

CLIMATE **CHANGE**: Global Risks, Challenges & Decisions
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Adaptation to climate change in the transport sector

The constraining effect of actor-interdependencies

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Introduction: Adaptation in the Transport Sector

- Highly sensitive to changes in climate and to extreme weather events in particular
- Long-lasting infrastructures
 - Long planning horizons with respect to climate change (CC)
- A multitude of actors involved, both from public and private sector
- Essential sector for multiple economic, public and private activities



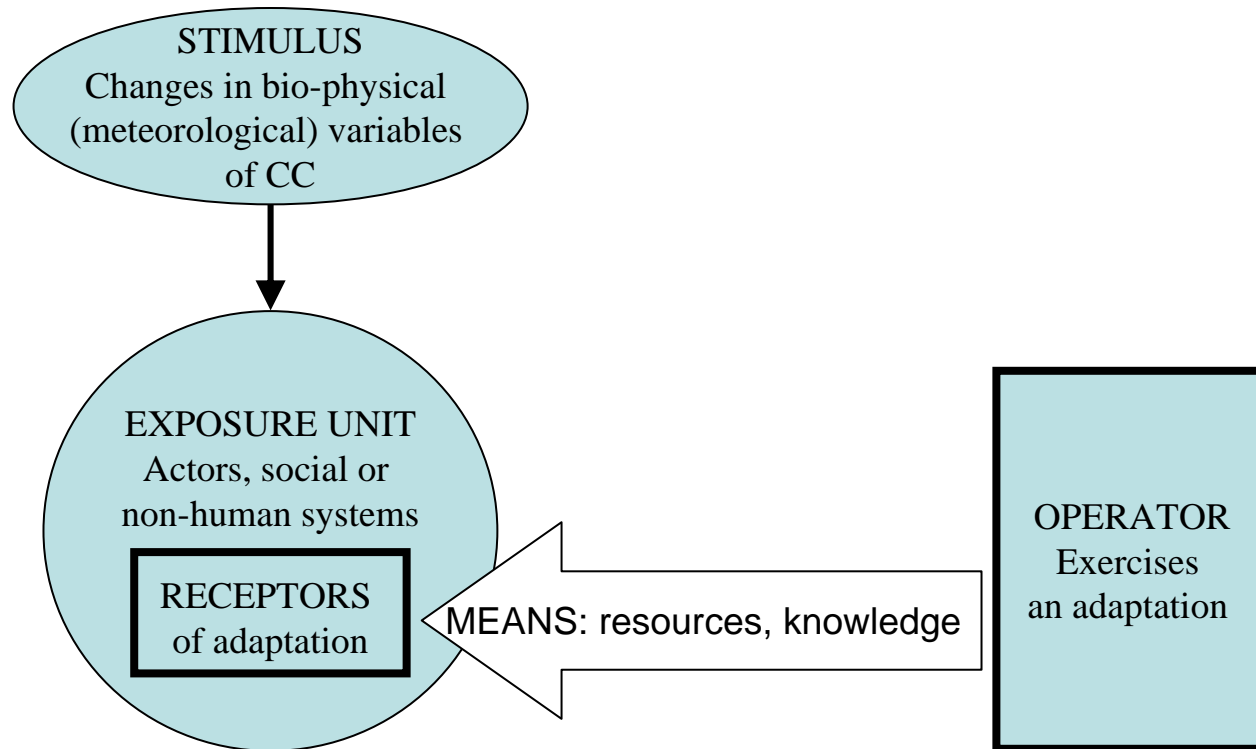
Methods

- **Literature Review**
 - available documents dealing with adaptation to CC in the transport sector structured by an action theory of adaptation
 - rooted in “action frame of reference” (Parsons 1937), DPSIR-Framework (OECD 1993)

- **Exploratory interviews in German companies**
 - infrastructure and service providers



Action Theory of Adaptation



Crucial actors: transport service and infrastructure providers, transport users (as exposure units, operators or receptors), politics and administration (at different levels) as operators



Results from Literature Review

- 9 papers included:
 - 1 (2004), 2 (2005), 1 (2006), 2 (2007), 3 (2008)
 - 4 reports commissioned by governments (US, Canada, EU, Germany), 2 focus on businesses (Germany, UK)

 - Papers discuss stimuli in more detail than adaptation measures
 - 3 papers hardly address any actors
 - Papers do not distinguish between different roles of actors
 - 5 papers address private sector or businesses as operators

 - Little adaptation so far under way, although awareness rises
 - Little adaptation from private actors visible
 - Gap between very vague and very detailed adaptation measures



Risks and Opportunities for Transport Companies

- **Biophysical risks**
 - Material damage due to heat and erosion
 - Delays caused by extreme weather events
 - Buildings: increased need for cooling
 - Changes in noise emissions
- **Market risks and opportunities**
 - Changes in preferences for transportation mode, destinations etc.
 - Risks in supply chains (availability of resources, security of supply)
 - Increased insurance cost
- **Regulatory risks and opportunities**
 - Changes in planning regulations, regulations on infrastructure use and prices, safety regulations, construction standards etc.





Possible Adaptation Measures in Transport Companies

- **Organisational measures**
 - Knowledge management (climate impacts, vulnerability, adaptation measures)
 - Investment planning (enlarge planning timeframes)
 - Reorganise supplier relations (supply chains, insurance, etc.)
 - Risk management and contingency plans
- **Technical measures**
 - Relocation of railways/runways/roads
 - New materials
 - Adapt heating/cooling systems
 - Adapt drainage systems



Results from Exploratory Interviews with German Providers of Infrastructure

- **Adaptation is a new and insufficiently addressed topic on the business agenda**
 - No clear responsibility in the company
- **Companies have difficulties to distinguish between adaptation and mitigation**
 - Climate issues framed as mitigation problem
 - In contrast to mitigation, adaptation is not seen as competitive advantage
- **Strong interlinkages between private and state actors with respect to planning, using and maintaining infrastructure**
 - Private sector dependent on regulatory adaptation and cooperation with public authorities
- **Mismatch between time horizons of corporate strategies/planning and climate change**
- **Companies perceive more organisational than technical constraints**

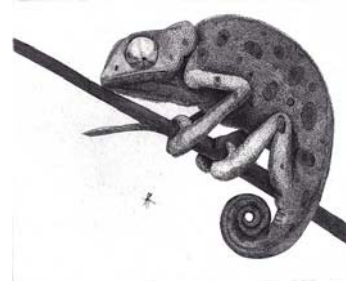




Conclusions

- Literature: gap between awareness and action
- Scientific knowledge on the role of business in adaptation: in its infancy
 - Role of business hardly addressed
- Large amount of actors involved in adaptation efforts in transport
 - Effects of adaptation on different receptors are strongly coupled
 - Complex interdependencies of actors a strong barrier to adaptation
 - needs better structured analysis to be useful to target audiences
→ operator, receptor & exposure unit
- Urban planning
 - Consider the role of companies in adaptation
 - Co-operation with companies





Adapting Utilities to Climate Change

Analysing and Developing Private and Public Action

interdisciplinary research group in Social-Ecological Research (SÖF)
funded by the German Federal Ministry of Education and Research, 2008-2013
in cooperation with partners from business and politics

key topics:

- vulnerability analysis of energy and transport sector
- strategic early warning systems for companies
- requirements for governmental regulation
- archetypical barriers and promoters of adaptation

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