

Goals and rationale of the Sustainability plan

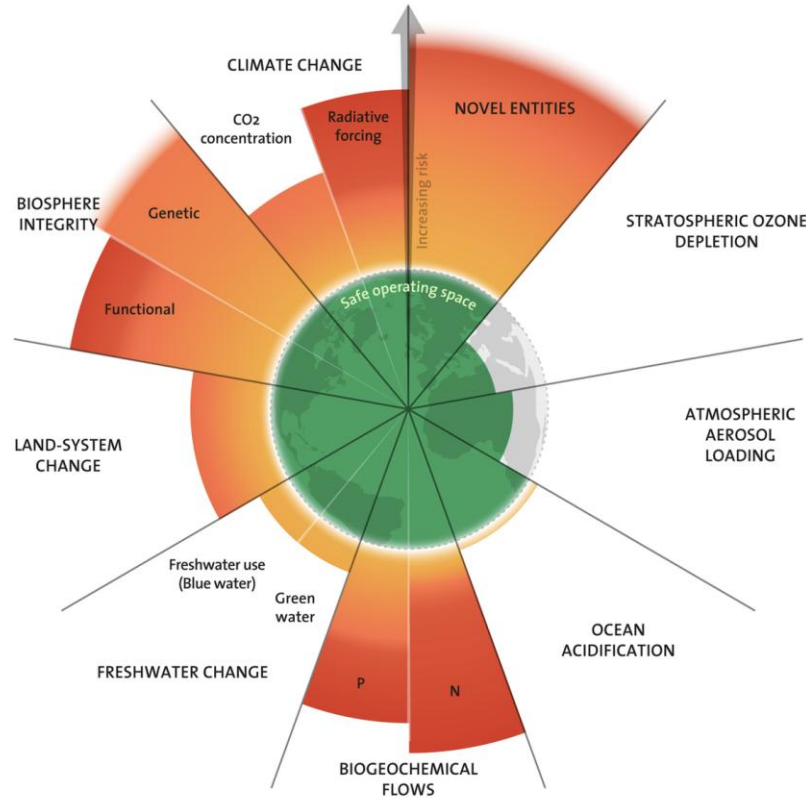
Kristian Sandahl, 2025-12-10 (may contain personal reflections)

What is sustainability?

A **sustainable society** is one that meets the needs of the present without compromising the ability of future generations to meet their own needs.



Why? Planetary Boundaries, beyond 7 of 9

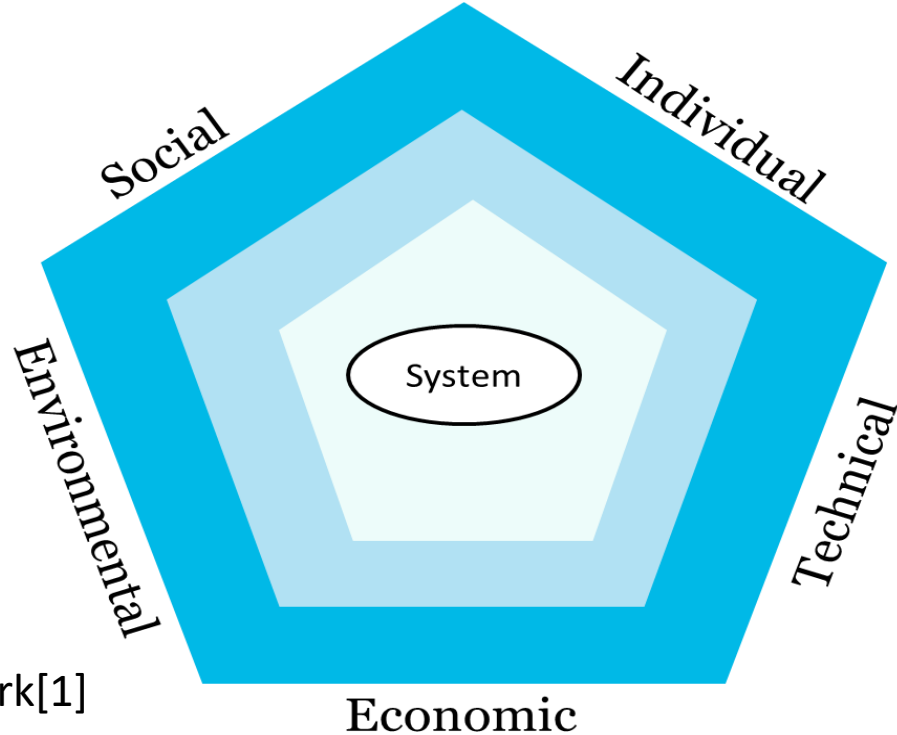


The dimensions of sustainability

Immediate effects

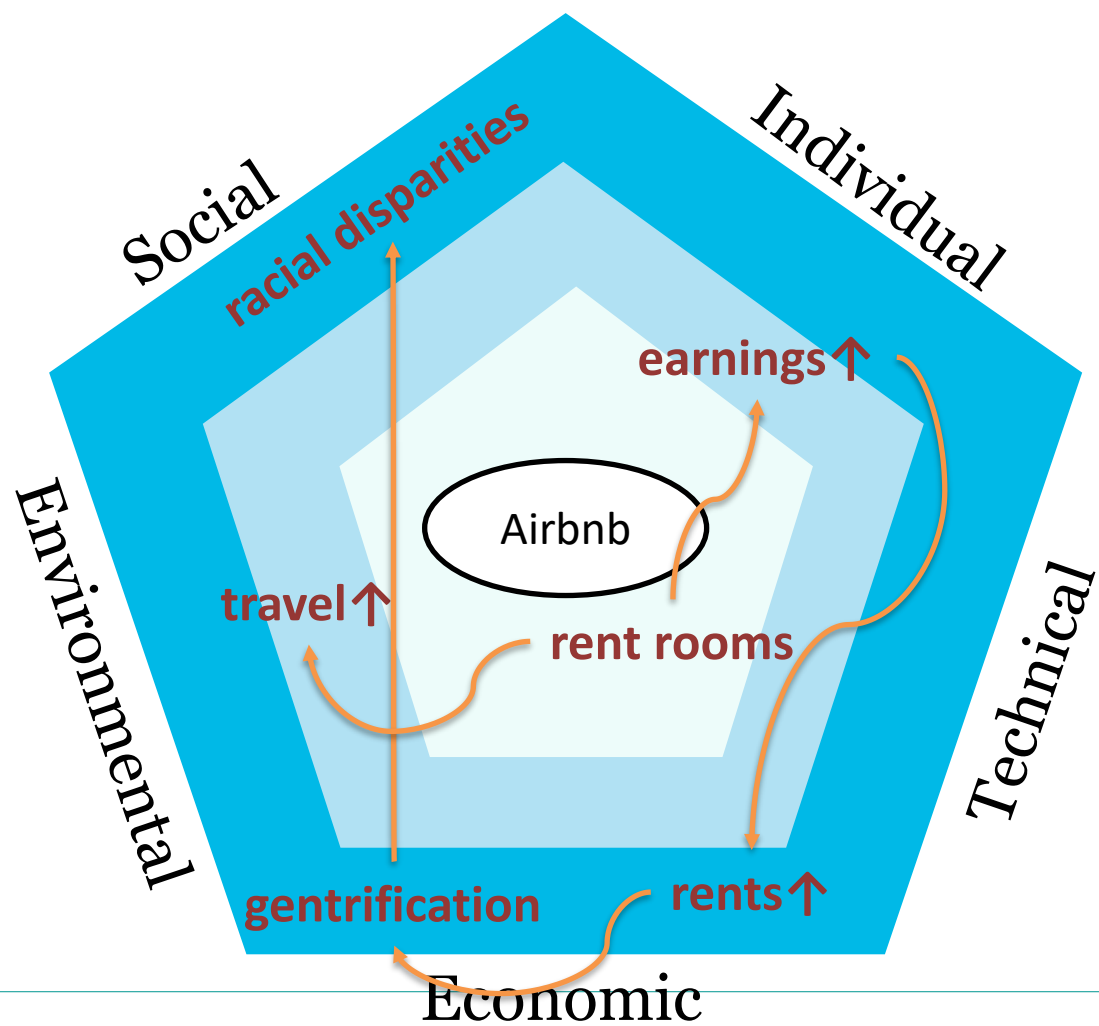
Enabled effects

Systemic effects



Sustainability Awareness Framework[1]

Example



We are developing methods for software development, why should we bother?

Well, you have to! 😊
(see next slide)

“Engineers in their professional capacity ought to feel personally responsible for technology being used in a manner that benefits humanity, the environment and society.” (*code of honour, Sveriges Ingenjörer*)

Admittedly, some of our contributions are indirect, but nevertheless valuable.

Two policy frameworks to know

CSRD – Corporate Sustainability Reporting Directive

Mandates reporting from companies who fulfills more than one of the conditions for 2025 [2]:

- More than 250 employees
- Balance sheet total over 280 MSEK
- Net turnover more than 550 MSEK

SDG – UN Sustainable Development Goals [3]

What's in it for companies?

Companies making a serious effort to align with the goals of the UN will gain:

- Long-term profitability
- Brand reputation
- Attracting and retaining talent
- Investor interest
- Strategic advantage



[4]

“Sustainability is a prerequisite for creating long-term value” *Investor*

Where can we have impact?

Sustainability
plan

Environment

CSRD, E1 Climate Change
CSRD, E2 Pollution
CSRD, E5 Resource use and
circular economy

Humans

CSRD, S1 Own workforce
CSRD, S2 Workers in the value
chain
CSRD, S4 Consumers and end-
users

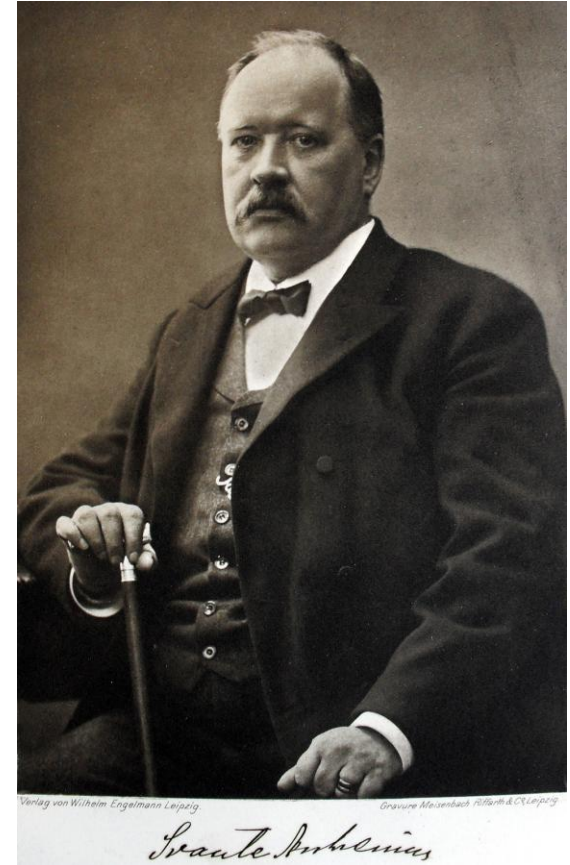
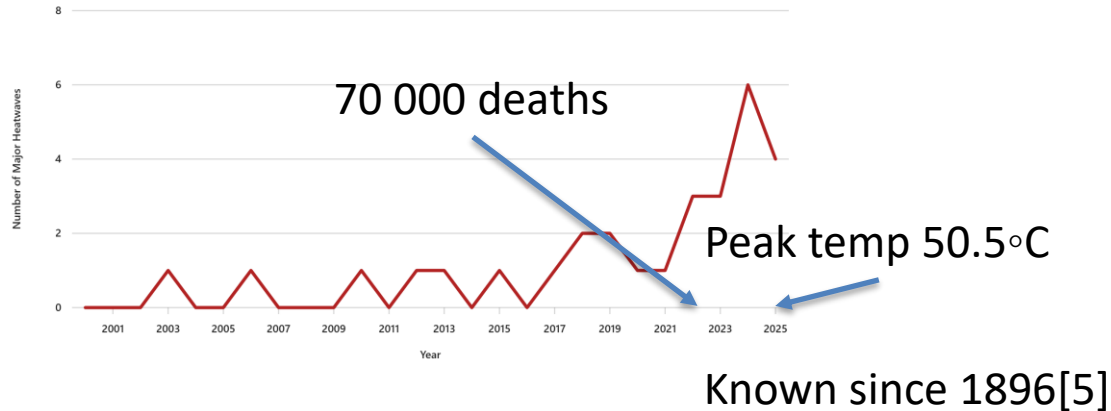
Society

SGD4 Quality education
SGD9 Build resilient
infrastructure, promote
inclusive and sustainable
industrialization and
foster innovation

Climate change

Observable effects by human activities are corroborated by many areas of science.

Denying it just displays ignorance and arrogance.



Subtopic: Energy use

Ericsson: Energy use in the ICT sector alone (2024):
1 100 TWh ~4 % of total use.
Forecast to 2030 over 1 200 TWh,
but that depends on AI [6].

Enerdata: Electricity share will be doubled by 2030 [7].



$EROI = \frac{\text{energy returned}}{\text{energy invested}}$ is likely to decrease in transition to renewable sources[8].

What can we do?

Use digitalization to replace and optimize demanding processes.
Create more energy-efficient solutions.
Support companies in automated regulatory compliance.

Support the demands of the fossil-free transition.

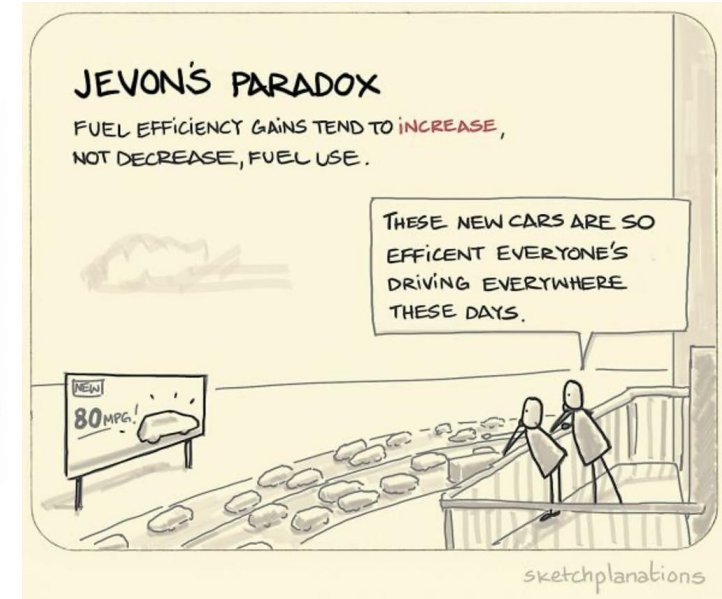
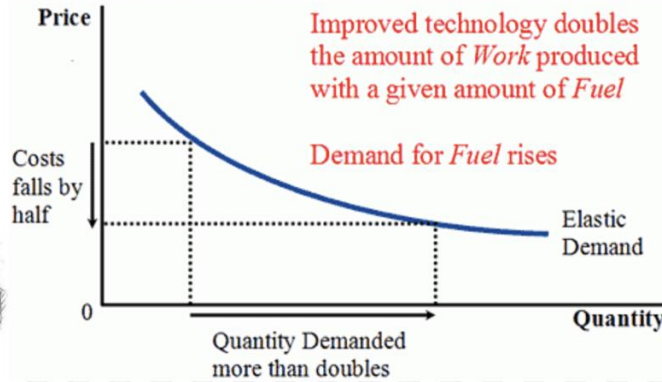
Low-hanging fruit:

Account for both the cost and utility of

- Research endeavor
- Anticipated implications

BUT, ...

Energy Efficiency? Careful: Rebound Effects



Jevons, William Stanley (1866). [The Coal Question](#). London: Macmillan and Co

Pollution

Industrial processes and consumer products have complex systems controlling the emission.

What can we do?

Software can realize more advanced control. Our research in safe systems can help to avoid unintended emissions.



Much has improved, but we see new threats, such as the plastic pollution.

Resource use and circular economy

R0 Refuse

R1 Rethink

R2 Reduce

R3 Reuse

R4 Repair

R5 Refurbish

R6 Remanufacture

R7 Repurpose

R8 Recycle

R9 Recover

The R-strategies [9]

We can use digitalization to:
Prolong value of hardware
Replace hardware solutions

Humans

People producing IT

People using IT, embedded or not

Technostress and vulnerable systems
are well-known.

There is a dramatic change of working
conditions ahead for both engineers and
end-users.

[Click the link to view the picture.](#)

End-users demonstrating in the streets. [10]

What can we do?

Safe systems avoid harm, physical, mental, legal.

Secure systems avoid harm and ensure correct accountability.

Include usability aspects in quality assessment.

Use knowledge about cognitive aspects when designing tools.

Study and improve AI-assisted software engineering.

Participate in broad research about consequences of AI, avoid pitfalls.

Sub-topic: equal opportunities

The digital divide might be stronger with AI – stronger than gender inequality.

Internally, there is a strong focus on equal opportunity in universities.

Universities do a lot to raise awareness about STEM amongst girls – be sure to contribute.

Personal observation: Female (and some male) students appreciate purposiveness.



Picture from <https://lexmarkconsultants.com/wp-content/uploads/2024/08/Tips-for-International-Students-for-Cultural-Adjustment.webp>

Quality in education

Many researchers are also teachers
Use the opportunity to teach how to
reflect on ethical considerations.

With the foreseen change of working conditions, a
large portion of re-skill and up-skill is needed.



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

With AI innovation will become faster and more powerful.
We can develop tools, business models, and insights to support this.

This power must be directed towards good and sustainable use.

Ongoing research in CoDig with direct sustainability focus

Theme 1

- Evaluation of frameworks for sustainable Software Engineering
- Focus group for avoiding mental harm with IT to own personnel and end-users
- Sustainability and Waste in AI-Assisted Test Engineering

Theme 2 and 4

- Automated compliance with regulations

Theme 3

- Introducing new ways of working in workshops
- Sustainability workshop

Theme 4

- Interview study about how AI affects tasks performed

We focus on **awareness** amongst researchers and industry participants

- Specifically, we look for good examples
 - Ongoing related research in Software Center/CoDig
 - Future discussion topics and trade-offs
 - Potentially interesting research if more funds were available
- Share your results and insights with us!

The fabulous sustainability team



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Software Center/CoDig



Links

- [1] SusAF <https://zenodo.org/records/7342575#.Y9p-yy8w0UF>
- [2] https://www.far.se/kunskap/hallbarhet/fragor-och-svar-om-csrd/?srsId=AfmBOooQz1mrjHjP6a3tznG_26X9cF_AunlTbmclRpXwJSx_II-zJ4Su (in Swedish)
- [3] <https://sdgs.un.org/goals>
- [4] <https://omni.se/wallenberg-egenintresse-satsa-pa-klimatomstallning/a/abkJ5d> (In Swedish)
- [5] <https://libris.kb.se/bib/15158939> (in German)
- [6] <https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/ict-carbon-footprint-decreasing>
- [7] <https://www.enerdata.net/publications/executive-briefing/world-energy-consumption-from-digitalization.pdf>
- [8] <https://doi.org/10.1016/j.esr.2019.100399>
- [9] <https://www.circularise.com/blogs/r-strategies-for-a-circular-economy>
- [10] <https://www.dagensmedicin.se/vardens-styrning/digitalisering/ivo-flera-brister-i-vgrs-inforande-av-millennium/> (in Swedish)

Software Center | Continuous Digitalization



That's all, folks!