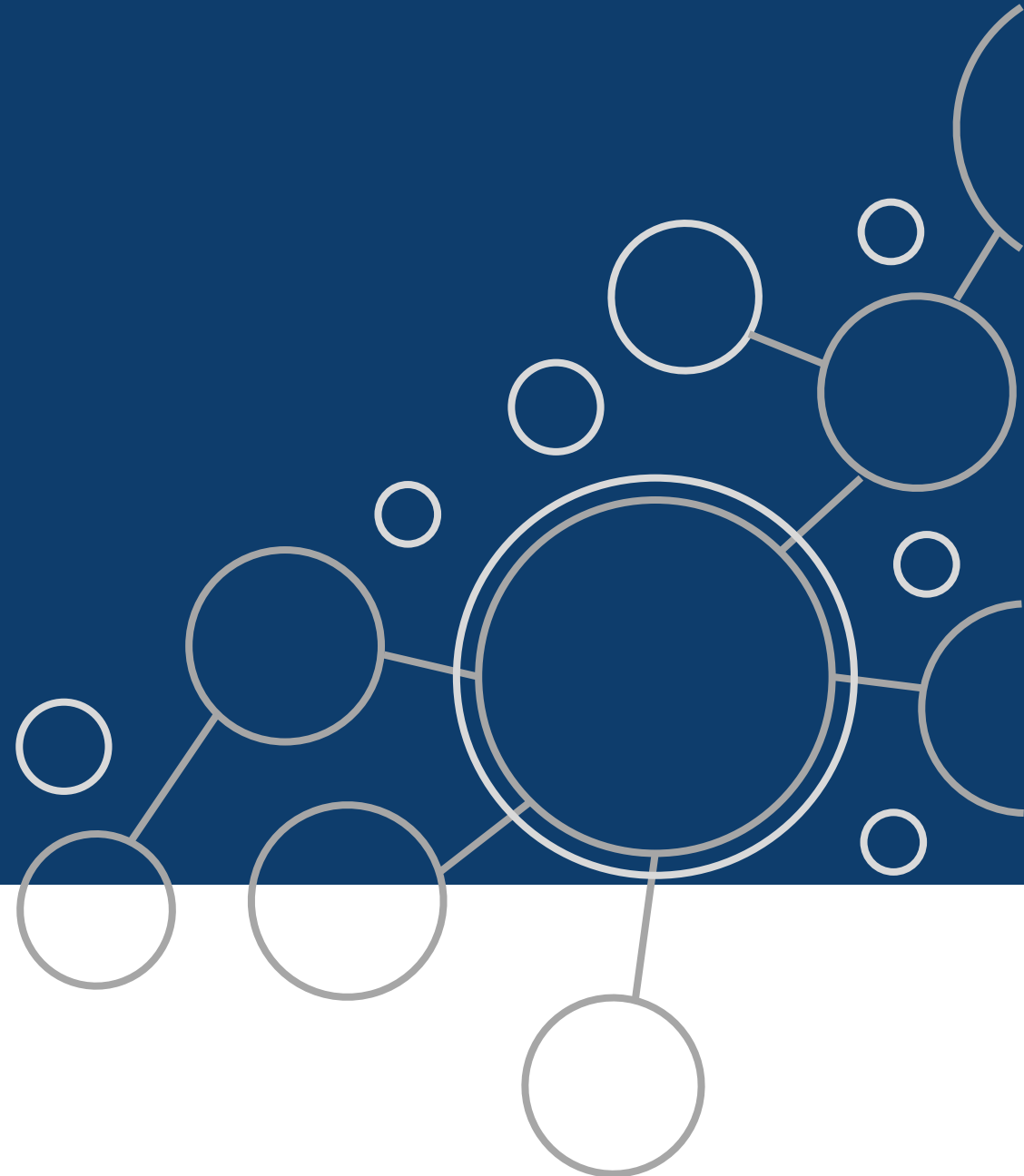


# 2023 PGCS Project & Program Management Symposium

**Harnessing Emergence in Complex Projects:  
Rethinking Risk, Opportunity & Resilience**



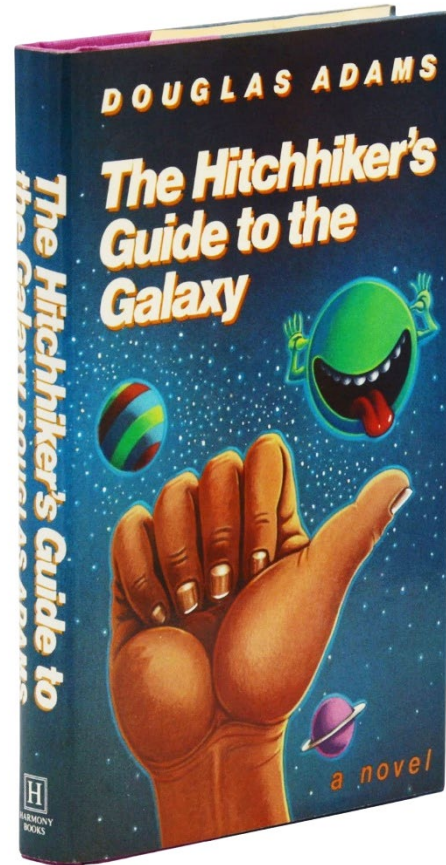
# ICCPM Roundtable Series

- Established by ICCPM in 2009 to provide thought leadership for those involved in complex and major projects
- The 2020 series built on the 2018 series that looked at the critical role of leadership in project success
- 2020 theme established at an ICCPM Partner meeting in Sep 2019
  - Leadership challenges > risk (recurring theme) > uncertainty > emergence
  - Considering projects as system > conversation
- Earlier Roundtables
  - Contracting for Success in Complex Projects (2016)
  - Complex Project and Programme Delivery in and Uncertain World (2012)
  - Global Perspectives and the Strategic Agenda to 2025 (2011)
  - The Conspiracy of Optimism: Why Mega Projects Fail (2009)

# About the 2020 series (defined by Covid-19)

- 7 workshops
  - 1 in-person, 1 hybrid, 5 online
  - >40 hours, guest speakers, break-out groups and plenary sessions
- ~150 participants
  - About a third were international
- ~50 organisations
  - Private, Public, universities, consultants, domestic, international & cross-sector
- Output
  - 130k words of transcript, >200 themes, >50 categories
- Three authors
  - Myself (QUT), Collin Smith (ICCPM) & Dr Richard Barber (RiskIQ Global)

# The obviousness of the unexpected



One of the things Ford Prefect had always found hardest to understand about humans was their habit of continually stating and repeating the very very obvious, as in *It's a nice day*, or *You're very tall*, or *Oh dear you seem to have fallen down a thirty-foot well, are you all right?* At first Ford had formed a theory to account for this strange behavior. If human beings don't keep exercising their lips, he thought, their mouths probably seize up. After a few months' consideration and observation he abandoned this theory in favor of a new one. If they don't keep on exercising their lips, he thought, their brains start working. After a while he abandoned this one as well as being obstructively cynical and

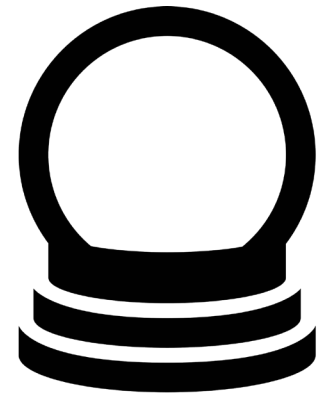
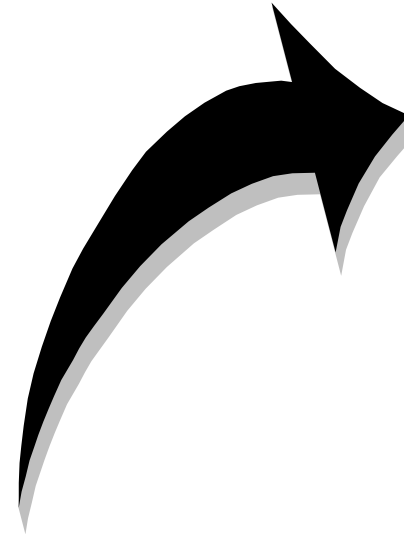
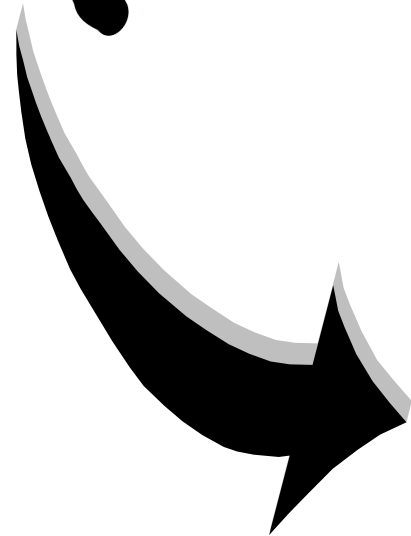
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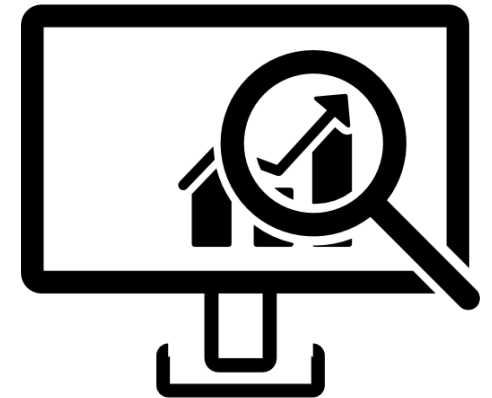
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Harnessing emergence is the art of integrating the unexpected

Adams, D., 1981, *The Hitchhiker's Guide to the Galaxy*, Pocket Books, New York, NY, p.49

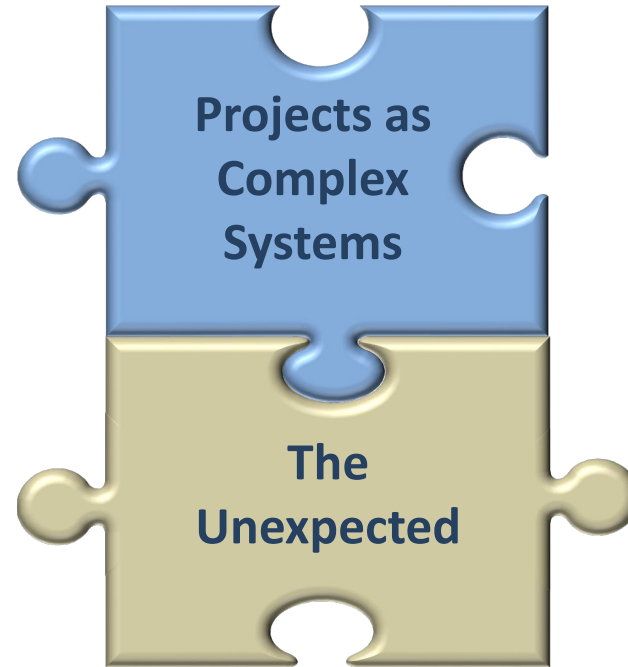


**Foreseeable**

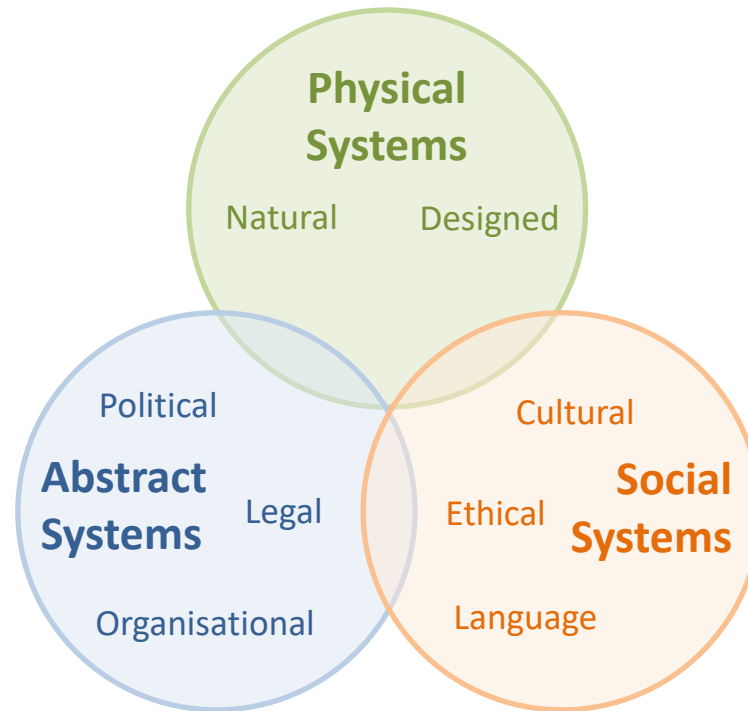


**Predictable**

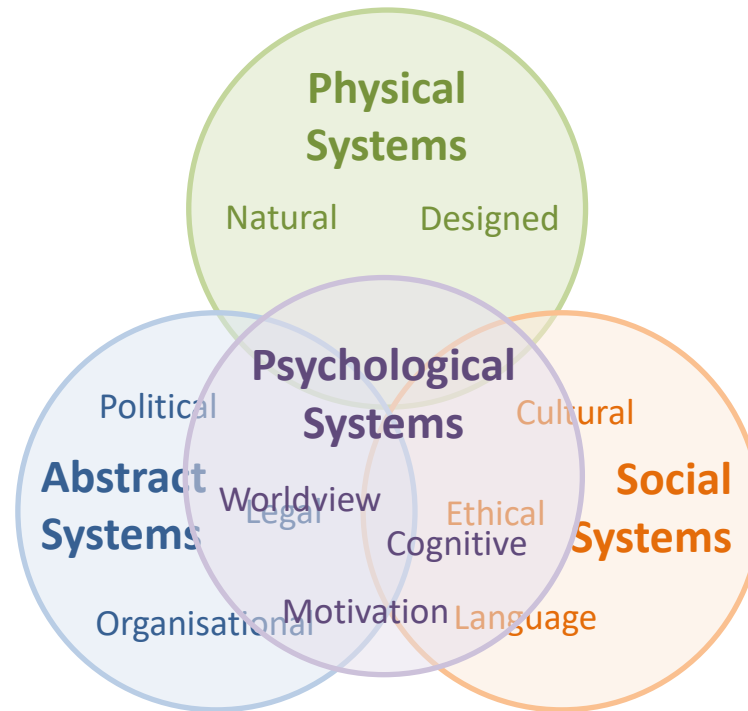
# Major Projects as Complex Systems – the starting point



# Major Projects as Complex Adaptive Systems (of systems)

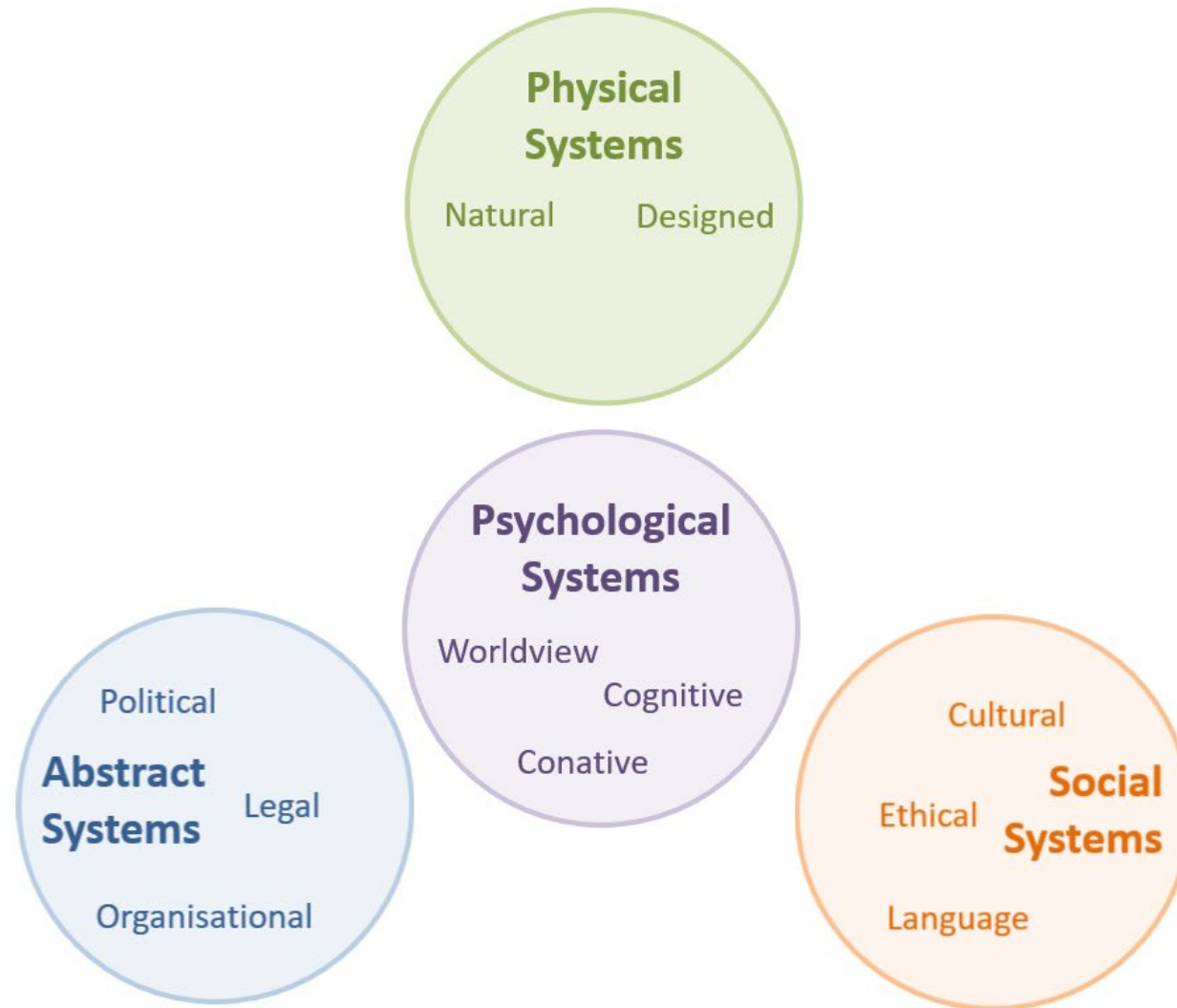


# Major Projects as Complex Adaptive Systems (of systems)





# Major Projects as Complex Adaptive Systems



# Factors that make major projects complex

Structure

- Component parts, interdependencies, scale

Technical

- Requirements volatility, design, manufacture, sourcing

Directional

- Ambiguity and agreement around goals, purposes

Temporal

- Competing purposes, delays

People

- Perception, perspective, purpose, worldview

Dynamics

- Concurrency, non-proportionality, uncertainty

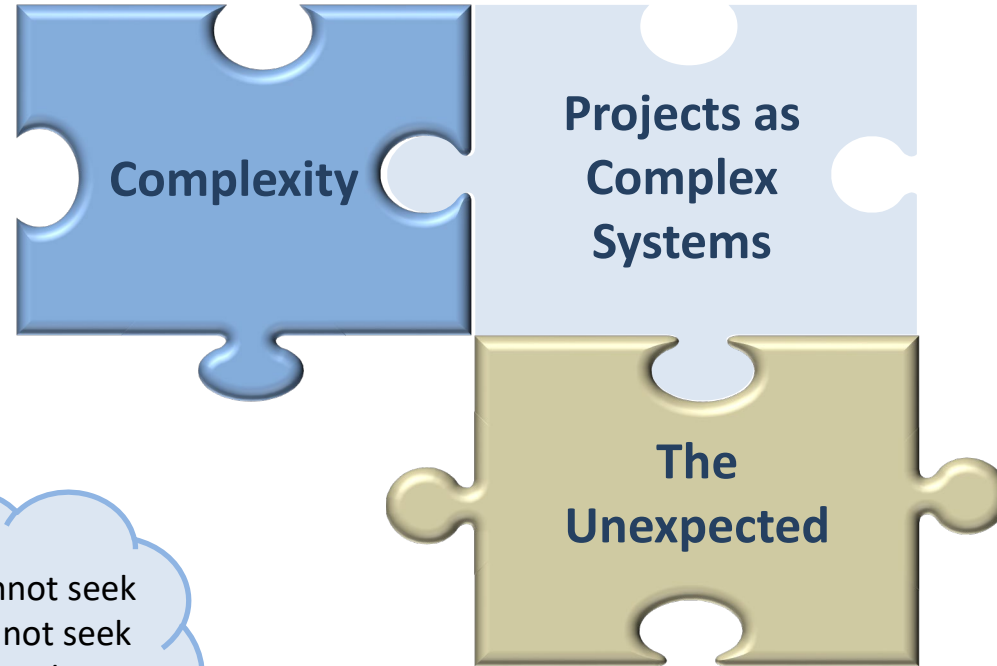
Open

- Context, relationship to environment, boundaries

Emergence

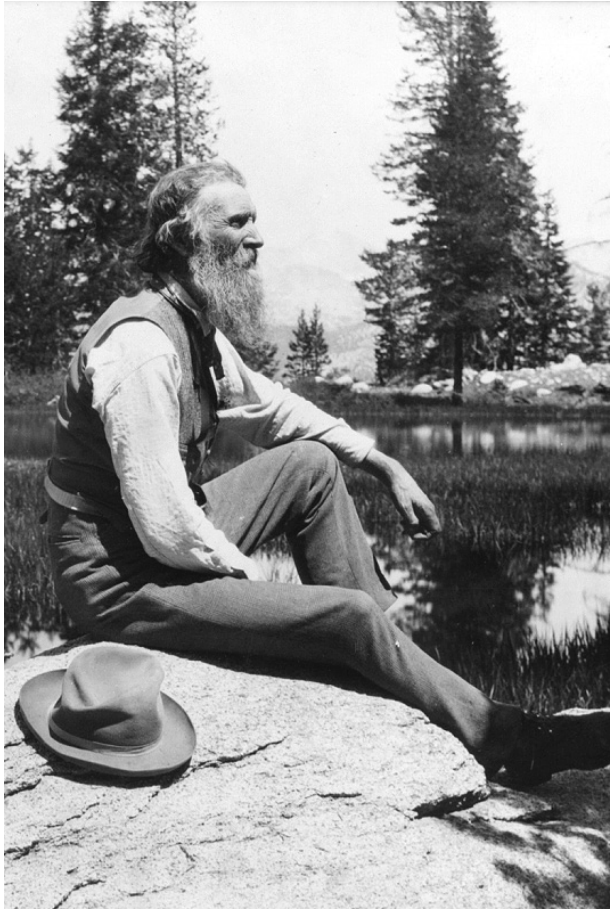
- Non-Linearity, unpredictability, irreducibility

# Major Projects - Understanding complexity

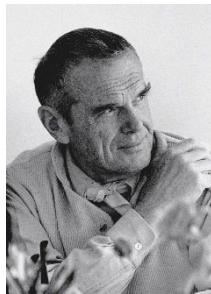


"In complexity, we cannot seek simplicity, and we cannot seek to know everything, and we cannot seek control, but we can seek clarity and focus"

# Complexity – Recognising connectedness



“When we try to pick out anything by itself, we find it hitched to everything else in the universe”.

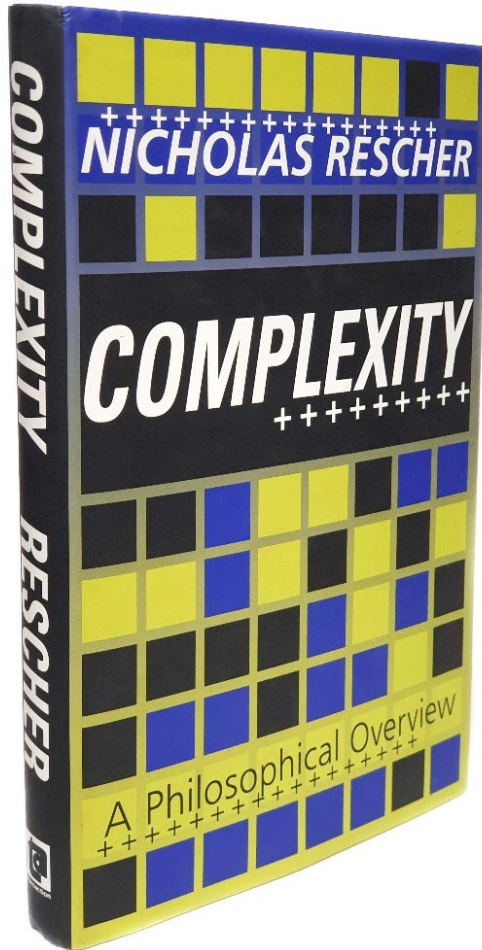


“Eventually everything connects – people, ideas, objects. The quality of the connections is the key to quality per se.”

Underwood, M. (2005). *Inside the Office of Charles and Ray Eames. Ptah, 2*, 46-63.

Muir, J. (1911). *My First Summer*. Boston, MA: Houghton Mifflin. p.211

# Complexity – The important human component

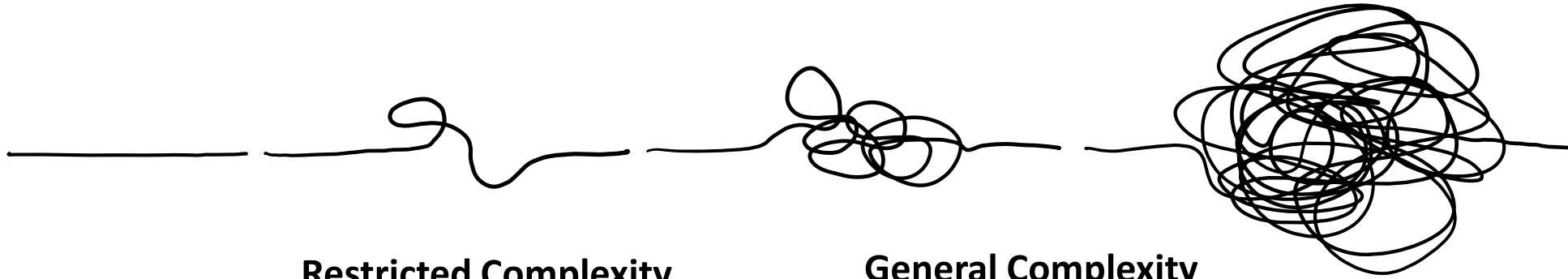


“The best overall index we have of a system's complexity is the extent to which resources (of time, energy, ingenuity) must be expanded on its cognitive domestication”

Complexity “hinges on the relationship of minds and of things - on the ways in which the former can come to terms with the latter”

Rescher, N. (1998). Complexity : a philosophical overview. New Brunswick, NJ: Transaction Publishers. P.16

# Complexity – A critical tension



## Restricted Complexity

The world can be understood  
Independent parts  
Number of parts  
Complete & comprehensive models  
Models reflect reality  
Extensive use of models  
Boundaries are closed  
Clear separation of environment

## General Complexity

The world cannot be understood  
Inter-related parts  
Relationships between parts  
Restricted & contingent models  
Models reflects assumptions  
Restricted use of models  
Boundaries are open  
Unclear separation of environment

Morin, E. (2007). Restricted complexity, general complexity. In C. Gershenson, D. Aerts, & B. Edmotads (Eds.), *Worldviews, Science and Us: Philosophy and Complexity* (pp. 5-29): World Scientific Publishing Co. p.11

# The General Complexity view

## Assumptions

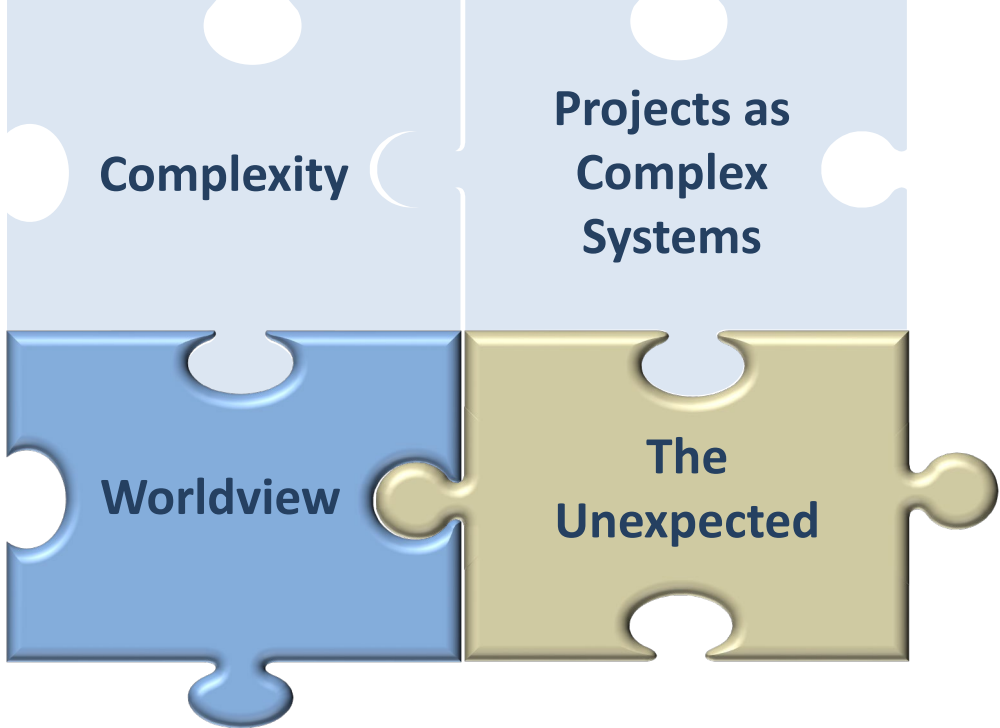
- The world is not always predictable
- Interactions are not always linear
- Not everything can be measured or controlled
- Ultimately not everything can be known

## Consequences

- There is always more than one future
- Systems may “tip” into a new form with different characteristics
- Interconnectivity of diversity drives adaptability
- Change occurs locally
- Nothing is fixed

Boulton, J & Allen, P. (2007). Complexity Perspective. In Jenkins, M. et. al. (Eds.), *Advanced Strategic Management: A Multi-Perspective Approach* Palgrave Macmillan, pp.215-234.

# The importance of worldview





# Worldview – what is it?



- Introduced in 1781 by Kant in *Critique of Pure Reason*
- Comes from the German “*weltanschauung*”
  - a conjunction of the German word *welt* which translates as “world” and *anschauung* which translates as “view”
  - However, the root of *anschauung* is the word *schouwen* which means “to look at”
- It’s all basically about the way we look at the world, as well as the view we have of it - its what makes what we *see and experience* make sense to us

“not merely a philosophical by-product of each culture like a shadow, but the very skeleton of concrete cognitive assumptions on which the flesh of customary behavior is hung” and something which is “implicit in almost every act”

Wallace, A. F. C. (1970). *Culture and personality*, Random House, New York, NY , p.143

# Elements of Worldview – “what is” and “what we know”

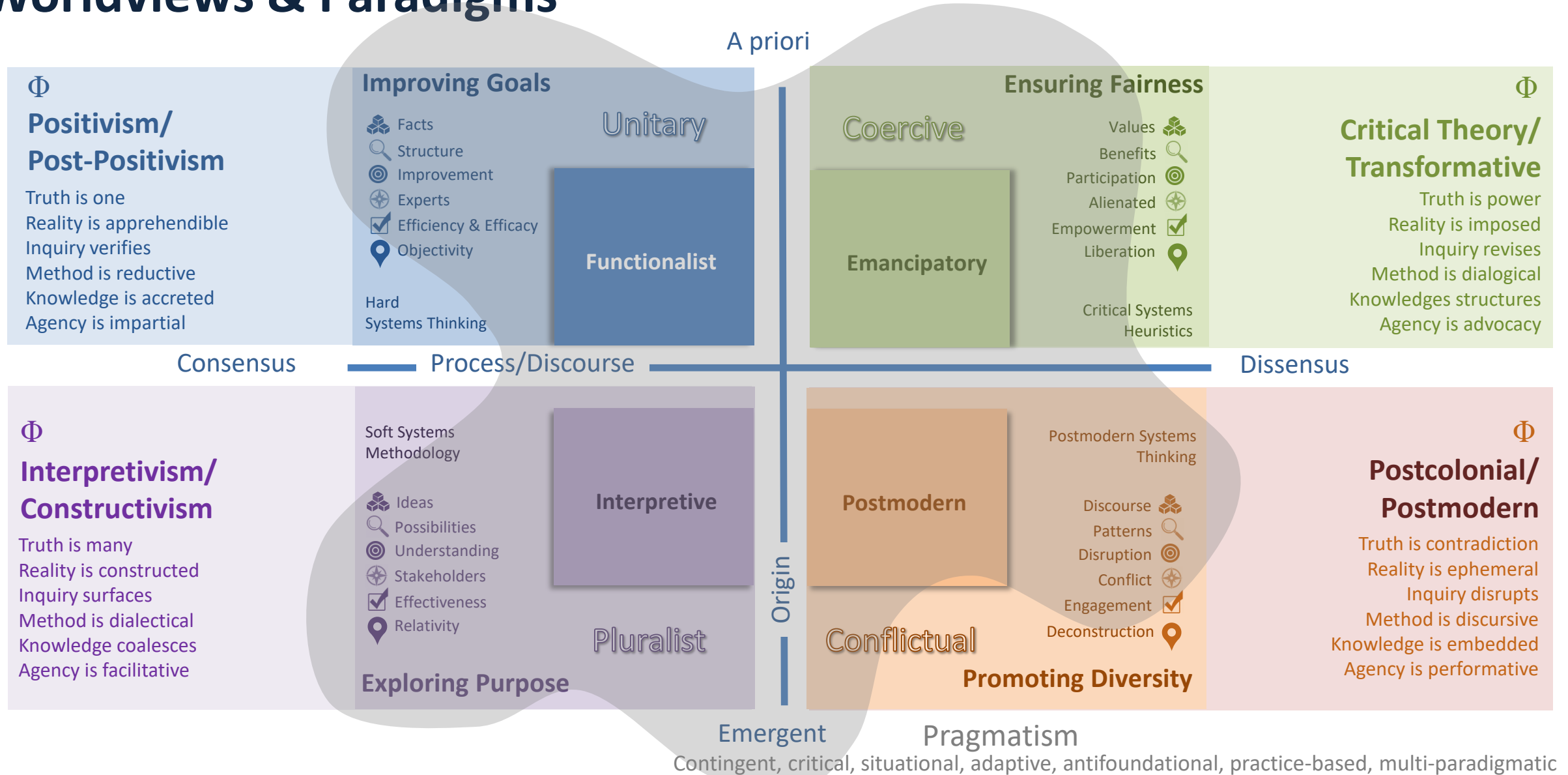
## Ontology

- Introduced in 1606 by Jacob Lorhard in *Ogdoas Scholastica*
- Comes from the Latin “*ontologica*”
- Translated as “science of being”
- Concerns being, existence and what is “real”
- Its all basically about what stuff there actually is
- Answers the question “*Is a thing actually a thing?*”

## Epistemology

- Introduced in 1854 by James Ferrier in *Institutes of Metaphysics*
- Comes from two Greek words “*episteme*” and “*logos*”
- “*episteme*” can be translated as “knowledge” or “understanding”
- “*logos*” can be translated as “reason” or “discourse” or “put together” (“*lego*”)
- Concerns the nature, sources, structure and even possibility of knowledge
- Its all basically about how we know stuff

# Worldviews & Paradigms



# The general relevance of paradigms

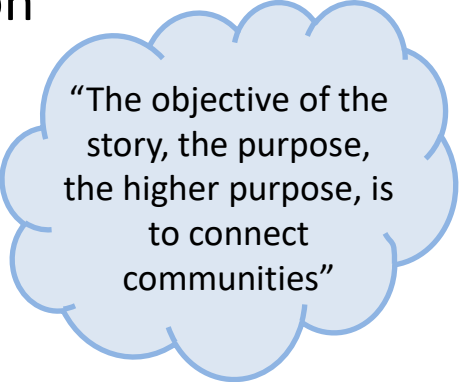


“...it is meaningful to examine work in the subject area in terms of four sets of basic assumptions. Each set identifies a quite separate social-scientific reality. To be located in a particular paradigm is to view the world in a particular way. *The four paradigms thus define four views of the social world based upon different meta-theoretical assumptions*”.

Burrell, G., & Morgan, G. (1979). *Sociological Paradigms and Organisational Analysis*, Heinemann, London UK, p.24

# The specific relevance for projects

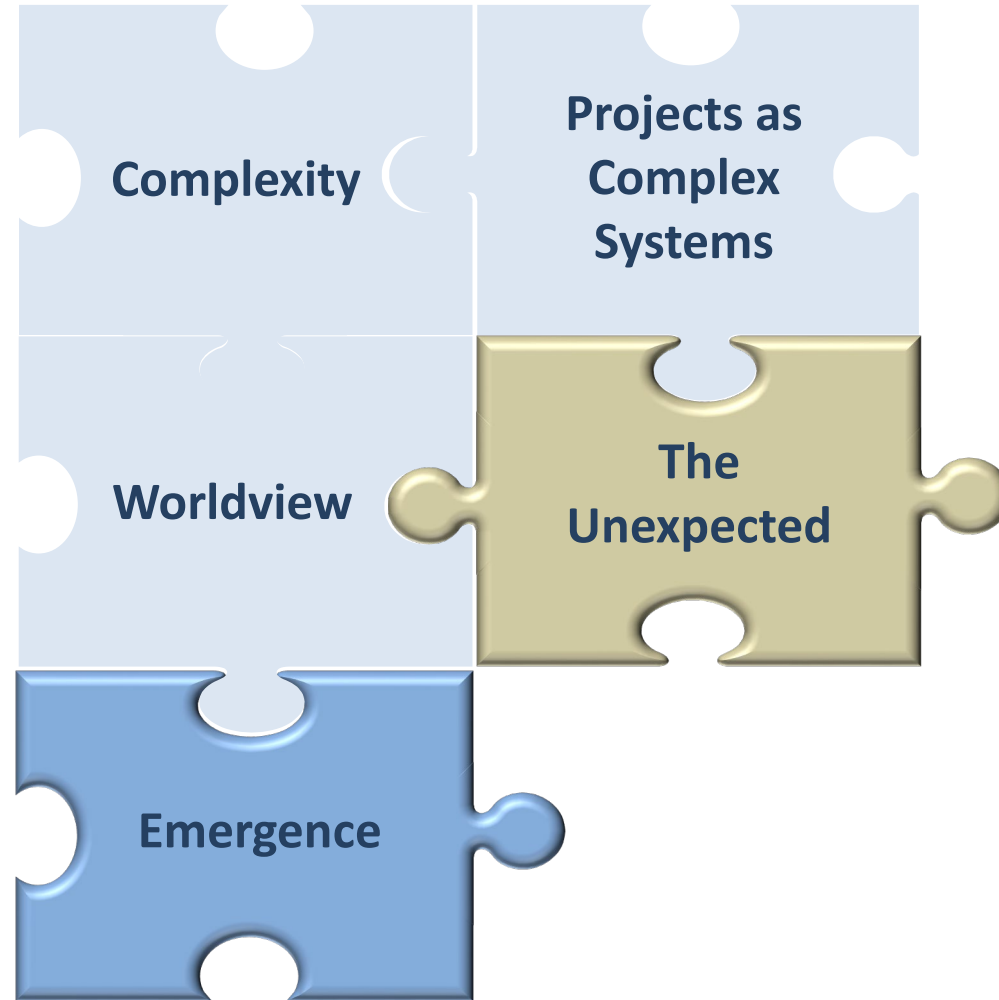
- Control – the value of critical theory
  - Power is ubiquitous, can exclude, can be contested, can lead to exploitation
- Narrative & Stories – the value of postmodernism
  - Networks of relations versus hierarchies, power expressed in interactions
- Scepticism – the value of postmodernism
  - Oppositional behaviour to offset group think and promote diversity
- Sensemaking – the value of constructivism
  - Making sense of things is ongoing and grounded in interactivity, social activity
- Knowledge – the value of constructivism
  - Created from interaction within communities of discourse
- Collective thinking – the value of constructivism
  - Thinking emerges from intentional and networks of co-creative inter-relationships



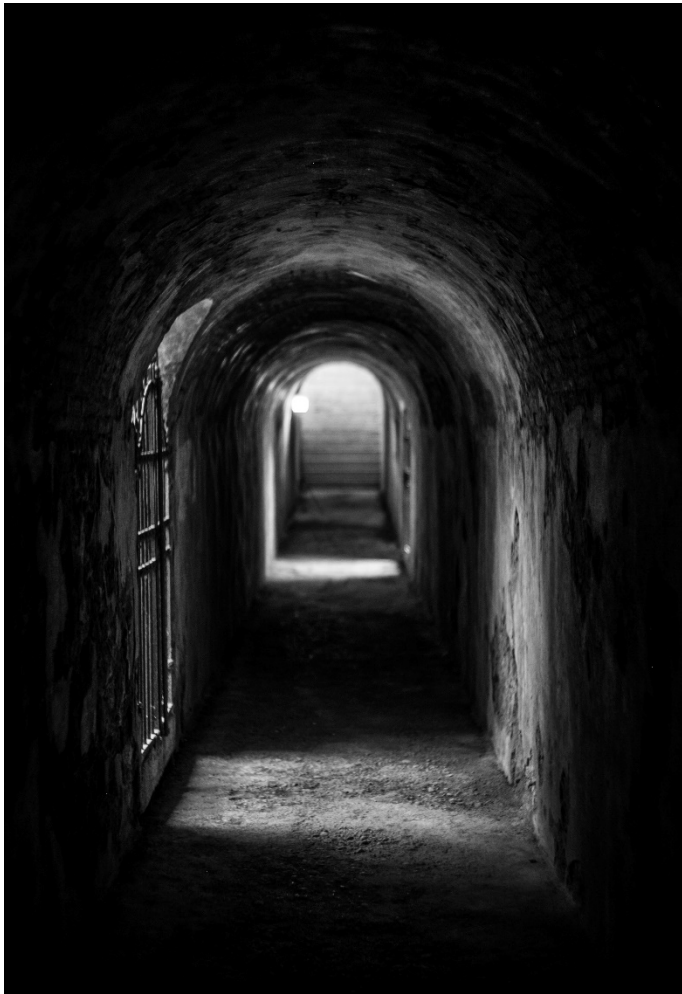
“The objective of the story, the purpose, the higher purpose, is to connect communities”

Bensley, J., Smith, C., & Barber, R., 2021, Harnessing Emergence in Complex Projects: Rethinking Risk, Opportunity & Resilience, ICCPM, Canberra, ACT

# Emergence - an extension of worldview



# Emergence – a threshold concept



“A threshold concept can be considered as akin to a portal, *opening up a new and previously inaccessible way of thinking about something...*[and] as a consequence of comprehending a threshold concept there may thus be a *transformed internal view of subject matter, subject landscape, or even world view.*”

Meyer, J.H.F. and Land, R. (2003) *Threshold concepts and troublesome knowledge: linkages to ways of thinking and practising*, In: Rust, C. (ed.), *Improving Student Learning - Theory and Practice Ten Years On*. Oxford: Oxford Centre for Staff and Learning Development (OCSLD), pp 412-424.

# Emergence introduced



“Although each effect is the resultant of its components, the product of its factors, we cannot always trace the steps of the process, so as to see in the product the mode of operation of each factor. In this latter case, I propose to call the effect an *emergent*. It arises out of the combined agencies, but in a form which does not display the agents in action”.

Lewes, George. H. (1875). *Problems of Life and Mind* (Vol. 2). Boston, MA: James R Osgood & Company, p. 368



# Emergence in everyday



“Hydrogen and oxygen are gases, and water is a liquid; and the wetness of water is a characteristic that could not possibly have been deduced from the nature of its components; it is a new characteristic that is attributable only to the structural organization of the molecular level of existence”.

Ablowitz, R. (1939). The Theory of Emergence. *Philosophy of Science*, 6(1), p.2

# Emergence

- Not planned or controlled
  - Dynamic interaction produces phenomena, patterns and properties that emerge and the element/s of, or the whole system
- Projects, as human systems
  - are not deterministic
  - are products of constant social negotiation and consensus building
- Changes in behaviour of elements can occur due to changes in the environment
  - without necessarily corresponding changes in the elements

# The essence of Emergence



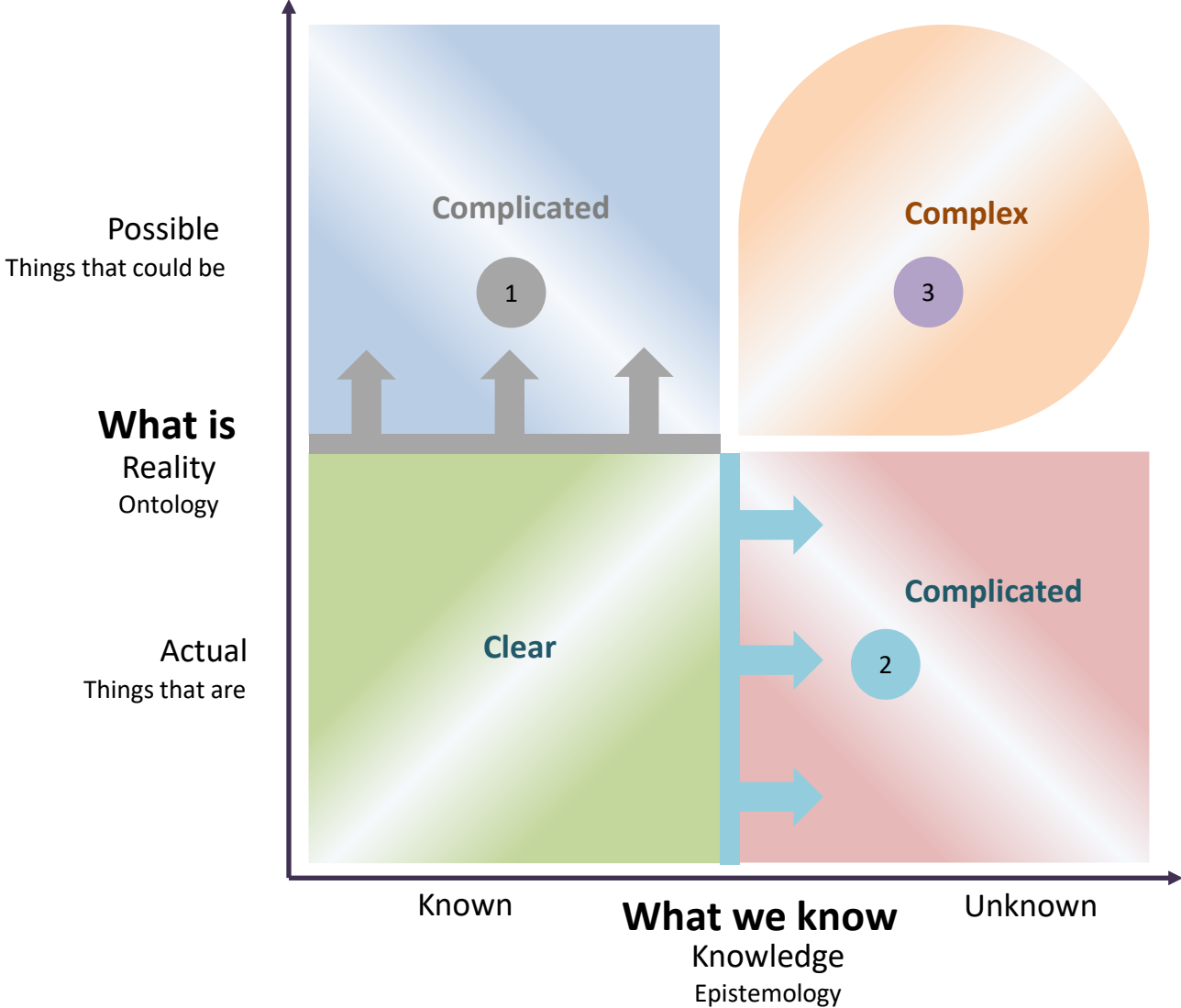
“emergence is not one of the features of things, but one of our unfolding information about them...an emergence in our knowledge”

“the emergence at issue relates to our cognitive mechanisms of conceptualization, not to the objects of our consideration in and of themselves”

“when talking about different people’s perception of emergence we need to be careful not to think of the “thing” or opportunity as an objectively “real” thing in relation to which people differ in orientation – it is far more complex than that”

Rescher, N. (1998). *Complexity : a philosophical overview*. New Brunswick, NJ: Transaction Publishers. P.35

# Zones of Emergence – whence & where



- Zone 1**  
 Traditional Project/Risk Management  
 Risk register = possible things (known) + mitigations (known)  
 Accommodates Positivist/Hard Systems view  
 The land of Probabilities  
 Weak emergence
- Zone 2**  
 Blinds spots  
 Points of exposure  
 Gaps in knowledge/research  
 Expertise can make these known – discoverable  
 Weak emergence
- Zone 3**  
 Pure/strong emergence - undiscoverable  
 Unknowable unknowns (in advance)  
 Knowable in retrospect (not necessarily known – might miss them)  
 Weak signals in this domain  
 Obliquity or attentive intelligence is required  
 Spheres of appreciation (appreciative inquiry/surfacing)

# Emergence and Projects

- Purpose
  - Complex projects exist for many reasons, purposes emerge at all levels
  - Sometimes alignments occurs and other times it doesn't
- Boundaries
  - Leaders need to listen to weak signals outside the boundaries
  - Boundaries are context and purpose dependent
- Planning and Control
  - Planning needs to be balanced with responding and adapting
  - Uncertainty, ambiguity and indeterminacy must frame planning
- Causation
  - Multiple and inter-related causes challenge linear approaches
  - Unlikely to be proximate in time or action to outcomes

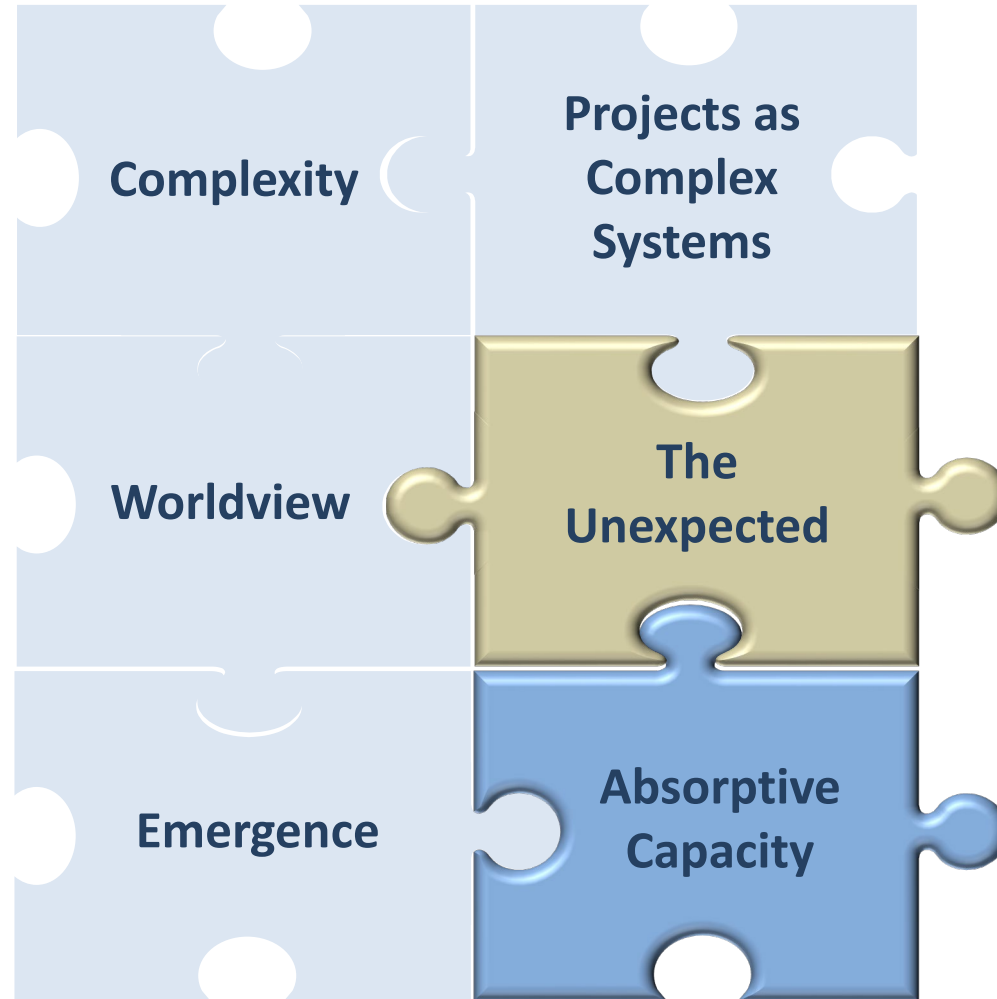
Bensley, J., Smith, C., & Barber, R., 2021, Harnessing Emergence in Complex Projects: Rethinking Risk, Opportunity & Resilience, ICCPM, Canberra, ACT

# Emergence – weak and strong

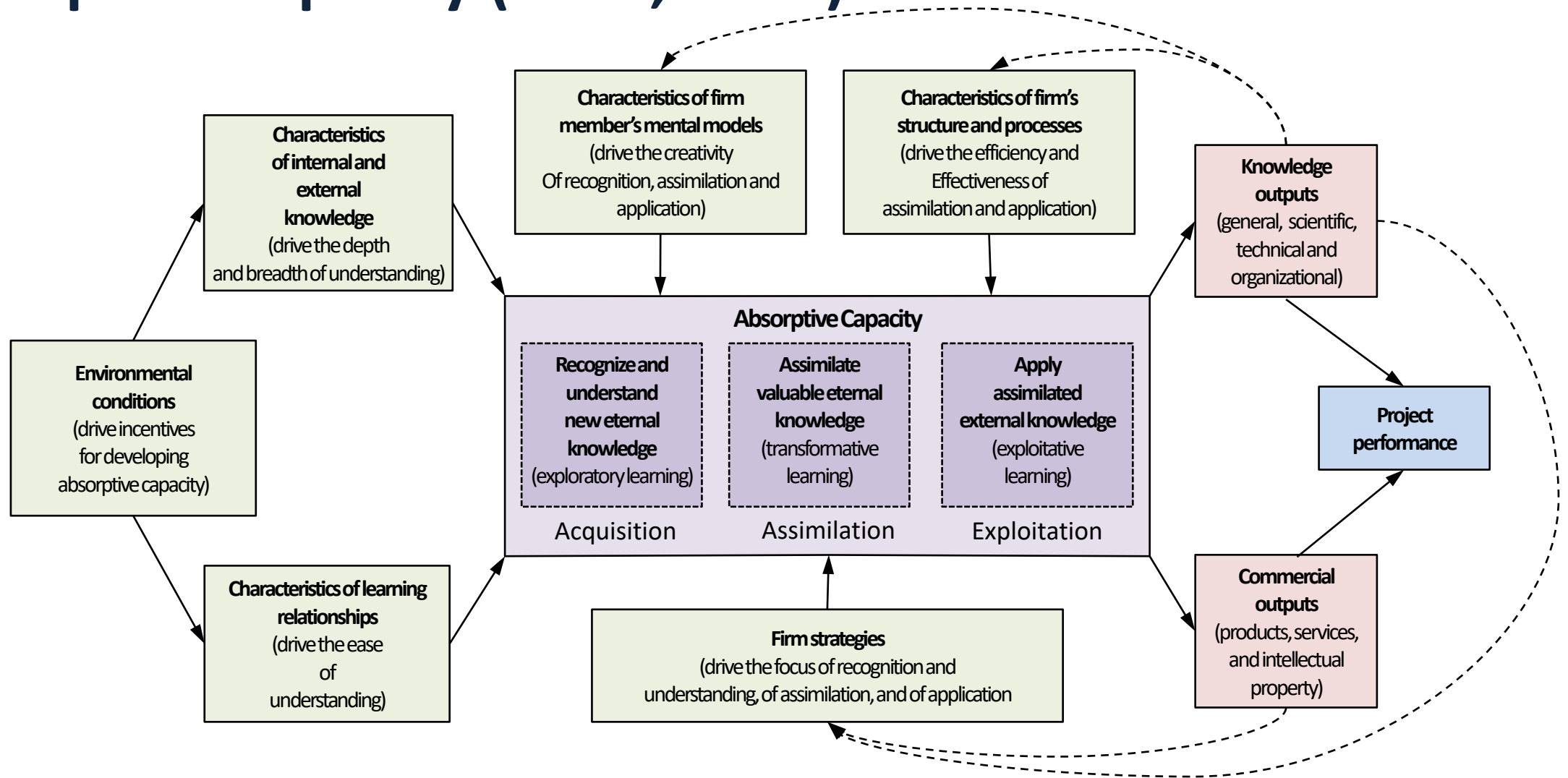
- Stemming from a *general complexity* view
  - the notion of strong emergence holds that emergent phenomena are neither predictable nor irreducible to their component parts.
- From the perspective of *restricted complexity*
  - noting the determinate role of parts, weak emergence can be said to exhibit deductibility without reducibility
- This means that within a system or project, there will be different types of emergent phenomena
  - Those that we may be able to reverse engineer and those that we can't/don't

Bensley, J., Smith, C., & Barber, R., 2021, Harnessing Emergence in Complex Projects: Rethinking Risk, Opportunity & Resilience, ICCPM, Canberra, ACT

# How then do we learn to respond to emergence?



# Absorptive Capacity (1989, 2002)

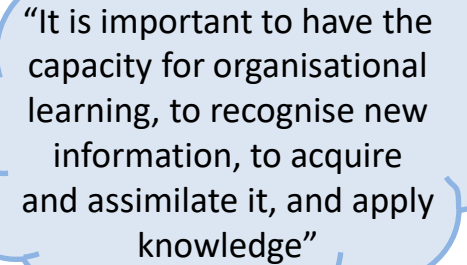


Lane, P. J., Koka, B. R., & Pathak, S. (2006). The Reification of Absorptive Capacity: A Critical Review. *The Academy of Management Review*, 31(4), 833-863



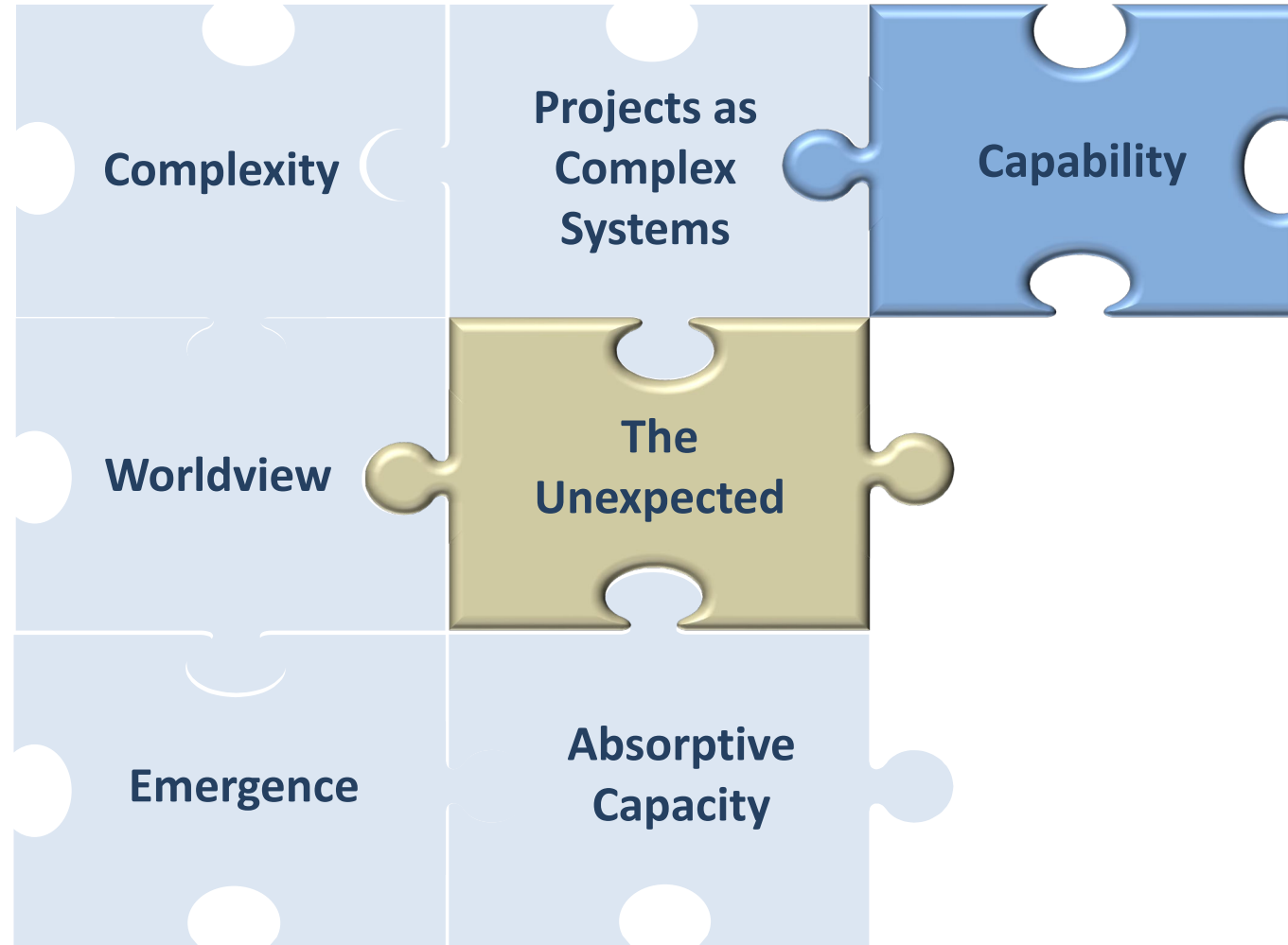
# Practical steps to improve Absorptive Capacity

- Undertake environmental scanning
  - Periodic, integrated, bounded and exploratory
- Search for and listen to weak-signals
  - Oblique and attentive intelligence for early insight
- Identify boundary spanners
  - Those good at working across boundaries and translating knowledge
- Identify gate-keepers
  - Connect those who control knowledge with boundary-spanners
- Proactively use boundary objects
  - Narratives, stories and metaphors at the intersection of knowledge groups
- Cultivate a knowledge culture
  - Establish values and norms that encourage curiosity and sharing



“It is important to have the capacity for organisational learning, to recognise new information, to acquire and assimilate it, and apply knowledge”

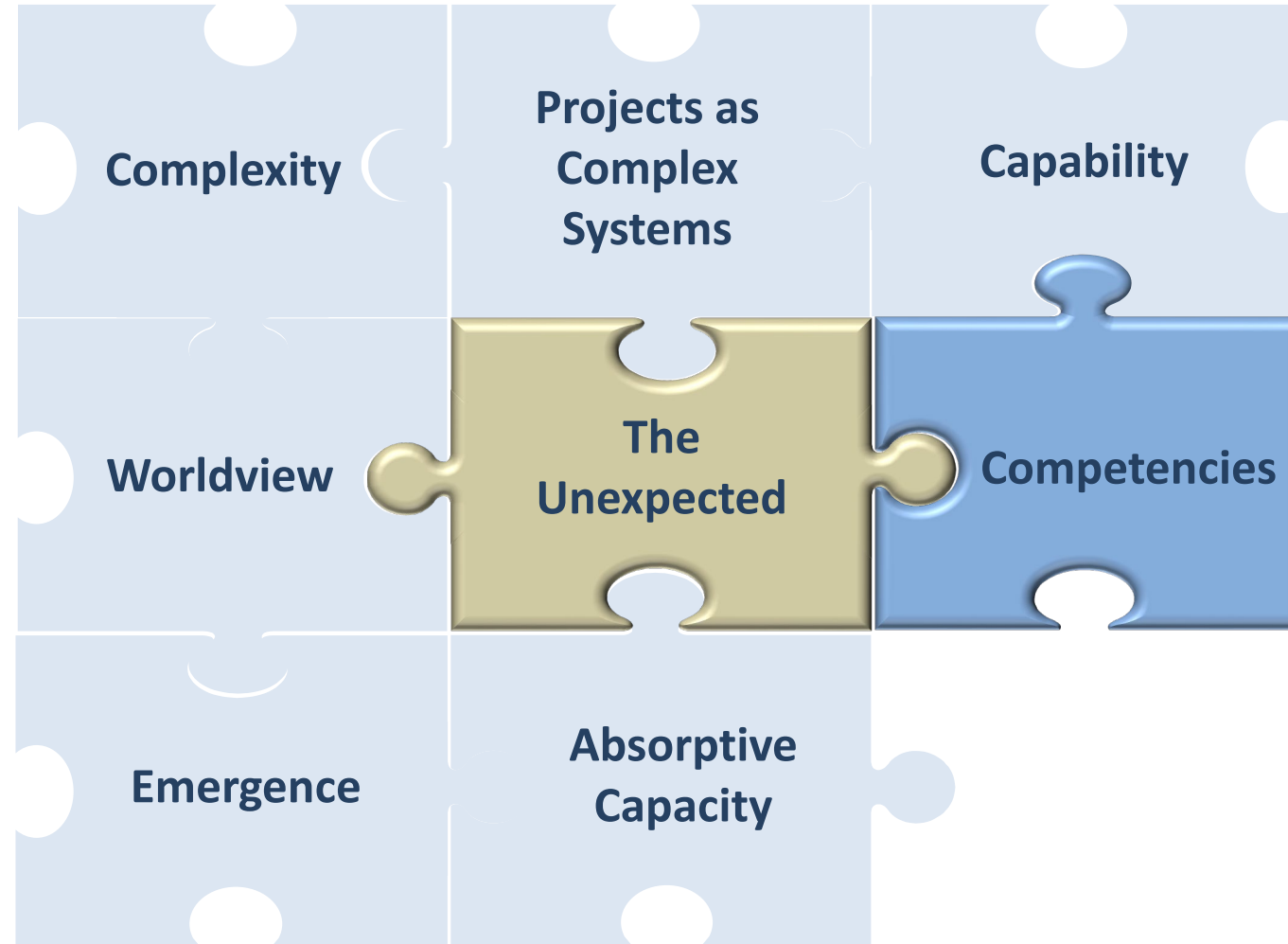
# Other capabilities to harness emergence



# Project Capabilities Required to Harness Emergence

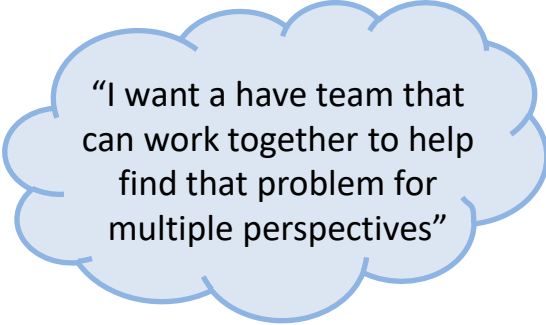
- Capable people
  - Skills, knowledge, emotional intelligence, flexibility of worldview (pragmatism)
- Systems Leadership
  - Systems of systems approach, systems approach to governance
- Discourse and connectivity
  - Wide conversations, open dialogue, formal and informal information systems
- Application of systems thinking
  - A range of sense-making tools that are appropriate to the varieties of complexity
- Culture
  - Shared beliefs, diversity
- Agility and readiness
  - Scenario thinking, contingency planning, ability to adapt quickly

# Competencies to support project capability

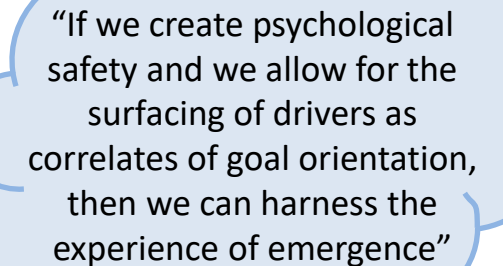


# Competencies to support project capability

- Multiple perspectives
  - Attentive intelligence
  - Suspending judgement when faced with uncertainty
  - Figuring out what matters to whom and why
  - Being open to new learning and adapting
- Thinking, knowing and doing
  - Inferential judgement
  - Differentiating between data, information, knowledge and wisdom
  - Boundary critique
  - Continuous dialogue
  - Psychological safety & trust

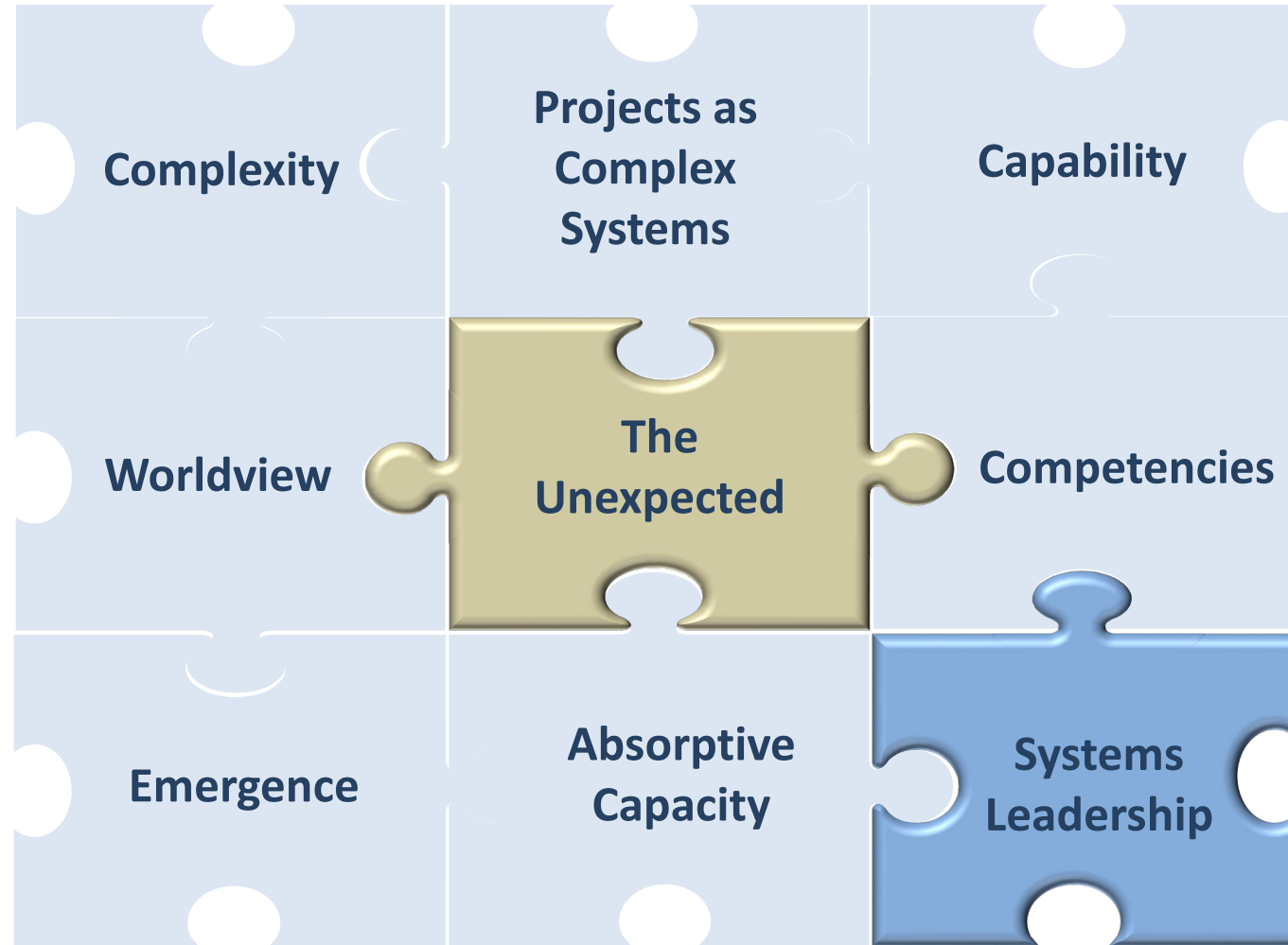


“I want a have team that can work together to help find that problem for multiple perspectives”



“If we create psychological safety and we allow for the surfacing of drivers as correlates of goal orientation, then we can harness the experience of emergence”

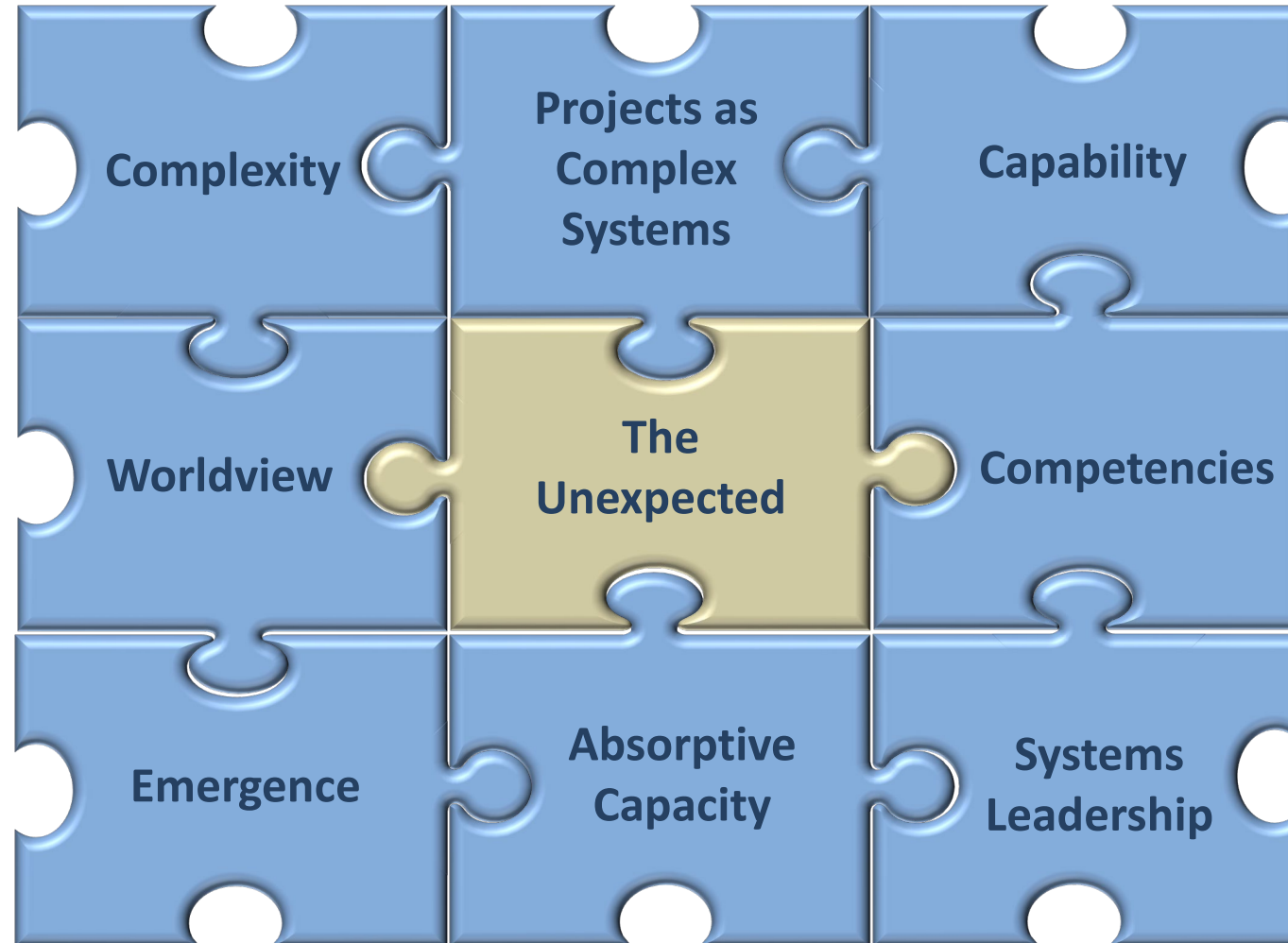
# Inter-relationships of Key Findings



# Systems Leadership (at all project/organisational layers)

- Principles (cultural)
  - Perception, Perspective, Purpose, Paradigms
  - Boundaries, Complexity, Worldview, Emergence
- Practices (functional)
  - Different circumstances call for different methodologies, fit for purpose selection
  - Different types of complexity require different methods of response
  - Technical, process, structural, people, organisational, coercive complexities
- Properties (directional)
  - Different leadership values and attributes for different circumstances/approaches
  - Humility, respect, empathy, curiosity, openness, equanimity
  - Obliquity, reflexivity, ambidexterity, paradox, abstraction

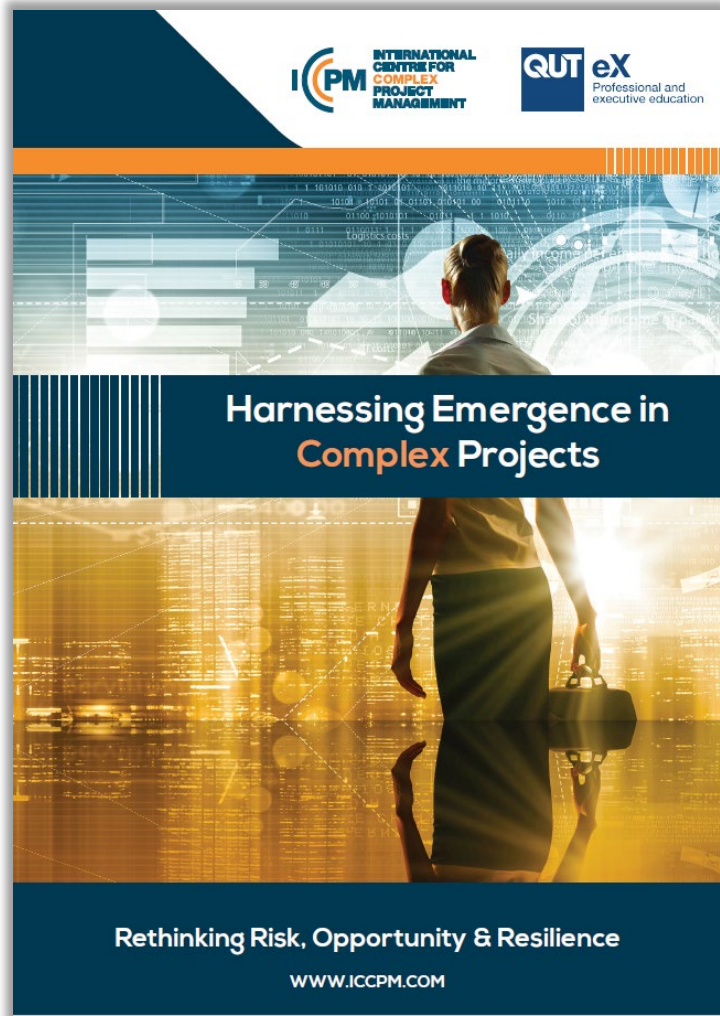
# Harnessing Emergence – Putting the puzzle together





# Harnessing Emergence – Summary Insights

- Understand the unexpected as a feature of complex adaptive systems
  - View major projects as complex adaptive systems
- Recognise different types of complexities and respond appropriately
  - Acknowledge both restricted and general complexity
- Appreciate that worldview shapes everything (complexity)
  - Tailor our response to complexity and approach to doing/managing/leading
- Be open to both weak and strong emergence
  - Adapt our approach and methodologies to the situation (emergent phenomena)
- Build a continuous learning capability
  - Promote the acquisition, assimilation, transformation and exploitation of knowledge
- Adopt a systems leadership capability at all layers in the project
  - Cultural, functional and directional (principles, practice and properties)



<https://iccpm.com/harnessing-emergence-in-complex-projects/>

