

Transformative innovation policy / mission-oriented

3. Transformative innovation policy / mission-oriented

- Places social and environmental problems at the core
- Layered upon (not fully replacing) earlier innovation policy paradigms
- Conceptual variety

‘Mission-oriented innovation policy is a co-ordinated package of policy and regulatory measures tailored specifically to mobilise innovation in order to address well-defined objectives related to a societal challenge, in a defined timeframe’ (OECD)

Policy discourse, 2010 >>

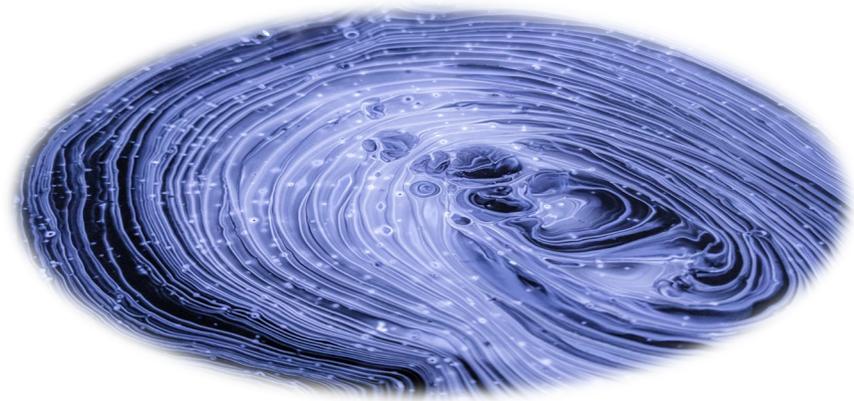
- OECD (2010): On [eco-innovation](#) in industry: emphasises system innovation, understood as innovation characterized by shifts in how society functions and how its needs are met
- OECD (2011): Towards [Green Growth](#): highlights the importance of a transition to green growth, which involves systemic changes across the entire economy, including new ways of producing and consuming things
- UNEP (2011): Towards a [Green Economy](#): green economy transitions and economic transformation that necessitate a fundamental rethinking of our approach to the economy
- EU (2010): Europe 2020 - importance of changing tracks and exploring new development paths to produce smart, [sustainable](#) and [inclusive growth](#).

Mission-orientated innovation policies

- The need to address grand societal challenges
- Enabling systemic change
- Frontier knowledge to achieve specific societal goals
- Directionality
- Operationalising an innovation agenda led by the public sector

Challenges – transformation failures

- Directionality
- Experimentation
- Demand articulation
- Policy learning and orchestration



Green growth

- **The belief:** it is possible to reduce ecological impact while achieving economic growth through the use of new technologies and sustainable practices.
- A term to describe a path of economic growth that uses natural resources in a sustainable manner
- It provides an alternative concept to typical industrial economic growth

(e.g. OECD, 2011)



Degrowth

- **The belief:** economic growth is inherently unsustainable and we need to reduce our consumption and production levels to achieve a sustainable future (Stratford, 2020)
- “The planned and democratic reduction of production and consumption as a solution to social-ecological crises.”
(Parrique and Cosme, 2022)

The proposals to support degrowth include:

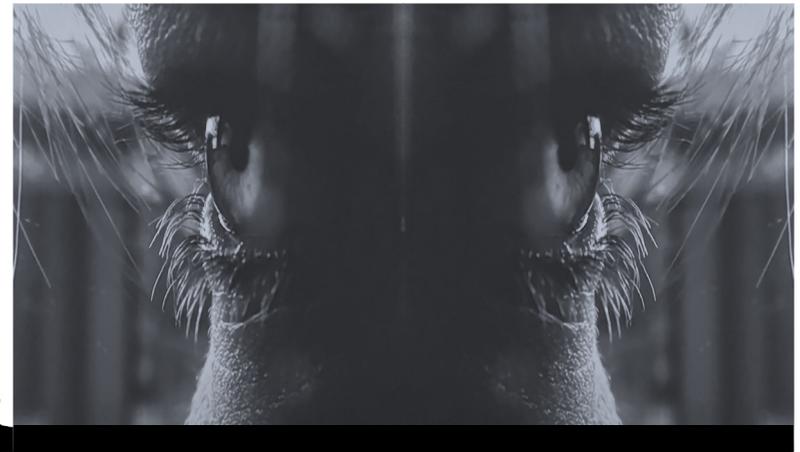
- 1) Reduce the environmental impact of human activities
- 2) Redistribute income and wealth both within and between countries
- 3) Promote the transition from a materialistic to a convivial and participatory society

(Cosme, Santos and O'Neill, 2017)

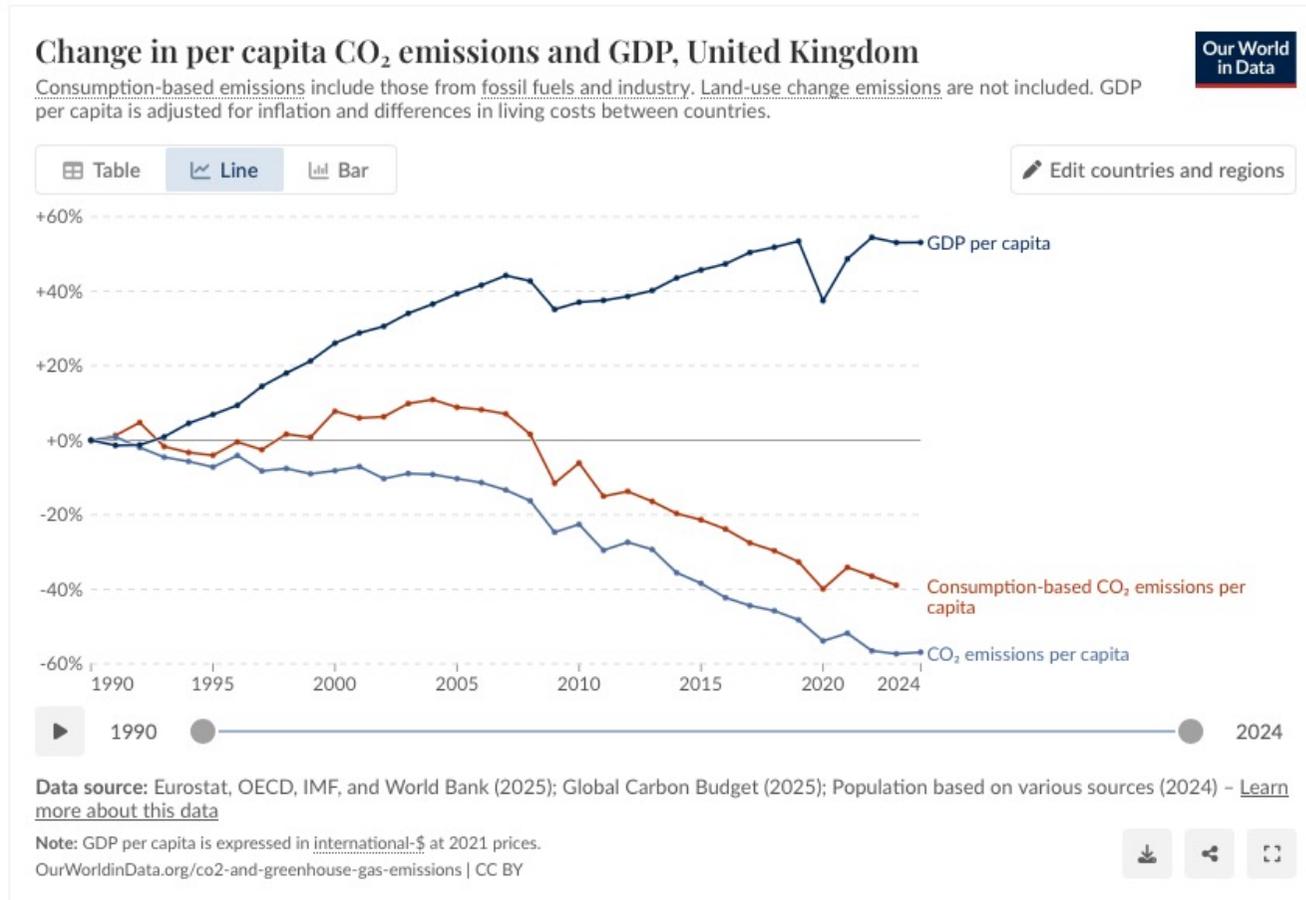


The tension

- A shared purpose: transforming economies to achieve sustainable economic development.
 - The theories on which they are based differ significantly, potentially leading to socio-political tensions.
 - The central issue between the two approaches is whether economic growth can be separated from environmental degradation.



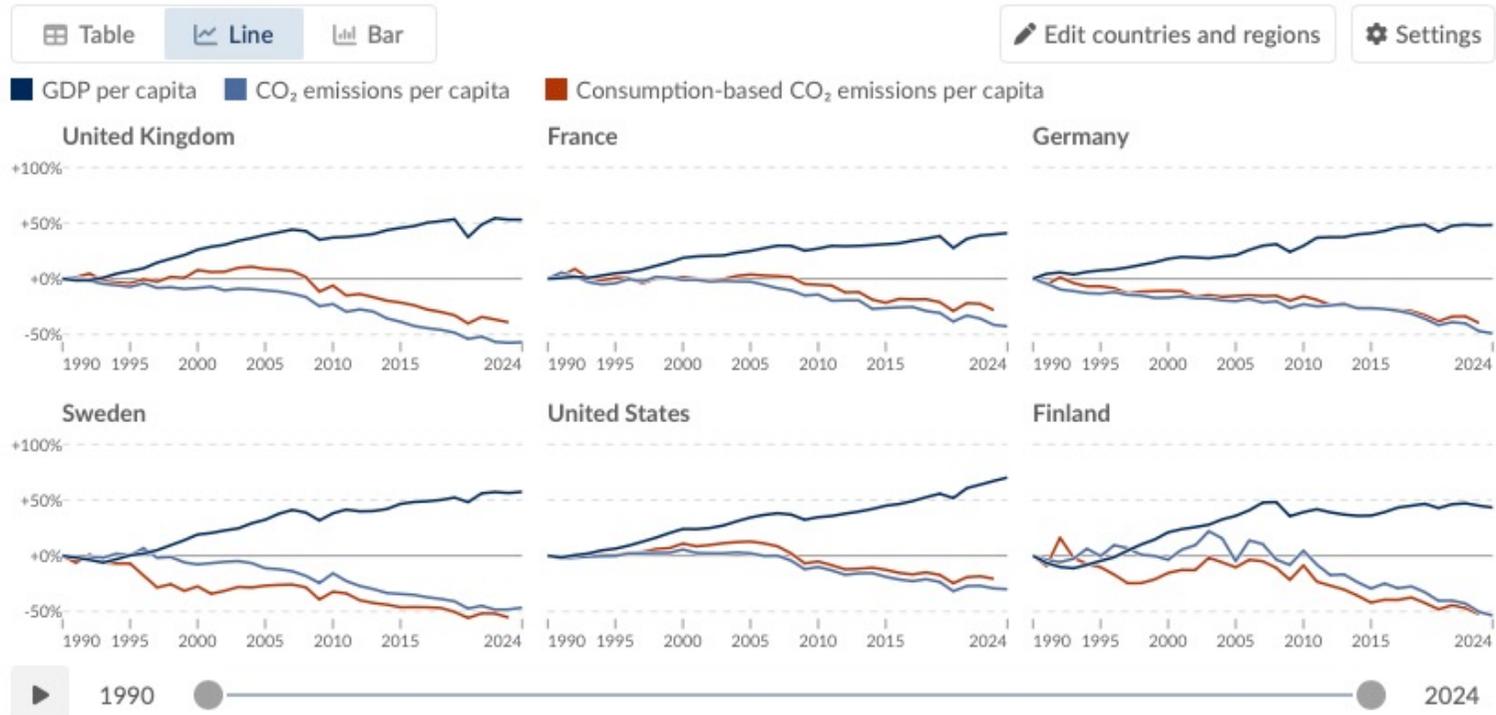
Green growth – decoupling of economic growth and emissions



Change in per capita CO₂ emissions and GDP

Our World
in Data

Consumption-based emissions include those from fossil fuels and industry. Land-use change emissions are not included. GDP per capita is adjusted for inflation and differences in living costs between countries.

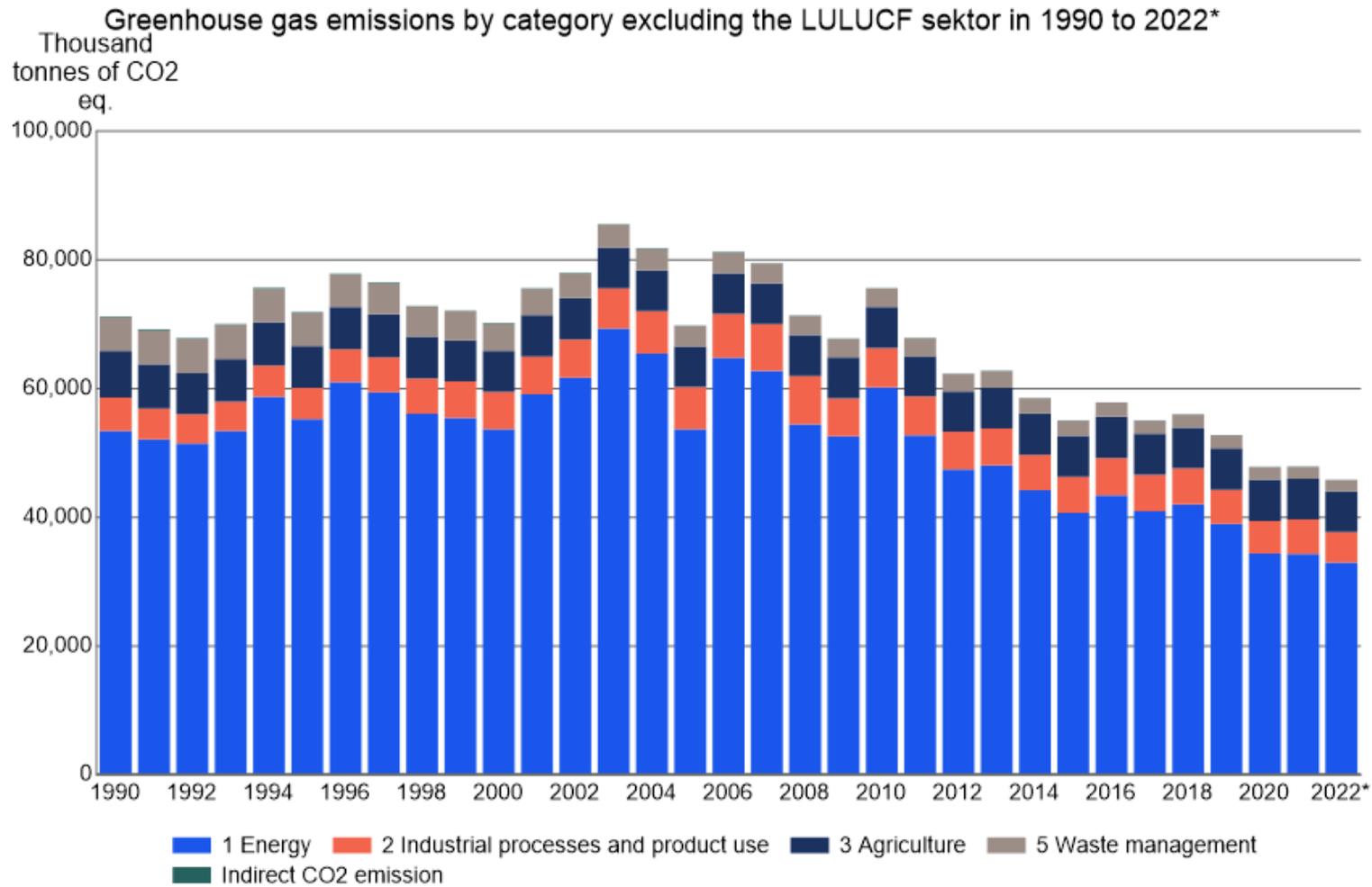


Data source: Eurostat, OECD, IMF, and World Bank (2025); Global Carbon Budget (2025); Population based on various sources (2024) - [Learn more about this data](#)

Note: GDP per capita is expressed in international-\$ at 2021 prices.

OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY





Source: Statistics Finland, greenhouse gases

Missions

- Missions should be well defined
- A mission does not comprise a single R&D or innovation project, but a portfolio of such projects.
- Missions should result in investment across different sectors and involve different types of actors.
- Missions require joined up policy making, whereby the priorities are translated into concrete policy instruments and actions to be carried out by all levels of the public institutions involved.

(Mazzucato & Penna, 2016)



Old and new missions

Table 1. Characteristics of old and new mission-oriented projects

Defense, nuclear, and aerospace	New: Environmental technologies and societal challenges
Diffusion of the results outside of the core of participants is of minor importance or actively discouraged	Diffusion of the results is a central goal and is actively encouraged
The mission is defined in terms of the number of technical achievements, with little regard to their economic feasibility	The mission is defined in terms of economically feasible technical solutions to particular societal problems
The goals and the direction of technological development are defined in advance by a small group of experts	The direction of technical change is influenced by a wide range of actors, including government, private firms, and consumer groups
Centralized control within a government administration	Decentralized control with a large number of agents involved
Participation is limited to a small group of firms due to the emphasis on a small number of radical technologies	Emphasis on the development of both radical and incremental innovations to permit a large number of firms to participate
Self-contained projects with little need for complementary policies and scant attention paid to coherence	Complementary policies vital for success and close attention paid to coherence with other goals

Source: Modified version of Table 5 in Soete and Arundel (1993: 51). Mazzucato, 2018

The World Economic Forum's Global Competitiveness Report highlights Finland, Denmark and Sweden, and declares these three countries as being 'among the best-prepared [...] for an economic transformation'

This assessment is based on the institutional, social and political capacity, not entrepreneurial capacity

Making Innovation a Mission?

Overview of the Implementation of
Mission-Oriented Innovation Policies
in Denmark, Finland and Sweden

Alberto Giacometti & Sigrid Jessen



Denmark has selected four national missions focusing on the green transition

- Carbon capture and storage or utilisation
- Green fuels for transportation and industry (power-to-X, etc.)
- Climate- and environment-friendly agriculture and food production
- Recycling and reduction of plastic waste (later expanded to ‘plastic and textiles’)

Sweden and Finland have no nationally declared missions

- But - they do not lack transformative processes in their respective innovation systems
- Sweden and Finland have long traditions of (transformative) innovation policy
- In Finland, transformation is partly led by the private sector

Two programmes as highlights

- Strategic research programmes (Research Council of Finland)
- Growth Engines of Business Finland

Strategic research



Strategic research – research-based knowledge for society (The Strategic Research Council (SRC))

<https://www.aka.fi/en/strategic-research/>

Examples

- Keys to Sustainable Growth
- Demographic Changes – Causes, Consequences and Solutions
- Environmental and Social Links to Biodiversity Loss
- Pandemics as a Challenge for Society
- The Changing Role of Public Authority and the Potential for Steering Society

2025 calls

- Labour Supply and Migration in Future Finland (SKILLS)
- Economy and Welfare in an Era of Strategic Competition (WELEC)

The Growth Engine programme

Leading companies

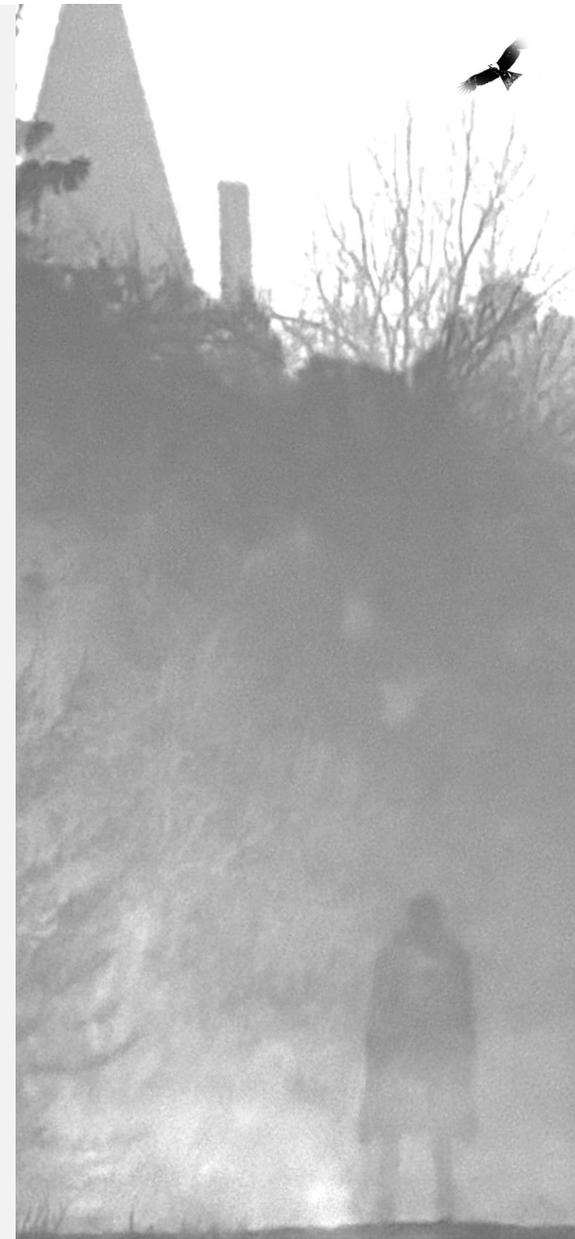
- **NESTE:** Sustainable and globally scalable solutions for the R&D of raw materials that reduce the use of crude oil.
https://www.businessfinland.fi/4a9cd1/globalassets/finnish-customers/01-funding/06-ecosystems/neste_veturi_tiekartta.pdf
- **ABB:** Platforms for the optimal generation and consumption of electricity in a carbon-neutral society.
<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/abb-green-electrification-2035-veturi-roadmap.pdf>
- **FORTUM & METSÄ GROUP:** New fibre-based products for consumer markets to reduce the carbon footprint.
https://www.businessfinland.fi/49a764/globalassets/finnish-customers/01-funding/06-ecosystems/expandfibre_ecosystem-roadmap_may-2023.pdf
- **KONE:** Mobility solutions for urban environments in line with the principles of sustainable development.
<https://www.businessfinland.fi/49073c/globalassets/finnish-customers/01-funding/06-ecosystems/kone-the-flow-of-urban-life-veturi-roadmap.pdf>
- **NOKIA 5G:** Making Finland a pioneer in 5G networks and industrial 5G (ended).
<https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/veturiyrittysten-ja-ekosysteemien-rahoitus>
- **SANDVIK:** Globally competitive electric and digital solutions for heavy machinery.
<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/sandvik-veturi-roadmap.pdf>
- **TIETOEVRY:** Trust-based digital services.
https://www.businessfinland.fi/494766/globalassets/finnish-customers/01-funding/06-ecosystems/20220221_tietoevry_veturi_public_roadmap.pdf
- **KONECRANES:** Zero4 material flow.
<https://www.businessfinland.fi/499c0b/globalassets/finnish-customers/01-funding/06-ecosystems/konecranes-zero4.pdf>

Challenger companies

- **BITTIUM:** Seamless and secure connectivity.
https://www.businessfinland.fi/4904f7/globalassets/finnish-customers/01-funding/06-ecosystems/bittium_seamless-and-secure-connectivity-2024.pdf
- **PONSSE & EPEC:** Unlocking sustainability in off-road and commercial vehicles.
https://www.businessfinland.fi/49bbc4/globalassets/finnish-customers/01-funding/06-ecosystems/ponsse_epec_forward27_roadmap.pdf
- **DANFOSS:** Fossil-free future.
https://www.businessfinland.fi/49c1e1/globalassets/finnish-customers/01-funding/06-ecosystems/danfoss_fossil-free-future_roadmap_2023.pdf
- **MIRKA:** Shaping the green transition.
https://www.businessfinland.fi/494803/globalassets/finnish-customers/01-funding/06-ecosystems/mirka_shape-02-2024.pdf
- **KEMPOWER:** Heavy electric traffic ecosystem.
<https://kempower.com/news/heavy-electric-traffic-ecosystem-program-boosted-by-10-million-euros/>
- **VALIO:** Food 2.0
<https://www.businessfinland.fi/491a86/globalassets/finnish-customers/01-funding/06-ecosystems/food-2.0-roadmap.pdf>

Connected to EU RRF

- **BOREALIS POLYMERS:** Sustainable plastic industry.
<https://www.businessfinland.fi/49542b/globalassets/finnish-customers/01-funding/06-ecosystems/borealis-spirit-veturi-roadmap-20220318.pdf>
- **MEYER TURKU:** Climate-neutral cruise ship and shipyard.
<https://www.businessfinland.fi/494cb5/globalassets/finnish-customers/01-funding/06-ecosystems/meyer-turku-2022-03-18-necoleap-veturi-roadmap.pdf>
- **VALMET:** Circular economy technology.
<https://www.businessfinland.fi/4a5208/globalassets/finnish-customers/01-funding/06-ecosystems/beyond-circularity-roadmap-valmet-september-2023.pdf>
- **NOKIA EDGE:** Energy-efficient edge-computing.
https://www.businessfinland.fi/494a77/globalassets/finnish-customers/01-funding/06-ecosystems/nokia-veturi_competitive-edge_roadmap_2601_2022.pdf
- **WÄRTSILÄ:** Zero-emission marine.
<https://www.businessfinland.fi/494cf9/globalassets/finnish-customers/01-funding/06-ecosystems/wartsila-zem-leading-company-ecosystem-roadmap.pdf>



Walking the talk? Innovation policy approaches to unleash the transformative potentials of the Nordic bioeconomy

Lisa Scordato^{1,*}, Markus M. Bugge^{1,2}, Teis Hansen^{3,4}, Anne Tanner⁵ and Olav Wicken²

- The analysed bioeconomy policy strategies in the four Nordic countries incorporate all three innovation policy approaches
 - Technology push
 - Systems of innovation
 - Transformative change
- **Policy layering** - refers to the process of adding new policy goals and instruments to existing policy mixes without discarding previous measures
- **Policy drift** occurs when new goals replace old ones without changing the instruments used to implement them.

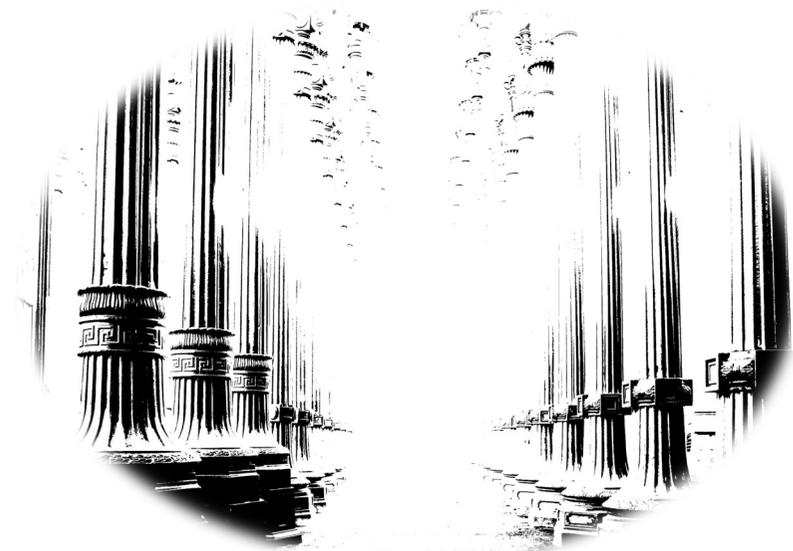
Kevin Morgan: The Public Animator: mission-led innovation and the “smart state” in Europe



<https://youtu.be/EhXwfvD2sk4>

Two perspectives

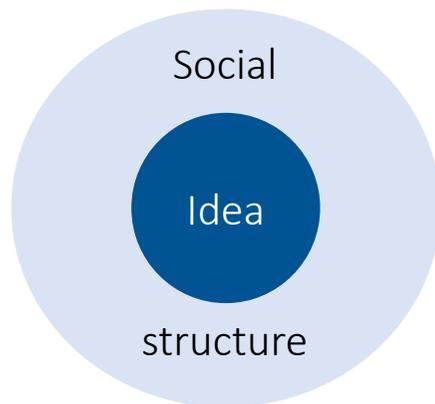
- Understanding city and regional development as processes of institutional change (deinstitutionalisation and institutionalisation)
- Understanding the role of institutions on city and regional development
 - Policies, laws, values, routines, standards, etc.



Institutionalisation

- A process of a new practice, activity, norm, belief, or some other institution, becoming established part of an existing system, organization or culture

(Sotarauta & Mustikkamäki, 2015)



- Institutionalised practice has attained a high degree of resilience (Scott 2001)
- ...like a rule in collective thought and social action (Scott 2001)
- The formation of such collective actors who defend the emergence of a new institution are an essential part of the institutionalization process (d'Ovidio & Pradel 2012)

Institutional change

(Streeck & Thelen 2005)

Process of change	Results of change	
	Continuity	Discontinuity
Incremental	Reproduction by adaptation	Gradual transformation
Abrupt	Survival and return	Breakdown and replacement

Innovation sources

STI (Science, Technology, Innovation)

- high-tech / science push / supply driven

DUI (Doing, Using, Interacting)

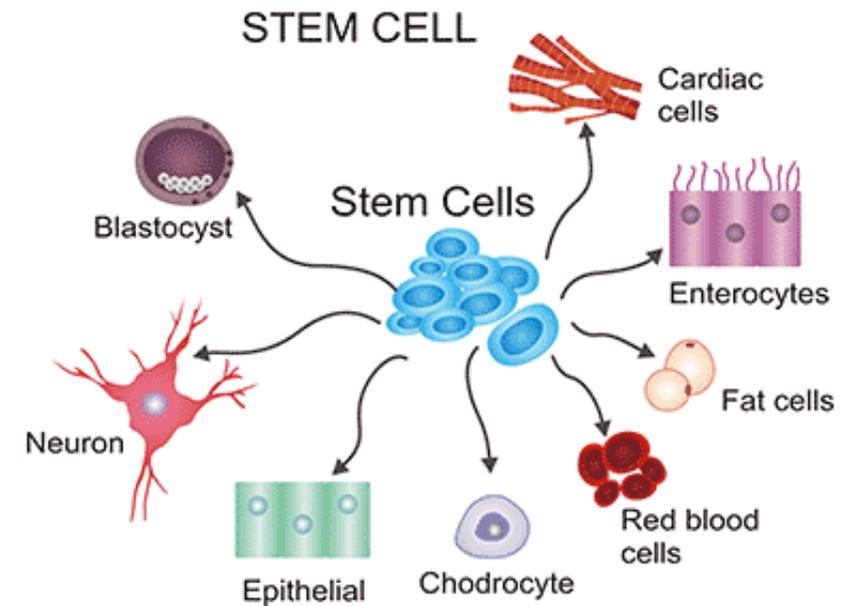
- competence building / organisational innovations / social innovations / market - demand - user driven

(Lorenz & Lundvall 2006)

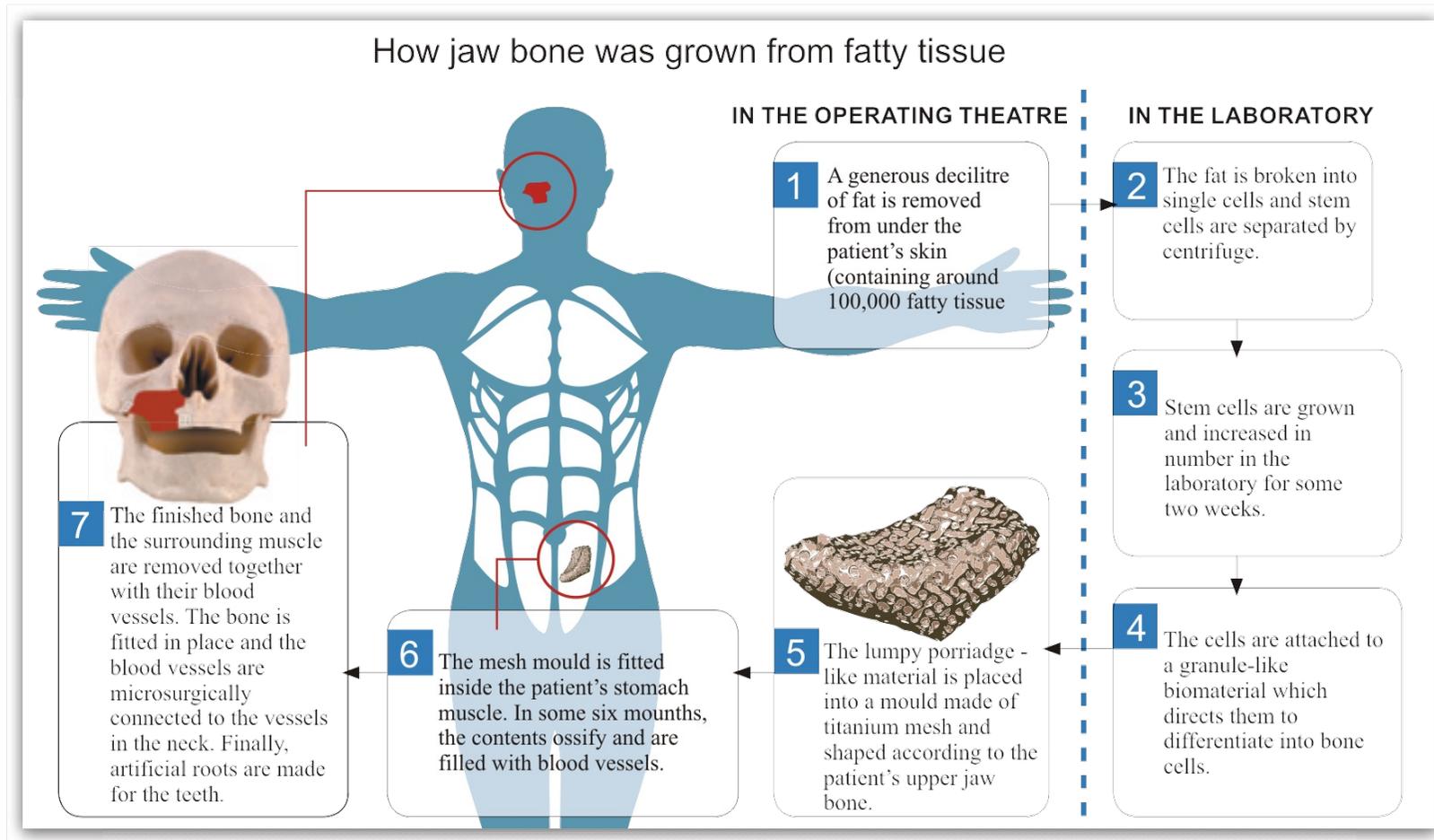


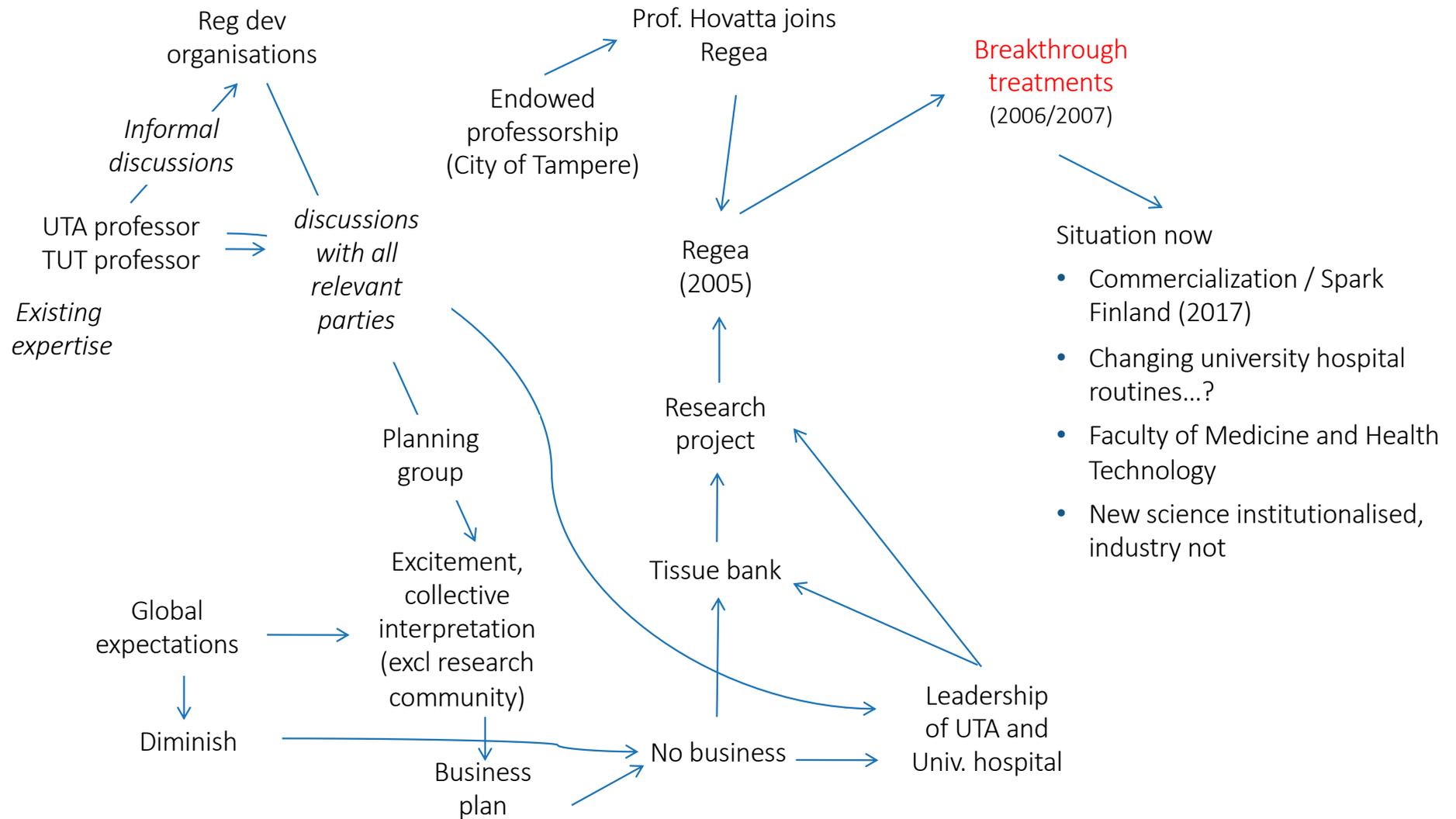
Stem cells

- **Stem cells** are undifferentiated or partially differentiated cells that can change into various types of cells
- The prevalent view was that mature cells were permanently locked into the differentiated state.
- In 2006, Shinya Yamanaka generated induced pluripotent stem cells from specialised cells.



How jaw bone was grown from fatty tissue





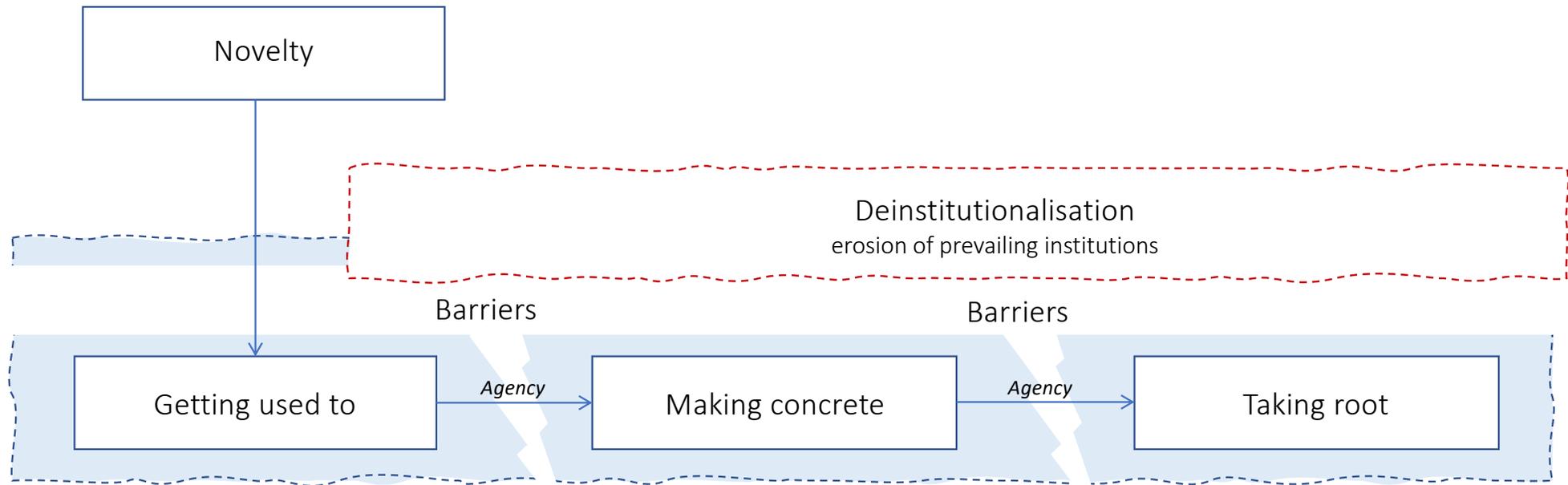
I - Seeds of change
(1997-2000)

II – Belief formation
(2001-2004)

III – Launch of activity
(2004-2007)

IV – Institutionalization
(2008-)

Process of institutionalisation



- Unstable processes
- Uncoordinated activity
- A few (support) actors
- Fragmented organisation
- No consensus on theories, knowledge, values or core actors
- High resistance

- Processes and structures taking shape
- Consensus, core values and theories emerging
- Intensive discourse
- Variance decreasing
- Heterogenous set of users

- Stable and structured processes
- Taken-for-granted
- Cohesive discourse
- Vested interests
- Low resistance
- Established support community

Traditional Biotechnology VS Stem Cell Value Chain/Development Chronology in California (Martin Kenney)

