3rd EDITION

LIVING COMPLEXITY

PRACTICAL APPLICATIONS OF HUMAN COMPLEXITY IN SOFTWARE AND DIGITAL PRODUCTS DEVELOPMENT

LUCA MINUDEL

Living Complexity

Practical applications of Human Complexity in software and digital products development

Luca Minudel

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Foreword

The world is becoming more interconnected and faster-paced resulting in ever-increasing unanticipated change. This increasing complexity is a challenge for individuals and organisations accustomed to predicting and controlling their environments. To navigate the world in such an ordered manner is becoming increasingly impotent.

This is where *Living Complexity* comes in.

Living Complexity is a compendium of practices which helps individuals and organisations deal with complexity. This book provides approaches to those wanting to employ complexity thinking without needing to become complexity theorists. It is also relevant to complexity theorists interested in accessible practices to apply their thinking.

I thank Luca for addressing a gap in offering to support those wishing to recognise and work with complexity. I would invite you to make use of and reflect upon these practices.

With this resource at our side, together we can support others to live with complexity.

Dean Latchana
Business Agility Consultant
July 2020

Acknowledgements

I would like to thank those whose work inspired and influenced me when I wrote this book: **Joseph Pelrine**, **Dave Snowden**, **David S. Alberts**, **Ralph Stacey**.

I would like to thank **Dean Latchana** and **Liz Keogh** that contributed to the catalogue with their own original practices and co-authored the related chapters.

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Thank you for the gift of your time and creativity.

Preface

Why I curated this catalogue

I was introduced to Complexity theory in Milan in 2004 by a keynote speech from Joseph Pelrine. Weeks later, Dave Snowden presented Cynefin during a keynote speech at an Extreme Programming (XP) conference in London. Since then my professional journey crossed path with Complexity theory many times while trying to understand why Agile works, while searching for the scientific foundations of Agile, and while learning more about self-organisation. But it was in 2006 when I started working in the Scuderia Ferrari Formula One racing team when I faced the many implications of a Complex system.

My understanding of Complexity theory helped me to interpret and better understand the events and the dynamics at work, and to intervene in ways that worked well. It gave me an edge.

As an Agile practitioner I've strived to turn Complexity theory into action, to live its learnings in my day to day work, in the form of practices I could adopt and enact with others.

It didn't help that the literature on Complexity science at the time was very theory focused. Nevertheless, during these years, I've managed to collect a list of practices inspired by Complexity theory that I used in the context of Software and Digital products development. These practices are inspired by the work of Joseph Pelrine, Dave Snowden, David S. Alberts, and Ralph Stacey, and include original contributions from Dean Latchana, Liz Keogh, and from me. Dean Latchana and Liz Keogh contributed to this catalogue with their own original practices and co-authored the related chapters.

The idea to curate this catalogue came to me when I realised I had

collected enough material to expound on the practical applications of Complexity theory. My hope for this catalogue is to inspire other Complexity thinkers to put Complexity theory into action, pairing their intellectual understanding of it with living it. I hope this catalogue will help practitioners avoid common mistakes and misunderstandings still widespread today. I also hope that those who favour a practical introduction to the new ideas can find this catalogue as a starting point for their journey into Complexity. And I hope more practitioners will feel encouraged to come forward and share more practices inspired by Complexity, making this catalogue even bigger.

Who is this catalogue for

This catalogue is for everyone working in software and digital products development and interested in the practical applications of Complexity theory. This catalogue is for those new to Complexity theory and looking for a practical introduction. And for those with a theoretical understanding of it, looking for practical applications. It is for hands-on practitioners, problem-solvers and tinkerers.

Leaders, managers, facilitators, team members, and change agents (e.g. Scrum Masters and Agile Coaches) will find in this catalogue several practices that can be applied when working with teams since their formation, and throughout a delivery initiative. The practices can be used to introduce everyone involved in the delivery initiative to the vocabulary and the basic concepts of Complexity theory. Stories and tips related to the practices will also suggest a different way of looking at the organisation through the lens of Complexity and a new way of thinking about how modern organisations work. Appendix A includes a list of relevant resources for everyone looking for a gentle introduction to Complexity theory.

Introduction

This book describes fifteen practical applications of Human Complexity in the context of software and digital products development. It also suggests a new strategy for introducing Complexity to teams and organisations, based on the principle of *acting your way into the new Complexity thinking*.

Human Complexity is the branch of Complexity science applicable to teams and modern organisations. And together with Lean and Agile Software Development, it is one of the pillars of modern ways of working.

Figure 1: Paradox by Michael Bergt, https://michaelbergtart.com/

The fifteen practices help you skip over the most common misunderstandings on Complexity that are still widespread. The strategy for introducing Complexity comes from personal experience, trying

with several managers, teammates, teams, and organisations, and it is based on the lessons learned the hard way from failures and from what, in the end, worked well.

All the practices are visual and collaborative. They can be used individually, and they can also be combined in different ways for more advanced uses.

This book also connects the dots between all the practices presented to give a glimpse of the modern organisations able to cope with and exploit Complexity, their traits and characteristics.

Complexity science is considered by many to be the single most important scientific development since general relativity. Complexity science studies systems like cities, weather systems, teams, and organisations, whose functioning cannot be explained in terms of their individual parts (reductionism) or in terms of cause and effect (determinism), but in emergent behaviours and outcomes that are often unanticipated. Of those systems we cannot predict and control the future; rather we must adopt a flexible approach that probes, senses and responds to how behaviours and outcomes emerge.

Therefore Complexity science is a huge paradigm shift from traditional thinking, and the dominant discourse around organisations. Paradoxical as it may seem, it often requires an oblique approach where the desired outcomes are achieved through secondary effects and indirect consequences.

With users, customers and competitors that are hyperconnected, and with the constantly accelerating rate of change in the markets and the technology, understanding Complexity science today is useful more than ever.

While my first encounter with Complexity dates back to 2004, it is in 2006 when I started working in the Scuderia Ferrari Formula One racing team that I fully faced the many implications of Complexity. First of all, as soon as I joined the team I was tasked with the paradoxical challenge of making software development faster and

safer at the same time. We later achieved that through a team effort, via automation, technical excellence, our collective ability to defuse Complexity, and taming Complexity with reversibility. The second challenge was social Complexity. A Formula One car is made up of several tens of thousands of parts. A midfield F1 team strives to increase the performance of every part. A top team finds the decisive performance gains that put it ahead of the competitors from the synergy between those tens of thousands of parts. To do that, the people developing those mechanical, electrical, electronic and software components need to make sense together of Complex problems, they need to resort to all their collective intelligence. And in the face of uncertainty, the many unknowns, rapidly changing circumstances, and under pressure, they need to find trade-offs and build consensus around common solutions. Continuously. Every day. Throughout the whole F1 championship. Until the last corner of the last lap of the last race.

All the practices in this book come with stories like this one and tips from my direct experience. I've also created a federated wiki here: http://livingcomplexity.fed.wiki/.

Below is a summary of the key takeaways from this book.

- There are several practices inspired by Complexity, to be employed every day in software and digital products development.
- The landscape of such Complexity-inspired practices has three major regions: the teams, the work to do, and the whole organisation.
- These practices provide a new means to gradually introduce our co-workers, our teams and our organisation to Complexity. They exemplify a new approach that consists of acting our way into the new Complexity thinking.
- This new approach shifts up-side-down the centre of gravity of the conversation around Complexity, from the theory to

the practice. It makes practice prominent. And it wants to engage hands-on practitioners, problem-solvers and tinkerers.
- All these practices are based on *Social-complexity* and *Anthro-complexity*, in a single word *human Complexity*. They fully recognise the unique qualities of the human element, and that we are not algorithms, cellular automata, nor hives.
- Collectively all these practices suggest a new way of looking at and understanding how modern organisations work and excel.

Note to this third edition of the book.
This third edition of the book comes after a few more years passed adopting Complexity thinking, applying practices inspired by human Complexity, and helping others do the same. As a result, this edition includes more stories, practical tips, conclusions, and strategies to introduce Complexity thinking in teams and organisations. Therefore, making this book easier to read and more enjoyable. The naming of some practices and concepts has also evolved thanks to the additional clarity emerged over time.

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Join the community of Complexity practitioners, comment and share your stories here: http://livingcomplexity.fed.wiki/

Two radically new ideas

Eighty years after introducing Complexity theory to the Agile community, when we observe teams at work in their day to day activities, we still see a massive untapped potential to adopt Complexity inspired practices.

What if we start a new conversation about Complexity engaging a completely different crowd: the hands-on practitioners, the problem solvers, the tinkerers? What if we approach that conversation in another way? Let's begin to do that, now, guided by two new radical ideas.

The first radical idea has to do with the practice of Complexity. The second radical idea has to do with the human element in Complexity theory.

The practical approach

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What a Complexity practice looks like

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The human Complexity

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The landscape

Since 2004, when I began my journey into Complexity, I've struggled to find practical applications of Complexity theory in the context of software and digital products development. Since then I've kept a list with any practice I could find and any model that could have a practical application. I have drafted and experimented with a few new practices myself, and I've asked other practitioners about their own practical applications of Complexity, up to the point where I've found myself with a list of several practices inspired by Complexity theory. I've selected the most relevant, I've grouped them searching for commonalities, I've sorted them from the most basic to the most advanced as a potential order of adoption. The result is more than a digest of practices. One may call it a catalogue of practices whose structure gives a hint of the landscape of the possible practices inspired by Complexity, in the context of software and digital products development.

Lists and catalogues are attempts to make infinity comprehensible, to create order out of chaos.

<< The list is the origin of culture >> **Umberto Eco**

The landscape of Complexity-inspired practices hinted by the catalogue may suggest where to search for other practices, and ideas for novel practical applications you can develop and experiment with.

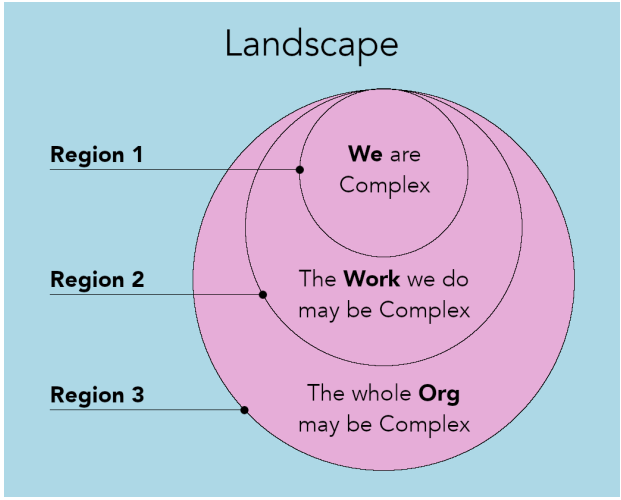

Figure 1: The landscape of Complexity inspired practices

All the practices from the first region are about self-organisation. More specifically, about attending to and orienting human self-organisation toward desirable and beneficial outcomes. Otherwise, anything can happen when self-organisation is left to itself. These practices are centred around the idea that we are Complex. Where "we" means individuals and teams.

The practices from the second region are organised in two groups. Those in the first group are about assessing the degree of complexity of the work a team has to do (a problem to solve, a feature to implement, an Epic, a set of User Stories, or a whole delivery initiative). They are centred around the idea that the work we do may be Complex.
Those in the second group are about adapting to the degree of complexity of the work at hand and the circumstances. These practices drive the adaptation of the estimates, the decision-making approach, the team settings, the ways of working, and the investment & delivery strategy.

The practices from the third region are about collaborating in the presence of Complexity. They are centred around the idea that

the whole organisation may be Complex. And they are based on co-creation, a collaboration pattern that is particularly effective when dealing with Complexity. More generally, these practices that look beyond the team make us reflect on the implications of Complexity on the broader organisation, the way we think about modern organisations, and the way we think about how modern organisations work.

This book documents the practices in each region, from the most basic to the most advanced. A Complexity practitioner could start by introducing to a team the most basic practice, build on that success, and then gradually introduce the more advanced practices.

The key concepts

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Human self-organisation

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Complexity

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Co-creation

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More on Complexity

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Other concepts from modern product development

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Region 1

The practices in this region are centred around the idea that we are Complex. Where "we" means individuals and teams.
All the practices are related to human self-organisation:

- **Basic model** (by Joseph Pelrine)
- **Heat model** (by Joseph Pelrine)
- **Flow model** (by Joseph Pelrine)
- **ABIDE model** (by Dave Snowden)

They focus primarily on orienting human self-organisation toward positive outcomes. They also introduce a few important concepts related to Complexity and the human element of Complexity.

These practices are described from the most basic to the most advanced. Suggesting a sequence that a Complexity practitioner could follow when introducing the practices to a team. From the smallest practice, building on the success of that practice, and then gradually introducing the bigger and more advanced practices.

The practices introduced in this region are of interest for everyone working in software and digital products development, for those leading and managing teams, for facilitators, for every team member, and for change agents (e.g. Scrum Masters and Agile Coaches).

Human self-organisation

Ralph Douglas Stacey describes (in his book listed in Appendix A) human self-organisation as a spontaneous ongoing process that continuously happens, naturally, in every group and organisation, because of our social nature and our social relations.

The peculiar characteristics of human beings and the uniqueness of each individual are what makes human self-organisation notable.

One branch of Complexity science that takes into account the human factor is *Social-complexity*, another one is *Anthro-complexity*. I refer to both of them more generally with the term *human* Complexity.

Human beings are the agents of the social process of self-organisation. They have a unique set of essential characteristics: uniqueness, the ability to learn and adapt and co-evolve, memory, disposition, propensity, free will and spontaneity, intentionality and agency, and the ability to co-create and share knowledge.

Examples of a social process include: a formation of a new team or a new community; a group making sense of an unexpected event; in general all the activities involving a group of people interacting and evolving over time.

The social process of self-organisation consists of all the local interactions among the people working in the organisation and its close proximity (such as customers, suppliers, etc.). It takes place during ordinary everyday conversations and actions, in the

processes of relating to each other. In these conversational dynamics, individuals, teams members and everyone in the organisation negotiate with each other who they want to be at work and what they want to do together.

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

These are examples of local patterns of interaction: teammates debating, learning, or collaborating with each other. And these are examples of population-wide patterns emerging from a group: a crowd singing, a new movement forming, tensions during a company merger.

Local and population-wide patterns of behaviour, meaning, and action emerge simultaneously, in the absence of any prior design, blueprint or plan for population-wide patterns. They are the result of individuals deciding and acting in the living present in a perpetual construction of the future in the present (instead of an act designed to close the gap between the present situation and an idealised version of the future). The population-wide patterns are the product of many local patterns resulting from the interplay of many local interactions between people, the interplay of many local choices, the interweaving of individual plans and intentions, and the emergence of individual and collective meaning and identities.

This means that one cannot take apart the components of self-organisation to study each piece and understand how it works, for then bringing them all together in a new way designed to achieve a predefined result. Self-organisation is more like a cloud, it can't be dissected. And its constantly changing dynamic depends on how all its parts and the external environment come together as a whole.

In this dynamic, there is no privileged vantage point, no objective point of view, no control centre. For no-one, without distinction. Instead, everyone without exceptions has a subjective, partial, and fragmented point of view, limited control, and incomplete knowledge and understanding of the whole organisation.

Therefore to gain a valid perspective, a plurality of points of view and a collective dialogue among those involved and affected are essential.

When an organisation hinders or frustrates the spontaneous social process of self-organisation, it prevents the possibility of exploiting the potential benefits of self-organisation. And in the worst case it risks the emergence of population-wide detrimental patterns of dysfunctional behaviours. When instead an organisation allows or encourages spontaneous self-organisation, it preserves the possibility to influence and exploit the emergence of beneficial patterns.

For that, the traditional approach does not work. One cannot define a desired end-state and plan the actions to close the gap. Instead, one needs to experiment with local actions, observe their impact on population-wide patterns, and consequently decide whether to amplify or dampen those actions.

The term *self-organisation* is often used with a variety of meanings, and in place of different terms. For example, it is used in place of 'self-management' or 'self-direction' intended as the empowerment of individuals and teams, their autonomy and freedom to take the initiative and control the work, in a flat hierarchy without strict managers supervision and control over teams and individuals.

Self-organisation in Complexity science is not exactly the same as the self-organisation in the Agile Manifesto.

To avoid any confusion, *self-organisation* in this book and the following practices of this region, is intended as the social process described above. Nevertheless it is a prerequisite for self-organisation as intended in the Manifesto and also for self-management as intended in the Scrum Guide. It follows that the related practices and considerations remain applicable and relevant. The C2 Approach Space described later in this catalogue introduces further control knobs that can bring a team where self-organisation is allowed closer to self-management.

The Basic model (by Joseph Pelrine)

There are several established practices in traditional medium and large organizations that we no longer notice, not even their impact and implications. For example, think about the annual budgeting and quarterly planning; the separation between planning and execution and between thinkers and doers; the division of labour and functional silos; the individual performance goals and reviews; the outsourcing; the project-centric approach that continuously mobilises 'resources' forming and then disbanding teams; etc. Only after trying to support human self-organisation I did realise how much those practices perpetuate ways of doing things that frustrate, hinder, or even prevent it. So I started wondering, what are the basic prerequisites for human self-organisation?

While learning to be a servant leader, I made every possible mistake. For example, making too many decisions alone, doing too much, not delegating enough, not focusing on creating an environment where individuals and teams can autonomously take the right decisions and get the job done. On the opposite side of the spectrum, while I worked at ThoughtWorks, when a new team was assembled for a new client engagement, the initial members autonomously searched for other team members needed for the job, organically completing the whole team. What can I do as a leader that doesn't hindering self-organisation?

This model gave answers to my questions.

Overview

Joseph Pelrine describes the prerequisites for self-organisation in the context of Agile teams. He introduces a few control knobs that can be used to orient self-organisation toward beneficial outcomes.

Purpose

The Basic model describes the prerequisites to allow and encourage self-organisation. They can be met during the formation of a new Agile team, or when promoting self-organisation for existing teams. The model also describes a few basic control knobs that leaders and managers can use to orient a team and self-organisation toward positive outcomes. Teams and organisations capable of exploiting the potential of self-organisation are better placed to become more effective in dealing with Complex problems and developing complex digital products.

Relation to Complexity

The Basic model is related to Complexity via self-organisation. Self-organisation is a dissipative social process in human Complex systems that brings islands of order and predictability out of chaos and uncertainty.

Description

Joseph Pelrine begins clarifying that "self-organising team" is a misnomer. The real thing is a self-organising human system that includes the team, the environment around the team, and those outside the team interacting with it and exchanging "energy" with it (e.g. in the form of work to do such as sprint backlog items or potentially releasable product increments). Self-organisation as

such is a dissipative process that transforms the "energy" into the emergence of macroscopic patterns; more about this at the beginning of Region 2.

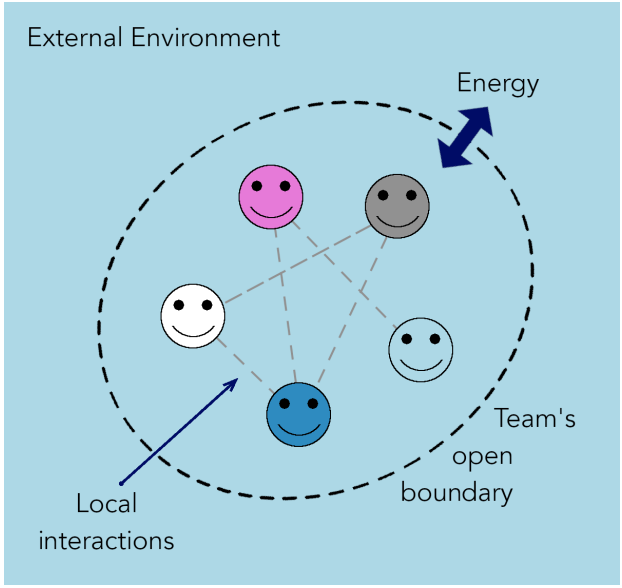

Figure 1: Human self-organising system

The Basic model describes four prerequisites, listed below, that allow and encourage spontaneous self-organisation. They extend the conditions for self-organizing in human systems described in the Glenda Eoyang CDE Model[1].

- **Critical mass**: no emergent behaviour occurs from a group of people that is too small; while the team size depends on the nature of the task, we can safely say that 3 members are the bare minimum for self-organisation.
- **Diversity and dissent**: homogeneous groups are easy victims of Groupthink and blind spots. Diversity in background, personality, gender, age, experience, etc. generates a multitude of

[1] https://en.wikipedia.org/wiki/Glenda_Eoyang

points of views and healthy friction of ideas that are beneficial for a team dealing with Complex problems.

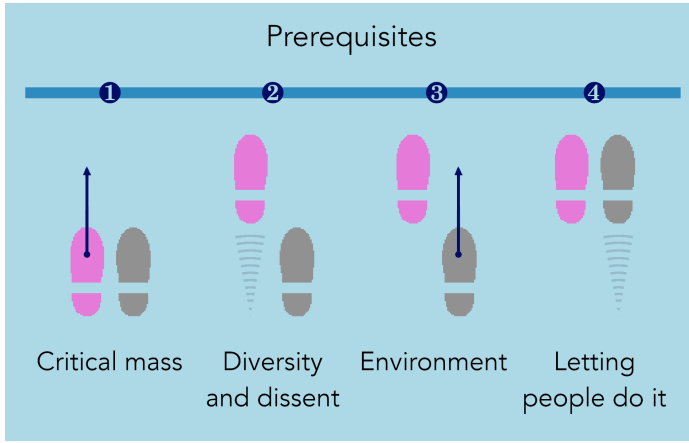

Figure 2: Prerequisites

- **Environment**: a physical or virtual space and time for the team, big enough to allow options for manoeuvring, and small enough not to let team members avoid each other.
- **Letting people do it**: it means for leaders and managers to allow space for the team members to interact with each other, communicate, collaborate, negotiate meaning and intentions, express their uniqueness, share their knowledge, learn together, and be creative. A space where population-wide patterns of behaviour, meaning, and action can emerge in the absence of any prior design, blueprint or plan. Such leaders and managers personality would typically resemble MacGregor's "type Y" personality (they believe "working can be like learning, and fun, and people left to their own devices will achieve great things", see Theory X and Theory Y[2] of human work motivation and management by Douglas McGregor).

[2]https://en.wikipedia.org/wiki/Theory_X_and_Theory_Y

Joseph Pelrine also describes the role of a leader or a manager, and the team members, in a self-organising system, that is to:

Orient and influence the emergence of patterns in the human self-organising system, amplifying those leading to outcomes beneficial to the team and its mission, and reducing or reversing those non-beneficial.

It is fundamental for leaders and managers to be aware that there is no privileged vantage point, no objective point of view, no control centre. But they too are part of the self-organising human system with a subjective, partial, and fragmented point of view, limited control, and an incomplete knowledge and understanding of the whole organisation. Therefore bringing together different views from every part of the organisation becomes essential. The biggest influence leaders and managers have in such a system is via direct local social interactions, contributing to the emergence of meaning, of shared narratives, of a common identity, and indirectly of the organisation culture.

The term 'control knobs' refers to variables that can be tweaked to orient self-organisation, ideally toward positive outcomes.

This model describes a few basic control knobs. A leader or a manager in a self-organising human system can tweak them, to orient self-organisation without hindering it.

- **Team Size**: merely by changing the size of a group, we can dramatically improve its receptivity to new ideas. For example, a smaller team may be more open to ideas from the outside, and faster to build consensus around them.

- **Team's Boundaries:** by defining who is part of the team and who is outside the team can make a huge difference on team's dynamics.
- **Roles**: the roles defined in the team can influence the behaviour too. For example, a role may promote collaboration or information sharing, impacting the team's dynamics.

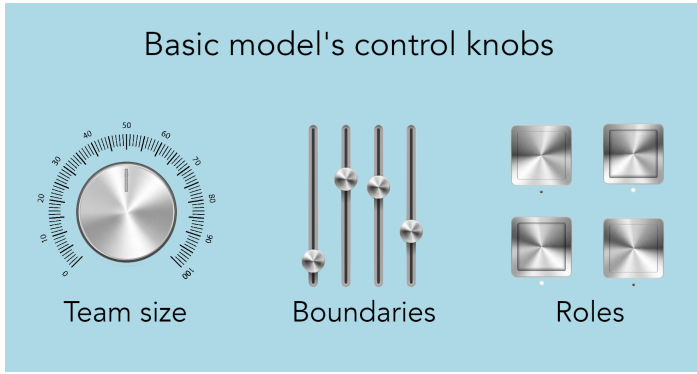

Figure 3: Basic model's control knobs

The general idea behind the control knobs is that they are an accessible and effective way to orient self-organisation. Kurt Lewin has theorised that the behaviour of a person is a function of the person and the external environment, or **B = f (P, E)**. For a person to change it takes time, and it involves psychology that is a profession on its right. Instead, the control knobs intervene on the environment.

The term 'control knobs' in all the models presented in this first region, refers to the variables of those models that can be tweaked to orient self-organisation. For uniformity of language, the use of the term is extended to all the other models presented in this book.

In conclusion, a leader or a manager in a self-organising human system can create an environment where the prerequisites that enable and support self-organisation are in place. He/she can tweak the three basic control knobs described here to orient self-organisation

in order to support the success of the team instead of hindering self-organisation.

Practical tips

'What now' Tip.
The first and foremost suggestion for leaders and managers is to take stock of the forces at work in their organisation that may support or hinder teamwork and spontaneous self-organisation. And reflect whether, with their authority and discretion, they can create a space where the prerequisites for self-organisation are met, with a focus on diversity & dissent, and letting people do it (self-organise).

'When' Tip.
The formation or the reboot of a team is a perfect time to assess what is supporting or hindering self-organisation. And also to work to ensure the prerequisites for self-organisation are met.

'How to' Tip.
This is essential. Due to self-organisation's nature, we cannot control or predict what patterns will emerge after tweaking a control knob. We don't know what secondary effects or unintended consequences there may be.

Instead, we can tweak the control knob that seems the most suitable for the circumstances and wait long enough for the effects to unfold and emerge. Then if they are beneficial, we can stop or even try to do more of that. Or, if they are detrimental, we can reverse the changes and try something different.

'When' Tip.
The team's Retrospective is a perfect place to consider the need to tweak some of the control knobs, to evaluate the effects of previous tweaks, and to consider follow-up actions.

'How to' Tip.
For leaders and managers learning to delegate more, I'd suggest

these techniques that may help: Intent-based leadership and the Ladder of Leadership from David Marquet, Delegation Poker from Management 3.0 and its variation known as Inverted Delegation Poker.

'How to' Tip.
While Scrum Masters and Agile Coaches may feel more relaxed in delegating decisions on the product, the scope, the priorities, etc. they may struggle to delegate to the team decisions on the ways of working. The techniques from the previous tip may help them too.

'What next' Tip.
In the following practices there are more control knobs that can be used to influence and orient self-organisation.

The Heat model (by Joseph Pelrine)

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Relation to Complexity

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Assessing the degree of Complexity

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Sensing Complexity (by Luca Minudel)

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Assessing Complexity (by Liz Keogh, documented by Liz Keogh)

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Delivery initiative Complexity assessment (by Luca Minudel)

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Four points method (by Dave Snowden)

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Adapting to the degree of Complexity

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RUDE estimation (by Dean Latchana, documented by Dean Latchana)

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Cynefin for decision making (by Dave Snowden)

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C2 Approach Space (by David Alberts)

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Cone of Complexity (by Luca Minudel)

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Co-cretion, collaborating in Complexity

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Red Team technique (by Dean Latchana, documented by Dean Latchana)

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Culture affinity assessment (by Luca Minudel)

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Lean Inception (by ThoughtWorks)

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A glimpse at modern Orgs

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How to introduce Complexity

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Appendix

Appendix A: Introduction to Complexity, resources

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Appendix B: Who is who

Dean Latchana (Co-author)

Dean Latchana is on a lifelong quest to explore how Complexity thinking can help individuals & organisations sense and respond to a rapidly changing world. He is a Business Agility Consultant operating from the UK. For more than 20-years he has supported many leading organisations transition to a world of rapid change and increasing interconnectedness.

Dean Latchana supports individuals and organisations to succeed in a dynamic market by helping them to develop awareness and ways of working that are contextual to their needs.

Dean advises and guides individuals and organisations to gain a new set of competencies so they can continuously re-optimise to an ever-changing business landscape. Dean co-develops change to remove organisational debt to create a more balanced focus for innovation.

In order to achieve this, Dean's role is to support business transformation programmes and develop new ways of working across departments. Dean teaches departments, and coaches & mentors individuals.

Dean contributed to this catalogue with two of his own original practices and co-authored the related chapters.

Liz Keogh (Co-author)

Liz Keogh is a Lean and Agile consultant based in London. She is a well-known blogger and international speaker, a core member

of the Behaviour Driven Development (BDD) community and a passionate advocate of the Cynefin framework and its ability to change mindsets. She has a strong technical background with 20 years' experience in delivering value and coaching others to deliver, from small start-ups to global enterprises. Most of her work now focuses on Lean, Agile and organizational transformations, and the use of transparency, positive language, well-formed outcomes and safe-to-fail experiments in making change innovative, easy and fun.
Liz contributed to this catalogue with one of her own original practices and co-authored the related chapter.

Dave Snowden

David John Snowden is a management consultant and researcher in the field of knowledge management. He is known for the development of the Cynefin framework, a decision-making tool.

He set up IBM Global Services' Knowledge and Differentiation Programme.
While at IBM he researched the importance of storytelling within organizations, particularly in relation to expressing tacit knowledge. He has been European director of the company's Institute for Knowledge Management and founded the IBM Cynefin Centre for Organisational Complexity. During this period he led a team that developed the Cynefin framework.

He now is the founder and chief scientific officer of Cognitive Edge, a Singapore-based management-consulting firm specializing in complexity and sensemaking.
His work covers government and industry looking at complex issues relating to strategy, organisational decision making and decision making. He has pioneered a science based approach to organisations drawing on anthropology, neuroscience and complex adaptive systems theory.

David Alberts

Dr David Stephen Alberts is a former Director of Research for the Office of the Assistant Secretary of Defense for Networks and Information Integration.

He has been Deputy Director of the Institute for National Strategic Studies, and the executive agent for DoD's Command and Control Research Program that included responsibility for the Center for Advanced Concepts and Technology and the School of Information Warfare and Strategy at the National Defense University.

His recent work focused on improving the agility of organizations and systems and issues related to cybersecurity. He is a prolific author with many publications on this subject.
He led international teams whose efforts have produced the NATO NEC C2 Maturity Model, the C2 Conceptual Reference Model, the NATO Code of Best Practice for C2 Assessment, and the Code of Best Practice for Experimentation.

Joseph Pelrine

A quiet and reserved researcher and practitioner, Joseph Pelrine is considered by cognoscenti to be one of the pioneers and top experts on Agile methods. Joseph Pelrine has spent almost 25 years defining and refining processes to help some of the world's most well-known companies improve their ability to satisfy the needs of their customers. As a psychologist, his focus on people and his experience in applying leading-edge techniques from social complexity and psychology to process optimisation goes far beyond the domain of software development, and extends to the whole organisation.

Joseph Pelrine was one of the first to make the connection between Complexity and Agile to explain why Agile works. Not only has

he been instrumental in popularising Agile software development in Europe, he has introduced numerous concepts from psychology and complexity to the Agile world at large, through numerous presentation at conferences as well as in trainings and workshops.

A respected coach, trainer, and manager, Joseph conducts research in novel applications of psychology to agile processes, and is also a PhD researcher in psychology and psycholinguistics.

Ralph Douglas Stacey

Ralph D. Stacey is a British organizational theorist, a Professor of Management, and an author of several influential books.
He is one of the pioneers of enquiring into the implications of the natural sciences of complexity for understanding human organisations and their management. He is best known for his writings on complex adaptive systems theory applied to organisations and management, and on the theory of organisations as complex responsive processes of relating.

Others mentioned in the book

Below there is a list with other names mentioned in the book, each with a short bio.

Alasdair Chalmers MacIntyre Scottish philosopher who contributed to moral and political philosophy as well as history of philosophy and theology. One of the great moral thinkers of the 20th and 21st centuries, well known also for emphasizing the role of history in philosophical theorizing.

Amy C. Edmondson: American scholar of leadership, teaming, and organizational learning. Leadership Professor at Harvard Business School.

Andrew Holm: Thought leader, author and practitioner in self-managing organisations.

Barry Boehm: American software engineer, distinguished professor of computer science. Known for the COCOMO cost model and the Spiral software development process model.

C. **West Churchman**: American philosopher and systems scientist. Contributed to the definition of wicked problems.

Daniel Terhorst-North: Consultant, author, and speaker well known as originator of the Behaviour-Driven Development (BDD) Agile practice.

David Marquet: Author of the bestseller Turn the Ship Around! and leadership expert. Served in the U.S. submarine force for 28 years.

Geoffrey A. Moore: American organizational theorist, management consultant and author. Known for his bestseller Crossing the Chasm.

Herman Carl Bauman: Author of several articles in cost engineering in industrial and engineering chemistry. Introduced the "cone" later used in the Cone of uncertainty.

Horst Willhelm Jakob Rittel: Design theorist and university professor. Wrote a seminal paper on wicked problems.

Ilya Prigogine: Physical chemist and Nobel laureate noted for his work on dissipative structures, complex systems, and irreversibility.

J. M. Gorey: Member of the Estimating Methods Committee published the first AACE guideline with the estimate type classification system with uncertainty ranges later used in the Cone of uncertainty.

Jim Highsmith: American software engineer and author of books in the field of software development methodology. He is the creator of Adaptive Software Development, co-author of the Agile Mani-

festo, co-founder of the Agile Alliance, and executive consultant with ThoughtWorks.

Jeff Patton: Author of the bestseller User Story Mapping. He champions a blend of product management, lean user experience and Agile delivery practices. He worked for ThoughtWorks.

Jonathan Rasmusson: Author of top-selling books such as The Agile Samurai. He is an experienced software engineer who has helped some of the world's most innovative tech companies. He worked for ThoughtWorks.

Kurt Lewin: German-American psychologist, recognised as the founder of social psychology. Known as one of the modern pioneers of social, organizational, and applied psychology.

Linda Rising: American author, lecturer, and consultant. Has a PhD in the field of object-based design metrics. She is credited for the application of design patterns to corporate change.

Luke Barrett: Business Analyst, Interaction Designer, Client Principal, and then Managing Director at ThoughtWorks Europe. He launched a QuickStart movement to cut IT projects waste at the planning stage. That led to the creation of the ThoughtWorks Inception.

Melvin M. Webber: Urban designer and theorist. Wrote a seminal paper on wicked problems.

Norbert Elias: German sociologist famous for his theory of civilizing/decivilizing processes. His theory focused on the relationship between power, behaviour, emotion, and knowledge.

Paulo Caroli: Author of Lean Inception. He has over twenty years of experience in digital products creation. He is co-founder of AgileBrazil, and principal consultant at Thoughtworks.

Richard D. Stutzke: Author of several papers and articles on software estimation and management. Wrote about the Cone of uncertainty in software development.

Steve Mcconnell: Best known as the author of software development books like 'Code Complete'. The term Cone of uncertainty appears for the first time in one of his books.

Stuart Alan Kauffman: American medical doctor, theoretical biologist, and complex systems researcher who studies the origin of life on Earth.

Appendix C: Mapping the Fearless Change patterns to ABIDE, exercise

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Identity/Role-based interventions

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Diversity-based Interventions

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Environment-based Interventions

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About the Author

Luca Minudel has been working in professional software delivery and digital product development for over 20 years, most of those with Lean and Agile. He has a technical background in software development and computer science.

He contributed to the adoption of Lean and Agile practices by Ferrari's F1 racing team. For ThoughtWorks, he delivered training, coaching, assessments and organisational transformations in top-tier organisations in Europe and the United States. He worked as Head of Agility, Agile Transformation Lead, Lean/Agile Practice Lead, and as Lean/Agile Coach in companies such as Lloyds, Japan Tobacco International, BP, The AA, HSBC, LexisNexis.

Luca is the founder and CEO at SmHarter.com, a London based company that helps organisations turn their way of working into their competitive advantage.

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