

Local negotiation and alignment of expectations – and transfer of lessons in niche development trajectories

Meta-analysis of 22 new energy projects in Europe

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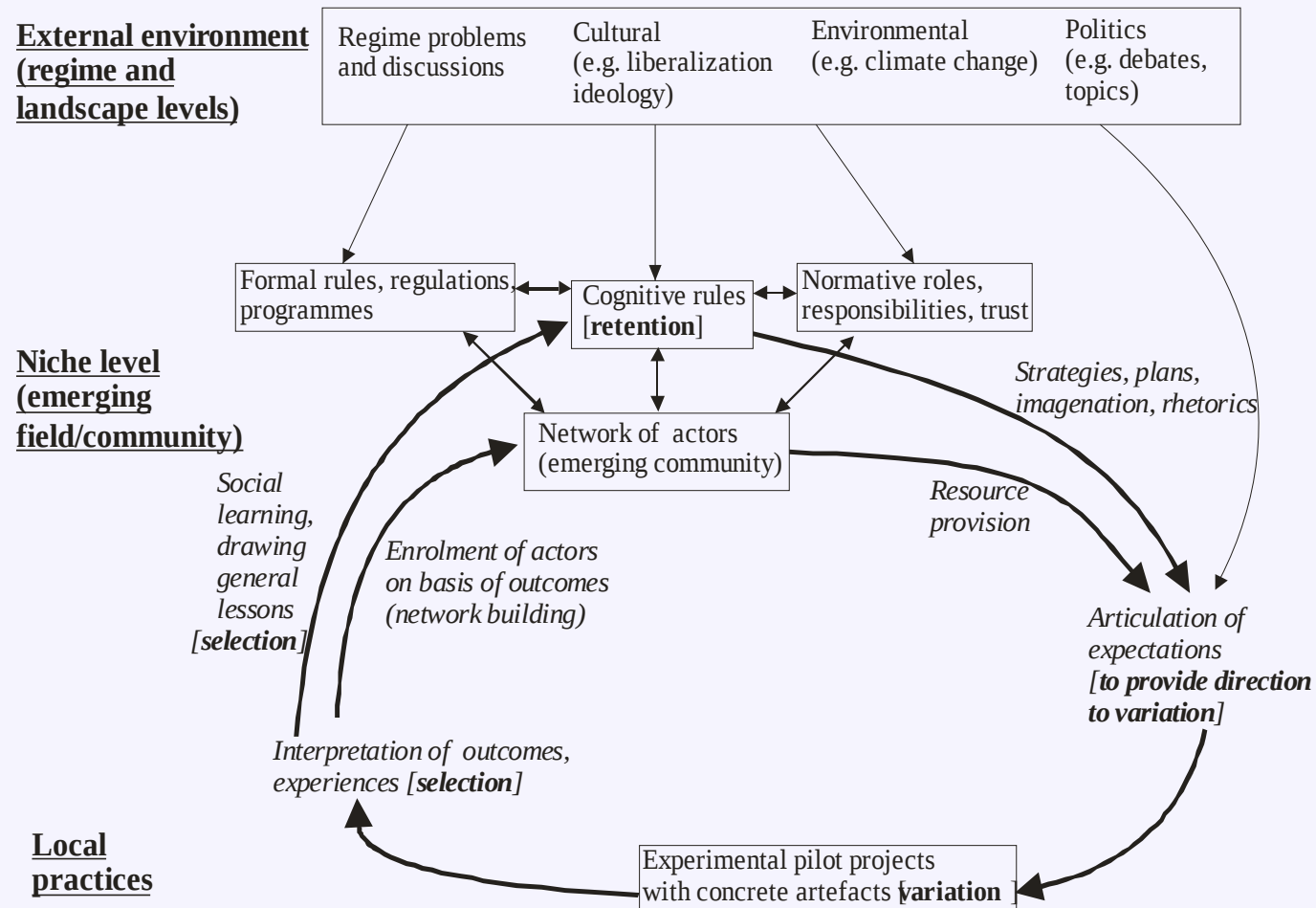
Purpose of the paper

- **problem:** tension between the need to maintain diversity & the need to support path creation in the promotion of emerging sustainable technologies
- **perspective:** niche development literature; dynamics of socio-cognitive technology evolution (Geels and Raven 2006)
- **question:** the relation between individual projects in local contexts & the transfer of local experiences into generally applicable rules on the 'global niche level'
- **data:** two illustrative case studies drawn from a meta-analysis of 22 new energy projects throughout Europe conducted within the ongoing [Create Acceptance](http://www.CreateAcceptance.net) project
- **analysis:** diversity of expectations, negotiation & alignment > diversity of local solutions > generally applicable rules?



Perspective

Create
Acceptance



Dynamics in socio-cognitive technology evolution (Geels and Raven, 2006; Raven and Geels, 2007)



The dataset

The dataset was collected in the ongoing EU FP6 Create Acceptance project:

- for a meta-analysis of factors influencing the social acceptance of new energy technologies (energy efficiency and geothermal energy, bioenergy, wind power, solar energy, hydrogen and CO₂ capture and storage) in different parts of Europe (North, West, Central and South Europe)
- To draw recommendations for management procedures that promote the societal acceptance of new energy technologies (e.g., local embeddedness, local benefits, continuity with existing structures & culture) > for further work on designing & testing a management tool in the Create Acceptance project
- Concern: will projects developed according to this 'formula' for success be able to provide useful contributions to the emerging niche community level? Will projects that are well-adapted to diverse local contexts create sufficient coherence & momentum for path creation beyond the local level?



Overview of the projects

- in terms of 2 types of successfulness

Other stakeholders' perspectives	Process largely successful	Process mixed or uncertain	Process largely unsuccessful
Project manager's perspective			
Outcome largely successful	Bioenergy Village Jühnde Västerås Biogas project Pannon Power biomass Pommerania solar project Barcelona Solar Ordinance PV Accept solar project ECTOS hydrogen project CRUST CO ₂ capture & storage	Hannover energy efficiency Berlin H2Accept hydrogen bus EOLE 2005 wind energy London CUTE hydrogen fuelling station	
Outcome mixed or uncertain	Suwalki wind energy	Low-energy housing, Finland Trinitat Nova energy-efficiency Snohvit CO ₂ capture & storage Podhale region geothermal	
Outcome largely unsuccessful		Bracknell Biomass CHP Energy Centre	Lund Biogas project Umbria local bioenergy (early projects) Crickdale Bioenergy Power Station



Three-Step Analysis Framework

(1) Variation through Local Contextualization of a Niche Innovation

- niche innovation & context are mutually shaping > contexts can host a variety of expectations of the possibilities of the innovation
- > analyse the variety of expectations expressed by the actors that were involved in the project

(2) Selection and Alignment of Expectations

- some expectations more powerful than others, negotiated through formal and informal processes of 'participation', co-ordination & alignment
- > analyse processes through which selection and alignment of expectations occur in local project-context variations

(3) Towards retention and transfer to the niche level

- considering the variety introduced through above processes ...
- > analyse which lessons are learned locally in the project and to what extent and through which mechanisms are they transferred to the global niche level?

Analysis of local variation, selection & retention

- Focus on two 'successful' cases
 - how the negotiation of different kinds of local expectations contributes to a diversity of social, economic and technical solutions for a generic technology
 - how these solutions provide lessons for other projects or general rules for the niche community

- Two biogas co-digestion projects with different applications, expectations and (successful) outcomes:
 - Bioenergy Village Jühnde (Germany)
 - Växtekraft biogas plant in Västerås (Sweden)

The illustrative cases

- Jühnde (Brohmann et al. 2006)
- village in Lower Saxony with 750 inhabitants
- Biogas plant + 700 kW CHP plant + 500 kW woodchip burner + district heating system > electricity & heat for the village
- Feedstock: manure, silage
- Västerås (Heiskanen 2006, Khan 2005)
- city in mid-Sweden with 100 000 inhabitants
- Biogas plant + reformulation plant producing vehicle fuel equivalent to 15 000 MWh + fuelling station
- Feedstock: urban waste + silage



Bioenergy Village Jühnde (Germany)

1. Variation through local contextualisation:

- Initiated by researchers + locals
- Local production & consumption in support of rural economy & environment

2. Selection & alignment of expectations

- Planned by 8 local working groups
- Operated by local co-operative (farmers & local residents)
- Independent production of electricity and heat for an entire village
- Conversion implemented in 4 years

3. Retention & transfer to the interlocal level

- Transdisciplinary research team + external experts
- “Jühnde model”
- Round table + study tours > diffusion to other villages in the region

Actor	Expectation
Funding Ministry	Implement biomass technology Societal welfare, rural economic welfare
University - IZNE	Interdisciplinary research: argiculture, ecology, cultural
Mayor of Jühnde	Economic and environmental welfare, gaining funds, future development, self-sufficiency, stabilization of farming structure
Co-operative /local farmers	Business success, energy and economic independence
Local residents	Cheap energy, environmental protection, stabilization of the farming structure, local empowerment
Engineering,	Image building, new employment opportunities
Construction firms	Enhanced capabilities, ensuring employment
Committee of external experts	Professional and scientific information transfer

Växtkraft biogas plant in Västerås (Sweden)



Create
Acceptance

1. Variation through local contextualisation:
 - Gvmt programme for sustainable development: grants for large-scale co-digestion facilities
 - 3 initiators: waste mgmt company, municipality, local farmers
2. Selection & alignment of expectations
 - 10-year planning process
 - Changes in plans: e.g., change of location > new product: vehicle fuel
3. Retention & transfer to the interlocal level
 - EU FP5 Agroptigas project > new ntnl partners, European demo project, research projects
 - Technical optimisation, connection of different systems

Actor	Expectation
Regional waste mgmt company, VaFab	Investigate alternatives for biological waste treatment for household waste Recover resources from waste Image & business development
Municipality	Improve local environmental quality Use sorted organic household waste Contribute to national goals
Local farmers	Grow & digest ley crops Utilize digested material as fertiliser
Energy company	Experiment with biogas production First: use gas for district heating
Government (grant provider)	Support local change processes toward sustainability Promote diffusion and further refinement of biogas technology
Environmental NGOs	Mildly supportive, Little active engagement
Local residents	Improved waste mgmt (source separation, odour control at landfill site)

Diverse 'translations' of a generic technology

- Visions pertaining to new technologies change in response to social interests present in the local context
- Variations derive from different local circumstances, expectations and competencies + emergent processes resulting from local negotiations

Jühnde:

- rural context > local participation & ownership
- biogas linked to local energy independence > local production of electricity (independence from electrical utilities)

Västerås:

- urban context > links to waste mgmt, urban transport fuel
- due to change in original plans > upgrading to vehicle fuel quality (marketable product)

- Through the incorporation of social interests, emergence of new cultural meanings & new governance institutions
 - Diffusion channels somewhat different from the 'cognitive rules'?



Research agenda

- Variation mediated through expectations, negotiation, alignment (emergent) > social learning:
 - Local variation of the technological concept
 - Local variation of the context of the project
 - Translation into general niche 'rules'
- Future work suggested:
 - On the nature of the translation, transfer & retention process: how are differences between local contexts overcome, what kind of work is needed?
 - Different kinds of rules (cognitive, normative...), different retention pathways (e.g. professional associations, standards vs. user-to-user)?
 - On the time dimension of this process?
 - On the role of global, national and local interests?



Diversity vs. path creation

- More research needed ...
- Cases suggest hypothesis:
 - Diversity can support path creation by creating new 'affordances' (i.e., design aspects that suggest different uses) into the generic technology?
 - E.g., different 'rules' for technical, organisational & social implementation in urban & rural contexts?
 - Providing that dedicated and active work is devoted to translation between niche community and local contexts