



NOTES ON SYSTEMIC THINKING



DEFINITION

Systemic thinking = the study of systems

System = a set of elements that interact with each other

Benefits: systemic thinking helps to have a complete view with context of complex subjects (in biology, mechanics, sociology...)

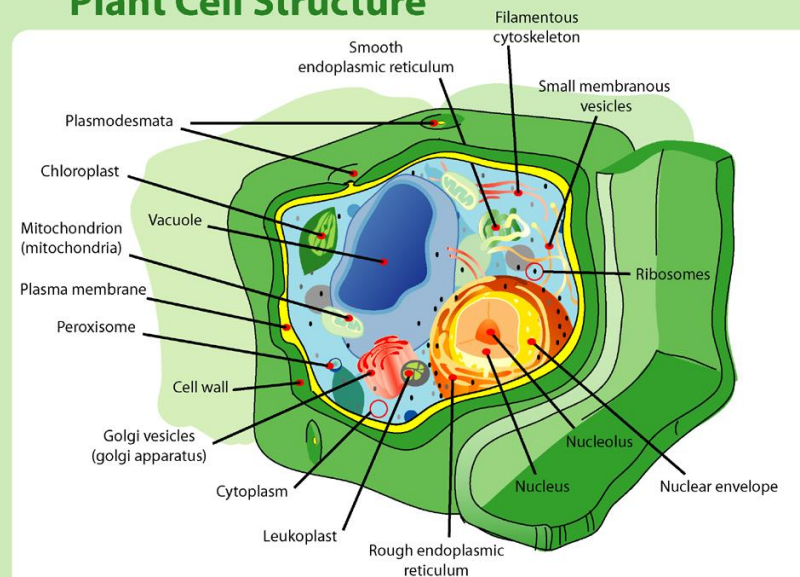
EXAMPLE I: biology

An animal is a system:

- Its elements: organs, tissues, fluids...
- The interactions between elements: physical exchanges like nutrients + information exchanges like chemical messages in the nervous system

Each element is a system as well: for example, an organ is constituted of cells which interact with each other. A cell is also a system: it contains elements like its core or membrane, which exchange matter and information between them and with the outside of the cell.

Plant Cell Structure



Source : wikipedia

EXAMPLE 2: car vs mobility

Without systemic thinking:

If we look at cars, that we need to go from point A to point B,

In order to reduce its negative footprint, we often look at how to reduce its consumption (for example by improving its efficiency or making it electric).

But this doesn't take into account the fact that cars work inside a system: it has been manufactured, sold, it requires infrastructures (roads, gas stations...)...

This introduces the questions of working conditions, consumption in general, pollution...

manufacturing

consumption

waste

infrastructure



— GHG emissions,
pollution,
habitat
destruction

A → B

selling

using

— work
— consumption

Source: frequency 440

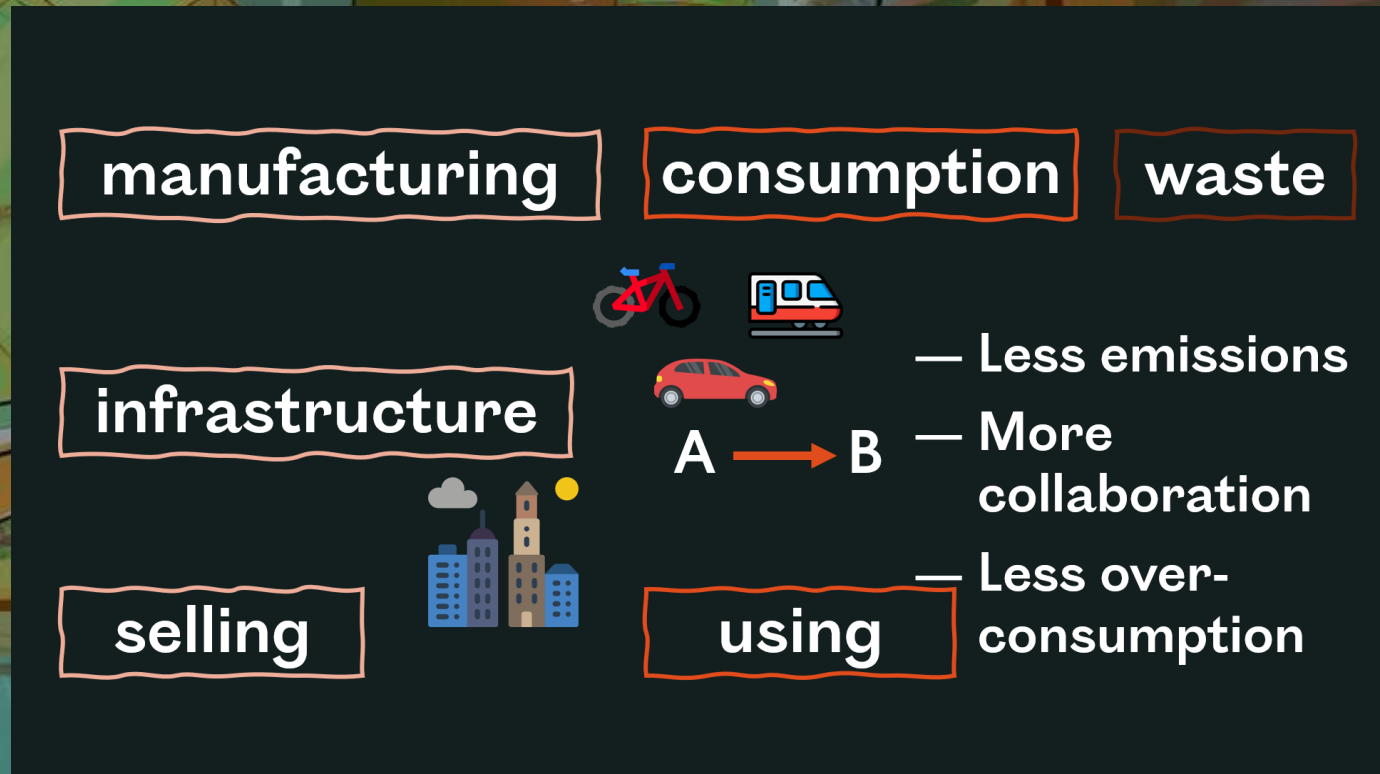
EXAMPLE 2: car vs mobility

With systemic thinking:

Thus, instead of only looking at a car's consumption, we can go back to the need: going from point A to point B,

And think about mobility as a whole. This means for example look at urban planning to make sure housing is close to workplaces and services, and that cities allow for different modes of transportation to operate in parallel.

And redesign everything on the value chain starting from needs, manufacturing, to usage and end of life of the transportation device



Source: frequency 440

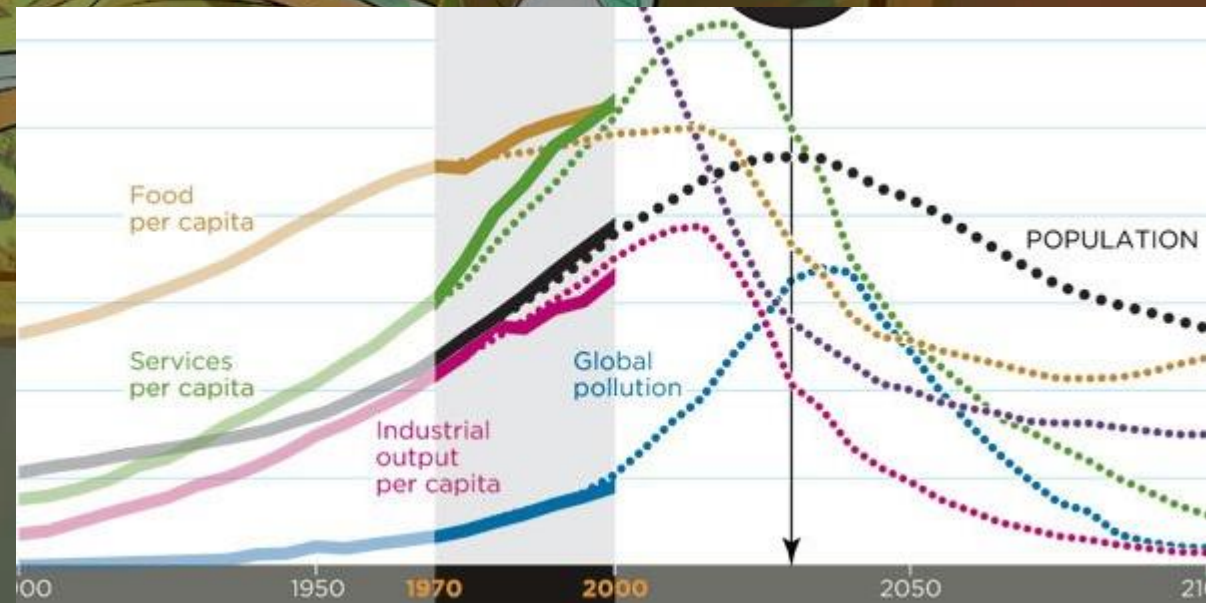
EXAMPLE 3: our civilization

Our civilization as modelled in the Meadows report:

[Read here](#)

- Its elements: population, energy use, economy, climate...
- The interactions between elements: example => more people means more energy consumption, means more greenhouse gas emissions, and a wider economy, ultimately leading to a population increase

The Meadows report was published by a group of scientists, the club of Rome, in 1972. They study the exponential growth of population, resources use, and greenhouse gas emissions. They conclude that such a growth is not sustainable and will lead to an abrupt collapse of population. So far, their predictions match reality.



EXAMPLE 4: symbiotic economy

[Dive deeper with this article](#)

A template for a sustainable and social economy, by Isabelle Delannoy:

- Its elements: economic players (companies, non-profits, networks...), humans, natural resources...
- The interactions between elements: materials flows, information flows, transactions, transformations (ex: water treatment, object manufacturing, energy production)...

Engineer in agronomy and expert in sustainability, Isabelle Delannoy introduces in her book existing solutions to environmental and social problems. She theorizes a set of principles that could be the foundation for a symbiotic economy as opposed to a competitive economy.

Symbiosis = when the elements of a system are mutually benefiting from one another

