OECD
Committee for Scientific and Technological Policy

Workshop on “Learning from the OECD STI Outlook 2025” Japan Science and Technology Agency, Tokyo, 5 February 2026

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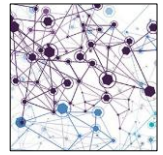
OUTLINE

- Introduction to OECD/CSTP communities
- Forthcoming 7th STI Basic Plan and relation to OECD/CSTP work
- Dives:
  1. Research security/technology security
  2. Technology convergence, including convergence of AI and science
  3. Strategic intelligence for emerging technologies
  4. Mission-oriented innovation policy/effective governance

COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY (CSTP)

Who we engage



- Chief information officers from R&D and innovation funding organisations (MARIAD)

Expert Group on the Management and Analysis of R&D and Innovation Administrative Data (MARIAD)

- National statistical offices
- Ministries/organisations in charge of measuring R&D and innovation
- Research organisations with STI analysis responsibilities
- Network of tax experts

Working Party of National Experts on Science and Technology Indicators (NESTI)

- Ministries of science, technology, research and innovation, health, economy
- Academia working in life science
- Industry (health, bio-economy)

Working Party on Biotechnology, Nanotechnology and Converging Technologies (BNCT)

- Ministries of research, innovation, industry, economy
- Experts from academia and industry working on tech & innovation systems

Working Party on Innovation and Technology Policy (TIP)

CSTP

- Space agencies
- Experts on STI and oceans
- Ministries responsible for these areas

Space Forum

Ocean Economy and Innovation

- Ministries responsible for advising on science policy, including infrastructure
- Research funding agencies
- Science academies

Global Science Forum (GSF)

CSTP THEMES

Theme 1 - Innovation, Sustainability and Key Transitions

Identify key transitions or “directions” that STI policies can help achieve to address both economic and societal outcomes.

Theme 2 - Governance of Transformative Technologies and Data

Prepare society to cope with greater uncertainty about how technology might evolve in the future, and equip policymakers to respond adequately to the challenge by developing frameworks for responsible innovation.

Theme 3 – Next Generation Data Infrastructures and Analysis for STI Policy

Strengthen quantitative and qualitative data infrastructure, and be at the frontier with cutting-edge tools and comparative policy advice.

Frontier issues

AI for science, neurotechnology, brain-computer interfaces, synthetic biology, quantum science and technology, carbon management, bioeconomy, space economy, ocean economy

Policy impacts

Research integrity and security, research precariat, R&D tax incentives and public support to innovation, knowledge transfers and co-creation, collaborative platforms for technology diffusion

Policy advice

Science policy, science advice and communication, mission innovation lab, innovation policy reviews, policy toolkits, policy compass, science, technology and innovation outlook

Measurement tools and analysis

Global measurement standards for R&D and innovation, research and innovation careers observatory, technology assessment, STIP Compass database

7th STI Basic Plan in relation to OECD/CSTP work

VISION

Future society: unleash the power of STI for growth and societal challenges	**Transforming STI policy**: strengthen the link between STI policies and national security policy (whole of government), strengthen R&D and implementation of cutting-edge technologies, science and technology diplomacy as a national strategy	**Reforming the STI promotion system** Building a World-Class Talent System Reforming funding mechanisms Advancing knowledge platforms (research infrastructures and data)

Examples of OECD/CSTP projects and themes

6 PILLARS

Revitalising Science as the Foundation of Knowledge	High-risk/high-reward research; Research assessment and incentives; Research infrastructure ecosystems; Research workforce gaps; Research and innovation careers observatory; Citizen science; AI for science; Mechanisms for sharing research data
Strategic Prioritisation of Technology Domains (e.g., K program)	Framework for anticipatory governance of emerging technologies; strategic intelligence for critical and converging technologies; technology domains and convergence (advanced biotechnologies, advanced materials, quantum, space technologies, ocean technologies …)
Organic Integration of Science, Technology, and National Security	Research integrity and security; Strategic intelligence for critical and converging technologies; Cross-ministerial coordination (governance)
Advancement of Innovation Ecosystems	Science and industry collaboration; Innovation Ecosystems; Frontier technology acceleration and diffusion
Advancement of Strategic S&T Diplomacy	International collaboration in STI; International legal standards on responsible governance of technology and research data; Mobility of S&T human resources; Competitiveness, security and international cooperation
Reforming the Promotion Framework and Governance	Measuring R&D and innovation funding directionality and impacts; Transformative STI governance models and missions

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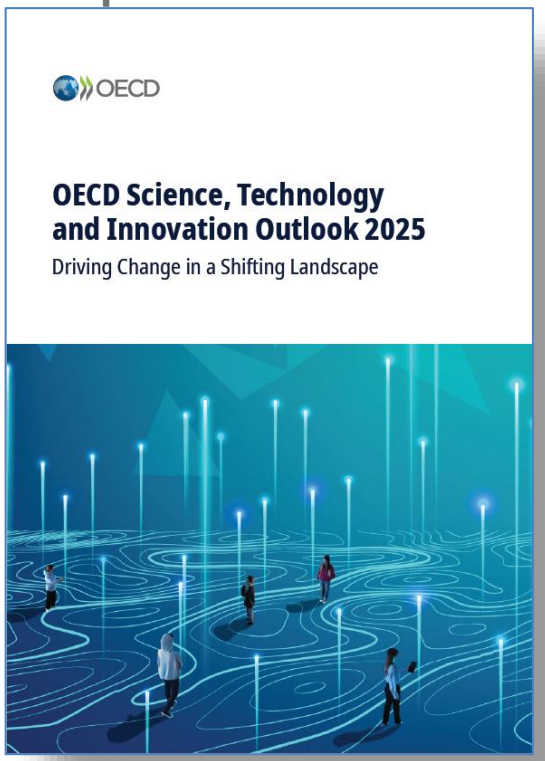
DIVE 1 – Research Security / Technology Security

STI Outlook chapter 2 and link to current projects

Chapter 2 - The changing geopolitical environment

- Growing **strategic competition** and the return to power politics
- **National security and economic security** intertwined
- Increasing pressures to integrate **civil and military research and innovation**
- Increasingly difficult to separate **fundamental research from applications**, e.g. quantum and AI
- **Research security and technology security**/sovereignty are merging
- Changing dynamics for **international cooperation and open science** (open as possible, closed as necessary)

Chapter 2



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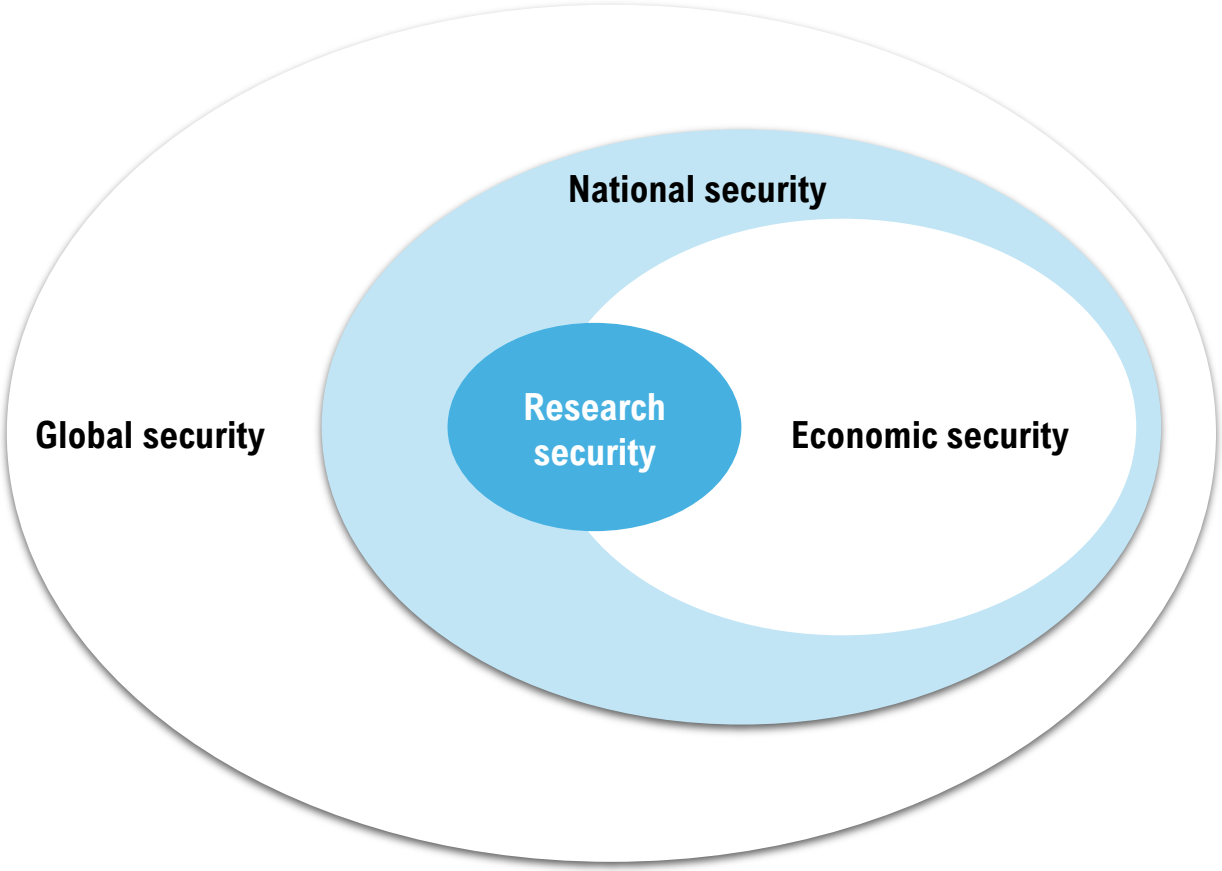
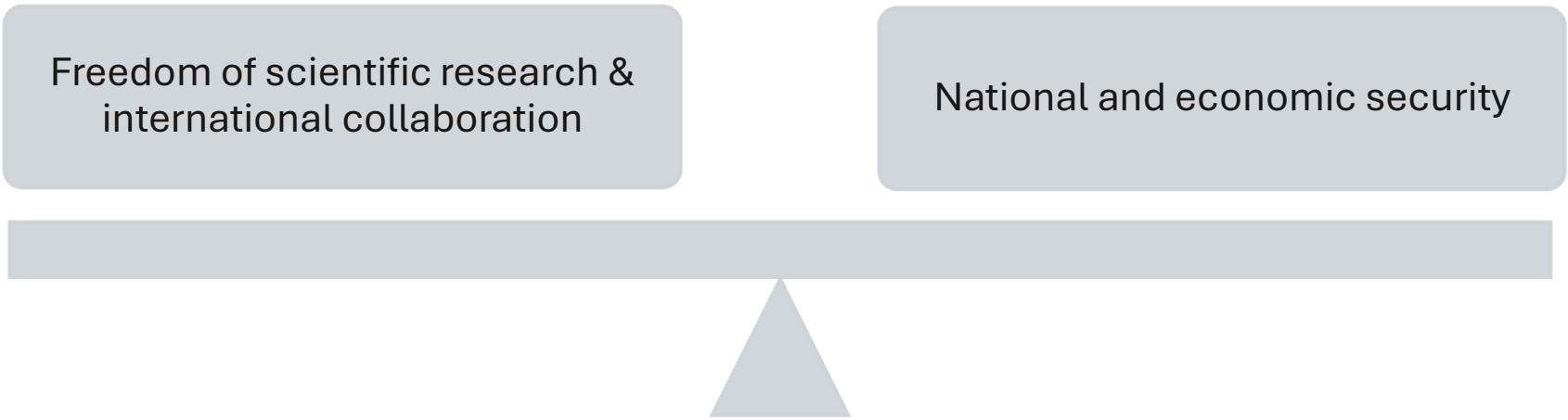
STI policy is increasingly shaped by security concerns that are reconfiguring international research and innovation linkages



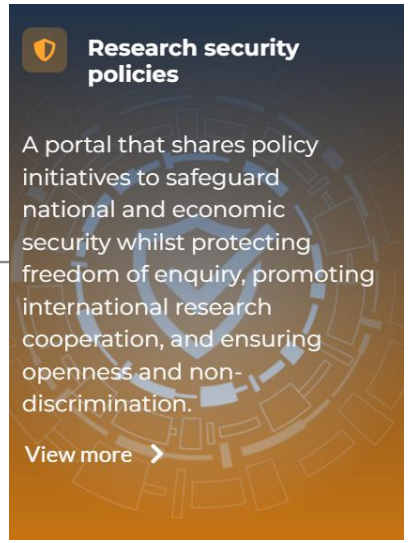
- **Global security** concerns issues like **food security**, **health security**, and **environmental security**, all areas where STI play central roles. These cover many well-known global challenges, including pandemics, growing antimicrobial resistance, biodiversity loss, soil erosion, and climate change.
- Though traditionally associated with the military and other security forces, broad definitions of **national security** also include many of these types of global security.
- **Economic security** covers issues like supply chain vulnerabilities and import dependencies, e.g., for CRMs. There is growing convergence between national and economic security, and the figure shows the latter as a subset of the former.
- **Research security** has recently emerged strongly and is largely a reaction to national and economic security concerns on the misappropriation of research by potential foreign adversaries.

The research security policy challenge

- How to mitigate national and economic security risks while maintaining freedom of scientific research and international collaboration.



Research security policy is intensifying



Dedicated structures

- In line with recommendations from OECD 2022 report, many are establishing structures with specific remit for research security
- Responsibilities include information sharing, research security training, risk assessment, and monitoring
- E.g., National Science Foundation (NSF) SECURE initiative

Restrictions on collaboration

- Some jurisdictions banning certain types of collaborations (e.g., Flemish against Seven Sons, Canada 'black list')
- Others pursuing a case-by-case approach to identifying sensitive research (e.g., German Research Foundation recommendations on dealing with risks in international cooperation, NSF TRUST policy)

Reporting and verification

- Many countries encouraging or tightening requirements for international collaborations and reporting such as for conflicts of interest and commitment (e.g., Japan, Netherlands)
- Some governments asking funding institutions to play a stronger role, moving beyond self-regulation by researchers and research institutions alone

Focus on implementation and collaboration across actors

❑ Key focus of new initiatives is implementation support

❑ Policy development is now more iterative and collaborative

- Organizations are **formalizing continuous learning** to keep pace with evolving risks and challenges:
  - Starting to undertake more **policy evaluation efforts** – e.g., UK Research Collaboration Advice Team, US NSF Research on Research Security Program
  - Emphasizing **peer learning and best practice sharing**, both in current practice (e.g., EC mutual learning exercise, NSF Research Security and Integrity Information Sharing Org) and guidance for future practice (e.g., G7 Best Practices for Secure and Open Research)

- Government agencies appear to be **better engaging** the research community, other countries, and one another—particularly science and security agencies
  - Many processes now engage **researchers** from the outset
  - More instances of **joint initiatives** between intelligence and scientific agencies
  - Clear evidence that countries are **learning from one another** (e.g., Dutch National Contact Point for Knowledge Security as an exemplar)

Policy priorities with which research security is being balanced or coordinated

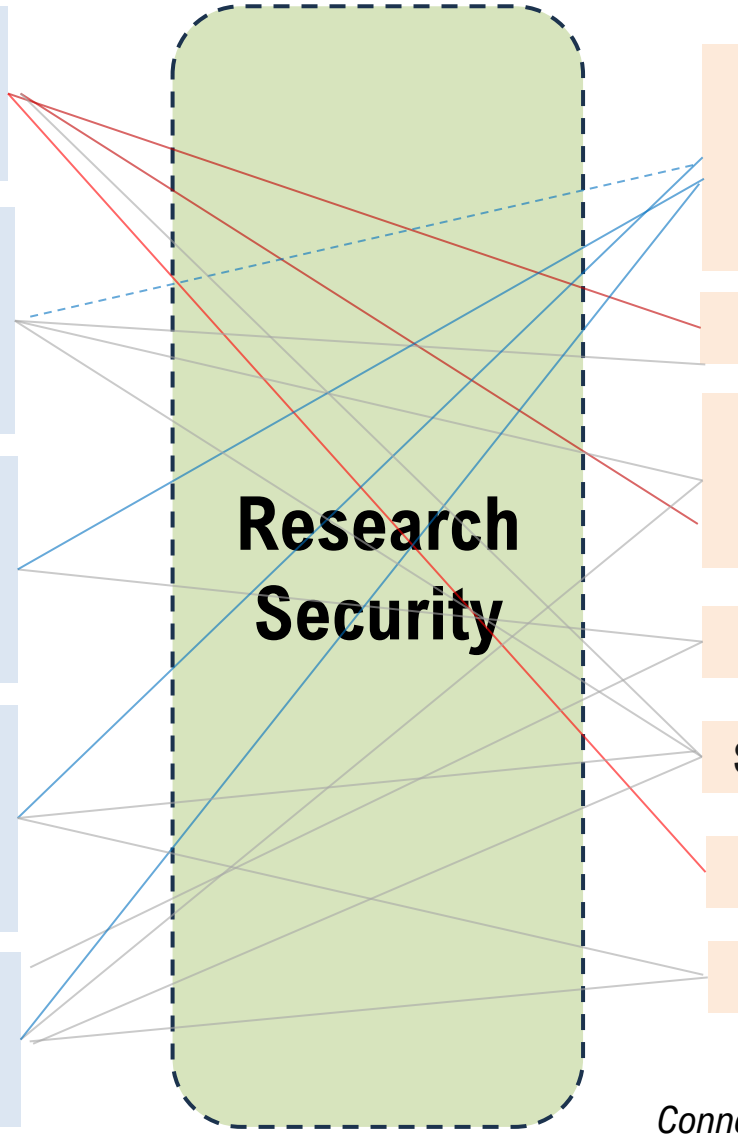
Ethics, Integrity & Societal Trust
Integrity frameworks are seen as foundational for secure and trustworthy research ecosystems.

Academic Freedom and Open Science
Research security measures are designed to uphold academic freedom and openness while embedding proportionate safeguards.

National Security
Research security is framed as part of national security strategies to prevent espionage, technology leakage, and foreign interference.

Economic Competitiveness & Innovation
Policies aim to protect strategic technologies and intellectual property while enabling global collaboration for innovation.

Critical & Emerging Technologies
Special regimes and strategies address high-risk fields like AI, quantum, and defense-related research.



National Governments
Ministries of Research. Education, Innovation, Foreign affairs, Defense, Economy

Research Funders

Research Performing Organizations
Universities, public/private research institutions

Intelligence & Security Agencies

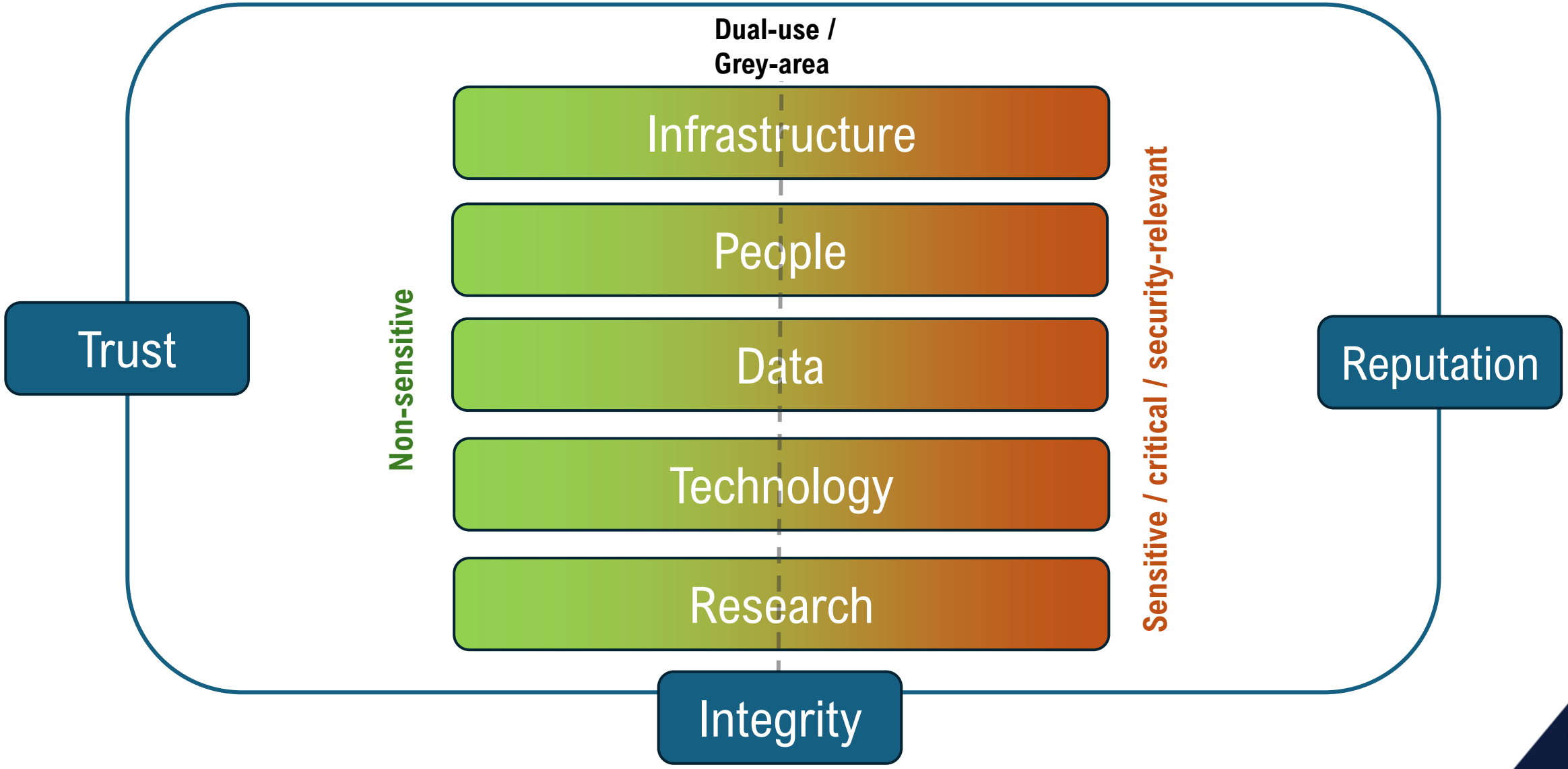
Sector Associations & Rectors' Councils

Ethics and Integrity Bodies

Business and Industry Sector

Connecting lines are for illustration purpose

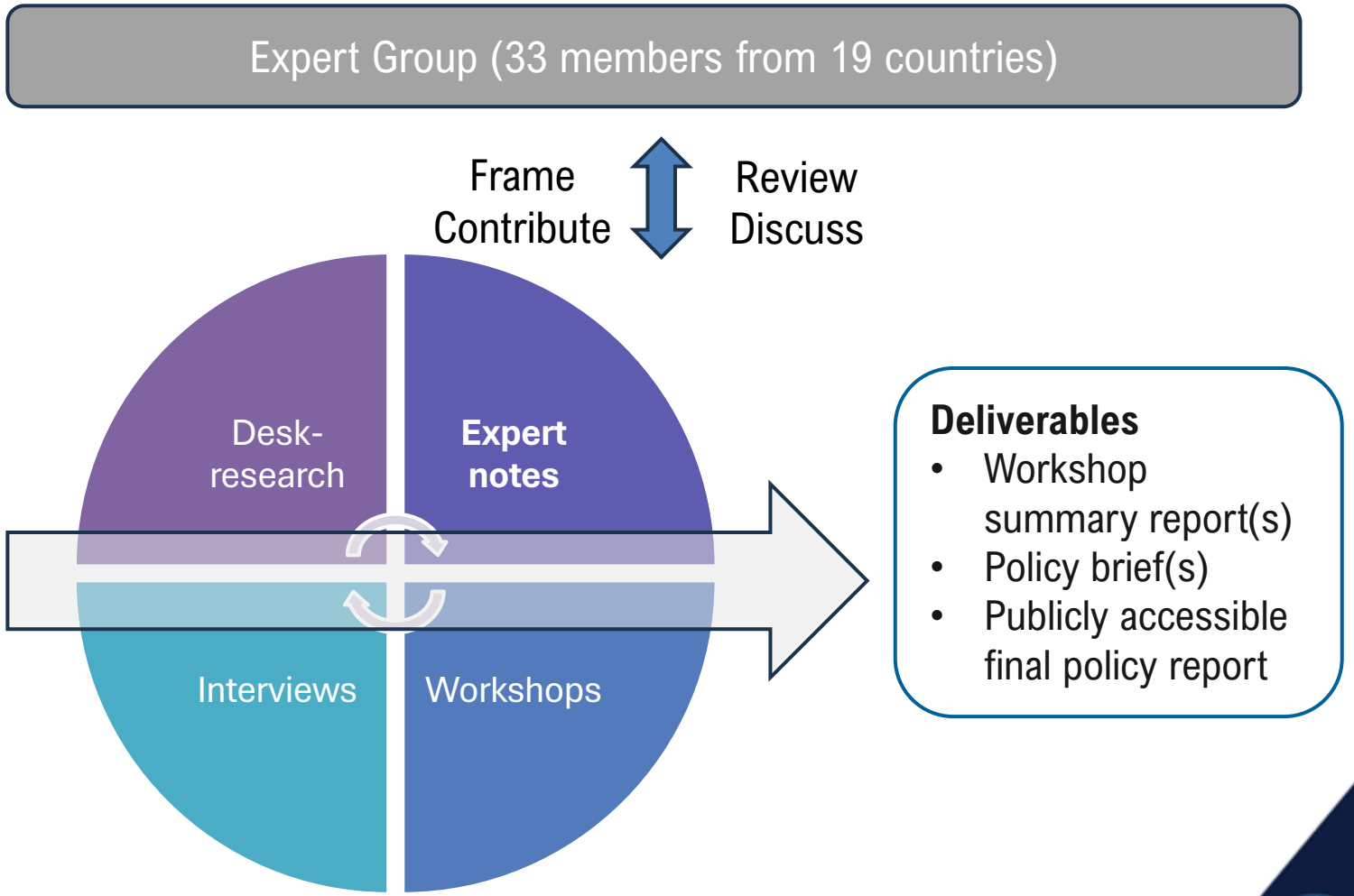
What should be protected?



Example: **Project on Research Security and Integrity (Global Science Forum - GSF)**

Project Scope

1. How can research integrity and security be conceptually framed and intersect with other policy priorities, such as technological sovereignty or open science and open data, and what are the key actors, policies, and coordination mechanisms involved?
2. How can research security risks be practically and effectively assessed and mitigated?
3. How can awareness, understanding, and action of the scientific community on research integrity and security be effectively promoted?
4. How can the effectiveness and impact, including unintended consequences of research integrity and security policies, be evaluated?

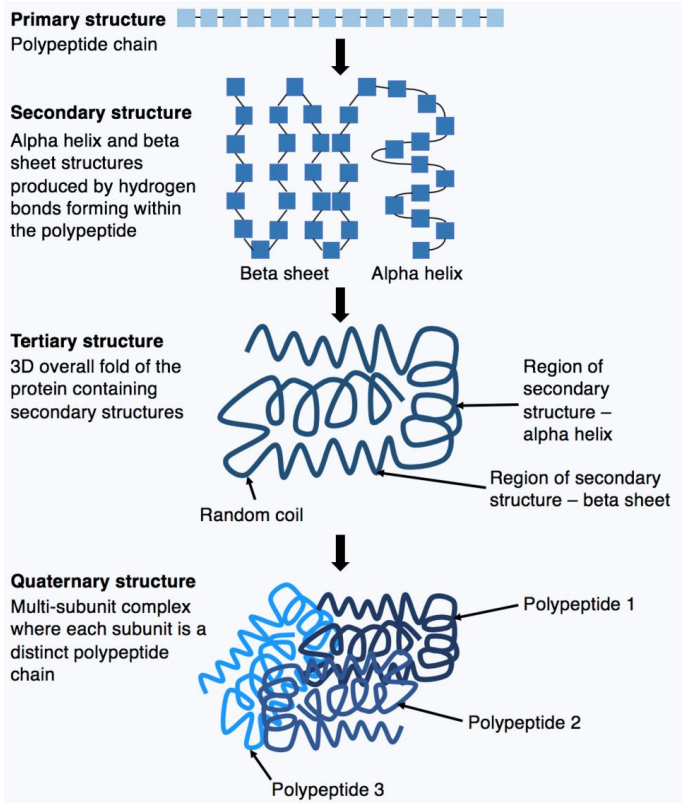


DIVE 2 – Critical and Converging Technologies

STI Outlook chapter 5 and link to current projects

The promise of technology convergence

- Promise of **powerful synergies** to enhance the speed and functionality of technologies, tools and products.
- Industrial actors are moving beyond traditional single-technology development models towards more **cross-disciplinary technology convergence**
- AI is likely to drive the **large-scale integration** of digital technologies
- Key areas of emerging technology like robotics, biotechnology, quantum science and technology or satellite systems **integrate tools, approaches and disciplines**



Alphafold uses AI to drive a new approach to computational biology that mines in new ways genetic data

Take home policy points

In the interest of promoting technology convergence to drive transformative change in the economy, governments could:

- ❑ Promote deeper forms of **interdisciplinary research**, engineering and business development.
- ❑ Use the power of **challenge-based thinking** to promote convergence
- ❑ Emphasise **interdisciplinary talent** (who can integrate and engineer digital and material systems)
- ❑ Leverage different funding models, access rules, and technology transfer structures to shape the technological and **collaborative platforms** necessary for convergence.
- ❑ Include **ethical, legal social analysis into the interdisciplinary mix** of institutions innovating through convergence due to the often-complex regulatory implications of convergence
- ❑ Find **agile regulatory approaches** and **promote strategic intelligence** to better anticipate and engage the drivers and impacts of convergence (OECD work on emerging tech governance can help)

AI and science convergence

Promote ambitious multidisciplinary programmes

- ❑ Bringing together computer and other scientists with engineers, statisticians, mathematicians and others to solve challenges using AI.
- ❑ National laboratories and their computing infrastructures, in collaboration with industry and academia, to develop training materials for institutions of tertiary education.

Public R&D can be used to advance the field

- ❑ Public research and development (R&D) can target areas of research where breakthroughs are needed to deepen AI's uses in science and engineering.
- ❑ Supporting the development of open platforms that track which AI models work best for a wide range of problems.
- ❑ Much of AI in science involves teaming with people, but funders could also help develop specialised tools to enhance collaborative human-AI teams and integrate these tools into mainstream science.

Research governance matters

- ❑ Funding calls could require to systematically evaluate the impacts of AI on everyday scientific practice, including on work, career trajectories and training, and funders and policy makers should establish response mechanisms to act on the insights gathered.
- ❑ Policy should address the potential dangers entailed in dual use of AI-powered drug discovery

A fast-moving field – much will **be new in a year from now**. AI in science may be the most **impactful of all uses of AI**

AI in Science – current work 2025-2026

- A series of **debates on the future of AI** for science (3 workshops), joint with the European Commission:
  - *The Future of AI and the Implications for Materials Science*
  - *The future of AI and the dangers of dual use applications in science*
  - *Future AI systems to improve policymaking, with a focus on policymaking for science and technology*

- An **update** of major public initiatives to harness AI for science (e.g. US' *Genesis Mission*, the *Trillion Parameter Consortium*, China's plans for *far-reaching public investments*, etc.).

- A focus on: **Generative AI in science: impacts and policy implications**
  - *The capabilities of LLMs as research tools*
  - *Possible standards and guardrails to govern LLMs' uses in research*
  - *Possible LLM-specific policy measures*
  - *The merits of the alleged threats of LLMs to research governance*

DIVE 3 – Strategic Intelligence for Emerging Technologies

STI Outlook chapter 7 and link to current projects

OECD expanding work in strategic intelligence for emerging technologies

- Strategic intelligence tools : A policy primer
- Chapter 7 of the STI Outlook: Tools for agility: Actionable strategic intelligence and policy experimentation
- Forthcoming **Horizon scanning paper**
- **Tech Assessment**: Synbio/AI and automation; Quantum applications to health, space, finance, transport and energy
- **Capacity building in countries** (e.g., Finland, Sweden)

Strategic Intelligence

"timely and useable knowledge that supports policy makers in understanding the relevant aspects and scope of the impacts of science, technology and innovation, and their potential future developments"

- Map the ecosystem of strategic intelligence **tools and practices**
- Facilitate (**do**) strategic intelligence work
- Support capacity building and dig deep into strat. Intel and policy interface **(use of intelligence)**
- Support mutual learning on new institutions and units for strategic intelligence
- Explore standards and best practices

Technology Assessment

Forecasting & Horizon Scanning

Participatory Foresight

Emerging Risk Assessment

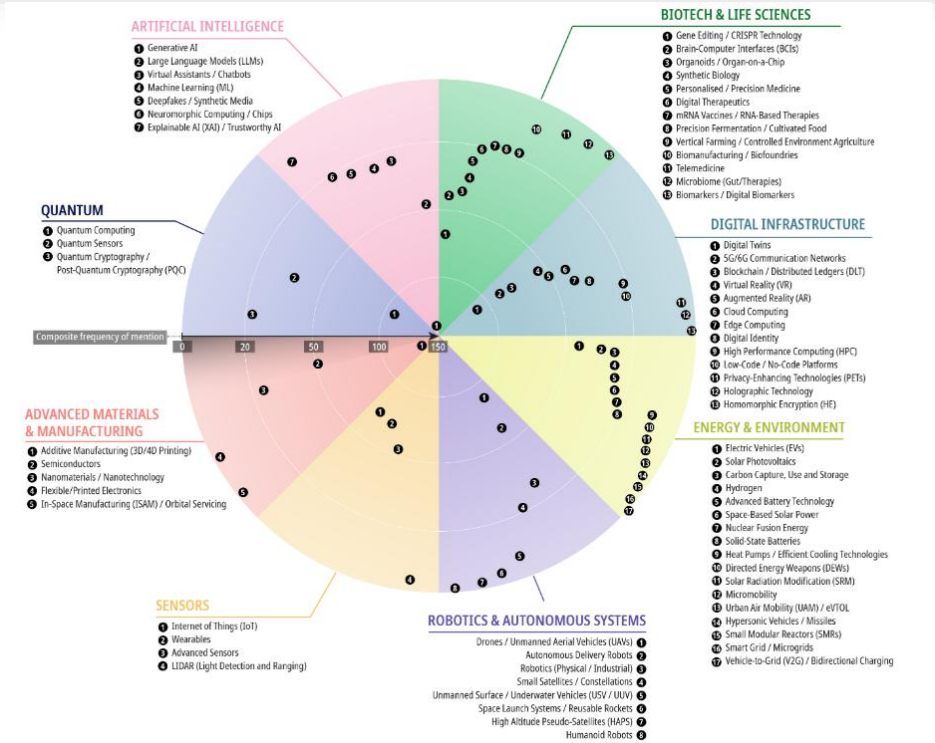
Ex Ante & real-time evaluation

New indicators and modelling

Key take aways

- **Tailor for use:** Link and tailor strategic intelligence to internal decision-making architectures.
- **Infrastructures of intelligence:** Understand how different countries and institutions have set up their own intelligence production and use capacities.
- **Lessons on specific policy foci:** Draw lessons on integration of strategic intelligence into the building and implementation of **national technology strategies**, for implementing **research security policies**, for ensuring **strategic autonomy** and informing **strategic alliances**.
- **Quality control:** Understand best (and bad) practices in intelligence production (and use)

Option	Examples
Build internal capacity in house	UK GO Science, Business Finland, Policy Horizons Canada. Israels HS Mechanism
Specialised thematic team or unit	Nuffield Council on Bioethics (Horizon Scanning focus on biomedical science and health)
Mobilise strategic intelligence ecosystem around particular policy questions	Foresight-on-Demand (EC framework contract)
Draw on international support facility	GESDA Anticipator
Pool with other organisations and countries around shared interests	OECD Strategic Intelligence SG
Commission ad-hoc Horizon Scan Studies	Consultants
Tap existing scans	OECD, JRC FUTURINNOVA



Example: project on research, technology security and strategic intelligence for emerging technologies in Finland /1 (GSF & BNCT)

European Commission's funded Technical Support Instrument project for Finland

FINNISH GOVERNMENT | European Commission | OECD BETTER POLICIES FOR BETTER LIVES

Enhancing Finland's capacity in research and technology security and in strategic intelligence relating to emerging technologies

Project overview

Objective 1:

Embed **research and technology security** considerations into Finland's science & technology operations at different scales, involving different actors.

Objective 2:

Improve Finland's capacity to collect and use **strategic intelligence** on **emerging technologies**.

Example continued: current OECD project on research, technology security and strategic intelligence for emerging technologies in Finland/2

Objective 1:
Embed **research and technology security** considerations into Finland's science & technology operations at different scales, involving different actors.

Guiding Questions

- ❑ What are the **limitations** of the current risk assessment, mitigation and monitoring procedures and which risks for the research and technology sector have been identified so far?
- ❑ What **collaboration** arrangements and mechanisms are needed?
- ❑ What **skills and knowledge gap** exists within the actors of the research ecosystem in order to be able to implement research and technology security measures?
- ❑ What is needed to promote a **cultural and systemic shift** to incorporate research and technology security into international research and technology collaboration practices?

Objective 2:
Improve Finland's capacity to collect and use **strategic intelligence** on **emerging technologies**.

Guiding Questions

- ❑ Understanding what **strategic intelligence needs** are essential for informing research and technology security
- ❑ **Diagnosing the strategic intelligence ecosystem** of Finland to see whether it has sufficient capacity to support forward-looking research and technology security policies

Example: improving strategic intelligence capacities in national technology programmes in Sweden

- Strategic intelligence **diagnostic in Sweden** by learning from past case studies in advanced materials and manufacturing to inform current and future technology programs
- Building a **strategic intelligence platform** for convening programme managers, funding and innovation agencies around strategic intelligence production and use – open to all OECD member countries

Intelligence from administrative data (MARIAD/NESTI)

Mutual learning:

- Using **AI tools to manage and analyse data in RD&I funding bodies**
- Enhancing **interoperability** of admin. RD&I funding data
- Practices for **access and use** of admin. RD&I data
- Using **AI for classification and labelling**
- **Large language models** for admin. R&D data
- Methods for **directionality**

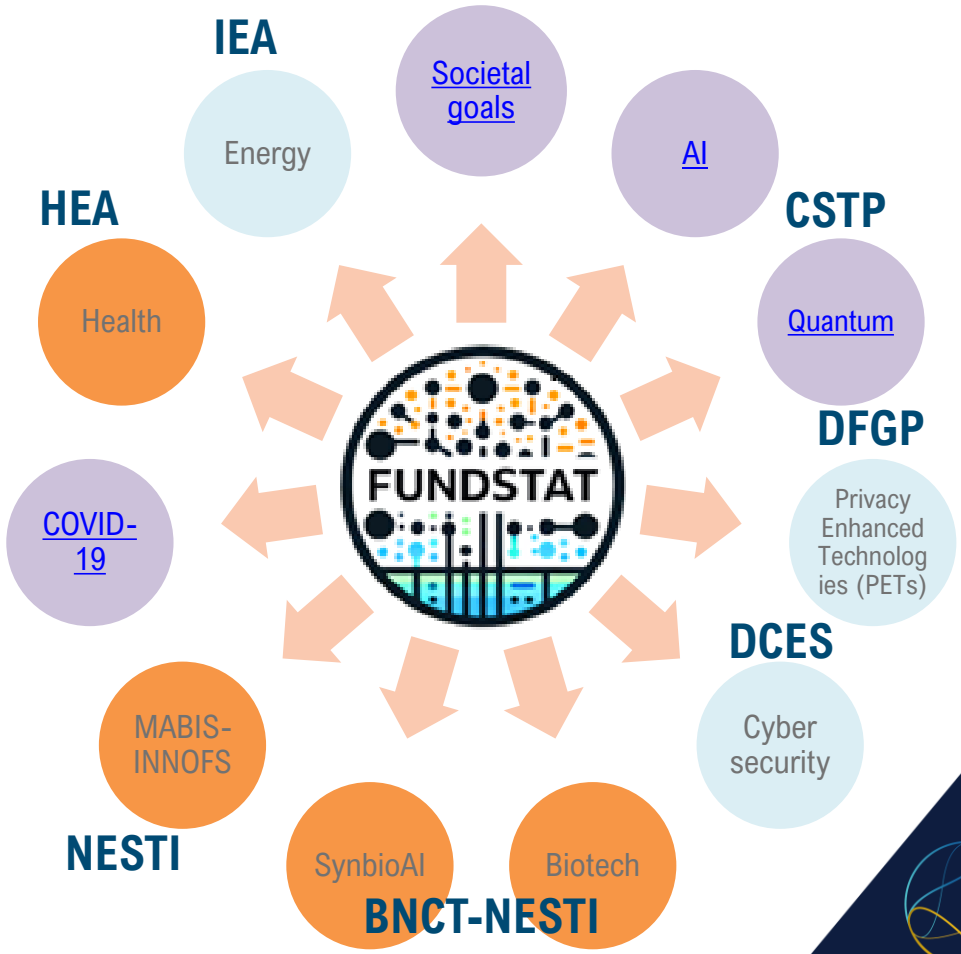
v.2024:

- **19 OECD member countries** (AUS, AUT, BEL, CAN, CHE, CZE, EST, FIN, FRA, GBR, DEU, IRL, JPN, LTV, LIT, NOR, POR, SWE, USA), and the **European Union – EC programmes.**
- **2.1 million R&D project awards**, accounting for **1.5 trillion USD PPP (2015-2023).**

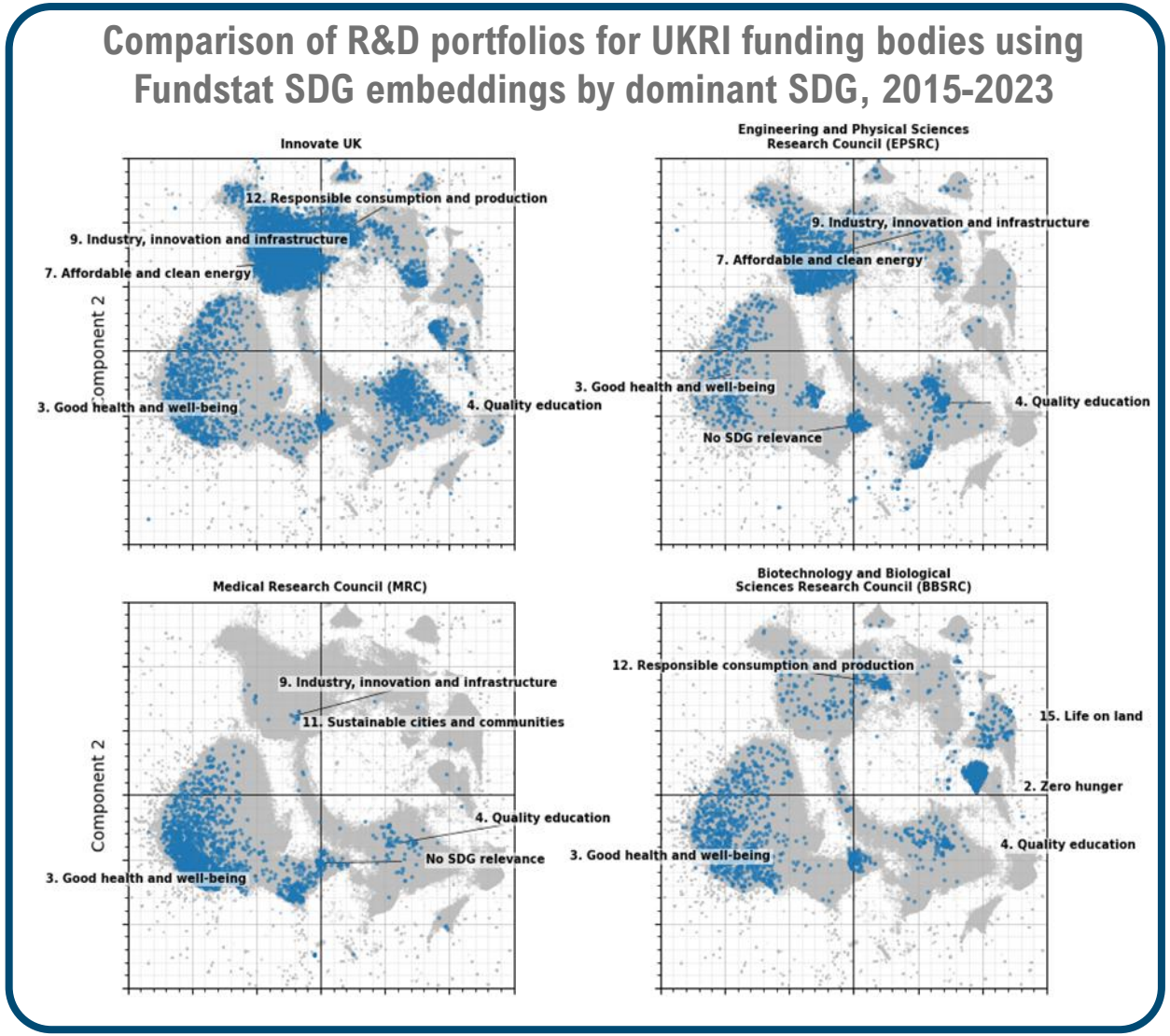
v.2026:

- **Upcoming additions:** COL, DNK, ESP, ITA, ISR, KOR, NLD, NZL, POL, SVN, BRA, HRV, CHN

AI-assisted methods and tool development: Classification (deep learning, multi-class, multi-label); Multilingual hierarchical **topic modelling**



Assessing the relevance of R&D funding towards societal goals with AI-assisted methods



Fundstat contains project-award R&D data with R&D funding amounts from the following Japanese sources:

- JSPS_KAKEN
- METI_NEDO
- AMED

DIVE 4 – Mission-oriented innovation policy/effective governance

STI Outlook chapter 1 and link to current projects

Governments should strengthen co-ordination between STI and non-STI policy areas

- Multidimensional issues like the relation between competitiveness, security and resilience cannot be achieved or even be chiefly driven by STI policies. Other policy areas with regulatory and fiscal powers have often taken the lead.
- Addressing the issue requires co-ordination across subnational, national and international levels of governance.
- What can help:
  - Strategic vision and oversight through national strategies, committees, etc.
  - Ecosystem approaches that make linkages across policy areas visible
  - **Mission-oriented innovation approaches and effective governance**

OECD EXPANDING WORK ON MISSION-ORIENTED INNOVATION POLICY AND TRANSFORMATIVE GOVERNANCE

- **2025-26 project "Implementation and evaluation guidelines of transformative missions"** provides concrete guidance and practical tools to support countries in their efforts to design, implement and learn from their missions
  Forthcoming papers:
  - Crowding in private sector resources to support missions
  - The role of innovation agencies in delivering on mission-oriented policies
  - Missions in universities
- **Mission Forward: Forging new frontiers in mission-oriented innovation policies**
  Forthcoming flagship report that brings together knowledge from across the mission practitioners and mission academics on what we know and don't know about how to implement MOIPs.
- **OECD-EC Partnership on Missions (POM)**
  - A four-year OECD-European Commission partnership to support the design, implementation, and evaluation of the missions in the EU and beyond.
  - Will include the first **Mission Outlook**, 14 reports, an update of the MOIP online toolkit, a biennial conference in Paris (first of which will be September 2026), and community of practice events.
- **Country specific study**: Capability Assessment of Ecosystem-Driven Mission Platforms in Sweden
- **2025-26 project "Transformative Governance"**: provides policymakers with insights and actionable guidance to reform the governance of their national STI systems, making them more effective at addressing complex and multiple challenges

Thank You!

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