

# WHAT SCIENCE COMMUNICATION CAN LEARN FROM THE DIGITAL TWIN

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Introduction

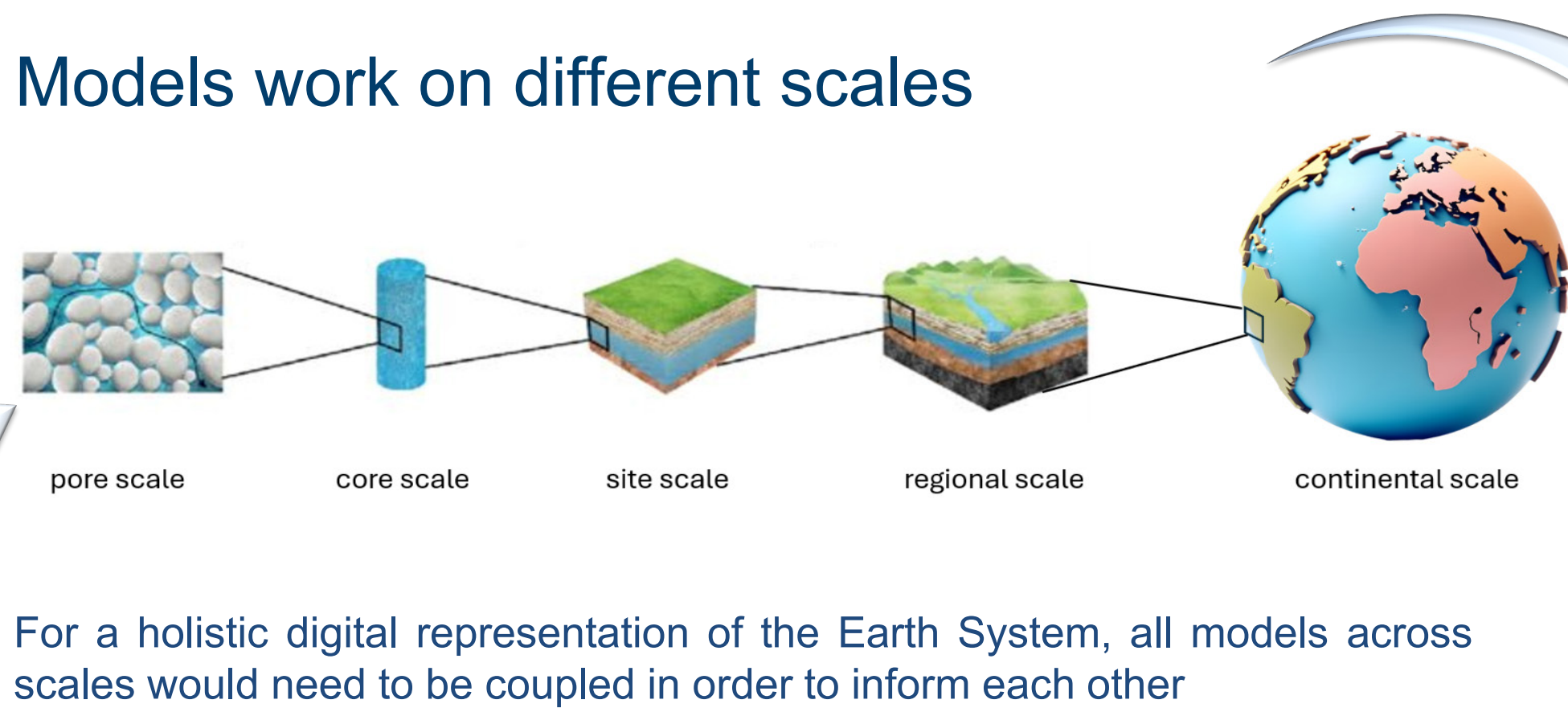
Welcome to model land

"Our world is awash with data. Models are at the center of everything we do."

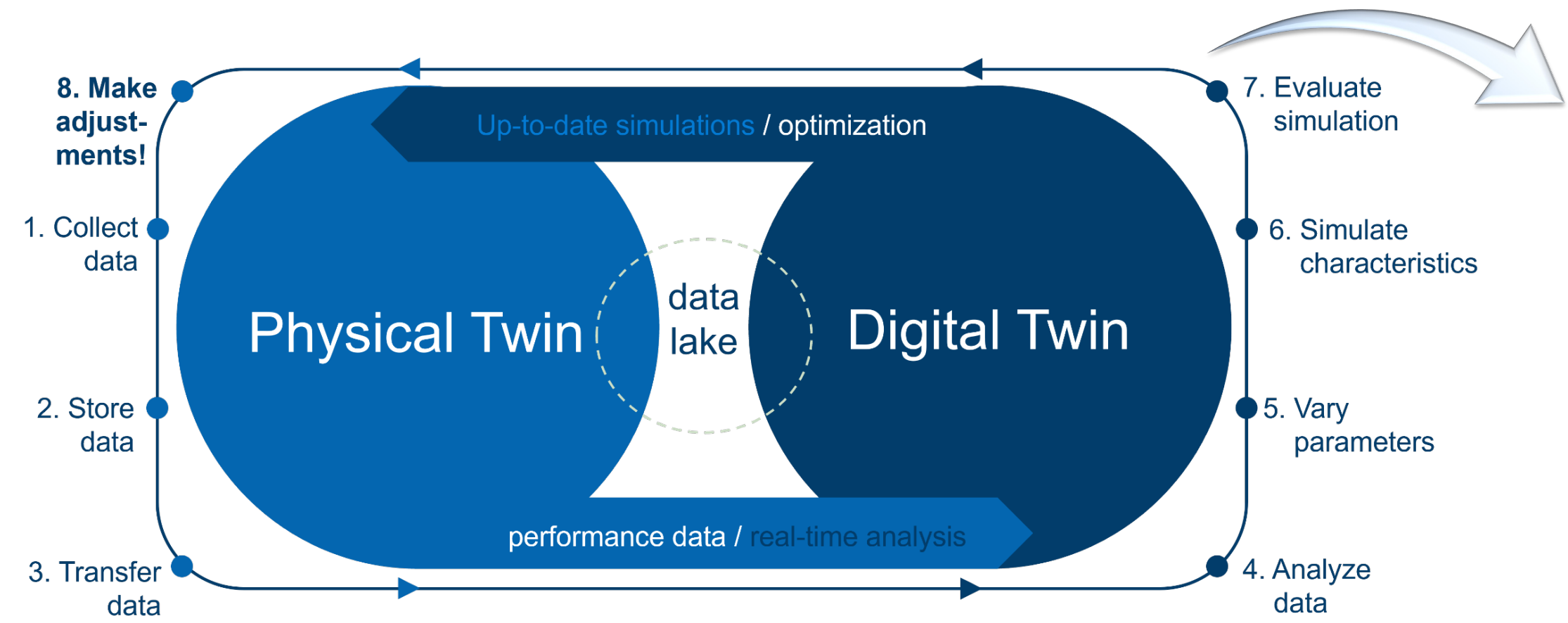
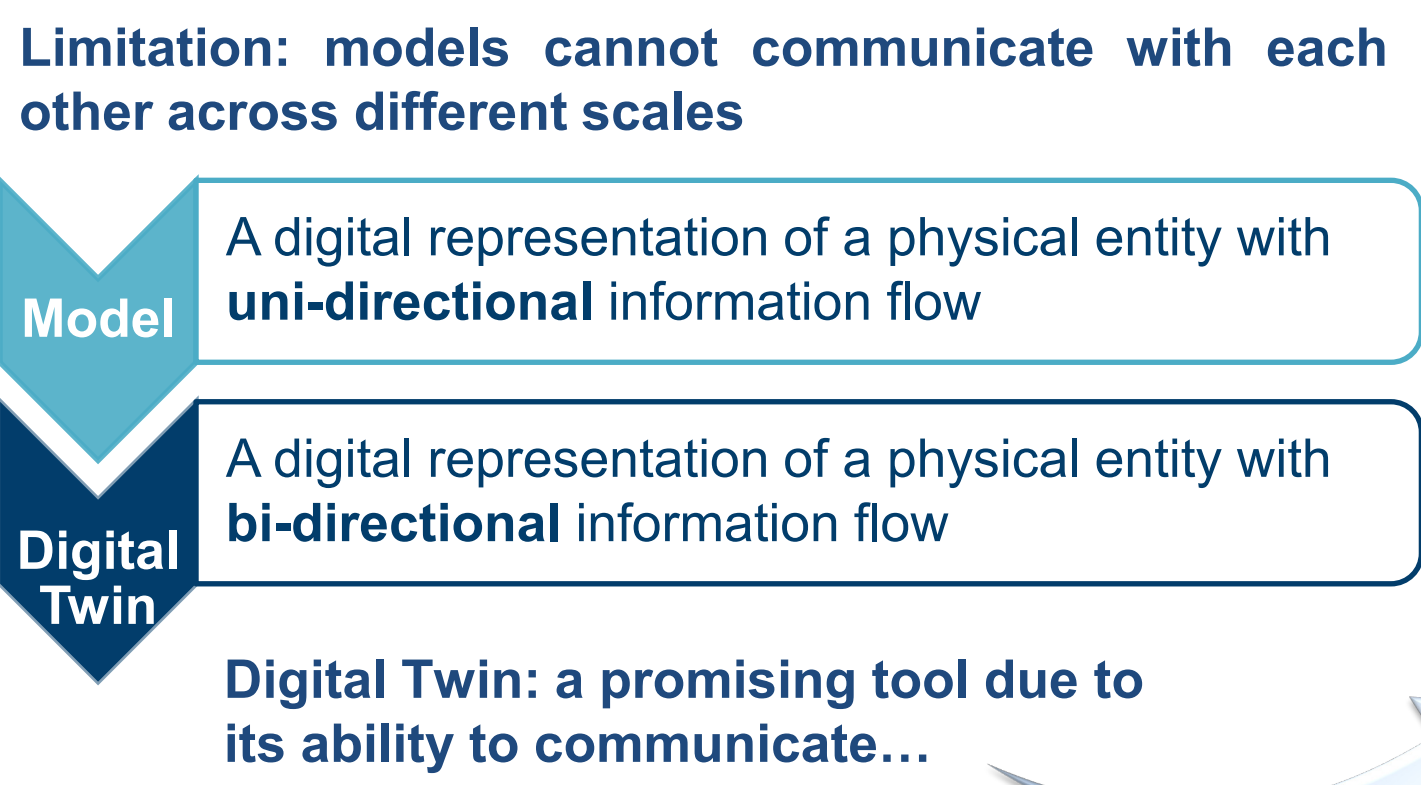
(Erica Thompson, *Escape from Model Land*, 2022)

We don't have a Planet B.

But we need a digital representation of Planet A to manage the pressing challenges of global change



## What is the Digital Twin?

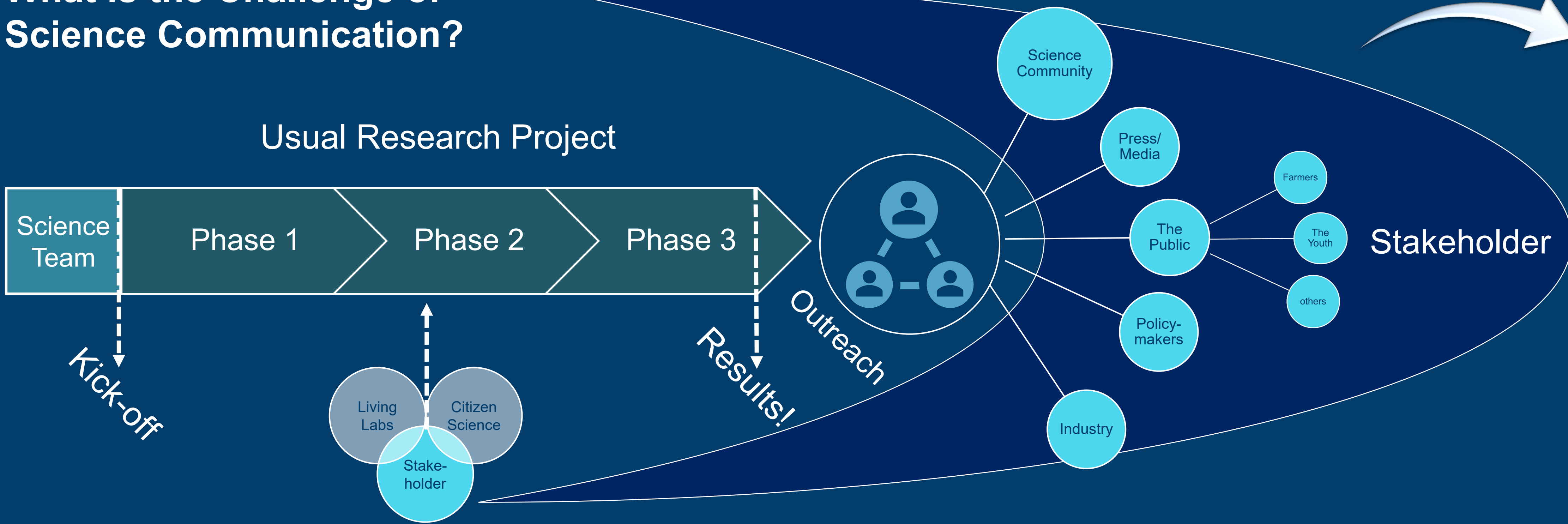


**Benefits of the Digital Twin**

- the ability to communicate. It can be asked („what-if scenarios“)
- the ability to process enormous and complex data
- the ability to evaluate simulations and to improve the real twin with the feedbacks

Sphere of Challenges

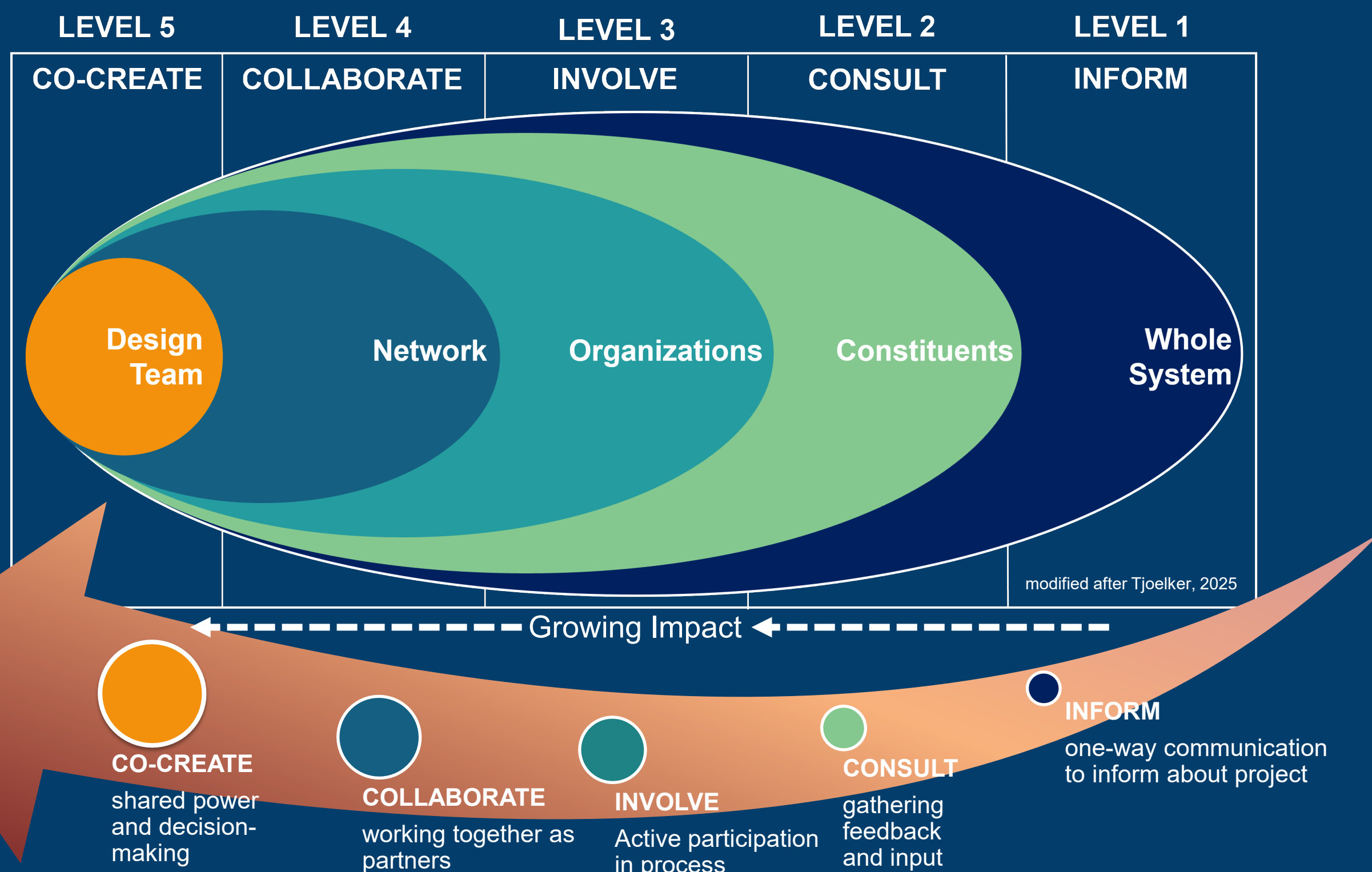
## What is the Challenge of Science Communication?



## Take Aways

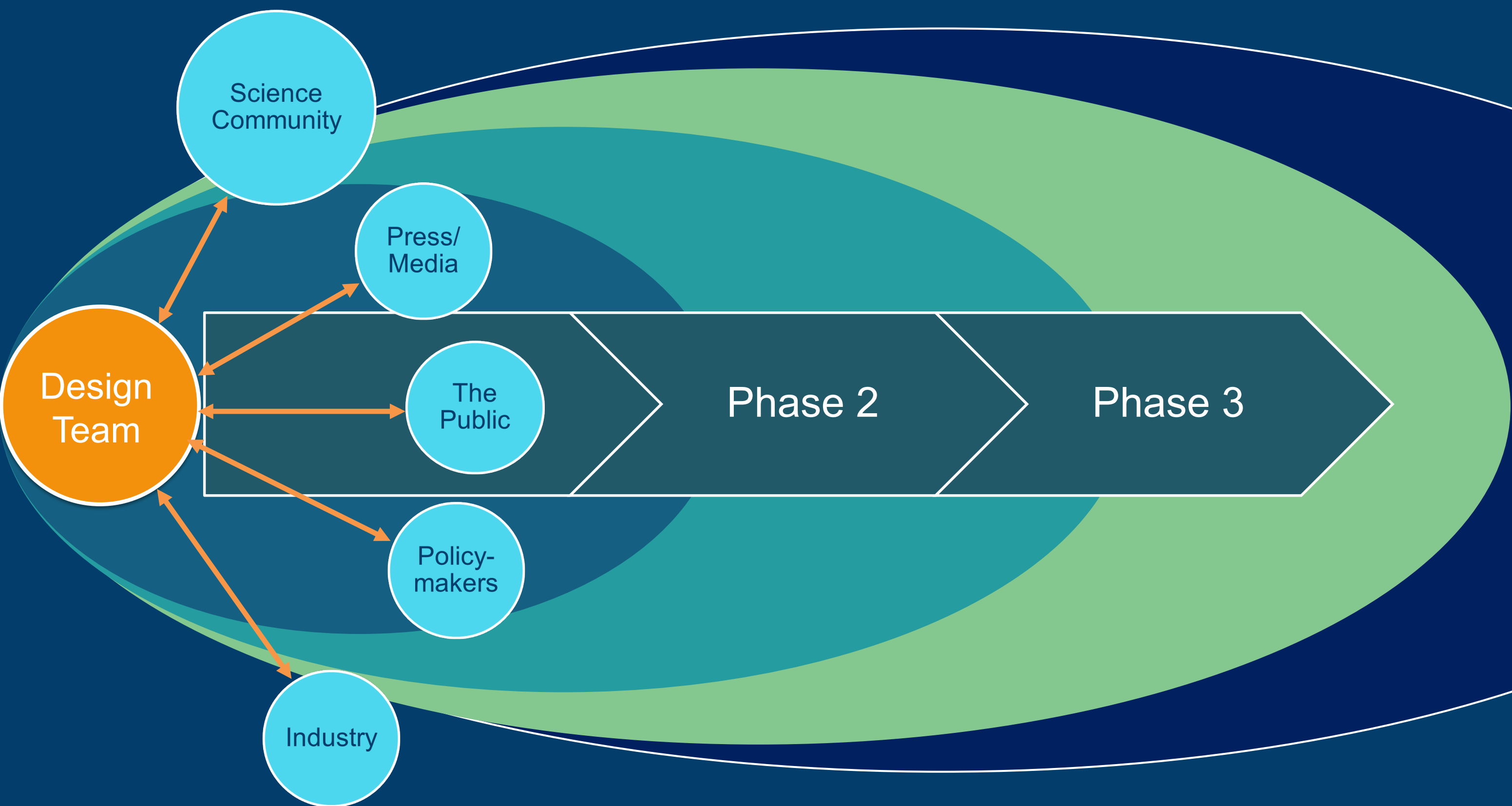
- ❖ If stakeholders are engaged only by being informed about the final project outcome:
  - ❖ results show weakest level of impact
  - ❖ results may not be adopted
- ❖ Formats like Living Labs or Citizen Science attempt to involve stakeholders earlier on, but are often ineffective
- If stakeholders are being integrated earlier into the research project:
  - results show to achieve a greater impact
  - stakeholder feedback can be used to improve the research design

## 5 Level of Stakeholder Engagement



Sphere of Solutions

## THE "COMMUNICATION TWIN" CONCEPT



Transferring the basic principle of a digital twin to science communication would result in strategic, stakeholder-specific communication with a bi-directional flow of information. The early integration of stakeholders – whether through Involvement (Level 3), Collaboration (Level 4) or even a Co-Creation approach (Level 5) – would maximize the impact of the scientific results through the many valuable effects of this approach:

## Learnings for the SciComm

**1. Individualized and target group-specific communication**

Science communication (SciComm) can adopt the digital twin philosophy and develop individualized communication twins tailored to each stakeholder group. The early identification of both sides' needs promotes a real dialog.

**2. Interactivity and real-time feedback**

A key aspect of a digital twin is the ability to interact with the physical twin in real time, simulate scenarios and receive immediate feedback. These dynamics can make SciComm an effective tool for improving research design itself.

**3. Transparency and traceability**

Communication twins could provide data according to the FAIR principles. This invites stakeholders to conduct their own analysis (e.g. data journalism) and enables evaluations. SciComm can benefit from this by making its content equally clear and accessible.

**4. Participation and empowerment**

Communication twins would enable stakeholders to actively participate in the design and use of research. This fosters a sense of ownership and engagement, a principle that supports the adoption of scientific results and derivation of concrete measures (such as policies)

**5. Dynamic adaptability**

Digital twins are not static, but evolve through the integration of new data and insights. This iterative approach could also be applied in SciComm for continuous improvement.

**6. Teaching systems thinking**

Digital twins visualize systems in their entirety and make interactions between different components visible. This systems perspective is a valuable concept that SciComm can adopt.

**7. Visualization and gamification**

The impressive visualization capacity of digital twins is a powerful tool for making complex information understandable. SciComm can benefit from this to make abstract concepts more tangible.

## Examples of Use / Outlook

**AgraSim Project**

A new ecotron infrastructure to investigate the effects of future climate scenarios on agricultural cultivation systems. A digital twin of this experimental facility will enable the evaluation of future management options and crop varieties.

FAIR data provided via Jülich data hub

**ReGenFarm Project**

Co-Creation Project between Science, Industry and Agriculture to build a digital twin of an entire farm system to explore the potential of regenerative agriculture with a focus on carbon farming

AgraSim Graduate School  
IBG-3 Team  
Network Ecotron Research [Europe/USA]  
Forward Farm „Damianshof“  
IBG-3 (IBG-1, IBG-2, Innovation + Transfer Department of FZJ)  
BAYER Crop Science

JuLAB School project courses [1y] NRW  
Data Journalism [Science Media Center Germany SMC]

Policy-Science Interface formats?

Continue the discussion

Marie Ludwig

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Sharing is encouraged