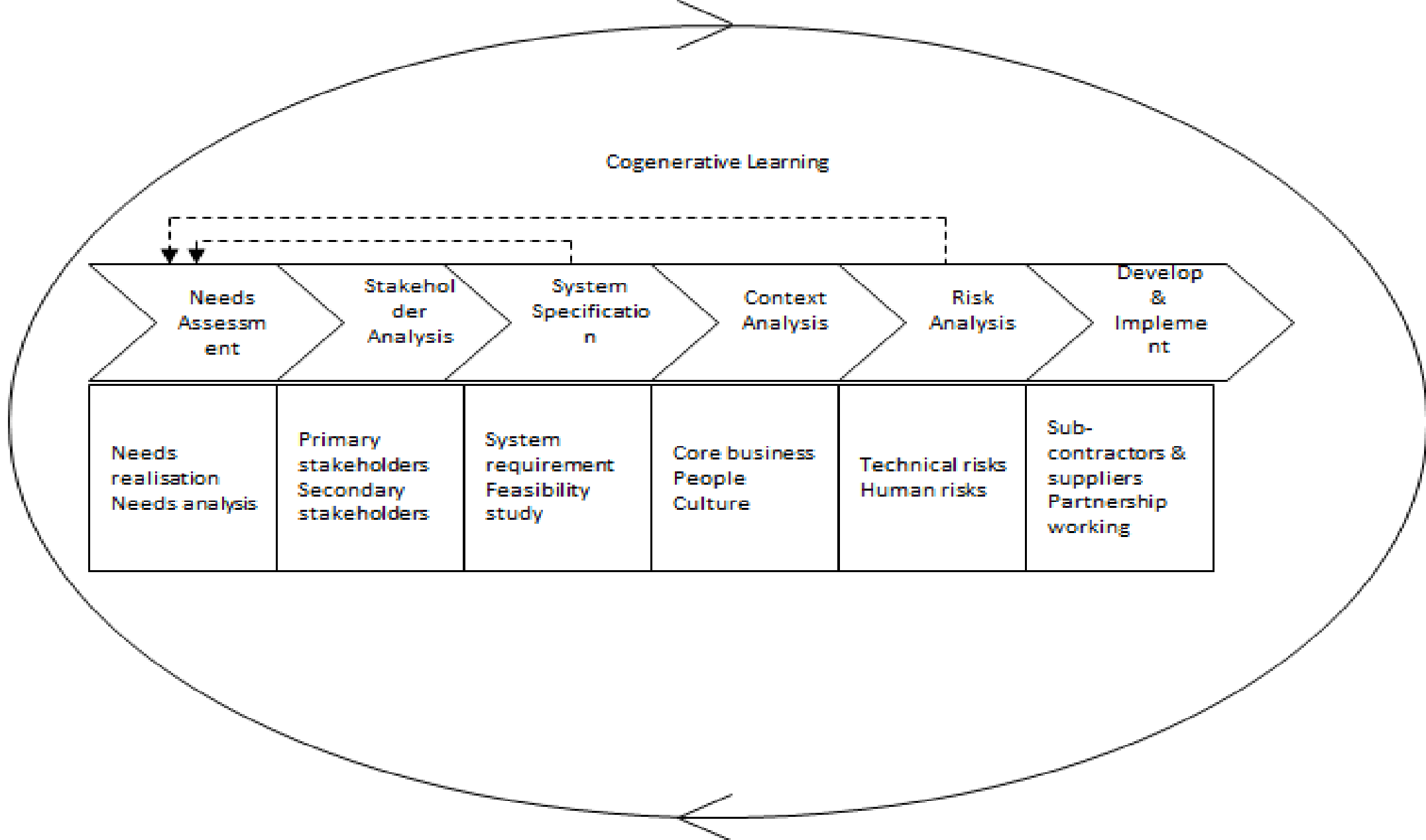
Top-down Approach



Group-2

Bottom-up Approach





Normative Approach to Healthcare IS

Strategic: an act of great importance within an integrated whole or to a planned effect

Convergence: an act of moving toward union or uniformity

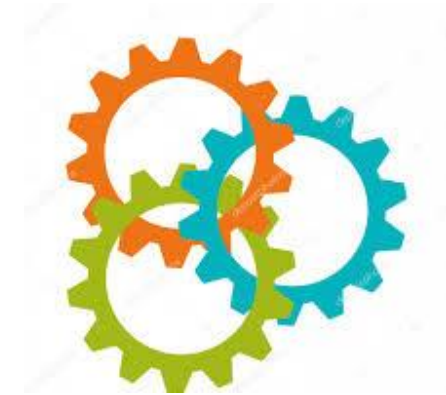
(Merriam-Webster)



INTENT



WORLDVIEW



ACTION-ORIENTATION

Strategic convergence involves going **beyond the obvious** of seeking fact-based agreements to aspiring for **values-based consensus**. This requires deeper intervention where the parameters of **intent, worldview and action-orientation** become important.



- Surfaced organisational challenges
- Delineated personal from organisational
- Non-competitive nature
- Fractions were non-threatening
- Enabled creative tension
- Unearthed hidden issues and mindsets
- Established common understanding
- Helped clarify procedural and substantive rationality



- Inadequate inclusivity
- Pre-research already brought in coloured perspectives
- Conceptual challenges
- No consideration of power-dynamics
- Scope for only 2 groups (SAST)
- Too much focus on consensus
- Who knows if the expression is authentic?
- Rationality for control?

Increasing divergence of values



Increasing Complexity



INTERSECTIONS

Unitary

Pluralist

Coercive

Simple

Linear Programming
Goal Programming
Viable System Model

Soft Systems Approaches

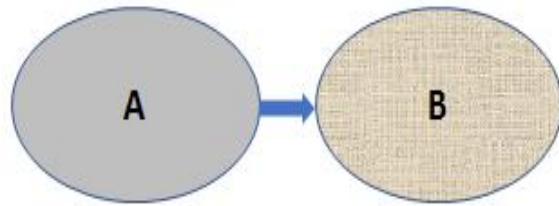
Emancipatory Systems
Thinking

Complex

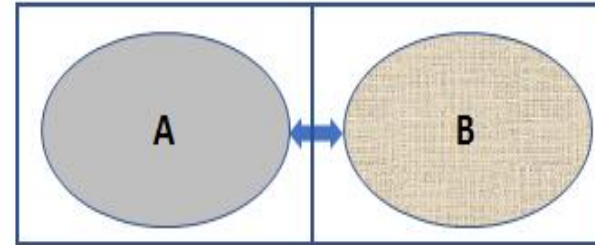
System Dynamics
Organisation Cybernetics
Interpretive structural
modelling

Postmodern Systems
Thinking

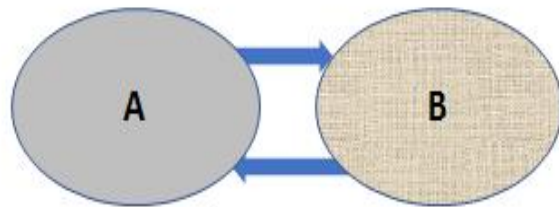
System of Systems Methodologies (SOSM) (Flood and Jackson)



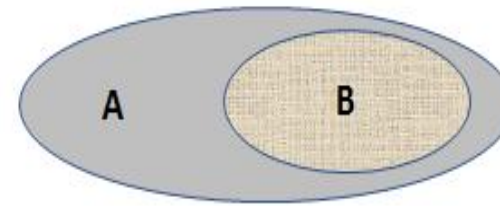
One-way Integration using in succession



Different Techniques for different parts of the problem situation



Both-ways integration



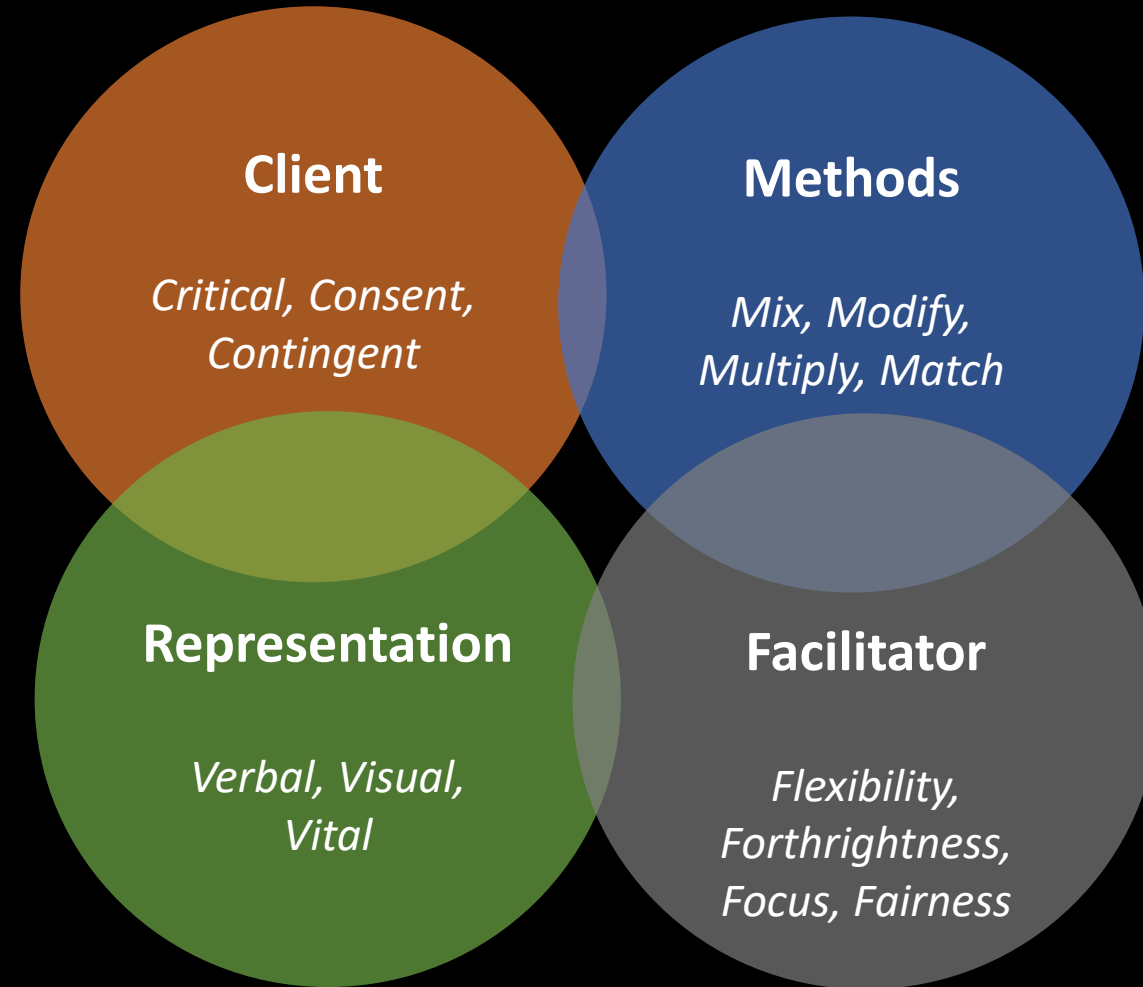
Submerging with identity



Full-mixing or amalgamation

Integration of Techniques (Sushil)

Nature of Pluralism



Taket & White in context of postmodern management systems

From theory to practice

HOLISTIC FLEXIBILITY

Flexible Systems Management

Rajneesh Chowdhury

Systems Thinking for Management Consultants

Introducing Holistic Flexibility

*Foreword by
Professor Michael C. Jackson OBE*

 Springer

A **significant addition** to the literature on 'systems thinking', particularly because the ideas it espouses are grounded on practical project work. They have emerged as a result of reflection upon fifteen years of personal experience undertaking management research and consulting in India and the UK. These engagements have embraced a wide variety of organisations in private industry, public health, professional services, and the charitable sector.

Michael C. Jackson OBE

Past President, International Federation for Systems Research, International Society for Systems Sciences, Professor Emeritus, University of Hull (UK)

The author **convincingly argues for the case of 'responsible outcomes'** for management interventions that is much needed for corporations, not-for-profits and governments operating in the current day. Insights presented in this book can have far-reaching impact in the areas presented, and beyond.

Zenia Tata

Chief Impact Officer, XPRIZE Foundation (USA)

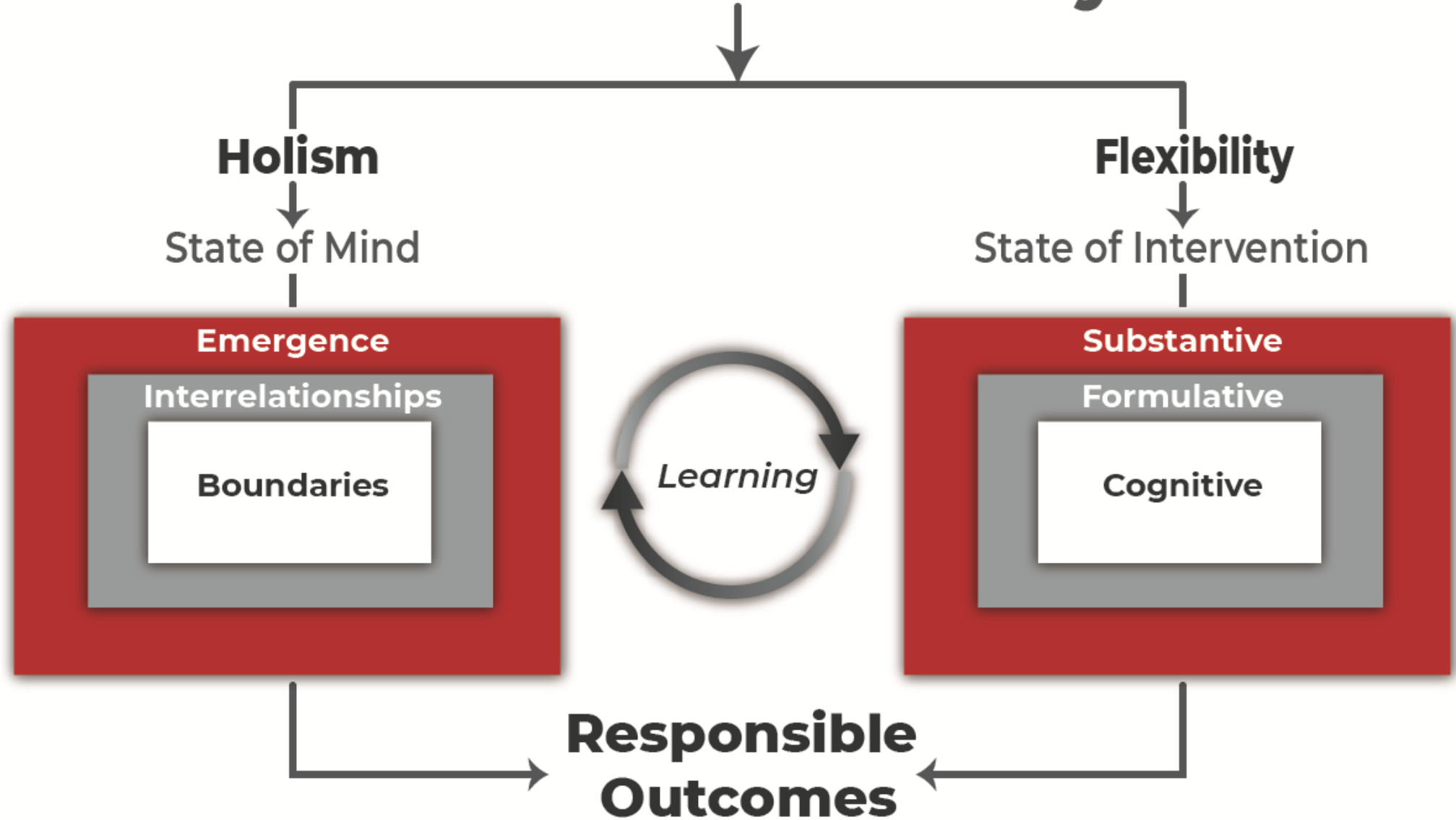
A **comprehensive journey** of understanding the relevance of systems thinking for consultants and change makers. Rajneesh's argument on building 'responsible outcomes' for change interventions brings in an onus to systems consultants to work towards solutions that are meaningful and sustainable. This is especially so at a time when we are moving to agile methods of driving change. This book is a significant addition in the literature of management consulting, for students and practitioners of this science.

Gopal N Sarma

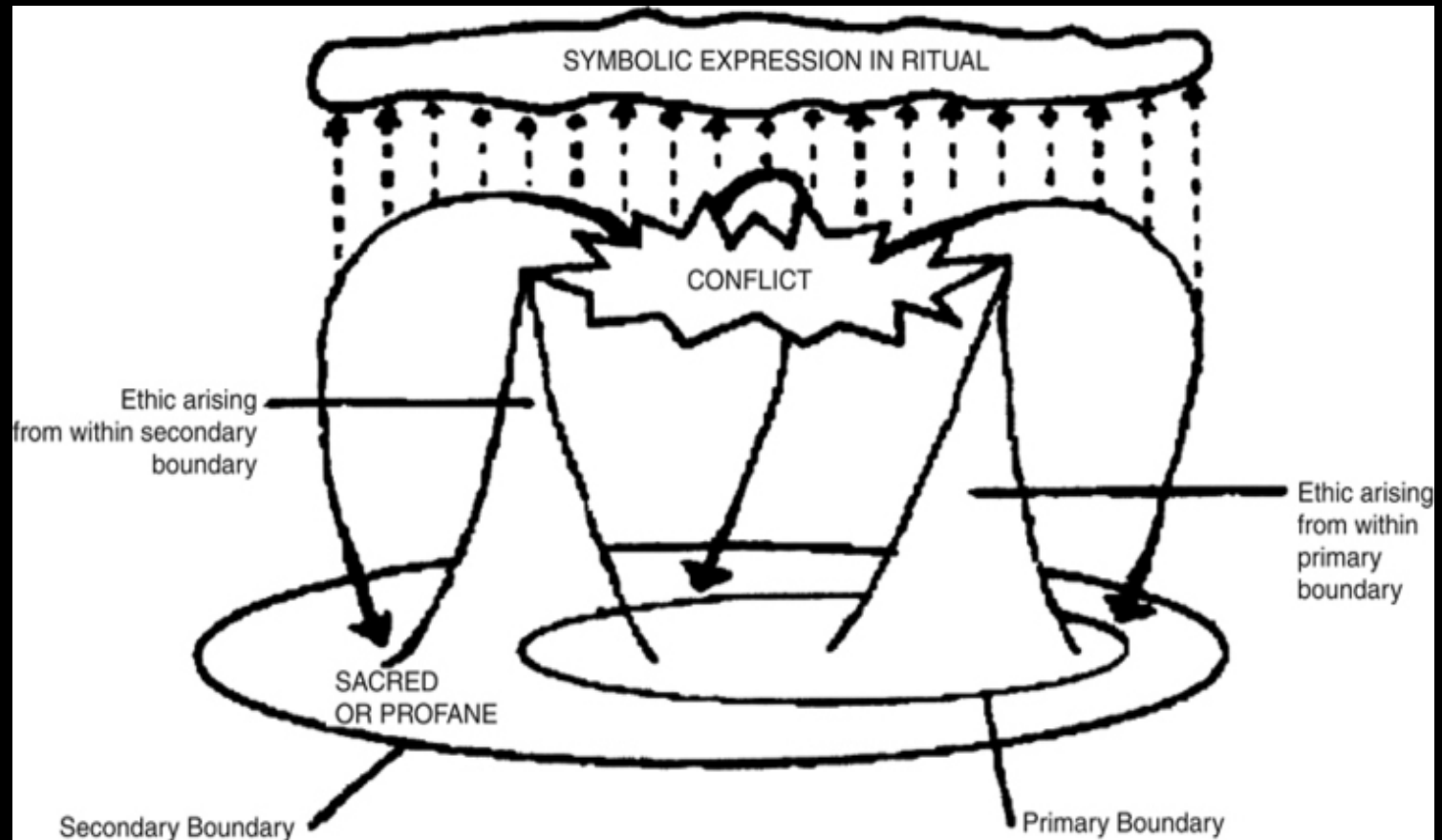
Partner, Bain & Company (India)

Published worldwide by Springer in 2019

Holistic Flexibility



Since there is no such thing as perfect boundary judgments – perfect boundary judgments would be those we can avoid – the crucial issue is not so much what they are but how we handle them. We cannot avoid the deficits of knowledge and rationality they imply; but we can at least try to handle these deficits in **transparent and prudent ways**”
(Ulrich, 2017)



Boundaries (Midgley & Pinzon, 2011)

Autopoiesis

“An **autopoietic** [system is] (defined as a unity) a network of processes of production (transformation and destruction) of components that produces the components which:

- I. through their interactions and transformations continuously **regenerate and realise** the network of processes (relations) that produced them, and
- II. constitute it as a **concrete unity** in the space in which they (the components) exist by specifying the topological domain of its realisation as such a network”

(Maturana & Varela, 1980)

Autopoietic systems **define, maintain, and reproduce** themselves, and appreciating the same can enable consultants work with directed energy towards a common goal

Interrelationships

Emergence

“Emergence is a **process, continual and never-ending**. It emphasises interactions as much as it does the people or elements interacting. Most of us focus on what we can observe—the animal, the project outcome, the object. Emergence involves also paying attention to what is happening — the stranger arriving with different cultural assumptions that ripple through the organisation or community”

(Carl Sagan)

- **People's** emergent properties
- **Structural** emergent properties
- **Cultural** emergent properties

(Archer, 2005)

“Cognitive flexibility represents someone’s ability to shift thoughts and adapt his or her behaviour to an ever-changing environment. Levels of cognitive flexibility are reflected by your ability to disengage from a previous task and respond effectively to another task — or to multitask. The more cognitive flexibility an individual has, the greater the chances are that this person can **optimise his or her human potential.**”

(Bergland, 2015)



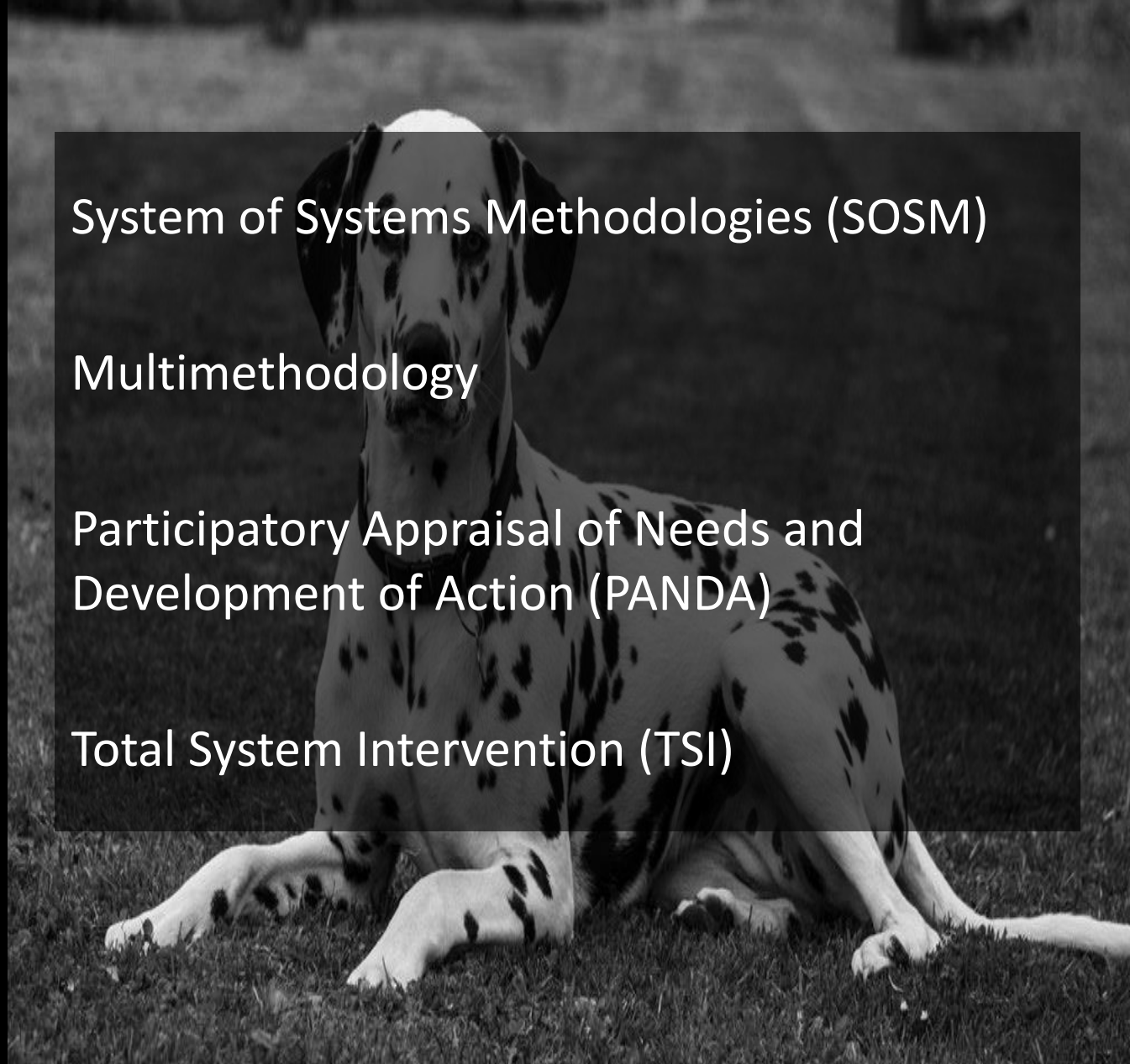
Elastic Thinking

Mlodinow

A systems interventionist needs an **enabling platform** that allows them to bring together various approaches and tools for optimal application during a consulting situation. Such platforms and frameworks induce creativity, streamline thinking and optimise efforts in the right direction to work with variety and absorb diversity.

I call this formulative flexibility – flexibility that allows for optimal **complementarism** of approaches and tools required by a consultant for effective intervention in a problem situation.

Formulative flexibility



System of Systems Methodologies (SOSM)

Multimethodology

Participatory Appraisal of Needs and Development of Action (PANDA)

Total System Intervention (TSI)

Tangible resources

- Capital
- Infrastructure
- Workforce

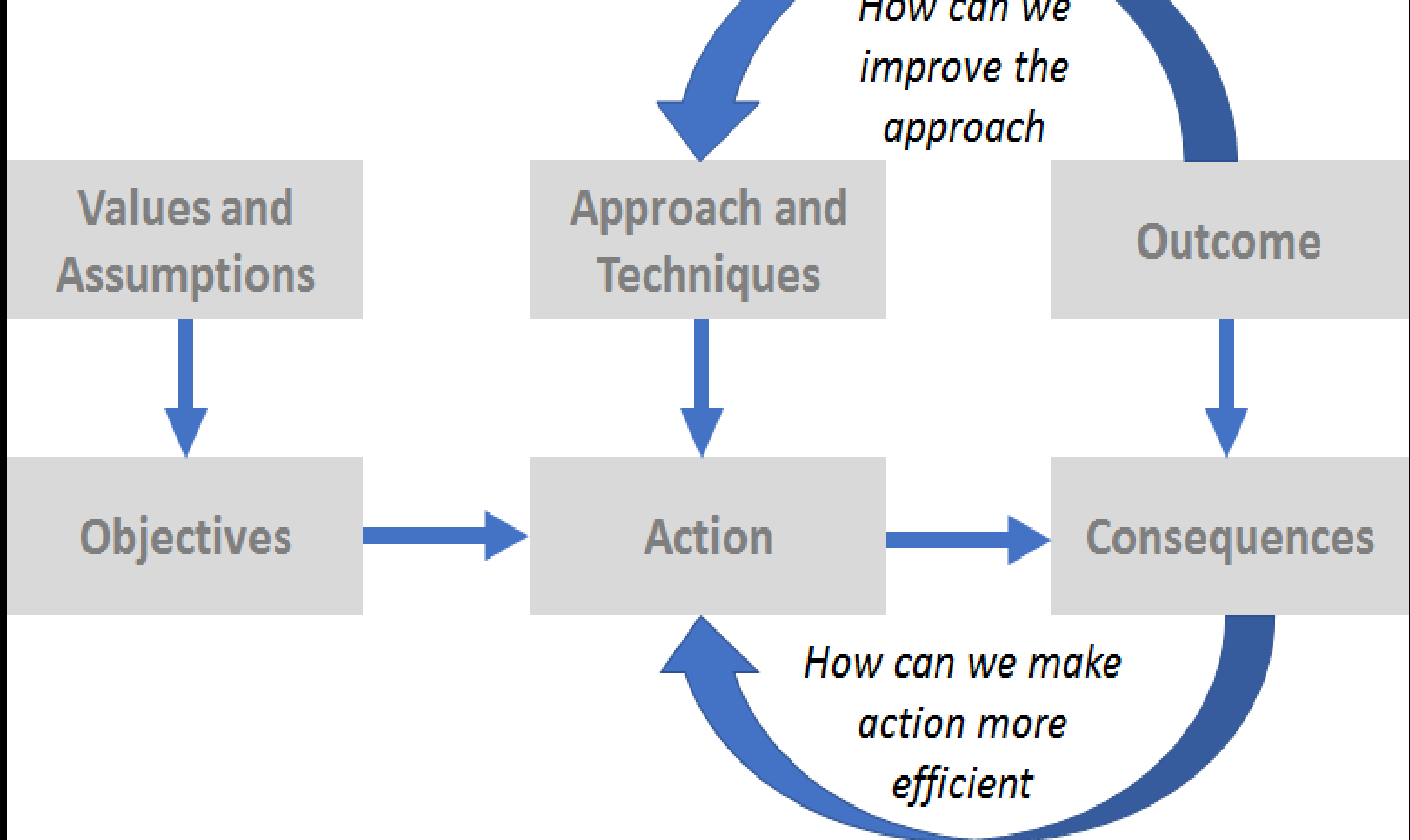
Intangible resources

- Time
- Competencies
- Goodwill/ Support

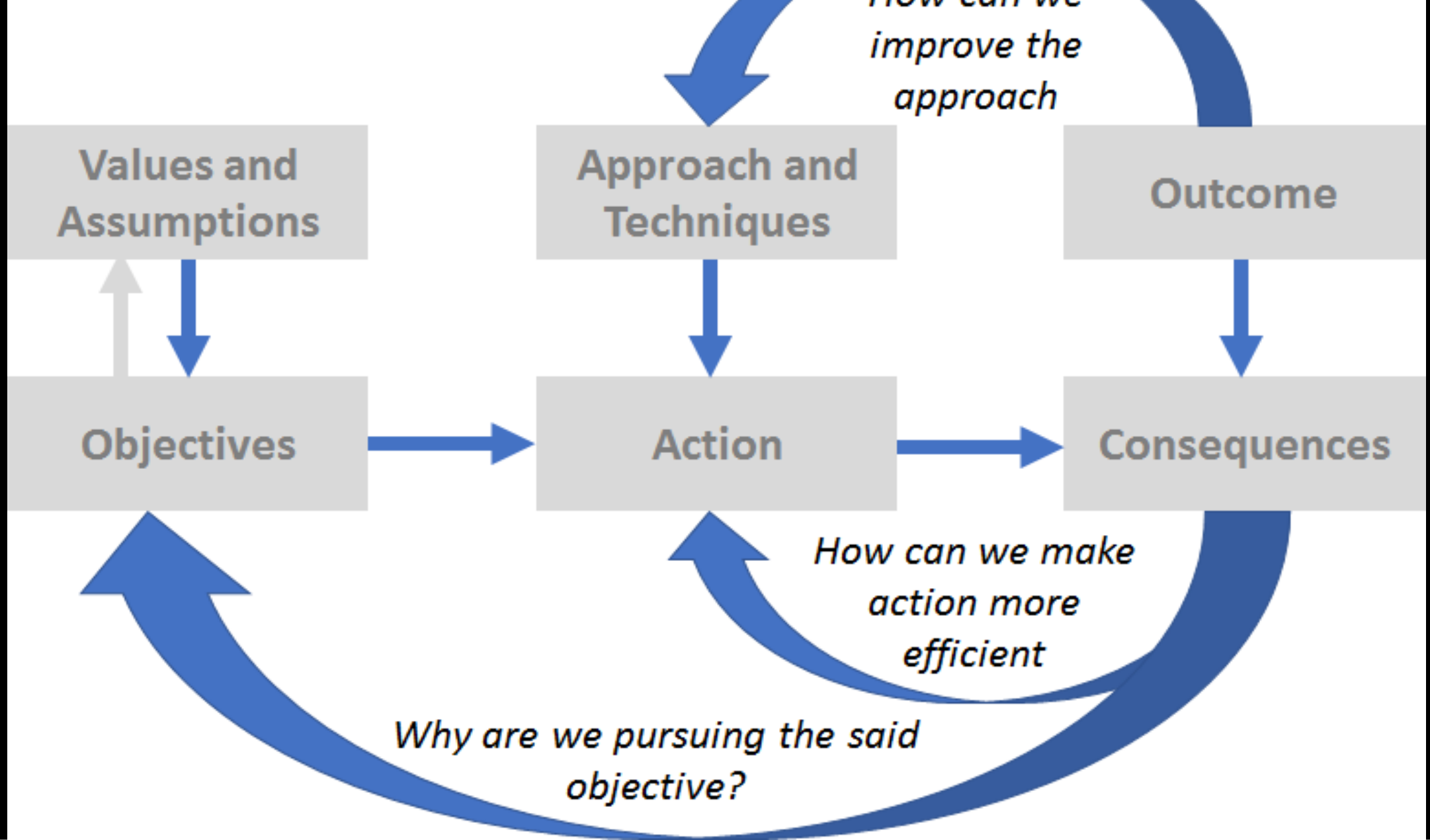
Formulative flexibility is the **bridge** between cognitive and substantive flexibility. If cognitive flexibility brings in the “thought”, formulative flexibility brings in the “form”.

	Aspect addressed	Dependency	Related discipline
Cognitive flexibility	Thinking	Nature-Nurture	Psychology, Psychiatry, Neuroscience, Sociology
Formulative flexibility	Planning	Frameworks & Models	Management, Administration
Substantive flexibility	Action	Resource availability	Material Sciences, Finance, Human Resource, Supply Chain

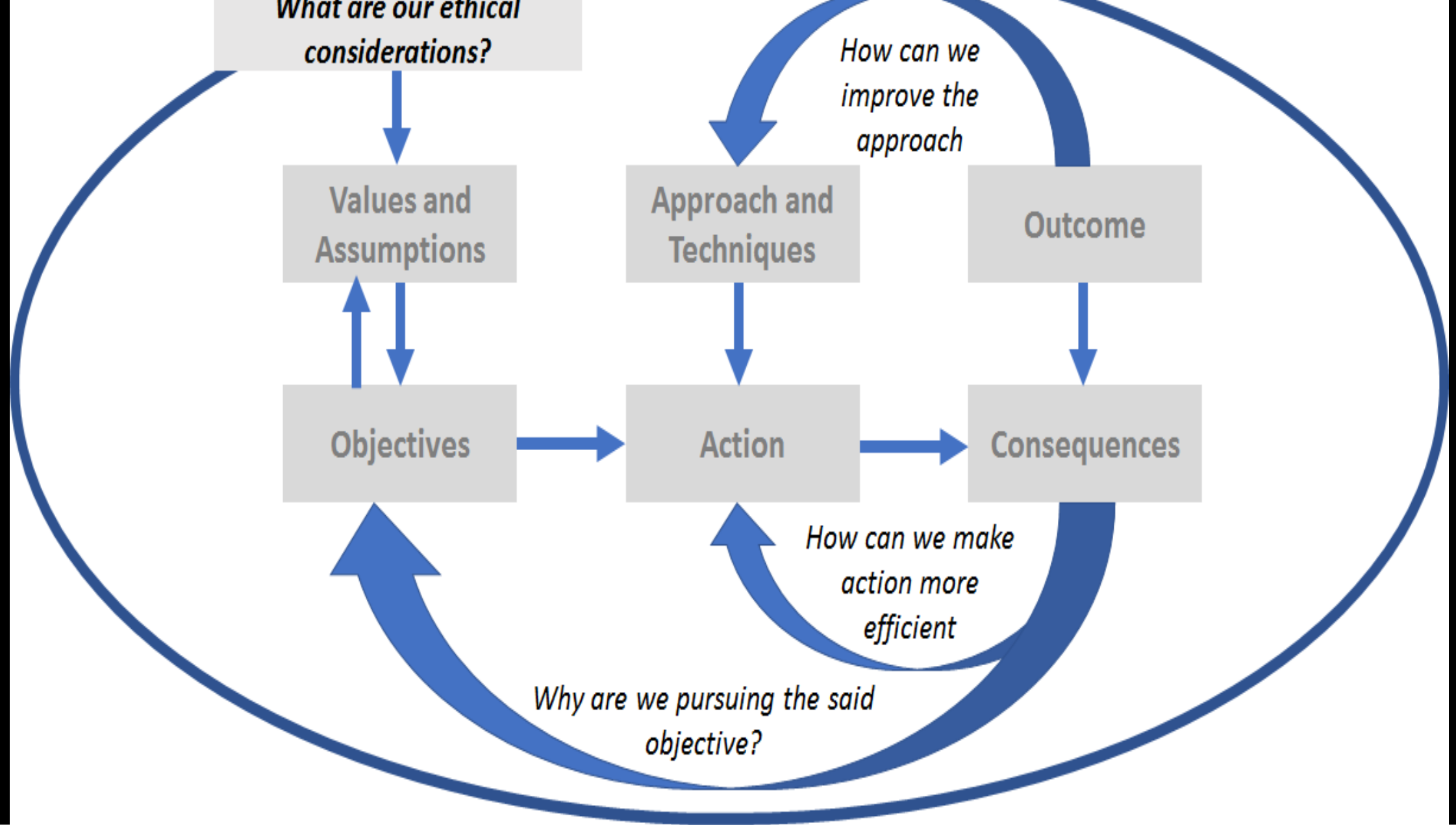
3 kinds of flexibility



Single-Loop Learning



Double-Loop Learning



Triple-Loop Learning



Systemic Value Add

Responsible outcome – 1

A photograph of a city street scene, likely in New York City, featuring a brick sidewalk, bare trees, and several yellow taxis. A semi-transparent dark grey rectangular box is centered over the image, containing the word "Emancipation" in white, bold, sans-serif font.

Emancipation

Responsible outcome – 2

The image is a composite. The top half shows a close-up of a man's face wearing a white knit hat, looking slightly to the right. The bottom half shows a person in a bright yellow jacket standing on a dark beach, looking out at a large waterfall cascading down a rocky cliff. The text 'Sustainable Outcomes' is centered over the man's face.

Sustainable Outcomes

Responsible outcome – 3



Approach of the higher education system



Existing Systems Pedagogy where present



Skewed balance of management priorities



Variety of approaches and methodologies



Language used is not mainstream

Challenges of a Systems Thinker

An aerial photograph of a river winding through a deep canyon. The river is a vibrant blue-green color, contrasting with the reddish-brown, layered rock formations of the canyon walls. A large, prominent rock formation sits in the center of the river's path. The sky is a clear, bright blue with a few wispy clouds. The overall scene is a dramatic and scenic landscape.

Thank You!

RAJNEESHCHOWDHURY@GMAIL.COM

RAJNEESHCHOWDHURY.COM