Facing the Complexity Gap

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Why Do Managers &Management Theorists Resist Complexity Science??

"Managers would rather live with a problem they can't solve

than with a solution they can't fully understand or control."

- Eric Bonobeau, researcher in swarm intelligence and CEO of Icosystems

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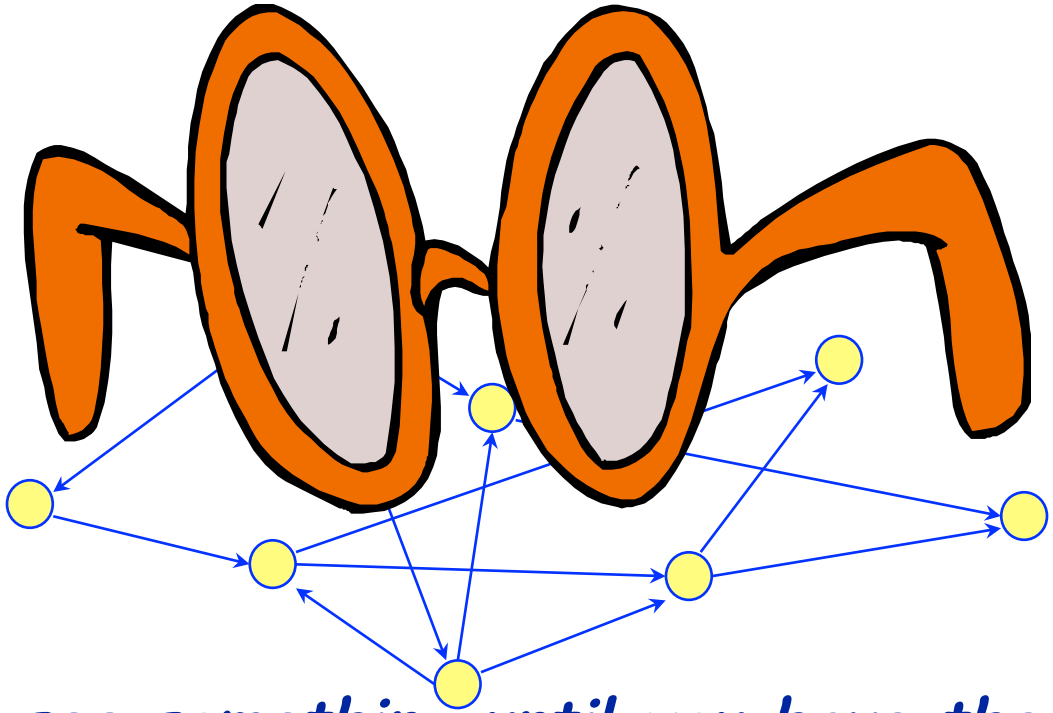
Seeing Through A Complexity Lens



"You don't see something until you have the right metaphor to let you perceive it". Thomas Kuhn

"Believing is Seeing" Karl Weick

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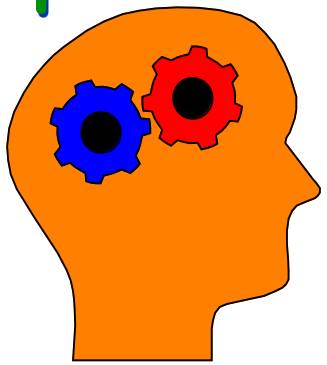
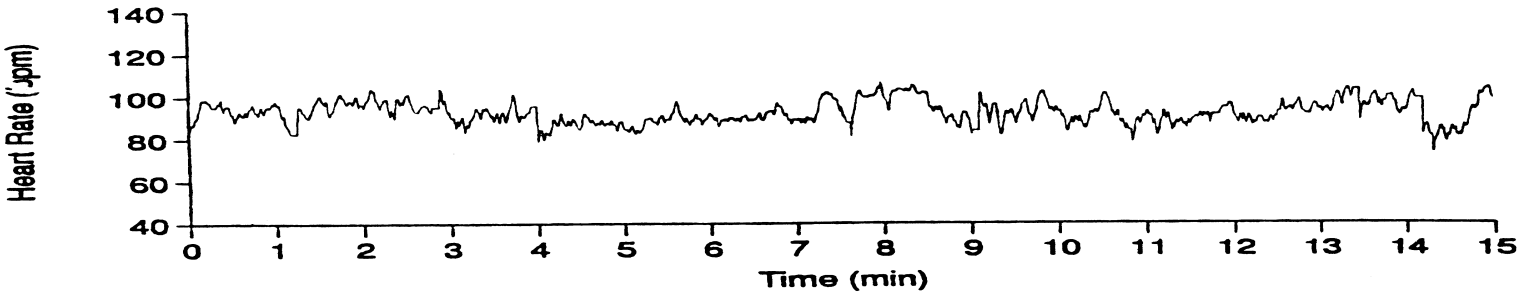
Newton & the Machine Metaphor

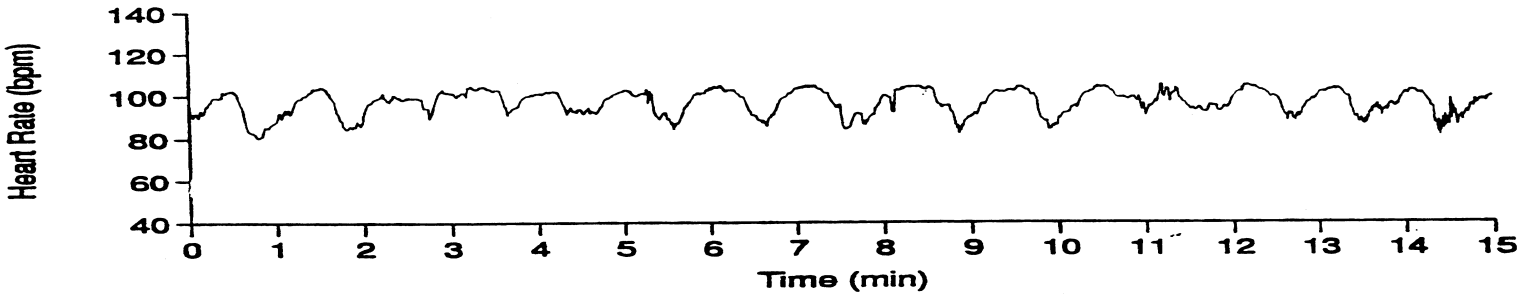


- Organizations and people are implicitly viewed as machines (or machine parts)

- How does treating humans and organizations as machines impact what we do?

Heart Rate Dynamics





Complexity Gap - based on IBM survey of 1600 CEOs

- Expect higher level of complexity than they feel prepared to address

- "Stand outs" – thrive on complexity. How?
  - Embodying creative leadership
  - Reinvent customer/citizen relationships
  - Building operating dexterity --- seeing complexity as (1) the reality of their work and (2) capable of using complexity to create value

Simple	*Complicated*	*Complex*
Baking a Cake	A Rocket to the Moon	Raising a Child

Simple Complicated Complex

Baking a cake A Rocket to the Moon Raising a Child

The recipe is essential

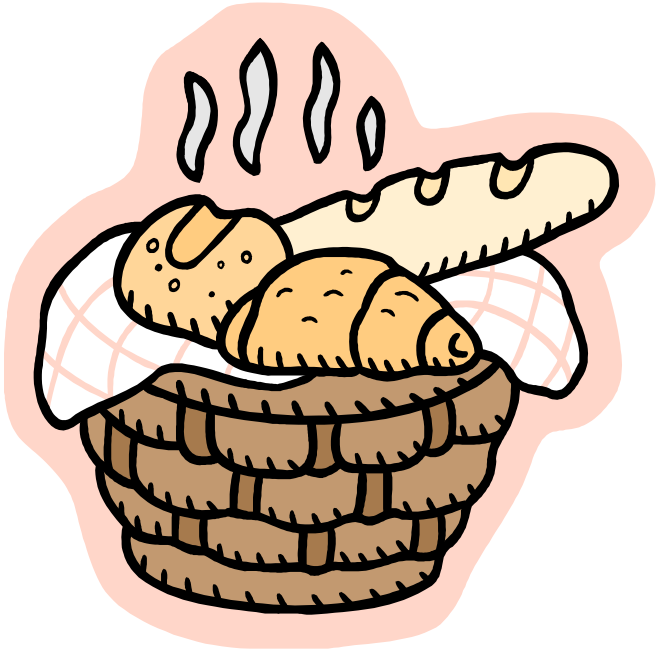
Recipes are tested to assure replicability of later efforts

No particular expertise; knowing how to cook increases success

Recipe notes the quantity and nature of "parts" needed

Recipes produce standard products

KNOWN



Following a Recipe

The recipe is essential

Recipes are tested to assure replicability of later efforts

No particular expertise; knowing how to cook increases success

Recipes produce standard products

Certainty of same results every time

A Rocket to the Moon

Formulae are critical and necessary

Sending one rocket increases assurance that next will be ok

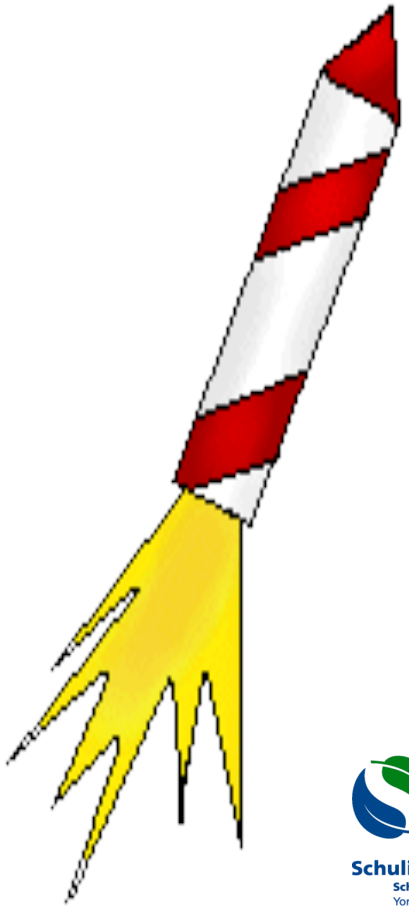
High level of expertise in many specialized fields + coordination

Separate into parts and then coordinate

Rockets similar in critical ways

KNOWABLE

Raising a Child



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A Rocket to the Moon

- For… are cr… n…
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High level of expertise in many specialized fields + coordination

- Rockets similar in critical ways
- High degree of certainty of

Raising a Child

Formulae have only a limited application

Raising one child gives no assurance of success with the next

Expertise can help but is not sufficient; *relationships are key*

Can't separate parts from the whole

Every child is unique

UNKNOWABLE

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Leadership Strategies

1. Minimize or reduce complexity?
2. Absorb or embrace complexity?

Leadership Strategies

- Minimize or reduce complexity?
  - simplify whenever possible
  - Standardize, routinize
  - Best practices

Leadership Strategies

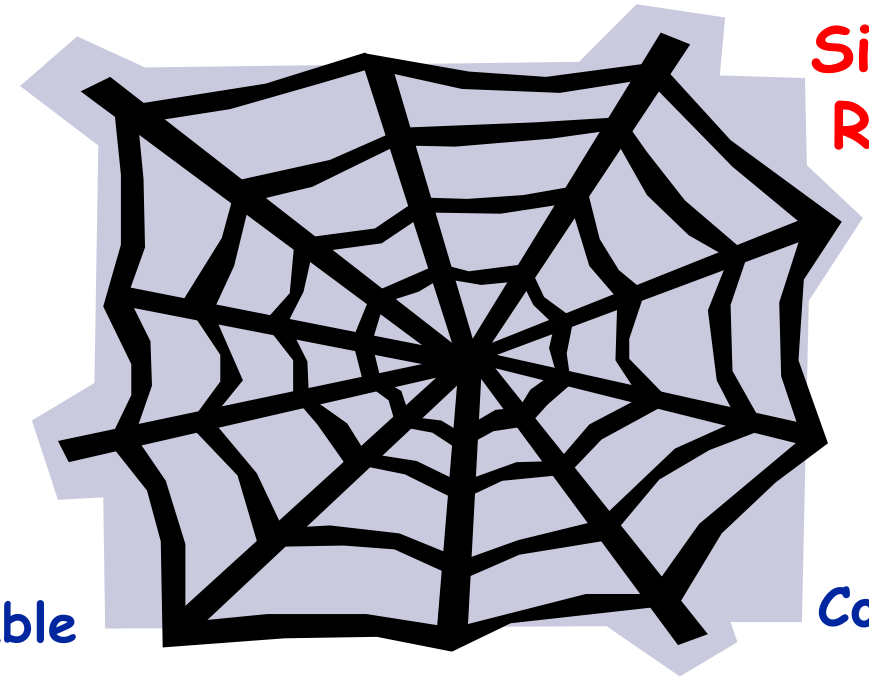
- Absorb or embrace complexity?
  - Put complexity to work for your stakeholders
    - By using the power of the rules of interaction to create positive emergent outcomes
  - Be glocal
  - Promote a mindset of being fast and flexible
  - Being nimble often means not doing it alone

Interdependent Attributes of Complexity

Adaptable Elements

Emergent Outcomes

Min Specs/ Simple Rules



Order w/o Central Control

Embedded Systems

Not Predictable in Detail

Co-Evolution

Non-Linearity

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"Things that never happened before, happen all the time"

Kathleen Sutcliffe, PhD

So what??

We need to be skillful at expecting, seeing and responding to surprise. Key to adapability

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Lessons From Biology

- Living systems - follow simple "rules" that create complex adaptability

- "Boids", ants, democracy & chess

Example: Reynolds' Flocking Rules

- Maintain a minimum distance from other boids and objects
- Match speed of neighbouring boids
- Move toward the center of mass of flock-mates in your area

Complex "flocking" emerges!

Exploring Min Specs/ Simple Rules

- **What are the rules that are currently affecting action? (inductive analysis)**

- What are the minimum set of rules to shape action in the future? (deductive analysis)

Checklist vs. Min Specs/Simple Rules

Checklist

- Lay out clear task
- Optimal process known apriori
- Steps to optimal process known and articulated
- Efficiency

Checklist vs. Min Specs/Simple Rules

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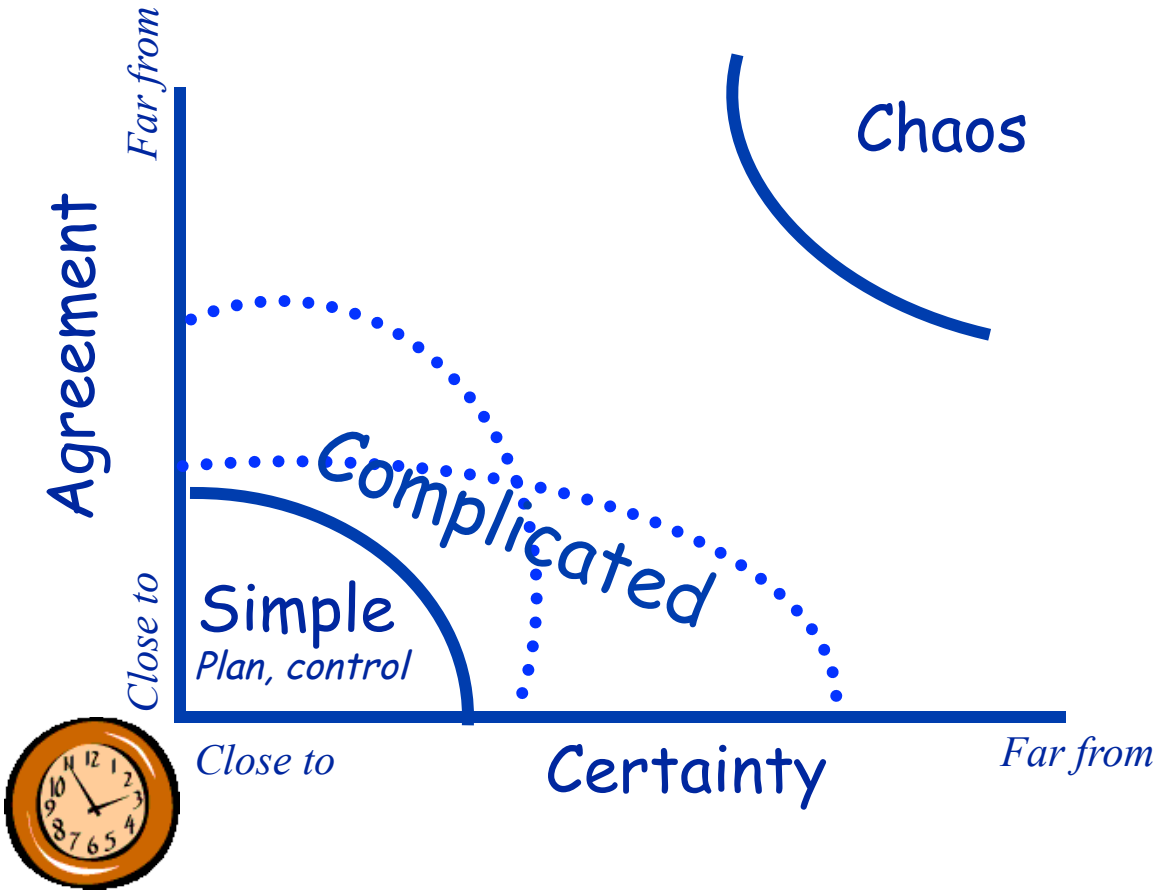
Min Specs/Simple Rules

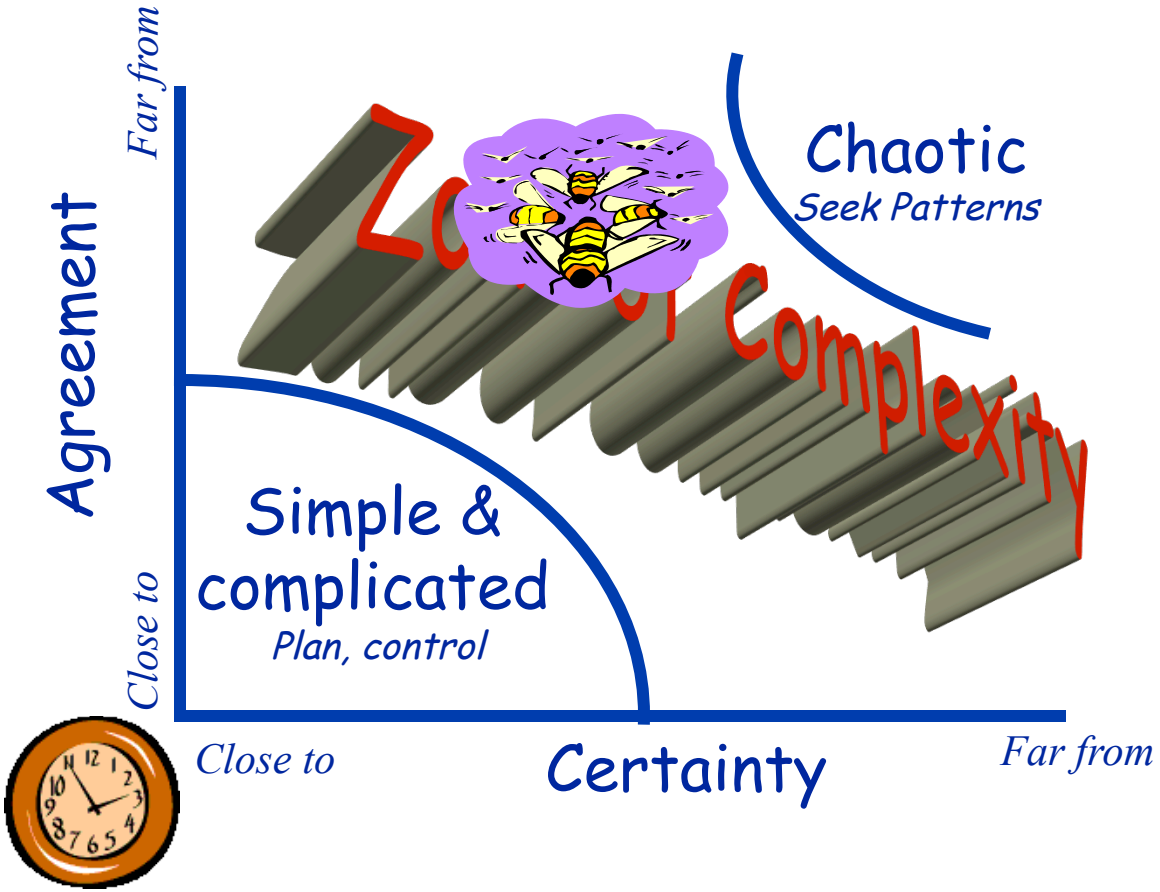
- Need to adapt quickly to changing circumstances
- Set boundaries of acceptable behaviour
- Leave room for flexibility or creativity
- Adaptability

Min Specs/Simple Rules – allow for swarming

- They give enough of a sense of direction without over-specifying
- Local solutions can be discovered (at the "edge" rather than center)
- Following same rules – can result in different solutions
  - Creates coherence rather than consistency
  - Allows for constant adaptation & innovation

Know When Your Challenges Are In the Zone of Complexity





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When In The Zone Of...

Simple/Complicated

Plan then act

- *Attention during strategic planning process key*

Aim for *consistency*

– *Best practice*

– *Predictions*

Engineering Resilience

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When In The Zone Of...

Complexity

"Act-learn" at the same time *("iterative approach to strategy")*

– *Lots of attentiveness as you act*

Aim for "*coherence*"

("global integration but local relevance)"

– *Emergent outcomes shaped by min specs*

– *Ultra-sensitivity to enviro*

Ecological Resilience

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Ecological Resilience

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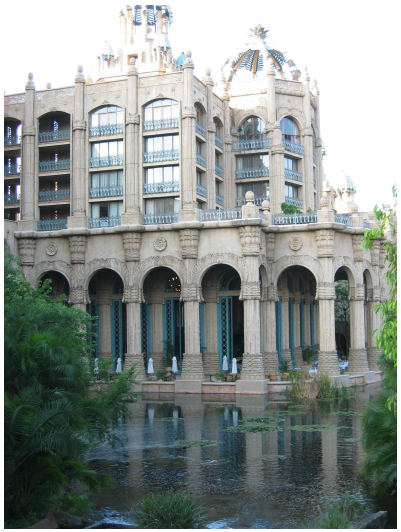
ENGINEERING RESILIENCE:

- Bouncing back to the status quo



ECOLOGICAL RESILIENCE:

- Adaptation and deep change through creative destruction which allows the system to continually learn from surprises

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Time is too short and things are too bad for pessimism.

Dee Hock

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