CLIMATE SERVICE INNOVATION JOURNEYS
Peter Stegmaier
IN THIS TALK:

1. INTRODUCTION
2. CONTEXTS OF CS INNOVATION JOURNEYS
3. CS INFRA-STRUCTURE GOVERNANCE
4. SKECTHES OF CS SCENARIOS
5. OPEN QUESTIONS
1. INTRODUCTION
ANTICIPATORY COORDINATION OF AN INNOVATION JOURNEY

1. **ANTICIPATORY COORDINATION**
   - Attempt to project a path into future, co-produced by concerted action by various actors
   - Increased policy & strategic interest
   - Their promises enter innovation journeys

2. **SIGNALING NEW OPPORTUNITIES**
   - Chance to link intelligence to fight climate change with economic growth

3. **PROMISES ACCEPTED**
   - Agenda setting with EU CS Roadmap

4. **CONVERSION INTO REQUIREMENTS**
   - Unified data infrastructure
   - Balance of users’ demands & providers’ services
   - Functioning business models for sectors
2. THE CONTEXTS OF CLIMATE SERVICE INNOVATION JOURNEY
(1) NICHES
- Protected spaces for vulnerable novelties
- Carved out in selection environments & by some boundary maintenance
- Problem 1: to find a niche (e.g. by help of benevolent sponsors, selectors), enter mini-paths
- Problem 2: to avoid lock-in, risk not to survive in wider world

(2) REGIMES
- Sets of rules, practices and organisations structuring the further development, leading to trajectories

(3) LANDSCAPE
- Shapes activities & interactions by
- Backdrop of affordances & constraints

Layered model of socio-technical change

Local practices & novelty creation

[1] Novelty, shaped by existing regime
[2] Evolves, is taken up, may modify regime
[3] Landscape is transformed

Evolving sociotechnical landscapes

A patchwork of regimes

Novel "configurations that work"

Development over time
Climate change ‘danger to humanity’ policy discourse

EU energy union & climate: Environment, resource efficiency, raw materials; Climate action, decarbonising economy

EU Horizon 2020: with new discoveries & breakthroughs from lab to market

UNFCCC Paris Agreement

Climate mitigation

Climate not high in public opinion

Trump’s exit from Paris agreement: Weakens Paris? Push from cities & federal states?

EU CS Roadmap: CS market, quality, relevance scarcely any mention of environmental protection

CLIMATE SERVICES & MARKET PRE-MATURE

WMO 2007, WMO’s GFCS 2009

Companies & intermediaries, successful in advising on climate risks and adaptation

HPC from national to EU?

Climate adaptation

Ad hoc CS organisations

Users lacking of technological & knowledge capacities

Users lacking of orientation about what’s there & potentially useful in CS

Spectrum of providers, purveyors, users highly fragmented & ambivalent

New companies (FinTech) with/without seed capital

Purveyors & providers limited knowledge about user demands

UK’s climate policy until/after Brexit?

Others’ moves away for Paris agreement?

WCRP, GCOS, Future Earth, BF, (E)CSP, C3S, EIT Climate-KIC etc.

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(1) INNOVATION HYPE CYCLE
- To take too long until infrastructure harmonized & fit for users & suitable business models
- Until CS hype is gone

(2) OPPORTUNITIES
- To miss the right moment for linking up...
- ...with the right other
  - services, e.g. related to forestry, water, natural disasters
  - disciplines, e.g. architecture for safer, more sustainable & affordable housing
  - higher level/more holistic services like ecosystem services, etc.

(3) FOCUS
- To concentrate too narrowly on Europe, while obvious that key developments are global (beyond EU)
- Not looking into other regions or not enough sharing of climate intelligence e.g. with poorer global South
- To insist on business models, which don’t fit with global scale of the climate problem
(1) EACH AGENT PROVIDER, PURVEYOR & USER
- Value chain model has its limitations
- Crucial: it starts from supply side
- Needed: integration of supply and user sides!

(2) KNOWLEDGE DEFICITS
- Lack of knowledge about OTHER agents/users
- Direct collaboration on boundary object can necessitate translation in all directions, thus …
- … create remedy for the knowledge deficit problem
3. CLIMATE SERVICES INFRASTRUCTURE AND ITS GOVERNANCE
(1) SERVICE PROVISION—A QUESTION OF KNOWLEDGE

- About technologies, actors, successful & failing services, markets, boundary objects, and those potentially willing to interact in a new, optimised CS market
- Importance of **boundary objects**: allow to exchange between so far not yet (optimally) connected areas, actors, professions, disciplines (data, tools, information, problem definitions, service products, aids, portals, templates, etc.)

(2) INTERACTION WITH DATA AND INFRASTRUCTURE

- Using **data**, actors need to know how to interpret it, to link it to problems etc.
- **Information**: data charged with all that knowledge
- **Communication**: knowing how to translate things to actors with different backgrounds & positions
- **Service**: a give-and-take-relationship
Governance: establishing, changing, de-aligning a social/political order, based on interactions & arrangements of all kinds of actors (also beyond the political system)

For climate data infrastructures: institutional patterns like rules, standards, conventions, procedures, legitimations, ethics
HERE: focus still mainly on services supply side

HOW: to better include users and their demands (along the value/supply chain)?

SYMMETRY: adding the dimension USER INFRASTRUCTURE, Connect users to all four matrix dimensions
(1) **Hypothesis 1**: A common data format & convention for data records & exchange might boost both services & popularisation of climate data use

(2) **Hypothesis 2**: Role-specific finding aids, offered with real human interactive support, crucial for successfully establishing & maintaining service relationships

(3) **Hypothesis 3**: Climate services will profit from a combination of a good portal, a good set of aids plus a good overview over available data sources, functional methods

(4) **Hypothesis 4**: The ultimate task of a good data infrastructure governance would be to emancipate it (from technical-technocratic restrictions of specialists’ mono-disciplinary ‘boundary working’) into a ‘knowledge infrastructure’ (Edwards 2010)

(5) **Hypothesis 5**: Boundary objects can provide the chance to let disparate knowledges and interest, positions and conventions converge

(6) **Hypothesis 6**: All four infrastructure dimensions need to be linked carefully and with users in mind
4. SKETCHES OF CS SCENARIOS
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<th>Focused</th>
<th>Integrated</th>
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| **Generic**    | Maps & Apps:  
• Generic climate services  
• Freely or cheaply …  
• … available to all users | Sharing Practices:  
• Mutual services on …  
• … adapting and mitigating Climate Change in urban environments  
• Available to all users |
| **Customised** | Expert Analysis:  
• Scientific, professional, commercial climate services  
• Tailored to specific urban planning decisions and decision-makers | Climate-inclusive Consulting:  
• Professional, commercial & …  
• … transdisciplinary climate services  
• Tailored to specific urban planning decisions and decision-makers |
### Types of Possible Future Climate Services

<table>
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<tr>
<th>Users</th>
<th>Service Providers</th>
<th>Technology</th>
<th>Value creation</th>
<th>Potential tensions</th>
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</table>
| - Users themselves incorporate climate data into their decision-making  
- Same climate data for all users | - Public meteorological & university institutes (PM&UI) provide meta-services (measuring, modelling, integrating)  
- Commercial applications designers make user interfaces | - Unified data infrastructure  
- Open source, open data | - Good user interfaces  
- Knowledgeable users  
- Global data infrastructure  
- Sufficient accuracy in generic models | - Does ‘one size’ fit all decisions & deciders?  
- Will Silicon Valley dominate the climate services industry? |
| - Decisions & designs draw on public databases with best practices & peer-to-peer exchange by people in similar situations  
- Experience fed into databases | - Users also as producers of climate services  
- PM&UI provide meta-services (meas., model., integr.)  
- Commercial platform providers & brokers facilitate sharing | - Unified data infrastructure (on adaptation/mitigation practices)  
- Open source, open data | - Local governments and civil servants knowledgeable as pro-sumers of climate services  
- Accurate local climate data  
- Government support for sharing platform on national and European level | - Will climate change mitigation become overly dependent on local politics?  
- Will the development of relevant expertise be too dispersed? |
| - Users decide based on expert analysis of climate effects for specific location & problem  
- Pay for accurate data & a highly contextualised interpretation of consequences | - PM&UI provide meta-services (measuring, modelling)  
- A range of specialised commercial firms deliver tailored climate services | - Heterogeneous data infrastructure  
- Dense & locally adapted measuring grid | - Specified user questions  
- Specialized and professionalized climate service providers  
- Government support for expertise development and measuring infrastructure | - Risk of ‘drowning in detail’, of ‘paralysis through analysis’?  
- Risk of biased expert analysis or suboptimal solutions? |
| - Users receive integral advice on how to cope with climate change in decision-making | - PM&UI provide meta-services (measuring, modelling)  
- A range of specialised commercial firms deliver tailored climate services  
- Consultancy may accompany implementation | - Moderately homogeneous data infrastructure  
- Dense and locally adapted measuring grid | - User-oriented cross-disciplinary consulting engineers  
- Climate knowledge integrated with other knowledge  
- Government support for climate knowledge development in established firms | - Will climate issues come too short in transdisciplinary services?  
- Professionalization of CS & expertise-building hampered? |
FOCUS:
• The CS process

INTERACTION:
• Validation of results: interaction + barriers
• Collection of suggestions about how to integrate CS in UP
• How to improve the information provided by CS

FOCUS:
• The CS tools

INTERACTION:
• Overview of the tools
• Selection of tools
• How to improve them

FOCUS:
• The CS interaction scenarios

INTERACTION:
• Intro & discussion of models
• Desirability & doability
• Barriers & enablers
STAKEHOLDERS WITH DIFFERENT BACKGROUNDS

IDENTIFY & DISCUSS POTENTIAL CHALLENGES …

AND AROUND BUSINESS MODELS FOR CLIMATE SERVICES

… AROUND DEMANDS, TECHNOLOGY, SOCIAL / LEGAL / ETHICAL ASPECTS

CREATING NEW IDEAS & LINKS, NETWORKING

• BASED ON FOUR POSSIBLE SCENARIOS OF FUTURE PROVISIONS & USE OF CLIMATE SERVICES

CONSTRUCTIVE TECHNOLOGY ASSESSMENT
FOR THE STAKEHOLDER INTERACTION TASKS

1. Sort scenarios by desirability
2. Sort scenarios by doability
3. Share your sorts & arguments behind them
4. Discuss your viewpoints in terms of desirability & doability
5. Which combination of scenario elements / which new elements would you find most promising? How come?

Which barriers do you see?
- In your direct environment
- In Finland
- In general

Who should do what to facilitate climate service?
- Government
- Industry
- Research
- You

Tasks for the stakeholder interaction:

Work together in one group in Finnish (with intro in English)
5. OUTLOOK
(1) DEMAND
• To which extent (frequency, depth)?
• In which areas?
• In which combinations with other intelligence?

(2) LINKING IN
• How will CS link into other (emerging or already established) services …
• … in order to get embedded in mainstream chains of knowledge & value creation?

(3) LOCK-INS
• How & whether lock-ins will be avoided
• By which strategies?
THANK YOU FOR YOUR ATTENTION!