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# CLIMATE SERVICE INNOVATION JOURNEYS

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# IN THIS TALK:

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

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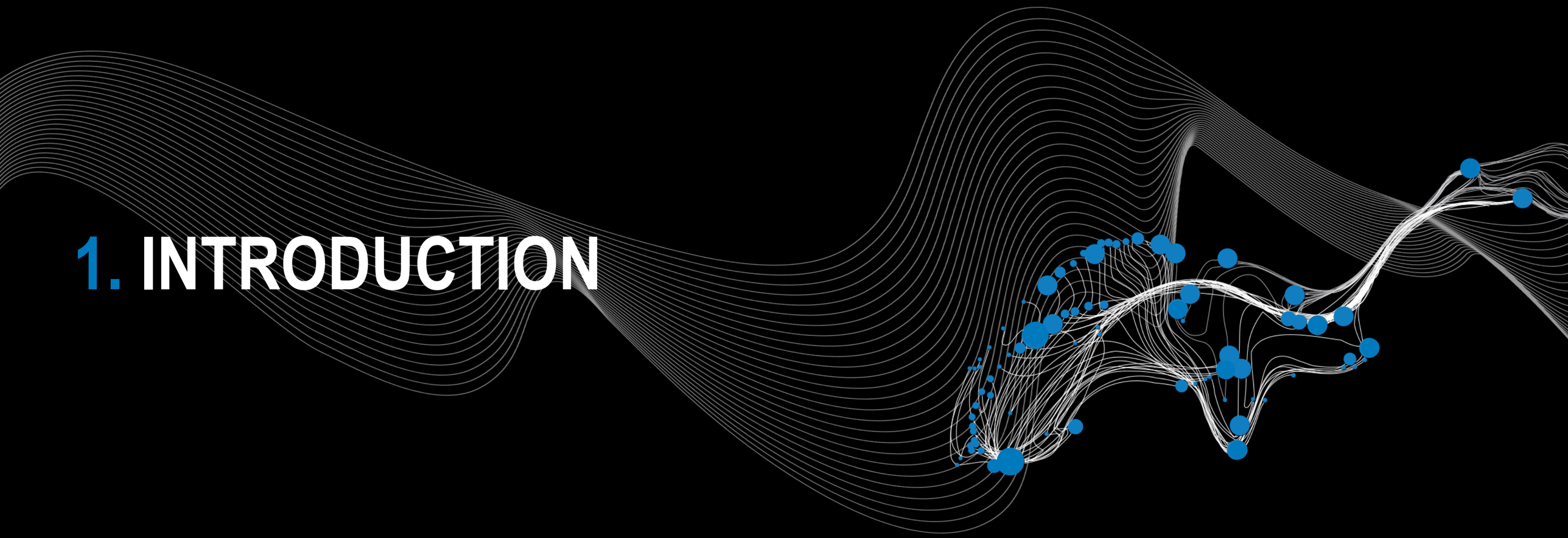
# 1. INTRODUCTION



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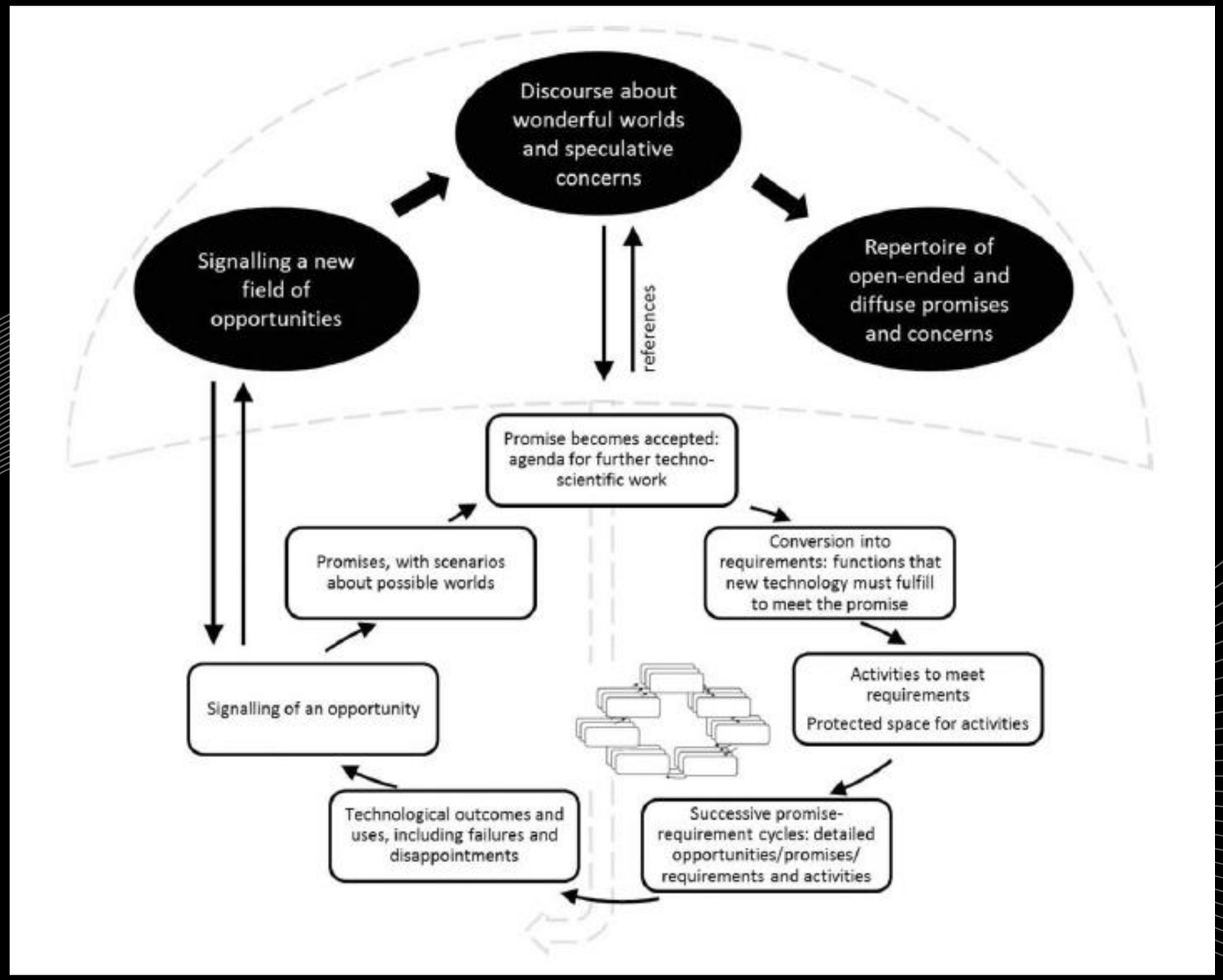


(1) ANTICIPATOY COORDINATION
- Attempt to project a path into future, co-produced by concerted action by various actors
- Increased policy & strategic interest
- Their promises enter innovation journeys

(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

# ANTICIPATORY COORDINATION OF AN INNOVATION JOURNEY

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# 2. THE CONTEXTS OF CLIMATE SERVICE INNOVATION JOURNEY

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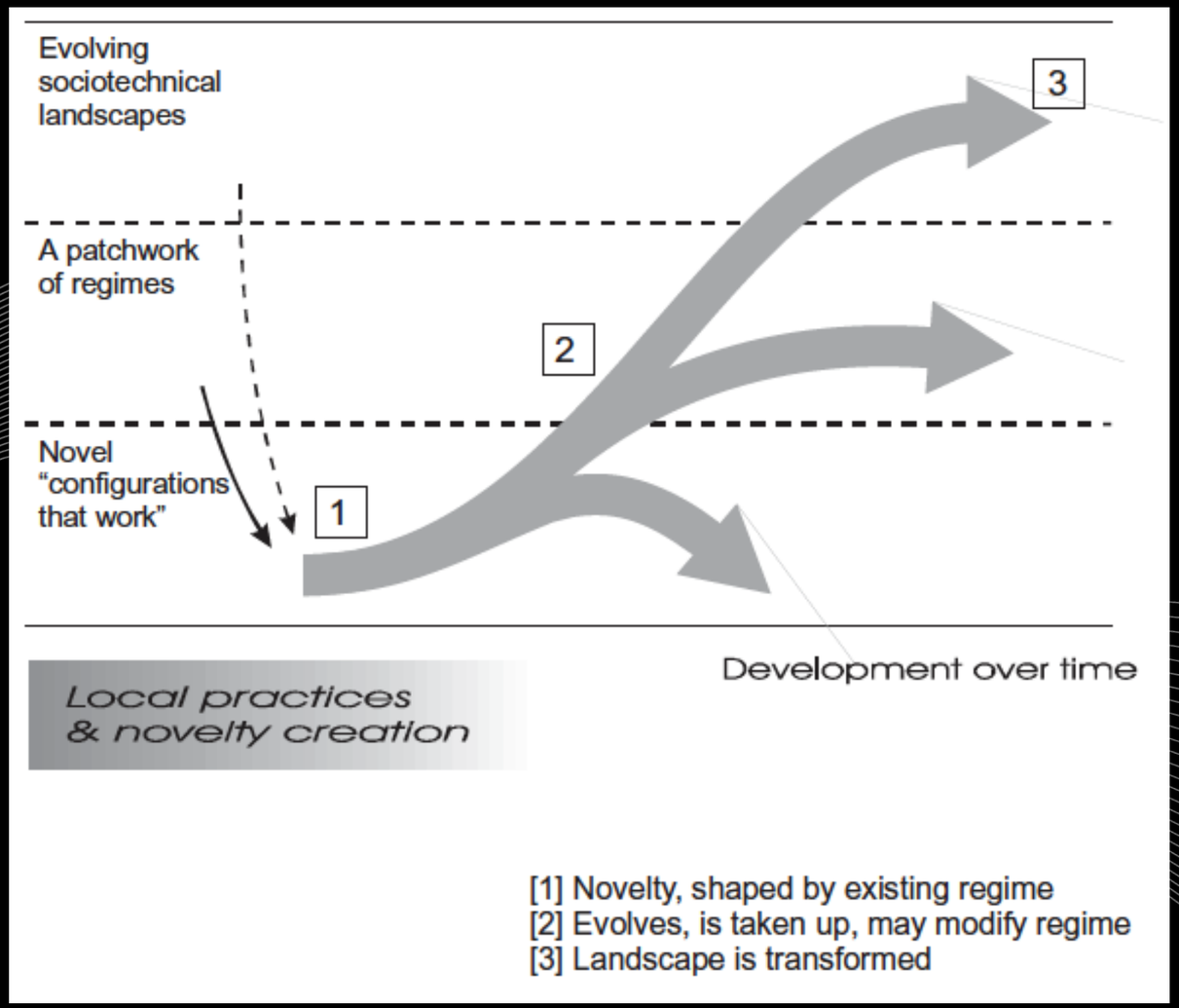


(1) NICHES

- 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

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# CLIMATE SERVICES IN MULTI-LAYER PERSPECTIVE

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

Climate not high in **public opinion**

**WEF** 2015: risk of climate change adaption failure

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

UK's climate policy until/after **Brexit**?

Others' **moves away** for Paris agreement?

EU **MS** climate Change policies

**EMI, ENMS**

UNFCCC **Paris** Agreement

Climate **mitigation**

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

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

**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

~~EU **regulation** obligating actors to use CS~~

**Users** lacking of technological & knowledge capacities

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

**CLIMATE SERVICES & MARKET PRE-MATURE**

Spectrum of providers, purveyors, users highly **fragmented & ambivalent**

New **companies** (FinTech) with/without seed capital

Purveyors & providers limited knowledge about user demands

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# RISKS OF LOCK-IN

(1) INNOVATION HYPE CYCLE

- To take to long until infrastructure harmonised & 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 saver, 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

# SUPPLY OR DEMAND – WHAT'S FIRST?

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# 3. CLIMATE SERVICES INFRASTRUCTURE AND ITS GOVERNANCE

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(1) SERVICE PROVISION—A QUESTION OF **KNOWLEGDE**

- 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

# CLIMATE SERVICE INFRASTRUCTURE & ITS GOVERNANCE

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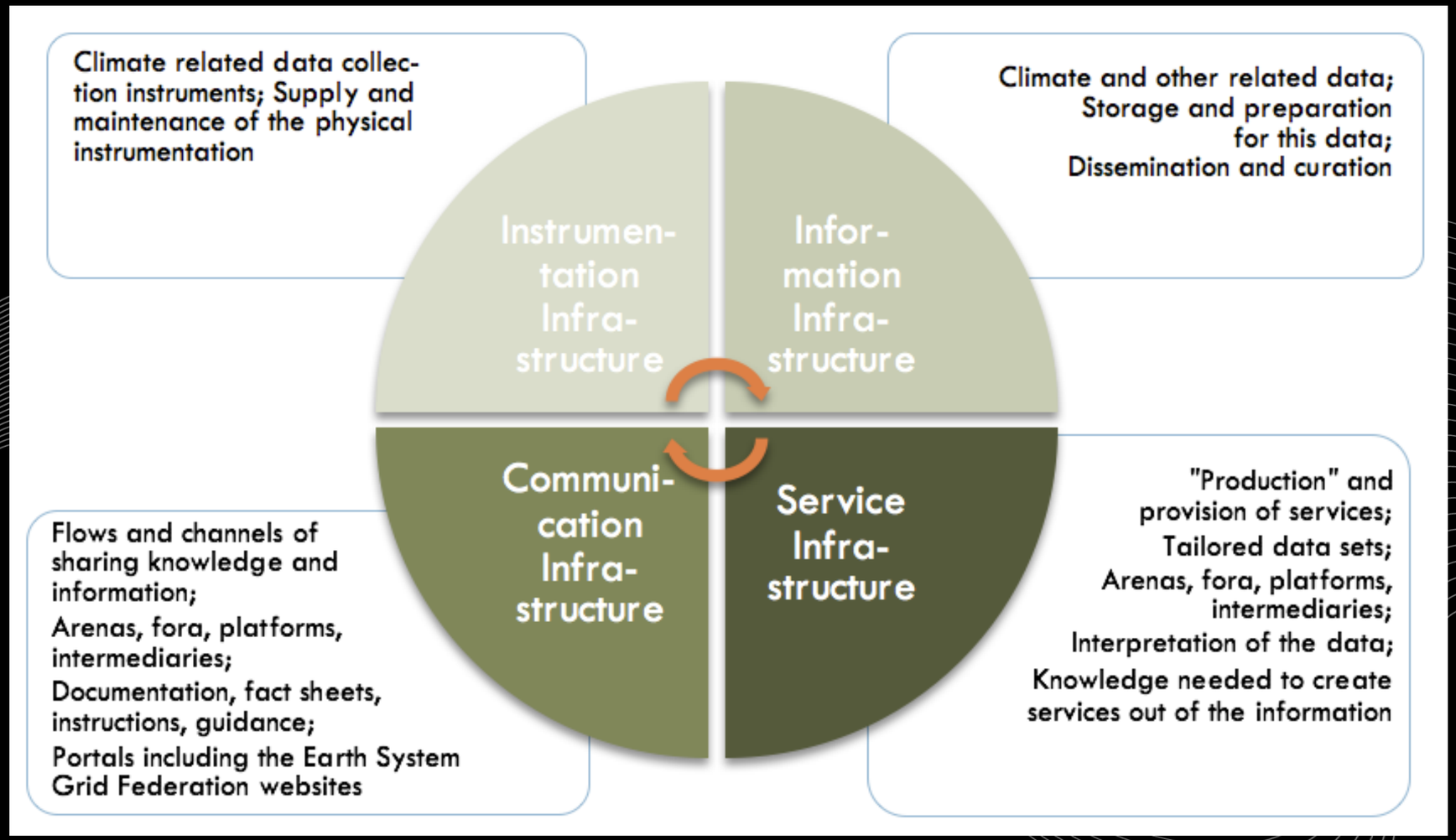


**Governance**: establishing, changing, de-aligning a social/political order, based on interactions & arrangements of all kinds of actors (also beyond the political system)

For climate data **infrastructures**: institutional patterns like rules, standards, conventions, procedures, legitimations, ethics

# CS INFRASTRUCTURE INTERACTION ORDER

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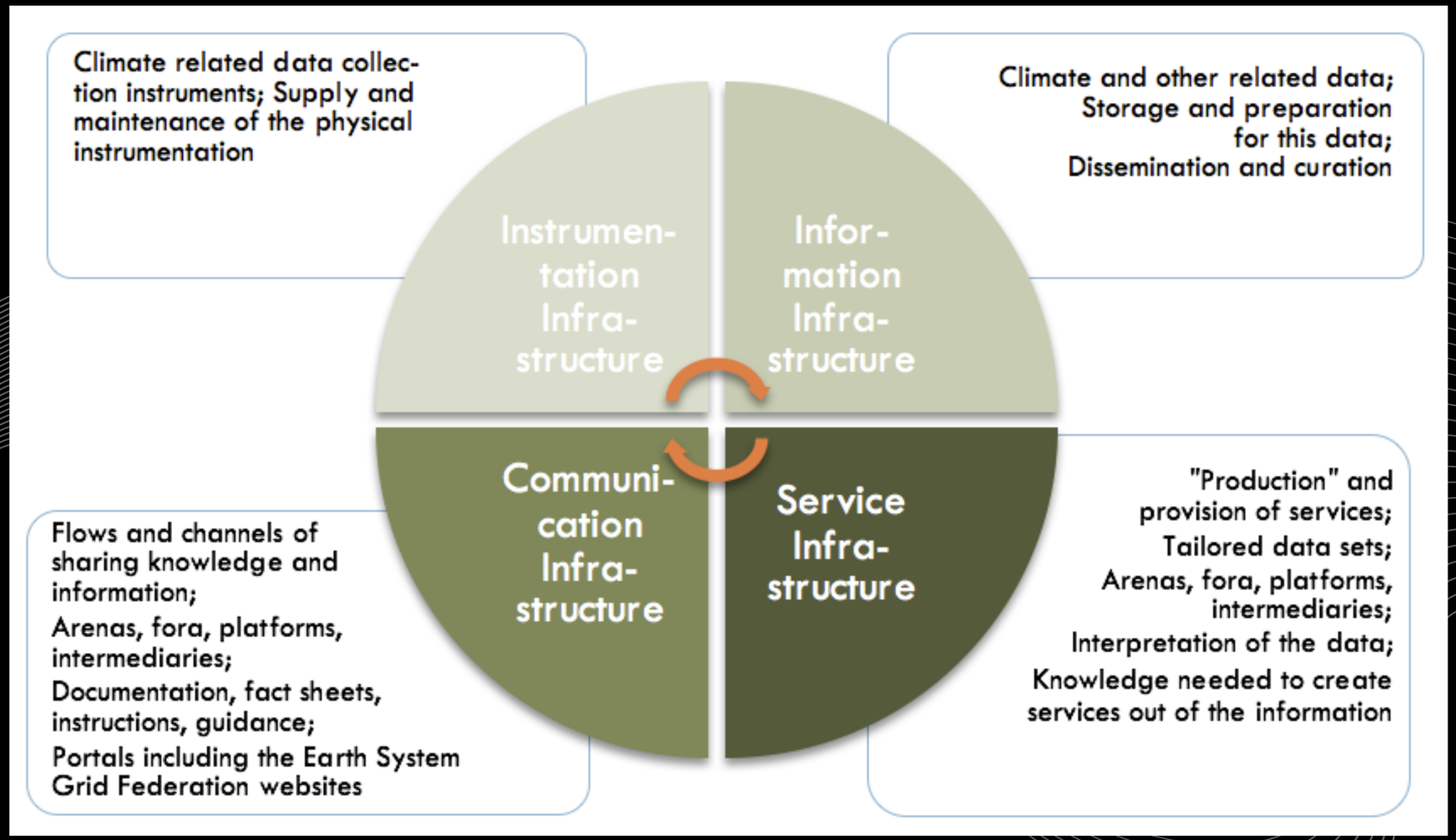


**HERE:** focus still mainly on services supply side

**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

# CS INFRASTRUCTURE INTERACTION ORDER *AUGMENTED*

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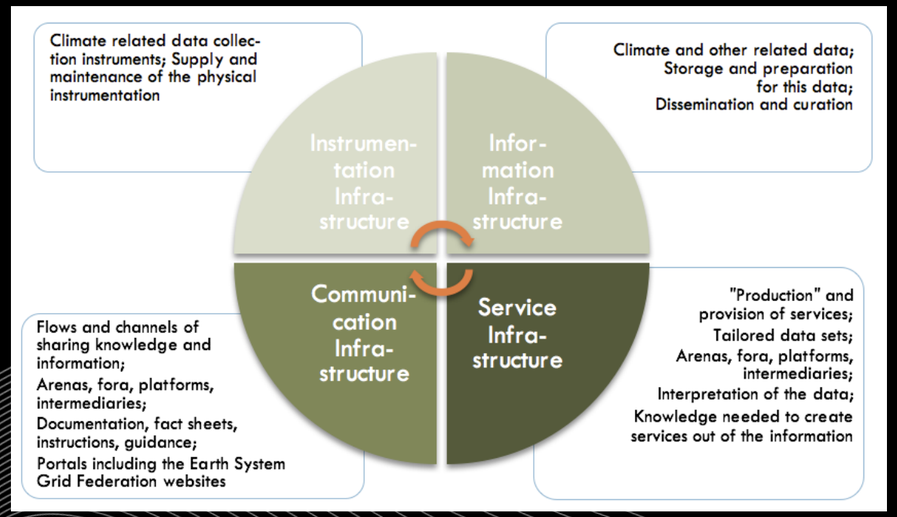


# HYPOTHESES ON INFRASTRUCTURE IMPROVEMENT

(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

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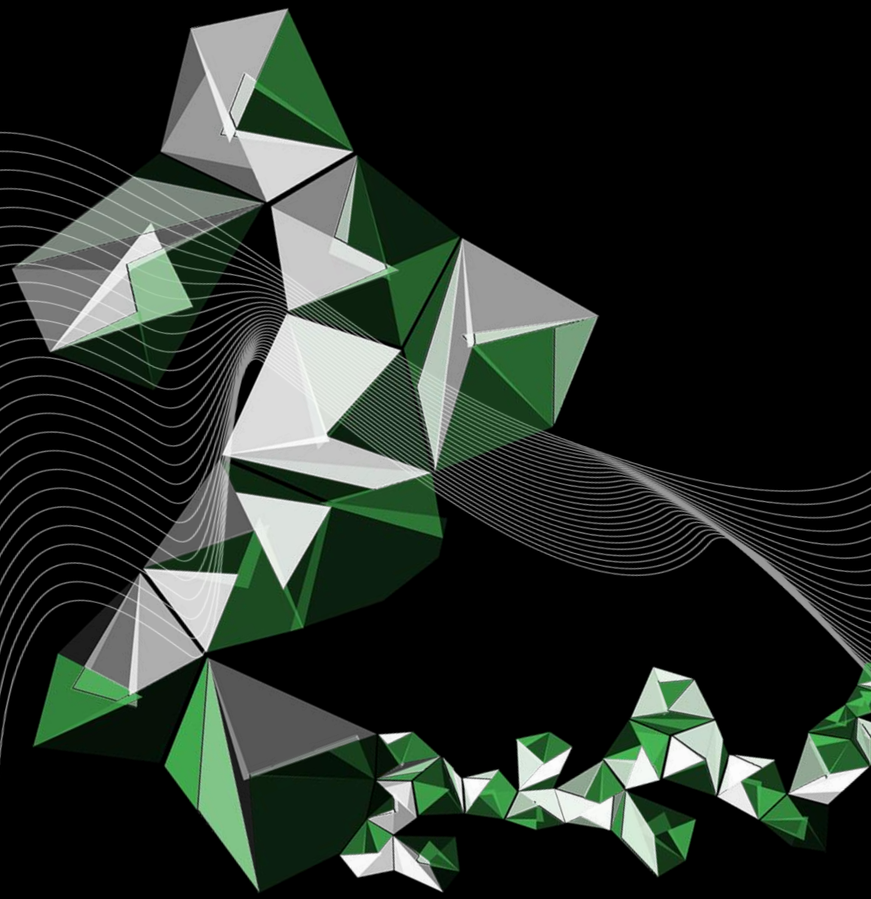
# 4. SKETCHES OF CS SCENARIOS



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| | *Generic* | *Customised* |
|---|---|---|
| *Focused* | **Maps & Apps:**<br>• Generic climate services<br>• Freely or cheaply …<br>• … available to all users | **Expert Analysis:**<br>• Scientific, professional, commercial climate services<br>• Tailored to specific urban planning decisions and decision-makers |
| *Integrated* | **Sharing Practices:**<br>• Mutual services on …<br>• … adapting and mitigating Climate Change in urban environments<br>• Available to all users | **Climate-inclusive Consulting:**<br>• Professional, commercial & …<br>• … transdisciplinary climate services<br>• Tailored to specific urban planning decisions and decision-makers |

# TYPES OF CLIMATE SERVICES THAT COULD WORK FOR USERS

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

MENTAL MAPS

LIVING LABS

CONSTRUCTIVE TA

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

# SUITE OF INTERACTIVE FORMATS

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STAKEHOLDERS WITH DIFFERENT BACKGROUNDS

IDENTIFY & DISCUSS POTENTIAL CHALLENGES …

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

… AND AROUND BUSINESS MODELS FOR CLIMATE SERVICES

CREATING NEW IDEAS & LINKS, NETWORKING

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

# CONSTRUCTIVE TECHNOLOGY ASSESSMENT

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# TASKS FOR THE STAKEHOLDER INTERACTION

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?

WORK TOGETHER IN ONE GROUP
IN FINNISH
(WITH INTRO IN ENGLISH)

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

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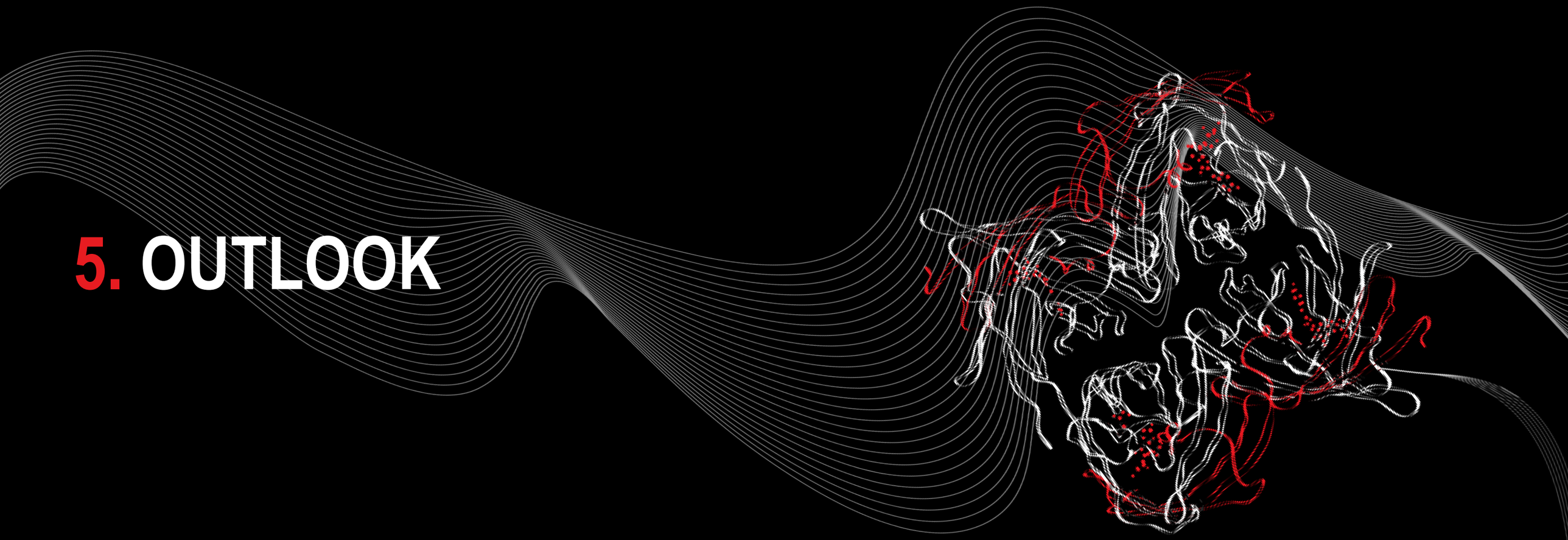
# 5. OUTLOOK



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(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?

# STILL UNDER INVESTIGATION …

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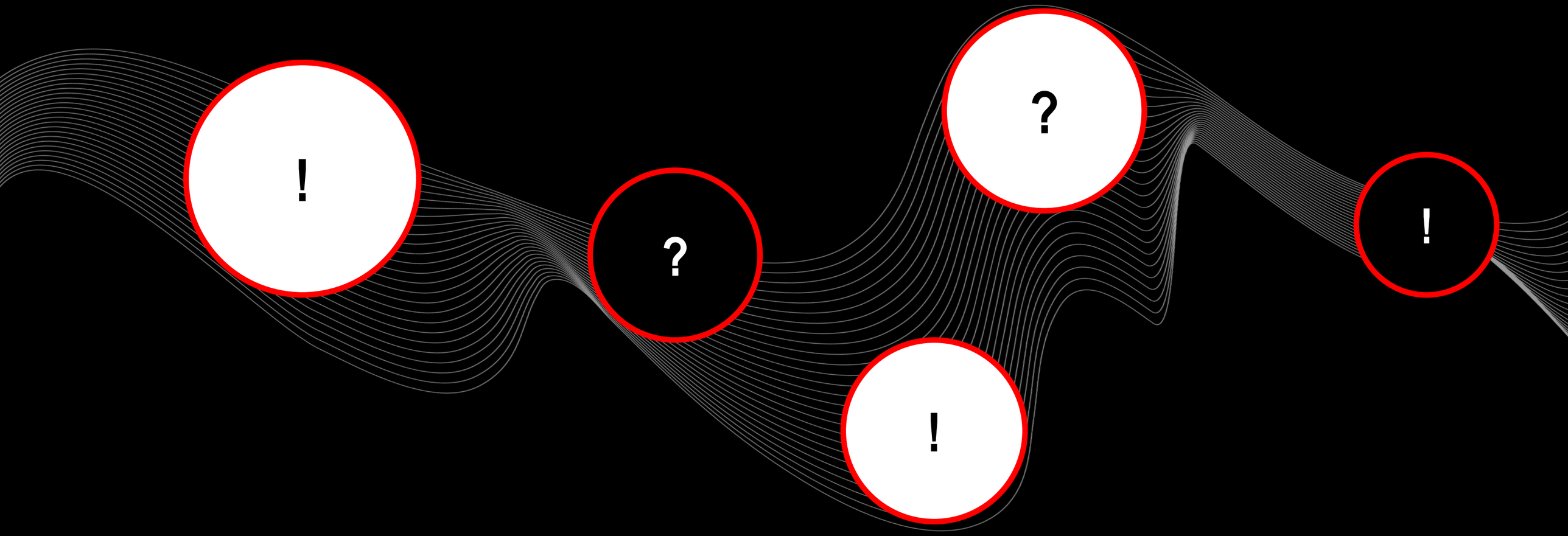


# OPEN FOR DISCUSSION …

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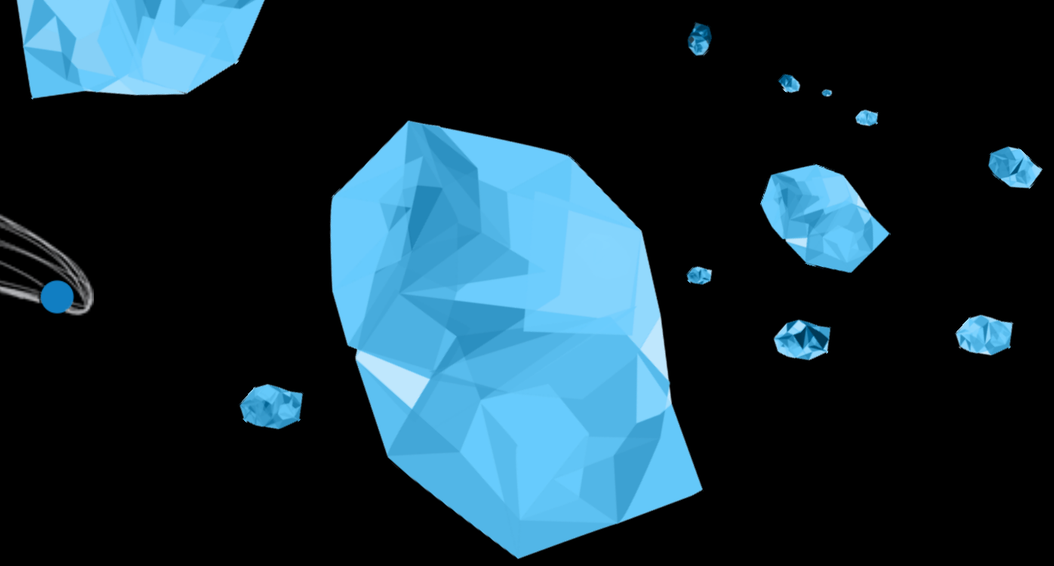
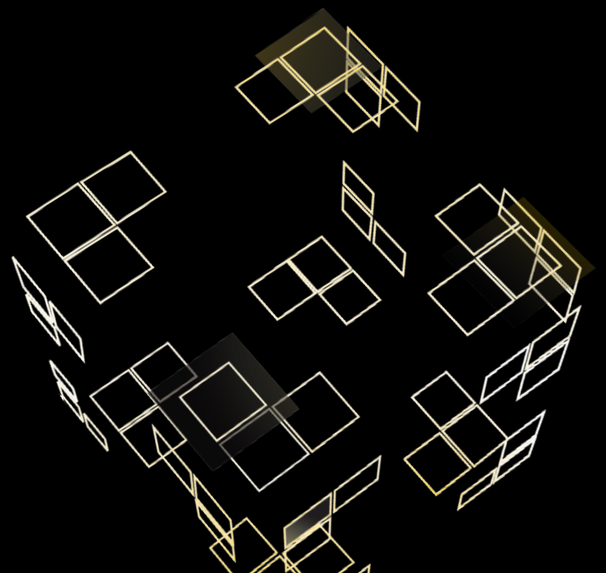
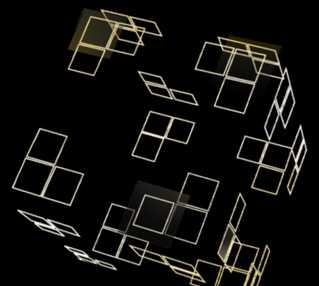
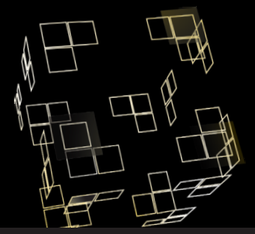


# THANK YOU
# FOR YOUR ATTENTION!







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