

Articulations of sustainability in nanotechnology

Comparing fixed and fluid funnels

Colette Bos

Alexander Peine, Harro van Lente

“Europe must focus on the Grand Challenges of our time.”

- Lund Declaration 2007, Horizon 2020
- Contribution of science to society:
 - Changing ‘contract’ between science & society: relevant science (Hessels et al. 2009)
- Control of science by society:
 - Resulted in assessments, public regulation (hard & soft), self regulation, dialogue & engagement
- Ideograph (McGee, 1980): “the right thing to do”

Steering science with big words

- Steering increasingly happening through ‘big words’
 - Sustainability
- Using broad and vague terms
 - Multiple ways of filling in
 - People using the same terms but different understandings
- How are they used and translated into other things than words?
 - Money
 - Technological
 - Human resources (knowledge, skills, etc)

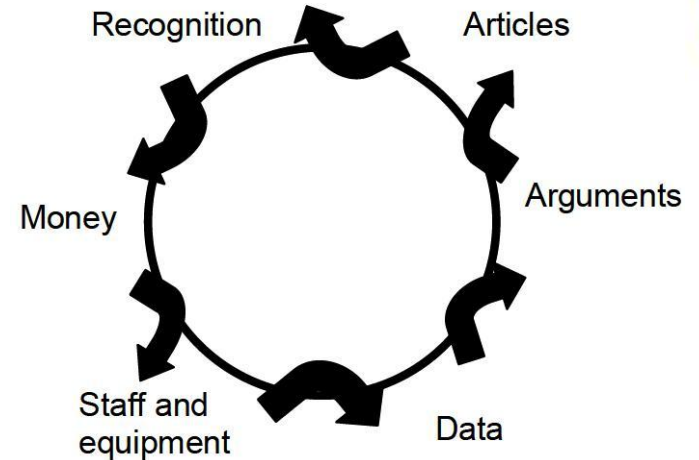
Analytic perspective

- An investigation in the logic two broad notions representing promotion & control
- and the socio-logic behind it

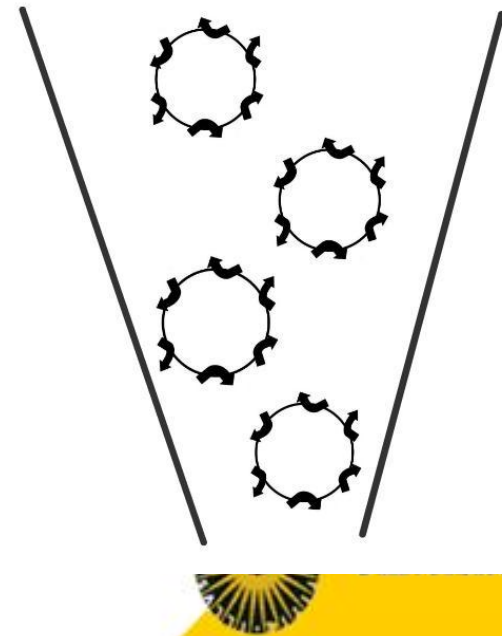
- Logic: articulations, steering by words, interrelated sphere of reasons, beliefs, expectations and stories make connection to the 'big words'
- Socio-logic: institutional context, actors, steering by institutions in arenas and arrangements

Logic

- Purposes of articulations:
 - Specification
 - Legitimacy
- Translations in credibility cycle
- Different articulations at different levels in science system (Gläser & Laudel 2007)
- Interacting credibility cycles



Credibility cycle adapted from Latour and Woolgar (1986) by Hessels et al (2009)



Socio-logic

- Actors
 - How do they relate?
- Different levels in science system
- Arrangements: formal structures
- Arenas: places where articulations get filled in

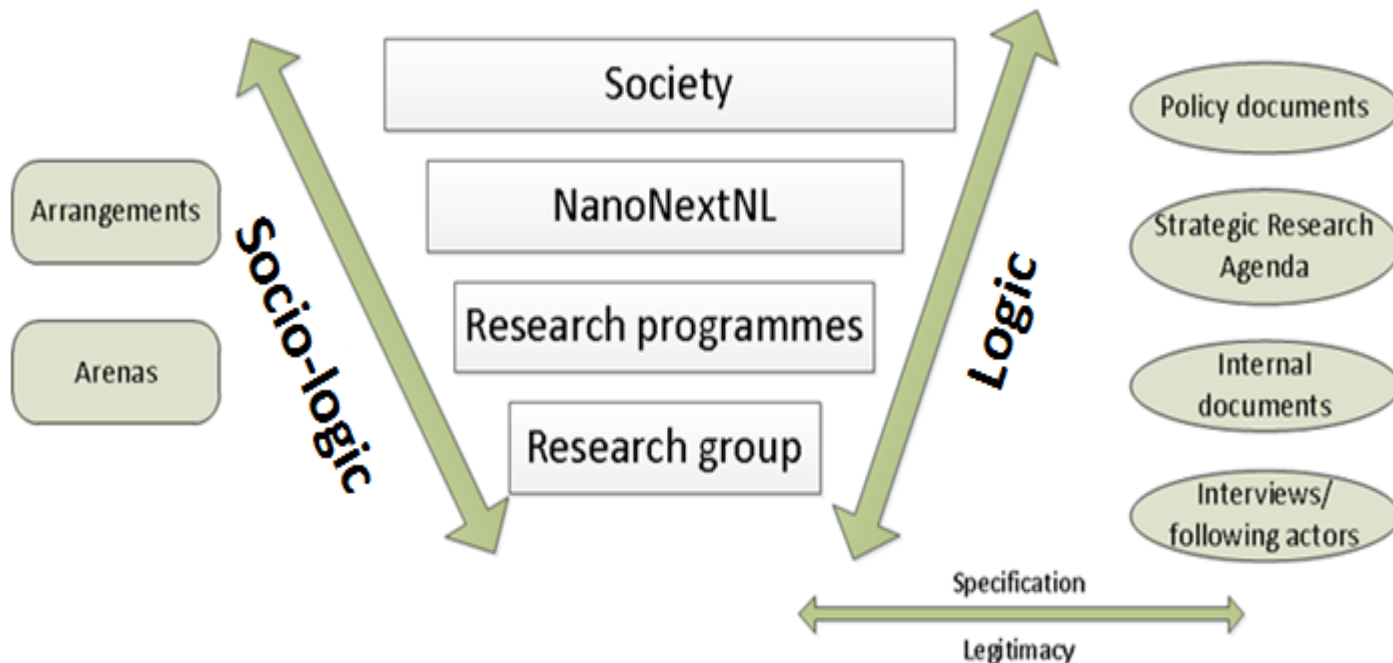
Case study

- NanoNextNL
- National Dutch research program nanotechnology
- Explicit societal goals
- Cases:
 - Theme 2 Energy > Solar panels project
 - Theme 10 Sensors and actuators > sensor project

	2. Energy	3. Nano-medicine	4. Clean water	5. Food
1. Risk Analysis and Technology Assessment (RATA)				
6. Beyond Moore				
7. Nano materials				
8. Bio-nano				
9. Nano fabrication				
10. Sensors and actuators				

Case study

- Tracing articulations on different levels
- Through analyzing, documents, interviews, observations, etc.
- Work in progress



Findings

Logic

- Explicit articulations
 - In documents: Strategic Research Agenda, Government vision on Nanotechnology
 - Themes Water and Energy have “strong link with sustainability”
 - ‘Easy’ legitimatization in Solar case
- Implicit articulations
 - Other themes (sensors) have more difficult legitimatization
 - But are making this connection nevertheless
 - “It is logical to steer to sustainability”

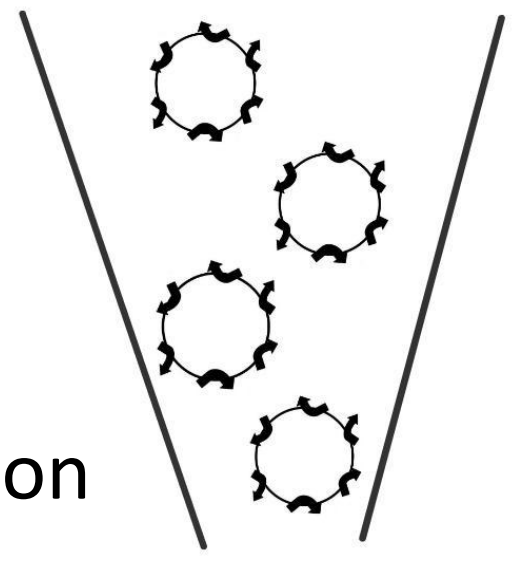
Findings

Socio-logic

- Different arenas and arrangement at different levels:
 - Policy/program level: Sustainability introduced in research agenda ‘negotiations’: inclusion of application oriented themes Water and Energy
 - Research program level: many other factors influencing final project design
 - Research group: sustainability as motivation for conducting research

Fixed and fluid funnels

- Legitimation is different in different application areas
 - Solar cells > ‘easy’ connection
 - Sensors > more difficult connection
- The more the connection to sustainability has been made > becomes more ‘fixed’
- Fluid funnels try to make connection more ‘logical’ > legitimacy



Discussion: logic & socio-logic

- *Logic* and *socio-logic* shape each other
 - Weak links between levels
 - Little interaction between themes
 - Ad-hoc selection for actual projects
- Arenas of articulation and institutionalization
- Looking further at these fuzzy interactions

Thank you!

Sustainability [background]

- Brundtland definition
- Areas:
 - Resources
 - Energy
 - Sustainable technologies / sustainable development: S&T for reducing resource use and (renewable) energy
- This paper: focus on sustainability as in S&T development (contributing to solve societal challenge)