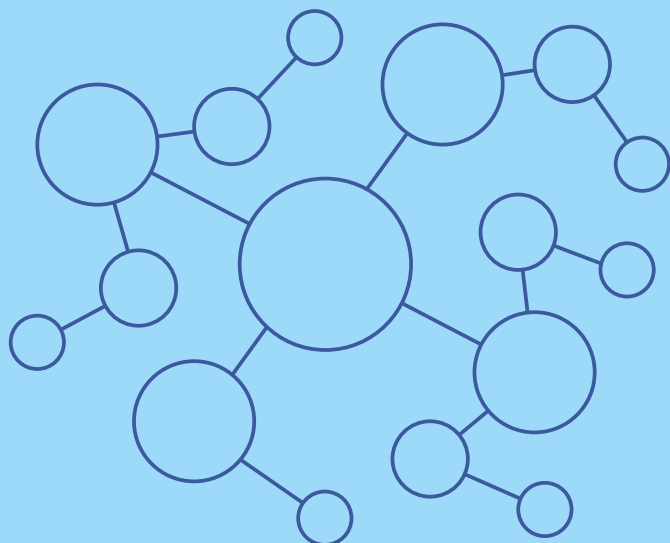


SYSTEMS THINKING HANDBOOK



Produced by

**WE ARE
MUSEUMS**

Supported by



Climate-KIC is supported by the
EIT, a body of the European Union





Credits: Joe Brusky

“THINK IN SYSTEMS, UNDERSTAND COMPLEXITY, AND DESIGN SUSTAINABLE OUTCOMES.”

A **system** is a configuration of parts connected and joined together by a web of relationships towards a purpose. Systems operate at many levels – cities, sectors, supply chains and organisations are all systems, although our focus is on systems beyond one organisation's boundaries.

A **systems approach** shifts the focus from individual parts to the organization of parts, recognizing that interactions are not static and constant but dynamic processes. Systems thinking identifies the interactions between different parts of a system and seeks to understand them to find solutions that go deeper to address underlying causes of what is not working.

Systemic change comes about when relationships between different aspects of the system have changed towards new outcomes and goals. It's driven by transformational, not incremental change.

WHAT IS SYSTEMS THINKING?

1

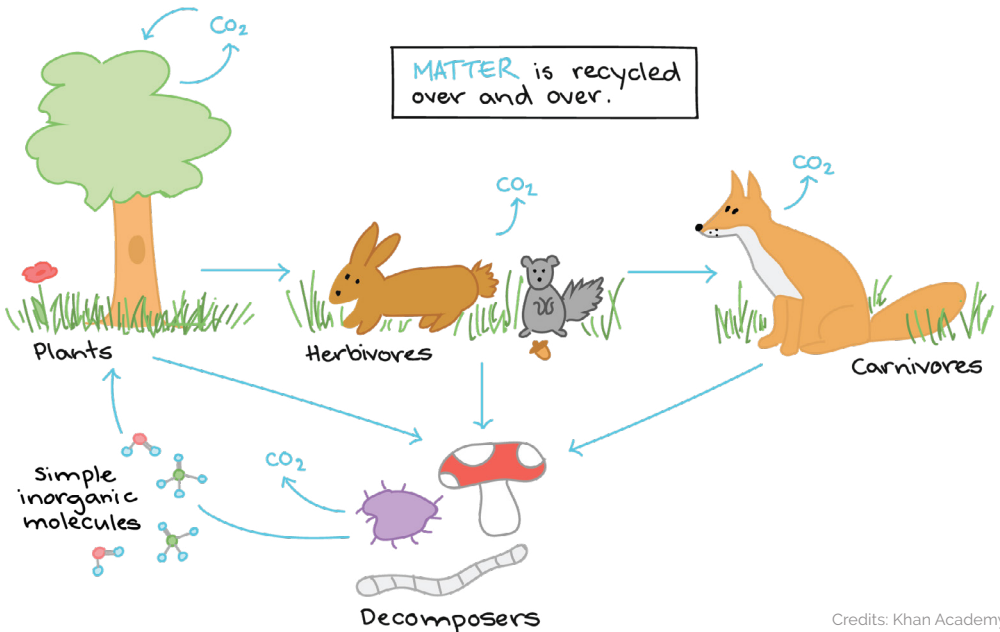
GET INSPIRED BY NATURE

“IF YOU DESTROY INSECTS YOU DESTROY FRUIT. IF YOU CHANGE THE CLIMATE, YOU CHANGE THE NATURE OF THE CROPS IT’S POSSIBLE TO GROW. ALL OF THIS IS EXTRAORDINARILY SENSITIVE, THIS WORLD. BUT GIVEN THE CHANGE IT CAN RECOVER, AND WE KNOW HOW TO DO THAT.”

David Attenborough, broadcaster and filmmaker.

As we think in systems there is no doubt that ecosystems are a good example of how nature is a complex and interconnected system. An ecosystem consists of a community of organisms living together in combination with their physical environment. There both matter and energy are conserved. Energy flows through the system while matter is

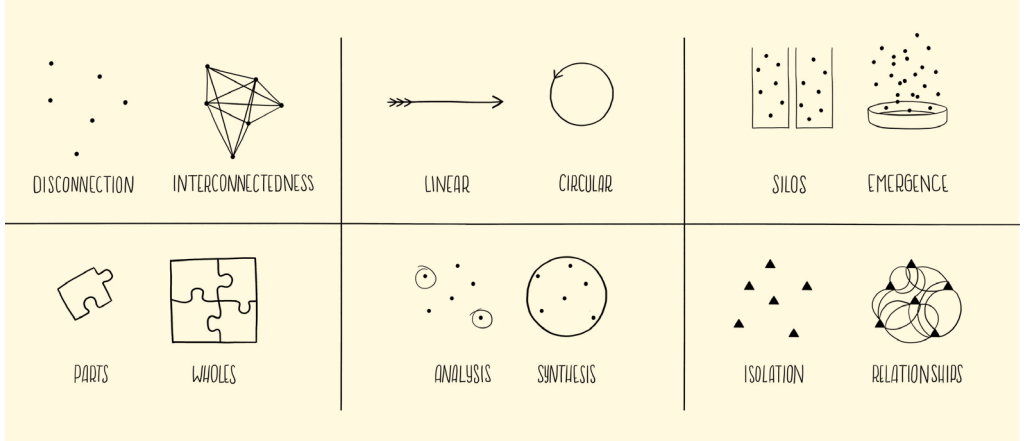
recycled, not generating any waste. When an ecosystem has higher biodiversity tends to be more stable with greater resistance in the face of disruptive events. Some of these events are natural, but other disturbances are the result of human activities. Examples include acid rainfall, massive deforestation, introduction of invasive species, air pollution.



Credits: Khan Academy

SYSTEMS THINKING IS A MINDSET

TOOLS OF A SYSTEM THINKER



Credits: Disruptive Design Handbook by Leyla Acaroglu, illustrated by Emma Segal.

System thinking is a mindset, a way to look at the world, and helps to look, think, talk, design about all the system not only its components. By developing and applying a system thinking approach to our daily work enables us to deal with complex problem solving and **transition to climate change champions**.

When we talk about systemic thinkers some traditional actions have to be changed into innovative actions for positive impact. In the picture above the drawings on the left relate to the traditional mindsets while those on the right should be adopted in the transition to the systemic mindset. These systems-related concepts or actions are:

Interconnectedness: Everything is interconnected and reliant upon something else for survival; the system is made up of elements that are related.

Synthesis: Is about understanding the whole and the parts at the same time, along with the relationships and the connections that make up the dynamics of the whole. While analysis studies the components as individual parts, synthesis combines 2 or more things to create something new.

Emergence: In systems, elements are interconnected to create new things. That process is emergence. As systems thinkers, we need to study how elements and their relationships come together to create emergence. (ex: snowflake)

Feedback loops: Since everything is interconnected, there are constant feedback loops and flows between elements of a system.

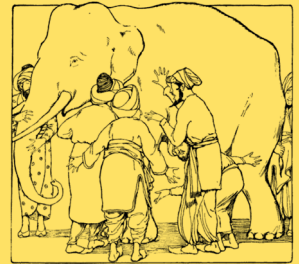
Causality: being able to decipher the way things influence each other in a system.

Systems mapping: is a way to draw/ visualize a system to better understand the elements and relationship/ interconnectedness.

Source: Disruptive Design Handbook by Leyla Acaroglu.

Credits : Illustrator unknown - From Martha Adelaide Holton & Charles Madison Curry, Holton-Curry readers, Rand McNally & Co. (Chicago), p. 108.

To better understand, think about six blind people encountering an elephant. Each of them touches a different part of the elephant and expresses what the elephant is. Although they are touching the same elephant, each person's description is completely different. They will be, therefore, able to know how exactly an elephant looks like?



To better reflect on this approach, watch [the story of cats in Borneo](#), based on a real story



WHY SYSTEMIC CHANGE?

2



Credits: EIT Climate-KIC, Transformation, in time.

Many of the vital systems that we rely on are not working—from the need for the food system to feed a growing population while coping with the impacts of climate change, to providing secure and affordable energy to all while reducing CO₂ emissions. We need to change these systems to make them more resilient, more circular, to support people to flourish and fulfill their potential, and for our society to be able to continue into the future.

According to the Rockstrom roadmap on carbon we can stay below the 2 degrees of warming required by scientists and the Paris agreement, but it is going to take significant effort to get anywhere close. We need to half emissions each decade for the next forty years AND actively take carbon out of the system. This is clearly not going to be achieved through incremental change—it needs a complete reset of activities, organisations, interrelationships and purpose. It needs system change.

Example: The food consumption system starts with food production, then processing, distribution, consumption and waste. This system is unsustainable as most of the food we eat is produced miles away from our local living place, and that needs transportation, packaging and other pollutant actions. At the same time, food production must be transformed, by changing diets and by replacing intensive tilling to extensive practices to prevent the breakdown of soil structure and by promoting the sequestering of carbon, thereby slowing climate warming

When thinking in urban mobility a car exists within a system which includes: the infrastructure and roads it drives on; the fuelling stations; the loans people may use to buy it; the service stations and the cultural significance attributed to car ownership. However, if you make an electric car without changing the system around it, it is unlikely to have widespread appeal, and the potential for huge positive environmental impact would be lost. That's where system innovation comes in.



Credits: EIT Climate-KIC, Transformation, in time.

UNDERSTAND SYSTEMS INNOVATION

3

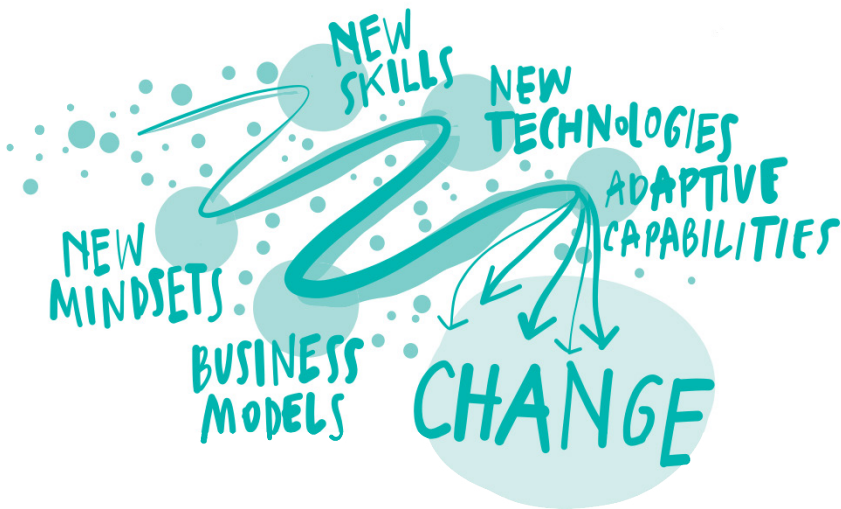
Systems Innovation is a new approach to innovation to tackle complex problems through the use of system thinking, new tools and practices.

These three building blocks are highly intertwined:

1. **Mindset:** System Innovation requires a mindset that looks at the whole and the relationships between the parts, instead of focusing on individual parts. We need to take a step backward, observe thoroughly and intervene only after having made sense of the big picture.

2. **Process:** is made up of "loopy" steps that are needed to take to reach our innovation goal. By taking these steps you'll be able to make sense of a system, frame a challenge, create and deploy solutions, and crucially, sustain them.

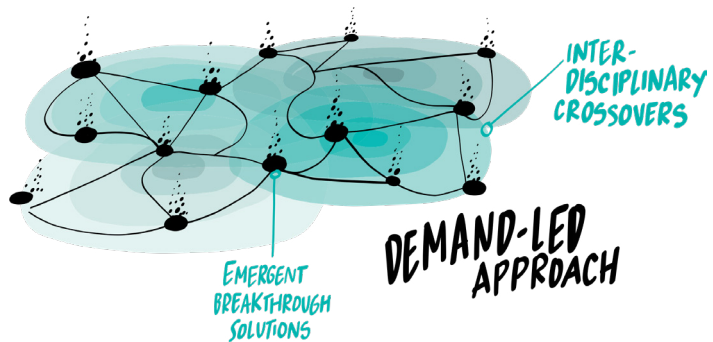
3. **Tools:** visually oriented to enable systematic, deep and broad analysis and discussion.



Credits: EIT Climate-KIC, Transformation, in time.

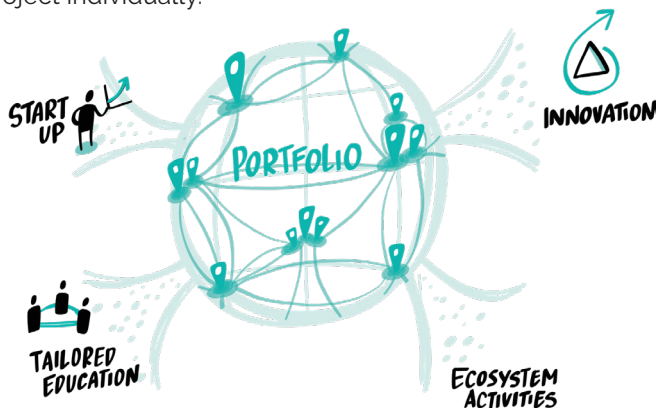
SYSTEMS INNOVATIONS REQUIRE TO EMBRACE NEW APPROACHES:

- **Demand-led:** We feel it important to acknowledge that effectively addressing climate change is going to require changing ourselves. This includes the ways we live, work, move, and create value.



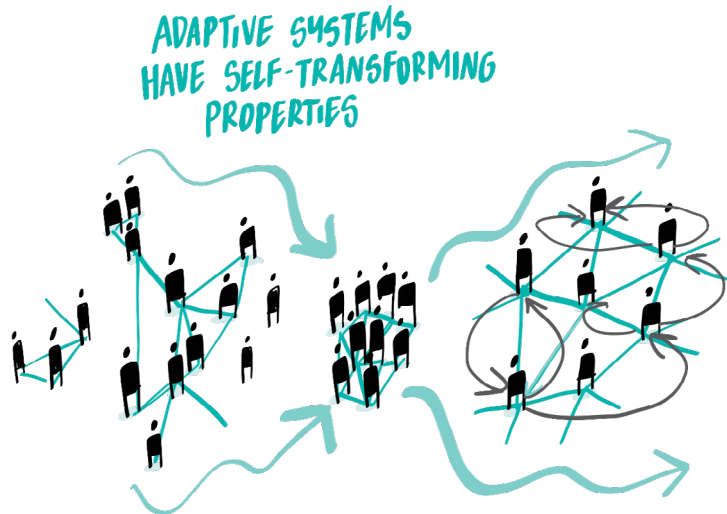
Credits: EIT Climate-KIC, Transformation, in time.

- **Portfolio Approach:** A portfolio approach to innovation means that instead of creating the usual competitive funnel for ideas that gradually selects down to winning or more investable solutions, we work to put in place multiple solutions simultaneously, with diverse approaches – connecting them up to learn from one another through a disciplined process of sensemaking. We look at a cluster of projects instead of just the results of each project individually.



Credits: EIT Climate-KIC, Transformation, in time.

- **Leverage Points:** The third principle is to embrace the fact that we aspire to catalyse change in a systemic way which means recognizing and designing for the properties of systems and systems transformation.



Credits: EIT Climate-KIC, Transformation, in time.

- **Learning By Doing:** Seeing is believing and that's why systems innovation approach works on the principle of learning by doing. It includes bringing the whole community into projects so that everyone becomes agents of change.



Credits: EIT Climate-KIC, Transformation, in time.

PLANNING FOR SYSTEMS CHANGE AND MAKING IT HAPPEN

4

A clear and detailed process is provided to plan for systems change and facilitate sustainability transitions:

1. **Making sense:** this involves identifying the multiple parts that make up the whole system (needs and assets), and exploring their interconnectedness and interdependence by unveiling the root causes of problems. " You should involve the people delivering and using services." Sarah Billiald, Collaborate
2. **Enabling enablers:** "Find people who have the energy to change the system, bring them together, empower and enable them to create change." Rachel Sinha, Finance Innovation Lab

This stage goes further than building the right team. You should start building a movement for change via consortium, networks and other kinds of communities to amplify your efforts.

3. **Framing:** this is about defining the challenge to be addressed, not in terms of fixing it but instead bringing about transformation through innovative interventions. Map the system by finding the points of leverage, help define the system and establish its boundaries and establish what can be controlled, and what can be influenced.
4. **Distribute Leadership:** it is crucial to operate at multiple levels of the system - at a national level, local level, organisational level, and individual level. It could also mean enabling beneficiaries to take control of their situations, and use the assets they have. Act on points of leverage where there is a realistic prospect of changing the system

“
YOU SHOULD
INVOLVE THE
PEOPLE DELIVERING
AND USING
SERVICES.”

Sarah Billiald, Collaborate

“FIND PEOPLE WHO HAVE THE ENERGY TO CHANGE THE SYSTEM, BRING THEM TOGETHER, EMPOWER AND ENABLE THEM TO CREATE CHANGE.”

Rachel Sinha, Finance Innovation Lab

5. **Delivering:** this requires generating, assessing and improving ideas- prototyping and deploying solutions; fostering and tapping into individuals creativity so as to turn into collective intelligence. This stage should foster a learning culture where the process and the commoning is valued as much as the results.
6. **Sustaining:** this involves continuously scanning, measuring, sense-making and responding.

Sources: "Systems Change: A guide to what it is and how to do it" by Rob Abercrombie, Ellen Harries and Rachel Wharton, June 2015 + System innovation learning course- EIT Climate-KIC



Credits: Produced by We Are Museums with the support of EIT Climate-KIC.

CREDITS

Produced by We Are Museums with the support of EIT Climate-KIC.

START THE CLIMATE JOURNEY
OF YOUR MUSEUM,
JOIN OUR PROGRAMME

“
MUSEUMS
FACING
EXTINCTION”

