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Practical Applications of Complexity in Software & Digital Products Development

Luca Minudel



LIVING COMPLEXITY

A catalogue of practices for everyday
software and digital products development

Luca Minudel



@LUKADOTNET



LUCA MINUDEL

 @LUKADOTNET

AGILE PRACTITIONER SINCE END 2001

COMPLEXITY PRACTITIONER SINCE 2004

LEAN PRACTITIONER SINCE 2006

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LIVING COMPLEXITY: ACKNOWLEDGEMENTS

BASED ON THE WORK OF:

- JOSEPH PELRINE, DAVE SNOWDEN, DAVID S. ALBERTS, RALPH STACEY, AND MANY OTHERS.

CONTRIBUTORS:

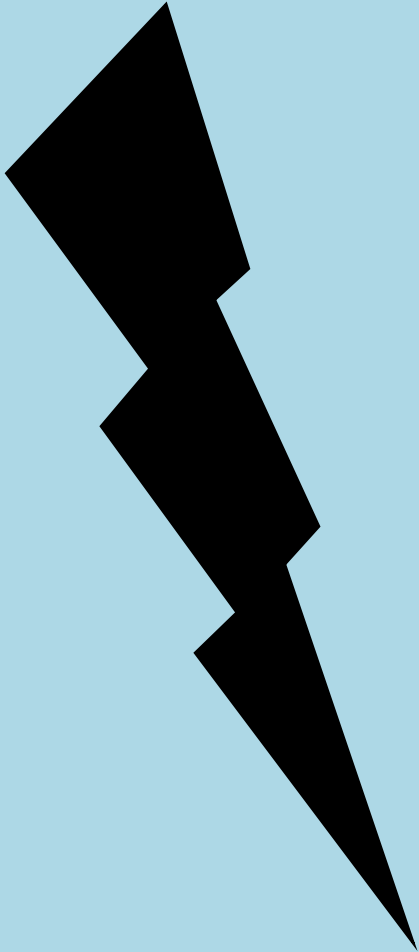
- DEAN LATCHANA, LIZ KEOGH

FEEDBACK FROM:

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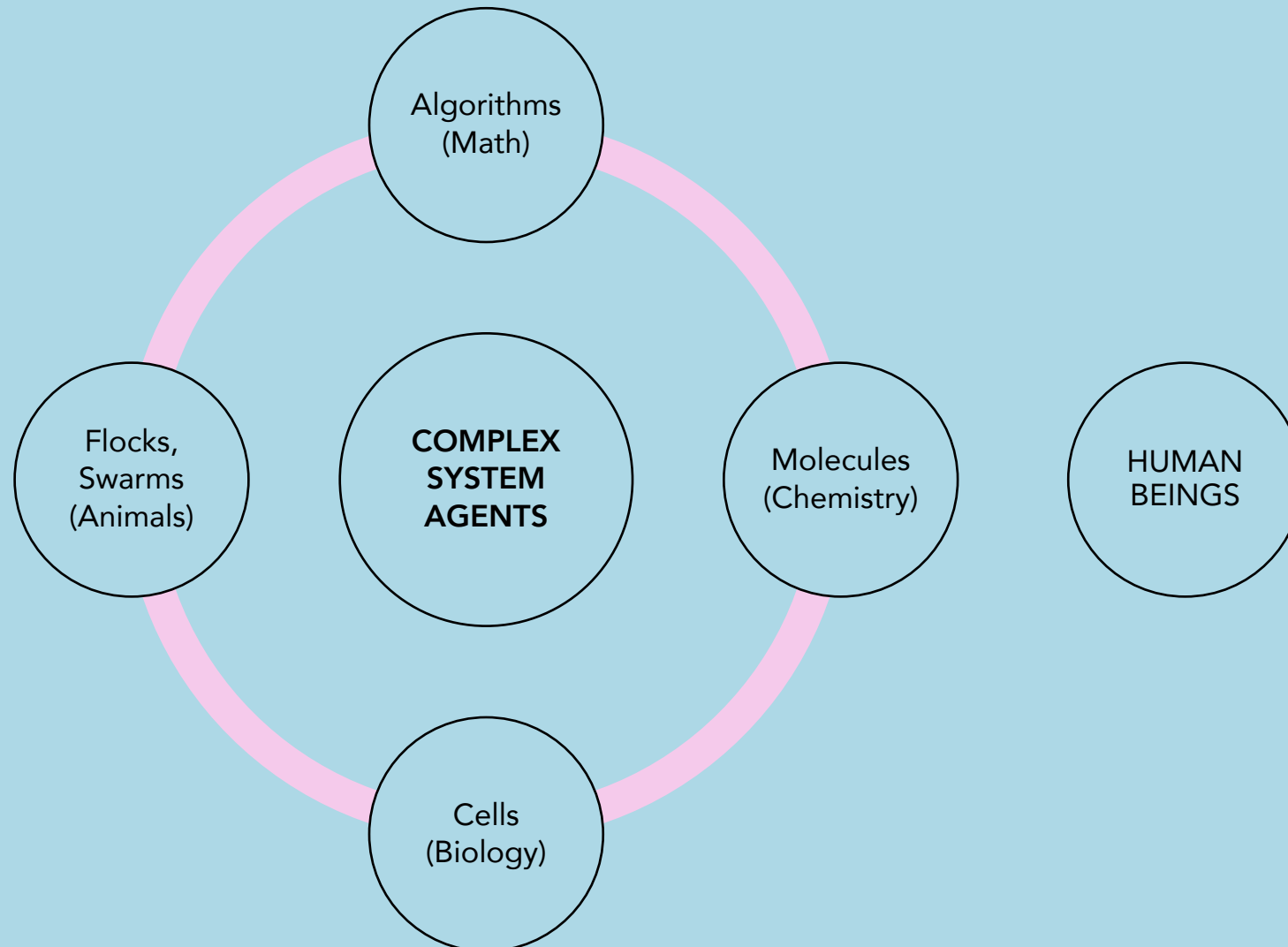
TWO NEW RADICAL APPROACHES TO COMPLEXITY

① PEOPLE
NOT HIVES

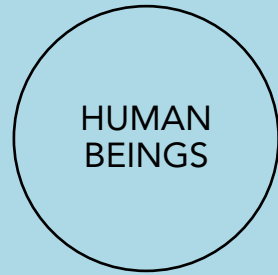


THE UNIQUE
QUALITIES OF
HUMAN AGENTS AND
HUMAN COMPLEX
SYSTEMS. WE ARE
NOT HIVES NOR
ALGORITHMS.

AGENTS OF THE COMPLEX SYSTEMS: PEOPLE NOT HIVES OR ALGORITHMS



AGENTS OF THE COMPLEX SYSTEMS: PEOPLE NOT HIVES OR ALGORITHMS



IDENTITY

- UNIQUENESS, HETEROGENEITY

INTENTIONALITY

- SPONTANEITY
- FREE-WILL
- AGENCY

INTELLIGENCE

- LEARN
- CO-CREATE NEW KNOWLEDGE
- SHARE KNOWLEDGE

HUMAN SELF-ORGANISATION



In a nutshell, self-organisation is a social process of local interactions leading to the emergence of population-wide patterns.

- **SPONTANEOUS, ONGOING**
- **PEOPLE WORKING IN THE ORG AND ITS PROXIMITY**
- **LOCAL INTERACTIONS**
E.G. TWO CO-WORKERS DEBATING
- **CONSTANTLY NEGOTIATING**
WHAT IS THE MEANING OF AN EVENT
WHO THEY WANT TO BE AT WORK
WHAT THEY WANT TO DO TOGETHER
- **POPULATION-WIDE PATTERNS**
E.G. TENSION DURING A COMPANY MERGER

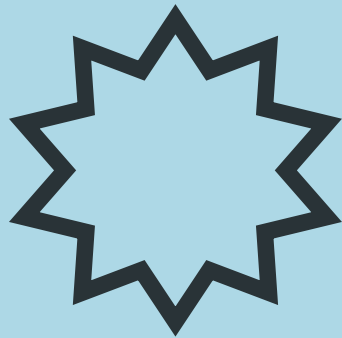


HUMAN SELF-ORGANISATION

“

A weather system is a self-organising system.
It can equally produce a sunny day or a natural disaster.
Self-organisation left alone can go either way.

”



SUNNY

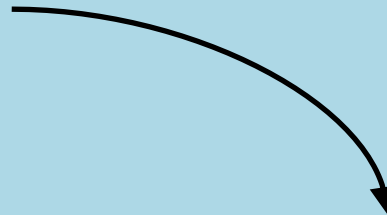


HURRICANE

- This is why in an organisation we want to orient self-organisation toward desirable and beneficial outcomes.

HUMAN SELF-ORGANISATION

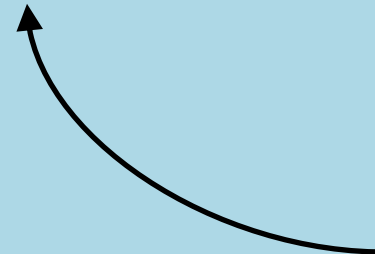
COMPLEXITY SCIENCE



SELF-ORGANISATION

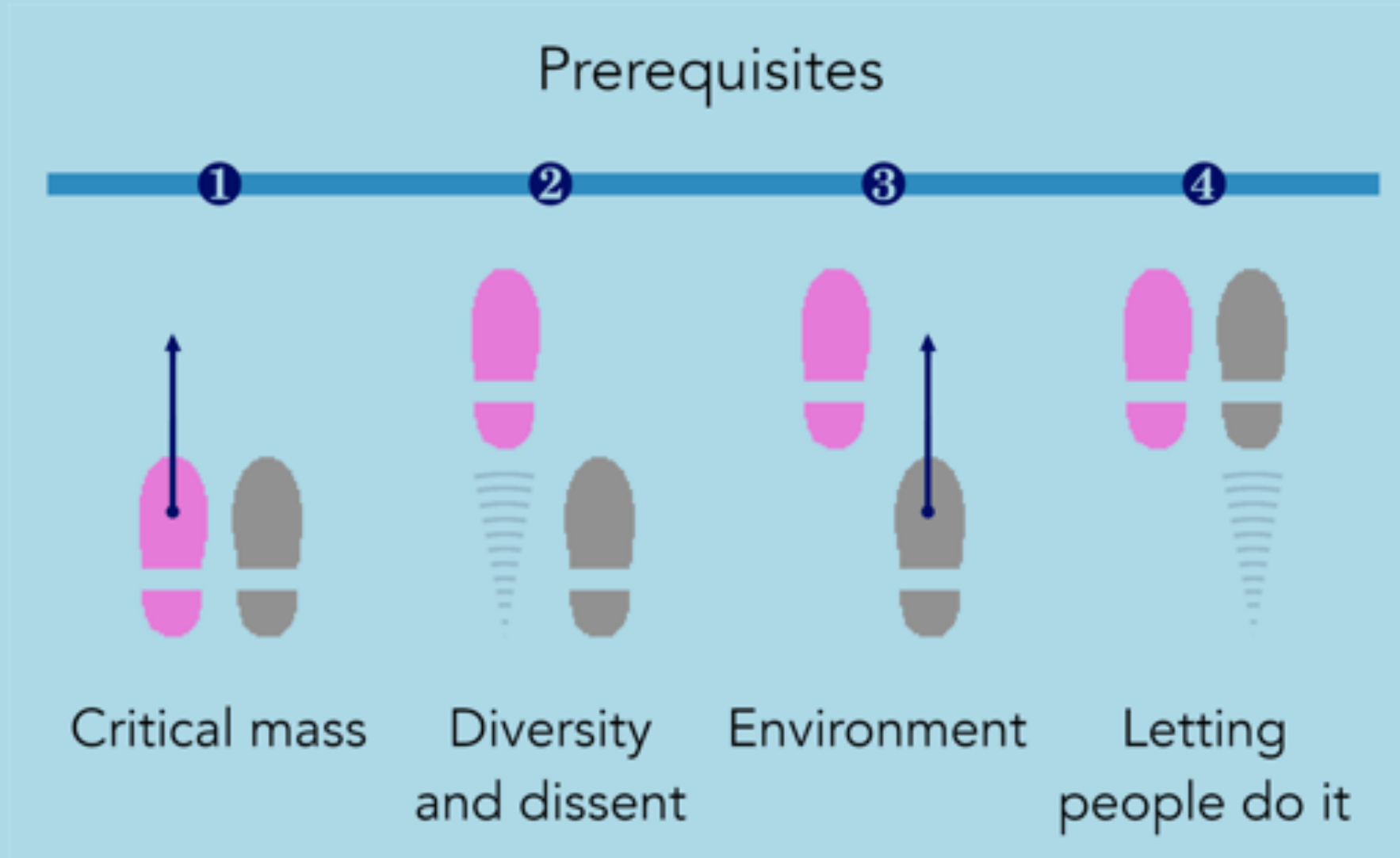
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SELF-ORGANISATION



AGILE SOFTWARE DEVEL.

SELF-ORGANISATION BASIC MODEL, JOSEPH PELRINE

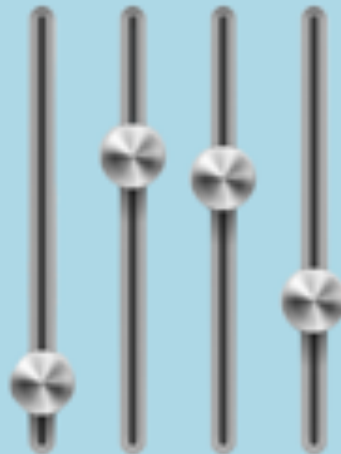


SELF-ORGANISATION BASIC MODEL, JOSEPH PELRINE

Basic model's control knobs



Team size



Boundaries



Roles

SELF-ORGANISATION

“

*Orient the emergence of patterns
in the self-organising system,
amplifying those beneficial,
and reversing those detrimental.*

”

A PRACTICE INSPIRED BY COMPLEXITY THEORY IS DESCRIBED WITH THESE SECTIONS:

OVERVIEW

- *WHAT DO I NEED TO KNOW BEFORE I CONTINUE READING?*

PURPOSE

- *WHAT IS THIS PRACTICE FOR? WHO IS FOR?*

RELATION TO COMPLEXITY

- *WHAT IT HAS TO DO WITH COMPLEXITY THEORY?*

DESCRIPTION

- *MAIN SECTION: INPUTS, STEPS OF THE WORKFLOW, OUTCOMES, ...*

PRACTICAL TIPS & STORIES

- *WHAT NOW? WHEN? HOW? STORIES. WHAT NEXT?*

SELF-ORGANISATION

5 PRACTICES INTRODUCE 21 CONTROL KNOBS

1 - BASIC MODEL

BY JOSEPH PELRINE

2 - HEAT MODEL

BY JOSEPH PELRINE

3 - FLOW MODEL

BY JOSEPH PELRINE

4 - ABIDE MODEL

BY DAVE SNOWDEN

5 - C2 APPROACH SPACE

BY DAVID ALBERTS

SELF-ORGANISATION

5 PRACTICES INTRODUCE 21 CONTROL KNOBS

C2 Approach Space model's control knobs



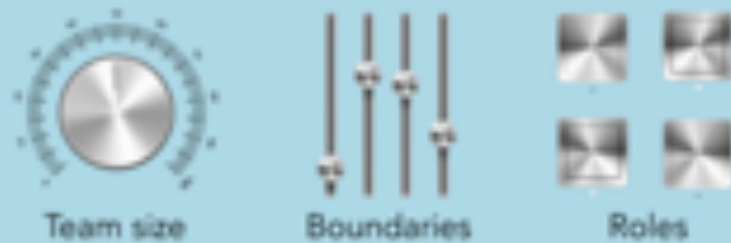
Heat model's control knobs



ABIDE model's control knobs



Basic model's control knobs



Flow model's control knobs

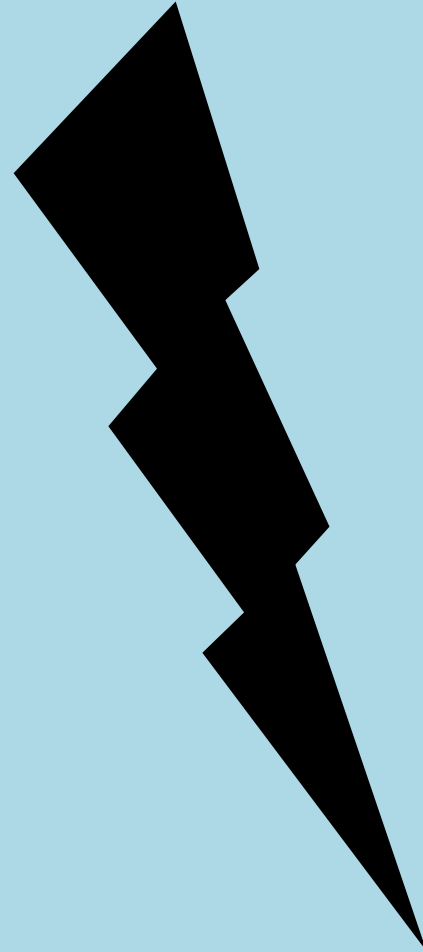


Extended Flow model's control knobs



TWO NEW RADICAL APPROACHES TO COMPLEXITY

② STARTING WITH PRACTICE



SHIFT UP-SIDE-DOWN THE CENTRE OF GRAVITY OF THE CONVERSATION AROUND COMPLEXITY. TO PUT PRACTICAL APPLICATIONS OF COMPLEXITY THEORY FRONT AND CENTRE.

THE WORK WE DO MAY BE COMPLEX

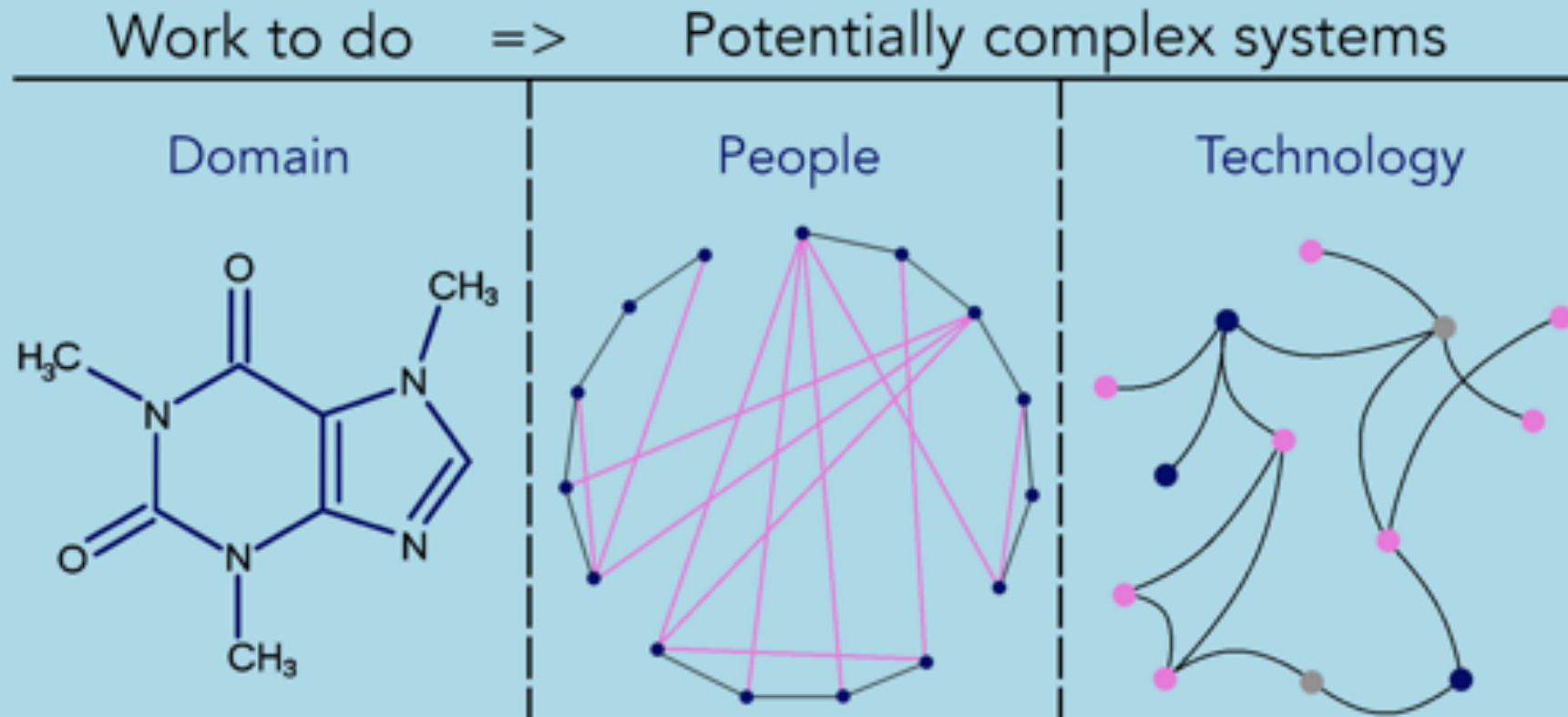


People that are used to dealing with a lot of simple problems tend to see all problems as simple. People used to deal with very Complex problems tend to see all problems as Complex.

- Therefore, practices to estimate the real degree of complexity of a problem are extremely valuable.

THE WORK WE DO MAY BE COMPLEX

Common origins of Complexity
for a Delivery Initiative



THE WORK WE DO MAY BE COMPLEX

A FEW COMMON ORIGINS OF COMPLEXITY FOR A DELIVERY INITIATIVE

- REQUIREMENTS THAT ARE INCOMPLETE, FRAGMENTED, AMBIGUOUS; **COMPETING** PRIORITIES, SHIFTING GOALS, VOLATILITY; CONTINUOUSLY **ACCELERATING** RATE OF CHANGE AND INSUFFICIENT TIME TO PROCESS ALL THIS **NEW** INFORMATION
- PEOPLE, COLLABORATION DYNAMICS, **UNPREDICTABLE CREATIVITY** AND UNCONTROLLABLE; **MISALIGNED GOALS** AND INCENTIVES; **CONFLICTING INTERESTS**; FAST CHANGING AND SAVVY CUSTOMERS
- TECHNOLOGY: A HUGE # OF SYSTEMS, ACCIDENTAL DEPENDENCIES AND **FRAGILE** INTEGRATIONS; **MASSIVE** LEGACY CODE-BASES; TECH-DEBT; **RAPIDLY EVOLVING** TECH ECO-SYSTEM

ESTIMATING COMPLEXITY, LIZ KEOGH

WHO IN THE WORLD HAS DONE THIS BEFORE?

5

Nobody in the world has done this before.

4

Someone has done it, but not here
(we have no access to expertise).

3

Someone within our organization has done it, or
we have access to expertise in a different way.

2

Someone in the team has done it.

1

We all know how to do it.

ASSESSING THE DEGREE OF COMPLEXITY

4 PRACTICES TO ASSESS THE DEGREE OF COMPLEXITY

1 - SENSING COMPLEXITY

LUCA MINUDEL

2 - ESTIMATING COMPLEXITY

LIZ KEOGH

3 - COMPLEXITY ESTIMATION

LUCA MINUDEL

4 - FOUR POINTS METHOD

DAVE SNOWDEN

ADAPTING TO THE DEGREE OF COMPLEXITY

4 MORE PRACTICES TO ADAPT TO THE DEGREE OF COMPLEXITY

5 - RUDE ESTIMATION

DEAN LATCHANA

6 - CYNEFIN FOR DECISION MAKING

BY DAVE SNOWDEN

7 - C2 APPROACH SPACE

BY DAVID ALBERTS

8 - ESTIMATES ACCURACY

LUCA MINUDEL

“

Manoeuvre Agility

is the ability to recognise the approach appropriate for the circumstances at hand, and to transition in a timely manner to that approach.

”

ORGANISATIONS MAY BE COMPLEX

COMPLEXITY AND COMPLEX DYNAMICS MAY PERMEATE THE ORGANISATION:
=> CO-CREATION, CO-EVOLUTION, EMERGENCE



Co-creation is a collaboration pattern particularly effective when dealing with Complexity.



Man is essentially a story-telling animal. That means I can only answer the question "what am I to do?" if I can answer the prior question "of what story or stories do I find myself a part?"

- Alasdair MacIntyre



ORGANISATIONS MAY BE COMPLEX

- Organisations that are complex are more susceptible to Complexity, and at the same time are better suited to cope with and exploit Complexity.

“

It takes a network to compete with a network
- Stanley Allen McChrystal, US Army general

”

ORGANISATIONS MAY BE COMPLEX

3 PRACTICES BASED ON CO-CREATION

- 1 - RED TEAM TECHNIQUE
- 2 - CULTURE AFFINITY ASSESSMENT
- 3 - LEAN INCEPTION

DEAN LATCHANA
 LUCA MINUDEL
 BY THOUGHTWORKS



A LANDSCAPE OF PRACTICAL APPLICATIONS OF COMPLEXITY IN SW & DIGITAL PRODS DEV

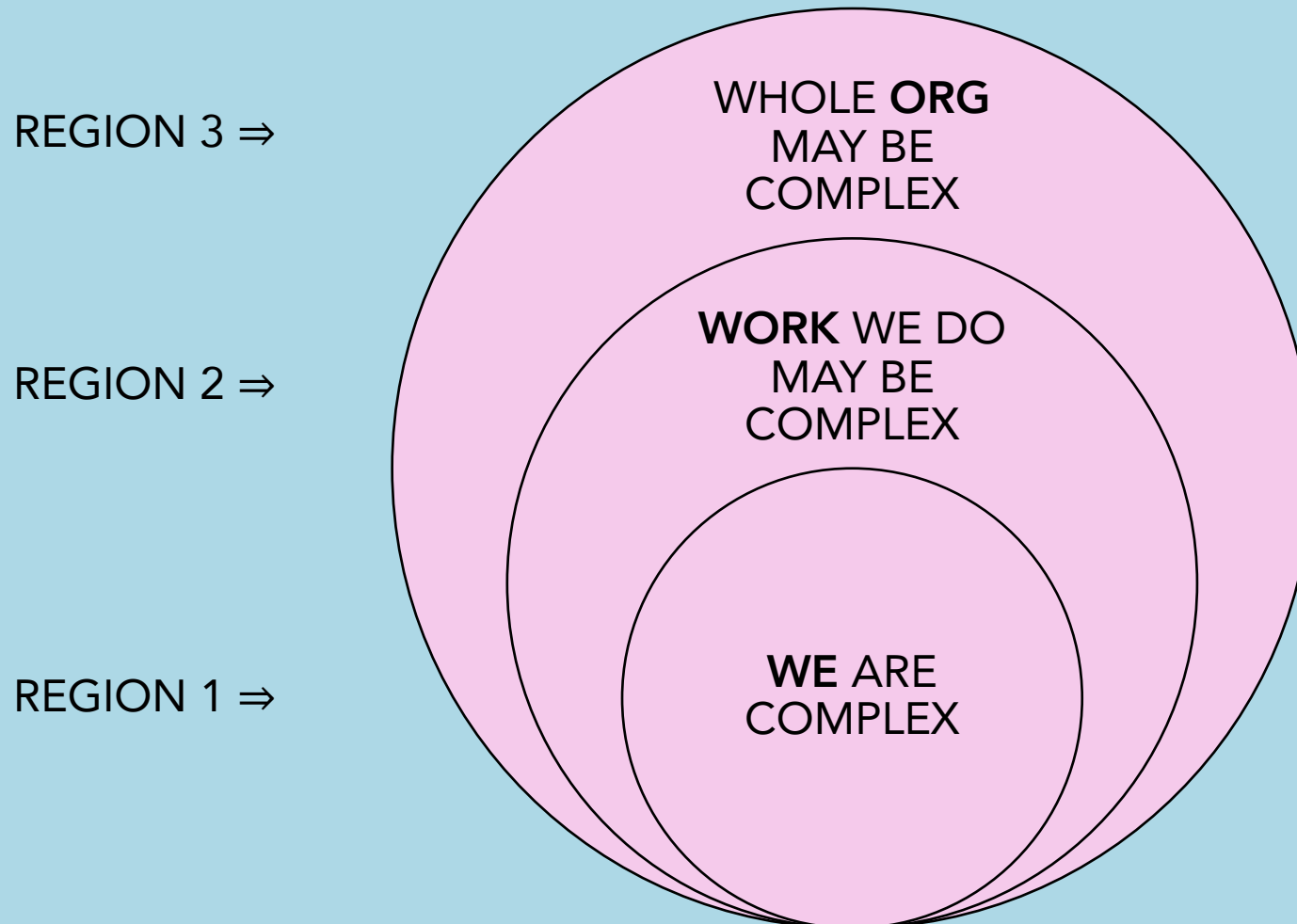
LISTS AND CATALOGUES ARE ATTEMPTS TO MAKE INFINITY COMPREHENSIBLE,
TO CREATE ORDER OUT OF CHAOS.

“

The list is the origin of culture
- Umberto Eco

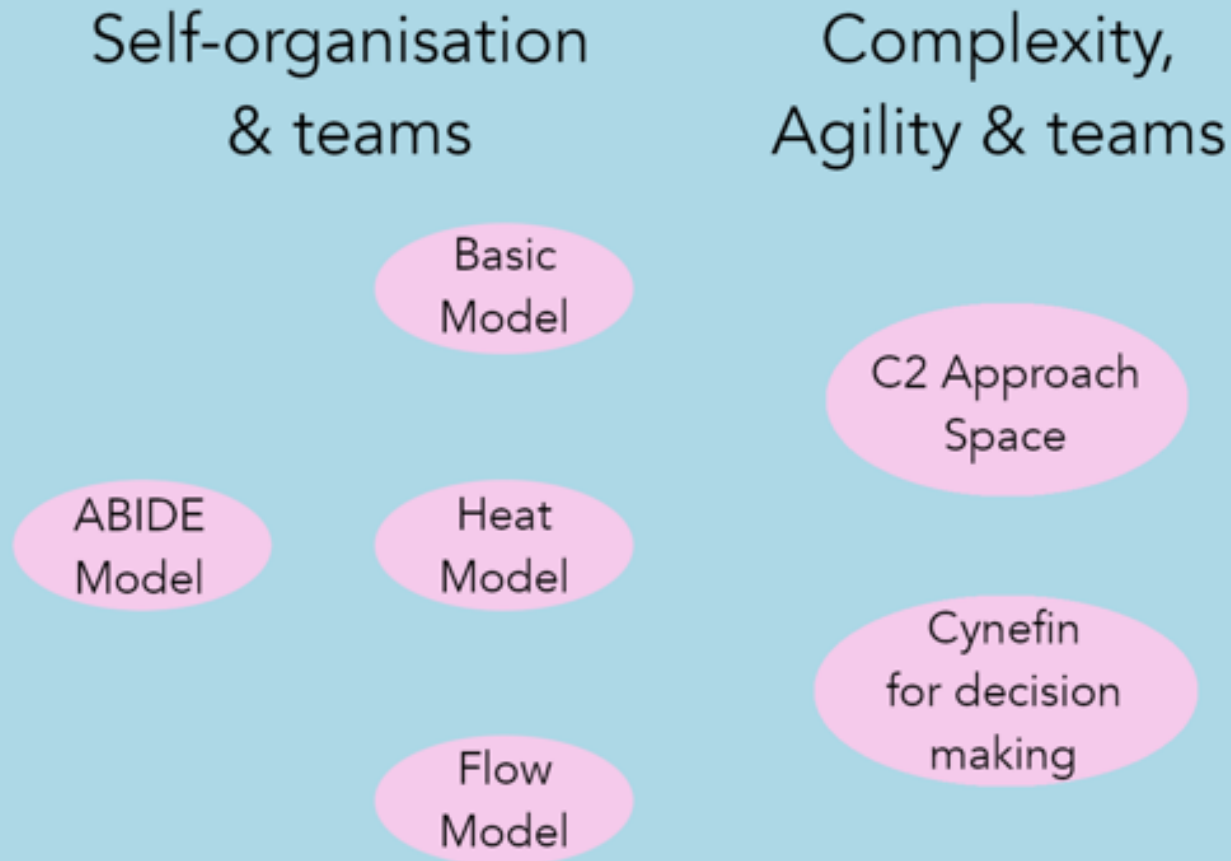
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A LANDSCAPE OF PRACTICAL APPLICATIONS OF COMPLEXITY IN SW & DIGITAL PRODS DEV



REGION 1: WE ARE COMPLEX SELF-ORGANISATION

6 PRACTICES FROM THE BOOK INTRODUCE 20-ODD CONTROL KNOBS



REGION 2: WORK MAY BE COMPLEX COMPLEX SYSTEMS

6 PRACTICES TO SENSE AND ADAPT TO COMPLEXITY

Sensing Complexity

Sensing
Complexity

Estimating
Complexity

Four points
Method

Complexity
Estimation

Complexity & Estimates

Estimates accuracy
with Cone of unc.

Rude
Estimation

REGION 3: ORG MAY BE COMPLEX CO-CREATION

Part 3 practices

Red Team
Technique

Lean
Inception

Culture
Affinity

KEY CONCEPTS

Self-organisation

Co-creation

Emergence

Co-evolution

Complexity

Agility

Manoeuvre
Agility

APPENDIX A:

INTRODUCTION TO
COMPLEXITY,
RESOURCES

LIVING COMPLEXITY

A catalogue of practices for everyday
software and digital products development



Luca Minudel

BOOK: LIVING COMPLEXITY

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PART 2 – OPEN MIC Q&A
=> POST AND VOTE THE QUESTIONS

PRACTICAL APPLICATIONS OF COMPLEXITY IN SOFTWARE & DIGITAL PRODUCTS DEVELOPMENT



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