Strategy: Causal loop diagram

Fundamentals of the strategy

What is the goal of this strategy ?

Use **causal loop diagrams** to **visualize** and understand **complex interactions**, **impacts** and **feedback loops** in complex **systems**, in particular socio-technical systems.

What is system thinking ?

System thinking is an approach to understanding and managing complex systems by recognizing the **interconnections and interactions** between their various components, focusing on **the whole system** rather than individual parts to improve performance and solve issues effectively.

System:

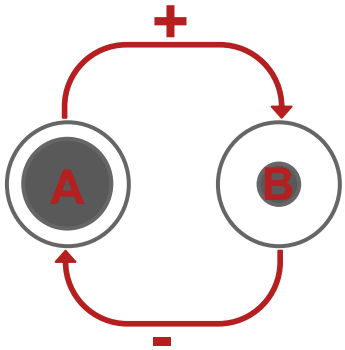
Collection of organized parts interacting with each other to function as a whole.

Balancing vs Reinforcing loops

Balancing loops:

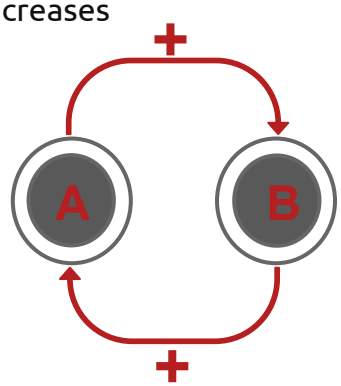
feedback loop that **maintains stability** within a system by counteracting changes. It brings the system back to a desired state or equilibrium whenever deviations occur.

Example:



Reinforcing loops: feedback loop that **amplifies changes** within a system, leading to **growth or decline** over time. It reinforces the direction of change, creating a cycle where an increase in one variable causes further increases, or a decrease causes further decreases

Example:



Causal loop diagrams elements

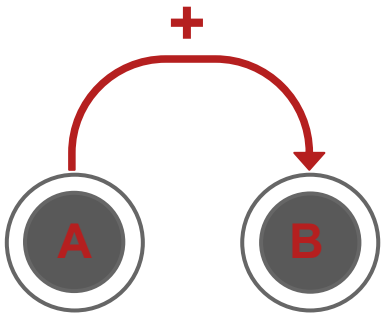
1. **Key variables: element** within a system that significantly influences the **behavior** and outcomes of the system. Each variable holds a **quantity** whose value **changes over time**.
It is represented this way:

When quantity increases

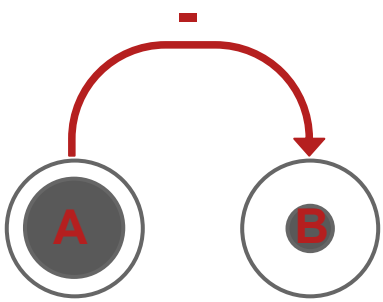
Initially

When quantity decreases

2. **Causal link:** indicates how one variable influences another, showing the **direction** of the relationship: **positive = same direction, negative = opposite direction**. It is represented this way:



Positive causal link: When A increases, B increases



Negative causal link: When A increases, B decreases

3. **Delayed effect:** the effect of one variable on another **does not occur immediately** but after some time (time lag in the system's response).