Health Workforce Complexity Concepts and Approaches

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Why bother with the complexity sciences?

TWO REASONS:

First, the Challenges of workforce management are deeply systemic, resistant to technical fixes, and often entangled with political, economic, and cultural structures, making them complex and “wicked” in nature.

Second, researchers rely on an increasingly narrower set of existing knowledge.

The same people in the same room applying the same methods asking the same questions and getting the same results, which perpetuates the same problems they are addressing instead of changing them.

SCIENTIFIC AMERICAN™

The Curious Wavefunction

Stephen Hawking's advice for twenty-first century grads: Embrace complexity

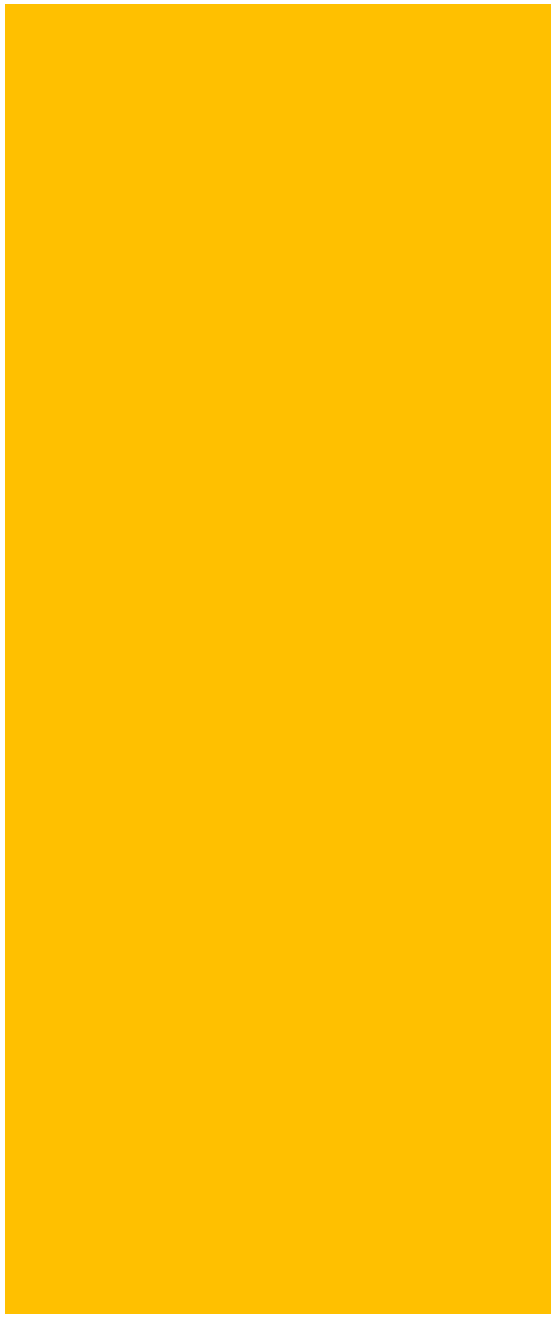
By Ashutosh Jogalekar on April 23, 2013

CAVEAT!!!

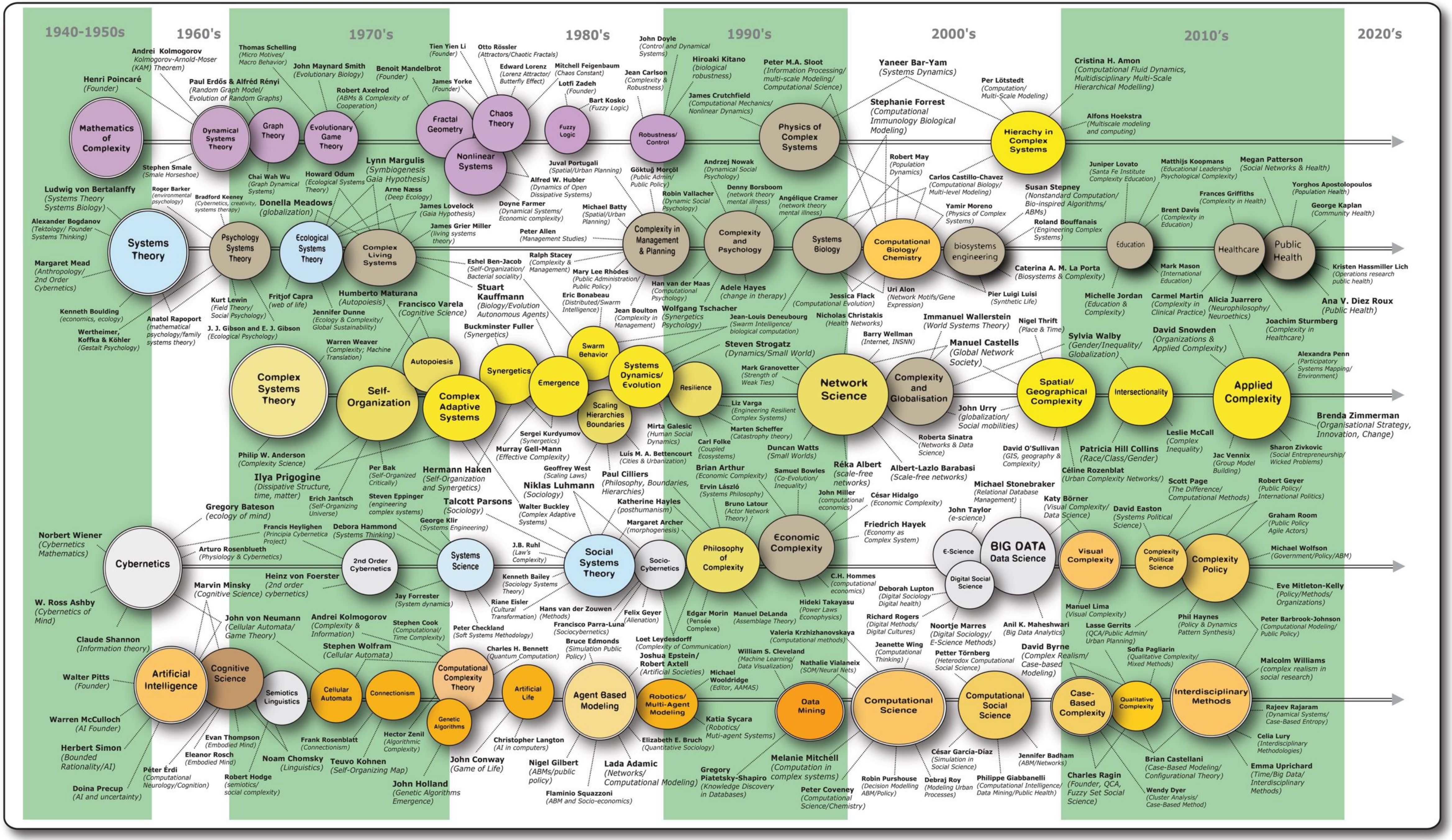
The Complexity Sciences are **not** the only solution to the problem.

Nor are they a panacea fix.

But they do have some highly useful concepts and methods – which is what we will explore here in this talk.



- We need both the social complexity literature and the health and social science literature.
- We need computational, statistical and qualitative interdisciplinary methods platforms.
- We need transdisciplinary engagement.



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Complex socio-ecological systems are:

case-based,
adaptive,
self-organising,
emergent,
nonlinear,
evolving,
casually complex,
comprised of multiple trajectories and outcomes,
nested within other complex systems and environmental forces,
network-based,
structurally open-ended,
and variously constrained and enabled via hierarchies and boundaries
and different forms of organisational closure.

Complex socio-ecological systems are:

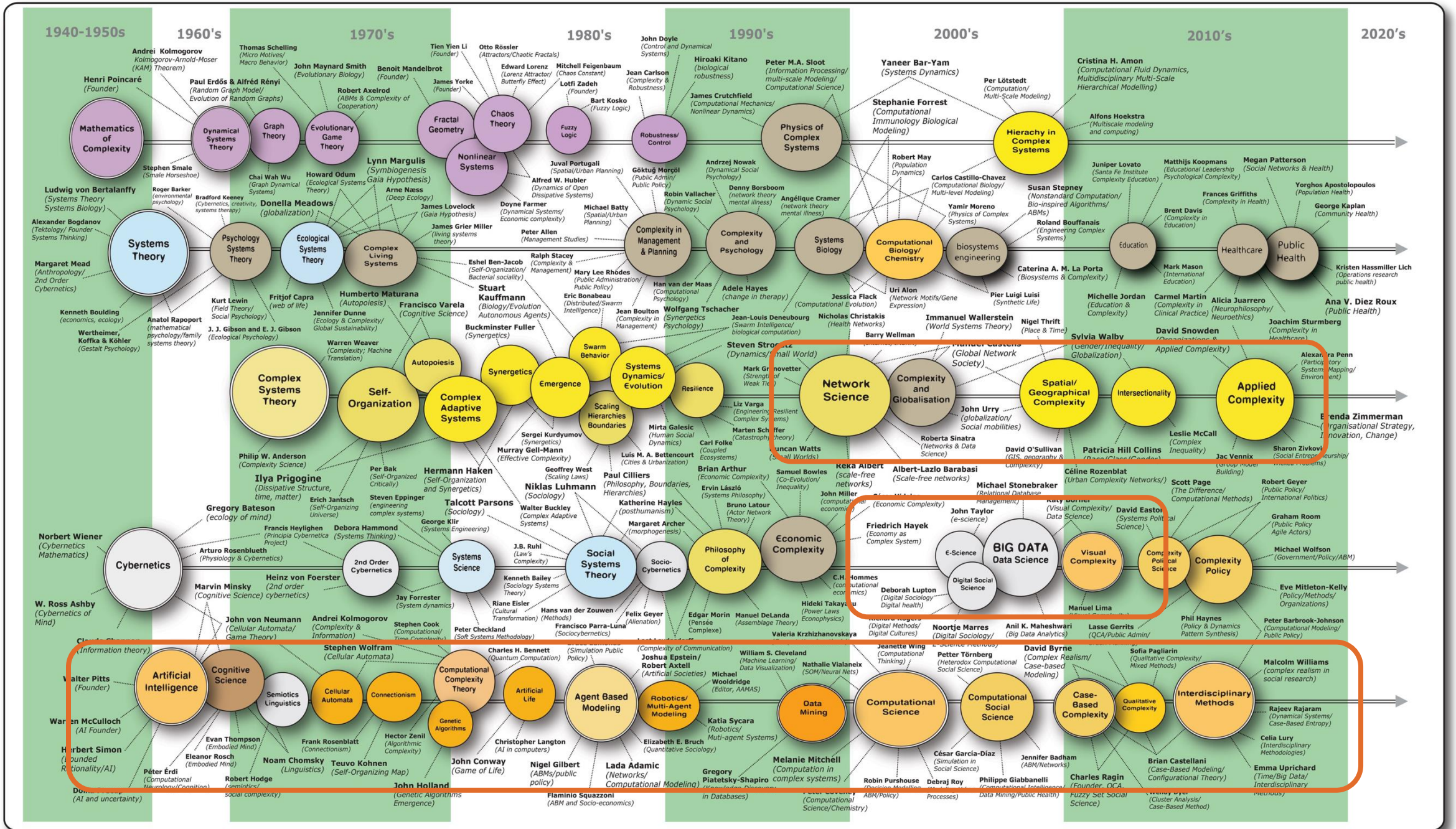
But they are also:

Comprised of relations of power.

Involve issues of inequality, exploitation, domination, governance, resistance, conflict, etc.

Comprised of varying levels of complex psychology, from the individual to the collective.

In need of different interventions and approaches to change, as wicked problems are not easily sorted or if ever solved.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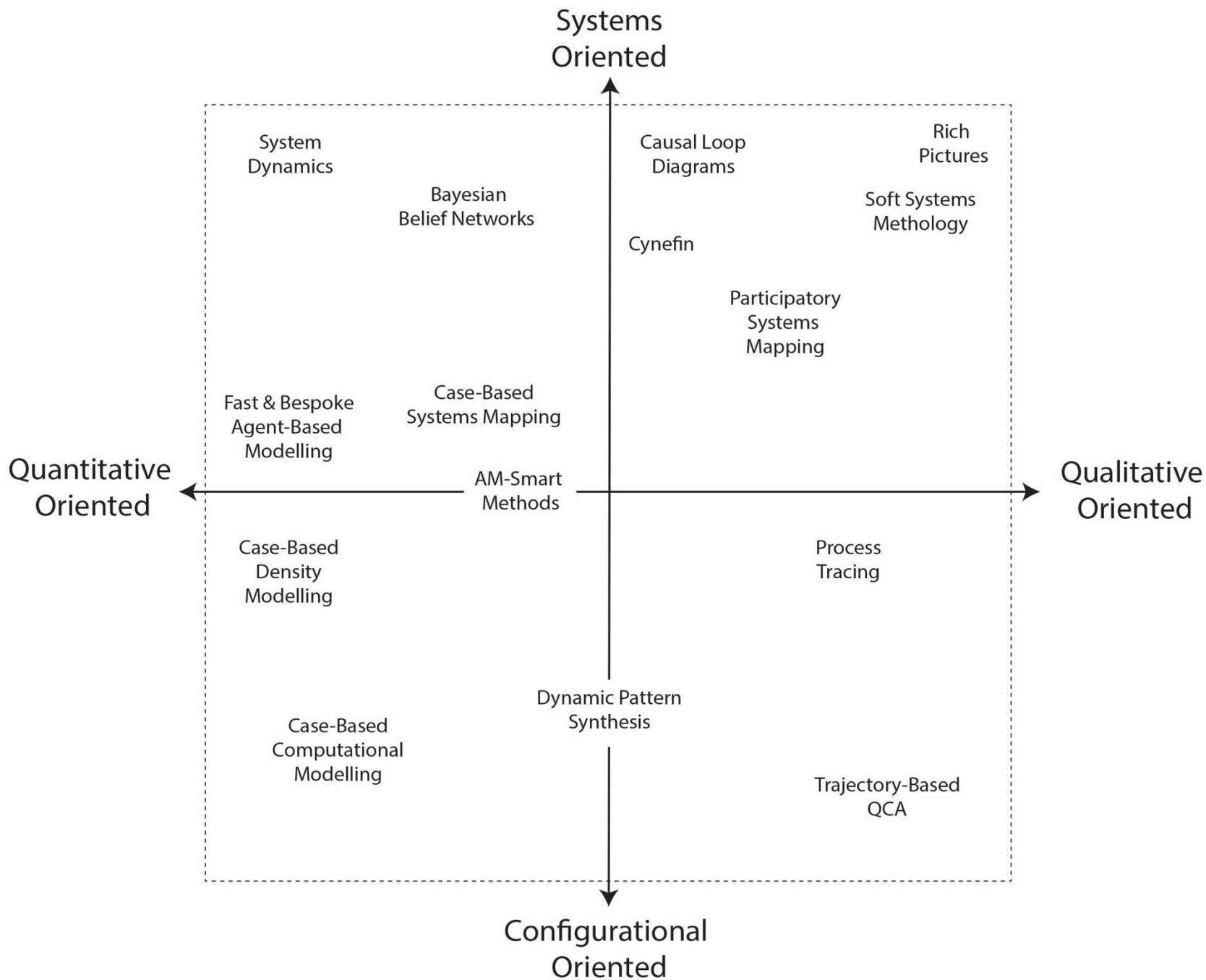
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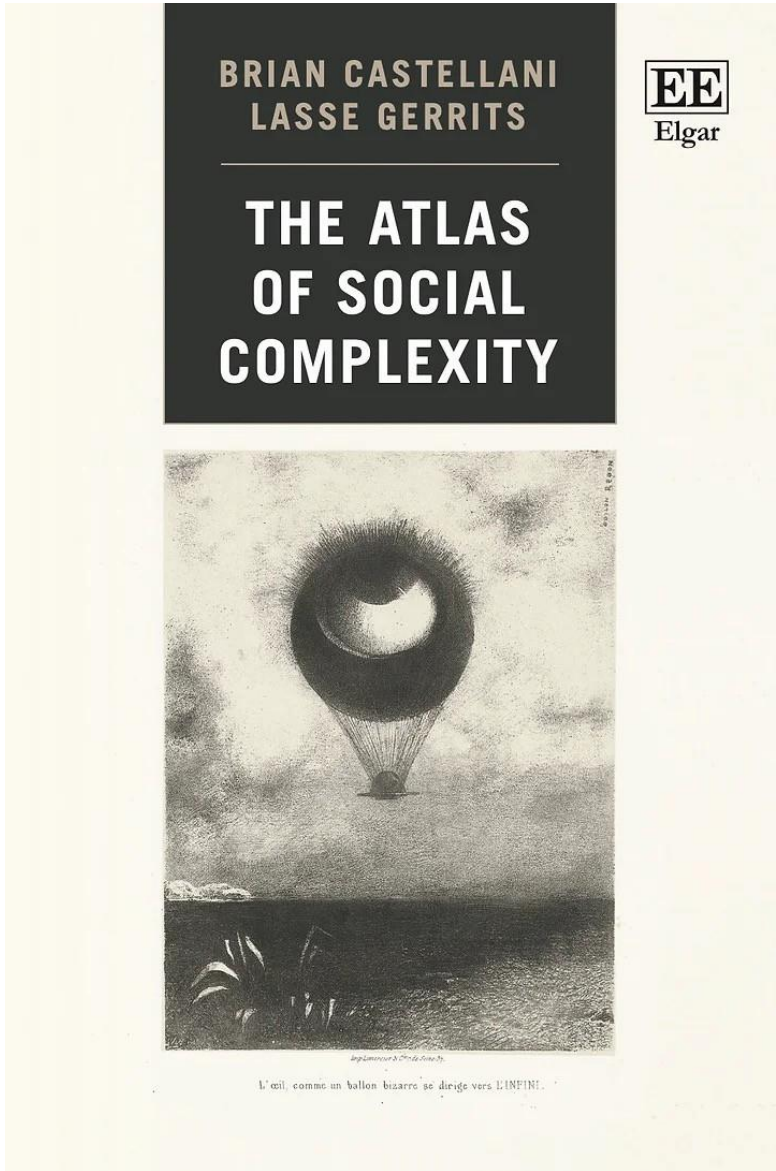
Quantitative Oriented
AM-Smart Methods
Qualitative Oriented
Case-Based Density Modelling
Process Tracing
Dynamic Pattern Synthesis
Case-Based Computational Modelling
Trajectory-Based QCA
Configurational Oriented



Biographical Summary

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Case-based complexity

- **Configurational Problems**
  - Health workforce issues are shaped by intersecting social, institutional, and ecological factors—not single causes.
- **Nested Systems**
  - Workers operate within nested systems e.g., local hospitals, national policy, global labour markets, which are all interacting.
- **Emergent Systems**
  - Teams self-organize and evolve over time; workforce dynamics are adaptive and nonlinear.
- **Scalable Analysis**
  - Analysis moves across scales, from daily routines to global structures, revealing interconnected patterns.

Case-based complexity

- **Fluid Categories**
  - Job roles and workforce categories must be interrogated, as they shift with social and political change.
- **Nonlinear Causality – multifinality, equifinality, causal asymmetry**
  - **Multifinality**: Similar conditions lead to different outcomes.
  - **Equifinality**: Different conditions lead to similar outcomes
  - **Causal asymmetry**: what accounts for success does not necessarily account for failure.
- **Trajectory Clustering**
  - Workforce cases evolve along different paths, clustering into dominant trends and hidden counter-patterns.

Optimization and Demand Models

- **Case-Based Complexity as the Grammar of Workforce Diversity**
- Health systems do not follow one script.
- They are **ensembles of cases,** each a unique constellation of social, economic, institutional, and ecological factors.
- Case-based complexity approaches reject the search for universal laws.
- Instead, they trace
  - **equifinality:** many paths to similar outcomes
  - **multifinality**: similar starting points diverging
  - **causal asymmetry:** the same variable helps in one setting, harms in another
- For workforce demand models, this means dropping the illusion of one-size-fits-all projections.
- Treat each workforce ecosystem as a situated case, where solutions must be assembled, not imposed.

Complexity is not a complication; it is a place-based contextual truth.

QUESTION:

What do you need to help you begin to explore or use the tools of the complexity sciences?