Strange Attractors: Designing Innovative Systems of the Future

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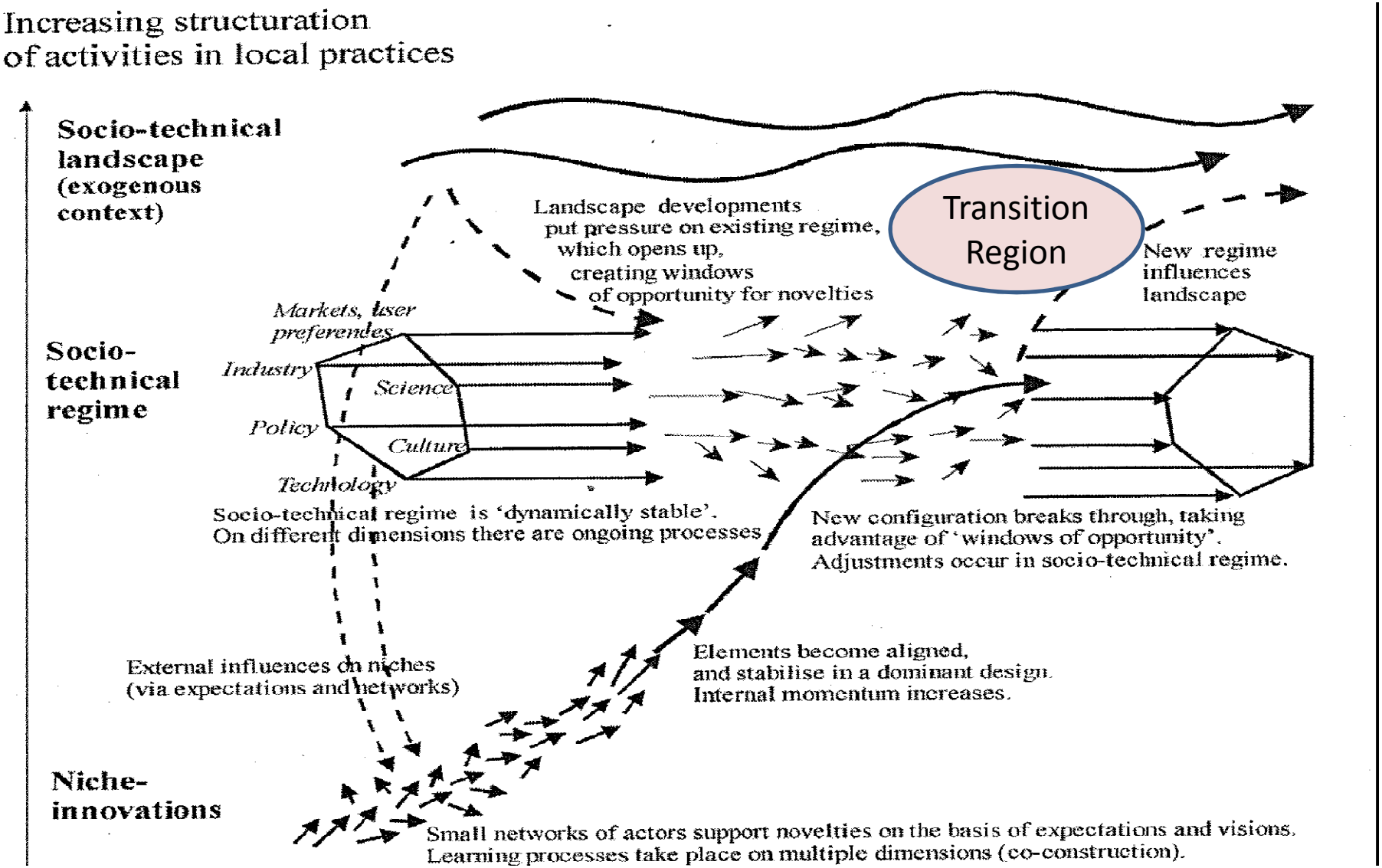
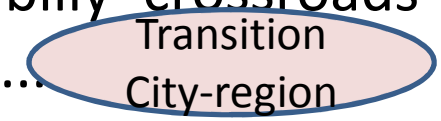
How Does Innovative Regional Transition Operate?

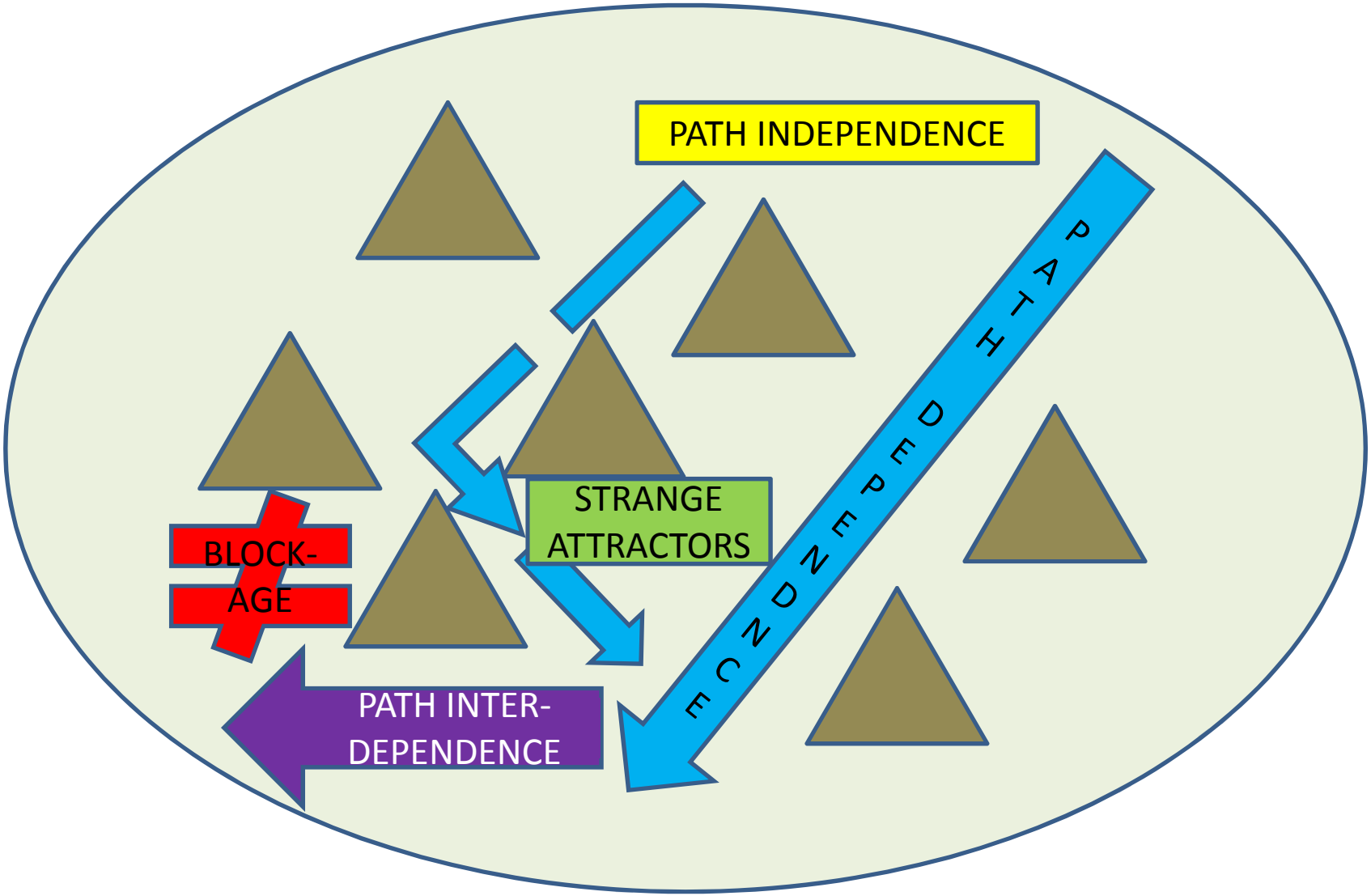
Spatialising The Co-evolutionary Transition (MLP) Model: Niche>Regime>Landscape (Source: Modification of Geels, 2006)



Relatedness in US radio, recording & rock ‘n’ roll (after Geels, 2007)

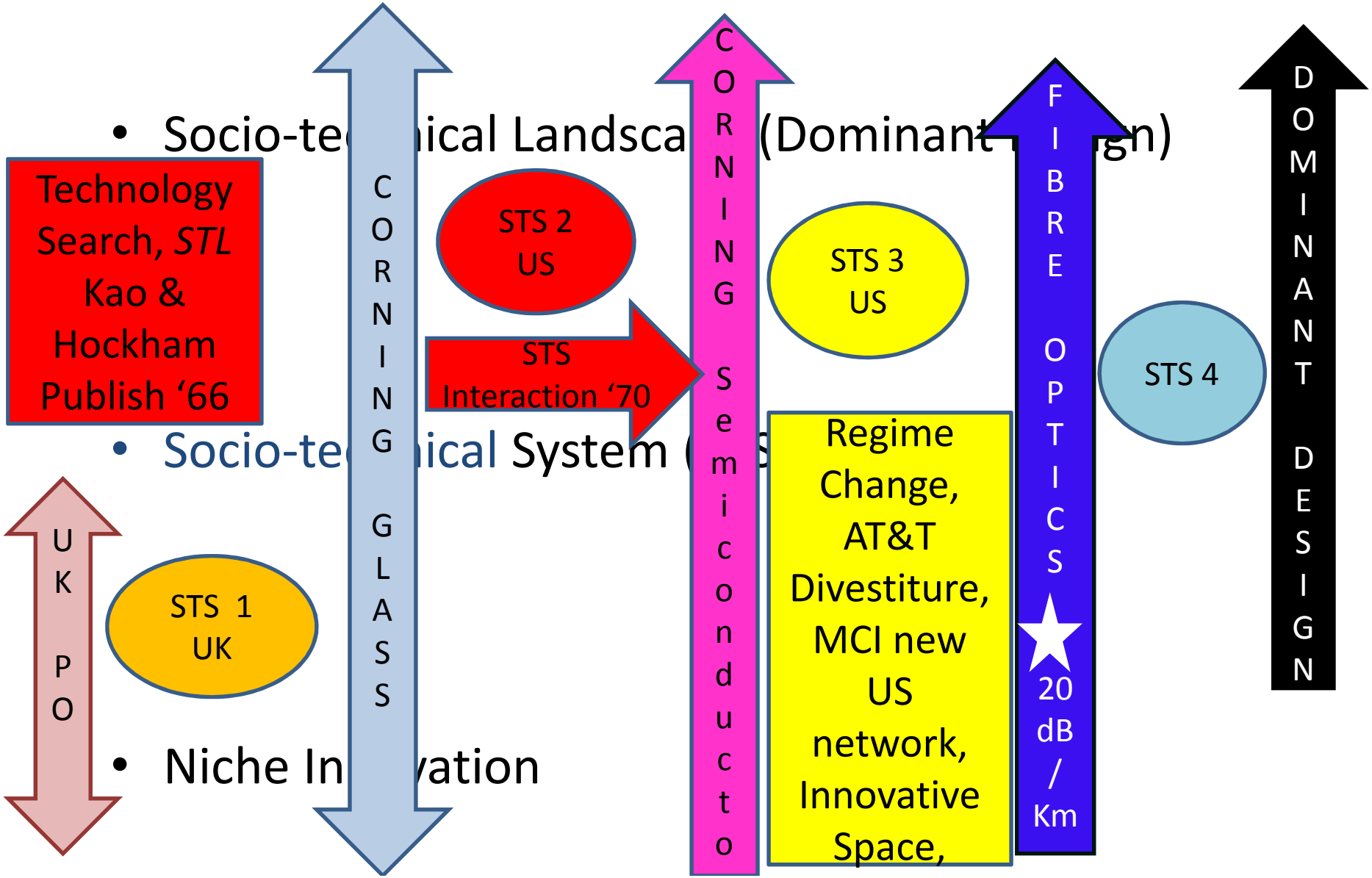
- The beginnings of both the radio and recording STSs showed intensely local innovation
- The US Radio Act of 1927 required less variety of radio stations, which centralised broadcasting into a few national networks. (The ‘Empire of Sound’ – Warner, CBS, RCA – later also dominated recording)
- Anti-trust broke the radio oligopoly in the 1940s, ushering in a wave of independent radio stations, benefiting local record companies by exposure of product
- As the oligarchs turned to television in the 1950s, radio became an increasingly localised ‘creative space’.
- One such was R&B/C&W ‘rockabilly’ crossroads – Sun Records, Memphis, Tennessee…..



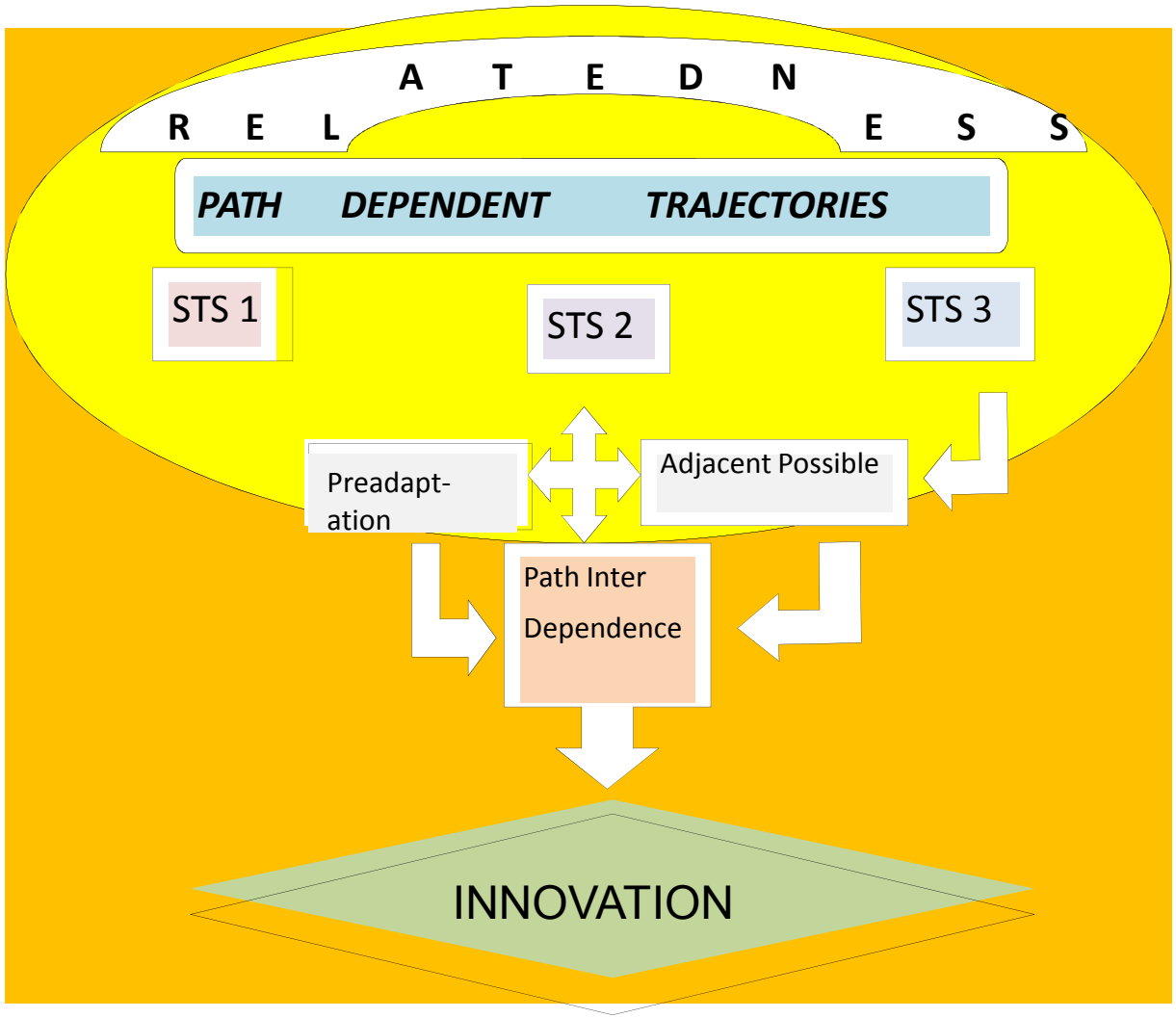


Complex Adaptive System Topology for Innovation

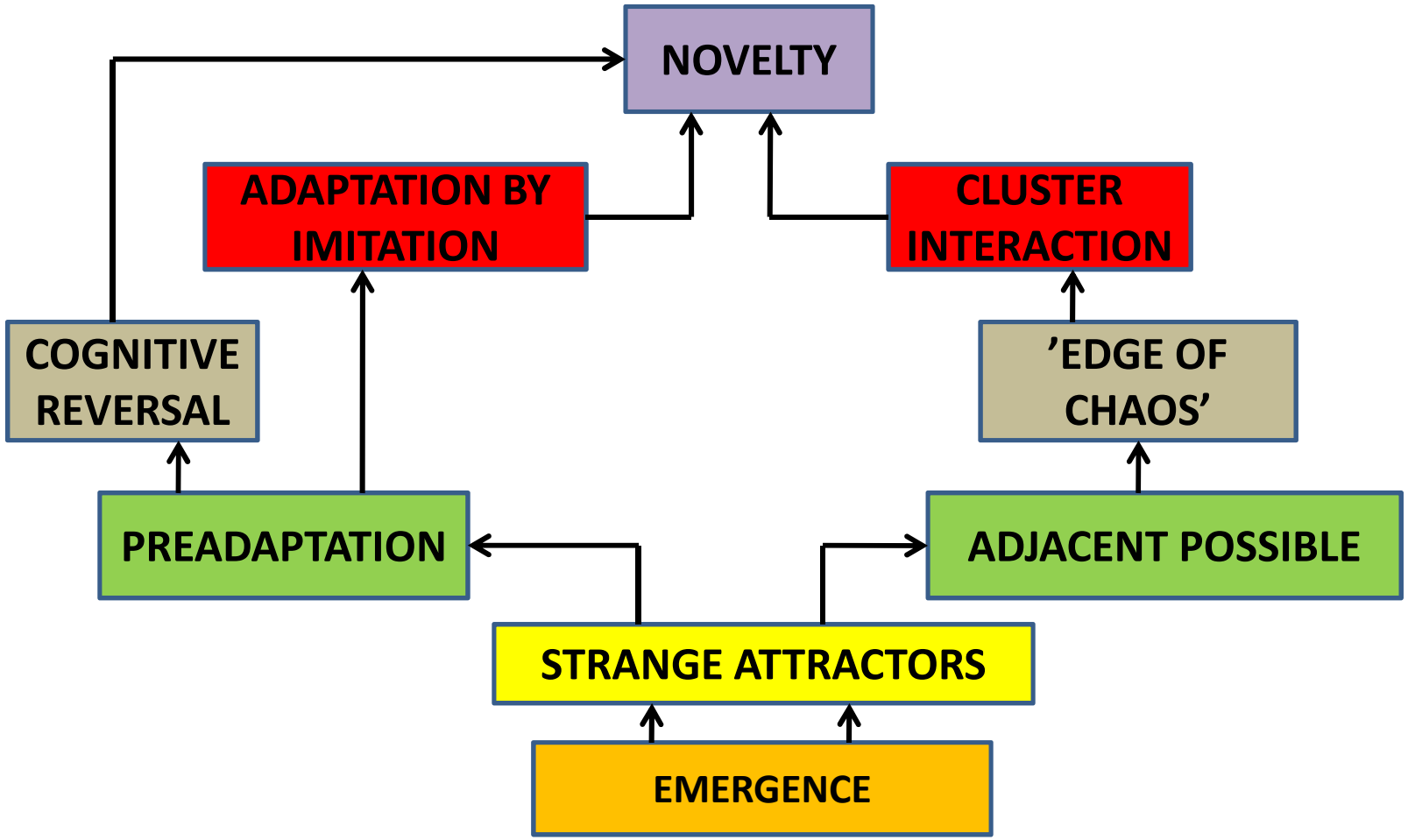
Relatedness in Fibre Optics: The Co-evolutionary Model of multi-regime interaction and reconfiguration (after Cattani, 2005)



Path Inter-dependence & Regional Innovation



Complex Adaptive Systems – Emergence through Strange Attractors to Novelty



Reverse innovation: How GE is disrupting itself

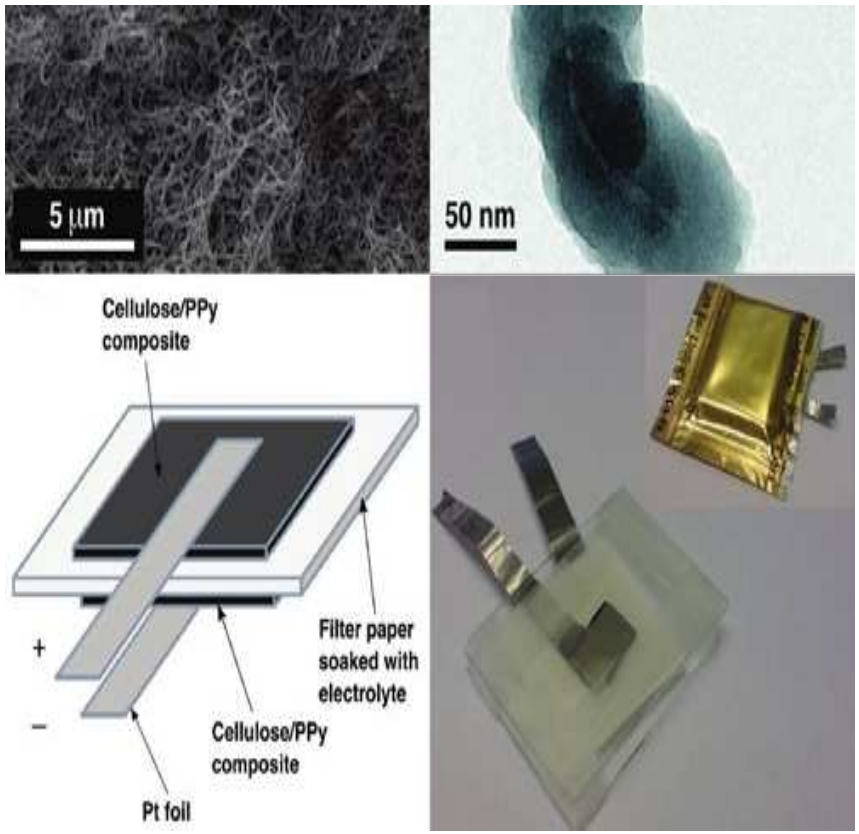
Source: J. Immelt, V. Govindarajan & C. Trimble (2009) *Harvard Business Review*, October

- GE Healthcare's Mac 400 *electrocardiogram* machine, was developed for markets in rural India and China.
- GE Healthcare made further improvements to the technology and brought the new model, the Mac 800, pictured inset (right)
- Next it was sold in the U.S, where it found new applications, such as at accident sites.

Connectivity to medical doctor is by SMS message from mobile phone-style keypad

While we are still on the subject of ‘strange attractors’

UppsalaBio Algae-based Battery

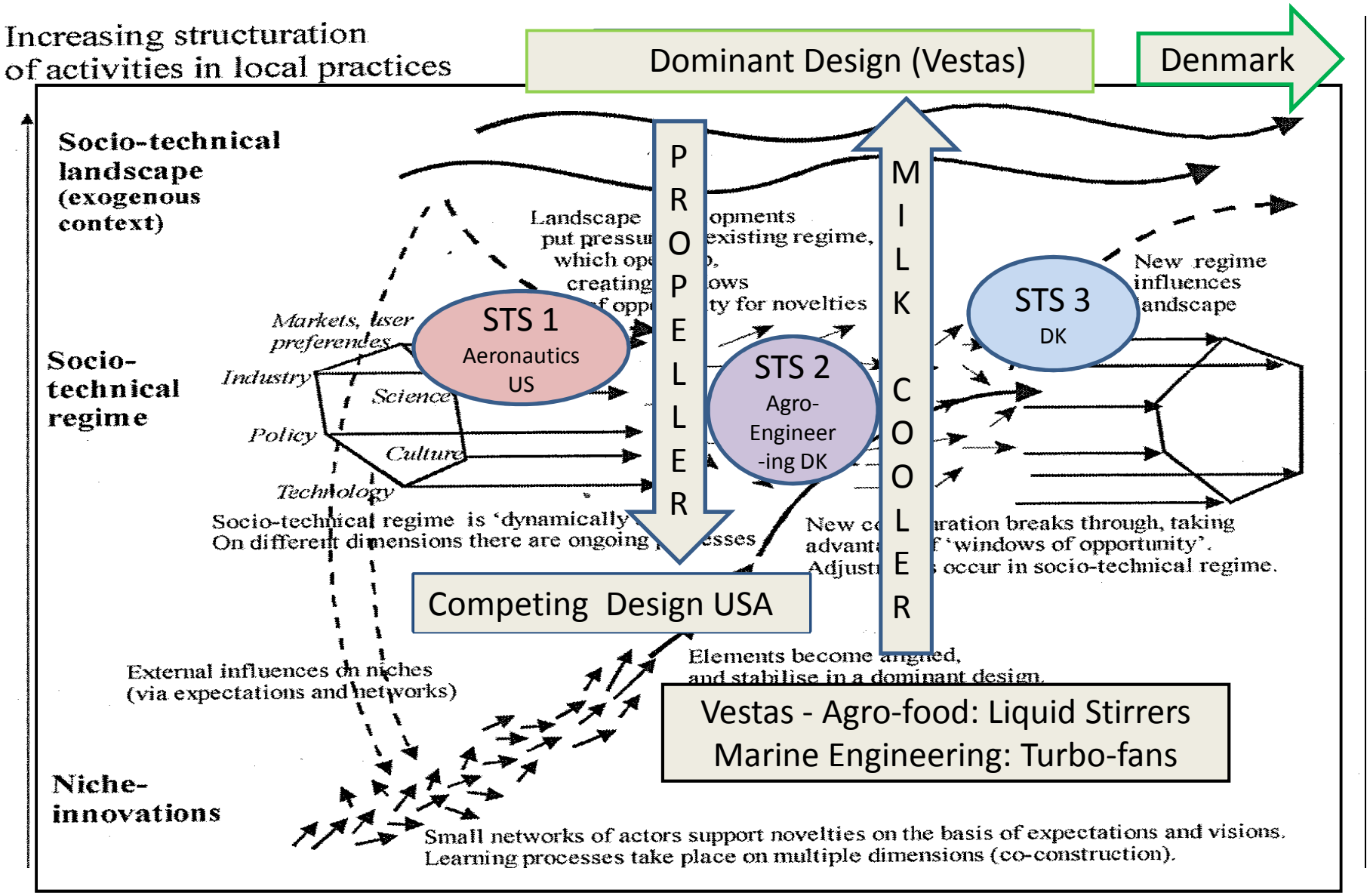


Who’s buying?

- **IKEA** –
- Photovoltaic textiles
- You can re-charge mobile phone with plug-in to curtains

- **Motorola** –
- EU Mobile phone recycling regulation 2014
- Paper-based batteries are ‘green’

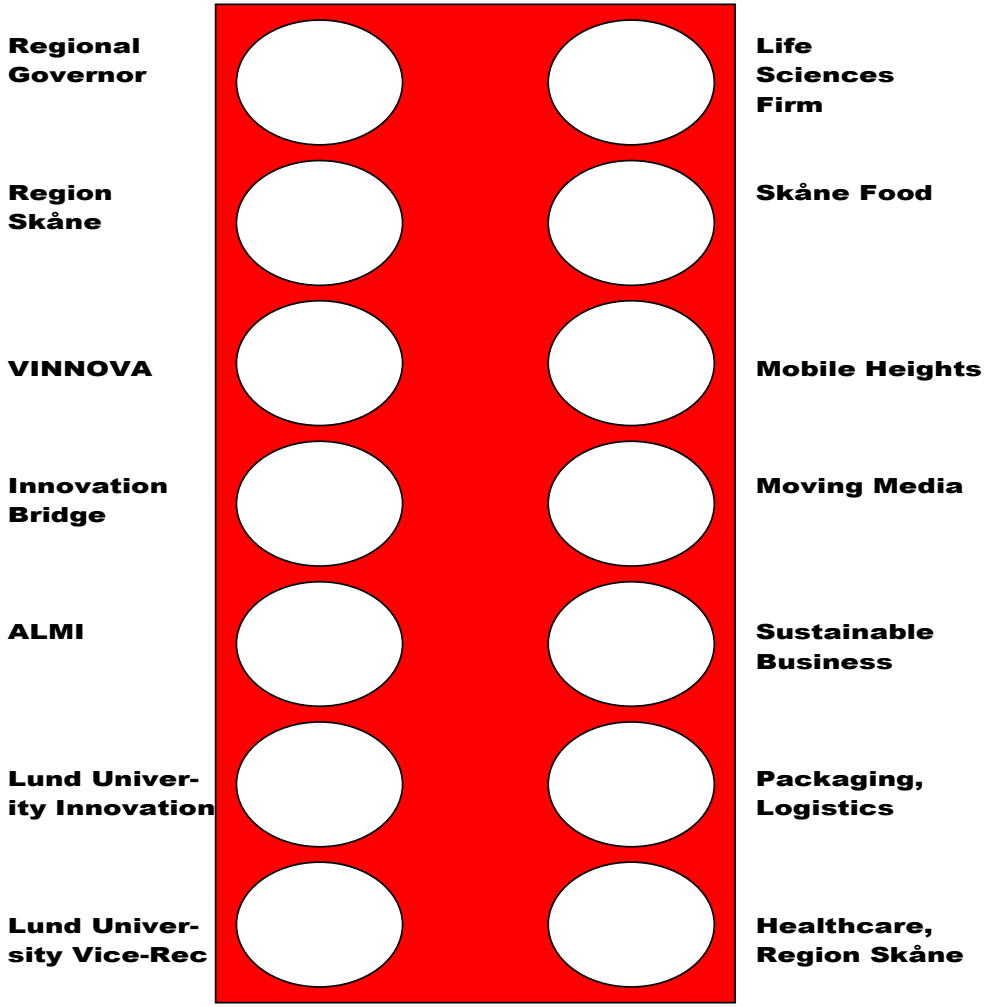
Co-evolutionary Transition Model: Niche>Regime>Landscape (Source: Geels, 2006)
for Wind Turbine Eco-innovation (Source: CASS)

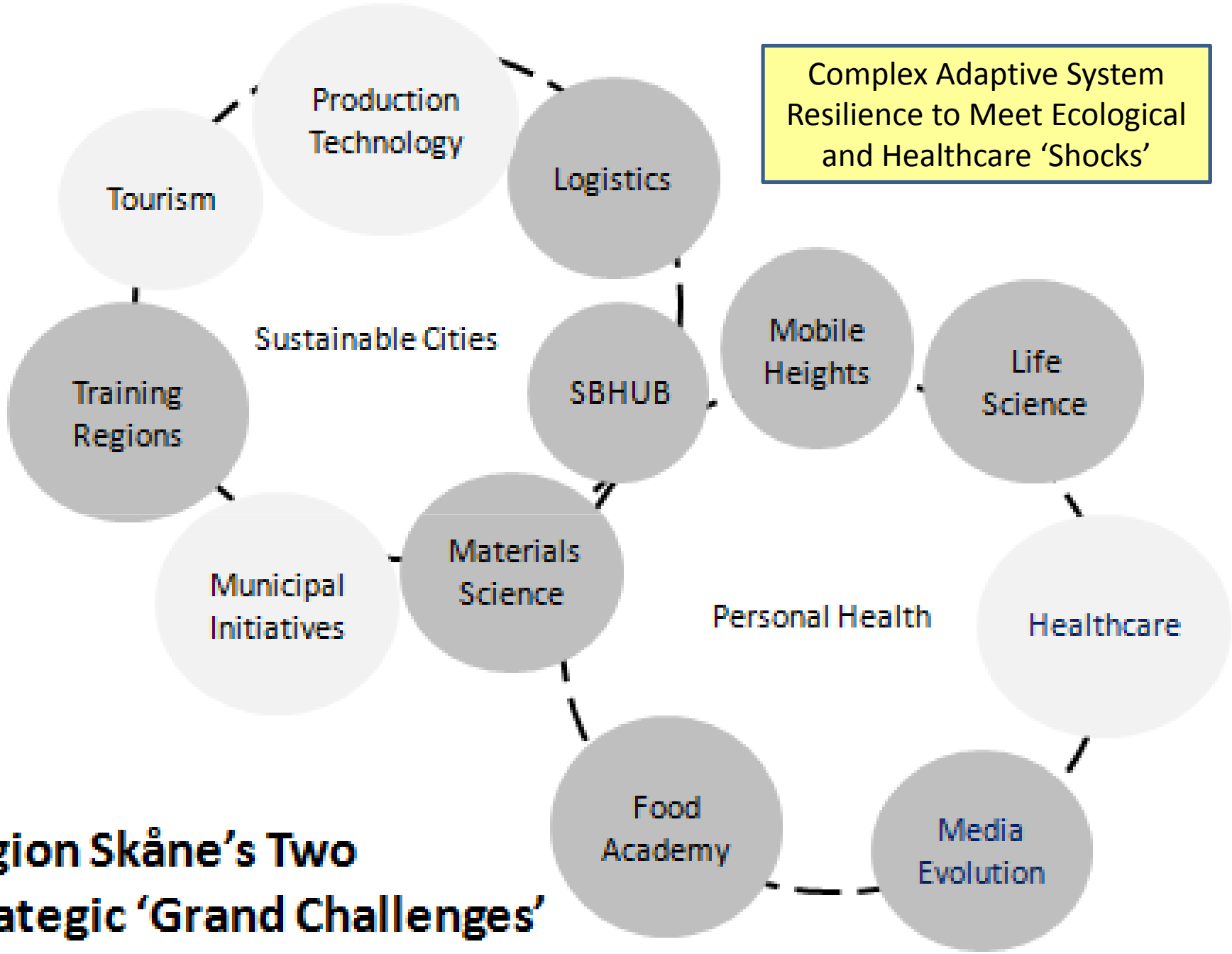


‘Value Variety’ Regional Regime

National Agency Learning: 2011

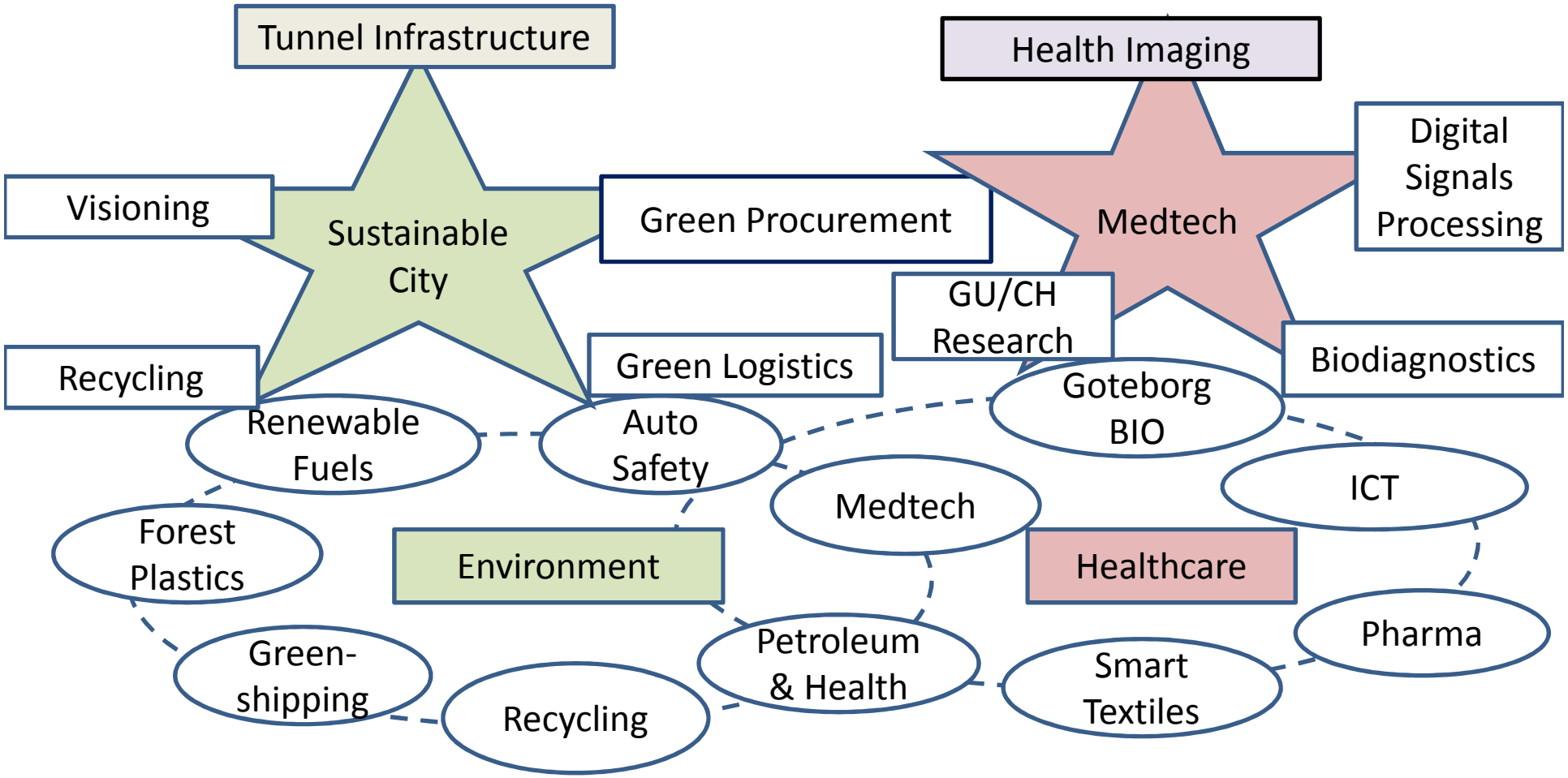
Skåne ‘White Spaces’ Sounding Board: 2009





Region Skåne's Two Strategic 'Grand Challenges' Innovation Platforms

Västra Götaland region's 'Iconic Projects' resilience to 'eco' and 'healthcare' shocks



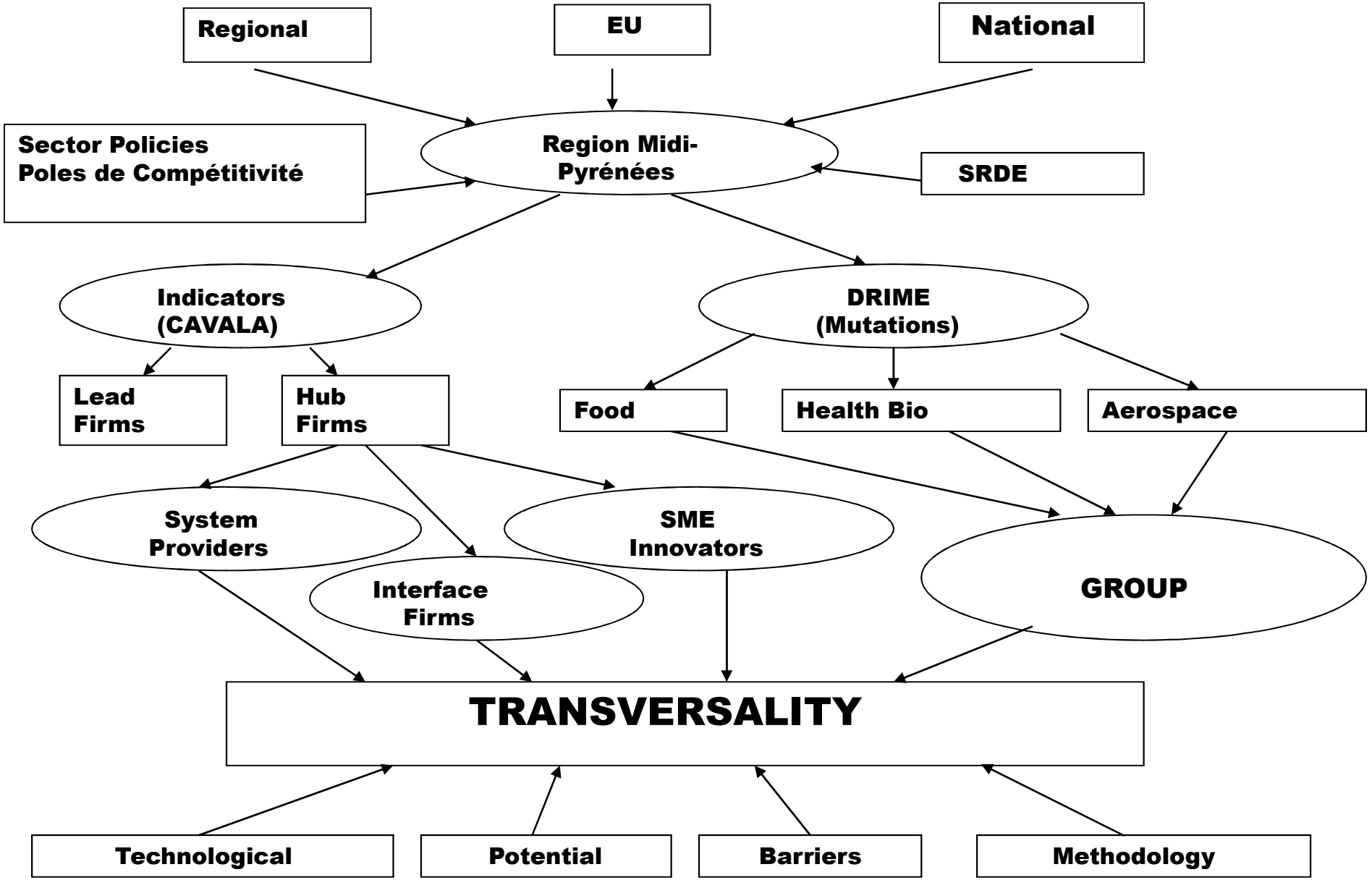
‘Storytelling’ Innovation Model: Bavaria’s Innovation Matrix

- *Bayern Innovativ*’s innovation platforms
- Orchestration & Narrative (e.g. ‘Living Lighter’)
- More than **1,000 new co-operations** initiated annually:
- Some 10% become ***commercial innovations***

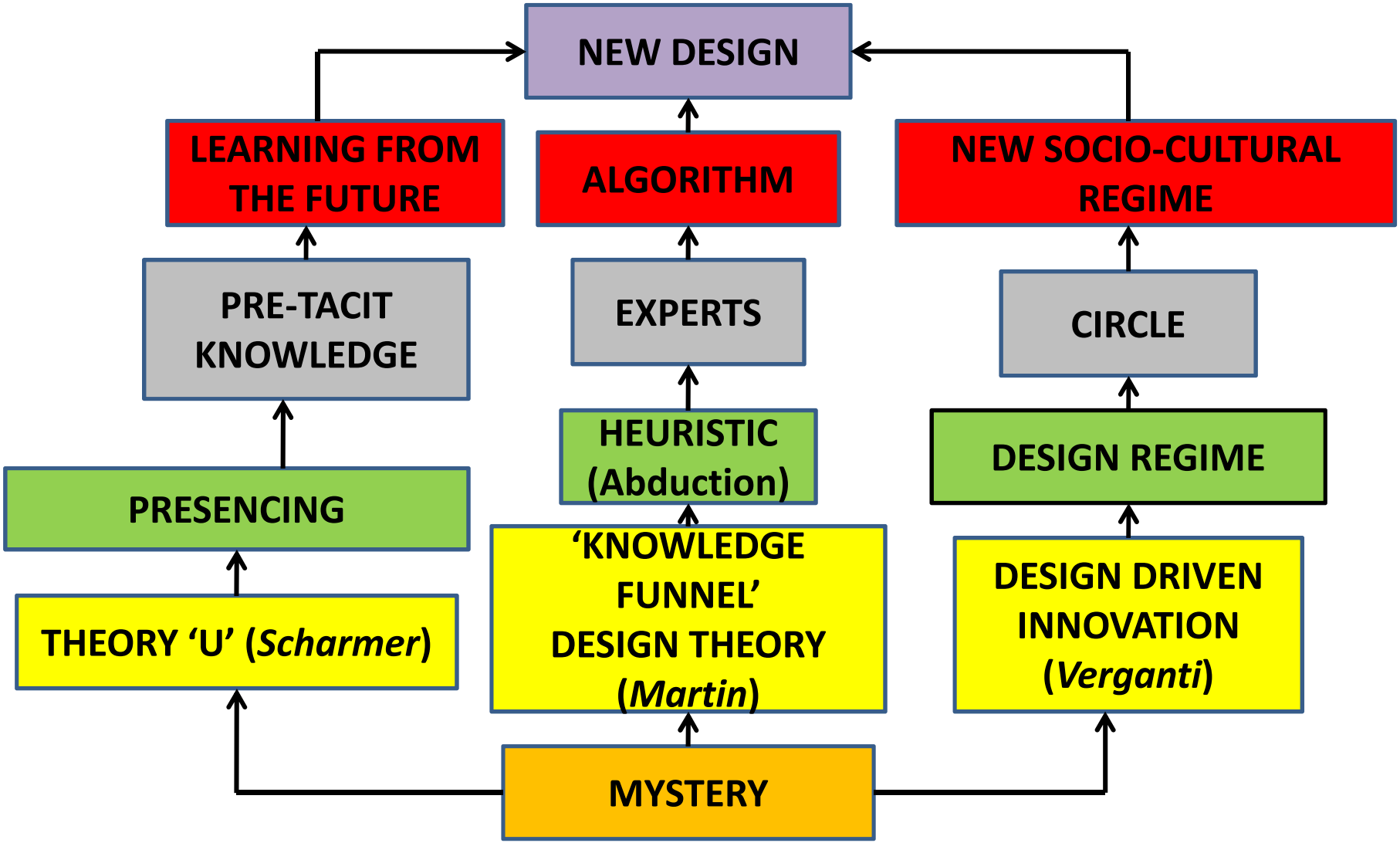
Examples

- ***Laser technology*** adapted to beam nanoscale droplets onto microarrays for rapid bioanalysis
- ***Mechatronic systems*** for car engine management that have been transferred to bus steering systems
- ***Portable fuel cells*** that have been applied in automotive electronics
- ***Plastic injection moulding*** processes from button manufacturing which have been implemented in automotive plastic components
- ***A logistics and transport*** company that has secured a contract with one of the world´s largest Internet suppliers
- ***A technical textile producer*** won a contract in medical engineering

Midi-Pyrénées Transversal Innovation Group Model



What Can Happen in the Adjacent Possible



Regional Innovation System Design

Region Dimension	Lahti	Skåne	Lombardy
Focus	Furniture	Shipbuilding	Design goods
Shocks	Hollowing-out	Deindustrialisation	Socio-cultural regime
Responses	Platform method	'White Spaces'	Regime change
Linkage	Expert panels	'Sounding Board'	Design Circle
Technologies	Cleantech	Sustainable City	Design innovation

So what is this design process?

- Facilitate idea generation (mind maps & dialogue)
- Negotiate value (interactive trade-offs)
- Visualise the intangible (systems expression)
- Navigate complexity (explore the 'adjacent possible')
- Mediate stakeholders (transverse governance)
- Synthesise strategy (create innovative system of the future)

Summary

- The regional system ‘self-designs’ – by evolution
- It unfolds what is enfolded in the system
- The complexity approach has no ‘global designer’
- But the ‘system’, in practice, has ‘designers’
- Novelty emerges from system continuity, co-evolution and transition ‘by design’
- Designers exploit ‘cluster cross-over’ variety
- Variety enables both ‘relatedness’ and ‘strange attractor’ path inter-dependence
- However, innovation, as with evolution, is unpredictable

Provocations

- How can RISs engage with big issues, like demographics, refugees, disasters, storms, earthquakes? Conclusion - they must and can.
- Recognise that 'Grand Challenges' are far from 'smart specialisation' and much more about 'value variety'
- Take a broad, system-design rather than a 'micro-design' approach for policy purposes. Pay attention to 'design process'.