



# **Innovation Systems and Transitions Overview of recent developments**

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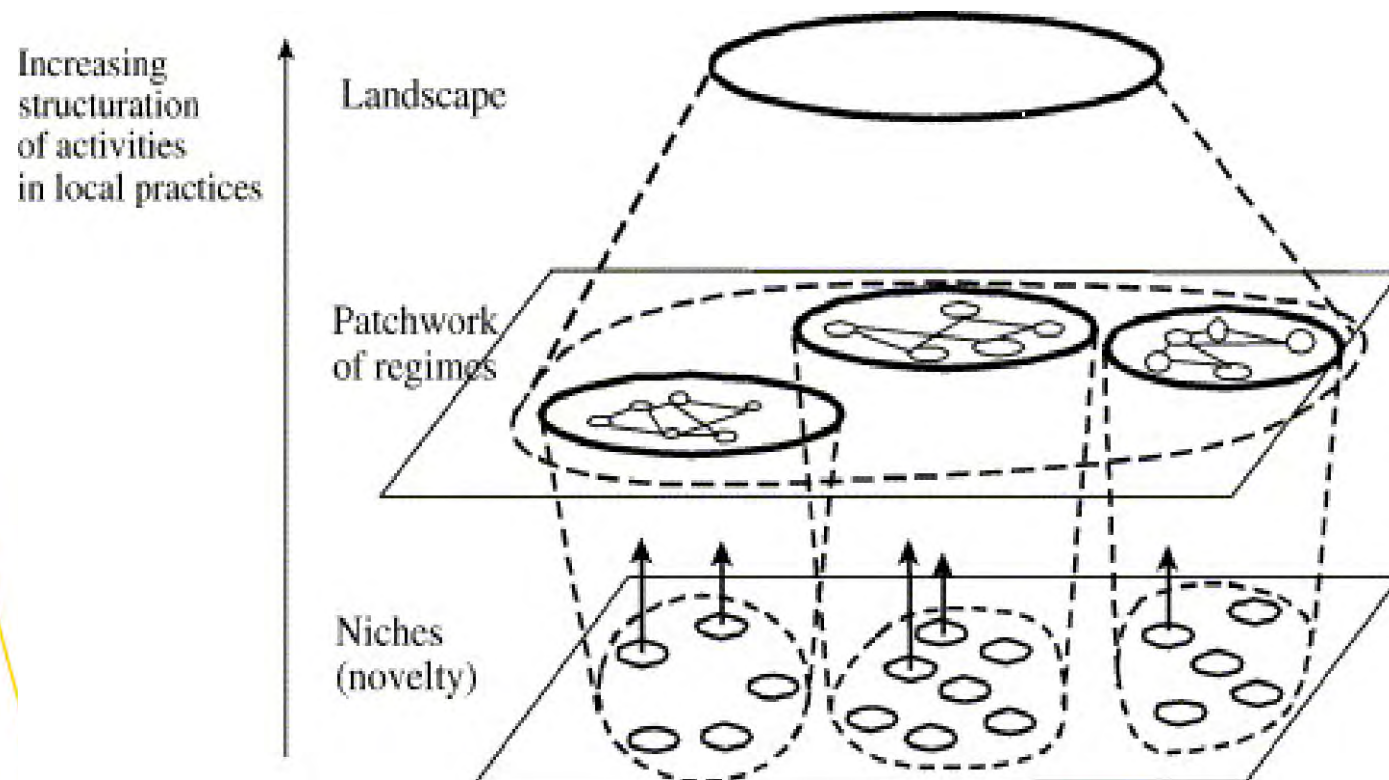


# Transition research

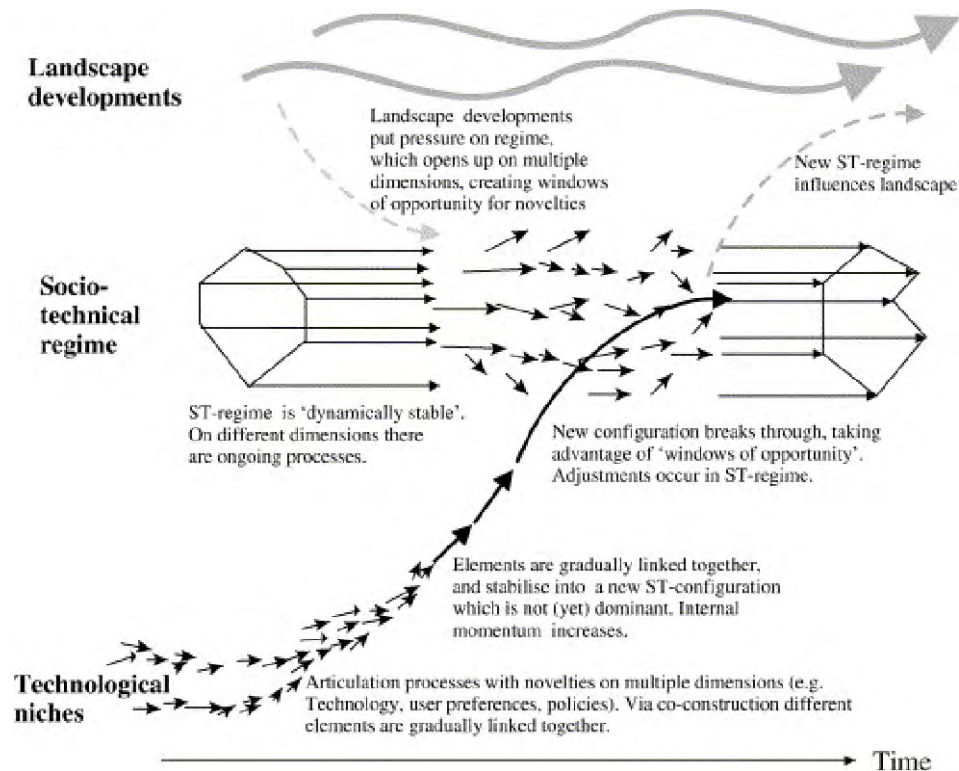
- understanding large societal transformations
- sustainability focus
- recent, fast growing community
- Environmental Innovation and Societal Transitions Journal
- IST conference
- High impact in innovation community; large share of highly cited papers in RP / TFSC are related to this field



# Multi level perspective



# Multi level perspective





# Socio-technisch regime

- Network of actors and social groups
  - They are active users and makers of the rules
- Rules (institutions)
  - Regulative: regulations, standards, laws
  - Cognitive: belief systems, guiding principles, problem definitions
  - Normative: values, behavioral roles, etc.
  - Constraining or enabling
  - vb roken
- Material and technical elements



# IS in transition research

- It is mainly the TIS approach that has become dominant in transition research
  - ✦ Focus on emerging sustainable technologies
- NIS, SIS or RIS could also be useful frameworks





# TIS and MLP

- Two main frameworks in transition studies
- Very similar in nature
  - Actors, networks
  - Institutions
  - Infrastructures
- Innovation / change is socio-technical process



- and yet:
- two different schools: fierce debate
- But remember: scientists need debate to create their own fame



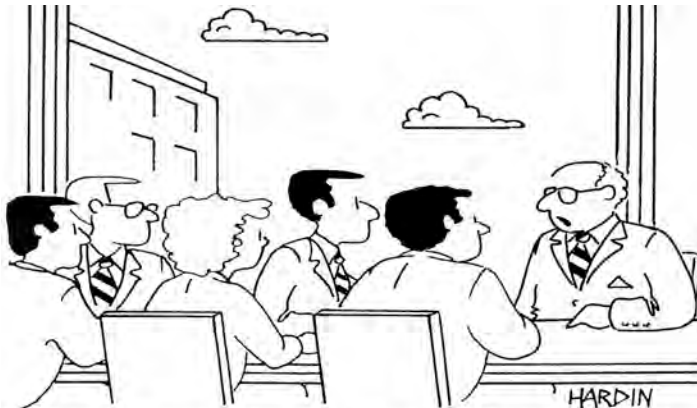


# TIS made large conceptual steps

- Focus on the dynamics of the innovation system
- Focus on what the system ought to do
  - ✦ Innovation system functions
  - ✦ Many structural configurations may lead to similar functional patterns
- ⑩ Focus on identifying blocking mechanisms + policy advice



# Entrepreneurial experiments



"We've considered every potential risk except the risks of avoiding all risks."



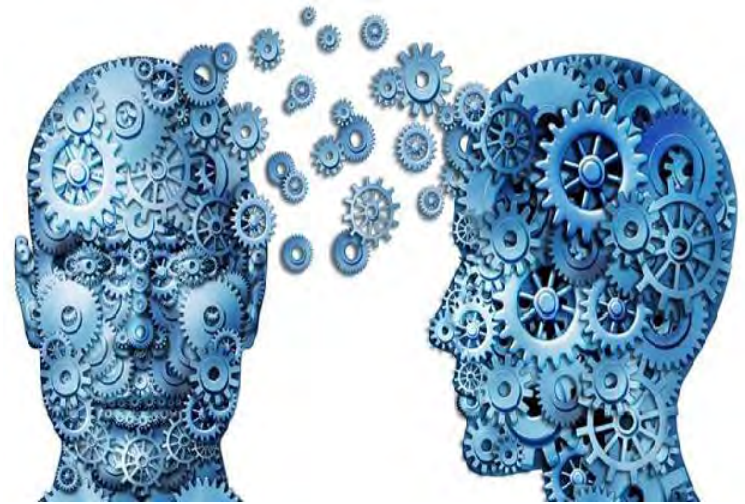
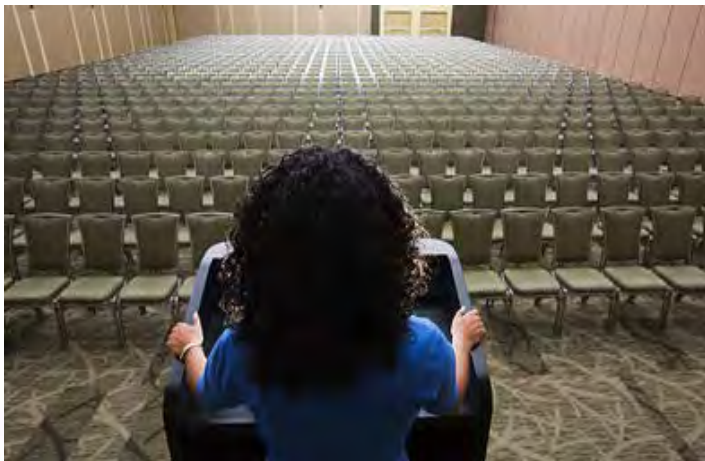
# Knowledge development







# Knowledge exchange





# Guidance of the search







# Resources mobilisation





# Market formation



Tax exemption  
for fuel based  
on renewable  
resources.



# Counteract resistance to change

Lobbying on Energy & Natural Resources, 2011

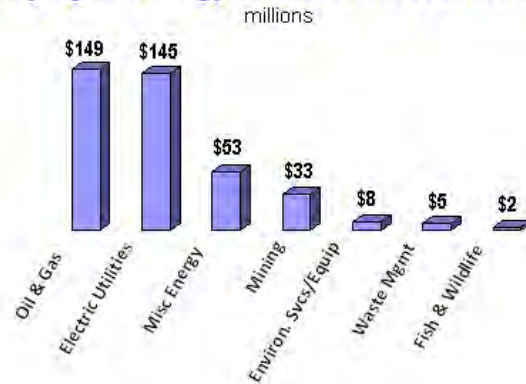
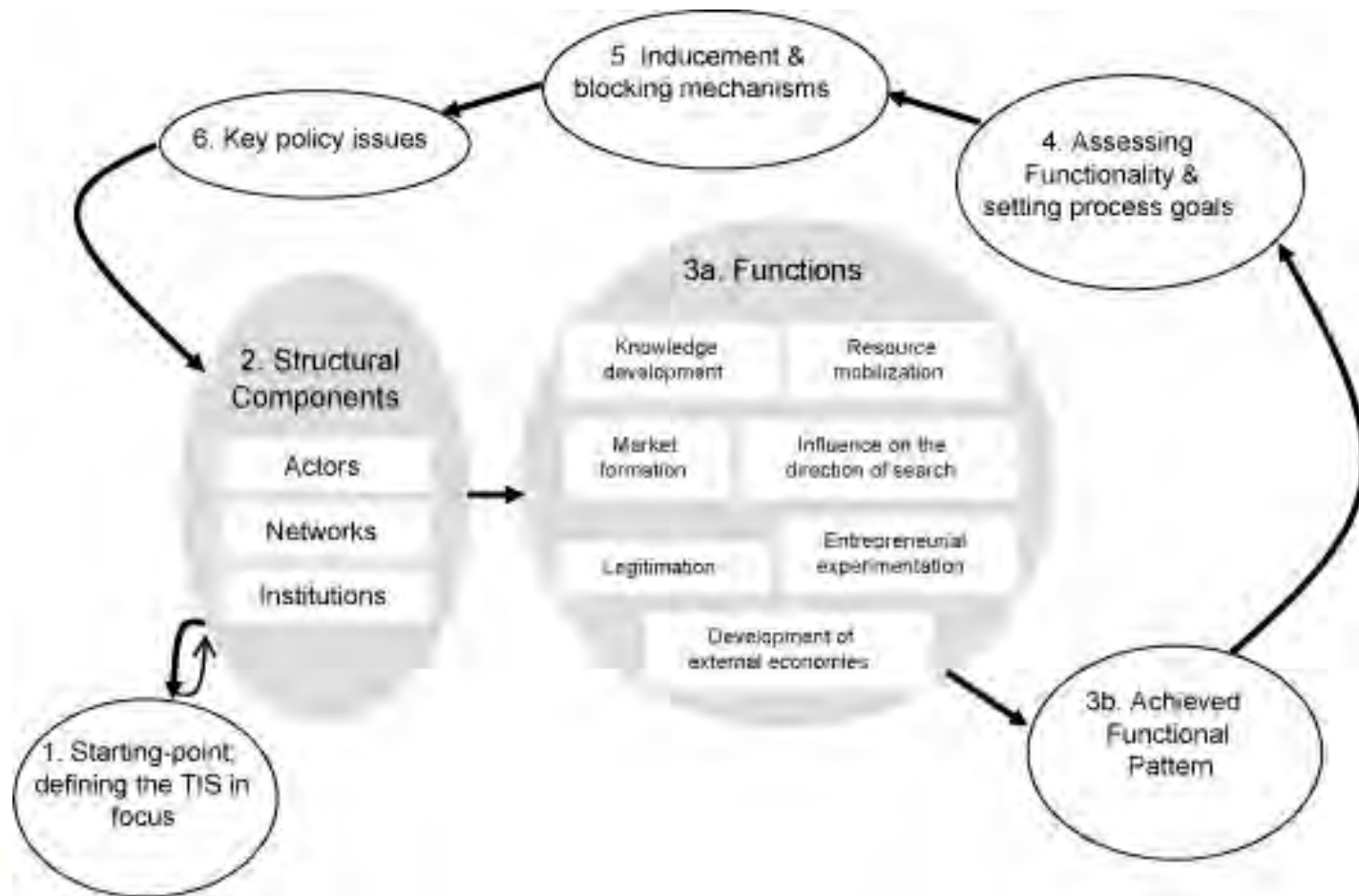


Chart: Chris Nelder | Data: OpenSecrets.org





Anna Bergek, Staffan Jacobsson, Bo Carlsson, Sven Lindmark, Annika Rickne

**Analyzing the functional dynamics of technological innovation systems: A scheme of analysis**

Research Policy, Volume 37, Issue 3, 2008, 407–429



# hot issues in the debate

- Lack of agency in TIS
  - “the goal of the system”
  - “system functions well when elements contribute to the goal of the system”
  - TIS is labeled as functionalist sociology
  - “Functions of innovation systems” does not help
- Causes for confusion:
  - wrong wording
  - engineering vs sociologist perspective
  - analyst versus insider perspective



## some hate systems

- "...the ... systems perspective ... serves to rob actors of any agency, as they find themselves pushed and pulled from one state to another"
- "To generate a theory of emergence, Stacey suggests that we need to incorporate how actors themselves experience and enact emergent complex processes through discussions, debate, and experimentation, rejecting even the notion of a 'system' as this implies a closed boundary."

From Garud, Path Dependence or Path Creation? Journal of Management Studies, June 2010



# Ecosystems are fine

To explore one such initiative, we revisit a common entrepreneurial challenge for regions, nations, and industries – the creation and sustenance of a robust **ecosystem**. Several scholars have demonstrated how large companies often anchor **ecosystems** (agrawal and cockburn, 2003; feldman, 2005; klepper, 2007; niosi and zhegu, 2010). But, what if anchor companies are not available in newly emerging industries, or if ecosystems must be fundamentally changed in mature ones? We suggest the notion of ‘anchor events’ within policy initiatives to serve as platforms for different constituencies of an **ecosystem** to coordinate their activities.

From: Contextualizing entrepreneurial innovation: A narrative perspective, Raghu Garuda, Joel Gehman, Antonio Paco Giuliani, Research Policy, 2014



# Inward orientation

- Focus on system internal processes; context is not taken into account
- system functions and systemic problems / blocking mechanisms
- Thus: taken into account but insufficiently conceptualized



# Lack of attention to politics and power struggles

- Event data shows many lobby activities, statements about power and public debates on new technology
- Summarized in guidance of the search function and legitimization / counteract resistance to change.
- However, political science theory on politics is indeed missing
- System approach takes a broad perspective; more detailed theories explain less but in more depth





# TIS is no transition framework

- focus on single technology, not on large societal transformations



## **too much emphasis on national boundaries**

- Much TIS studies indeed focus on country specific TIS
  - policy advice
  - national institutions matter a lot
- International influences matter a lot: under researched so far



# New developments

- TIS and MLP mix
- TIS and institutional literature
  - context
  - institutional entrepreneurship
- The geography of innovation (systems)
- TIS and policy lit: attention for advocacy and lobby



- Recent article by Bergek, Hekkert, Markard, Sanden, Truffer and Jacobsson on contexts of TIS
  - Sectorial
  - political
  - geographical
  - technological



# lessons

- do not do just another TIS study but focus on a theoretical problem
  - bring in geography
  - come up with a way to deal with context
  - focus on politics
  - etc
- Be careful in use of language



# Methods: choose them carefully

- scientometrics for insight in international influences on national knowledge creation
- interviews for insight in lobby and politics
- newspaper article analysis for insight in technology debate
- network analysis for insight in power structures, knowledge flows, lobby networks
- professional journal article analysis for insight in technology development and experimentation strategies
- combine methods



# science versus strategy advice

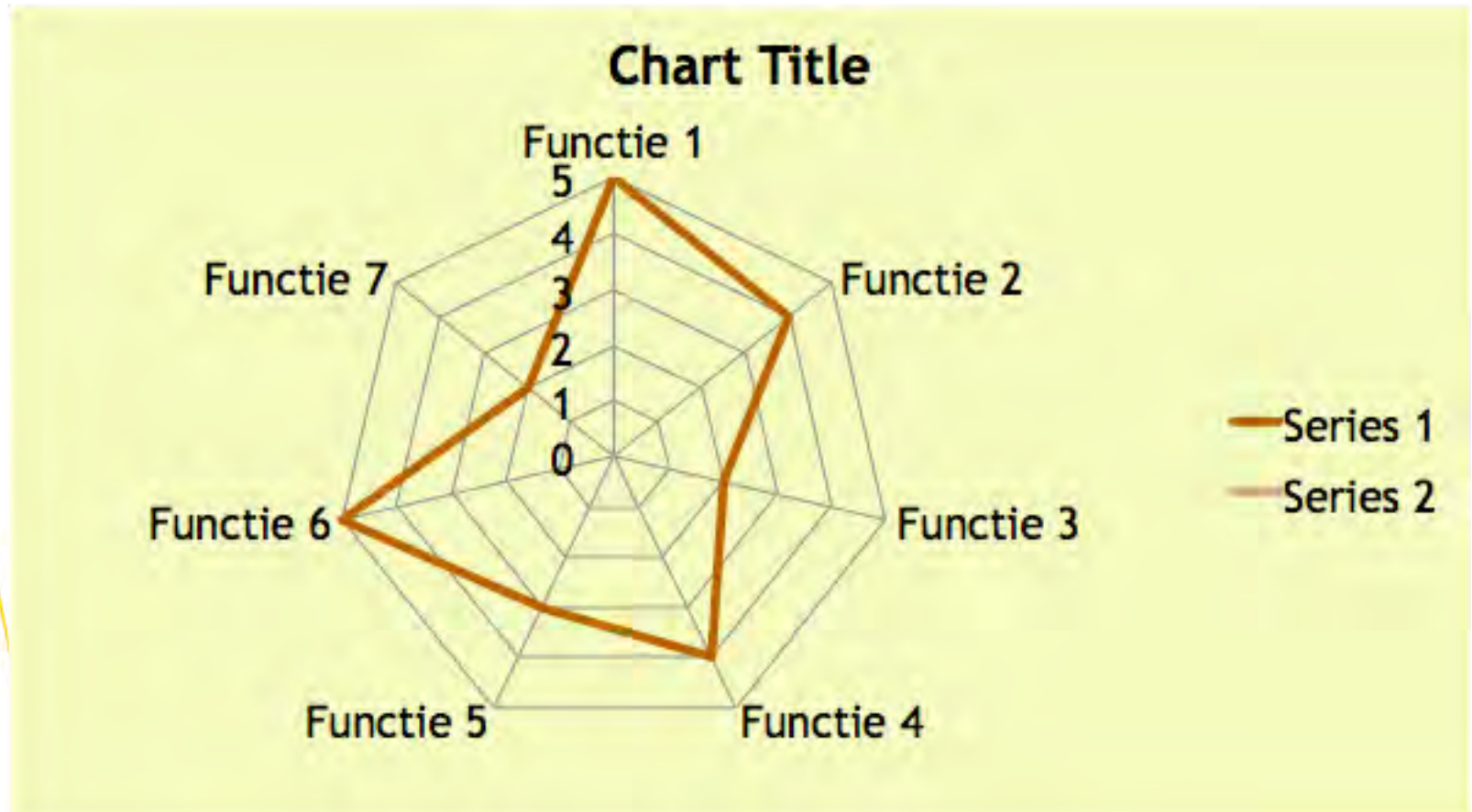
- Policy makers / firms have different needs
  - no desire to develop theories
  - what is the problem? What do I need to do to fix it?
- TIS is perfect tool for strategy advice
  - focus on functioning / not functioning
  - motors of innovation
  - systemic problems / systemic instruments





# different methods are required

- No interest in deep history;
- current issues need to be solved
  
- Thus: Quick scan of the innovation system
- visual representation of system functioning





# Policy advice useless for science?

- policy induced sessions lead to high commitment
- discussion between stakeholders provide powerful insights
- additional data needs to be added
- Reputation helps to get access to more funding



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# questions?