AGILE MECHANISMS FOR RESPONSIBLE TECHNOLOGY DEVELOPMENT

Workshop on Agile Approaches for Governing Emerging Technologies
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Dauphine | PSL Université Paris

David Winickoff, OECD Directorate for Science, Technology and Innovation
Becky King, Public Governance Directorate
Laura Kreiling, OECD Directorate for Science, Technology and Innovation

OECD
BETTER POLICIES FOR BETTER LIVES

A new international framework for anticipatory governance of emerging technology

Welcomed by Science & Technology Ministers on 24 April 2024

5 elements of anticipatory governance apply to specific technology contexts

- Guiding values
- Strategic intelligence
- Stakeholder engagement
- Agile regulation
- International cooperation

Technology development

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FRAMEWORK FOR ANTICIPATORY GOVERNANCE OF EMERGING TECHNOLOGIES

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BETTER POLICIES FOR BETTER LIVES
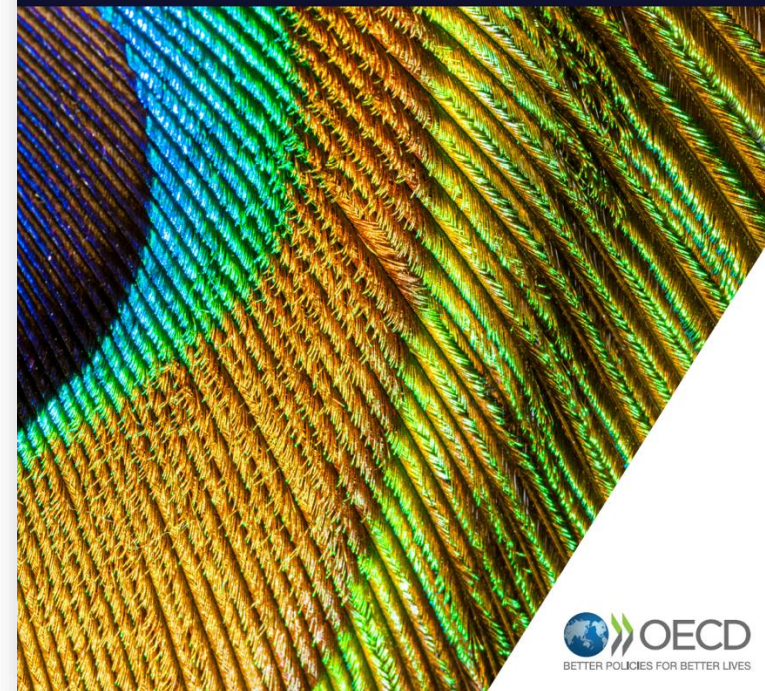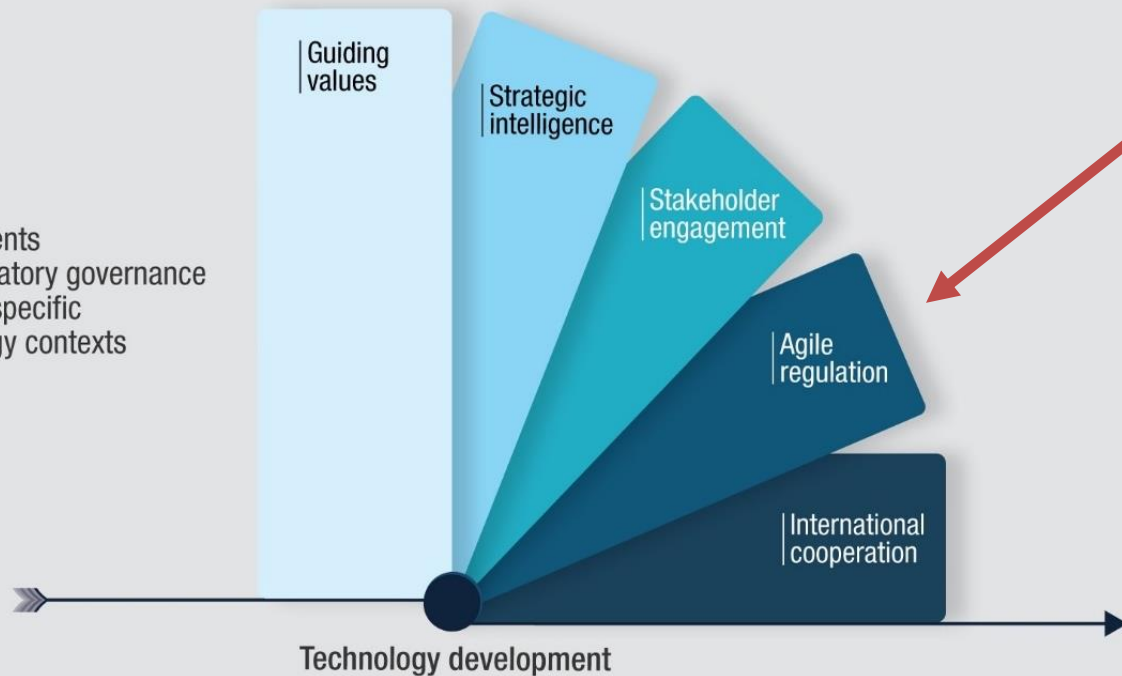
Outline and Context

Objective

There is a disconnect between innovation and policymaking. This report advances knowledge on how to better integrate technological and policy development (using agile mechanisms) for anticipatory governance that more effectively encourages responsible innovation.

Report outline

1. **Introduction**

2. **Analytical architecture**

   Presentation of the analytical architecture, which depicts the process of technology development (Innovation process and TRLs), policy development (policy cycle), the interaction between the two and the role of agile mechanisms.

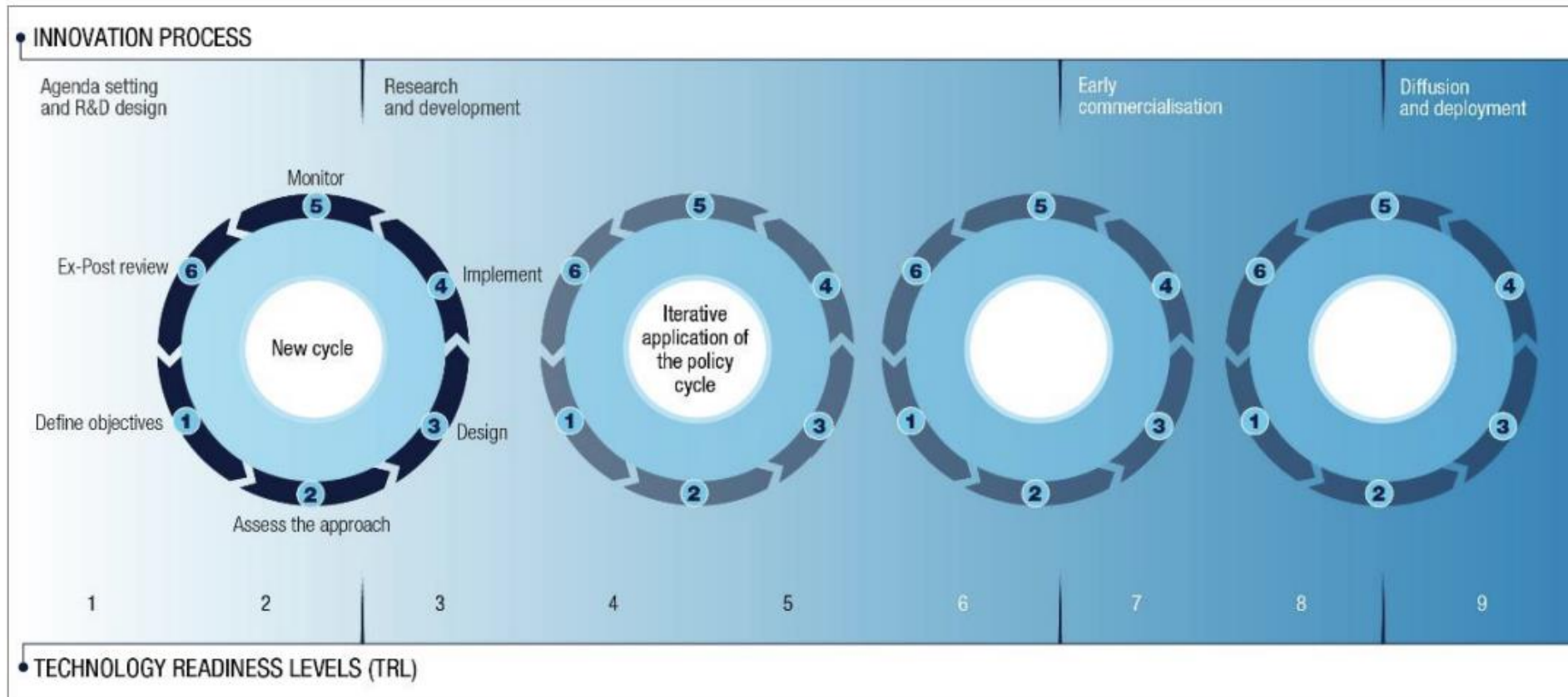3. **Agile mechanisms for innovation and policy making in practice**

   Assessing 9 agile mechanisms and 11 case studies to draw insights on how agile regulation mechanisms are used at different stages of policy and technology development.

4. **Analysis of agile mechanisms deployment**

   Overarching assessment of how and when policy makers and innovators would use specific agile mechanisms at different stages is provided

5. **Recommendations for policy makers and innovators**

   Detailing six agile governance principles and describing the further considerations for policymakers and innovators to integrate agile approaches into existing systems and create an environment that supports an effective co-evolution of technology and governance.

Innovation cycle engages the policy cycle in iterative fashion

Agile mechanisms help encourage an interactive relationship between technology development (innovation process & TRLs) and policymaking (policy cycle) to ensure that both develop in tandem.

Agile mechanisms taxonomy and case examples

For each mechanism the assessment includes:

- Objective

- Methodology

- Phases of Innovation process

- Relevant TRLs

- Stage of the policy cycle

- Types of outputs

- Discussion on application, strengths and weaknesses

Framework category	Selected mechanisms	Empirical cases
Strategic intelligence	Horizon Scanning	1. Report to maximise the benefits of the Internet of Things (Australia)
	Strategic Foresight	
Regulatory experimentation	Policy Prototyping	2. Prototyping the EU AI Act with the Private Sector (EU) 3. Policy Prototyping for Privacy Legislation (USA)
	Innovation Test Beds	4. Open Innovation Testbeds for Advanced Materials (EU)
	Regulatory Sandboxes	5. National Technology and Innovation Sandbox (Malaysia) 6. Engineering Biology Sandbox Fund (UK)
Outcomes-based regulation	Outcomes-based regulation	7. EASA Unmanned Aviation System Regulatory Framework (EU)
Non-binding approaches	By-design	8. Online Safety by Design Initiative (Australia)
	Codes of scientific practice	9. Stem Cell Research – guidelines by the International Society for Stem Cell Research 10. Code of Conduct for Geoengineering research
	Market-based certification and licensing	11. The IEEE's AI Ethics Certification

Case example: Innovation Testbeds

EU's Open Innovation Testbeds created economies of scale through shared testing and validation infrastructures—anticipating and overcoming barriers such as cost, investment risk and time to market for advanced materials and nanotechnologies

- Testbeds helped identify regulator barriers, with a focus on compliance with existing regulations

- A means to provided guidance on regulatory compliance with European norms

- Targeted technologies TRL 4-7 in guidelines, but in practice many technologies selected were at TRL 2/3

Case example: Online Safety By-Design

Australian eSafety Commissioner championed standards and execution of by-design for technology developers and service providers to preemptively address online harms by anticipating to eliminate risks and avoid retrofitting technology for harms.

- Approach applied in the development of online safety standards, with tools helping translate them into technical specifications

- Targets the early phases of innovation by embedding digital safety into the design and development stages of the product (TRL 3/4)

- Practical recommendations may be extended to inform other digital products, such as the safety of the metaverse.
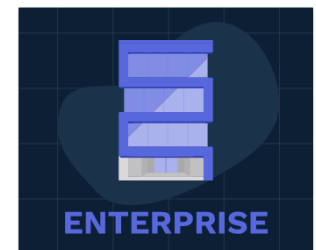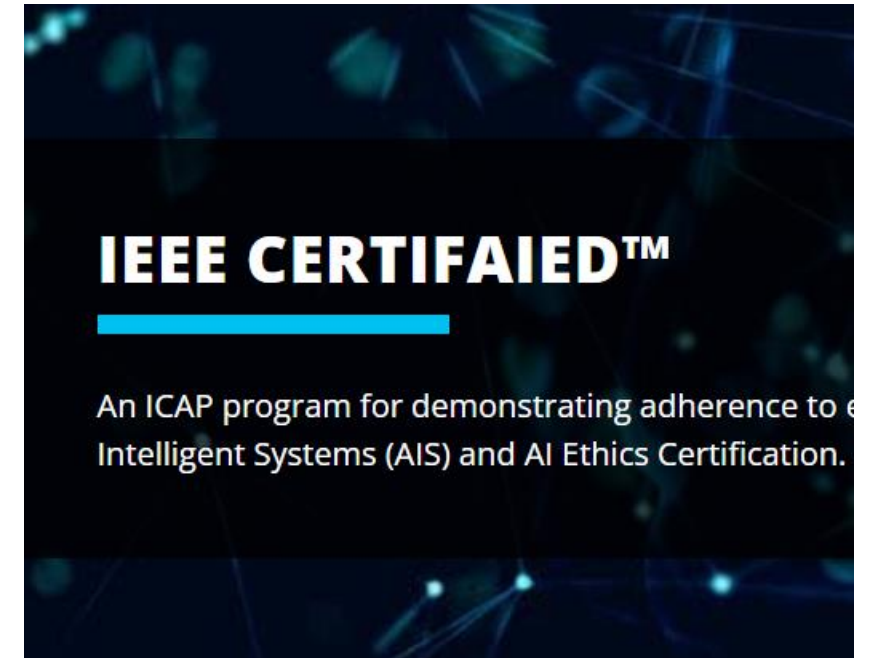

Safety by Design Overview

Start-up tool   Enterprise tool

Case example: Market based certification & Licensing

The IEEE License for Ethical AI Development was established through a multi-year, multi-stakeholder approach provides technical design guidelines for responsible AI development.

- Targets earlier phases of innovation, focusing on TRL 3 and TRL 4

- License framework dictates the governance structures for responsible AI development, as well as adherence mechanisms and periodic reviews

- License also integrated by-design approaches for identifying potential ethical issues from the early stages of development.

IEEE CERTIFAIED™

An ICAP program for demonstrating adherence to e
Intelligent Systems (AIS) and AI Ethics Certification.

Analysis of agile mechanism deployment

Summary and grouping of agile mechanisms according to **technology development**

Agile mechanism	Agenda Setting and R&D Design		Research and Development				Early Commercialisation		Diffusion & Deployment
	TRL 1	TRL 2	TRL 3	TRL 4	TRL 5	TRL 6	TRL 7	TRL 8	TRL 9
All innovation phases									
Horizon Scanning	■	■	■	■	■	■	■	■	■
Strategic Foresight	■	■	■	■	■	■	■	■	■
Policy Prototyping	■	■	■	■	■	■	■	■	■
Early-mid innovation phases									
By-design	■	■	■	■	■	■	■		
Codes of Scientific Practices	■	■	■	■	■	■			
Innovation Testbeds		■	■	■	■	■	■		
Mid-late innovation phases									
Certification and Licensing			■	■	■	■	■	■	■
Outcomes-based regulation				■	■	■	■	■	■
Regulatory Sandbox							■	■	■

Analysis of agile mechanism deployment

Summary and grouping of agile mechanisms according to **technology policy development**

Agile Mechanism	Needs and objectives		Approach and Design		Implementation and Review		
	0. External Trigger	1. (Re)define objectives	2. Assess the policy approach	3. Design of the policy	4. Implementation	5. Monitoring	6. Ex-post review
Horizon Scanning	■	■	■	■			
Regulatory Foresight	■	■	■	■			■
Codes of Scientific Practices		■	■	■			
Policy Prototyping			■	■			
Regulatory Sandbox			■	■	■	■	■
Outcomes-based regulation			■				
By-design			■	■			
Certification and Licensing			■	■	■	■	■
Innovation Testbeds				■	■	■	■

6 Principles for greater agility in technology governance

1. **Iterate:** revisit and refine governance approaches as the innovation process develops

2. **Learn continuously:** systematically incorporate feedback loops, and knowledge transfer into governance

3. **Generate knowledge and data:** Systematically generate high-quality communicable knowledge for aligned governance and technology design

Geoengineering codes of conduct (Case 12) evolved from high-level, academic guidelines in early innovation phases to more specific directives with broader involvement from industry and international institutions as the technology matured

Malaysia's national sandbox generated new information to inform more effective and targeted regulations. The process has also revealed challenges to the clarity and implementation of regulation.

6 Principles for greater agility in technology governance

4. Embed governance in design and development: Actively support approaches that embed governance considerations throughout the innovation process

5. Activate and support science and technology development communities

6. Co-create: Employ different engagement strategies to incorporate diverse perspectives

The Codes of conduct for Stem Cell Research (Case 11):

- a structured professional ecosystem can initiate and produce concrete regulatory outcomes.
- At early innovation stages, the codes cultivate knowledge-sharing and self-policing.
- At later stages, it is crucial gateway for policymakers to understand technology-specific research developments and ethical concerns

Thank you!