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Scenario #4
CIRCULAR SYSTEMIC SOLUTIONS

Green Acceleration Methodology for EU Clusters

Introduction

The challenges we face in the 21st century are fundamentally complex in nature and traditional linear approaches are limited in such context. When supporting clusters of SMES towards the development of sustainable and circular products or services, **it is necessary to take a systemic perspective**.

A specific mindset, some analytical frameworks and practical tools will facilitate your job in transforming your companies. Systems thinking, systems innovation, and systems change are **three interconnected concepts that relate to framing, understanding and transforming complex systems**. They can also be bridged with Future thinking approaches to cocreate desirable sustainable future.

>> SYSTEMS THINKING

Systems thinking is the foundational concept that underpins both systems innovation and systems change. Systems thinking involves analyzing and understanding how various components within a system interact with each other and how they contribute to the behavior of the whole system. It emphasizes the interconnectedness, feedback loops, and emergent properties of systems.

>> SYSTEMS INNOVATION

Systems innovation involves applying systems thinking principles to create new solutions or improve existing ones within a system. It focuses on identifying leverage points within the system where interventions can lead to significant positive change. Systems innovation often involves interdisciplinary collaboration, creativity, and a deep understanding of the underlying dynamics of the system.

>> SYSTEMS CHANGE

Systems change goes beyond innovation and involves intentionally shifting the structures, behaviors, and underlying paradigms of a system to address complex challenges or achieve desired outcomes. Systems change recognizes that sustainable transformation requires addressing not only surface-level symptoms but also the deeper systemic causes of problems. It often involves systemic interventions at multiple levels, such as policies, practices, and cultural norms.

>> FUTURE THINKING Businesses need to understand the long-term impacts of today's phenomena. Systematic future thinking and strategic foresight are the keys to this understanding. Future thinking helps anticipate futures, empowers businesses to actively build it, and assists in strategic planning and communication.

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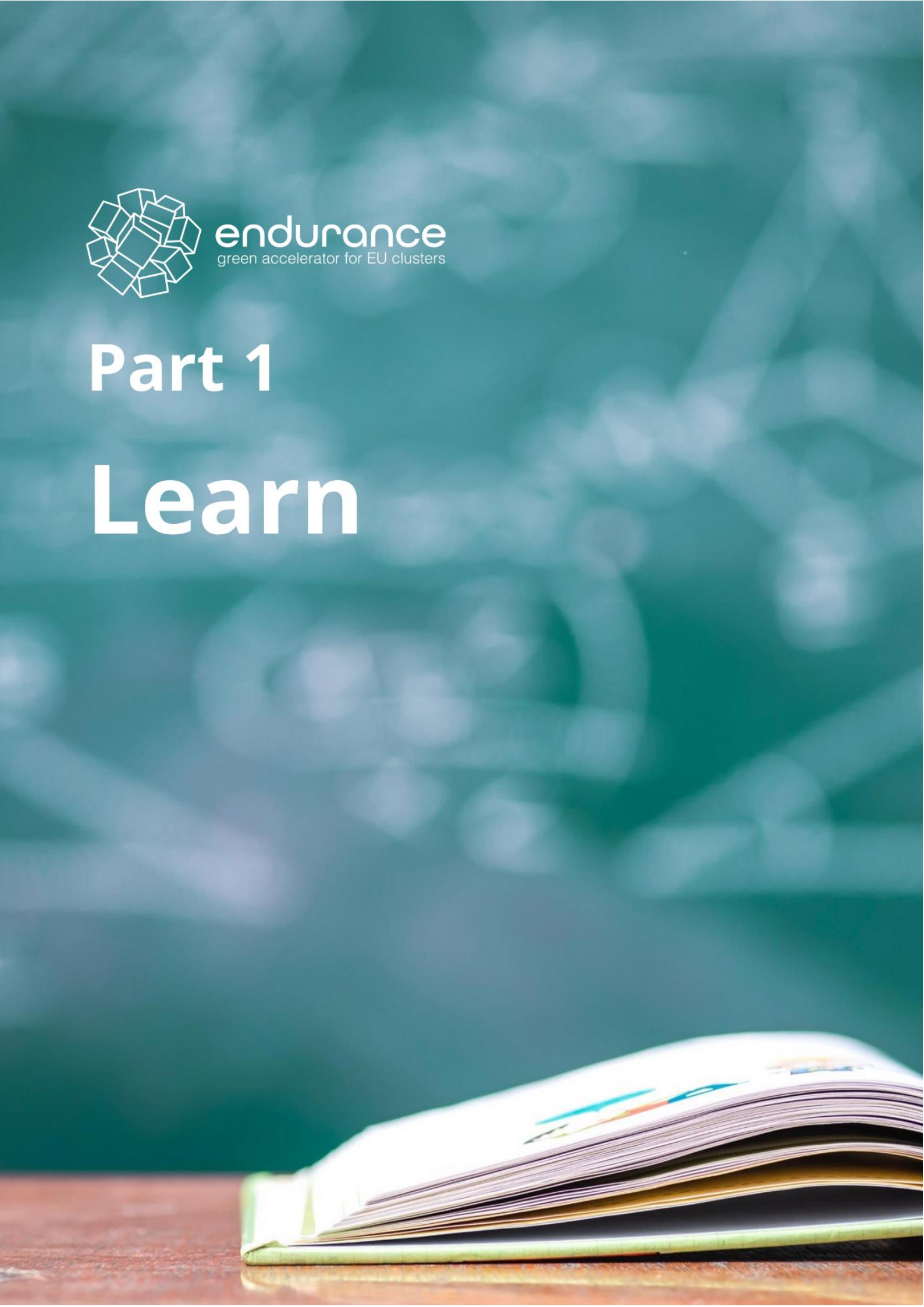
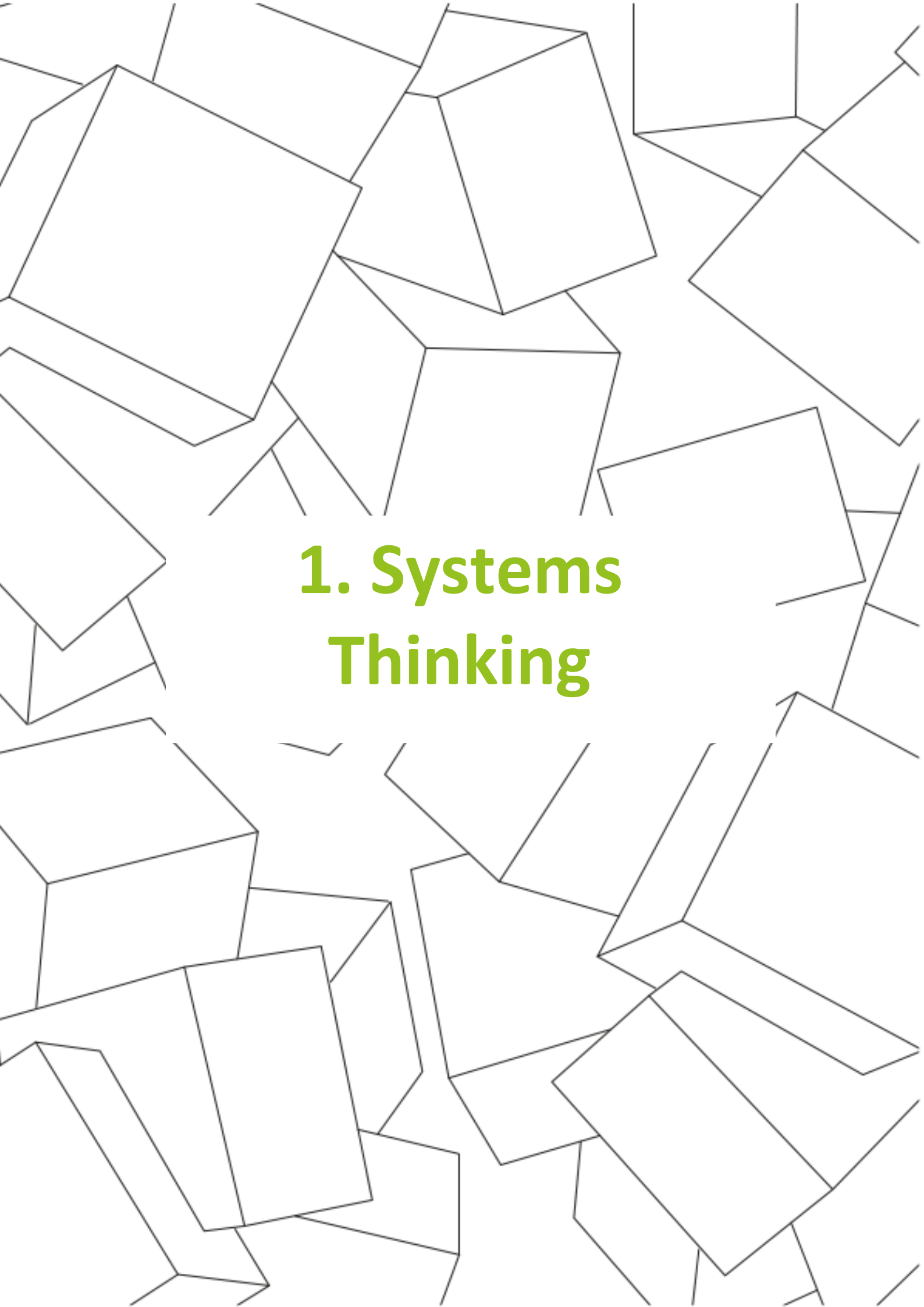
green accelerator for EU clusters

Part 1

Learn





1. Systems Thinking

Introduction

What is Systems Thinking?

Systems thinking is a paradigm or world view, meaning that it is a way of looking at the world. This paradigm is characterized as being holistic, meaning that we try to understand and interpret phenomena with respect to the whole that they form part of. This is in contrast to a more traditional paradigm called reductionism which is focused on understanding the parts of a system and optimizing those parts.

Seeing systems

Systems thinking is about trying to improve the quality of our thinking so as to not just see parts, but instead to see systems; the systems we form part of in our world. For most adults seeing systems does not come naturally, in our everyday way of being we see parts and draw a few connections that are very much centered around us and our particular place in the world. To see systems is to in some way overcome this self-centered view of the world.

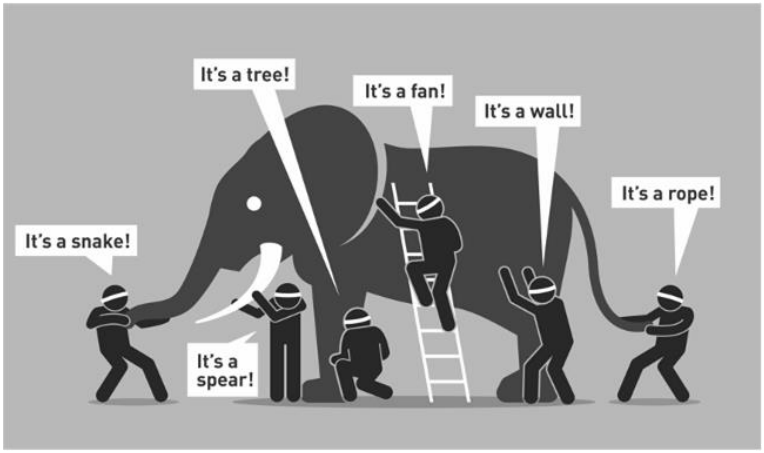


Figure 1: The blind men and the elephant (illustration iconscout)

This requires us to overcome some of the limitations, flaws, and biases in our thinking resulting from our egoism so as to see the systems we form part of independent from ourselves. Calling oneself a systems thinker should be a commitment to an ongoing learning

process of examining and trying to improve our thinking to become better at seeing systems. This starts with first understanding how we see the world, and the existing limitations in our reasoning.

Features of Systems Thinking

Thinking in systems implies requires us to shift our usual thinking and make a shift.

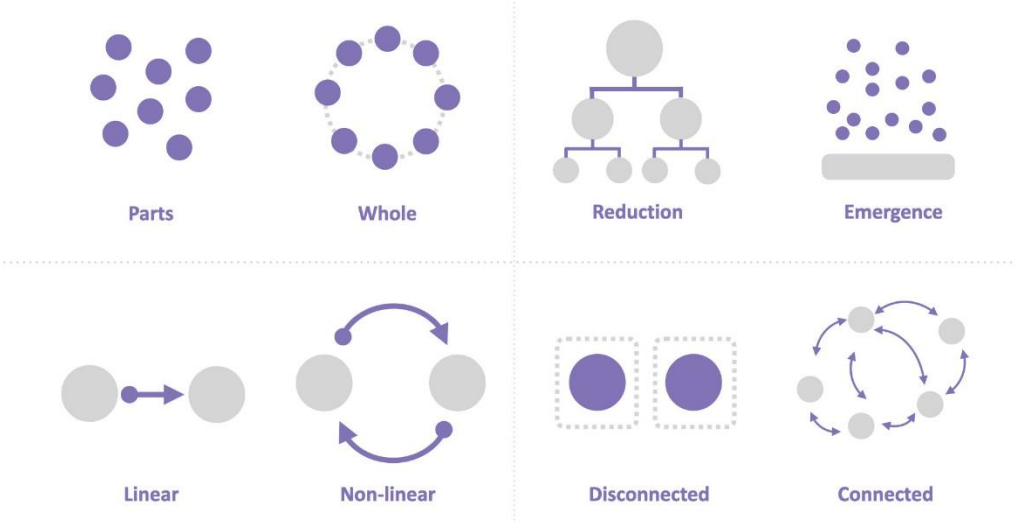


Figure 2: Systems thinking vs linear thinking (Source: SI network)

Parts vs whole: The systems approach to understanding a system involves identifying the system, explaining the behavior or properties of the whole system, and explaining the behavior or properties of the parts in terms of the role they play in the whole system. This approach emphasizes the importance of understanding the system as a whole, rather than just the individual parts.

Reductionism vs emergence: Reductionism is the view that complex systems can be understood by analyzing their individual parts and understanding the properties and behaviors of those parts. In other words, reductionists believe that the whole is nothing more than the sum of its parts.

Emergence, on the other hand, is the idea that complex systems can have properties and behaviors that cannot be predicted or explained

by understanding the properties and behaviors of their individual parts.

In other words, emergence suggests that there are properties and behaviors that "emerge" from the interactions between the parts of a system, and these properties and behaviors cannot be reduced to the properties and behaviors of the individual parts.

Linear vs non-linear: In the context of systems thinking, non-linear thinking is essential for understanding and solving problems in complex, dynamic systems. Linear thinking is a reductionist approach that focuses on individual parts of a system, ignoring the relationships and interdependencies between those parts.

Non-linear thinking, on the other hand, takes into account the surrounding system as a whole, recognizing the dependencies within the system and effectively solving complex problems with many interrelated components.

Disconnected vs connected: systems thinking emphasizes the importance of connectedness in understanding the behavior of complex systems. By recognizing the interdependencies between different parts of a system, we can better understand its dynamics and optimize its performance.

Why Systems Thinking is relevant for clusters managers?

If we wish to achieve systems-level innovation, we need to adopt a different mindset. Systems thinking can help us to think about systems wide structural features, such as integration between the parts, synergies, alignment, and adaptive capacity.

With a purely analytical view, we drill down and just try to optimize the properties of the parts, for instance focusing all our time on improving a biodegradable wrapping or developing a recyclable clothing material. If these single innovations are needed, they will only get us so far - and may indeed blind us to the broader systems changes that need to take place, thus ultimately perpetuating the status quo.

While we need to change the parts we also need to change the system. Systems change involves changing the structure of the system to interrelate things in new synergistic ways. Without systems thinking we will get too caught up in all the trees and lose sight of the whole and the changes that need to come about on that level. Having a systems thinking mindset can prove useful when supporting and challenging SMES on their new business model ideas.

Key concepts

#1 The iceberg model

The iceberg model is a model used in systems thinking to illustrate the various levels of abstraction to a situation or organization. Just like with an iceberg, a large percentage of what is going on in our world is hidden from view and the Iceberg Model tries to make this explicit by depicting it as a series of layers that sit beneath the everyday observable world.

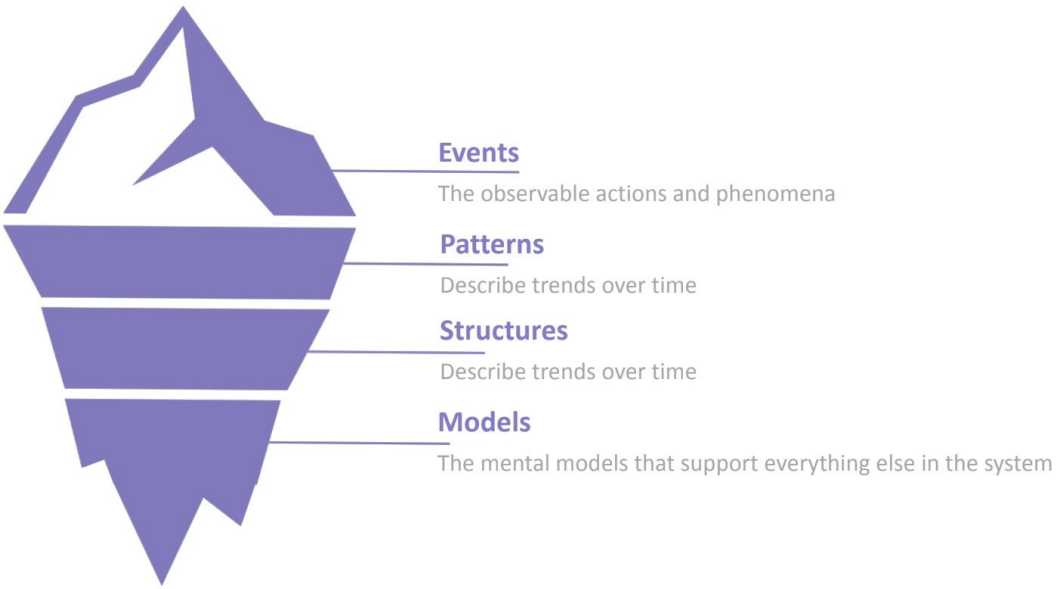


Figure 3: The iceberg model (Source: SI network)

>> Event

Events are the individual activities or facts about the state of things in the system.

>> Patterns

Patterns are the changes in variables that occur over a period of time. They are the trends that we perceive taking place over time.

>> Structures

What are the rules, norms, policies, guidelines, power structures, distribution of resources, or informal ways of work that have been tacitly or explicitly institutionalized?

>> Mental models

What are the key mental models expressed through beliefs, attitudes, morals, expectations, values or culture which allow structures to continue functioning as they are?

#2 Emergence

Emergence is one of the central concepts within systems theory as it describes a universal process of becoming or creation. A process whereby novel features and properties emerge when we put elementary parts together as they interact and self-organize to create new patterns of organization. Emergence is literally everywhere, from the evolution of the universe to the formation of traffic jams, from the development of social movements to the flocking of birds, from the cooperation of trillions of cells giving rise to the human body to the formation of hurricanes and financial crises.

Emergence can be understood as a form of nonlinear pattern formation. Where synergies between elementary parts give rise to self-organization and the formation of a distinct pattern, that creates new, emergent levels of organization, that are driven by an evolutionary dynamic.

In the context of green clusters, emergence theory suggests that the development of sustainable innovation can be facilitated through the interactions of various actors within the cluster. For instance, the emergence of circular business models in clusters can be perceived as a transition of its macro-level properties, such as pollution, financial assets, and other sustainability indicators, which can guide actor behavior and drive further transition. Additionally, the openness of clusters, which are characterized by constant interaction and exchange with their environments, can facilitate the adoption and creation of green technologies, leading to a more sustainable cluster.

#3 Leverage point

"The future can't be predicted, but it can be envisioned and brought lovingly into being. Systems can't be controlled, but they can be designed and redesigned. We can't surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them. We can't impose our will upon a system. We can listen to what the system tells us and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone."

Donella Meadows

What are leverage points? The idea of leverage points was introduced by Donella Meadows in a paper where she proposed a scale of places to intervene in a system that would result in varying degrees of change within the overall organization. She started with the insight that there are levers or places within a complex system where a "small shift in one thing can produce big changes in everything".

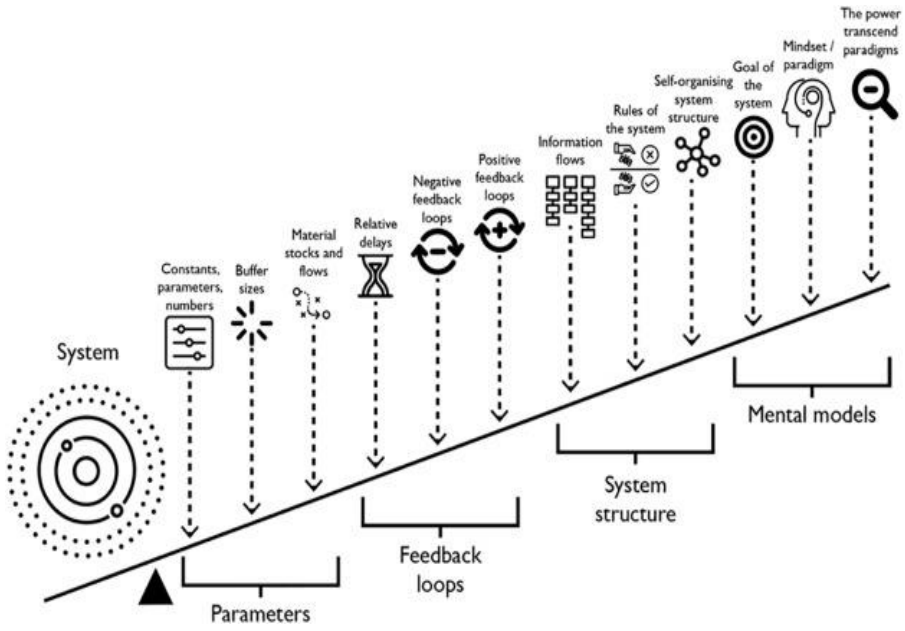


Figure 4: Meadow's leverage points (Source: C. Angheloiu and M. Tennant)

Donella Meadows' leverage points to intervene in a system are places within a complex system where a small shift can produce significant changes. Here are examples of all twelve leverage points, using the transition to sustainable food systems as a context:

Constants, parameters, numbers (Point 12): These are the least effective points to intervene, as they involve modifying numbers or quantities within

a system, such as taxes, incentives, or standards. For instance, implementing policies like subsidies for organic farming, taxes on carbon emissions from agriculture, or setting standards for sustainable farming practices.

Buffers and other stabilizing stocks (Point 11): These are the ability of a system to stabilize itself through stocks, such as water in a lake. In sustainable food systems, this could involve maintaining healthy soil as a buffer to improve the system's resilience.

Structure of material stocks and flows (Point 10): This involves the structure of material stocks and flows, such as transport networks and population age structures. In sustainable food systems, this could involve redesigning food distribution networks to reduce food waste and carbon emissions.

Length of delays in feedback loops (Point 9): This involves the time it takes for feedback loops to operate. In sustainable food systems, this could involve reducing the time it takes for farmers to receive payment for their produce, which can improve their financial stability and incentivize sustainable practices.

Strength of negative feedback loops (Point 8): This involves the strength of feedback loops that dampen or stabilize a system. In sustainable food systems, this could involve promoting practices that reduce nutrient runoff, such as cover cropping and agroforestry, to maintain soil health and prevent eutrophication of water bodies.

Structure of information flows (Point 7): This involves the structure of information flows within a system. In sustainable food systems, this could involve improving communication and data sharing between farmers, consumers, and policymakers to promote transparency and informed decision making.

Governance (Point 6): This involves the rules, policies, and institutions that govern a system. In sustainable food systems, this could involve promoting policies that support small-scale farmers, agroecological practices, and food sovereignty.

Culture (Point 5): This involves the shared values, beliefs, and attitudes within a system. In sustainable food systems, this could involve promoting a culture of sustainability, food justice, and community engagement.

Power (Point 4): This involves the distribution of power within a system. In sustainable food systems, this could involve promoting policies that empower marginalized communities, such as indigenous peoples, women, and small scale farmers.

Goals (Point 3): This involves the goals of a system. In sustainable food systems, this could involve promoting goals that prioritize environmental sustainability, social equity, and economic viability.

Paradigm (Point 2): This involves the fundamental assumptions and beliefs that underlie a system. In sustainable food systems, this could involve challenging and transcending paradigms that prioritize economic growth over environmental sustainability and social equity.

Transcending paradigms (Point 1): This is the most effective point to intervene, as it involves transcending the fundamental assumptions and beliefs that underlie a system. In sustainable food systems, this could involve promoting a paradigm shift towards regenerative agriculture, agroecology, and food justice.

To go further

Do you want to learn more about Systems Thinking?

On systems thinking

- Teaching Systemic Thinking: Educating the Next Generation of Business Leaders - The Systems Thinker. (2015). Retrieved 22 August 2020, from https://thesystemsthinker.com/teaching-systemic-thinking-educating-the-next-generation-of-business-leaders
- OpenLearn. (2020). Systems thinking and practice. [online] Available at: https://www.open.edu/openlearn/science-maths-technology/computing-ict/systems-thinking-and-practice/content-section-3.4
- Metabolic. (2020). Lessons in systems thinking – exploring unintended consequences. [online] Available at: https://www.metabolic.nl/news/lessons-in-systems-thinking-exploring-unintended-consequences/
- The Schumacher Institute (2014). Introduction to Systems Thinking, Part 1 - How do we view the world? (with Martin Sandbrook). YouTube. Available at: https://www.youtube.com/watch?v=SH94PMHPZW8

On the iceberg model

- Iceberg model - Ecochallenge.org . (2020). Retrieved 18 August 2020, from https://ecochallenge.org/iceberg-model/

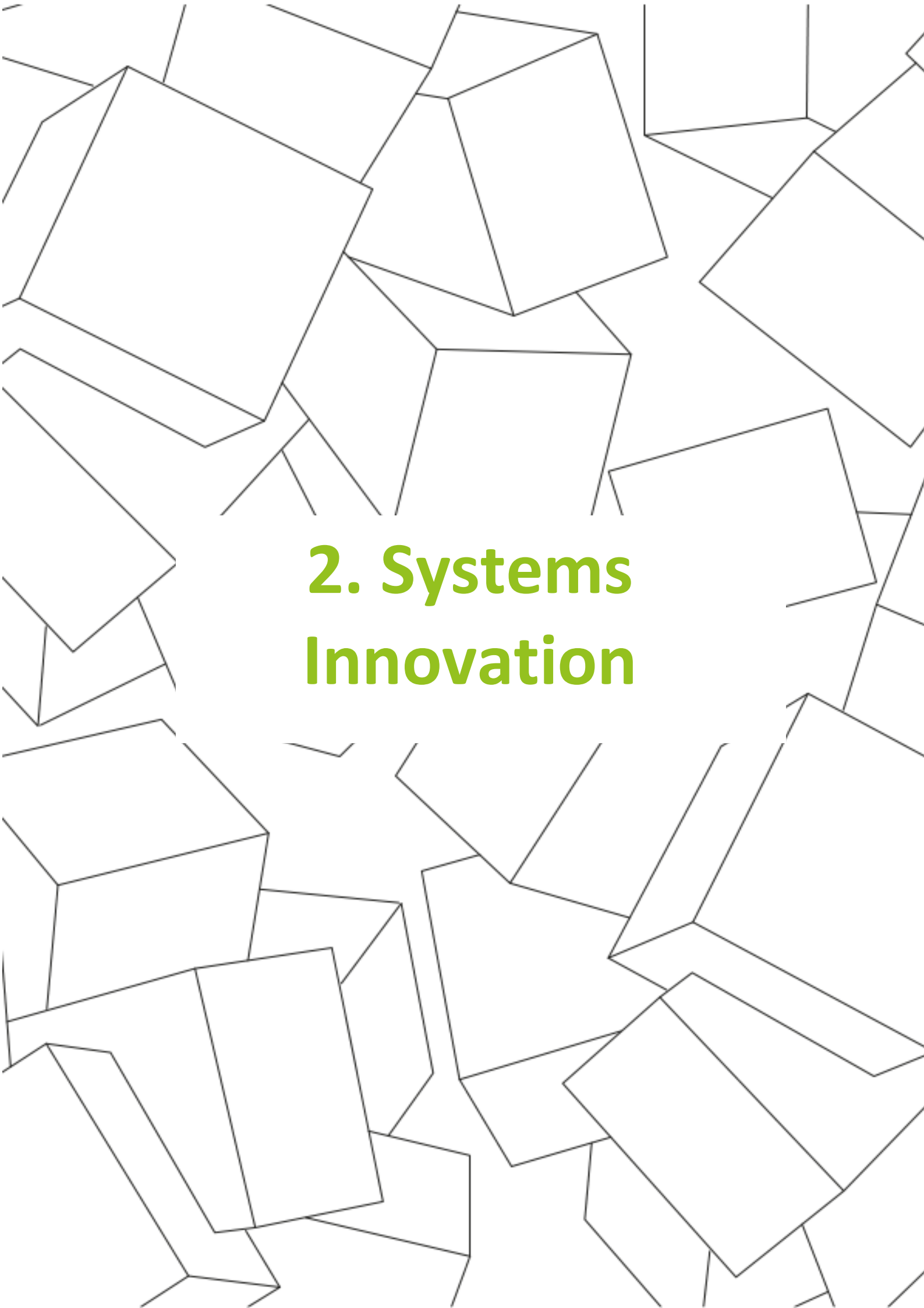
On leverage points

- Meadows, D. *Leverage Points Places to Intervene in a System*. [online] Available at: http://www.donellameadows.org/wp-content/userfiles/Leverage_Points.pdf

- Fischer, J. and Riechers, M. (2019). A leverage points perspective on sustainability. *People and Nature*, [online] 1(1), pp.115–120. Available at: http://fox.leuphana.de/portal/files/15276630/pan3.13.pdf

Other methods to intervene

- AC4Columbia (2015). *Orit Gal - Social Acupuncture*. *YouTube*. Available at: https://www.youtube.com/watch?v=CKFtIo264Yo
- The Academy for Systems Change. (2012). *Dancing With Systems*. [online] Available at: https://donellameadows.org/archives/dancing-with-systems/ [Accessed 3 April 2024]
- Connor, T. (2019). *Systems Archetypes- Places to intervene - 10x Curiosity - Medium*. [online] Medium. Available at: https://medium.com/10x-curiosity/systems-archetypes-places-to-intervene-b778debac0ed
- The Systems Thinker. (2016). *Finding Balance: What Aikido Can Teach Us About Conflict - The Systems Thinker*. [online] Available at: https://thesystemsthinker.com/%EF%BB%BFfinding-balance-what-aikido-can-teach-us-about-conflict/



2. Systems Innovation

Introduction

What is Systems Innovation?

Systems innovation is a holistic approach that looks at the overall dynamics and systemic conditions of an issue. Rather than reducing complex systems down to their individual parts and doing innovation in those parts, it looks more broadly at how the whole system is organized and aims to change the way the parts are interrelated and organized to realize new outcomes.

While traditional innovation is the application of new ideas from science and engineering to the development of new individual products and services, systems innovation is about the use of systems thinking to look at the issues differently and from this then, change the system by connecting and organizing it in new ways so as to realize the emergence of new outcomes.

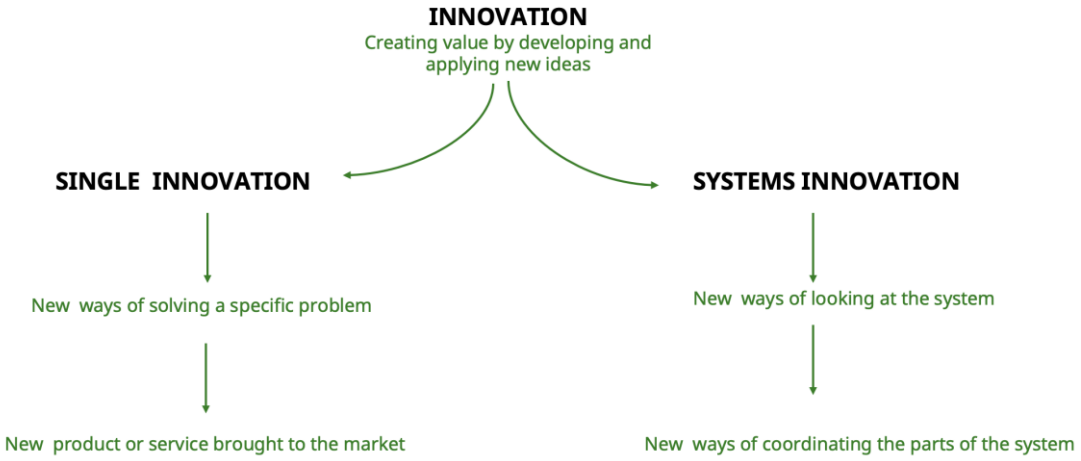


Figure 5: Single vs. Systems innovation

Why Systems Innovation is relevant for cluster managers?

Systems approaches become particularly relevant when dealing with complex challenges, such as the transition to renewable energy or the transformation of our current food system. This is because when systems

become complex, they become more defined by their connections and interdependence rather than the properties of their parts.

In such a context we need to change our design and management approaches from a logic of dividing and separating things out to a logic of connectivity, synergies, and integration. This is particularly relevant when managing clusters of companies.

By taking the overall system as well as its parts into account the systems paradigm offers us fresh insight that is not accessible through the more traditional reductionist approach. This new perspective then makes apparent new ways to innovate and change established patterns that are no longer functional

Circular systemic innovation?

Circular economy, as a megatrend, invites us to decouple economic activity from resource consumption. When shifting from a linear economic model to a nonlinear model - or from a linear economy to a circular economy, we can rely on how natural ecosystems function and adopt non-linear processes such as reuse, recycling or refurbishing.

These new strategies though, need to be organized by taking a wider lens, which involves different complementary actors, offering different resources and capabilities to achieve a common purpose. In a circular economy, the focus shifts from gross input and throughput toward looking at how resources are used, distributed, and exchanged within the system to enable their most effective usage.

Here, value is generated less by extracting and processing more "stuff" but new opportunities emerge around helping people use and exchange their resources more effectively, thus optimizing the system as a whole instead of just its parts.

Key concepts

#1 System mapping

Before innovating in a system, one need to understand it. Systems mapping aims to get a visual overview of the system we are dealing with; the different component types and generally how they are interrelated. Once we have this overview we can start to refine it and add in detail later in the process. Mapping is a way of getting everything out there in front of us.

System mapping is about gaining an empirical understanding of what is before we engage in envisioning what could be or what we would like to be. However, systems maps should not be seen as deliverables or endpoints, rather they are tools of exploration, stepping stones on our path to understanding the system dynamics that underly complex issues.

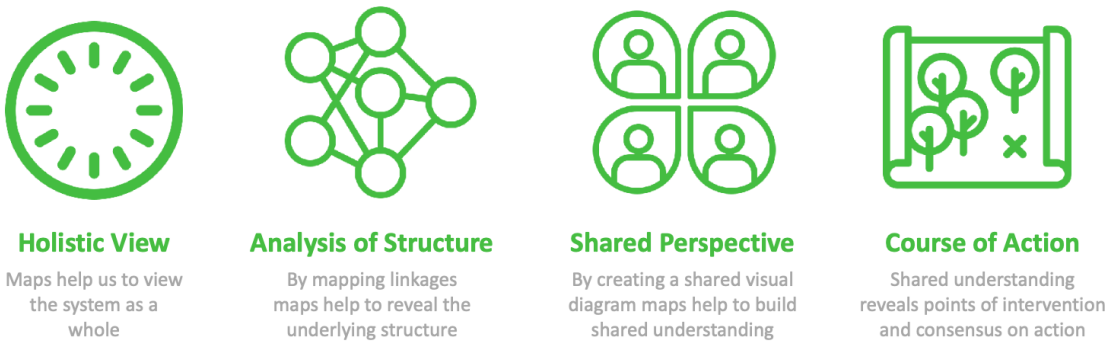


Figure 6: Systems mapping principles (Source: SI network)

#2 Actor mapping

Systems innovation requires collaboration across a wide variety of actors and connecting them in new ways. For example, when we design new packaging we need to involve recycling companies from the very beginning and also involve consumers. We need the raw material producers, we need the consumer, we need the brand owners, we need the retailers, along with the recyclers. Everyone in the value chain needs to collaborate, start to have a dialogue with each other, have an understanding of each other's needs, and start working together.

For us to get this understanding we need to map out the actors in the system, understand who they are, what are their roles, values, incentives, motivation, etc - this is in essence the task of actor mapping.

The actor mapping canvas can help you with this task. Have a look at the tool section of this module.

#3 Systems dynamics

All systems thinking approaches have to do with simplifying reality so we can deal with it more effectively. System dynamics offers an approach in which the model resembles reality structurally, so we can review it for usefulness and consistency. Furthermore, it offers us a way to see the ramifications of that simplification through simulation, so we can test our hypotheses.

Some key features of systems dynamics:

- You model the problem, issue, or evaluation questions, not the whole program or real world.
- Assumes most problems have endogenous causes.
- Assumes events are part of patterns, which are generated by structures.
- Selection of the problem boundary is a vital step.
- Extent in time and space is generally more important than detail.
- It's about testing hypotheses.

The classic system dynamic process:

- Identify a problem, puzzle, evaluation question, or issue.
- Develop a dynamic hypothesis explaining the cause of the problem.
- Build a model of the system at the root of the problem.
- Ensure the model reflects the behavior seen in the real world, or explore similar models that have already been tested.
- Play around with the model to see what insights it gives you about the issue, problem, evaluation question or puzzle.
- Draw conclusions from these insights.

#4 Network analysis

Industries form a complex system with an underlying network structure that shapes of how they function. Understanding this network structure is key to understanding the system and how we may influence or change it.

Key questions that should be answered include:

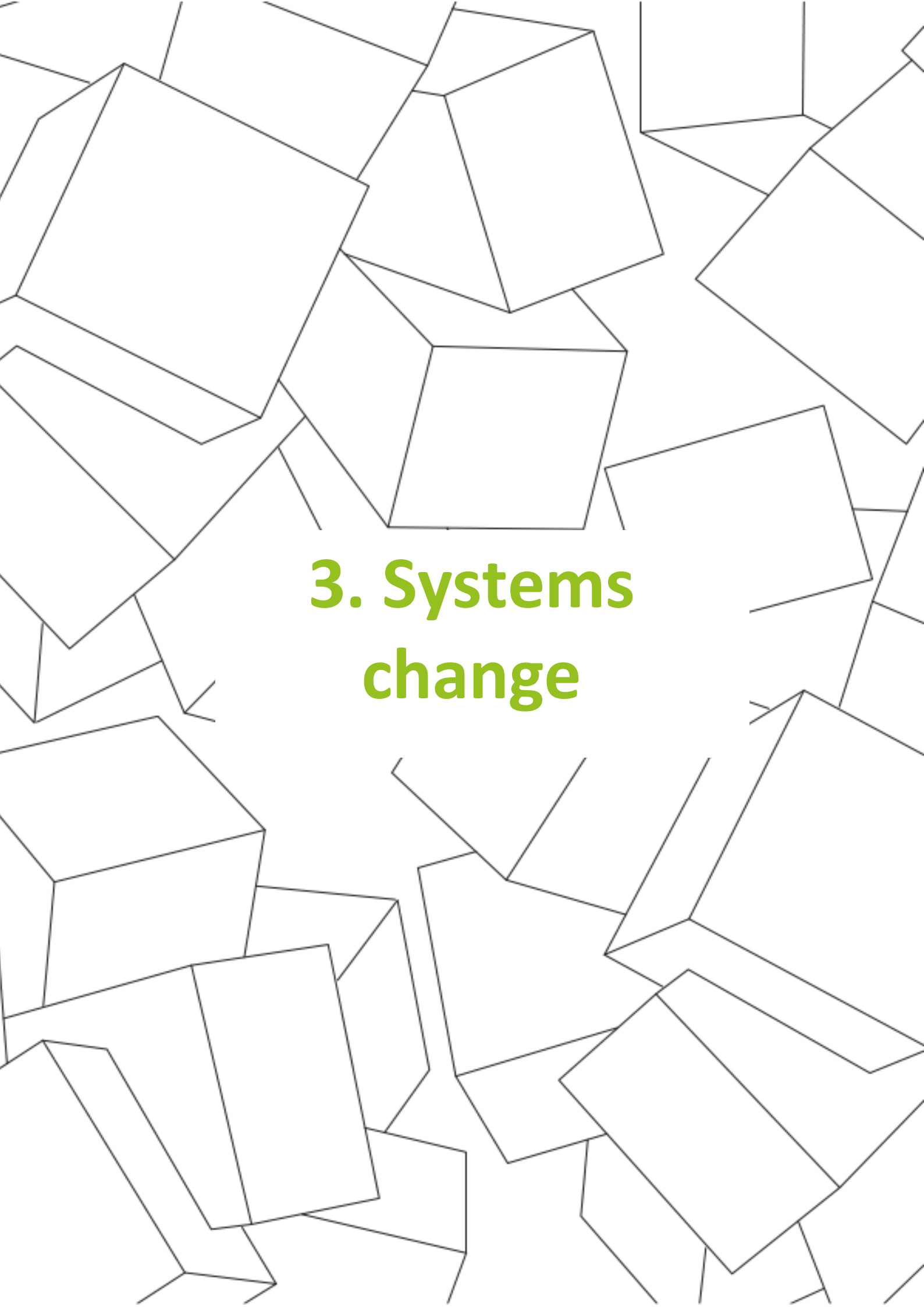
- Who are the most important nodes in the network?
- What is the overall structure of the network, how centralized or decentralized is it?
- How equally are the connections in the network distributed out, i.e. do some nodes have very many connections will others have few?

The network analysis canvas can help you with this task. Have a look at the tool section of this module.

To go further

Do you want to learn more about systems innovation?

- System innovation network – the reference for tools, guides: https://www.systemsinnovation.network/
- System innovation guidance – Nesta: https://beamexchange.org/resources/694/
- EIT Climate Kic – visual toolbox for systems innovation: https://oecd-opsi.org/toolkits/visual-toolbox-for-system-innovation/



3. Systems change

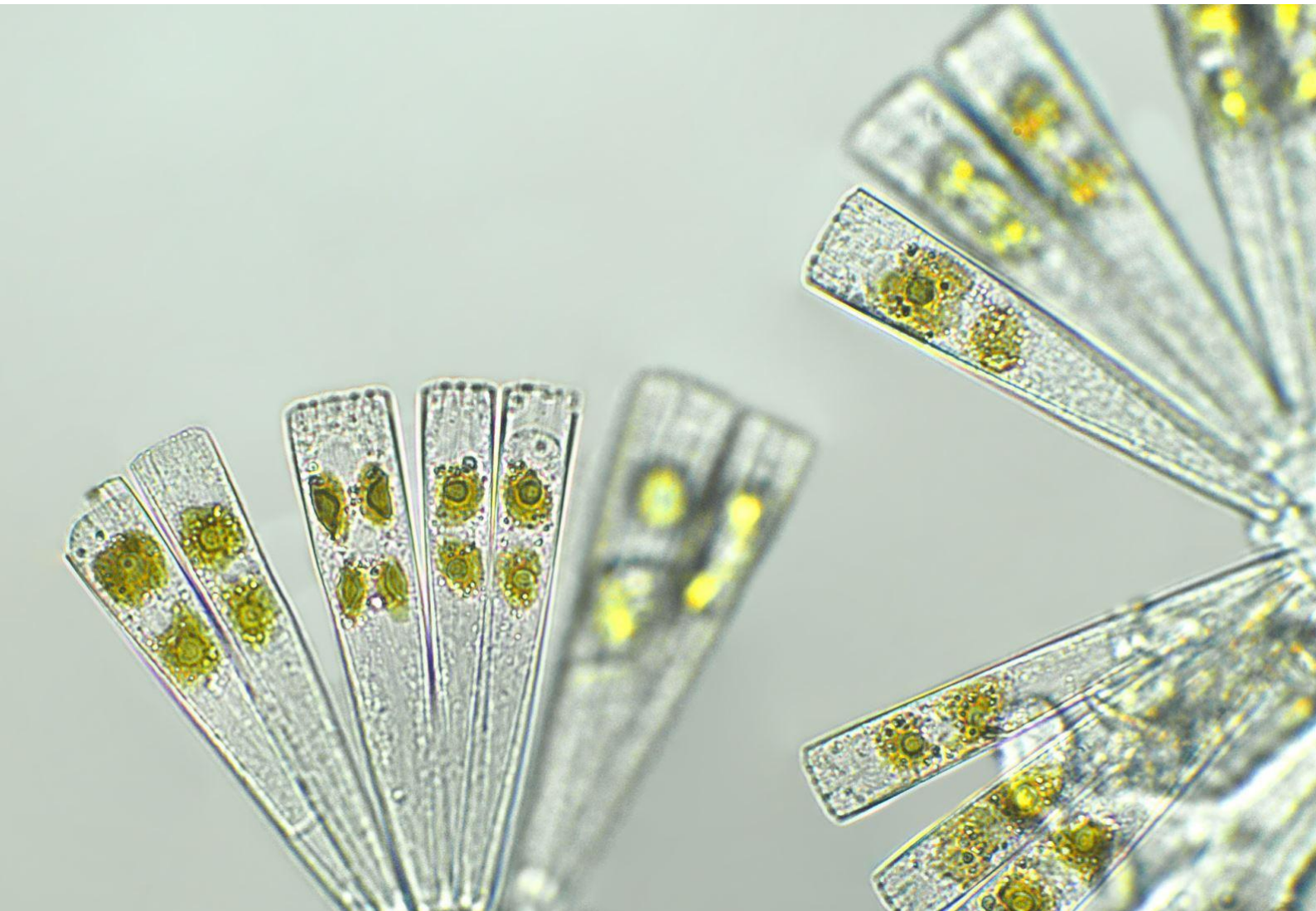
Introduction

What is systems change?

Systems change is about working with transition process within complex systems so as to try and realize the emergence of new structure and functions. It is about influencing the system at certain strategic “leverage points” so as to influence it in some way towards a new higher equilibrium that is more sustainable.

Why is it important for cluster managers?

As a cluster manager who supports SMEs of a specific sector on their green transition, you will need to develop distinct approaches for, on one hand, supporting starts up that can directly operate in the future desirable system, and on the other hand helping traditional companies depart from activities that are part of the old system. Navigating between the old and the new in transition requires specific systems tools and approaches.



Key concepts

#1 The Multi-level perspective

The multi-level perspective (MLP) is a prominent framework for describing transition processes in complex socio-technical systems as it plays out on different levels. This model has been designed to help us analyze and better understand the "long-term, multi-dimensional and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption."

The focus of the MLP is on how transitions occur at multiple levels through the interplay of processes at different levels. As illustrated below the model posits three heuristic levels on which change takes place. The macro-level (called the landscape), the meso-level (the regime) and micro-level (home to the niches).

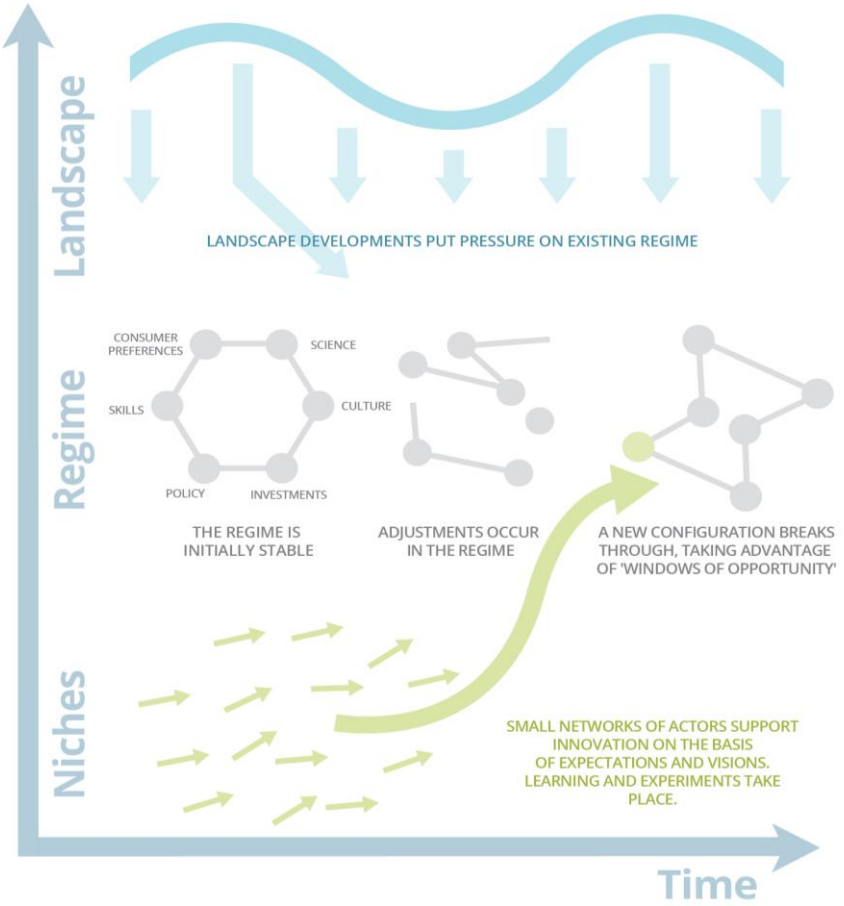


Figure 7: Multi-level perspective (Source: fullcirc.com)

#2 Horizon Scanning – from weak signals to emerging change

Horizon scanning is about gathering future-related knowledge. It is about being vigilant concerning the changes in one's environment. The main focus is on discontinuities, emerging issues, and weak signals of change.

Discontinuities are changes in trends, which can be, for example, previously seen developments in social or technological phenomena. They are culminations, breaks, or decisive turning points at which a significant historical event or change occurs. Discontinuities can be either expected or unexpected accelerations, slowdowns or total cessations of the known path of developments. In most cases, they cannot be forecasted from historical knowledge.

Emerging issues are novel things that are just beginning to form, potentially driving change in the working environment. They are new by definition, meaning that they don't have history. Emerging issues may also be called embryos, seeds of change, infant, incubating or germinating issues or phenomena.

According to futurist Pentti Malaska's funnel model, there is always a dominant mode of production in the market. It is first in an extensive growth phase, meaning that all suppliers can flourish as there is more demand than supply. At some point, the growing market starts to get saturated, and the competition intensifies. Suppliers start looking for new ways to differentiate, urging them to become more productive.

The answer to this is a new technology or production mode, an "embryo" that is very small, weak and unknown at the beginning. Once this new embryo proves profitable to businesses, it becomes attractive to the market. Next, this embryo or emerging issue starts to obtain investments and generate new business models until it becomes the new dominant production mode, leaving the former dominant production mode in its shadow.

Both discontinuities and emerging issues are more or less surprising changes in the course of the prevailing development. Neither can usually be calculated solely from historical knowledge. The difference between these two is that emerging issues are novel things without previous history, while seemingly similar discontinuities may recur in time.

Last, weak signals are early signs of potential discontinuities and emerging issues, such as new technologies that are still in the infant phase. They are not public knowledge yet, meaning that only a small group of people are aware of their potential. When media and the larger public become aware of a weak signal, they turn into strong signals. Both weak and strong signals may grow into trends or drivers, fade away, or act as early warnings to wild cards.

Besides the most impactful discontinuities, emerging issues and weak signals, horizon scanning also seeks to identify and prioritize other types of phenomena that are highly important for understanding the issue under study. These other phenomena may cover, for example, various types of trend-based knowledge, drivers, scenarios and wild cards. This second objective of horizon scanning is essentially what we call comprehensive futures intelligence.

#3 Systems gardening – planting need seeds at niche level

As a cluster manager, you should take the role of a system gardener to bring a deep and positive change in the system.

As Paul Plsek shares: *"When dealing with complex adaptive systems] it is more helpful to think like a farmer than an engineer or architect... Engineers and architects need to design every detail of a system. This approach is possible because the responses of the component parts are mechanical and, therefore, predictable. In contrast, the farmer knows that he or she can do only so much.*

The farmer uses knowledge and evidence from past experience and desires an optimum crop. However, in the end, the farmer simply creates the conditions under which a good crop is possible. The outcome is an emergent property of the natural system and cannot be predicted in detail."

Concretely, cultivating system change is based on the following principles:

- **Context Setting:** Complex Adaptive Systems are context-driven, and copy-paste solutions are not available for instant benefits. We have to sense the emerging patterns and adapt our action. Systems change is not fixing an issue or a separate component but creating conducive conditions around that issue. We need to work on shifting the conditions that hold the problem in place. Systems thinking is about elevating our thinking to the context within which the parts interact.

- **Probing:** Introducing probes or safe-fail experiments will allow the nature of emergent possibilities to become more visible.

- **Dampen & Amplify:** Complex systems are dynamic in nature, and they are characterized by patterns that emerge through endless interactions. Over time, these emerging system patterns incentivize certain behaviors and constrain others. These are called pattern attractors. As these attractors are the most stable and robust elements, they configure the evolution of complex adaptive systems. An attractor is a set of reinforcing feedback loops that will stabilize the system within a new pattern. So, dampen down or amplify the attractors depending on if they are beneficial to the whole system or not.

- **Growing pockets of the future:** There are some details that are currently in low prevalence but will become common in the future. "A pocket of the future is defined as an observable practice, idea, or thing that is rare and insignificant in the present moment but has the potential to become more prevalent and impactful. Pockets of the futures are important weak signals that have the potential to profoundly influence the organization's core challenge."

- **Seeding Transitions:** The role of a systems gardener is to seed transitions by identifying, connecting, supporting, and spotlighting the pioneers of the new system. By fostering the seeds of new ideas, the system change agent enables transformation through emergence. The systems gardener must support the new pockets of the future and try to build them into viable attractors.

#4 Two loops model – navigating the transition

A key aspect in any transition process is the simultaneous growth of the new system and the disintegration of the old. Navigating this dynamic is key to a successful change process. As we develop new circular solutions, incumbent actors in the existing economy will also need to be helped to let go of the old and find their place in the new system. If we fail to do so, we risk creating strong resistance to change.

The two loop model shows a dominant system that is working well for some, but is in decline and an emergent system, which is gaining influence. When the dominant system reaches its peak, alternatives arise. Pockets of possibility. 'Pioneers'. To stimulate change:

- Name the pioneers.
- Connect them together.
- Nourish them, with time, connection and resources.
- Illuminate their work, or stories of change.

When groups of pioneers form networks and communities of practice, they build relationships. Between them, they create new knowledge, ideas and practices. When they share stories about this change, others have the confidence to join. The networks grow. A new system can emerge. The model reminds us to pay attention and care to the dominant systems, during transition, to keep the dominant system functioning as it declines, create space for the pioneers and provide 'hospice' for those who find change painful.

The model also encourages us to ask a few important questions:

- *What are the characteristics of the emergent system we want to create?*
- *What would it look like and feel like?*
- *Where do we see this future already emerging?*
- *Who are the pioneers already embodying this?*
- *What is holding the dominant system in place?*
- *What mental models, power dynamics and incentives?*

- *What do we want to bring with us, and leave behind?*
- *What do we want to compost, to nourish the emergent system?*
- *What is not serving, that should be left behind?*

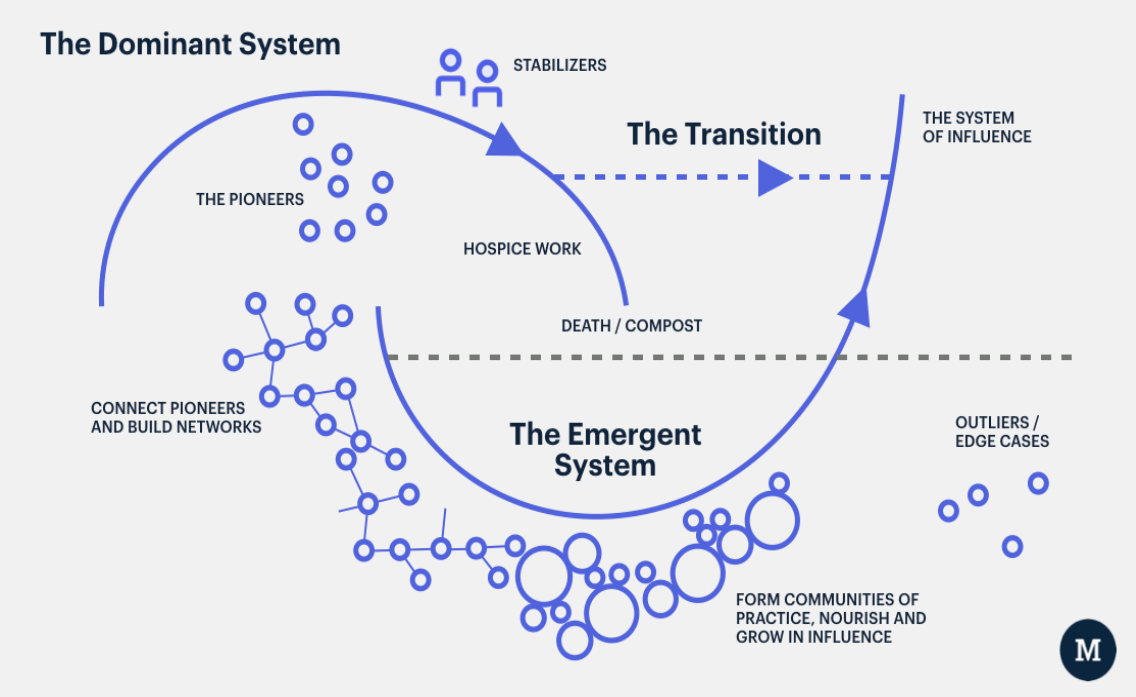
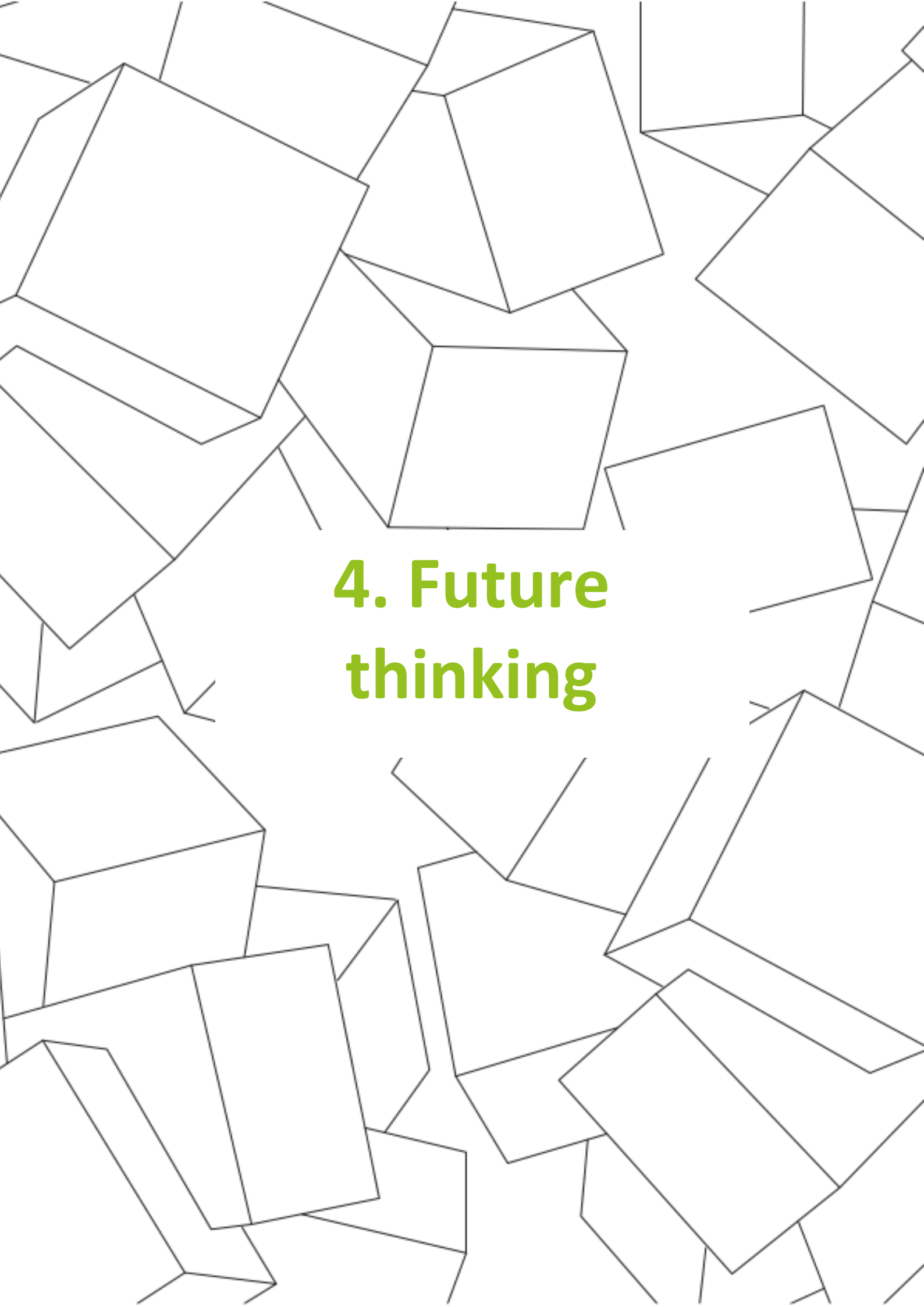


Figure 8. Two loops model (Source: Conscious brands)

To go further

Do you want to learn more about systems change?

- Horizon scanning — tips and tricks - A practical guide from the European Environment Agency https://www.eea.europa.eu/publications/horizon-scanning-tips#:~:text=Horizon%20scanning%20%2D%20a%20foresight%20method,future%20shocks%20and%20reduce%20uncertainty
- On system gardening https://www.linkedin.com/pulse/what-systems-gardening-why-important-enabling-change-joss-colchester/
- The two loop model in video https://youtu.be/B1jcfax4ntw



4. Future thinking

Introduction

What is future thinking?

Future thinking is defined as a skill that encompasses the ability to critically and creatively envision a range of possible futures. This skill involves imagining various scenarios and outcomes, enabling individuals and organizations to prepare for and navigate uncertainties effectively. It builds on a set of skills and complementary approaches that can support cluster development towards more sustainable futures.

Futures thinking is a creative and exploratory process that uses divergent thinking, seeking many possible answers and acknowledging uncertainty. It's a different mind-set to analytical thinking which uses convergent thinking to seek the right answer and reduce uncertainty. As a discipline in its own right it is used in strategy development and in design and planning, as well as to inform policy development.

Systems thinking and future thinking: creating desirable futures

The world today is complicated and rapidly changing, making linear problem-solving approaches inadequate. Combining Future thinking and Systems thinking is well-suited to deal with this dynamic complexity. Both approaches acknowledge that the future is not predetermined but shaped by the interactions of multiple factors.

By applying future thinking and systems thinking together, we can gain deeper insights into complex issues. Future thinking helps anticipate emerging trends and opportunities early on. Systems thinking then provides a framework for understanding the fundamental drivers behind these trends and their systemic implications

The intersection of future thinking and systems thinking is also a powerful source of innovation. By exploring potential future scenarios and understanding the underlying system dynamics, we can uncover new possibilities for intervention and positive change. This anticipatory innovation allows us to proactively shape the future rather than just reacting to it.

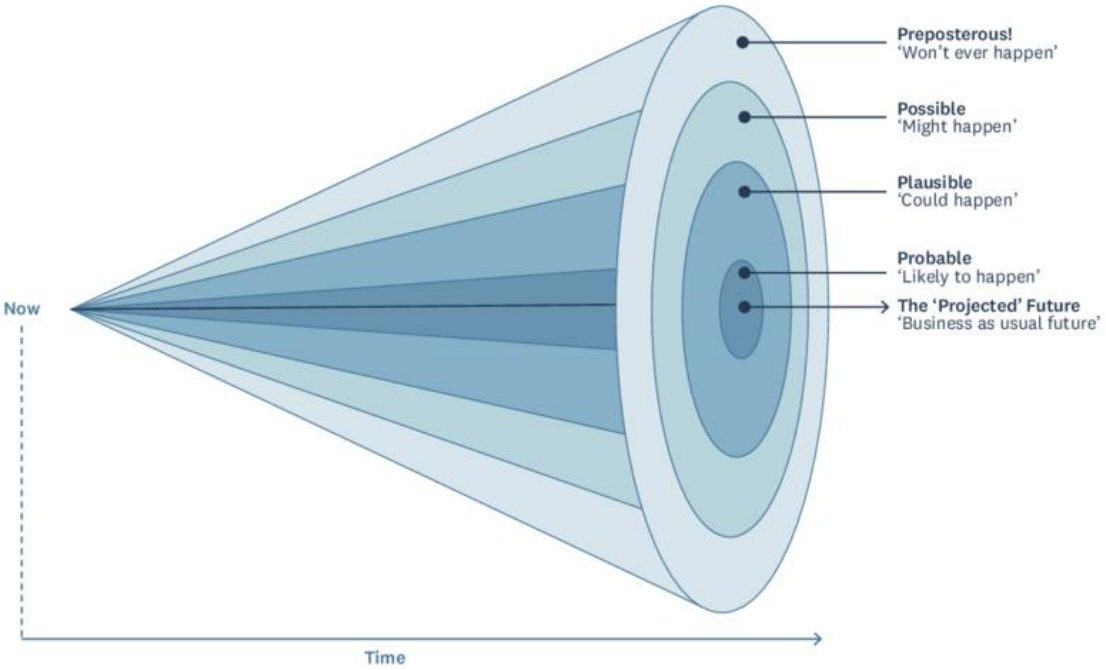


Figure 9: Future cone. Adapted from Varos (2003)

Why is relevant for clusters managers?

Futures thinking provides a range of techniques to help you think about the drivers of change that are shaping the future and explore the implications of these for making decisions today – not only about what to do, but how and when to do it.

Futures thinking does not attempt to predict the future, nor does it purport that there is only one correct future or that the future is pre-determined. There are a range of possible futures and the future can be actively shaped by the decisions we take today.

Futures thinking helps you understanding the long-term issues or challenges shaping the future development of your sectoral area. By using futures thinking as part of your process it helps you to:

- Identify and test the assumptions (individual, team, agency, and system) that are influencing how strategic issues are being considered and allows you to update those assumptions as the world changes.

- Explore beyond the assumed future to consider a much wider range of possible contexts in which your cluster may be operating.

- Generate new insights into possible future developments so you can take account of them in the way you frame your development.

- Think through future intended and unintended consequences of your strategies in different contexts.

- Reduce risk by developing strategies that are more resilient to changing conditions and takes advantage of new opportunities.

Key concepts

#1 Critical and Creative Thinking

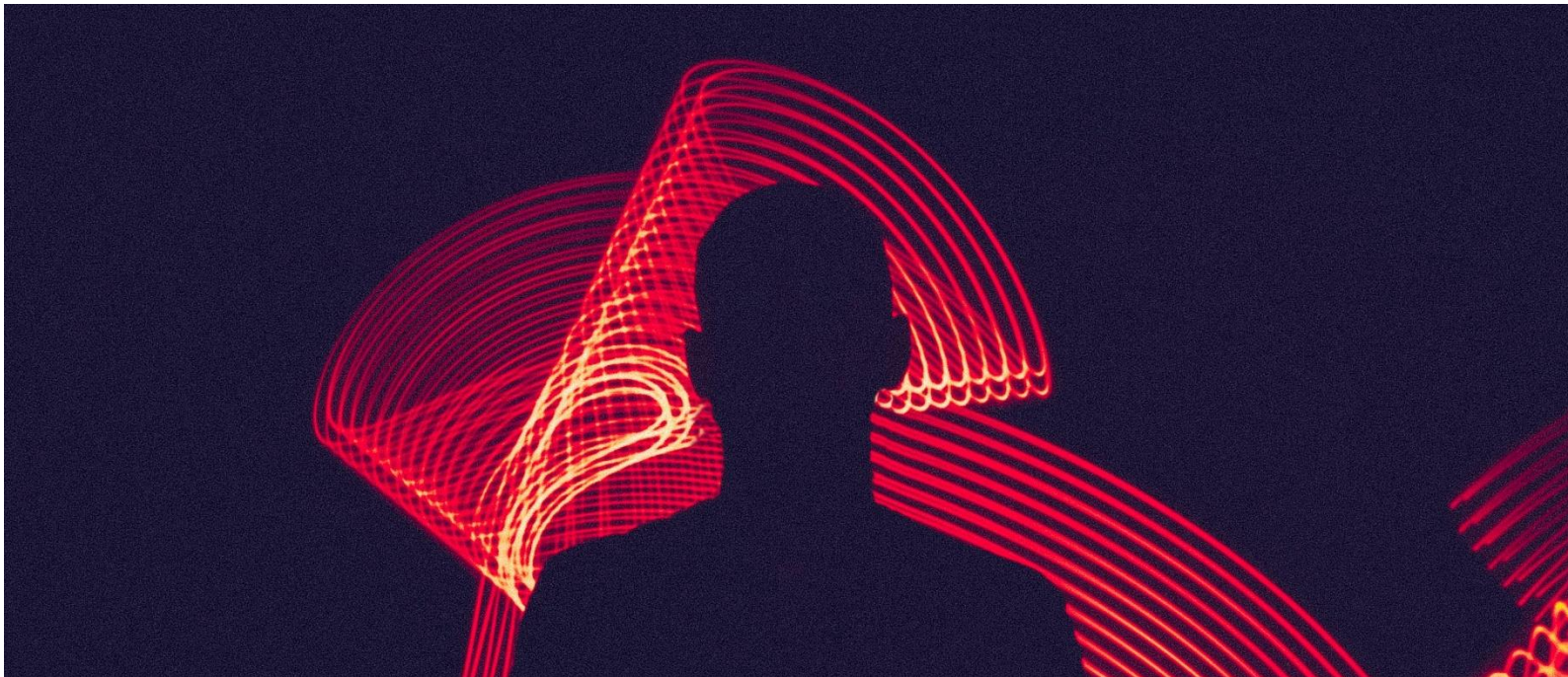
Future thinking requires both critical analysis and creative imagination. It involves evaluating current trends, data, and signals of change to construct plausible narratives about what the future may hold. This dual approach helps in identifying opportunities and risks that may not be immediately apparent.

#2 Scenario Development

A fundamental component of future thinking is the ability to develop scenarios. This involves creating detailed narratives that explore different potential futures based on varying assumptions and variables. Scenario planning allows individuals and organizations to visualize the implications of their decisions today on future outcomes, fostering a proactive rather than reactive mindset.

#3 Futures Literacy

Futures literacy is a related concept that enhances one's capability to understand the role of the future in decision-making. It empowers individuals to break free from conventional paradigms and engage with complex, uncertain environments. This skill is essential for leaders who must navigate transformative changes in society and technology.



#4 Continuous Learning and Adaptation

Future thinking emphasizes the importance of continuous learning and adaptation. As the landscape of possibilities evolves, so, too, must the strategies and skills of those engaged in future thinking. This adaptability is crucial for fostering innovation and responding to emerging challenges effectively

#5 Practical Application

Future thinking is not merely theoretical; it involves practical skills such as trend analysis, vision setting, and stakeholder engagement. It equips individuals to structure decision-making processes that shape the future, ensuring that organizations remain relevant and resilient amid change.

To go further

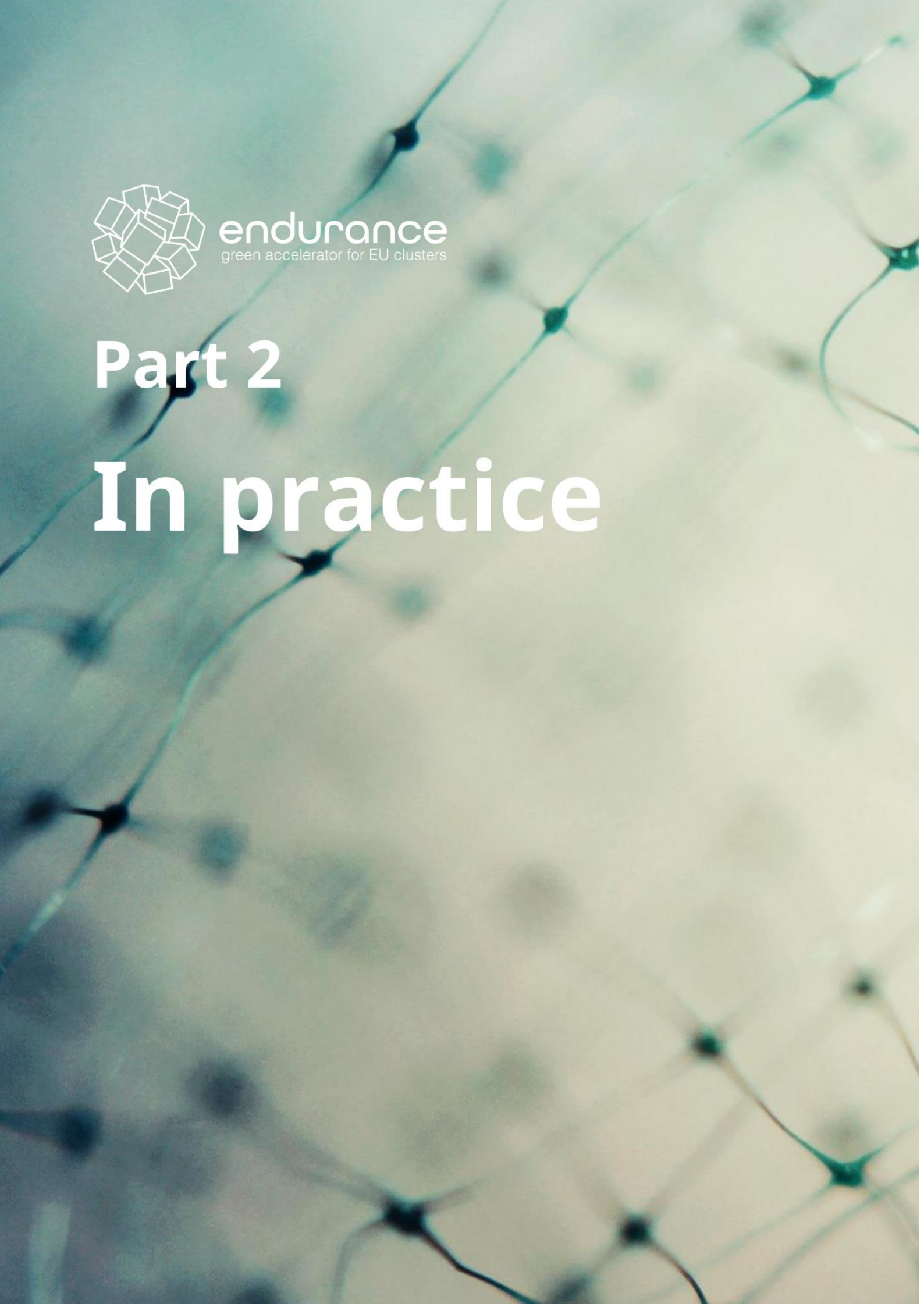
Do you want to learn more about future thinking?

- A guide to using futures thinking to help drive corporate resilience and transformational innovation (WBCSD) https://www.wbcsd.org/wp-content/uploads/2023/12/A-Guide-to-Futures-Thinking.pdf

- Lean futures creation toolkit (Futurice) https://www.futurice.com/lean-futures-creation-toolkit

- Backcasting: work backwards from a desirable future to identify the actions needed to help shape your desired future/s. https://www.dpmc.govt.nz/our-programmes/policy-project/policy-methods-toolbox/futures-thinking/backcasting

- Future wheels: Structured brainstorming that helps participants visualise how important trends or events might impact on the policy area. https://www.dpmc.govt.nz/our-programmes/policy-project/policy-methods-toolbox/futures-thinking/futures-wheel



Part 2

In practice

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endurance
green accelerator for EU clusters

Learn from others

How is systems innovation applied in practice? Have a look at the following stories that provide concrete examples of practitioners, SMES, NGOs and cluster managers who take a systems approach to build circular systemic solutions.

endurance-accelerator.eu/video-toolkit

endurance
green accelerator for EU clusters

Part 3

Get equipped

Get equipped

In this section we introduce you to specific tools and canvas that can support you in taking a systems approach.

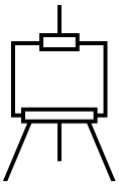
These tools can be used individually as a way to understand the system in which you operate, or as codesign tools to be used with your SMES and/or startups to help them frame their own understanding of their system and design concrete strategies to become system shapers.

These tools are categorized to identify three possible uses: specifically to promote the development of skills within the cluster, as a support resource aimed at the development of green innovation in SMEs and startups, or in both cases.

Tool 1: Actor map canvas

Tool 2: System Map canvas

Tool 3: Network Analysis canvas



Tool 4: Innovation Ecosystem canvas

CLUSTERS

SMES & STARTUPS

BOTH

Take aways

In this module, we have learnt that in essence, systems thinking provides the analytical framework for understanding complex systems.

Systems innovation offers the creative and problem-solving tools to improve those systems, and systems change focuses on the intentional and holistic transformation of those systems to achieve desired goals – in our case a truly sustainable and circular society.

These concepts are all interconnected and complementary approaches to addressing complex problems and driving positive change.

As a cluster manager, thinking in systems and using systems innovation tools will help you maximise your impact and support your companies on their green transition.

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