Tutorial: Metaphysics of Business Technology Research

Workshop on Social Aspects in Business Intelligence and Technology (SABIT), 24 March, 2015, Nice, France

Janne J. Korhonen, Aalto University, Finland

Some questions to be pondered

1. What is business technology (BT)?
2. How is it different from information technology?
3. What is business technology research?
   - Subject matter, scope of inquiry
4. How is this field different from the information systems (IS) discipline?
5. What research paradigms are pertinent to business technology research? Upon which contingencies?
6. What are the ontological, epistemological and methodological implications of BT vs. IS?

Aalto University
School of Science

Four Sets of Metaphysical Assumptions

1. **Ontology**
2. **Epistemology**
3. Human nature
4. Methodology

What is Ontology?

- A metaphysical study of the fundamental categories of existence and elementary entities of the world

- Pertains to the theory of high-level concepts and distinctions underlying more specific descriptions of phenomena, e.g.:
  - Cause and effect
  - Time and space
  - System

- A basic ontological question in social science: is the "reality" external to the individual, i.e. "objective" in nature, or the product of individual consciousness, i.e. "subjective".

What is Epistemology?

- Studies knowledge: its nature, premises, reliability and justification

- A basic epistemological question in social science: is the nature of knowledge seen as "hard" and transmittable in a tangible form or as being of a softer and more subjective kind
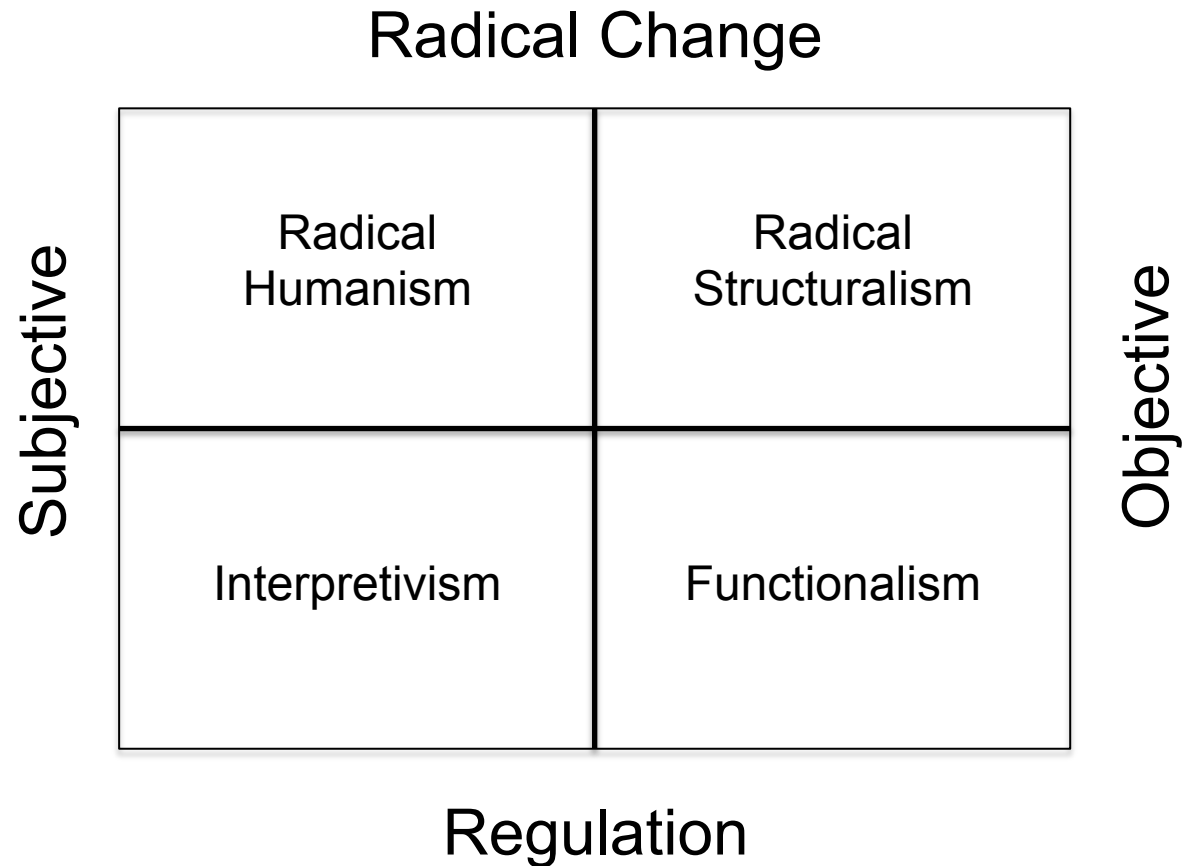
Functionalist Paradigm

- A concrete, real existence of the society, an ordered systemic character, a real world of concrete and tangible social relationships

- Quantitative, empirical analyses on hypotheses of linear, causal relationships

- Incremental and deductive theory-building
  - *taking existing literature and theories as a starting point*
  - *revision or extension of the original theory*

- An objective and value-free social science analyzed through the scientific method

Interpretive Paradigm

- The social world as the product of the subjective and inter-subjective experience – no objective social science
- Perspective of an active participant, not of a passive observer
- Theory building is about generating interpretive accounts of phenomena to reveal their underlying structures and structuring processes
- Discerned patterns in data are coded, categorized, and interpreted at the level of meaning of the informants
- Theory building is inductive, and building on extant theories is avoided as far as possible to avoid being contaminated by them
- Multiple iterations needed until a grounded, substantive, mid-range theory is proposed

Radical Humanist Paradigm

- Relativist ontology: reality intersubjectively constructed
- Critical analysis: exposing the alienating and repressing aspects of industrial societies and how they are reified through psychic and social processes
- Linking thought and action to transcend these bounds and to develop alternative social institutions and relations
- Theory-building is often limited to reinterpretations of existing research rather than collecting new data
- Hypothesis testing is rare
- Theories tend to promote a political or ideological agenda

Radical Structuralist Paradigm

- Reality viewed as existing on its own, independent of how it is perceived and reaffirmed
- Characterized by intrinsic tensions and contradictions between opposing elements, leading to radical change in the system
- Typically concerned with the macro level of the society or industry structures
- Importance on praxis as a means of transcending the dominating forces of society
- Theory-building is dialectic and seeks meta-level accounts for contextual instances
- Generation of new theories is rare
- Process ontology, or, ontology of change

Cynefin
(Kurtz and Snowden, 2003)

Complex Un-Order
Cause and effect
coherent in retrospect
"Probe-Sense-Respond"

Hidden Order
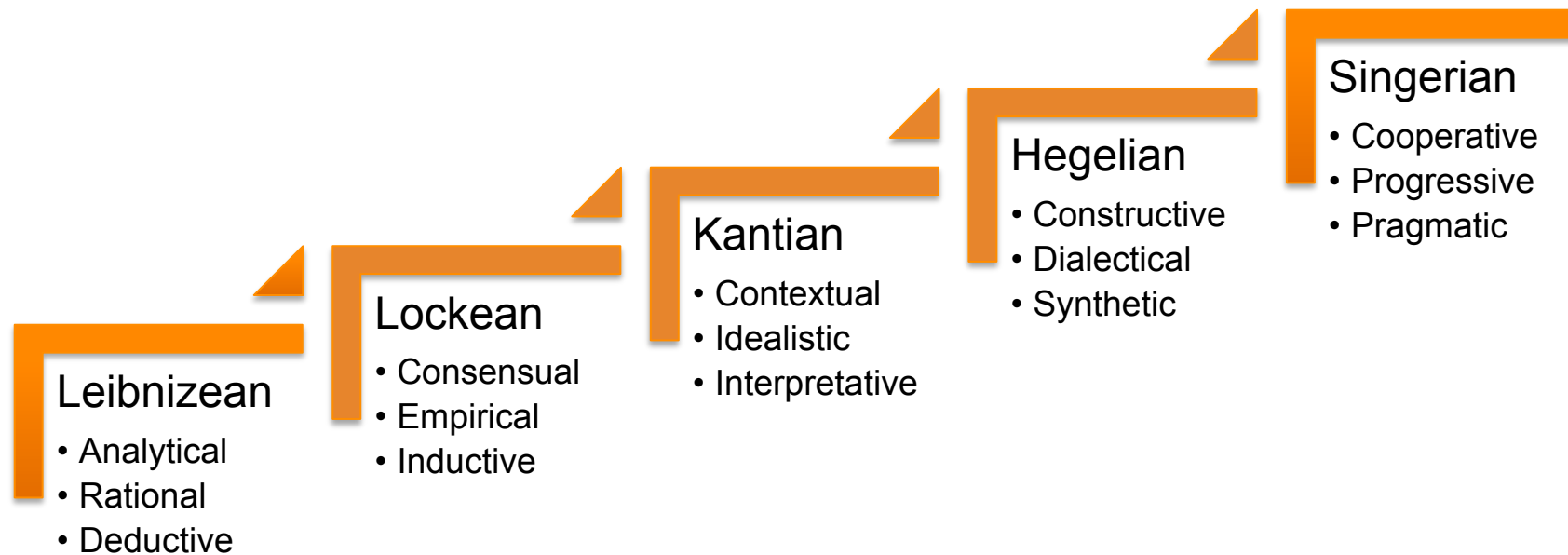Cause and effect
discoverable
"Sense-Analyze-Respond"

Chaotic Un-Order
No perceivable
cause and effect
"Act-Sense-Respond"

Visible Order
Cause and effect
readily apparent
"Sense-Categorize-Respond"

Inquiring Systems
(Churchman, 1971)

Leibnizean
- Analytical
- Rational
- Deductive

Lockean
- Consensual
- Empirical
- Inductive

Kantian
- Contextual
- Idealistic
- Interpretative

Hegelian
- Constructive
- Dialectical
- Synthetic

Singerian
- Cooperative
- Progressive
- Pragmatic

Leibnizean Inquiring System

- A closed system with a set of axioms that, along with formal logic, are used to generate fact nets or tautologies
- Relevant for the study of formal systems, but uninteresting from the organization's point of view

Lockean Inquiring System

- A "Lockean community" learns from external empirical observations and arrives at a consensus on the labels that are assigned to the system inputs (Courtney, Croasdell, and Paradice, 1998)

- A network of increasingly more general "facts" is deduced from elementary sense data (Wood, 1990)

- The exploratory ways in which these other concepts can be derived from the base concepts are not directly tied to empirical evidence or even logical inference (Laske, 2008)

- Suited for stable and predictable organizational environments (Malhotra, 1997)

Kantian Inquiring System

- Synthesizes rationalism and empiricism, reconciling the Leibnizian and Lockean inquiry modes

- Able to interpret inputs and generate hypotheses based on what the system already knows and to create and incorporate new knowledge

- The guarantor of the system is the fit between data and model (Courtney et al., 1998).

- "Competency trap" (Malhotra, 1997): due to multiple alternative models, there is no guarantee that the model represents the best solution

- Kantian inquiry systems are best suited for moderate ill-structured problems (Malhotra, 1997).

Hegelian Inquiring System

- Knowledge is created through a conflictual thesis–anti-thesis–synthesis pattern
- "Self-awareness, more completeness, betterment, progress" (Churchman, 1971)
- The guarantor of the system is synthesis that opposes the conflict between the thesis and its anti-thesis (Courtney et al., 1998).
- "Taken-for-granted" interpretations of "pre-packaged" best practices are problematic when multiple and contradictory viewpoints need to be generated.
- The Hegelian process ensures that knowledge is subjected to continual re-examination and modification vis-à-vis the changing reality (Malhotra, 1997).

Singerian Inquiring System

- Progressive like the Hegelian one, but more precise and explicit

- A system of measures reveals inconsistencies in models and helps resolve disagreements among members of a community.

- The "whole scope of inquiry" transcends any one discipline

- The inquiring system requires a cooperative environment, in which inquiry is needed to create cooperation and cooperation is needed to create inquiry

- Ultimately the design of a Singerian inquiring system becomes the design of the whole social system. (Churchman, 1971)

Metaphysical Underpinnings

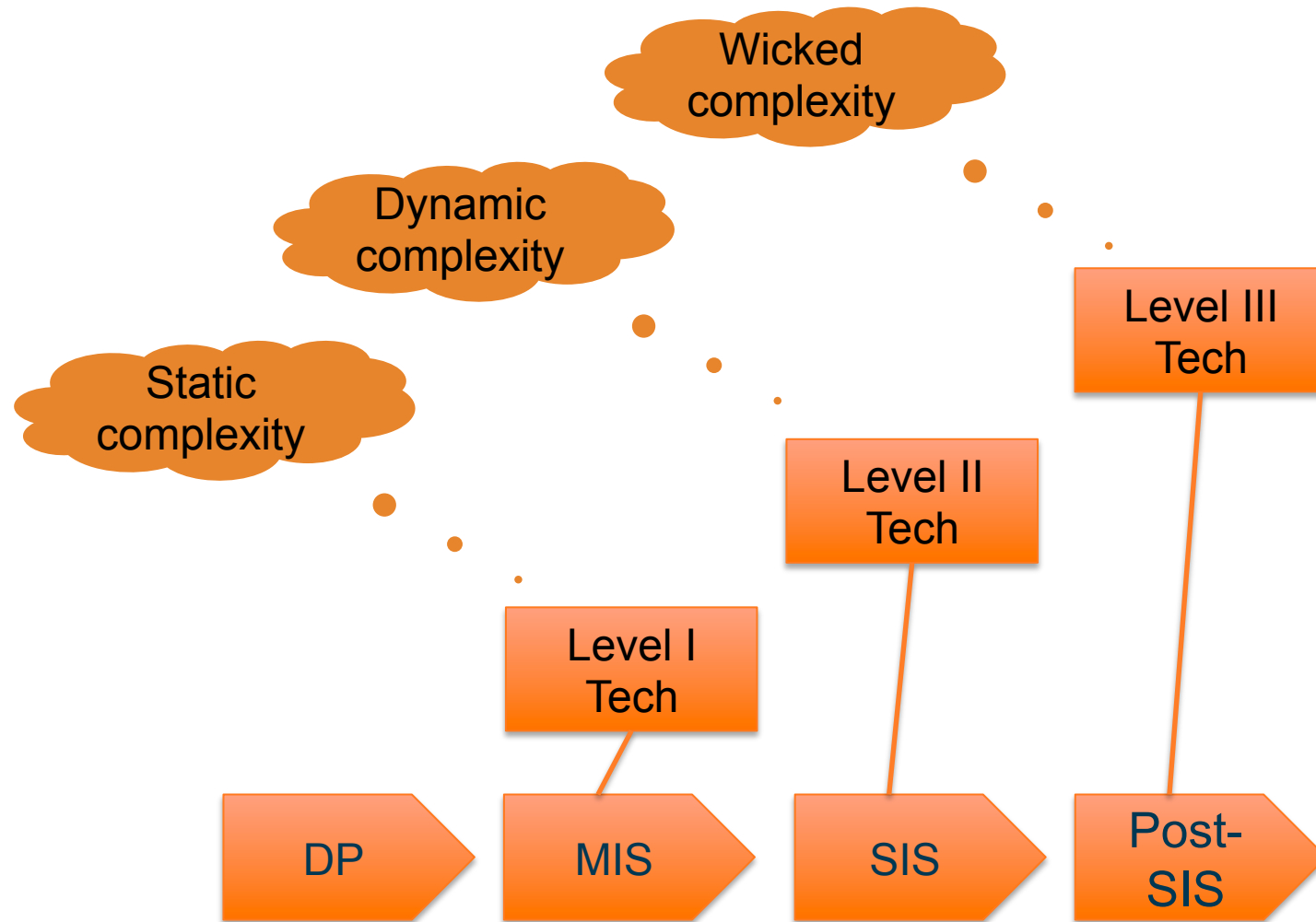| Metaphysical Paradigm (Burrell and Morgan, 1979)	Ontology	Epistemology
Functionalist paradigm	Objectivist: direct observation of concrete reality. "Visible order."	Empirical inquiry, scientific method, inductive logic
Interpretive paradigm	Subjectivist: social reality intersubjectively constructed. "Hidden order."	Based on systemic models. Interpretative, contextual.
Radical humanist paradigm	Relativist: social reality deconstructed. "Complex un-order."	Dialectic inquiry. Constructive, synthetic.
Radical structuralist paradigm	Post-relativist, change ontology. "Chaotic un-order."	Pragmatic, transdisciplinary, progressive.

Call for Post-SIS Research Agenda

Three "eras" of IT in organizations (Peppard and Ward, 2004):
1. data processing (DP)
2. management information systems (MIS)
3. strategic information systems (SIS).

Development of the scope of IS field (Merali et al., 2012):

- From internal **alignment** of business and IS to **integration** with global networks
- From engaging **internal** players to engaging **society** and
- From the focus on internal IT **resource management** to leveraging **human, social, relational and intellectual capital** dynamically and across boundaries

Eras of IT and Levels of Technology

Wicked complexity

Dynamic complexity

Static complexity

Level III Tech

Level II Tech

Level I Tech

DP

MIS

SIS

Post-SIS

Peppard and Ward (2004), Allenby and Sarewitz (2011)

Systemic Views of Increasing Embrace
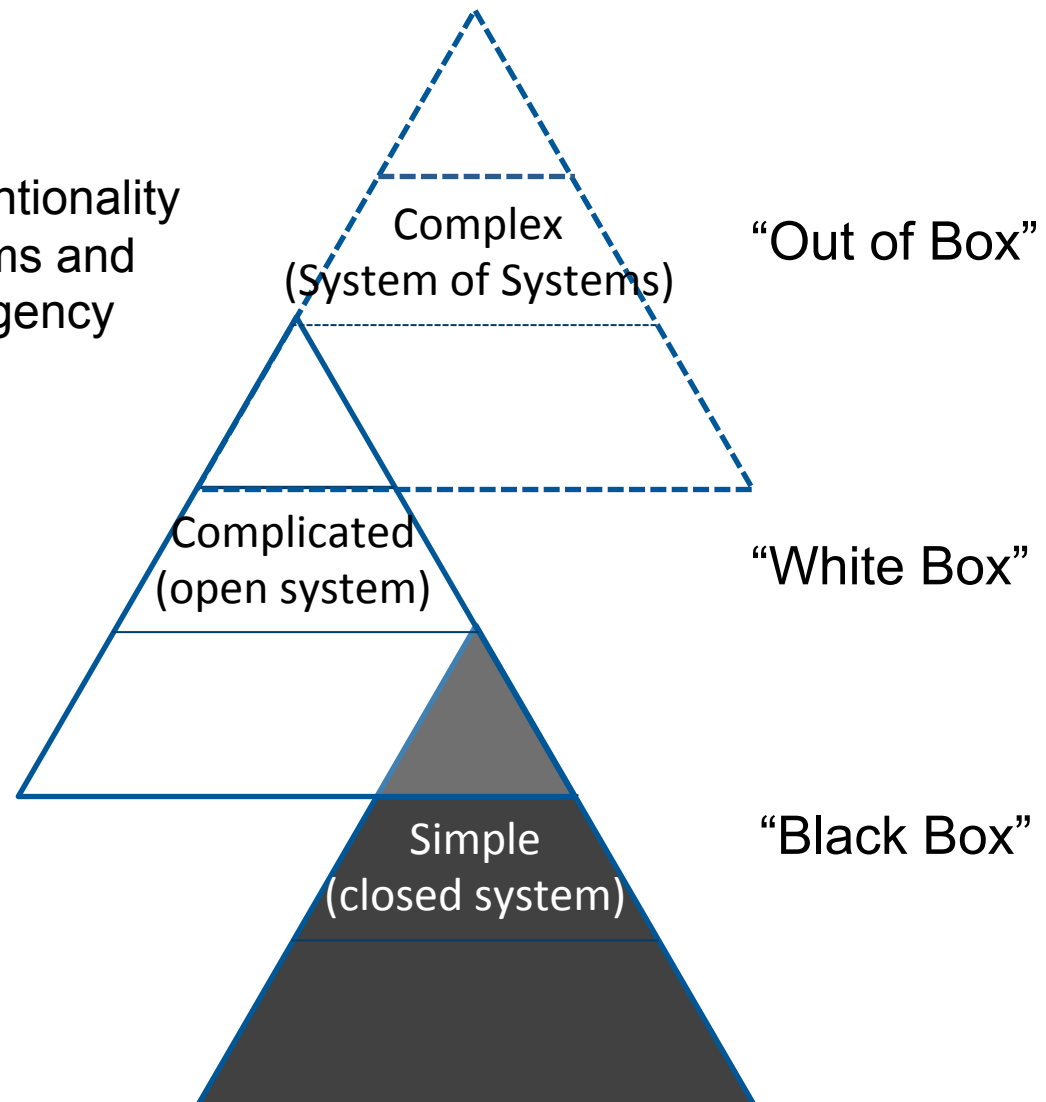
Wicked Complexity
- Arises from the reflexivity, intentionality and evolution of human systems and institutions that creates contingency and unpredictability

Dynamic Complexity
- Arises as the nodes of the system interact in new and unexpected ways, changing the relative position of nodes

Static Complexity
- Arises from the number of nodes and their linkages

Complex
(System of Systems)

"Out of Box"

Complicated
(open system)

"White Box"
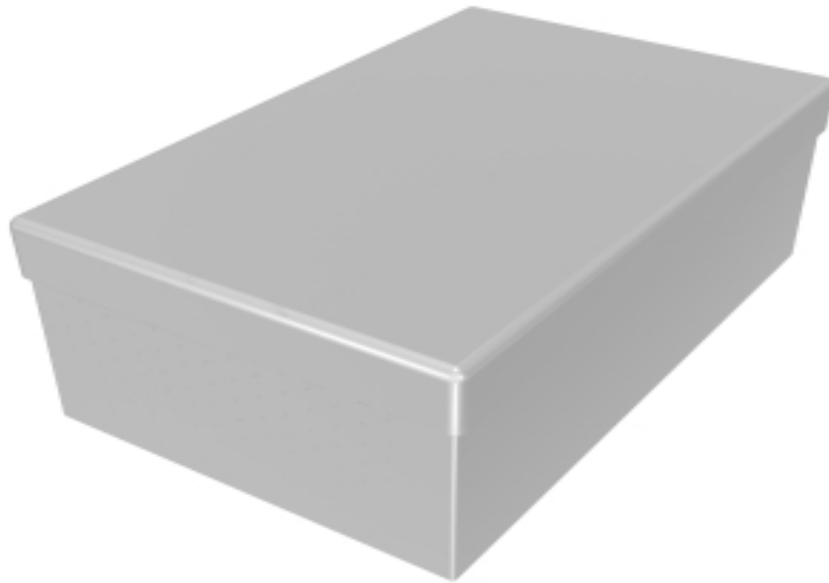
Simple
(closed system)

"Black Box"

Black-Box Perspective

- Closed system
- Functional
- Control-oriented
- Design irrelevant
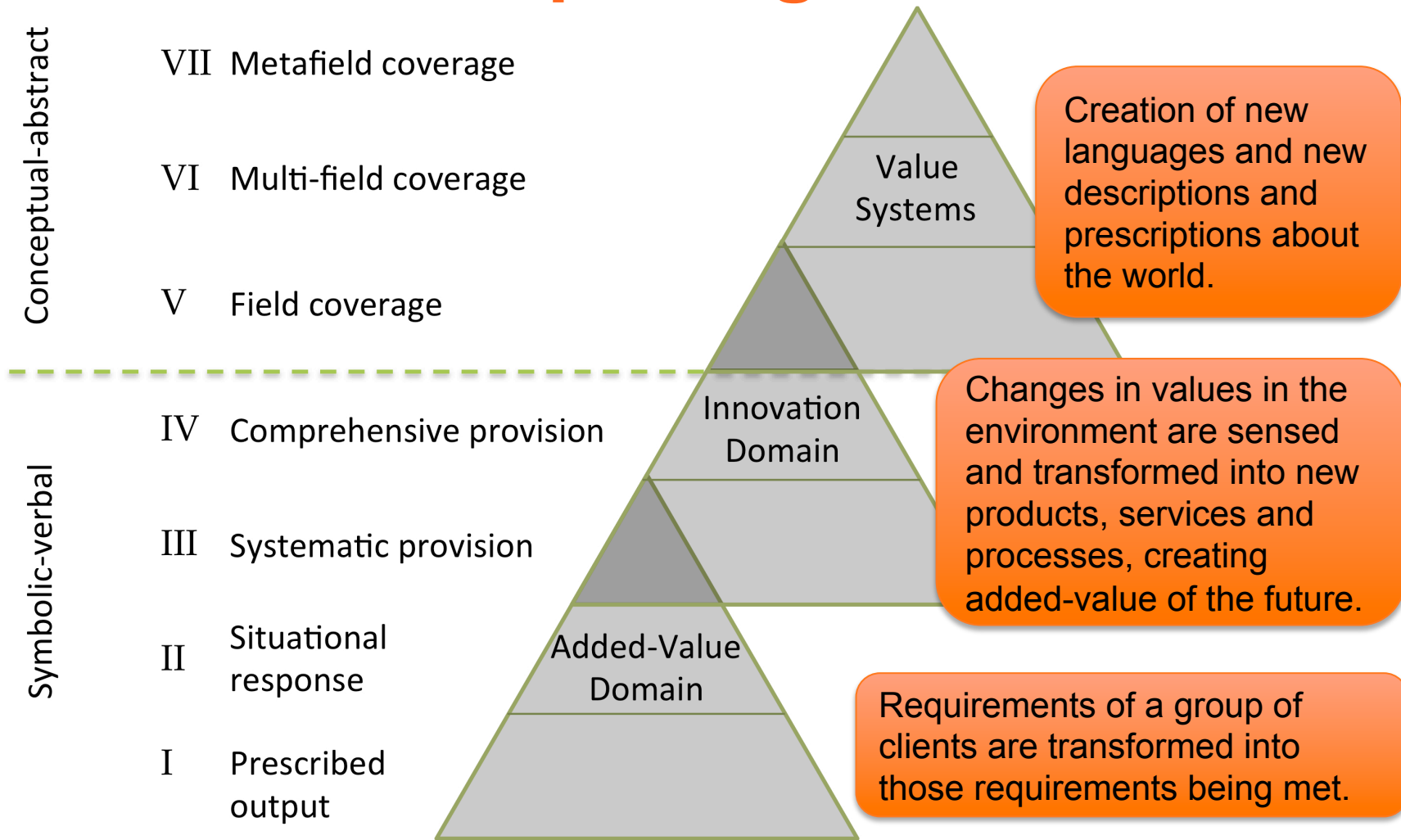
White-Box Perspective

- Open system
- Constructional
- Change-oriented
- Design essential

Out-of-Box Perspective

- System seen from the outside
- System-of-systems view
- Complex adaptive system
- Transformation and coevolution

Structural Underpinnings

Conceptual-abstract

VII Metafield coverage

VI Multi-field coverage

V Field coverage

Symbolic-verbal

IV Comprehensive provision

III Systematic provision

II Situational response

I Prescribed output

Value Systems

Innovation Domain

Added-Value Domain

Creation of new languages and new descriptions and prescriptions about the world.

Changes in values in the environment are sensed and transformed into new products, services and processes, creating added-value of the future.

Requirements of a group of clients are transformed into those requirements being met.

Aalto University
School of Science

Jaques (1998), Rowbottom and Billis (1987), Hoebeke (1994)

- Out-of-box perspective
- Interorganizational scope
- Complex problems
- Creating change
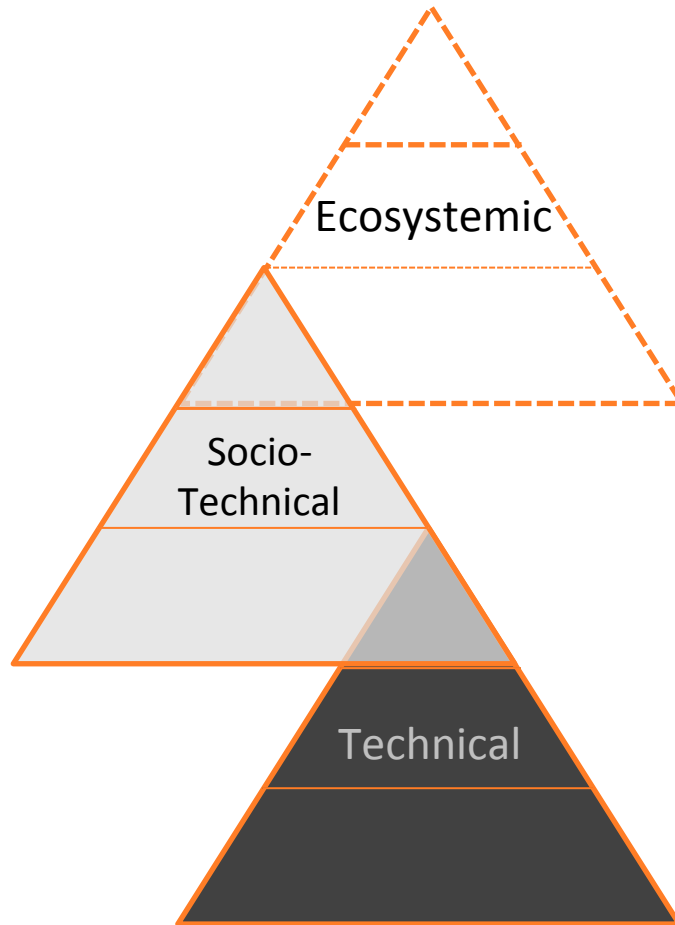- Strategic options

- White box perspective
- Organizational scope
- Complicated problems
- Anticipating to change
- Strategic choice

- Black box perspective
- Domain scope
- Simple problems
- Reacting to change
- Strategic commitment

Value Systems Domain

Innovation Domain

Value-Added Domain
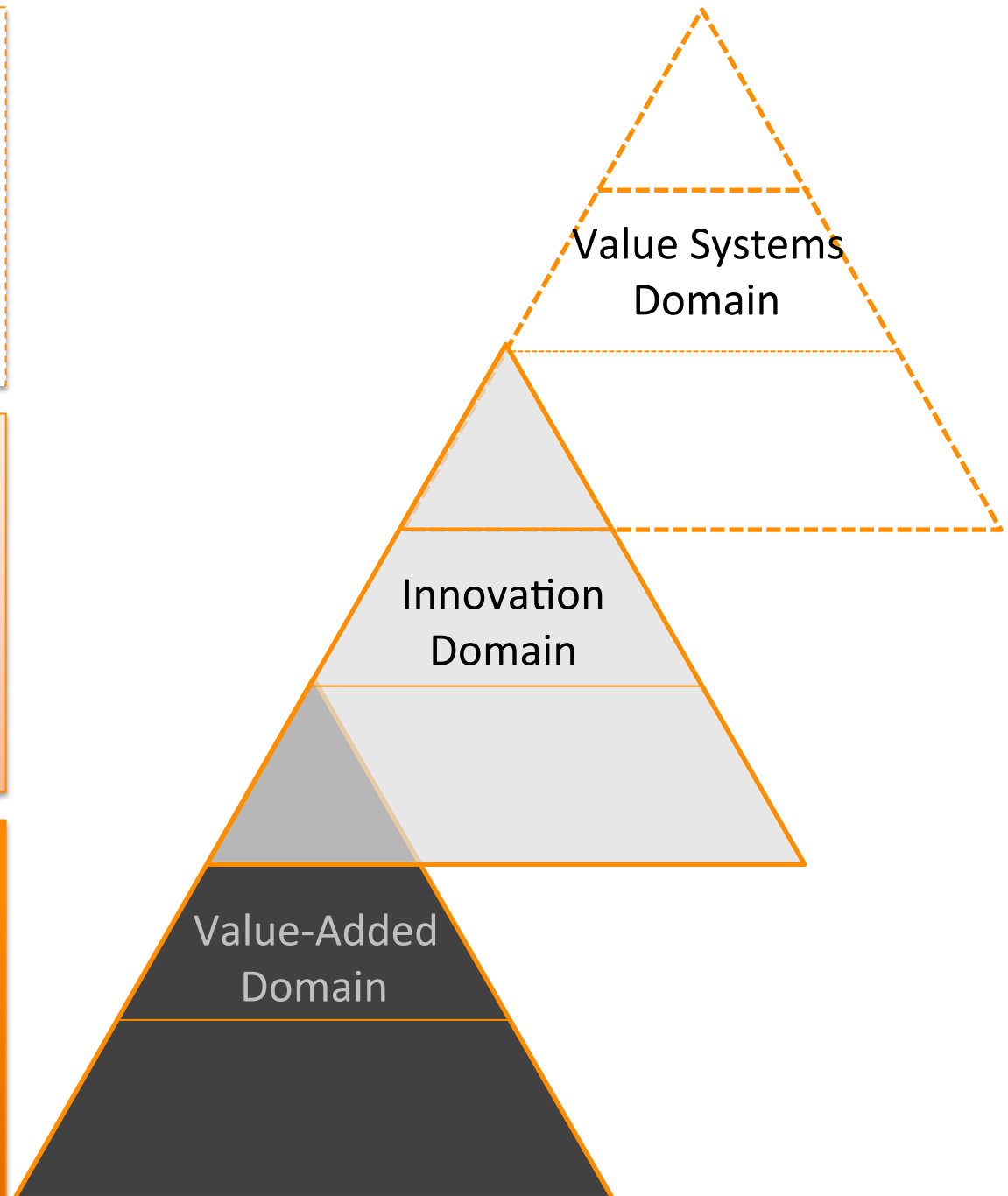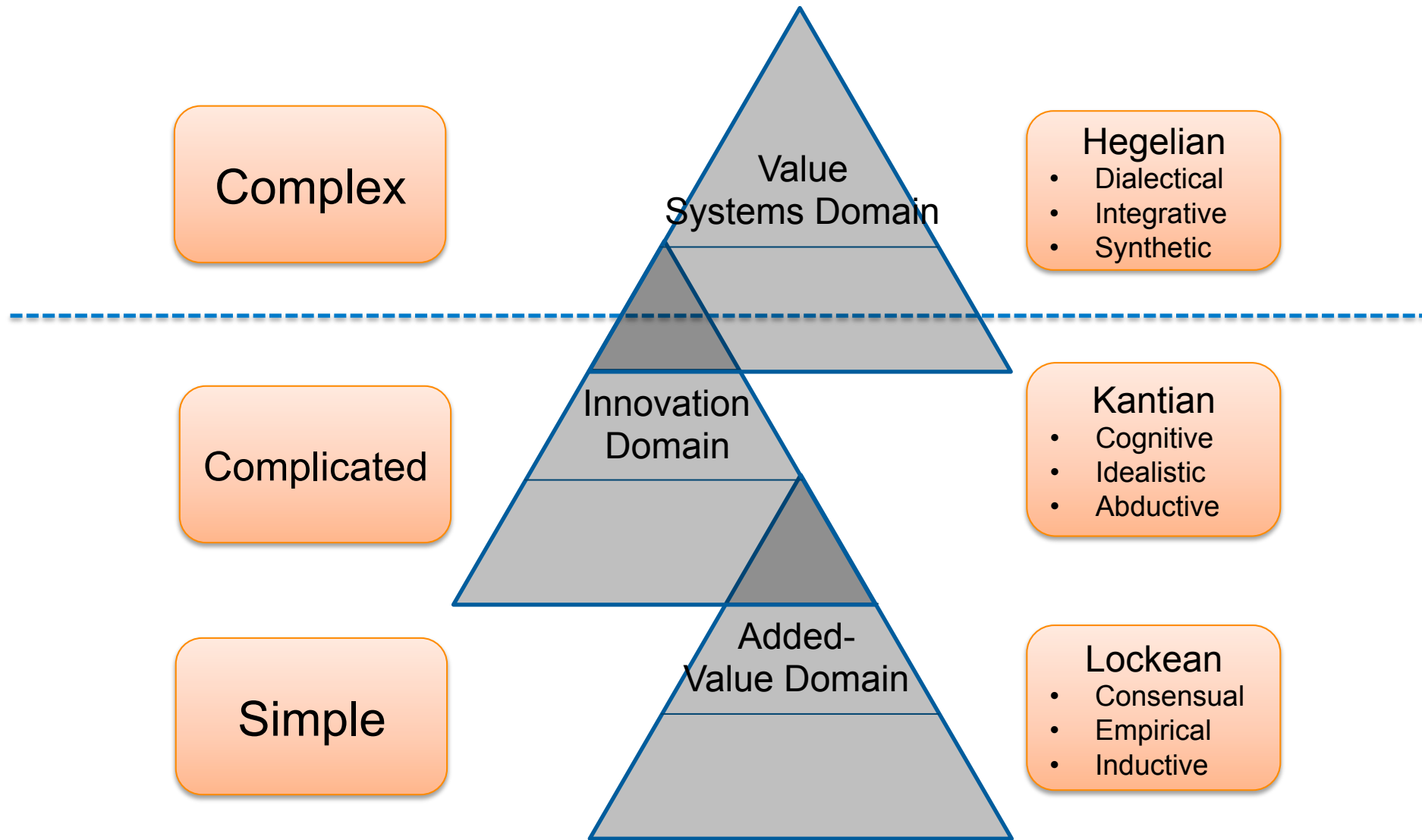
Three IT Realms

"Business follows IT"
- IT enables capabilities
- Value innovation
- Relativist metaphysics
- Inter-organizational scope

Loosely coupled
Flexibility
Exploration
Informating

"IT enables business"
- IT enhances competencies
- Engineering of future value
- Interpretive metaphysics
- Business scope

"IT follows business"
- IT provides resources
- Present day value realization
- Functional metaphysics
- Departmental scope

Tightly coupled
Efficiency
Exploitation
Automating

A'' Aalto University
School of Science

Revisiting the questions

1. **What is business technology?**
2. **How is it different from information technology?**
3. **What is business technology research?**
   – **Subject matter, scope of inquiry**

- A multifaceted discipline concerned with the development, use and implications of information and communication technologies in business organizations
- Often about organizational action and social change
- Cf. Level II technology

Revisiting the questions

4. **How is this field different from the information systems discipline?**

- IS typically deals with physically discrete, tangible, and recognizable artifacts through the use of which requirements are reliably and effectively translated into a desired outcome

- BT systems are less bounded, socio-technical, complex and far less predictable than IT systems; interacting subsystems create unpredictable behavior

Revisiting the questions

5. What research paradigms are pertinent to business technology research? Upon which contingencies?

- In most cases, interpretive paradigm appears to be the most relevant to BT:
    - Inquiry is inherently socio-technical
    - Intentionality of social agents must be considered
    - Prescriptive models valued

Aalto University
School of Science

Revisiting the questions

6. What are the ontological, epistemological and methodological implications of BT vs. IS?

- Information Systems
  - Functional, rational
  - Focus on cause–effect observations
  - Typically quantitative
  - Deductive theory building
  - Paradigmatic scope: information systems and solutions they support

- Business Technology
  - Interpretive, constructive
  - Focus on understanding causal mechanisms
  - Typically qualitative
  - Inductive theory building
  - Paradigmatic scope: organizational entity and its environment