Innovation for a World in Transition

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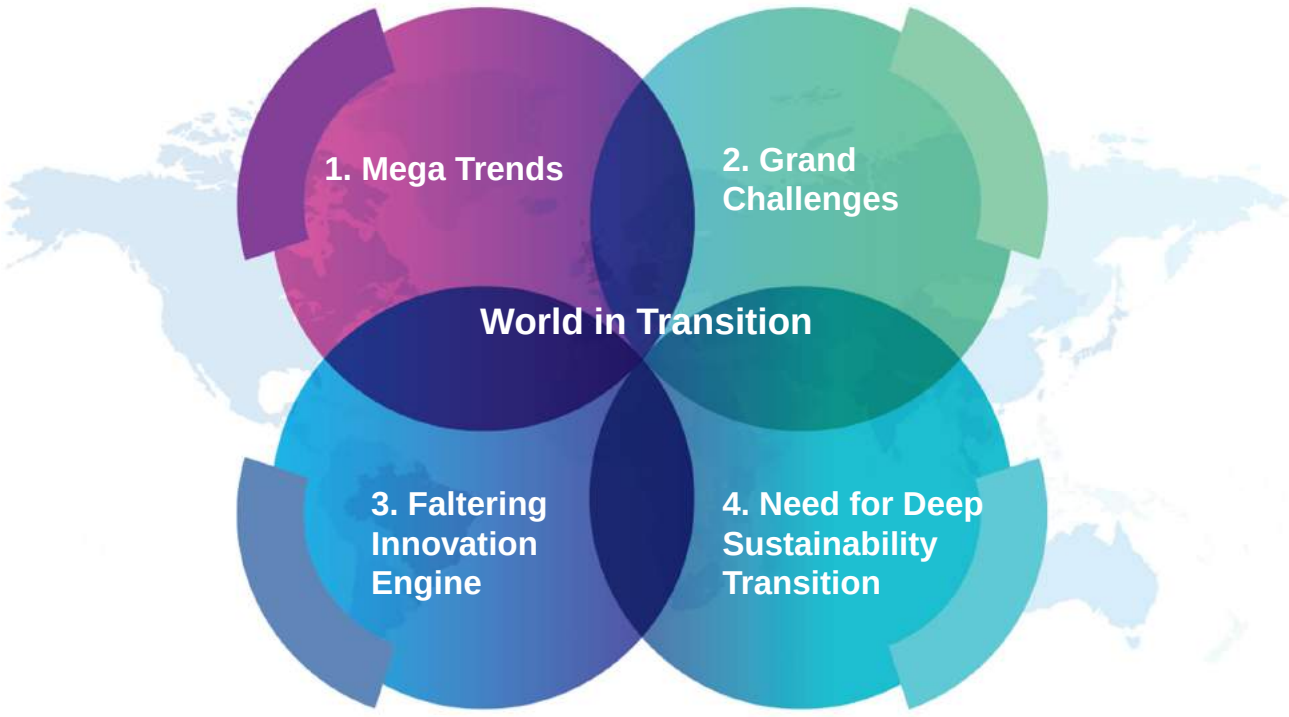
A World in Transition: Four Expressions



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1. Mega Trends

Economic Crisis

Megacities

Climate Change

Multi-polar world

Inequality

Migration

New Wars

Hollowing out of Nation-States

2. Grand Challenges Translated in 17 UN SDGs

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Web: www.ipsp.org Twitter: @ipsprogress

3. The Innovation Engine Falters

Creative Destruction is becoming Destructive Creation

4. Deep Transition Required

1 Transition of individual sociotechnical regimes/systems

2 Need for nexus of system innovations: techno-economic paradigm

3 Moving in a similar direction

World in Transition demands: Riding the ways of the megatrends, addressing grand challenges, modifying the innovation engine, working towards a deep transition of multi-socio-technical systems and avoiding a new world war.

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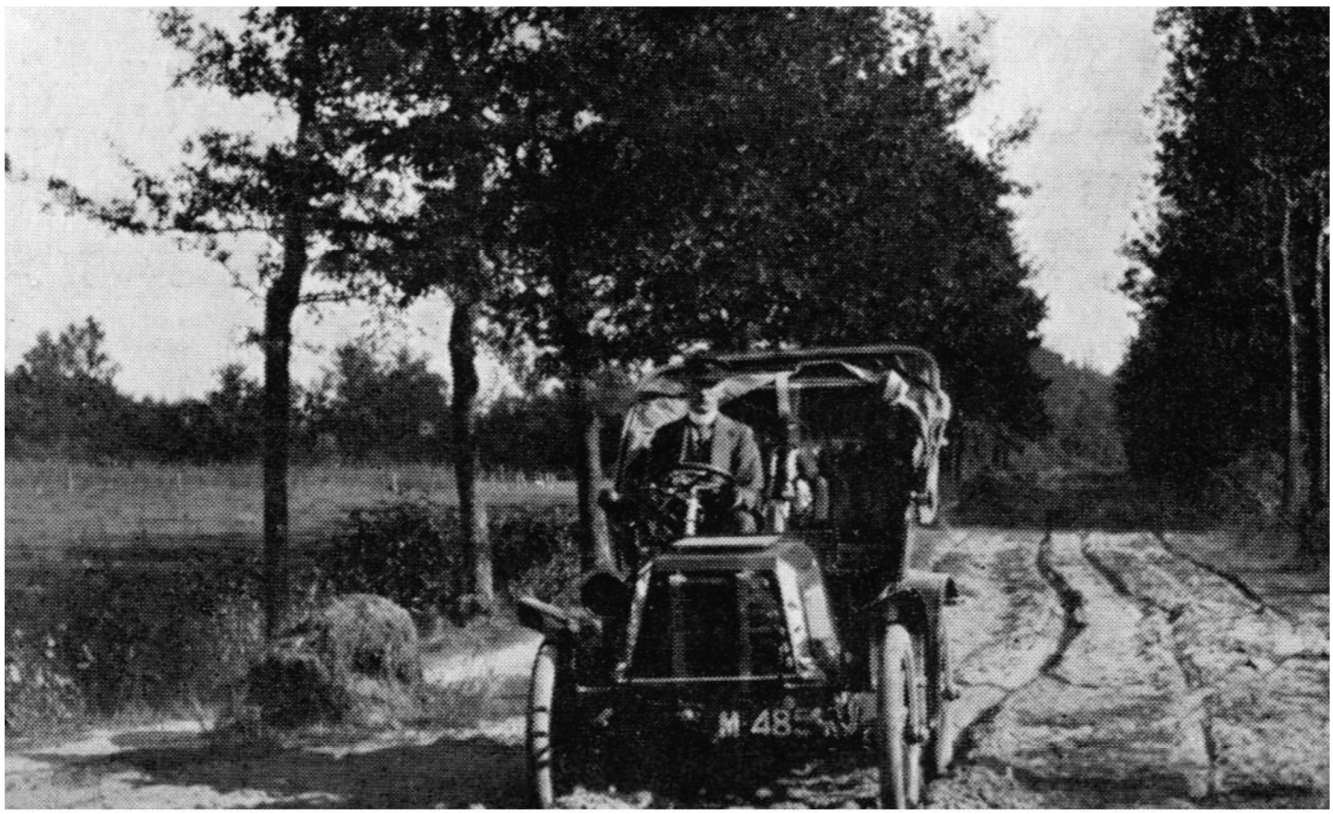
A Socio-technical System: Mobility

Definition of a Socio-technical Regime:

"A technical regime consists of a distinct set of stable rules, used by actors to guide socio-technical design and use. This rule-set is embodied in shared engineering search heuristics, ways of defining problems, user preferences, expectations, product characteristics, skills and standards."



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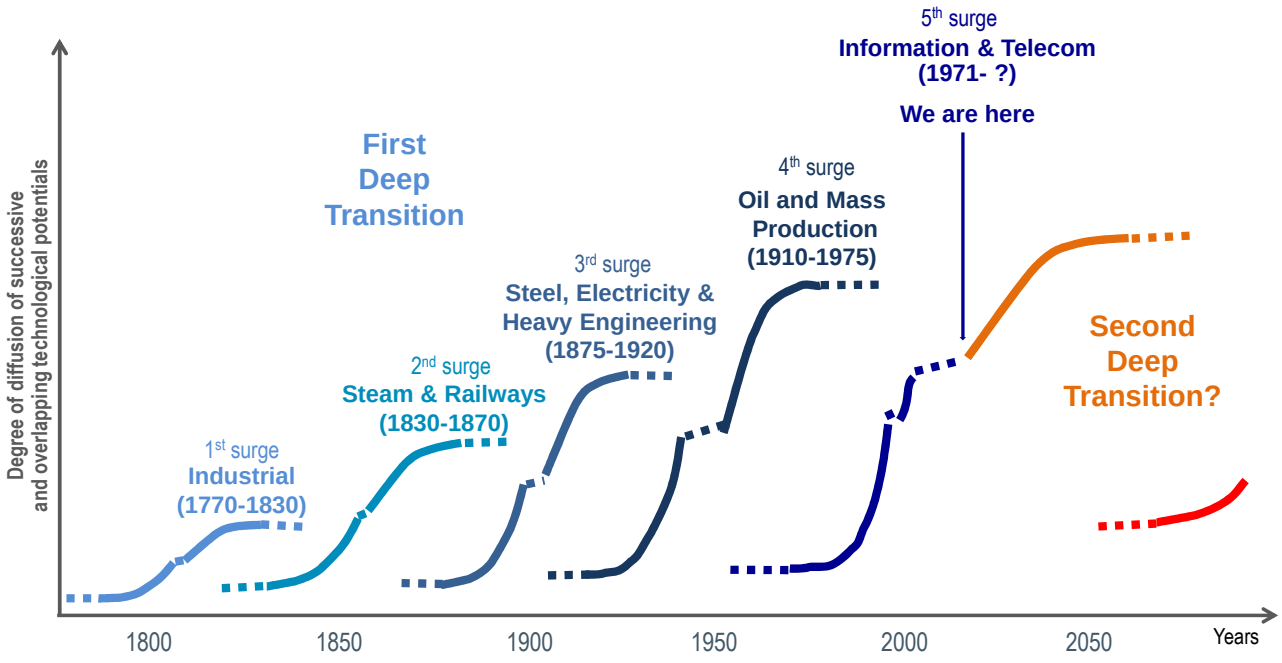
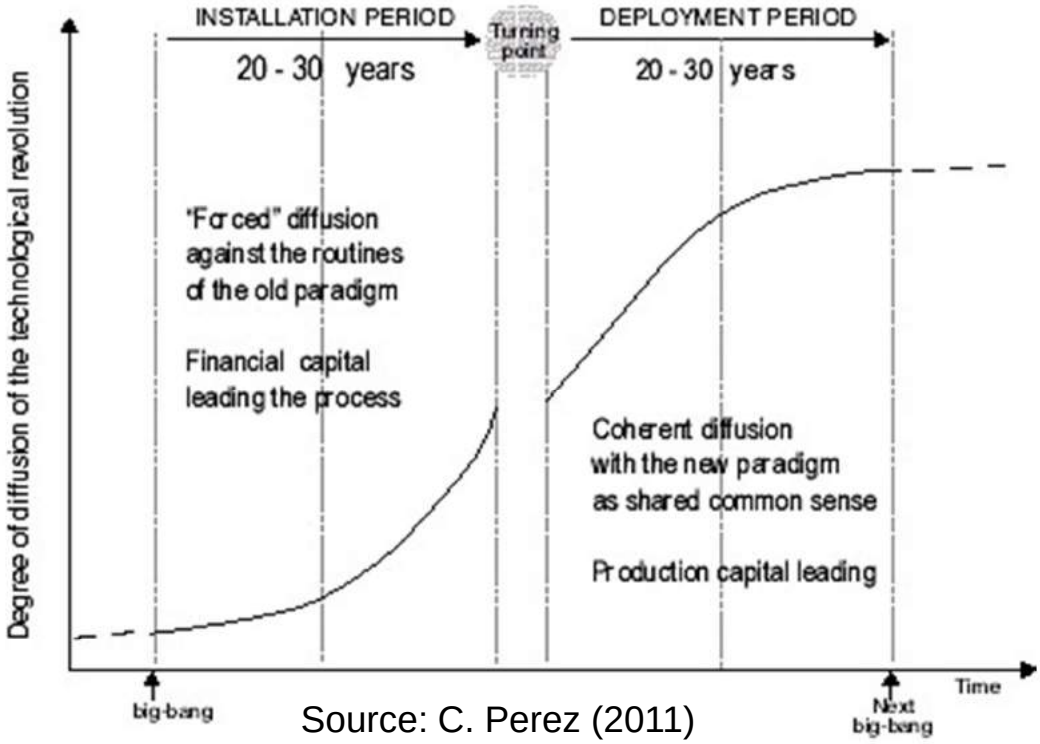
First and Second Deep Transitions



Source: Adapted from C. Perez (2002)

Installation & deployment periods



Source: C. Perez (2011)

Installation & deployment periods

GREAT SURGE	Date Technologies Core country	INSTALLATION PERIOD Bubble prosperity	TURNING POINT Recessions	DEPLOYMENT PERIOD "Golden Age" prosperity	
1st	1771 The Industrial Revolution Britain	Canal mania	1793–97	Great British leap	
2nd	1829 Age of Steam and Railways Britain	Railway mania	1848–50	The Victorian Boom	
3rd	1875 Age of Steel and heavy Engineering Britain / USA Germany	London funded global market infrastructure build-up (Argentina, Australia, USA)	1890–95	Belle Époque (Europe) "Progressive Era" (USA)	
4th	1908 Age of Oil, Autos and Mass Production / USA	The roaring twenties in USA Autos, housing, radio, aviation, electricity	Europe 1929–33 USA 1929–43	Post-war Golden age	
5th	1971 The ICT Revolution USA	Emerging markets dotcom and Internet mania real estate and financial casino	2000 & 2007-08 -???	Sustainable global Golden Age"?	

We are here

Source: C. Perez (2013)

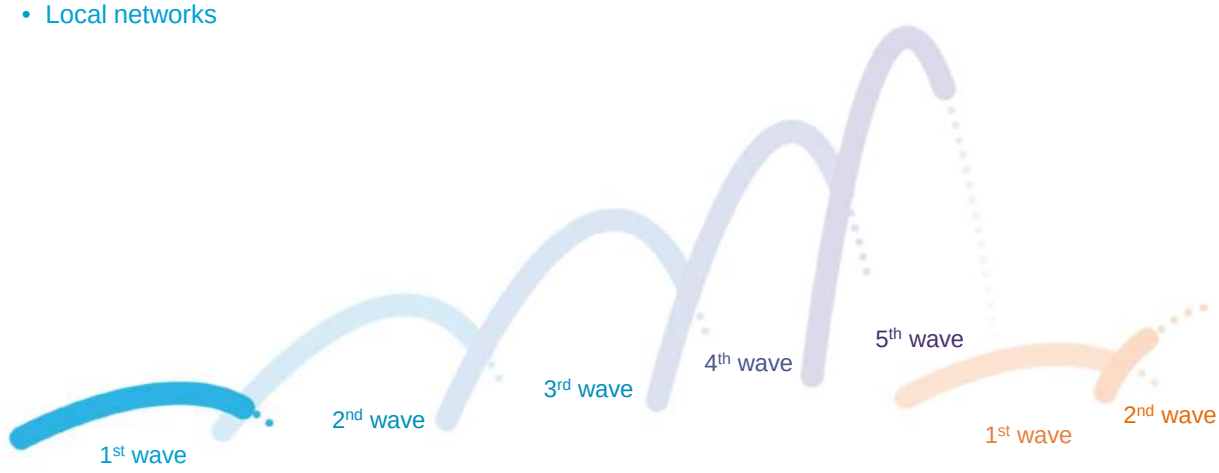
The Techno-economic Paradigm

"A best practice model made up of a set of all pervasive generic technological and organizational principles, which represents the most effective way of applying a particular technological revolution and using it for modernizing and rejuvenating the whole of the economy. When generally adopted, these principles become the common-sense basis for organizing any activity and for structuring any institution." (Perez, 2002: 17)

The Techno-economic Paradigm

First Surge from 1771: The Industrial Revolution

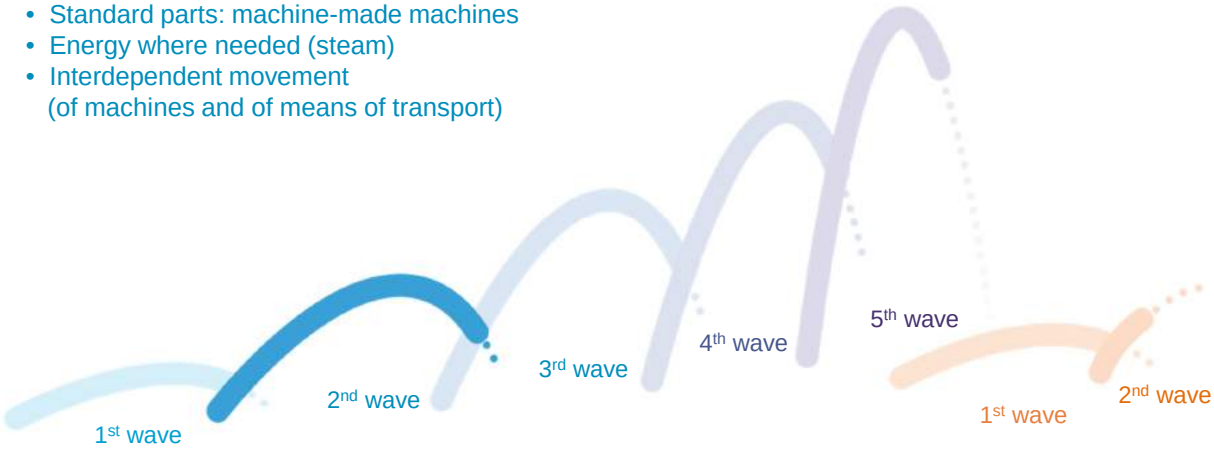
- Factory production
- Mechanisation
- Productivity: time keeping and time saving
- Fluidity of movement
- Local networks



The Techno-economic Paradigm

Second Surge from 1829: Age of Steam and Railways

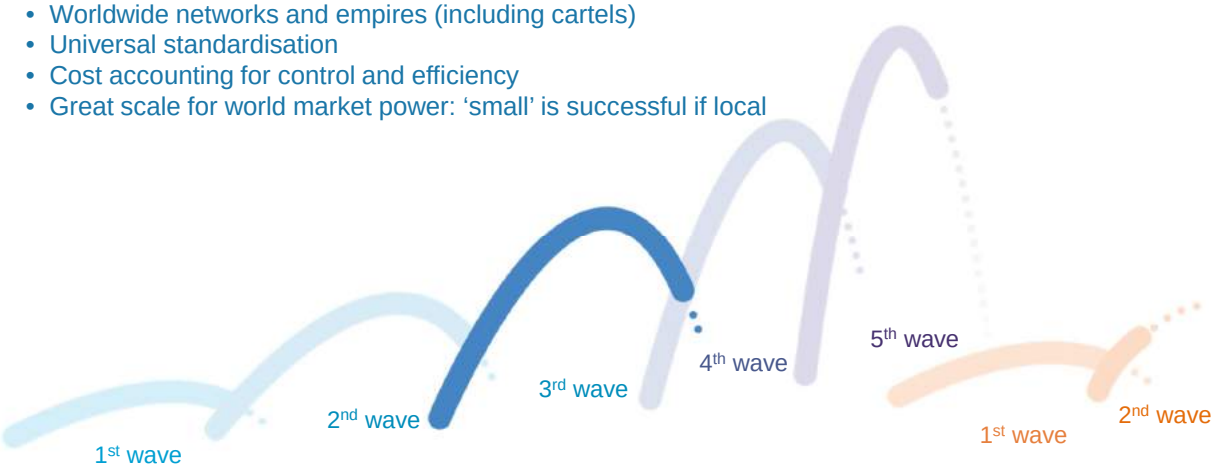
- Economies of agglomeration
- Industrial cities
- National markets
- Power centres with national networks
- Scale as progress
- Standard parts: machine-made machines
- Energy where needed (steam)
- Interdependent movement
  (of machines and of means of transport)



The Techno-economic Paradigm

Third Surge from 1875: Age of Steel, Electricity and Heavy Engineering

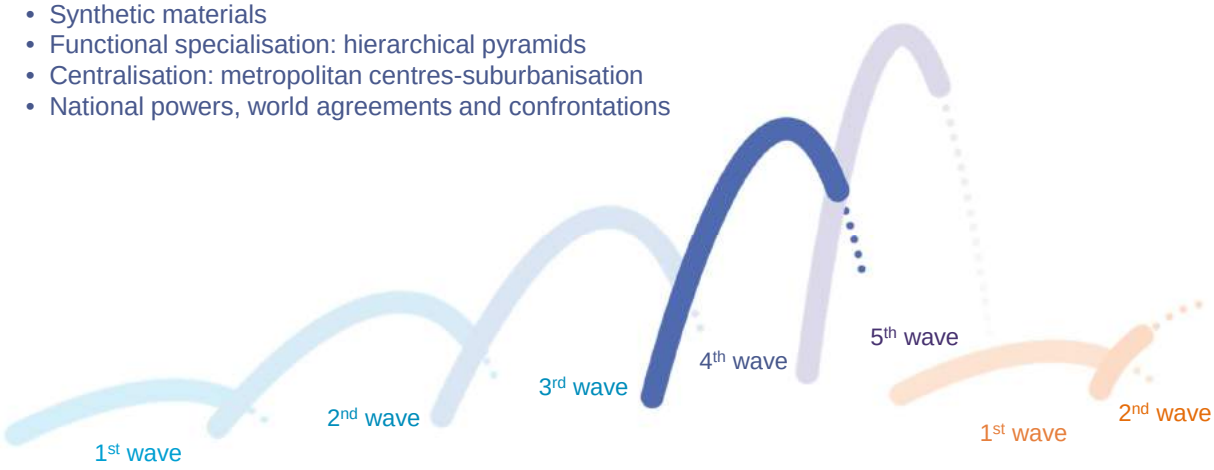
- Giant structures (steel)
- Economies of scale of plant: vertical integration
- Distributed power for industry (electricity)
- Science as a productive force
- Worldwide networks and empires (including cartels)
- Universal standardisation
- Cost accounting for control and efficiency
- Great scale for world market power: ‘small’ is successful if local



The Techno-economic Paradigm

Fourth Surge from 1908: Age of Oil, the Automobile and Mass Production

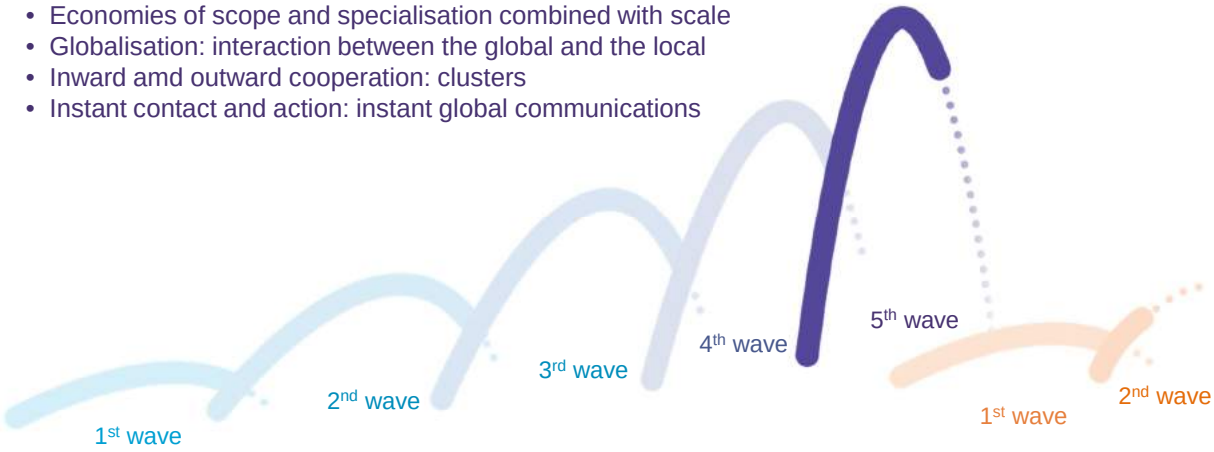
- Mass production / mass markets
- Economies of scale (product and market volume): horizontal integration
- Standardisation of products
- Energy intensity (oil based)
- Synthetic materials
- Functional specialisation: hierarchical pyramids
- Centralisation: metropolitan centres-suburbanisation
- National powers, world agreements and confrontations



The Techno-economic Paradigm

Fifth Surge from 1971: Age of Information and Telecommunication

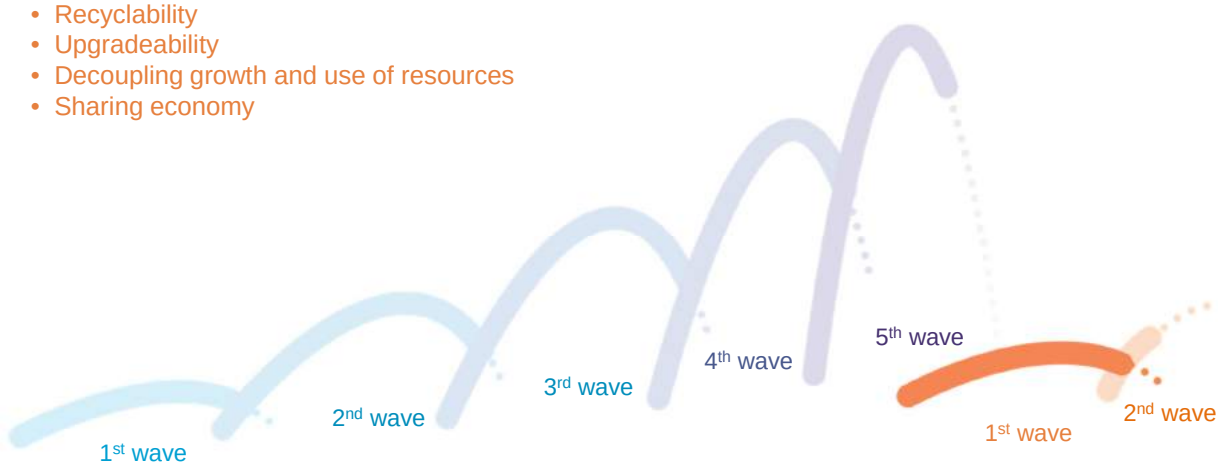
- Information-intensity (microelectronics-based ICT)
- Decentralised integration: network structures
- Knowledge as capital: intangible value added
- Heterogeneity, diversity, adaptability
- Segmentation of markets: proliferation of niches
- Economies of scope and specialisation combined with scale
- Globalisation: interaction between the global and the local
- Inward amd outward cooperation: clusters
- Instant contact and action: instant global communications

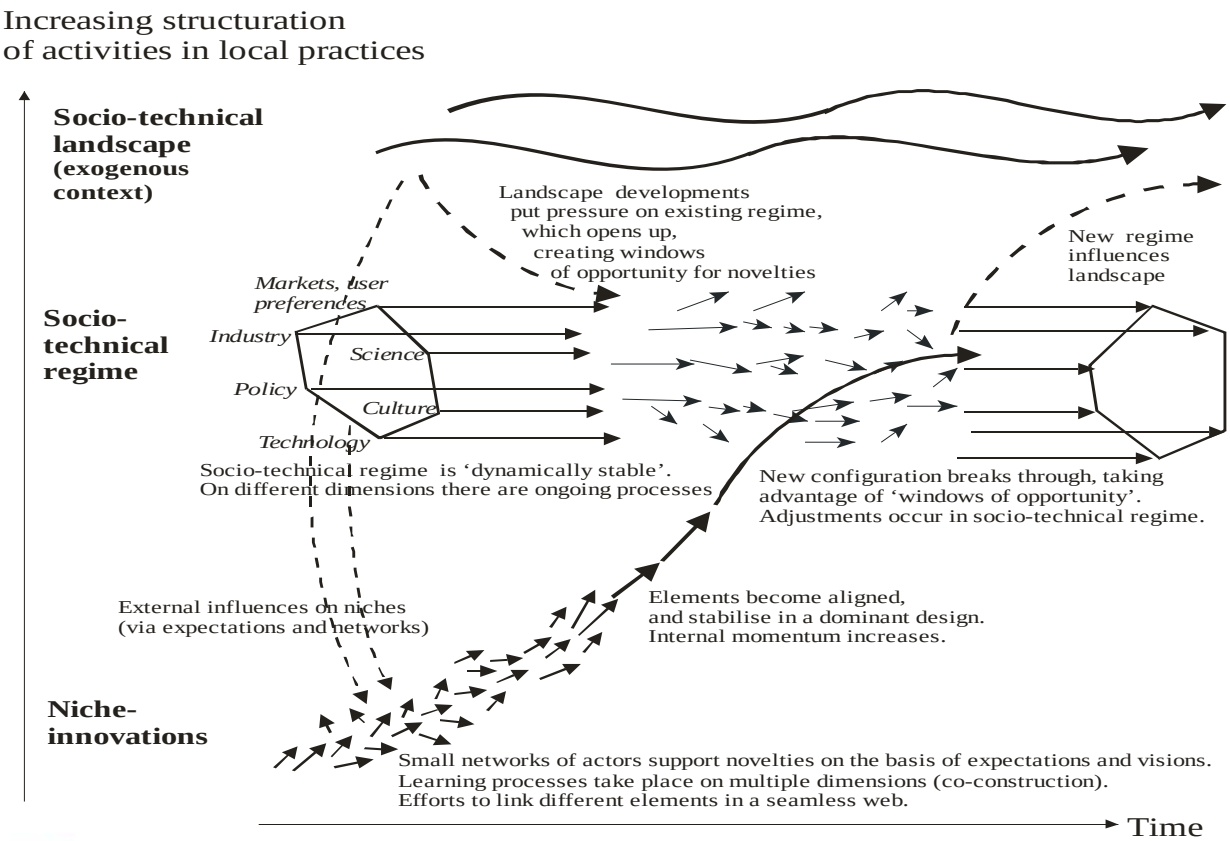


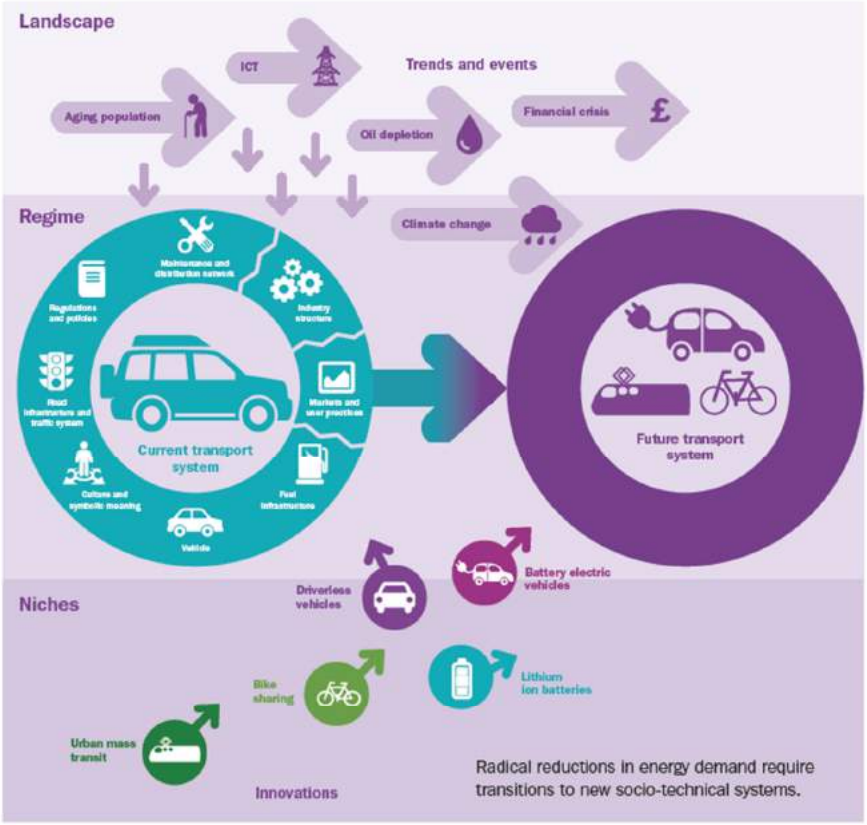
The Techno-economic Paradigm

Sixth Surge

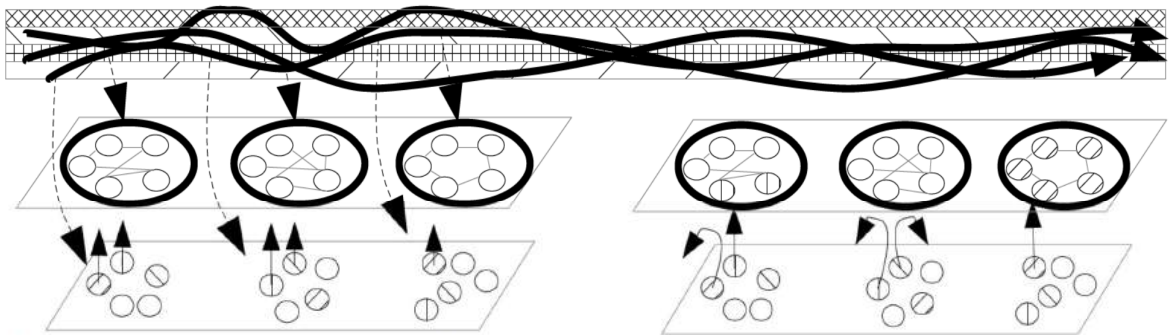
- Quality
- Durability
- Low-energy consumption
- Low or no carbon emissions
- Recyclability
- Upgradeability
- Decoupling growth and use of resources
- Sharing economy







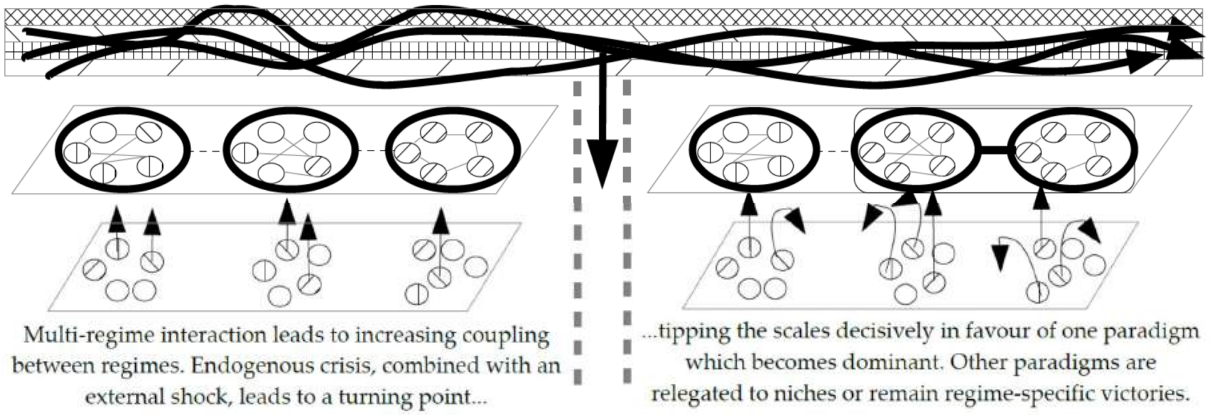
Deep Transition: Installation Period 1: The Irruption Phase



New techno-economic paradigms emerge and compete in several niches of individual socio-technical systems...

...leading to the partial success and possible dominance in certain regimes but not in others.

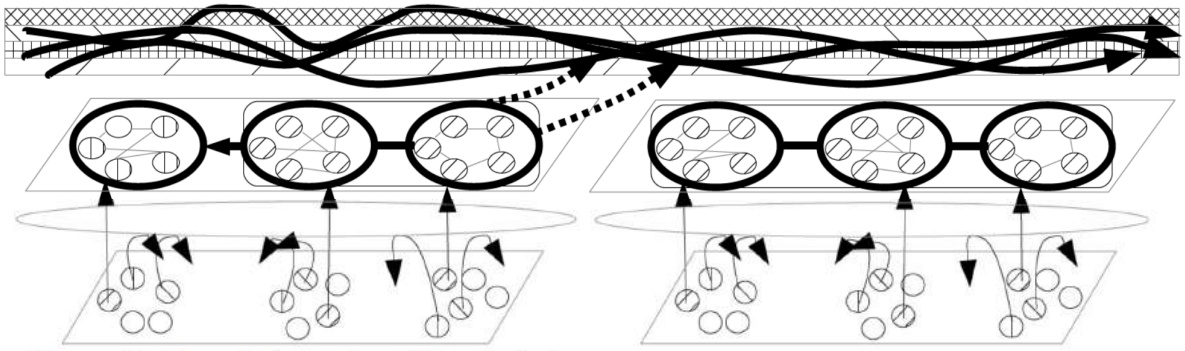
Deep Transition Installation Period 2: The Frenzy Phase



Multi-regime interaction leads to increasing coupling between regimes. Endogenous crisis, combined with an external shock, leads to a turning point...

...tipping the scales decisively in favour of one paradigm which becomes dominant. Other paradigms are relegated to niches or remain regime-specific victories.

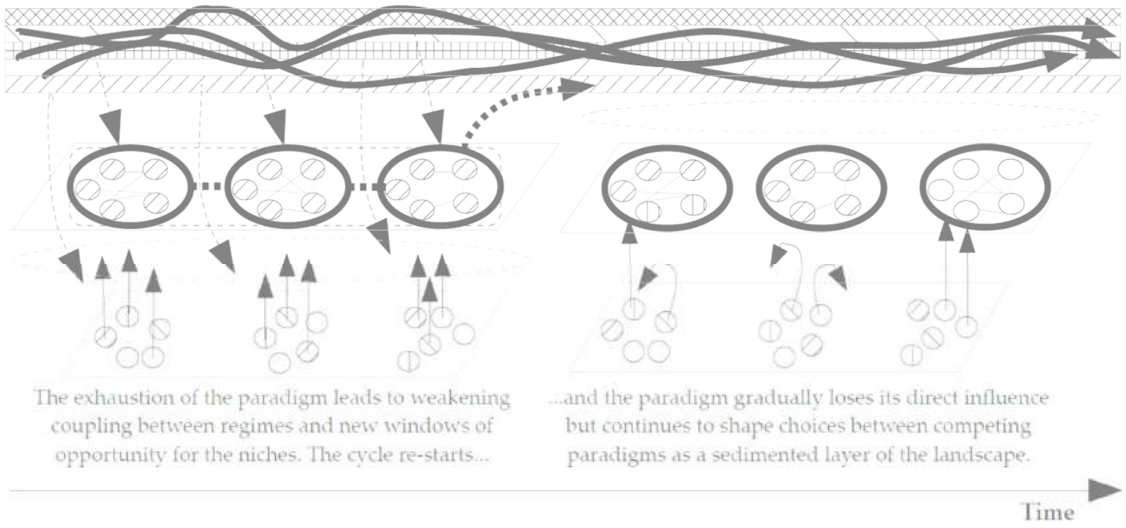
Deep Transition Deployment Period 1: The Synergy Phase



The paradigm increasingly structures niche technologies, diffuses to other regimes and influences the landscape...

...leading to its dominance in a wide variety of regimes.

Deep Transition Deployment Period 2: The Maturity Phase



Innovation for a World in Transition

1. Towards Co-construction: Aligning the Technological & the Social
2. Innovation Actors: New Connections & Capabilities
3. Experimentation & Participation: Multiple Pathways & Approaches
4. The Circulation Perspective: Fairer Distribution of Benefits

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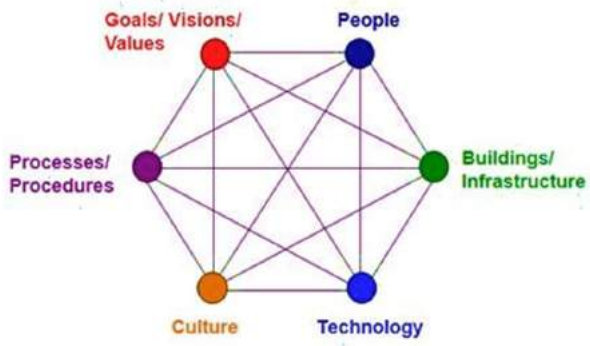
1. Innovation - Aligning the Technological & the Social

- Socio-technical, co-construction, co-evolution = avoid Technological & Social Determinism
- New Alignments in Building Niches & De-alignment in regimes



2. Innovation Actors: New Connections & Capabilities

- 'Mining' knowledge from many actors – firms, governments, civil society, users, men and women, Global South & North
- Draw from frontrunners, marginal actors as well as dominant sources
- Build capabilities to participate

3. Experimentation & Participation: Multiple Pathways

- Explore multiple options
- Experimentation
- Openness & flexibility

4. The Circulation Perspective

- Beyond national appropriation & diffusion perspective
- Local flexibility & global exchange
- Fairer distribution of benefits

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Research for a World in Transition

1. Problem-focused & interdisciplinary
2. Trans-disciplinary research building long term relationships
3. Bridging the divide between deeply academic & practical
4. Between Constructivist as well as Positivist
5. Between qualitative & quantitative

Building a Second Deep Transition Knowledge Infrastructure

- Challenge led - Research and teaching should have purpose and impact
- Integrate students into research and have research in teaching
- Inclusive - students, stakeholders, local and global
- Combine disciplinary grounding with bridging and interfacing skills
- Experimentation and institutional diversity
- Interfacing (or fusing?) Social Science/Humanities and Science/Engineering
- Open Access, Open Science

Thank you.

SPRU is hosting a major 50th Anniversary conference
7-9 September on 'Transforming Innovation'.
The first day has a focus on policy.

Please join us. More details at
www.sussex.ac.uk/spru