



Aalto University  
School of Arts, Design  
and Architecture

# Systems thinking

## MUO-E8029 & SPT-1050

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*27.10.2020*

# Agenda

## **13.15-13.50 General introduction**

- **Course organization & teachers (Mikko & Kata and Alpo & Thomas)**
- **Learning objectives**
- **Session plan for weeks 1-3**
- **Tour in MyCourses**

**13.50-14.05 Your expectations. Ground rules: What makes a good course / good teamwork experience? (10 min in small groups and then together)**

**14.05-14.15 Introduction of deliverables and assessment (breakout rooms)**

**Break**

**14.30-15.30 Planetary boundaries. Why systems thinking (Mikko).  
Significance for urban development practice (Alpo).**

**15.30-15.45 Assignment and readings for the next session**

# Teachers

- M(Sc) in Industrial management & PhD in Management studies
- Head of Creative Sustainability masters programme
- Research areas
  - Energy demand in everyday life
  - Practice theory
  - Renewable energy technology and energy transitions



# Learning objectives

## **MUO-E8029 Systems Thinking**

- Understand the systemic principles of sustainability including ecological and social systems.
- Be able to define and discuss the key concepts related to systems thinking in the context of design.
- Understand basic principles of regenerative design and to be able to use them to approach design activities.

## **SPT-1050 Systems thinking for sustainable living environments**

- Achieve an understanding of the large-scale systemic principles and the multi-dimensional interdependencies of sustainability.
- Be able to define and discuss the key concepts related to systems thinking in the context of sustainable living environment.
- Be able to apply systems thinking in the context of sustainable living environment.

# Deliverables & grading (MUO-E8029)

## Course essay (50%)

Implications of systems thinking perspectives in your field of action/profession/practice (1500-2000 words)(dl Friday 18.12.): Evaluation criteria: 1) Use of literature and key concepts of the course, 2) Own analysis, argumentation and the development of implications for the selected field of action/profession/practice, and 3) Quality of writing.

- **Peer-to-peer teaching as group project (40%)**

Submit a one-pager on your reading material. 24 / 27.11.

- Class presentation (15min+10min discussion): What is the main idea in the book and the most important concepts? What strengths and weaknesses are there, how could it be used/improved to promote sustainability? 26.11 / 3.12.

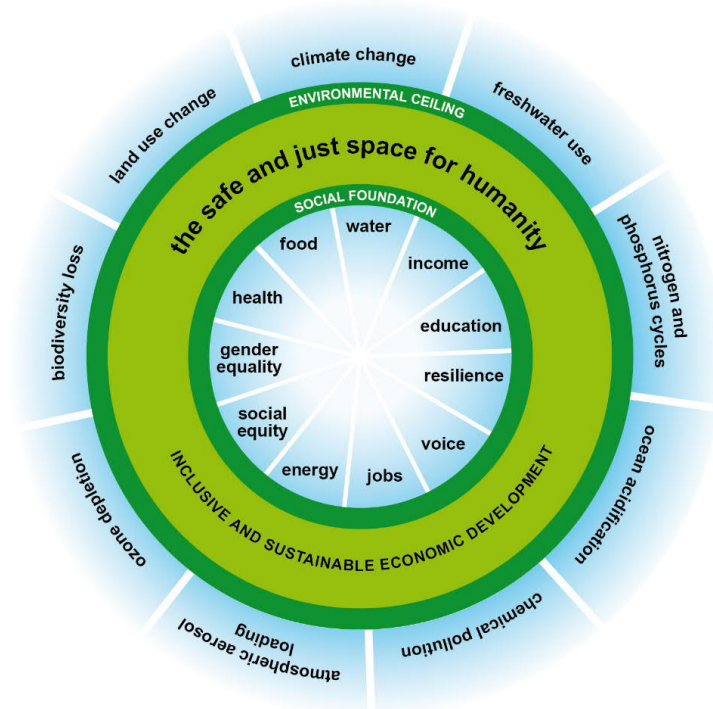
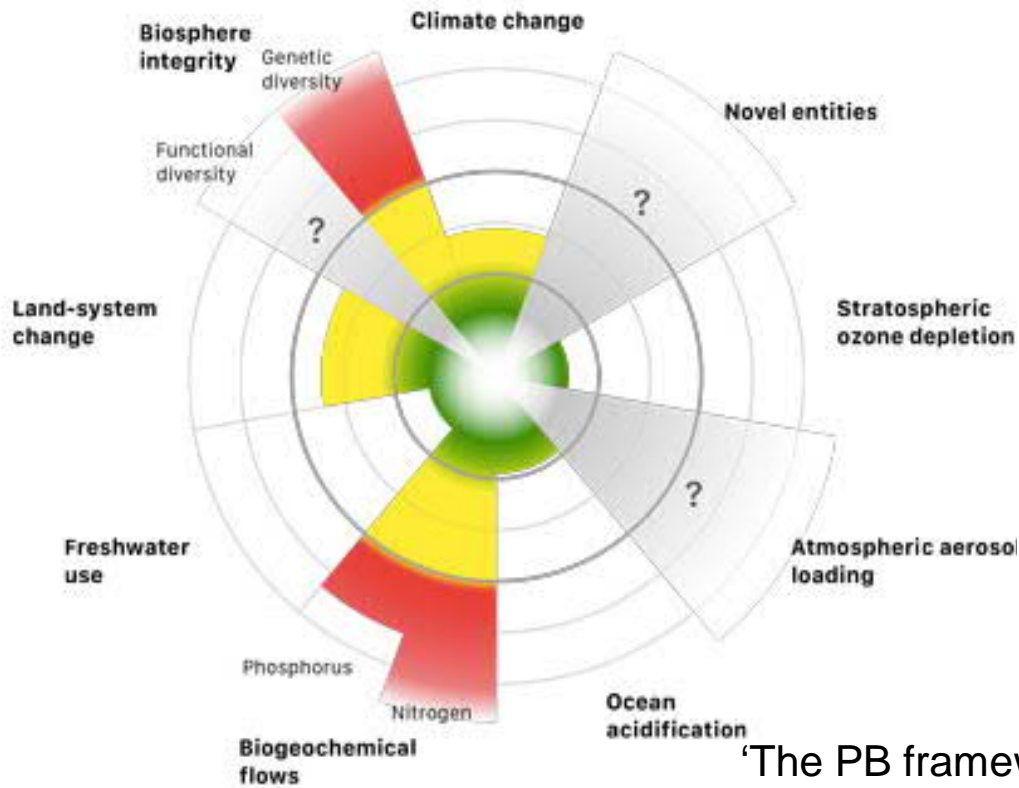
- Peer evaluation of contribution (+/- 1 of your groupwork grade)

## Other personal assignments and active participation (10%)

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# Workload allocation

Lectures	Reading	Essay	Other personal assignments	Peer-to-peer teaching	Personal reflection	Sum
36	33	25	5	26	10	135



**Holocene?  
Anthropocene?  
Resilience?**

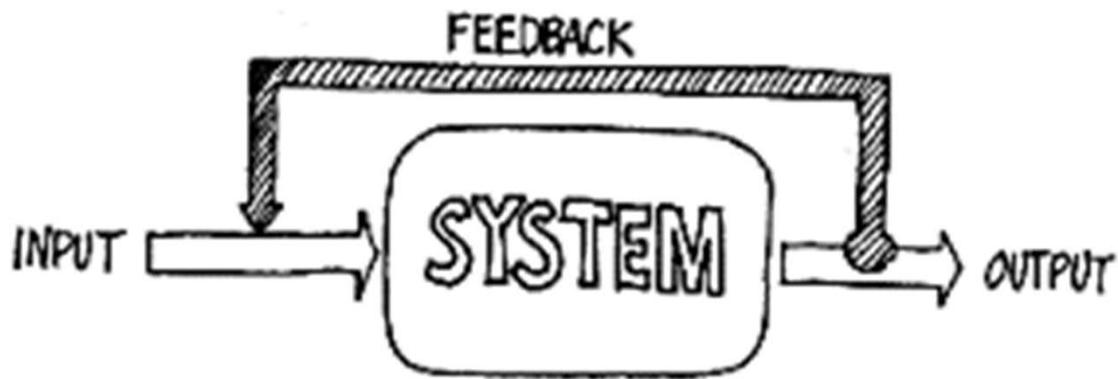
‘The PB framework does not dictate how societies should develop. These are political decisions that must include consideration of the human dimensions, including equity, not incorporated in the PB framework.’

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Folke, C. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223).



BEFORE → AFTER → TIME

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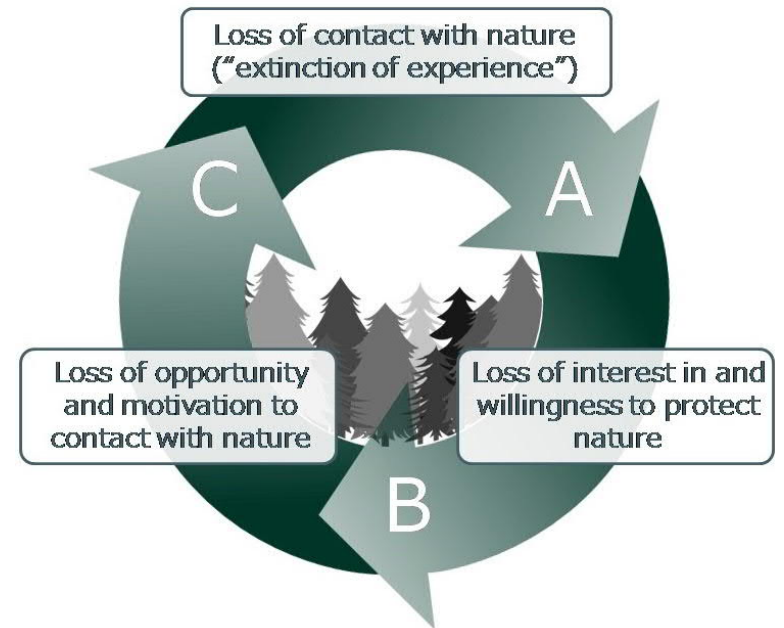


# Balancing / negative feedback

**+ Atmospheric CO<sub>2</sub> > +Photosynthesis > - Atmospheric CO<sub>2</sub>**

# Accelerating, positive feedback

‘Extinction of experience’



Source: Soga 2016, see also. Soga, M., & Gaston, K. J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment*, 14(2), 94-101.

# Accelerating, positive feedback

‘Learning to learn’

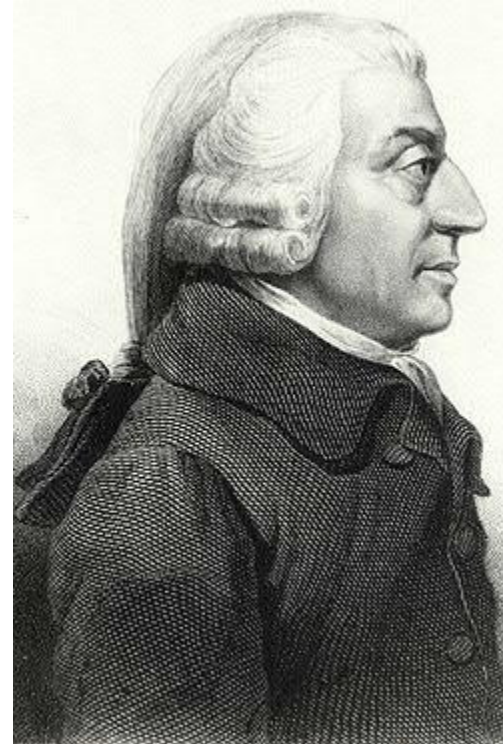


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# - Feedback

Economic theory?



Adam Smith, source Wikipedia

# - Feedback

**Economic theory:**

**e.g.**

**Low availability**

**>high cost**

**>low demand**


**>substitution**

**>increased  
availability**

THE BLOG CHAIN

## Is Stainless Steel Nickel Free? The Surprising Truth.

Stainless steel jewelry can be beautiful, nearly indestructible, and a great cost effective substitute for Sterling Silver. But did you know that not all Stainless Steel jewelry is created equal?



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Your Questions Answered

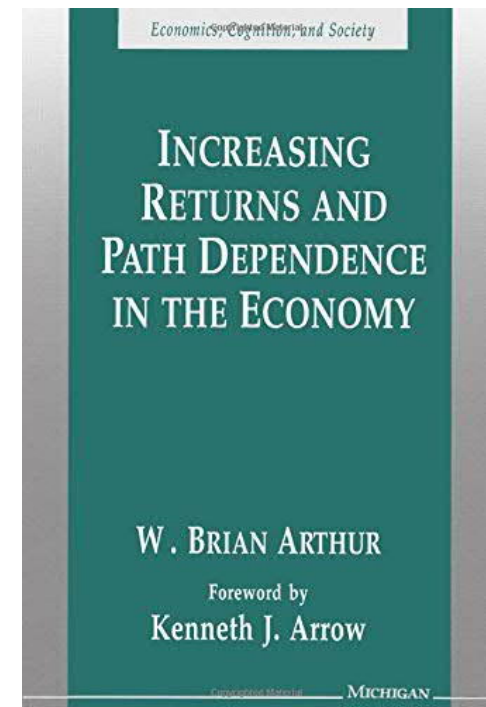
# Path dependency & Lock-in

**System properties such as resilience are problematic if you want to change system conditions**

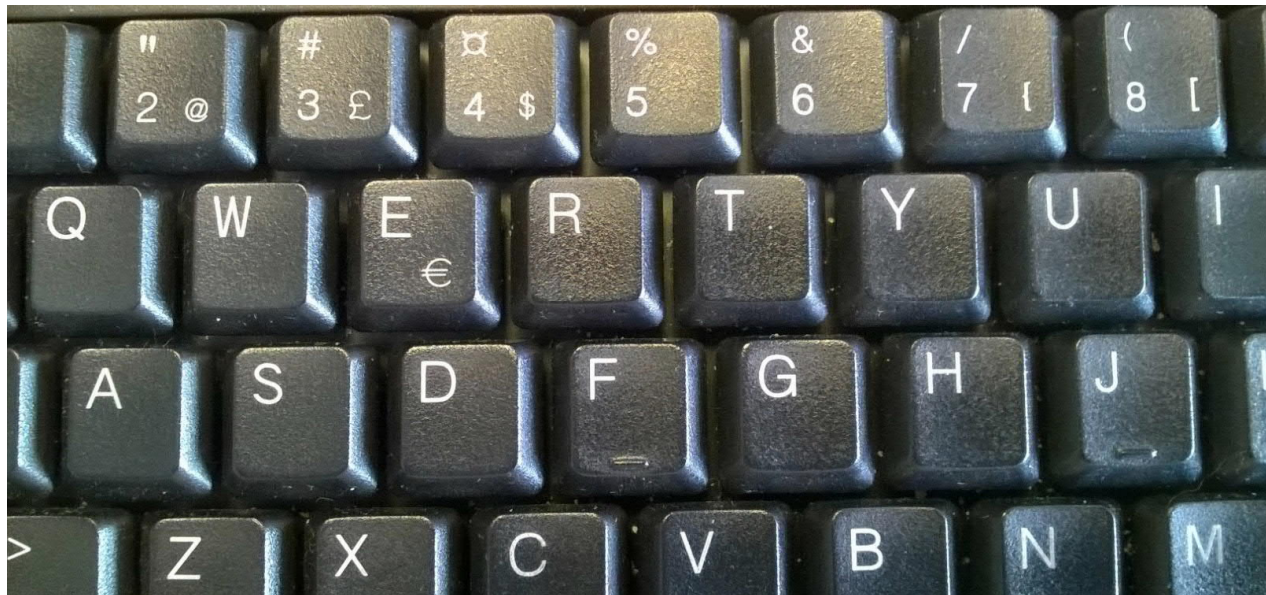
e.g.

Unruh, G. C. (2000). Understanding carbon lock-in. *Energy policy*, 28(12), 817-830.

Destablization and disruption as policy objectives

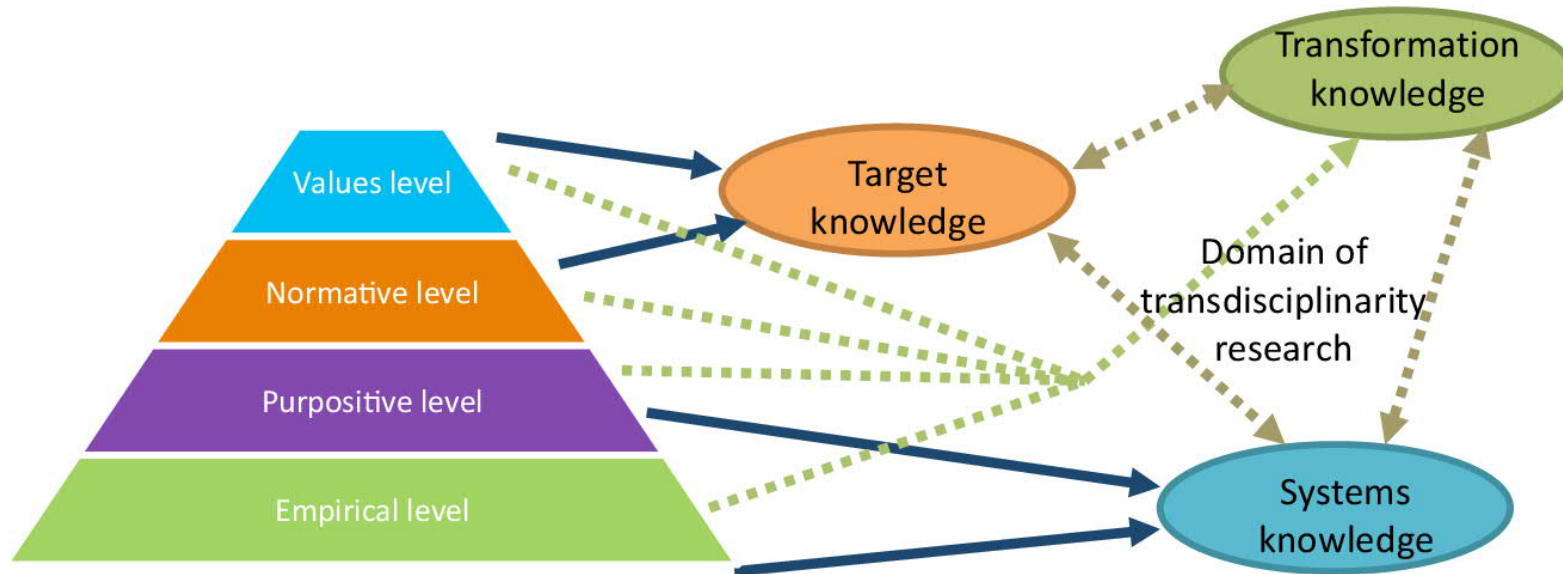


# *QWERTY – we do not live in the best of possible worlds*





# Sustainability science



Gaziulusoy, A. I., & Boyle, C. (2013). Proposing a heuristic reflective tool for reviewing literature in transdisciplinary research for sustainability. *Journal of Cleaner Production*, 48, 139-147.  
Max-Neef, M.A. (2005). Foundations of transdisciplinarity. *Ecological Economics*, 53 (1) :5-16



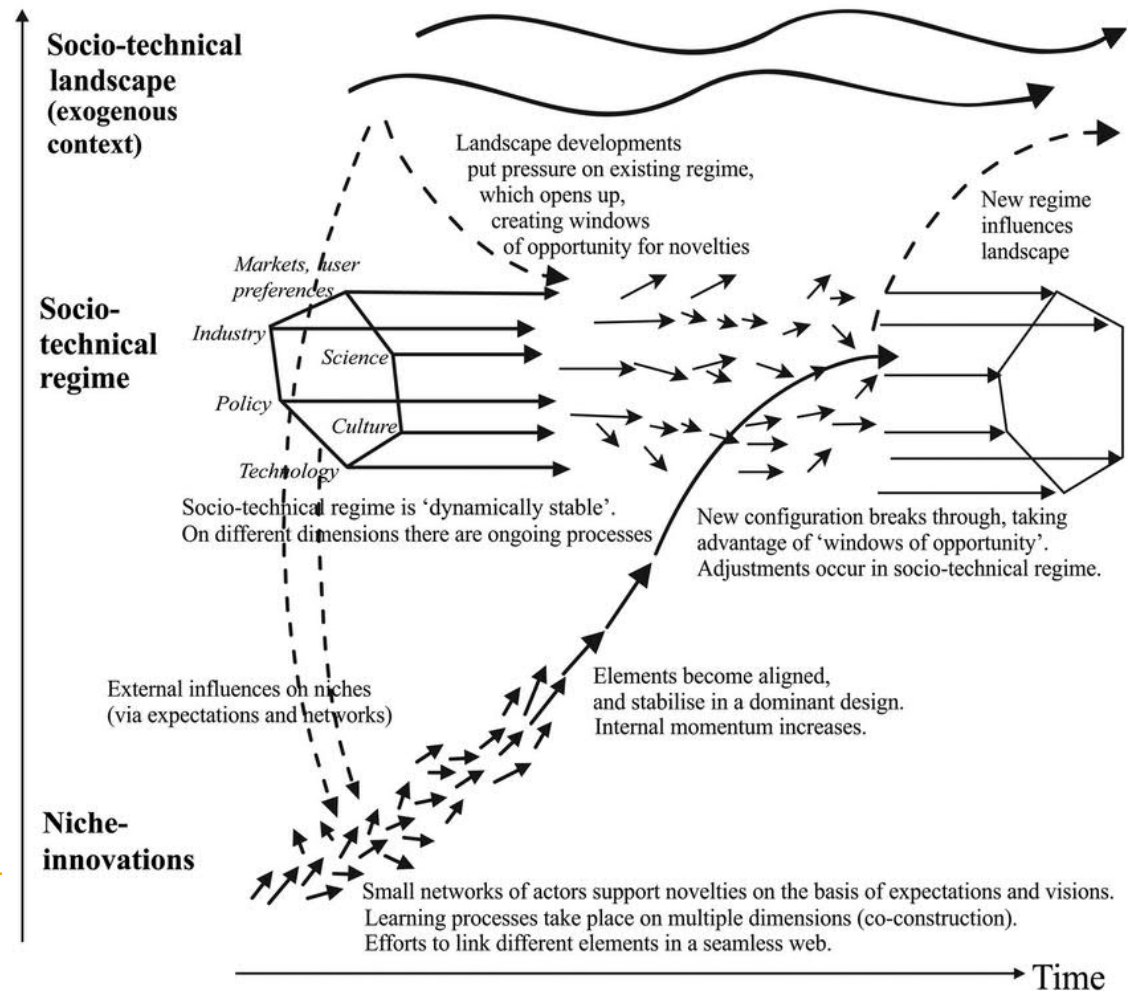
Flick: Simonetta Viterbi

# Next session

## Reading: Frank Geels offers three perspectives on what is happening at the ground level of his Multi-Level Perspective (MLP)

Geels, F. W. (2020). Micro-foundations of the multi-level perspective on socio-technical transitions: Developing a multi-dimensional model of agency through crossovers between social constructivism, evolutionary economics and neo-institutional theory. *Technological Forecasting and Social Change*, 152, 119894.

Increasing structuration  
of activities in local practices



# Exercise

We will have a class exercise on **‘Rising demand for air-conditioning and alternatives to rapidly increasing power demand’**.

Please do a short self study of the subject: what personal experiences you have, how is this present in your country of origin, what trends exists, what actors are prominent, what could be done to the raising power demand of air conditioning.

Submit your notes, max 1 page here.