AN ANTICIPATORY FRAMEWORK FOR THE GOVERNANCE OF EMERGING TECHNOLOGY

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David Winickoff
Directorate for Science, Technology and Innovation
OECD

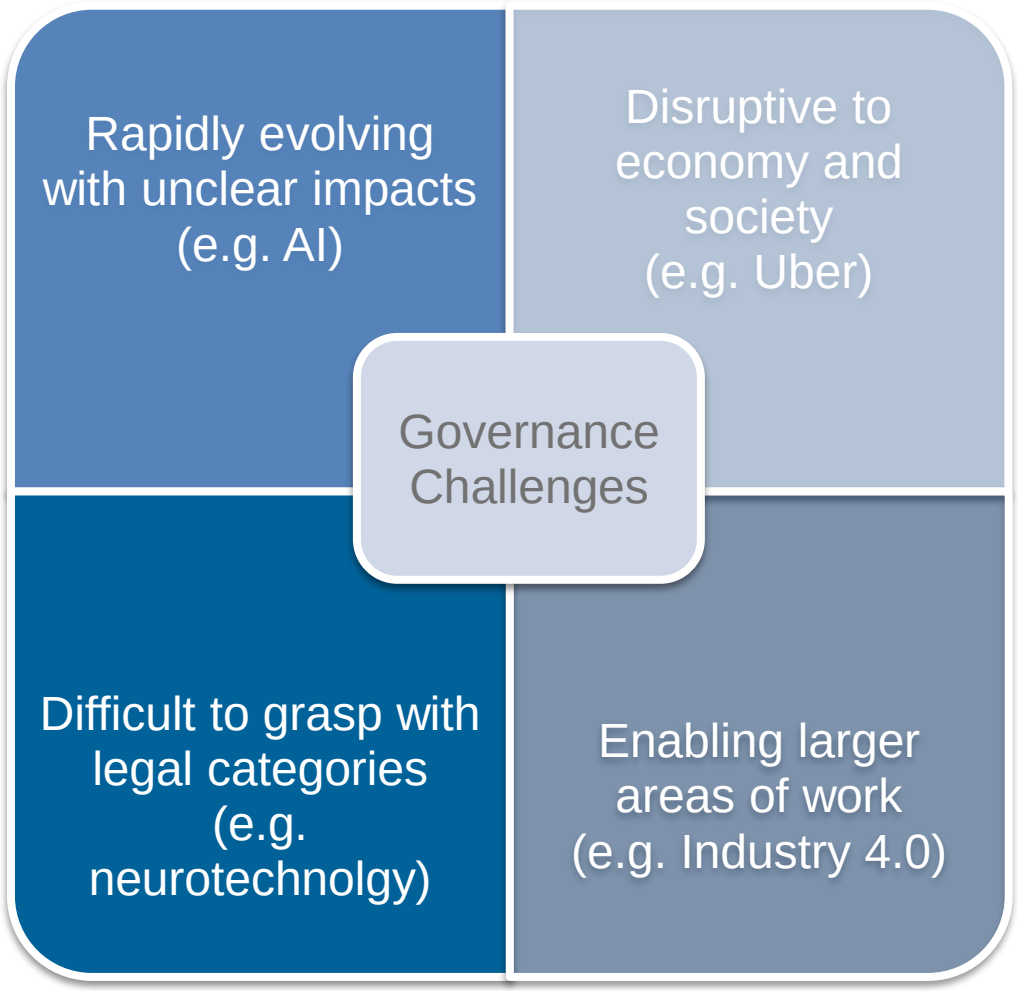
BETTER POLICIES FOR BETTER LIVES

We need collective action on good technology governance to reach goals and missions

Technology governance rationales

- Anticipate and mitigate social and political disruptions
- Safety, security and democratic risk management
- Tech divides and rising inequalities
- Public trust and public acceptance deficits in S&T
- Inadequate alignment of technology and societal goals

Common challenges but governance is not one-size fits all



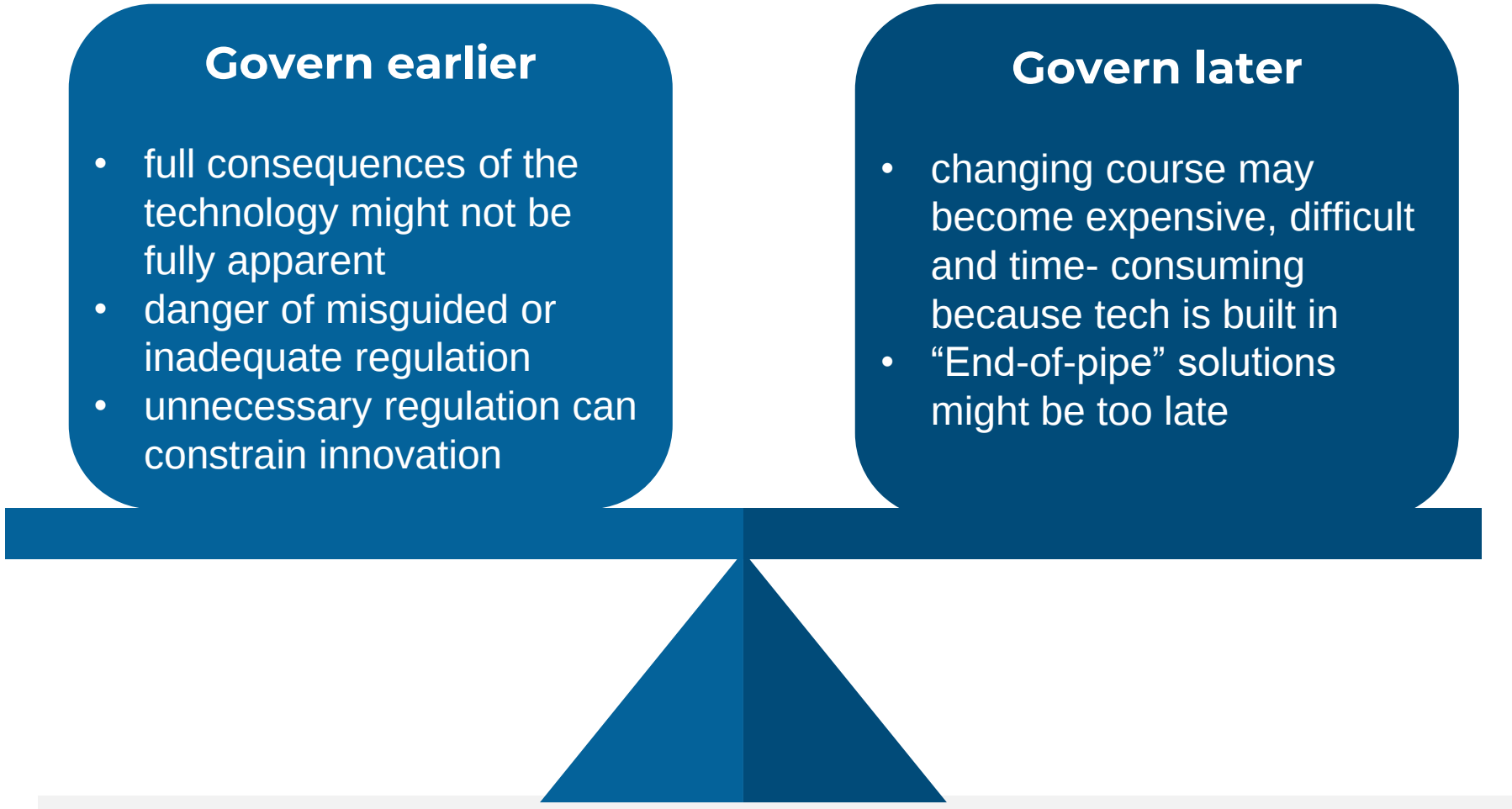
COMMON CHALLENGES

- Rapid pace of development. uncertain risks, benefits and trajectories
- Multiple applications, industries, contexts, and regulatory agencies, cross-border aspects
- Concerns extend beyond traditional health, safety and environmental risks

RESPONSE takes into account specificities

- Level of readiness for commercialisation
- Profile of perceived risks and potential benefits in the short and long term
- Profile of local, national and international matters of concern
- Level of public concern

The “Collingridge Dilemma”



OECD: international norms and standards

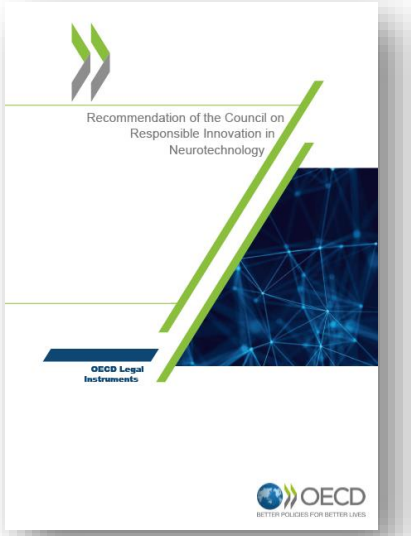
- OECD: 38 member international organization based in Paris

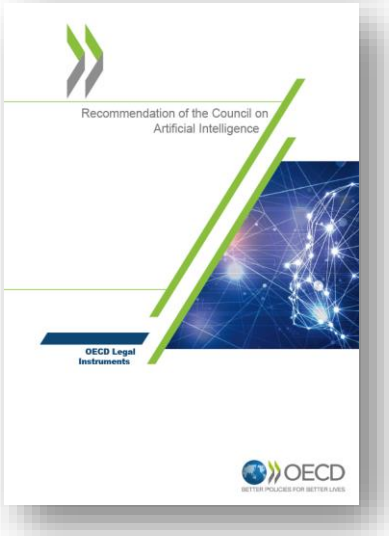
- Three functionalities: research, convening, development of international “soft law” in many policy fields

- OECD Recommendations
  - Not legally binding
  - Entail a moral and political commitment
  - Expectation that Adherents will do their utmost to implement
  - New members must demonstrate compliance
  - Implementation is reviewed
  - Focus on peer learning and exchanging best practices

- International landscape and cross-national learning: gene editing, dual use, etc.

International soft law on emerging technology governance





Fields, e.g.,

- Artificial intelligence
- Neurotechnology
- Biobanks and data repositories
- Genetic licensing
- Access to data
- Policy framework on “emerging technology for good” (under construction)

Political and Social Process

- Research and evidence base: governance landscape and gaps, good practices
- Convening stakeholders: government, private sector, civil society, academia

Key Point: inclusive process means it will be more likely to be taken up

- Recommendation of the Council on Artificial Intelligence (2019)
- Recommendation of the Council on Responsible Innovation in Neurotechnology (2019)

9 Recommendation Principles

1. **Promote responsible innovation in neurotechnology to address health challenges.**
2. **Prioritise assessing safety in the development and use of neurotechnology.**
3. **Promote the inclusivity of neurotechnology for health.**
4. **Foster scientific collaboration in neurotechnology innovation across countries, sectors, and disciplines.**
5. **Enable societal deliberation on neurotechnology.**
6. **Enable the capacity of oversight and advisory bodies to address novel issues in neurotechnology.**
7. **Safeguard personal brain data and other information gained through neurotechnology.**
8. **Promote cultures of stewardship and trust in neurotechnology across the public and private sector.**
9. **Anticipate and monitor the potential unintended use and/or misuse of neurotechnology.**

Implementation “levels”: Recommendations, directives, and tool kits

4. Foster scientific collaboration in neurotechnology innovation across countries, sectors, and disciplines. In order to achieve this, relevant actors should:

a) Promote interdisciplinary research and development where communities of scientists and engineers interact closely with the social sciences and humanities communities as well as with user and other relevant groups.

b) Foster pre-competitive consortia of collaborative research across public research institutions, private non-profit organisations, private sector entities, and patient communities.

c) Support the development of standards and best practices for the technical as well as ethical, legal, and social aspects of innovation in neurotechnology.

d) Support an international culture of “open science” by creating joint infrastructures and environments for sharing, aggregating, auditing, and archiving data relating to neurotechnology as appropriate.

Neurotechnology Recommendation

Water governance recommendation

The Toolkit for Water Policies and Governance compiles policies, governance arrangements and related tools that facilitate the design and implementation of water management practices in line with the OECD Council Recommendation on Water. It is designed to inspire and support countries which have either adhered to, are considering adhering to, or aim to converge towards the OECD standard.

Maps, gaps, levers, incentives

- **Map relevant actors in possible governance system / institutions**
- **locating gaps**
- **Identify levers** for each actor class and relevant **incentives**

- **Ministry/health agency**
- **Public funders**
- **Regulators/legislators**
- **Executive organs**
- **Research institute or university**
- **Tech transfer offices**
- **IRBs or other review boards**
- **Researchers**
- **Investors**
- **Private firms**
- **Industry associations**
- **Clinicians**
- **Professional societies**
- **Scientific associations**
- **National academies**
- **Patient groups**
- **Philanthropic orgs and funders**

July 2022 workshop with private sector actors

Neuroethics Implementation in the Private Sector

OECD-BrainMind workshop
at OECD in Paris, July 2022

- **Participants**
  - policy makers, entrepreneurs/industry, academics, students, philanthropy/investors
- **Key points discussed**
  - challenges for ethical neurotechnology innovation
  - tools and mechanisms to put ethical principles into practice
  - Prole in the responsible development of neurotech
- **Concrete action points**
  - Develop *implementation guidance resources* tailored to stakeholders
  - Set-up: *Neuro Advisory Network* –> kick off on 2 November 2022
  - *Convene global key Neurotech stakeholders* in Asilomar-like meeting

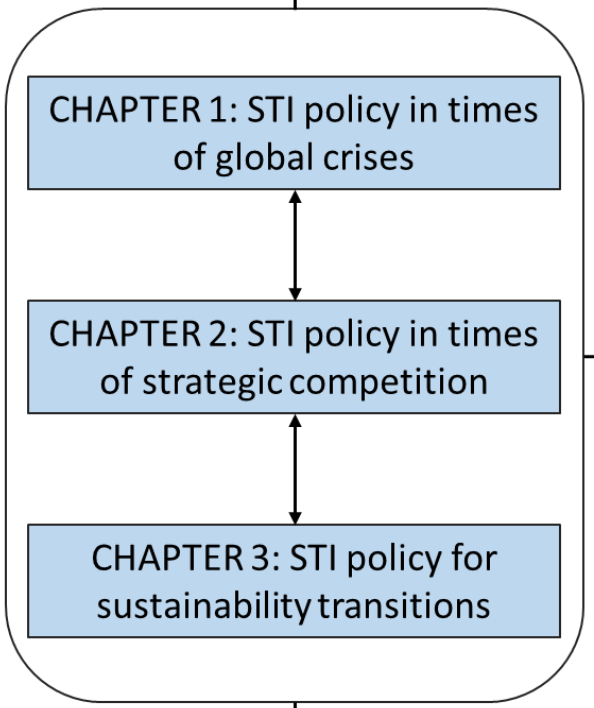
STI OUTLOOK, CHAPTER 6

STI Outlook 2023 – book chapters

How can STI policy develop capacities to help governments deal with a range of global crises?

How can STI policy reconcile competing demands in a context of global strategic competition?

How can STI policy reorient to better meet the challenges of sustainability transitions?



CHAPTER 4: Mobilising science in times of crisis: lessons learnt from COVID-19

How can science be better prepared to meet future crises and contribute to sustainability transitions?

CHAPTER 5: Mission-oriented innovation policies for net zero

How can mission-oriented approaches be upscaled as part of new industrial policies that promote resilience and sustainability transitions?

CHAPTER 6: Emerging technology governance: Towards an anticipatory framework

How can technology be developed responsibly at a global level to realise just transitions?

STI Outlook Chapter 6 : key messages

Key messages

Actors at country and international levels seek guidance and agreement on how to **embed foundational values in technology** to make innovation more **responsible and responsive to societal needs.**

Innovators and societal stakeholders (funders, researchers, tech developers, associations etc) need to be brought in the **technology governance process.** This should occur at both the **national and international levels.**

General and anticipatory framework for the governance of emerging technologies is needed, to **use common tools and learning** to help address many recurrent policy issues and dilemmas.

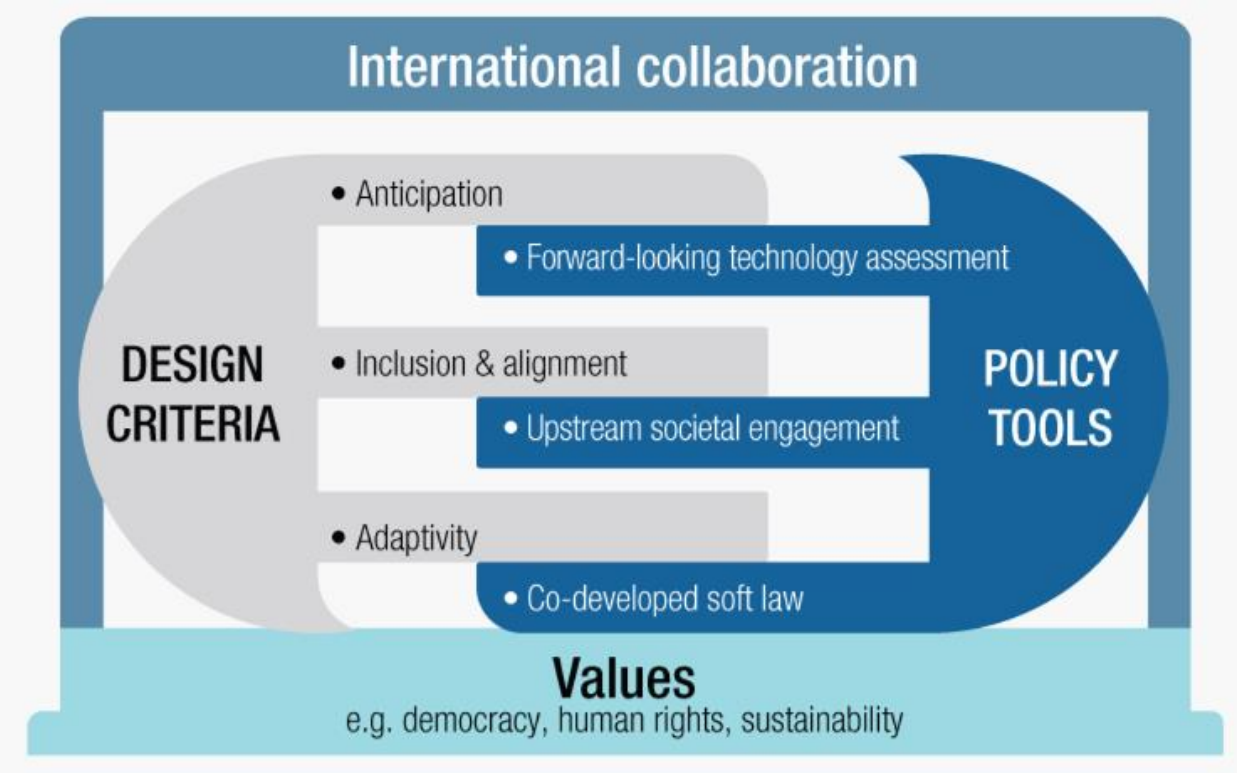
The framework as a whole could act as a **force for technological cooperation** at the international level by reinforcing the commonality and commitment of these values and tools.

Emerging technology governance framework: key elements

Three-tiered structure

- **Values** provide the orientation of governance systems as a whole
- **Design criteria** could guide the development of emerging technology governance at both the national and international levels
- **Tools** for countries to operationalise design criteria

The framework can **apply both to national and international governance of emerging technologies**, and **international collaboration should be a goal** for work at both levels



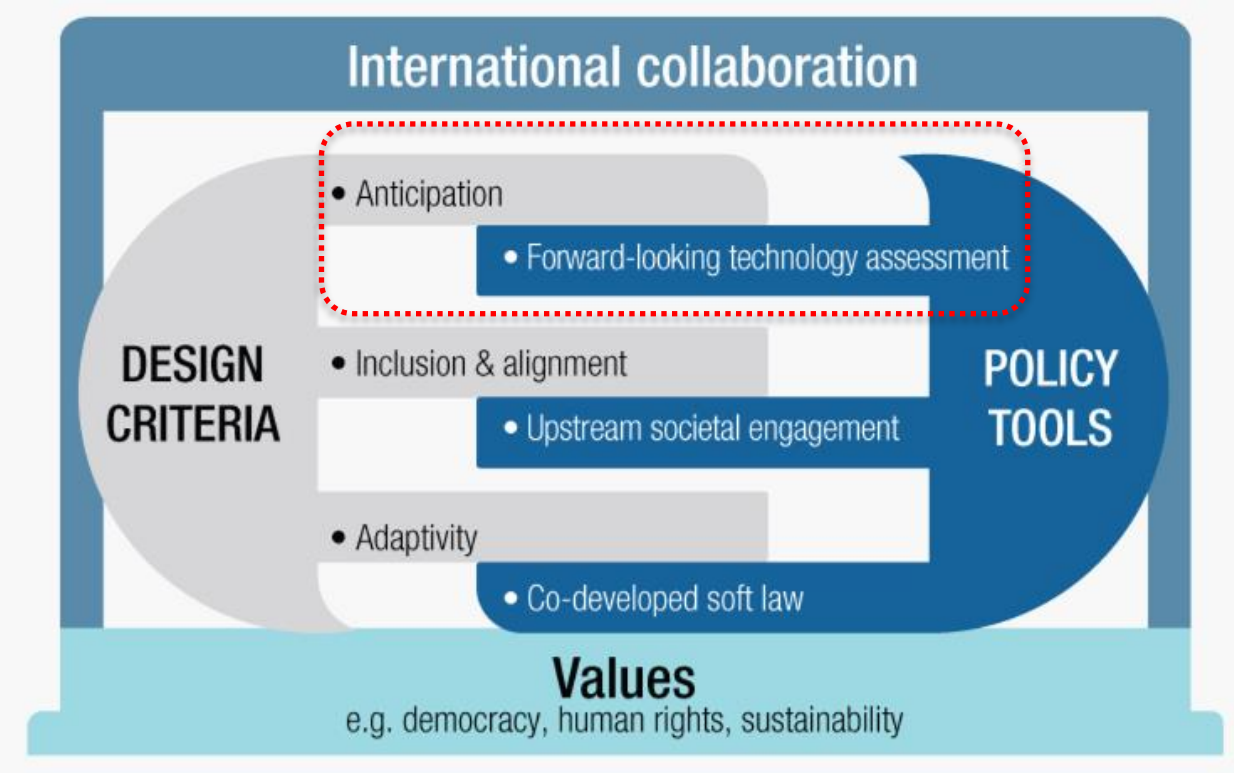
Tool 1. Forward-looking technology assessment

Trends reshaping needs for TA-based strategic intelligence

- Technology: the **pace of convergence**
- Innovation policy: **mission-orientation**
- Exogenous forces: **proliferation of crises**

Design criteria for robust TA

1. Fitness-for-purpose
2. Clarity in scope
3. Smart and inclusive participation
4. Explicit with regards to values, frames and biases
5. Usability



Tool 2. Societal engagement

Mode 1 — Build deliberative capacity

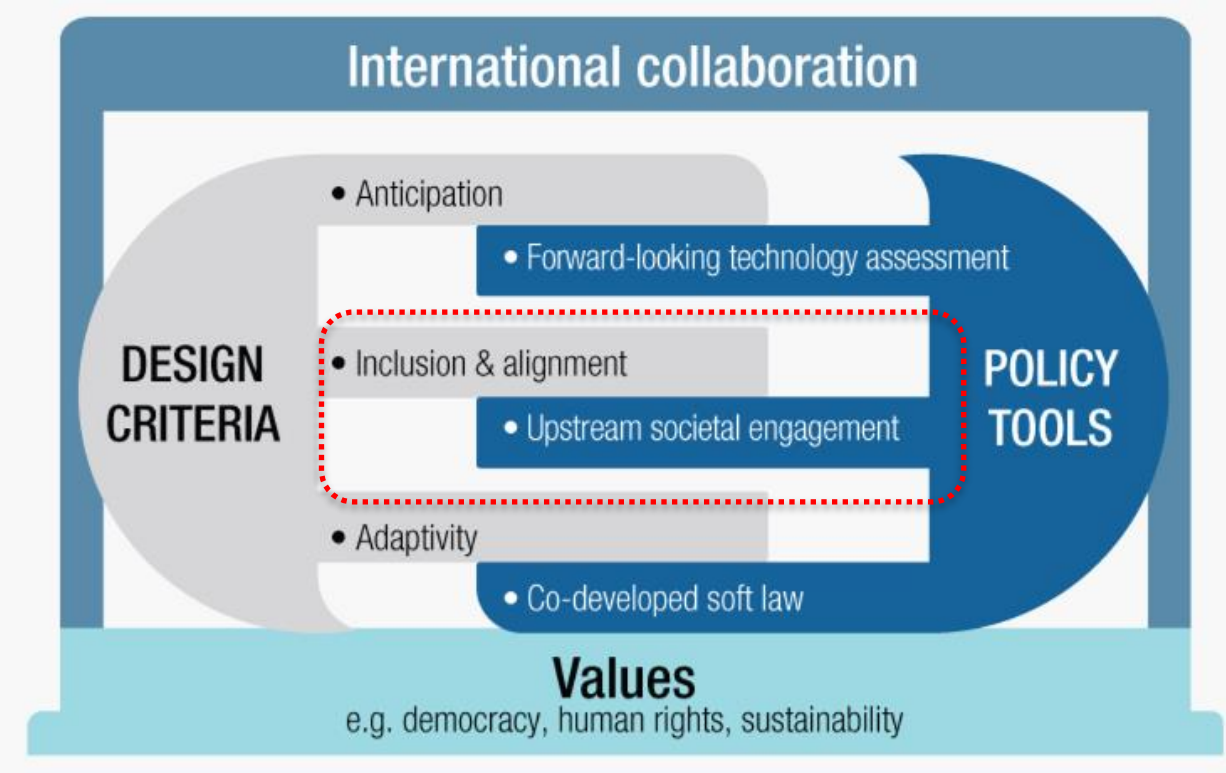
1. (Interdisciplinary) education programs
2. Information online (repositories, podcasts, games, competitions)
3. Inclusive community building
4. Media and communication training
5. Foresight exercises

Mode 2 — Communicate and consult

1. Engagement spaces (museum exhibitions, Science Café events)
2. Focus groups, citizen juries, citizen assembly, consensus conference, World Wide Views, Citizen Dialogue, Social Listening, Surveys
3. Artists in residence programs
4. Lived experience council

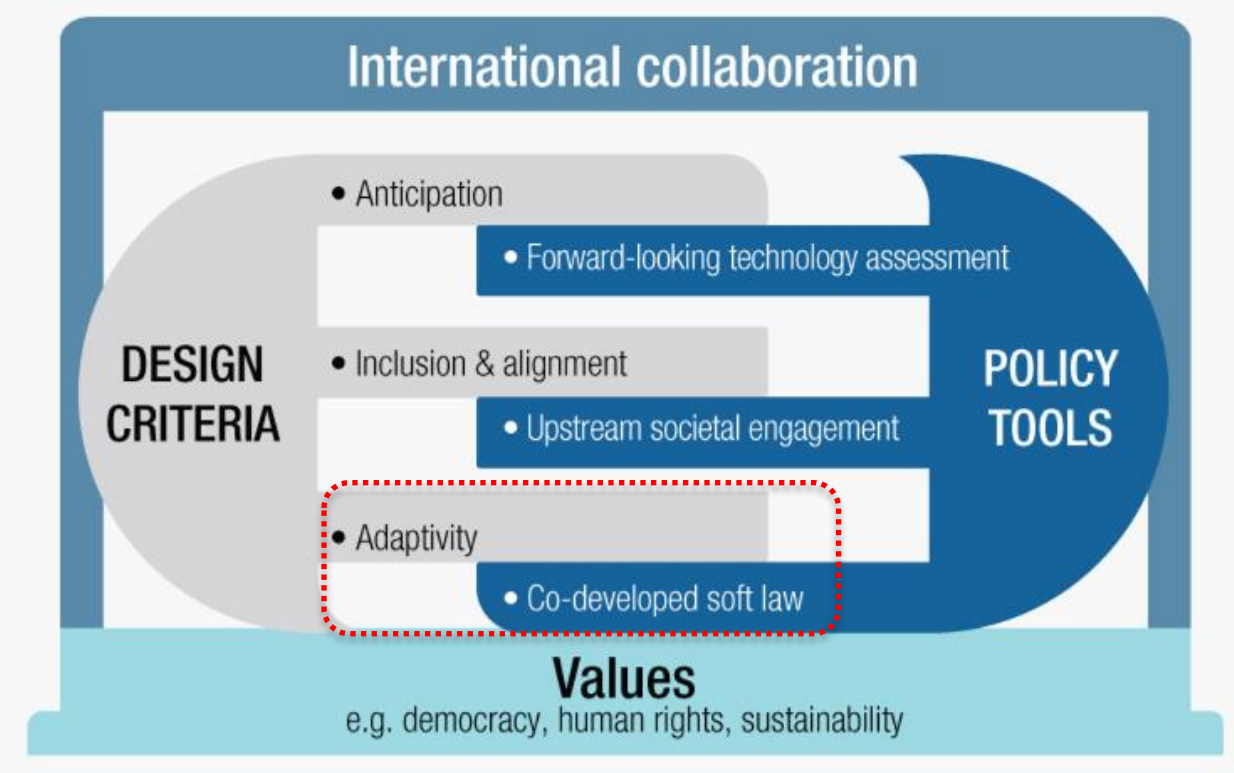
Mode 3 — Co-construct technology development

1. Participatory agenda-setting
2. Citizen Science, Science Shops, games
3. Participatory Technology Assessment
4. Co-creation spaces (FabLabs, Living Labs)
5. Transdisciplinary research
6. Collaborative platforms
7. Governance guidelines and policies



Tool 3. “Soft law”

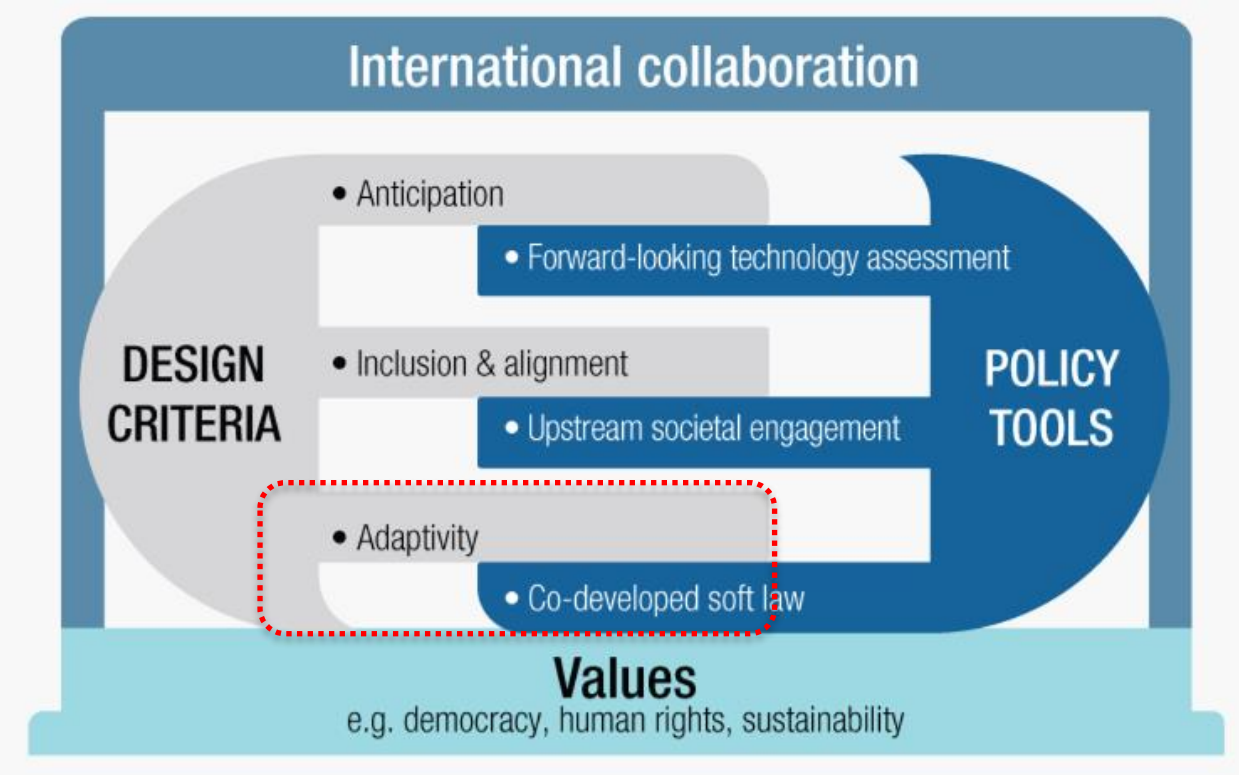
Soft Law Mechanism	Example
Company-NGO Partnership	Dupont-EDF Nano Risk Framework
Responsible Use Guidelines	Coalition for Responsible Gene Editing
Risk Mitigation Checklist	Ethical OS
Industry Best Practices	Future of Privacy Forum
Public Engagement	Nantucket – Gene Drives
Request Government Regulation	Microsoft – Facial Recognition
Corporate Principles	Google/AI
Data Sharing	IBM/Facial Recognition
Patent License Restrictions	Broad Institute/ Gene Drives



Source: Prof Gary Marchant, Arizona State University

Tool 3. Mechanisms to meet soft law's compliance challenge

- **Third party audits of technology governance** as part of an effective quality control infrastructure.
- **Liability regimes** with contractual force;
- **External ethics committees**;
- **Insurance** companies might require compliance and performance.
- **Strengthen the use of and compliance with governance tools**: tie funding, publication, and regulatory approval to compliance with safety standards, access, transparency and ethical, legal, and social principles.

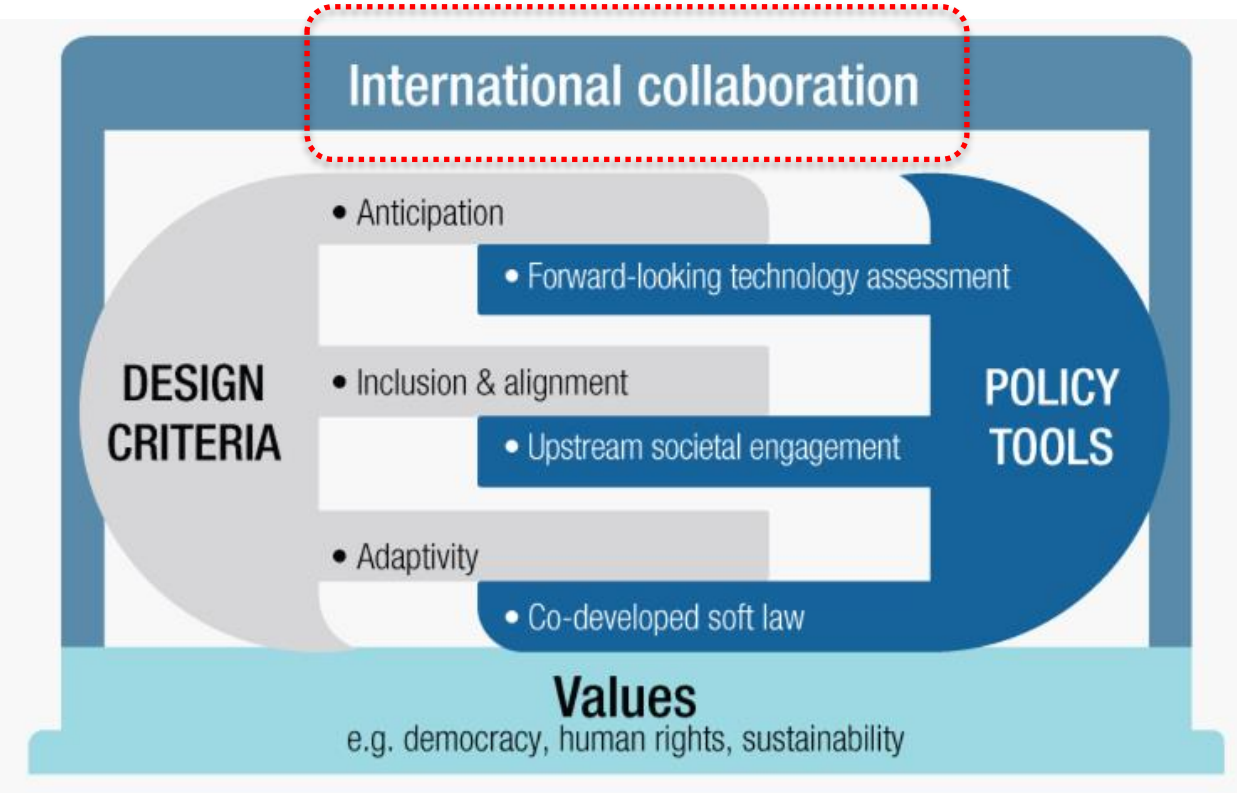


Source: Prof Gary Marchant, Arizona State University; *STI Outlook 2023 - forthcoming*)

Towards international collaboration on anticipatory governance

- **Global challenges** have implications for *national and international* technology governance systems
- Framework helps governments design **national governance systems** with an international outlook (**prerequisite for int.collaboration** on emerging tech governance):

1. **Might reinforce commitment to common values**
   (e.g. human rights, responsibility, economic co-operation and democratic governance)
2. **Might pave the way for the development of international approaches** (e.g. good strategic intelligence, stakeholder and societal engagement, and soft law tools like OECD recommendations)



THANK YOU!