



# Technology governance assessment

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Rinie van Est

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*Workshop on lessons learned from the UNCTAD pilot  
project on TA in Africa. 23 October 2024, Geneva*



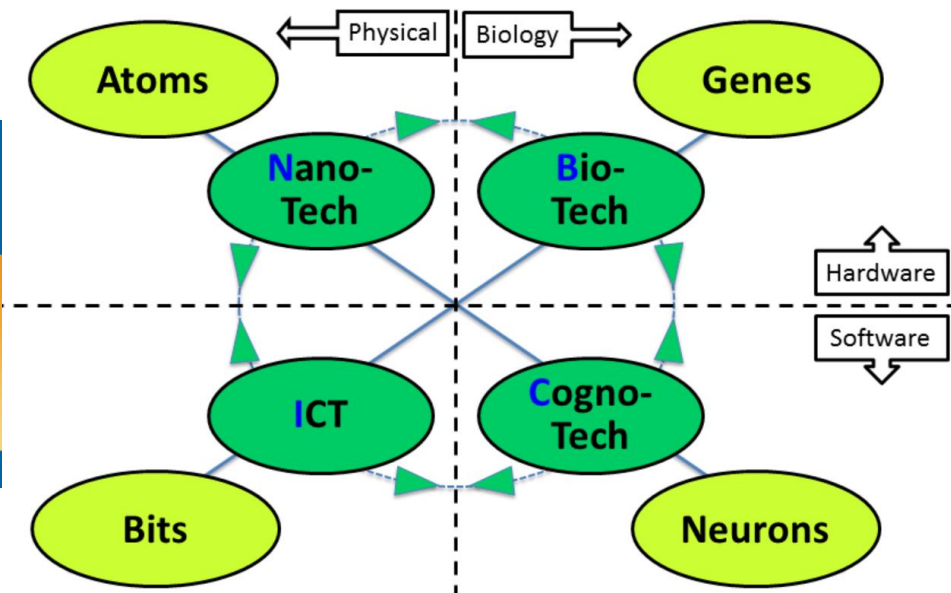




# Green & Digital The Twin Transition

# Emerging technologies

2000s: NBIC-convergence leading to robotics, AI, synthetic biology, etc.



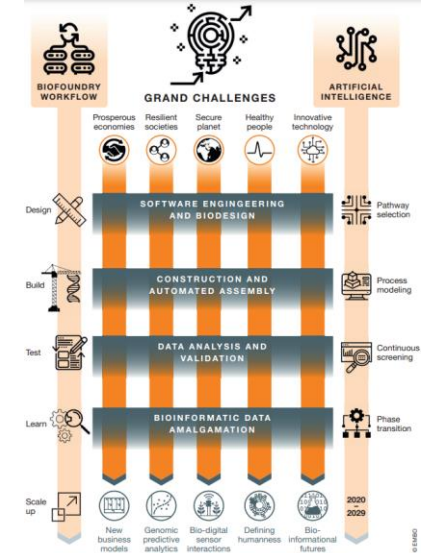
2020s: Converging converging technologies

Science & Society

## Bio-informational futures

*The convergence of artificial intelligence and synthetic biology*

Thom A Dixon<sup>1</sup>, Natalie C Curach<sup>1,2</sup> & Isak S Pretorius<sup>1</sup>

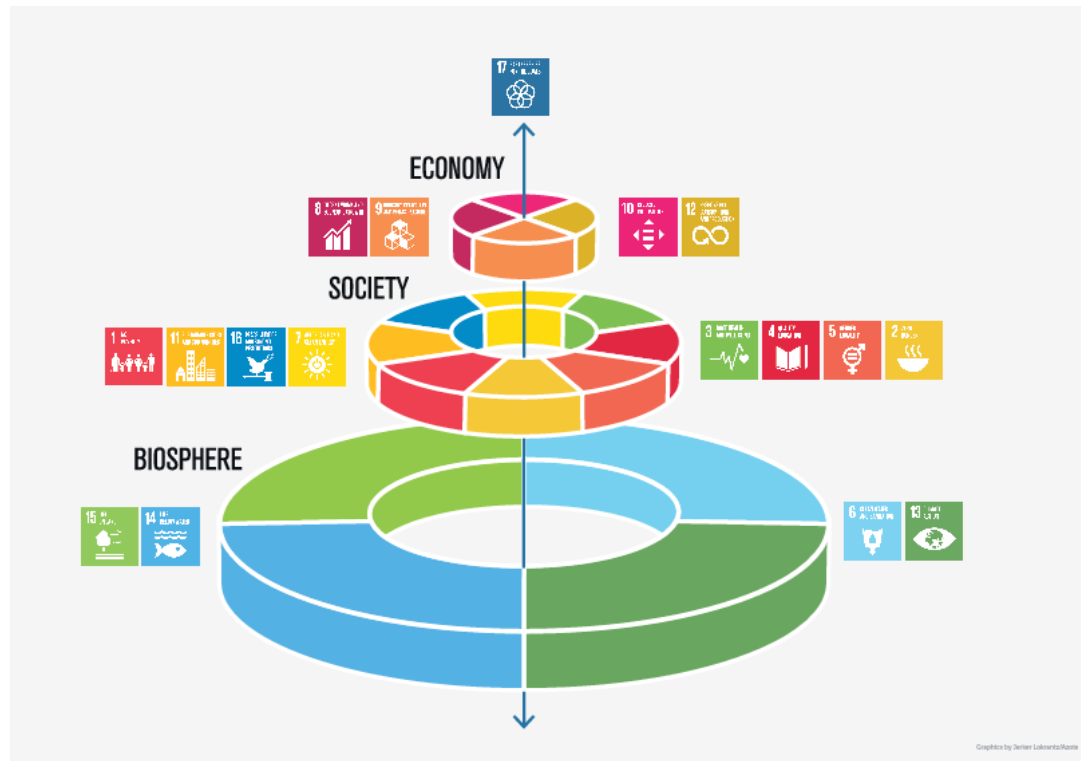


**Figure 2. Convergence of synthetic biology and artificial intelligence in the biofoundry.** Artificial intelligence applications enable efficiency gains in the design-build-test-learn cycle that can assist synthetic biology practitioners in meeting the grand challenges of the 21st century.



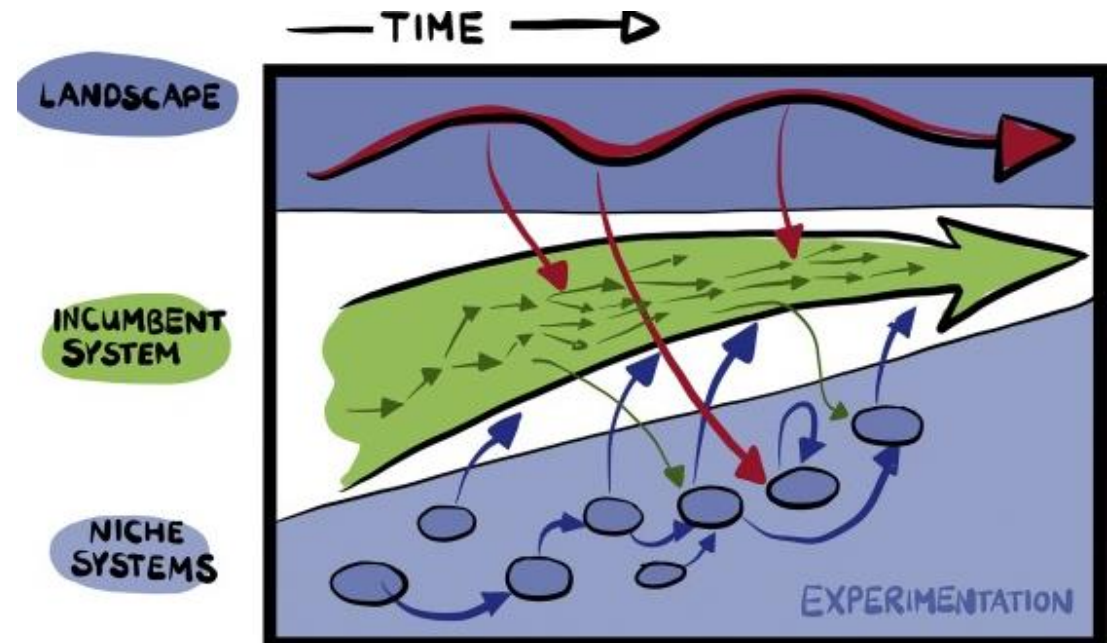
# Sustainability transition

## From CO2-reduction to SDGs

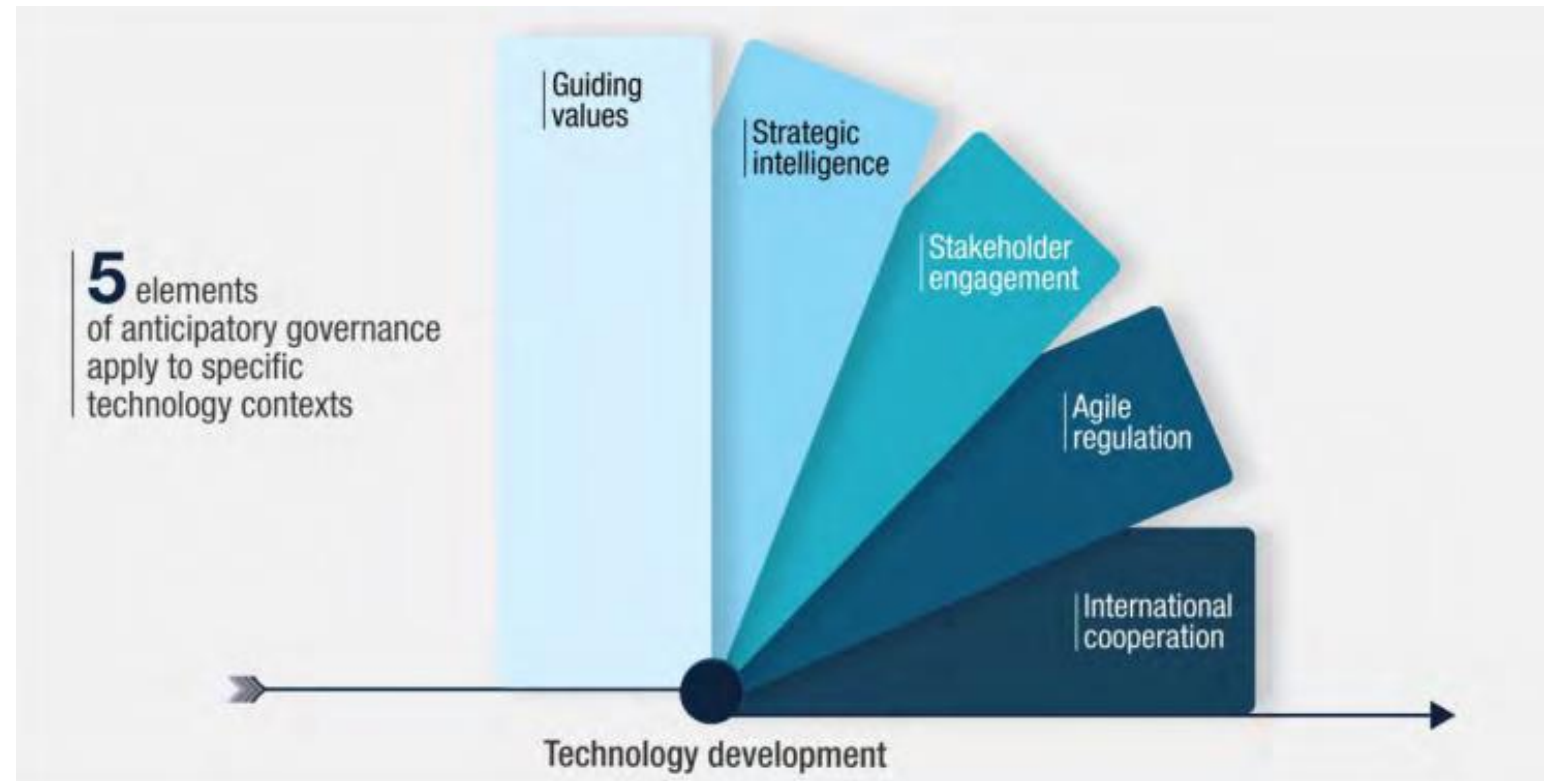


Rockström & Sukhdev (2016): "The SDG's wedding cake"

## Transforming socio-technical systems



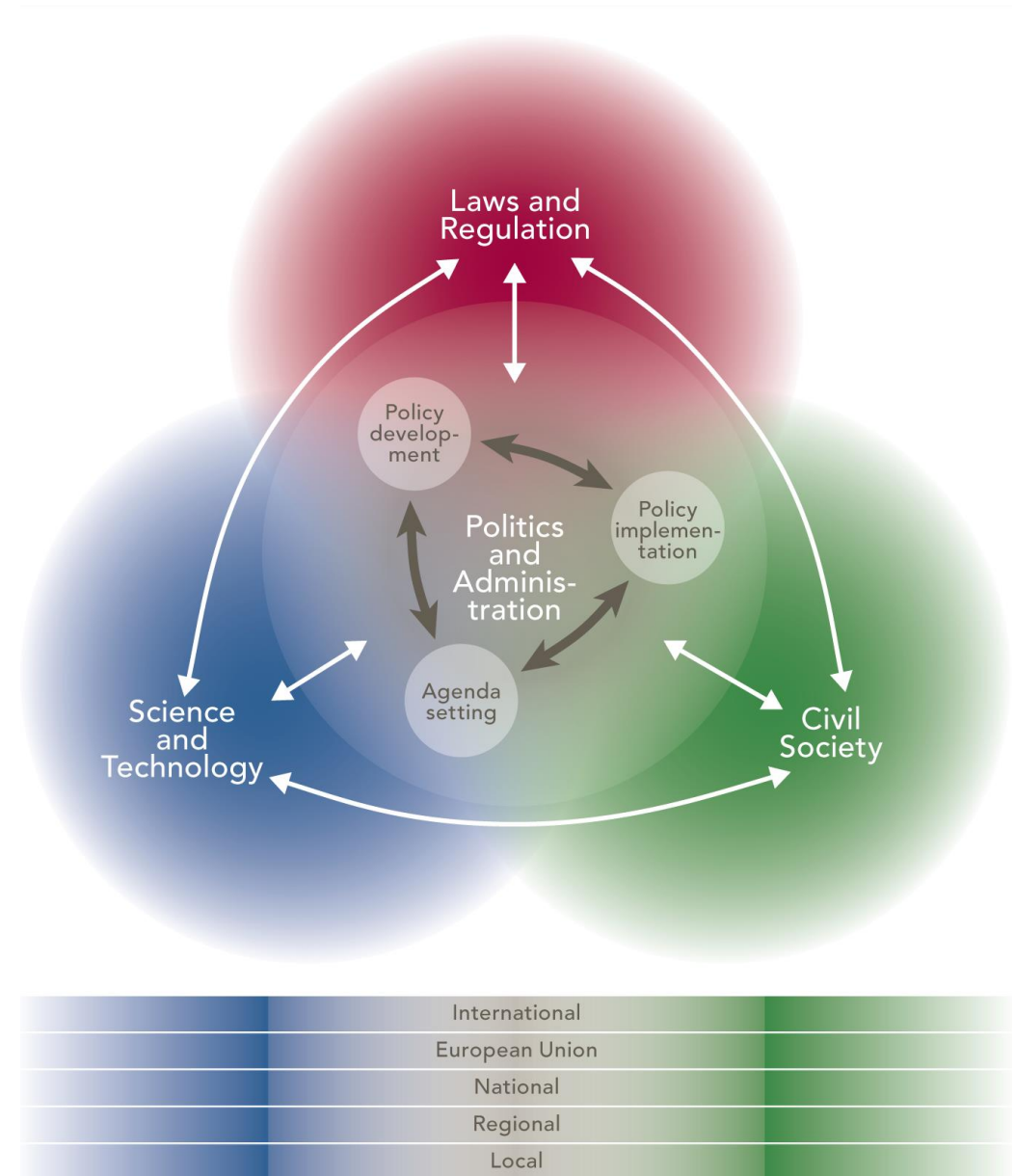
# How to govern the twin transition?



# Technology governance assessment

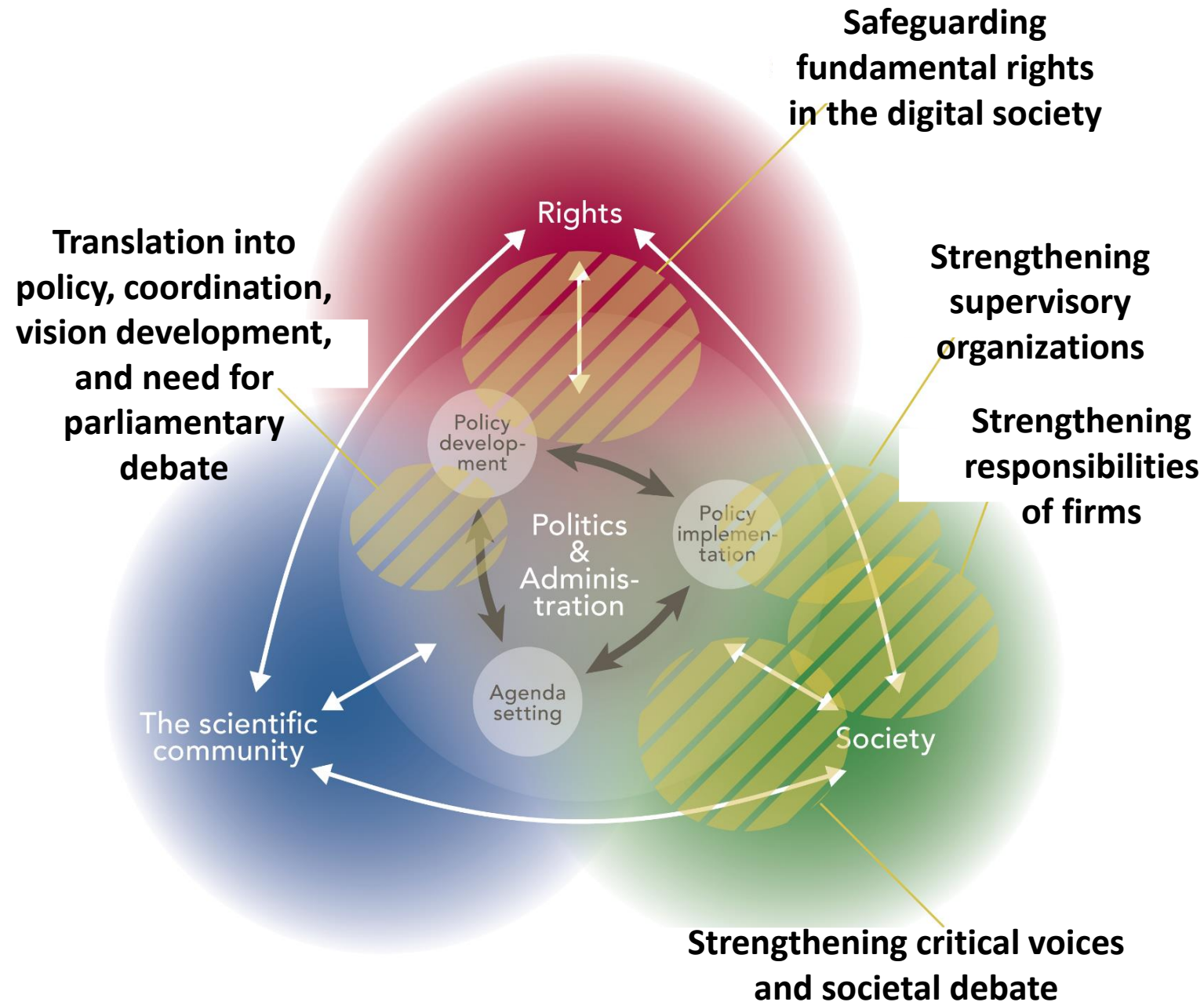
- **STI developments**
  - State of the art
  - Expectations
- **Social, ethical, and legal aspects (ELSA) and ecological aspects of STI, and who is involved in these aspects**
  - State of the art
  - Expectations
- **Contribution of STI to (social, economic and ecological) sustainability objectives**
  - State of the art
  - Expectations
- **Governance of STI, and related ELSA and sustainability goals**
  - State of the art of governance arrangements and institutions
  - Type of governance intervention(s) needed

# Technology governance ecosystem framework



Source: Kool et al. 2017; Arentsen & Van Est 2023

# Example: Blind spots Dutch governance of ELSA of digitalization





# Upgrading technology governance by strengthening institutions



Nederlandse  
Digitaliseringsstrategie 2.0  
Hier heb het. Hier gebeurt het.

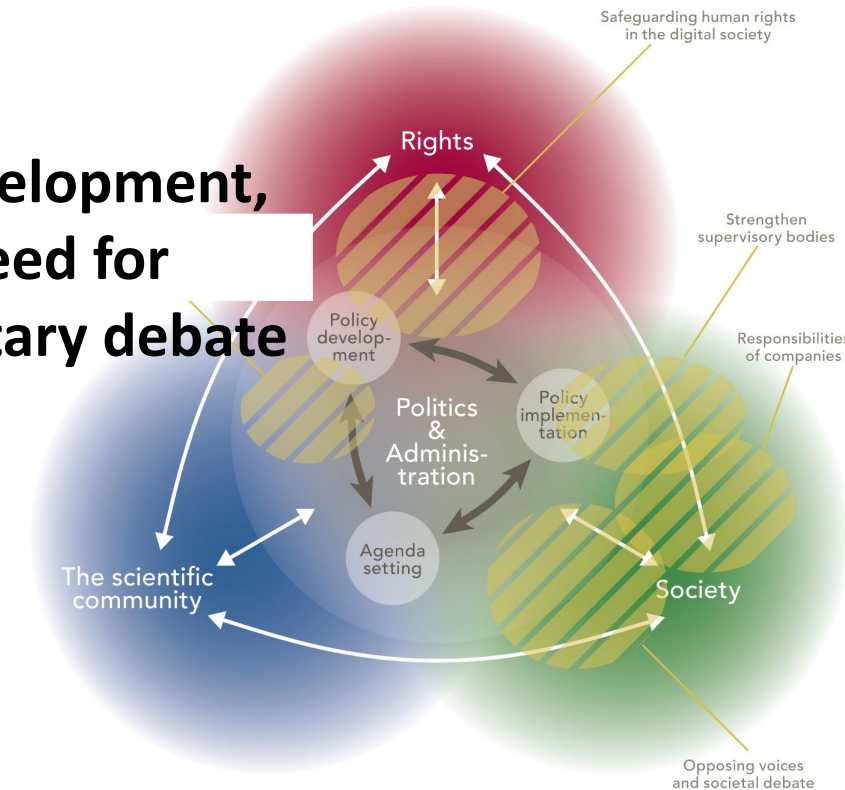


First Secretary of State  
Internal Affairs and  
Digitization (2022)

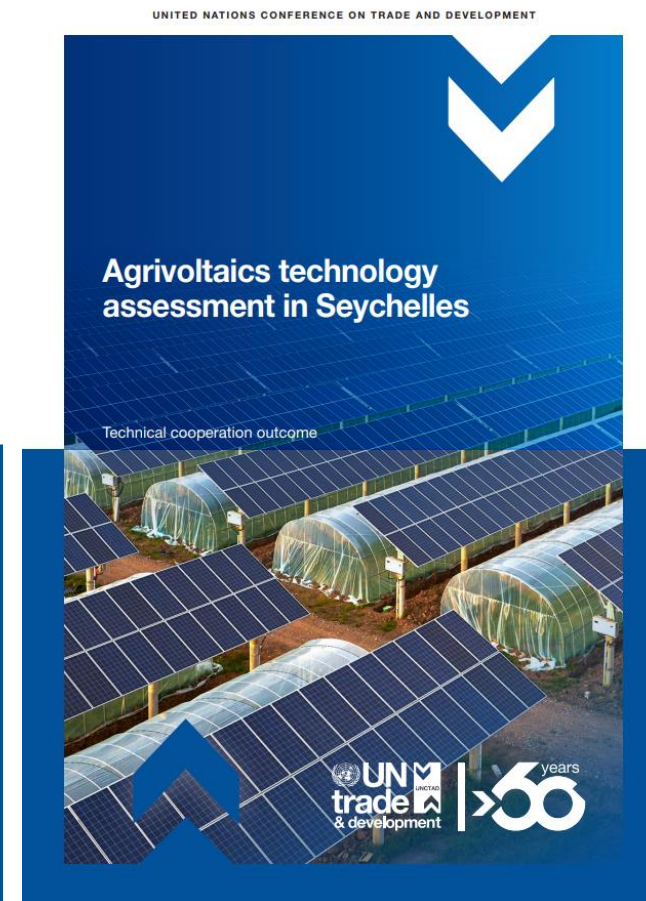


Permanent committee for  
Digital Affairs in Second  
Chamber (2021) and Senate  
(2024)

↑  
**Policy development,  
and need for  
parliamentary debate**  
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# Global need for assessing & strengthening technology governance



# Rathenau Instituut

Thanks for your attention

## Contact information

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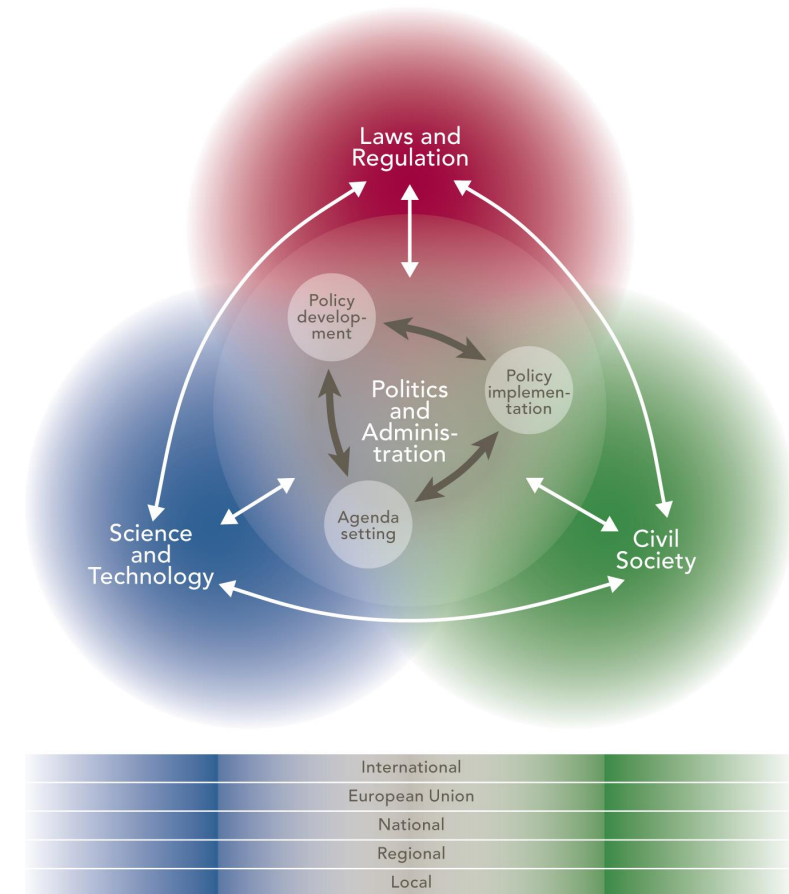






# Example: Research and dialogue program on radioactive waste governance

- **Four lines of research and dialogue**
  - Past, present, future, elsewhere
- **Research and dialogue activities**
  - Historical study
  - International study
  - Legal framework
  - Knowledge ecosystem
  - Expert-stakeholder dialogues
  - Focus groups with citizens



**Multi-level governance ecosystem framework**

# Example: Advisory report on radioactive waste governance

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## Taking steps together now

Advisory report on the decision-making process on the long-term management of radioactive waste



Advisory report

Recommendations address:

- substantive choices
- procedural choices
- allocation of tasks and responsibilities

## Four processes for decision-making

