Problem Solving Methods

Proven tools for
Radical Open Innovation

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Radical Open innovation

A modern innovation processes requires:

- An enormous diversity of knowledge and skills
- Use of knowledge partners
- Openness

Radical Open innovation is all about collaboration

We define Radical Open Innovation(ROI) as a method in with exchange of ideas and knowledge is possible in an open structure using openness principles by default.

ROI requires the use of problem solving methods with a foundation in systems thinking.

Accelerating changes

Changes in:

- Technology: Machine Learning (AI), biohacking (crissp) , Internet use, etc
- Post covid-19 economy
- Environmental shifts (water becomes the new gold)

Solving problems is never easy

Well intentioned efforts to solve pressing problems lead to:

RESISTANCE

Many times your best efforts to solve a problem actually:

MAKE IT WORSE

Systems thinking will help

Move from generalizations to tools and processes:

- that help to solve complexity
- design better operating policies, and
- Guide change in systems (organisations and technology systems)

System Dynamics is a method to enhance learning in complex systems

Systems thinking is critical for ROI

- Changes in our environment are driving us to think differently about governance.
- Information **explosion**: More accessible knowledge (fads, facts and opinions)
- Digital connected world (Machine Learning / AI, IoT, Internet) -> Everything is connected.
- Communication is more complex: E.g. complex collaboration networks

What is a system

- A combination of interacting elements organized to achieve one or more stated purposes.

- An integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and other support elements.

- a set of things, connected in such a way that they produce their own pattern of behavior over time. (Donella Meadows)

Systems thinking

- Systems thinking is a unique perspective on reality a perspective that sharpens our awareness of wholes and how the parts within those wholes interrelate.

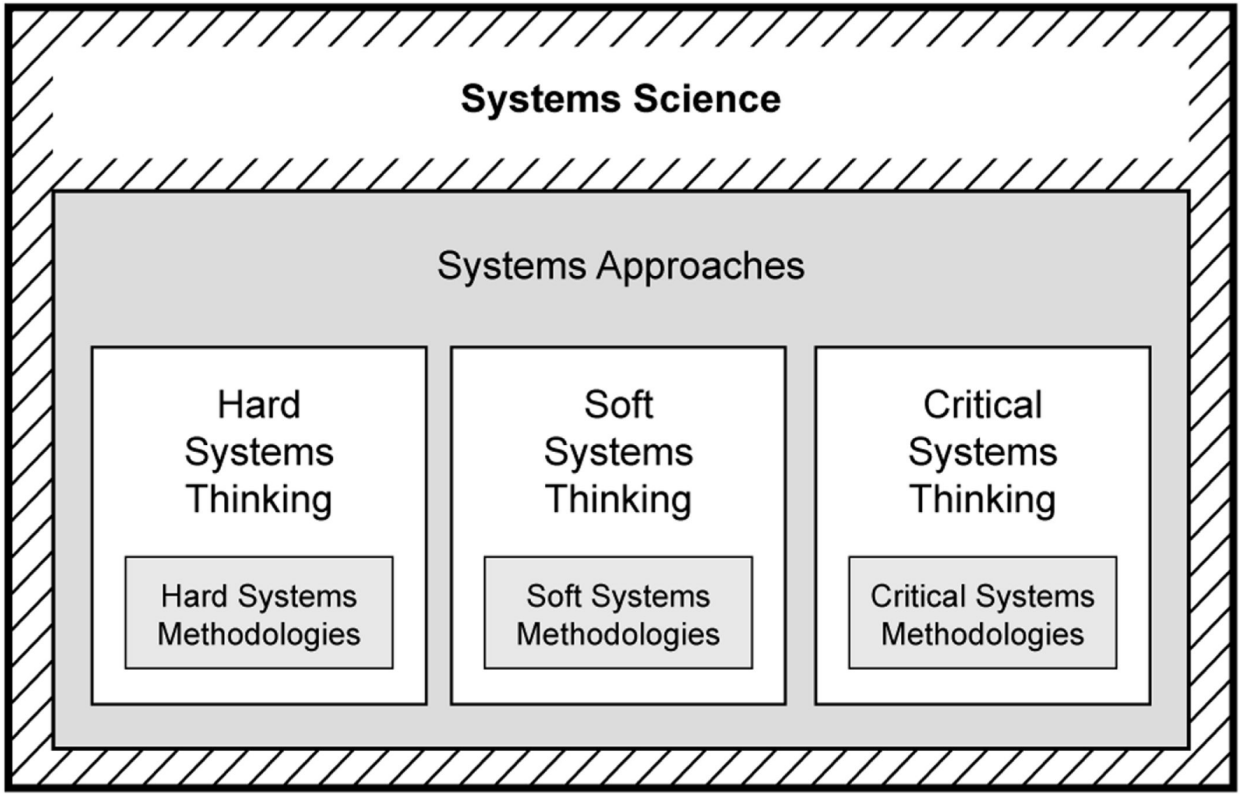
- A systems thinker knows how systems fit into the larger context of day-to-day life, how they behave, and how to manage them.

- Systems thinking recognizes circular causation, where a variable is both the cause and the effect of another and recognizes the primacy of interrelationships and nonlinear thinking. A way of thinking where the primacy of the whole is acknowledged.

Emergence

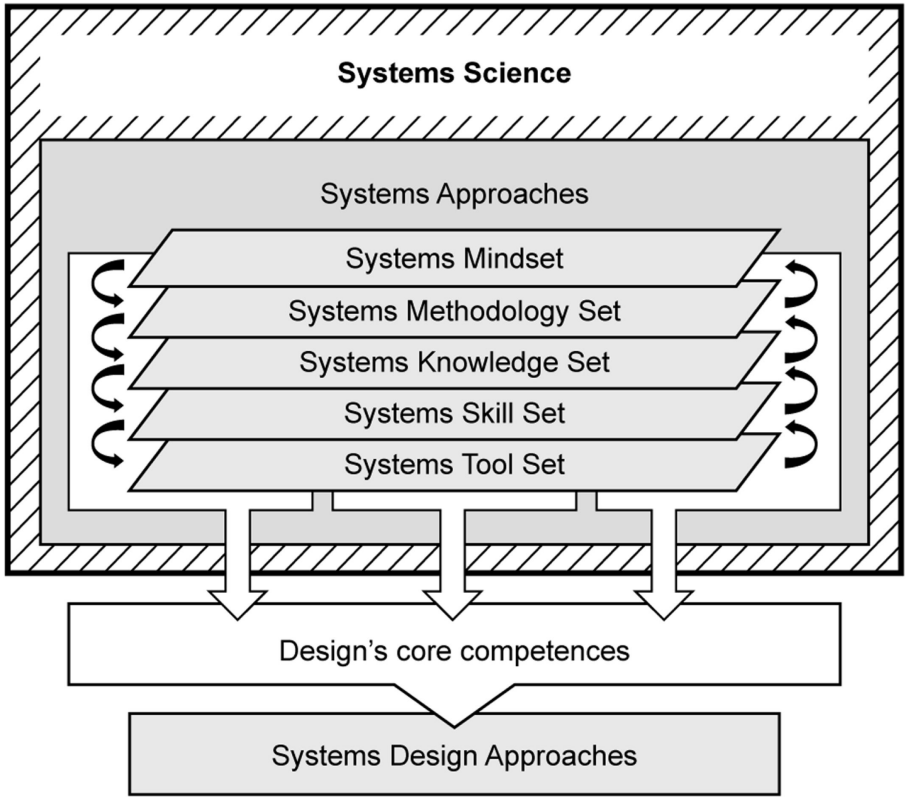
- System-level properties exist only at the system level as the system functions.
- System properties are not observable by looking at a subsystem only.
- Emergence behaviour cannot be understood, explained, or inferred from the structure or behavior of constituent elements or their local properties.
- Cause and effect relationships can only be established through retrospection.
- Traditional reductionist analytic techniques are incapable of useful predictions of emergent, system-level behavior.

Systems Science overview



Source: DOI: https://doi.org/10.1017/dsj.2018.16 (cc-by)

Systems Science overview (2)



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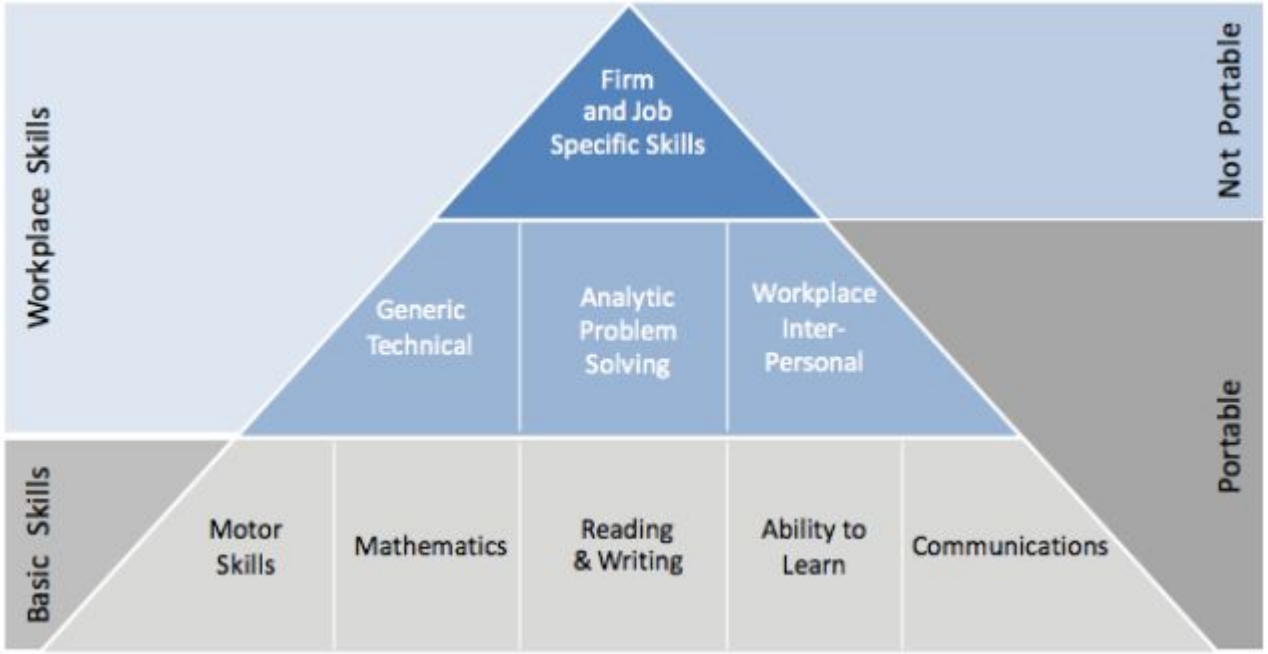
Skills



Source: Canadian Chamber of Commerce, 2013

System Dynamics

Known and Unknown behaviour makes IT innovation comparable with rocket launching:

- Programming (mistakes)
- Knowledge
- Floating specs
- Budget
- Scope creep
- Software errors
- Hardware errors (CPU, Storage, etc)
- Communication errors (network and humans)
- Human behaviour
- Factor time

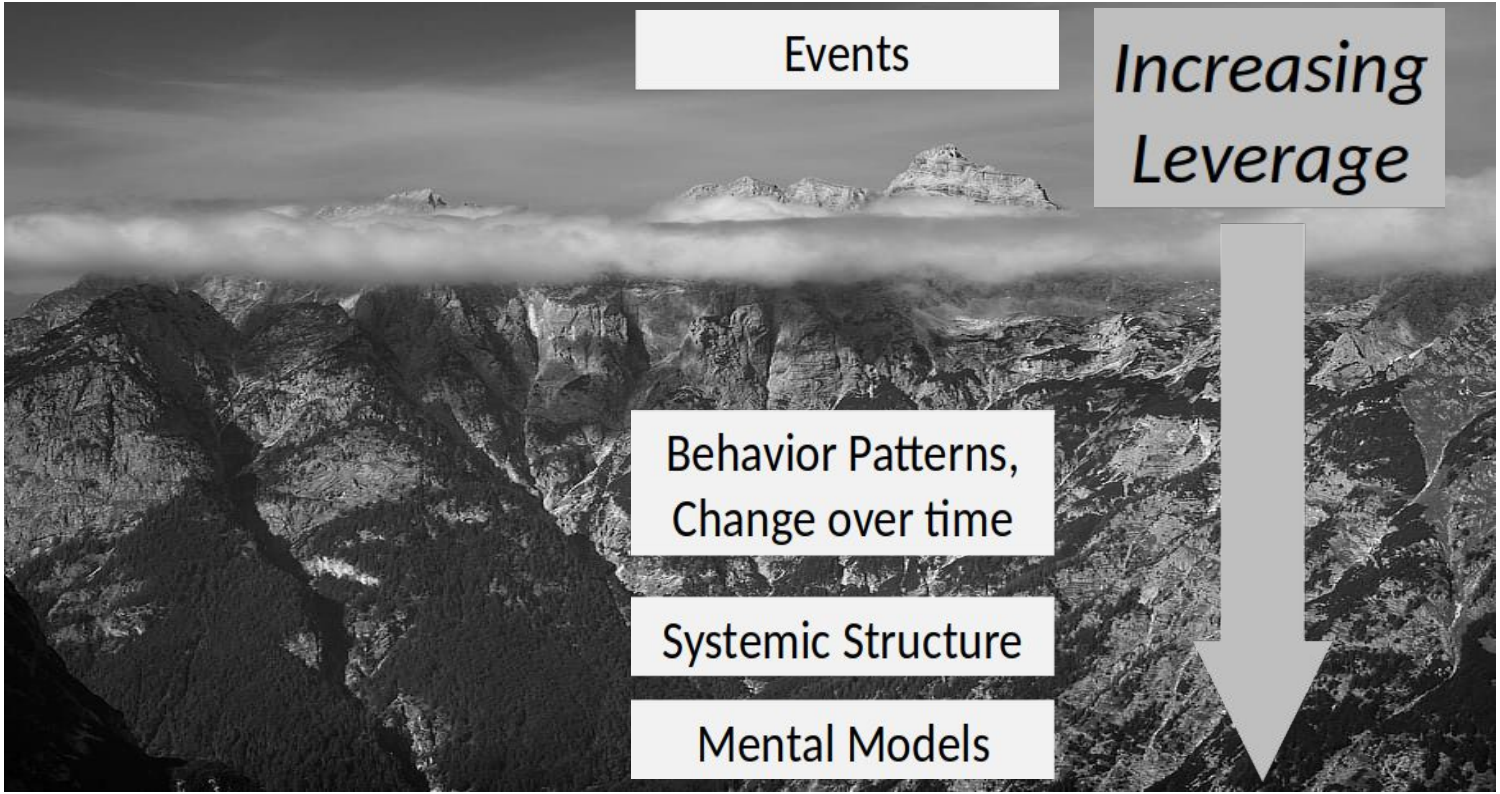
System Dynamics

System dynamics is fundamentally interdisciplinary:

- Behaviour of complex systems
  - Theory of nonlinear dynamics and feedback control

- Behaviour of humans
  - Cognitive and social psychology, economics and other social sciences.

System Dynamics



Factors that make innovation complex

Only a few factors make problems complex and hard to solve:

- Humans (mostly behaviour)
- Time (and delays in time)

Time delays between taking a decision and its effects on the state of the system are common and particularly troublesome.

Feedback

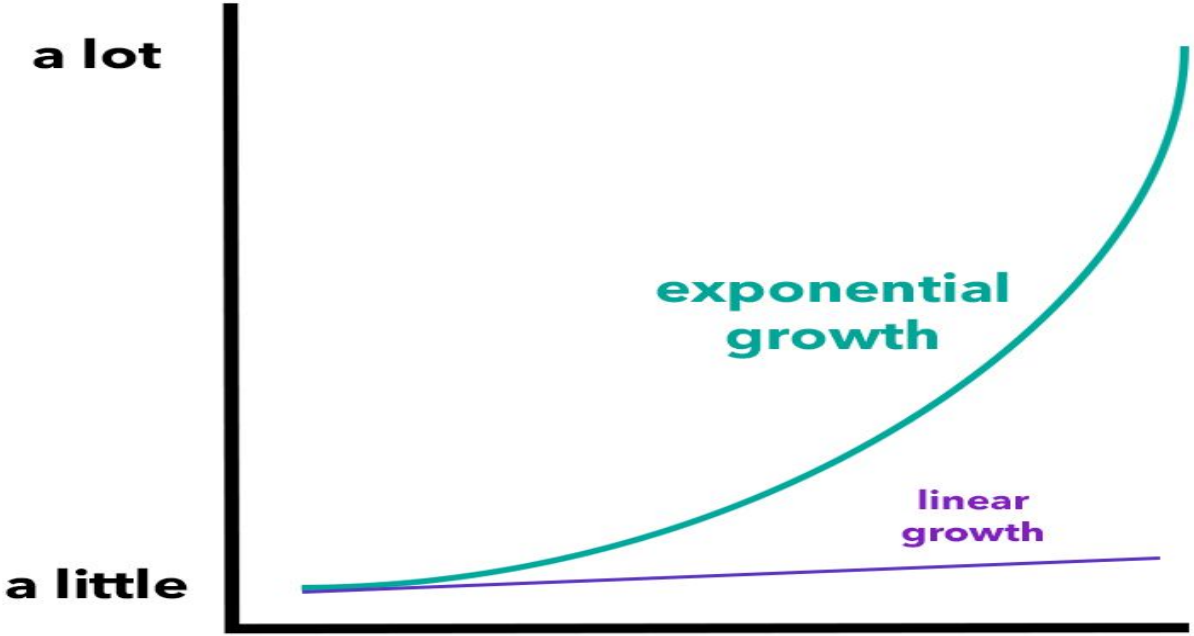
- Much of the art of system dynamics modeling is discovering and representing the feedback processes.

- The most complex behaviors usually arise from the interactions (feedbacks) among the components of the system, not from the complexity of the components themselves.

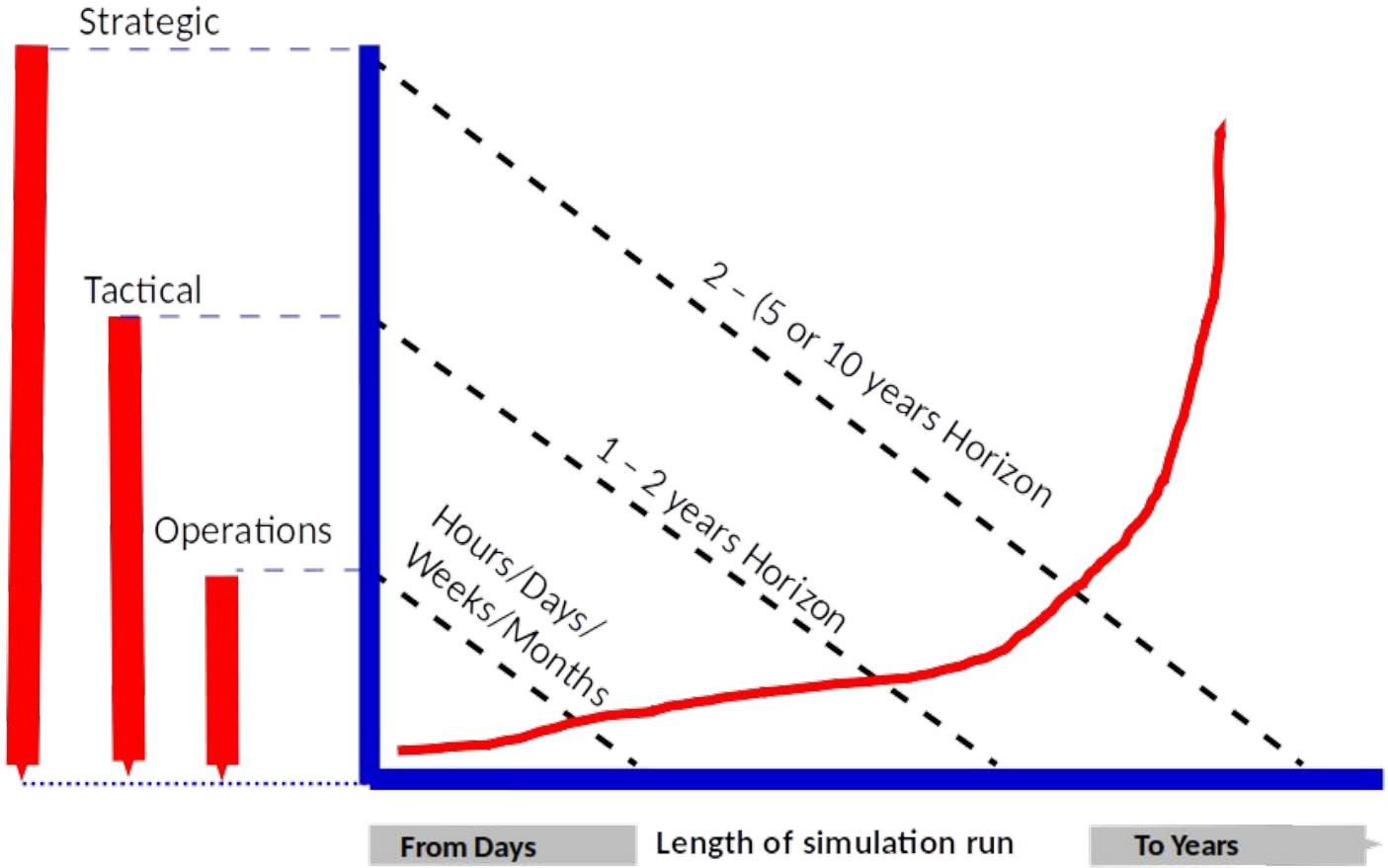
POSITIVE FEEDBACK ➡ SELF-REINFORCING

NEGATIVE FEEDBACK ➡ SELF-CORRECTING

Time: Exponential behaviour



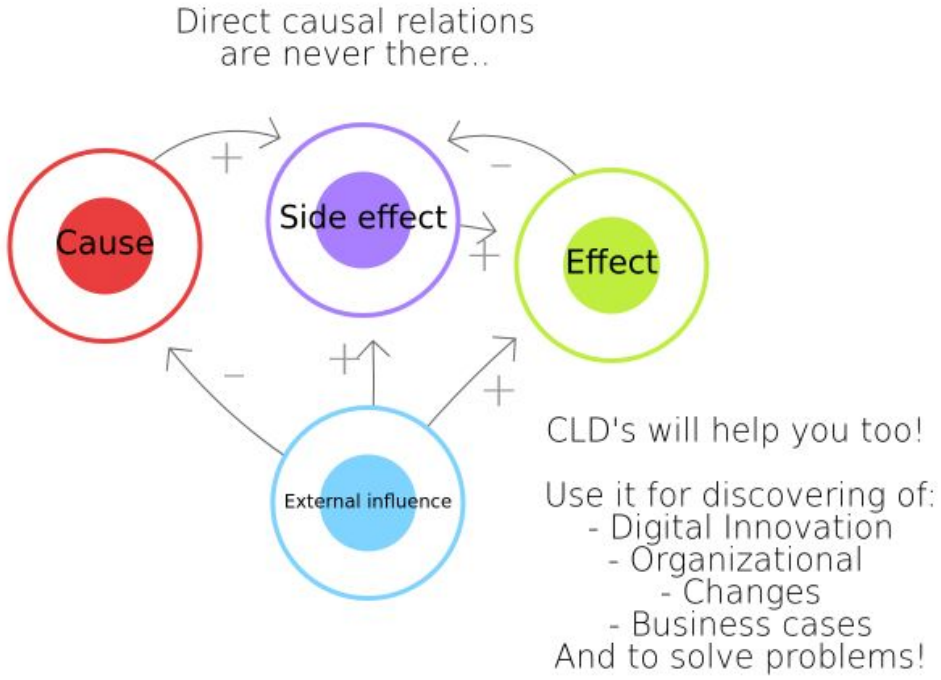
Time: Scale


Strategic
Tactical
Operations
2 - (5 or 10 years Horizon
1 - 2 years Horizon
Hours/Days/
Weeks/Months
From Days
Length of simulation run
To Years

Core tool: mental models

Share perceptions

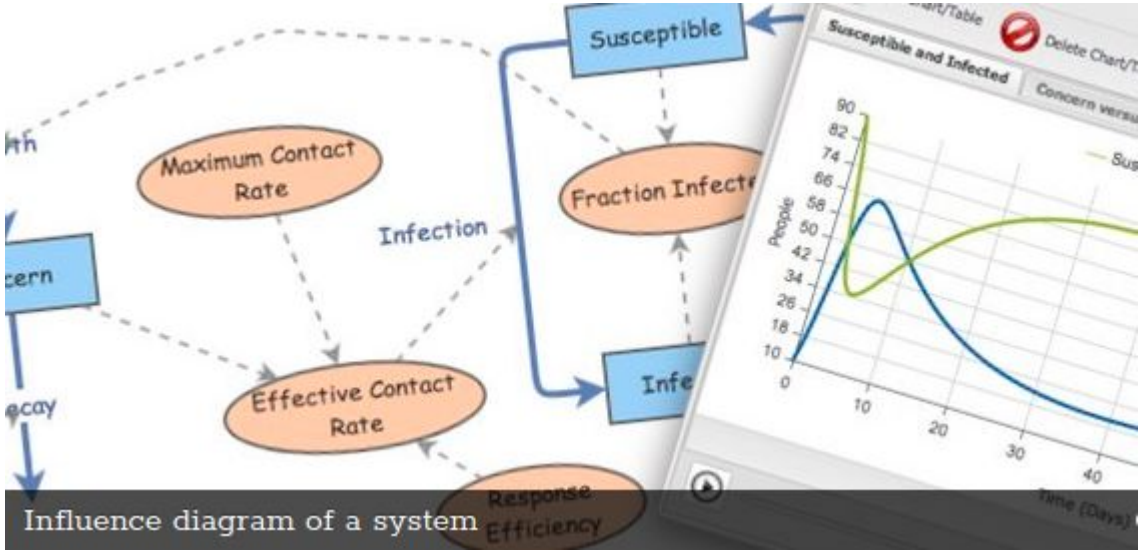
Core tool: Causal Loop Diagrams



Use the most simple (and FREE!) tool available: https://nocomplexity.com/causalloopdiagram/

Core tool: Stock and flow models

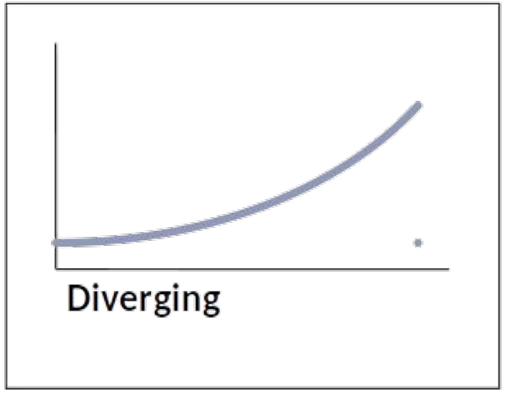
Use the FOSS tool Insight Maker to create fast simulations to validate if changes are sustainable. Its free to use! Check: https://insightmaker.com/

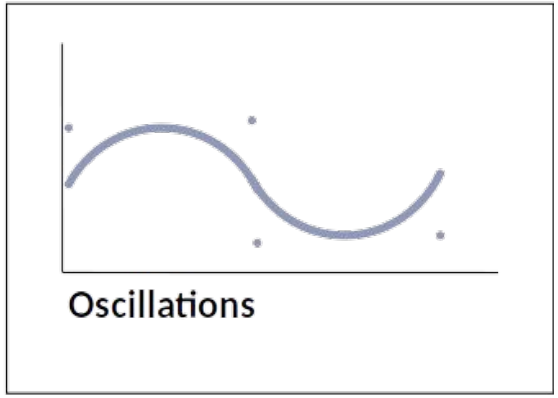


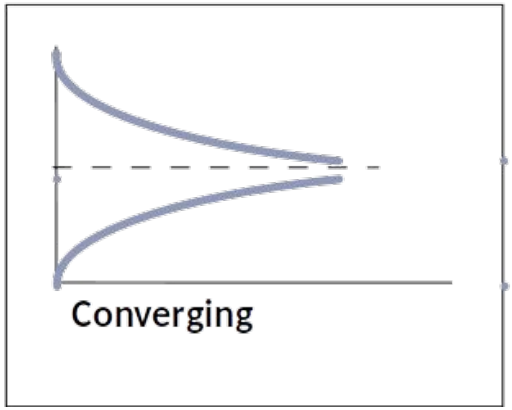
Influence diagram of a system

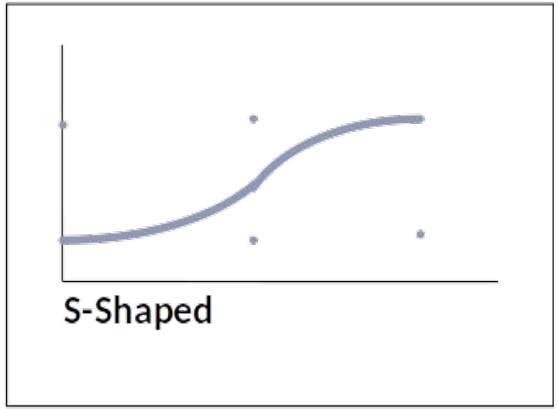
Core tool: Archetypes to predict behaviour

- Feedback loops are linked to specific kinds of behaviour patterns.
- Finding archetypes (feedback loops) in nonlinear systems (so real world systems!) is very hard!



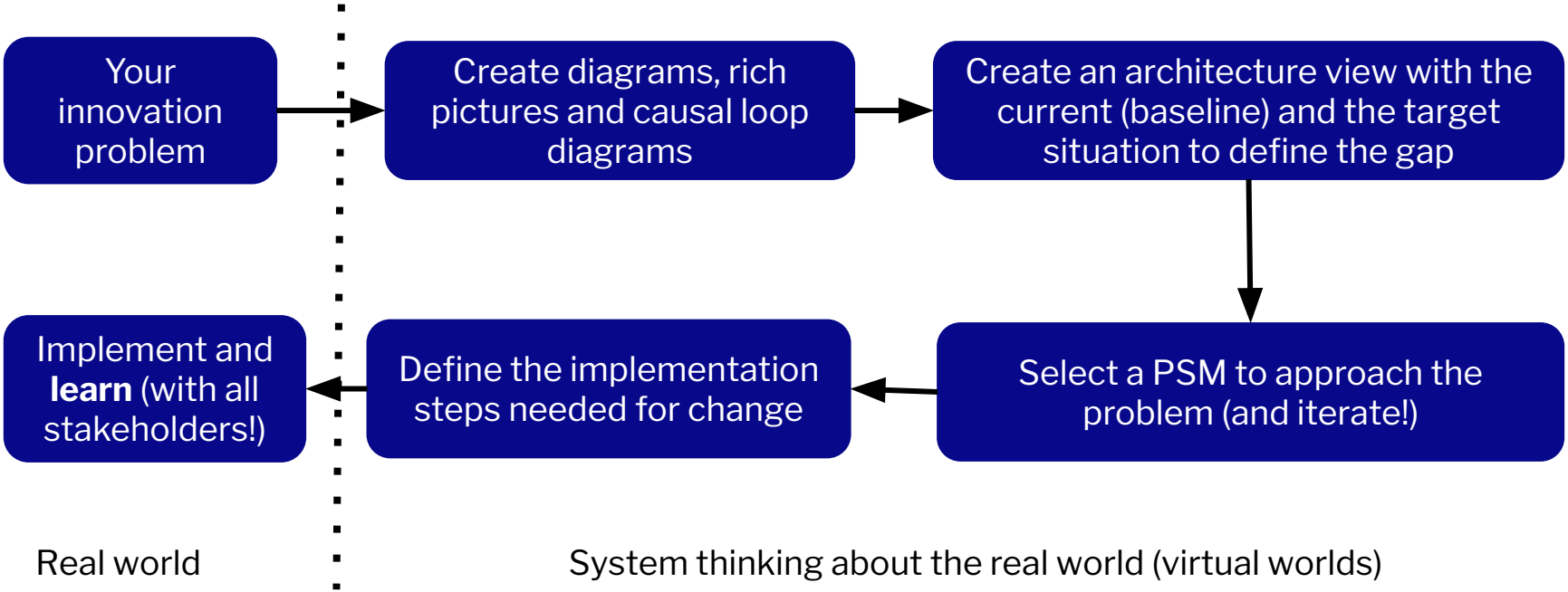






Requirements for successful ROI

- Use systems thinking and the key tools.
- Simulation is essential.



Join!

Joining the Open Company Directory network of the BM-Support.org Foundation enables more opportunities for your open collaboration project.

- Joining this open network is free. No strings attached!
- It is a decentralized network by design. You decide if, how, when and with whom you want to collaborate.

https://www.bm-support.org/join/

Contact Information

Business Management Support Foundation

Chamber of Commerce number 08164333 (The Netherlands)

Info [at] bm-support.org

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