STREAMS

Systems Thinking,

Real Enterprise Architecture,

Management Science

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What Is STREAMS?

www.streams.gb.net
www.streams.expert

Practical Level: STREAMS is an open, public Wikipedia-style Wiki where the 'subject-matters' of ST, REA & MS may be debated and developed. A place where (practitioner) community knowledge can be shared.

Theoretical Level: STREAMS is a 'theoretical synthesis' or 'confluence of ideas' about the analysis and synthesis of change in (human-intensive) Enterprises – also known as "Organisations".

STREAMS on Systems Thinking

'Hard' Systems Thinking / Traditional Systems Engineering

'Soft' Systems Thinking / 'Social' & Organisational Systems Thinking

Systems of Power Thinking / 'Coercive' Systems Thinking

Technological ← → **Sociological**

Philosophical		
Theoretical		
Methodological		
Methods & Techniques		
Practical		

Reductionism

Interpretivism

Dialecticism

GST

Functionalism

Constructivism

Critical Theory

Cyb1

Cyb2

SAST

TSE

SSM

SOSM

VSM/D

SD

IP

CSH

Func. Decom.

SD Model

Boundary Critique

Rich Pictures

Eng. Des. Composition

STREAMS on Systems Thinking
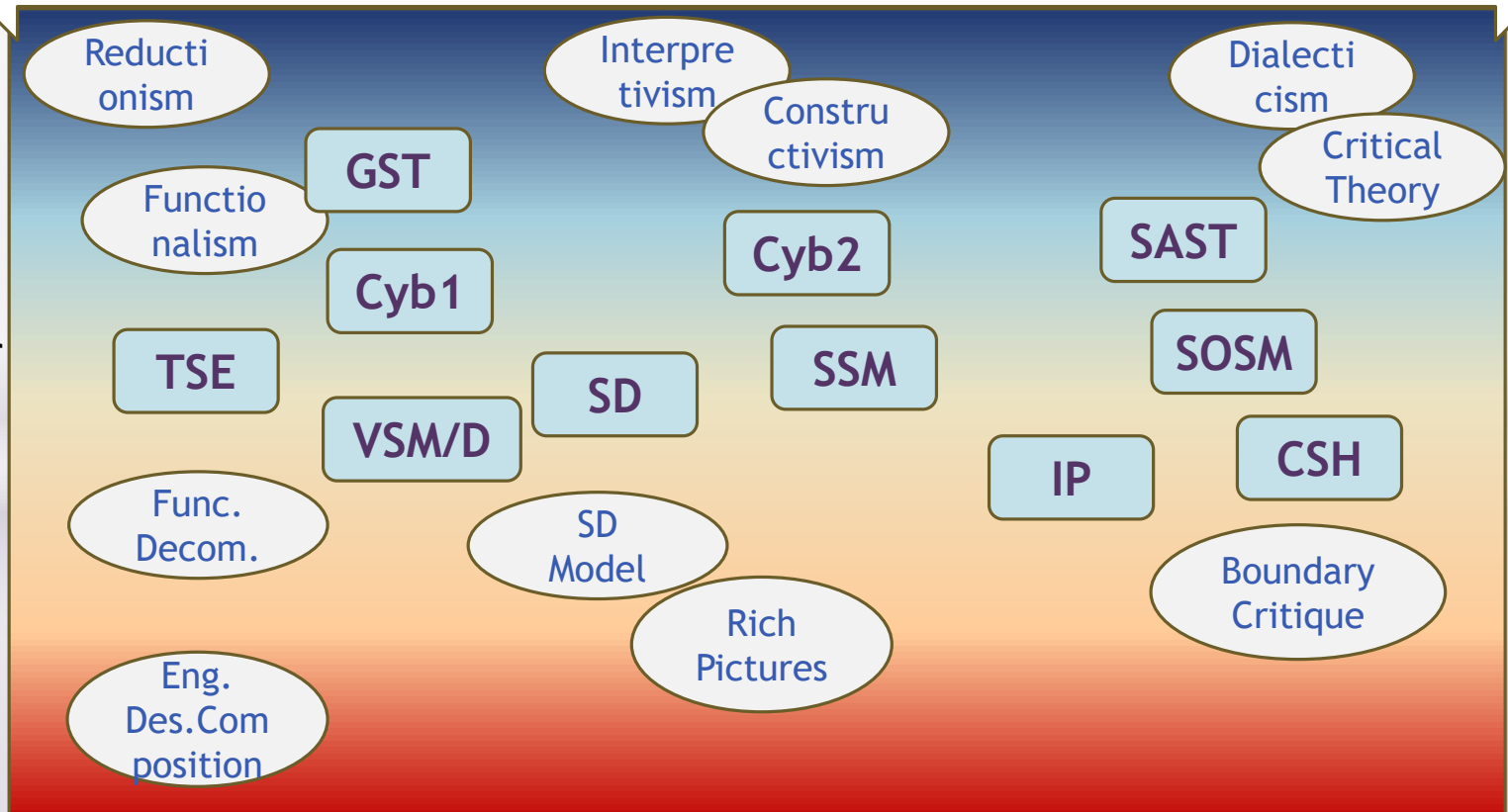
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Philosophical

Reducti onism

Interpre

Dialecti cism

Theoretical

Func

Critical Theory

Methodological

Methods & Techniques

Practical

Eng. Des.Com position

Why?:

Construction of "Systems Models" to better <u>understand</u> some situation…

… because better understanding leads to better <u>decision-making</u> on <u>actions</u> on …

… how to change the organisation of the systems and apply technology…

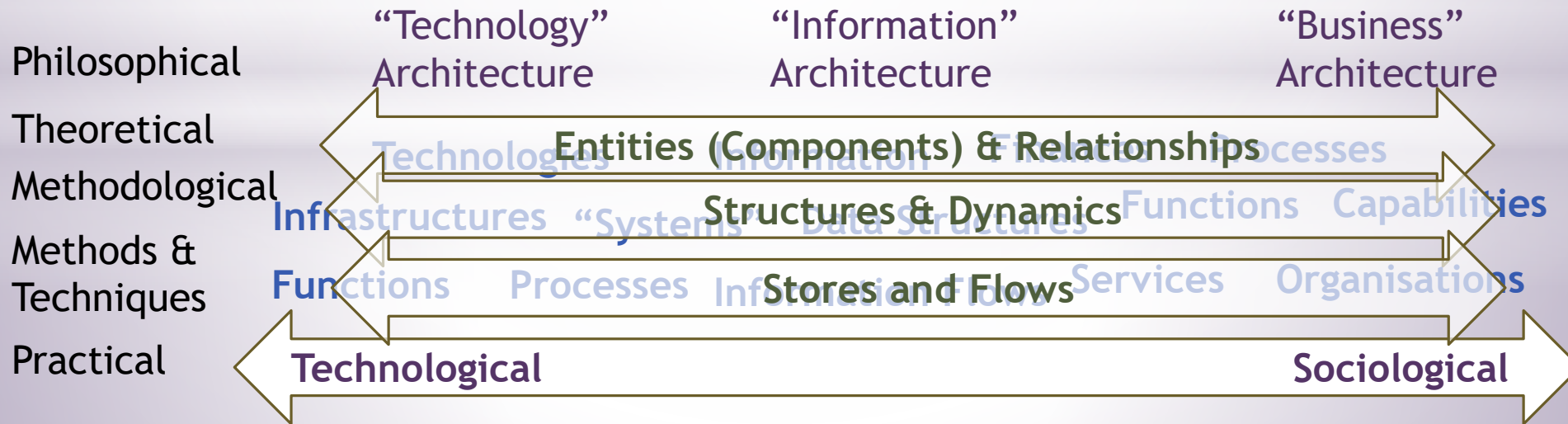… to make the situation "better". *

* For some value of "better".

STREAMS View of Real Enterprise Architecture
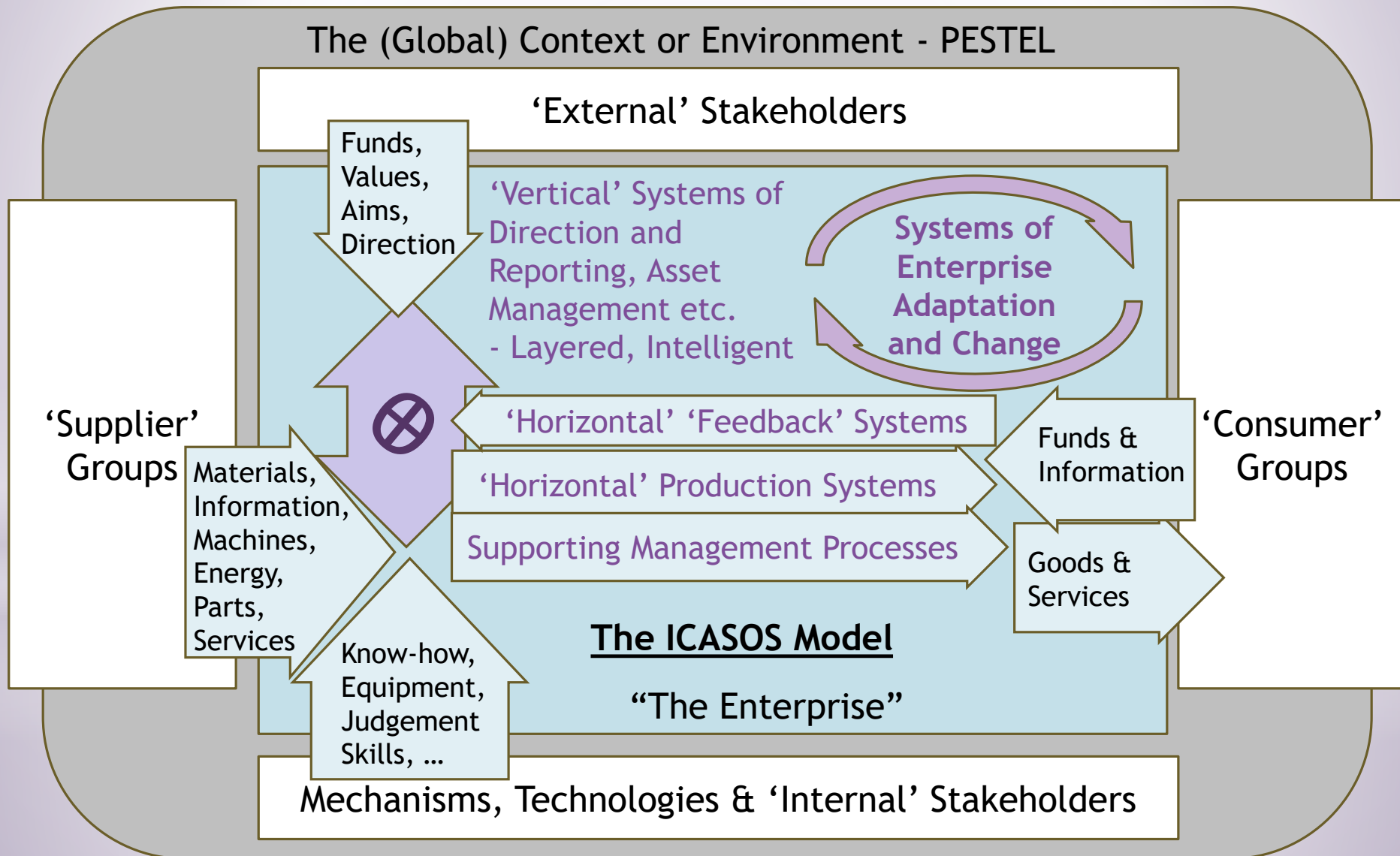
Real Enterprise Architecture is…. the (collectively) conscious and explicit architecting of the future enterprise. It is not…

ICT Systems Design	… but all modern enterprises are ICT intensive.
Organisation Design	… but effective enterprises are (partially) designed.
MBSE Re-named	… but MBSE is an effective set of methods.
Strategic Planning	… but directed change requires some planning.
OR Re-Invented	… but OR has some useful techniques to be adopted.
BPM+ (aka)	… but efficient processes are core to enterprises.

"Technology" Architecture   "Information" Architecture   "Business" Architecture

Philosophical

Theoretical

Methodological

Methods & Techniques

Practical

Technologies   Information   Finances   Processes

Infrastructures   "Systems   Data Structures   Functions   Capabilities

Functions   Processes   Information Flows   Services   Organisations

Entities (Components) & Relationships

Structures & Dynamics

Stores and Flows

Technological   Sociological

A (Generic) REA Model of an Arbitrary Enterprise

The (Global) Context or Environment - PESTEL

'External' Stakeholders

Funds, Values, Aims, Direction

'Vertical' Systems of Direction and Reporting, Asset Management etc. - Layered, Intelligent

Systems of Enterprise Adaptation and Change

'Supplier' Groups

'Consumer' Groups

Materials, Information, Machines, Energy, Parts, Services

'Horizontal' 'Feedback' Systems

'Horizontal' Production Systems

Supporting Management Processes

Funds & Information

Goods & Services

The ICASOS Model

"The Enterprise"

Know-how, Equipment, Judgement Skills, ...

Mechanisms, Technologies & 'Internal' Stakeholders

STREAMS

The (Global) Context or Environment - PESTEL

Why?:

Construction of a set of coherent "Enterprise Models" (using modern modelling technology) to better <u>understand</u> the dynamic enterprise and its changing context…

… because better understanding leads to better <u>decision-making</u> on <u>actions</u> and systems/structures within the enterprise to …

… change the enterprise by exploiting developing technologies and new organisational possibilities …

… to make the future enterprise "better". *

* For some value of "better" for some stakeholders.

'External' Stakeholders

'Supplier Groups'

'Consumer' Groups

Mechanisms, Technologies & 'Internal' Stakeholders

STREAMS Perspective on "Management Science"

"Management Science" is ... the use of 'quasi-scientific' methods and techniques to understand phenomena within and around the organisation or enterprise.

This means:
a) the use of measurement,
b) the application of statistics,
c) the hypothesis of causal explanations
d) the development of qualitative and quantitative models,
e) the use of mathematics (as appropriate) – including financial maths.
f) the application of well-known theory, methods and paradigm problems

Within STREAMS we think of "Management Science" as including the methods and techniques of Quality Management and Quality Control – such as Statistical Process Control and Sampling Theory - and associated methodology – e.g. QFD, Deming-Shewart PDCA Cycle or Boyd's OODA loop etc.

"Management Science" includes "Operational Research" and has a significant overlap (commonality) with Systems Thinking – it could be regarded as the quantitative arm of Systems Thinking – and these days includes "Big Data".

Technological   **Sociological**

STREAMS Perspective on "Management Science"

"Management Science" is … the use of 'quasi-scientific' methods and techniques to understand phenomena within and around the organisation or enterprise.

This means:

a) the use of measurement;
b) the application of statistics;
c) the hypothesis of causal explanations;
d) the development of qualitative and quantitative models,
e) the ... <!-- obscured -->
f) the ... <!-- obscured -->

Within STREAMS we think of "Management Science" to include … statistical methods and techniques of Quality Management and Sampling Control - i.e. Statistical Process Control and Sampling Theory - and associated methodology – e.g. QFD, Deming-Shewart PDCA Cycle or Boyd's OODA loop etc.

"Management Science" includes "Operational Research" and has a significant overlap (commonality) with Systems Thinking – it could be regarded as the quantitative arm of Systems Thinking – and these days includes "Big Data".

Why?:

Developing of a "Management Science Model" (using modern modelling technology) permits better <u>understanding</u> - including quantification - of the management problems and phenomena …

… and leads to better <u>decision-making</u> on change <u>actions</u> and solution options within the enterprise to …

… change the operations and management model by exploiting developing technologies and new organisational possibilities …

… to make the future enterprise "better". *

* For some value of "better" for some stakeholders.

Technological   **Sociological**

The STREAMS' Confluence

Why put <u>these</u> ideas together?

Concerned with Problems of Enterprise Change

Principle of Holism; Inadequacy of Reductionist Methods

Active Debate and Development of the Thinking

Use of "System" Concept – and SOS 'model'.

Re-Use and not Re-Invention of good past thinking and methods.

Demand for more "Professional" Management of Enterprises - including Innovation

Use of Modelling; new Modelling Technology

Complementarity & Synergy

Greater Inter-disciplinarity / Trans-disciplinarity

Attempt to Tackle Complexity, Messes and "Wicked Problems"

Demand for Effective (Engineering-Like) Approaches to Enterprise Change

Pace of Technological and Organisational Change (Accelerating)

Embracing and Encompassing Multiple Perspectives

More interest in "Multi-Methodological" Approaches

The STREAMS' Confluence

Why now?

Enterprise Architecture 2.0 (or is it 3.0?)

Enterprise Systems Engineering

Enterprise Engineering

"Access To Research"

"Open Access"

Strategic Enterprise Architecture Management

Systemic Enterprise Architecture

Market Demand: Tech-Enabled Business Change <-> Commoditised and Outsourced ICT

Enterprise Architecture & Systems Thinking (EAST)
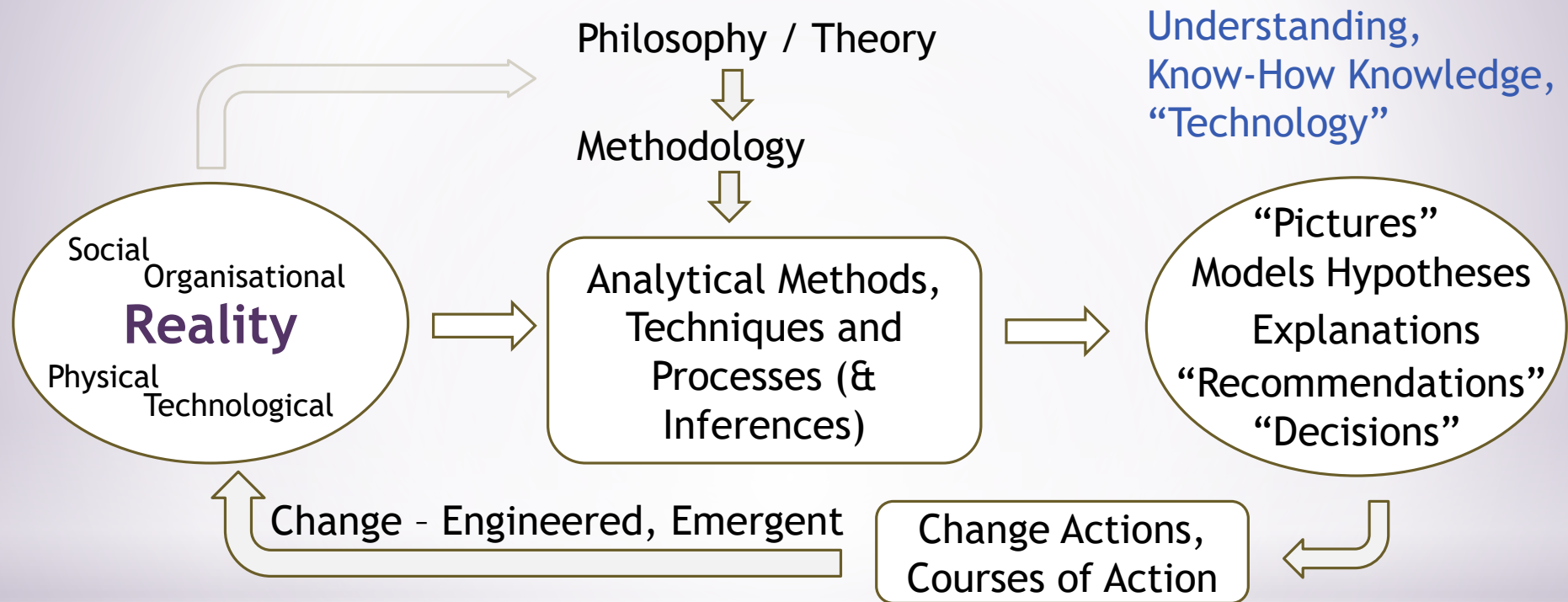
Post-Positivist, neo-Realist shift in Systems Philosophy

Innovation Management

Shift of the "good practice" / methodology debate online.

Personal Motivations:
1) Frustration with academic-practitioner gap
2) Frustration with EA community
3) Frustration with Universities system
4) Time available to do it …

Maturity of Online "Professional Collaboration" Technology – LinkedIn, Wikis etc. - & communities forming.

STREAMS – "Incommensurability"?

Philosophy / Theory

Understanding,
Know-How Knowledge,
"Technology"

Methodology

Social Organisational
Reality
Physical Technological

Analytical Methods,
Techniques and
Processes (&
Inferences)

"Pictures"
Models Hypotheses
Explanations
"Recommendations"
"Decisions"

Change – Engineered, Emergent

Change Actions,
Courses of Action

STREAMS "neo-Realist" Philosophy => No Incommensurability in Reality

=> "Incommensurability" is a human construct – introduced by bad assumptions in our Philosophy / Theory transmitted through Methodology into analytical inference. Result: incoherent pictures / models, poor understanding, bad decisions … actions?.

Systems Philosophy Orthodoxy

'Hard' Systems Thinking

Naïve Realism

Techno-Physicalism

Reductionism

'Linear' Humean Causality

Ontic Priority

'Uncomplicated' Objectivity

"Positivism"

Empiricism

No Emergence

Science / Analysis as Inductive Inference

'System' as Ontic Object

'Soft' Systems Thinking

Anti-Realism

Interpretivism

Anti-Reductionism

Human Agency / Mental Causation

'Impossible' Objectivity

Relativism (Perceptual, Cognitive, Epistemic)

Epistemic Priority

'Organic-ism'

"Constructivism"

Science / Analysis as Experience Interpretation

'System' as Epistemic Process

'Critical' Systems Thinking

Harbermas-ian / Frankfurt School Critical Theory

"Dialectic-ism"

Traditional Systems Engineering

e.g. Soft Systems Methodology

e.g. SAST, CSH, SOSM

Reformed Systems Philosophy

Ervin Laszlo's Vision of the 1970s?

'Hard' Systems Thinking

'Soft' Systems Thinking

'Critical' Systems Thinking

Unified Scientific Approach – Pragmatic Differences
Technological/Sociological

Ontic Priority

Epistemic Fallibility

Mechanism Hypothesis =>
Model-Making

Pragmatic Ontological Pluralism

Science / Analysis as Inference to Best Explanation (Abduction)

Critical Realism

The Empirical

The Actual

The Real

"Generative Mechanisms" = 'Systems'

Stratified Reality

'Difficult' Objectivity => Critical Thinking

Complexity and Emergence

Transitive and Intransitive Structures & 'Forces' – Technological & Sociological

Complex, Multi-Level "Emergent Powers" Causality

"Post-Positivism"

Sociomateriality

Traditional Systems Engineering

e.g. Soft Systems Methodology

e.g. SAST, CSH, SOSM

STREAMS – Some Recommended Reading

John Mingers: Systems Thinking, Critical Realism and Philosophy

Gerald Midgely: Systemic Intervention

Mike Jackson & Robert Flood: Creative Problem Solving

Roy Bhaskar (et al.): Critical Realism – Essential Readings

John Mingers: Realising Systems Thinking

Robert Flood & Ewart Carson: Dealing With Complexity

Martin Reynolds & Sue Holwell: Systems Approaches to Managing Change

George Rebovich & Brian White: Enterprise Systems Engineering

Deborah Nightingale & Donna Rhodes: Architecting the Future Enterprise

Jan Hoogervorst: Enterprise Governance and Enterprise Engineering

Jonathan Rosenhead & John Mingers: Rational Analysis for a Problematic World Revisited

Terry Williams: Management Science in Practice

Theo Janssen: Enterprise Engineering

Pallab Saha (et al.): A Systemic Perspective to Managing Complexity with Enterprise Architecture

John Gotze & Anders Jensen-Waud (Eds.): Beyond Alignment – Applying Systems Thinking in Architecting Enterprises

STREAMS –
Come Join the Game!

Are you 'into' an holistic perspective on social, organisational and technological change?

Are you 'into', or a user of, Systems Thinking, Enterprise Architecture or Management Science?

Are you interested on one or more aspects from the Philosophy to the Practice?

Do you want to engage with like-minded people and advance the disciplines and/or professions? [But perhaps don't want to play the academic publishing game or work in a university or "research"?]

Do you have a viewpoint or some knowledge you want to contribute – or feel you might be able to learn something that could help you and/or others?

Do you find other forums or avenues for debate (social media, journals, conferences etc.) unsatisfying, fruitless, restricting or even closed?

www.streams.expert

Give the STREAMS Wiki a try – it is free to play and all contributions are welcome.

Thanks for Listening!