

R&D policies for better post-pandemic futures: new approaches and tools

Friday 21 May 2021

Antti Vasara

President of EARTO, CEO of VTT,
Member of the Finnish Research and
Innovation Council, and Member of the
Technology Advisory Board

*The role of technology in driving
growth: key findings from the Finnish
case study on R&D intensity and
implications for the future*

#RandDfutures



The VTT logo consists of the letters 'VTT' in a bold, white, sans-serif font, centered within a solid orange square. The background of the slide features a repeating pattern of stylized, interlocking shapes in blue, orange, black, and light grey, creating a dynamic, geometric texture.

VTT

R&D intensity targets in the Finnish context

Antti Vasara

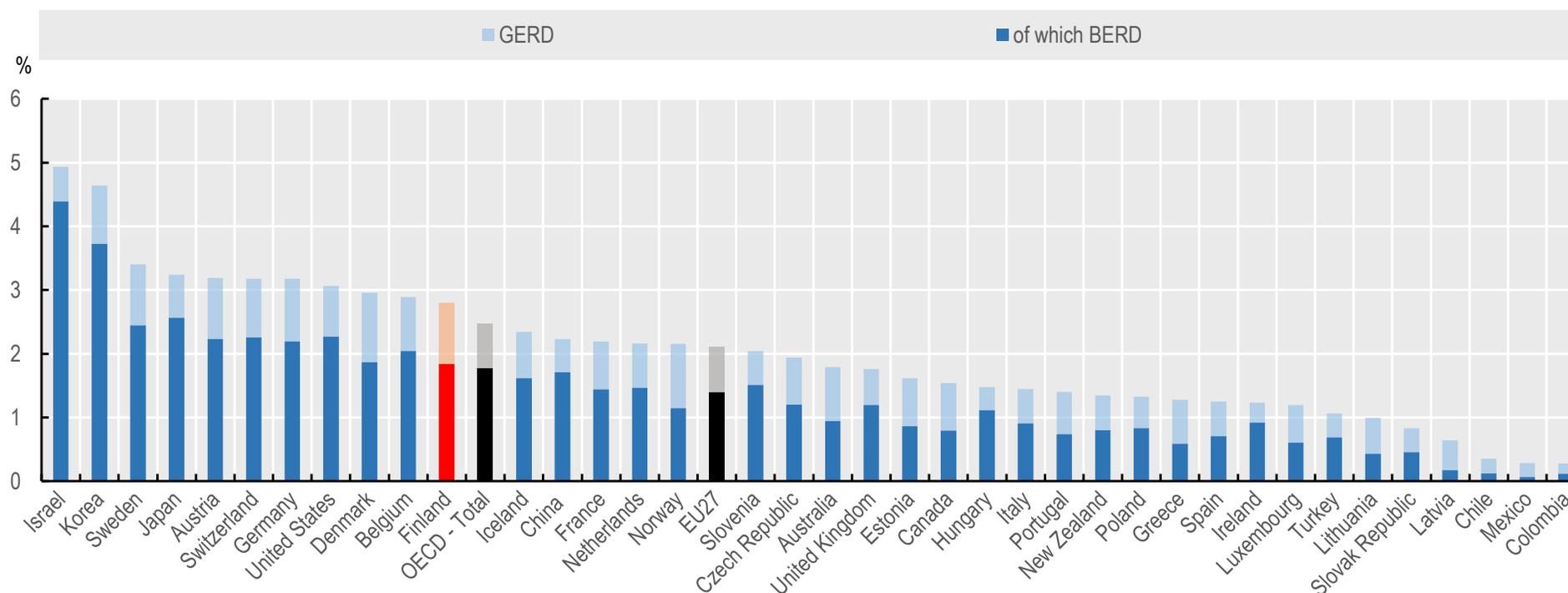
VTT Technical Research Centre of Finland

President & CEO

26/05/2021 VTT – beyond the obvious

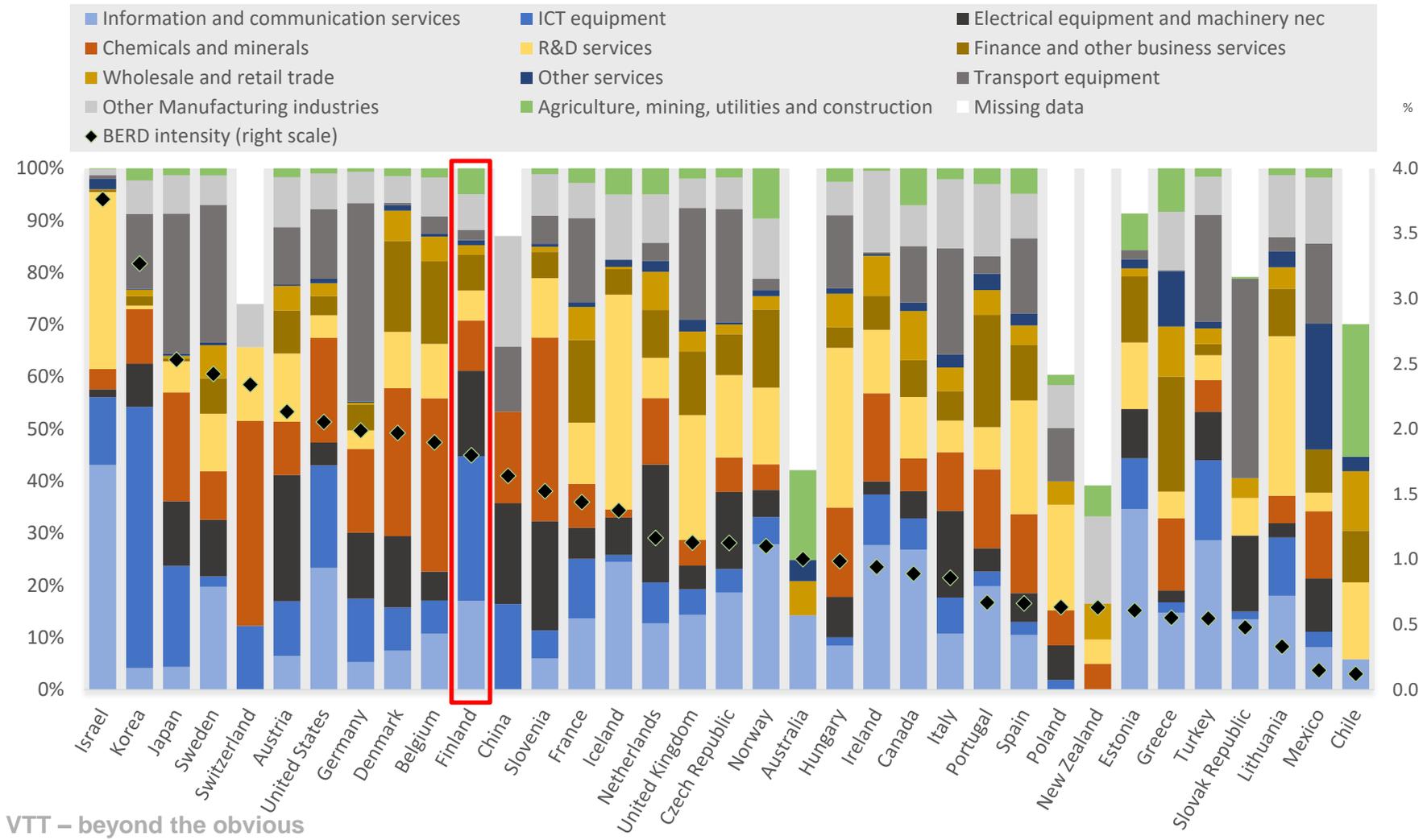
Finland in OECD perspective

Total R&D expenditures (of which business expenditures) in selected economies, 2019 or latest year available (source: OECD)



GERD = Gross domestic expenditure on R&D
 BERD = Business enterprise R&D expenditure

Business Expenditure on R&D (BERD): Distribution by industry in 2017 (source:OECD)



Key findings from the Finnish case study on R&D intensity targets

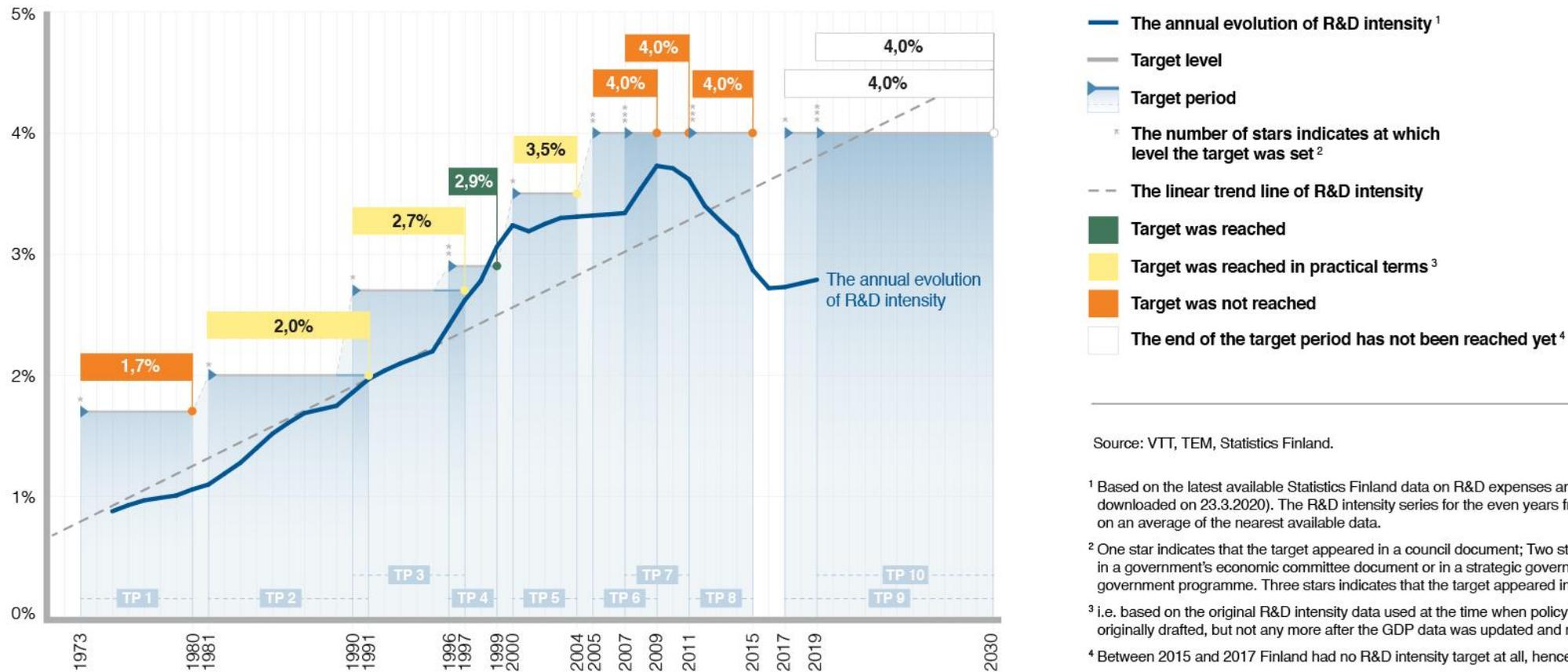
Policies to enhance R&D performance:

Key lessons from Finland's policy experience

1. A *systemic and integrated policy approach* needs an **impactful coordination** and governance mechanism or forum.
2. A **balanced innovation system** with well-working joint Public Private Partnership efforts and mechanisms will do better in absorbing shocks.
3. A key strategy to be able to absorb shocks to the economy and society is to **invest in long-term capabilities.**

Finland's experience with R&D target setting

Finland's R&D intensity target changes and its performance in reaching the targets



- The annual evolution of R&D intensity ¹
- Target level
- Target period
- * The number of stars indicates at which level the target was set ²
- - - The linear trend line of R&D intensity
- Target was reached
- Target was reached in practical terms ³
- Target was not reached
- The end of the target period has not been reached yet ⁴

Source: VTT, TEM, Statistics Finland.

¹ Based on the latest available Statistics Finland data on R&D expenses and GDP at current prices (both series downloaded on 23.3.2020). The R&D intensity series for the even years from 1976 to 1996 are estimates based on an average of the nearest available data.

² One star indicates that the target appeared in a council document; Two stars indicates that the target appeared in a government's economic committee document or in a strategic government document but not in the government programme. Three stars indicates that the target appeared in the government programme.

³ i.e. based on the original R&D intensity data used at the time when policy lines and recommendations were originally drafted, but not any more after the GDP data was updated and recalculated later.

⁴ Between 2015 and 2017 Finland had no R&D intensity target at all, hence the two-year gap in the grey line.

How the future looks like from the perspective of Research and Technology Organisations



OUR PURPOSE

We bring together people,
business, science and technology,
**TO SOLVE THE WORLD'S
BIGGEST CHALLENGES,**
creating sustainable growth,
jobs and wellbeing.



Look beyond R&D intensity

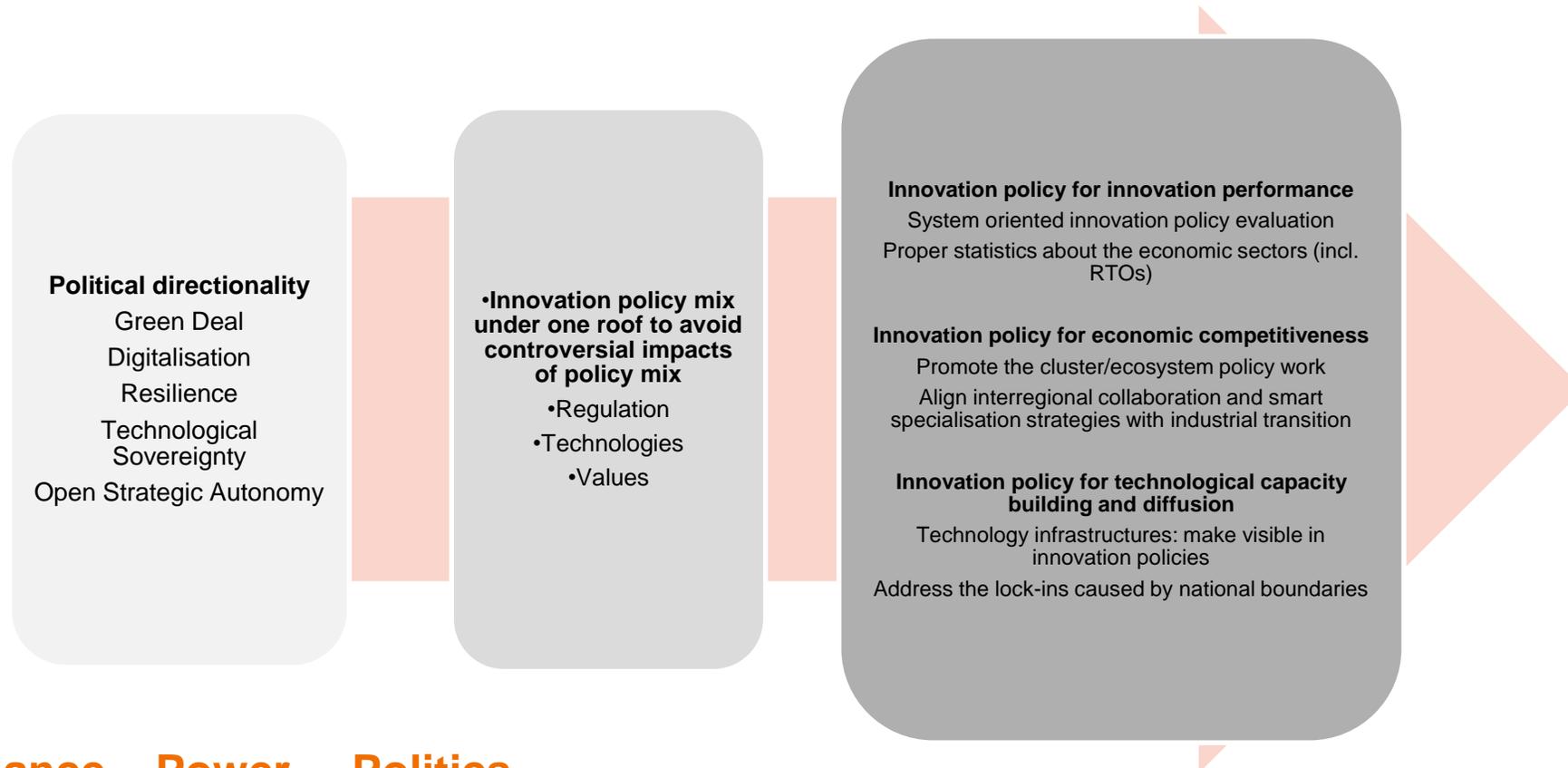
- We should increasingly focus, not only on intensity, but also on a broader, multicriteria evaluation of R&D
- A major component of this is quality, defined by the ability to create new capabilities, innovations and impact
- Quality or excellence can be delivered by forging, attracting, bundling and motivating talent
- Cooperation is key

The innovation system is the grand public-private partnership

- We should look holistically on the role of different actors in the system and focus on clear expectations of impact delivered and the reduction of overlaps
- Motivations and attitudes play a role in what we can expect. We should let organizations play to their strengths
- Technology and Ethics should go hand-in-hand



Design and implementation of innovation policy for systemic transition



Governance – Power – Politics

Key messages

| | |
|-----------|--|
| Invest in | RDI to enable a long-term resilient society, with special focus on developing critical technology capabilities and technology infrastructures |
| Set-up | New agile forms of public-private partnerships and new ways of cooperation between private and public based on roadmaps with a trans-disciplinary approach co-designed with all relevant stakeholders including RTOs |
| Leverage | Make full use of RTOs' foresight capabilities and their strong multidisciplinary knowledge of research & technology on one side and market needs and uptake on the other |
| Develop | Develop better statistics on RTOs to support better decision making on innovation policies |
| Ensure | Ensure the right framework conditions to stimulate and spread knowledge and technology co-creation in Europe and prevent the creation of unwanted regulatory barriers |

bey⁰nd

the obvious

Kai Husso

Chief Planning Officer, Ministry of
Economic Affairs and Employment,
Finland, and Vice-Chair of the OECD
TIP Working Party

*R&D policies in Finland's current and
future STI policy agenda*

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R&D funding in Finland's STI policy agenda

Mr. Kai Husso,
Chief Specialist, MEAE,
Vice-Chair of the OECD TIP Working Party

Joint OECD-MEAE-VTT event on R&D policies for better post-pandemic futures: New approaches and tools
21.5.2021

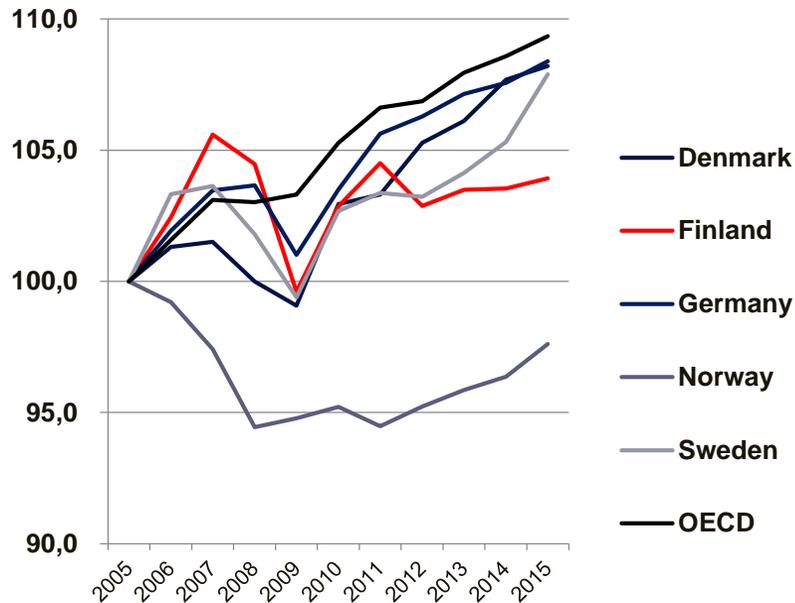


Ministry of Economic Affairs
and Employment of Finland

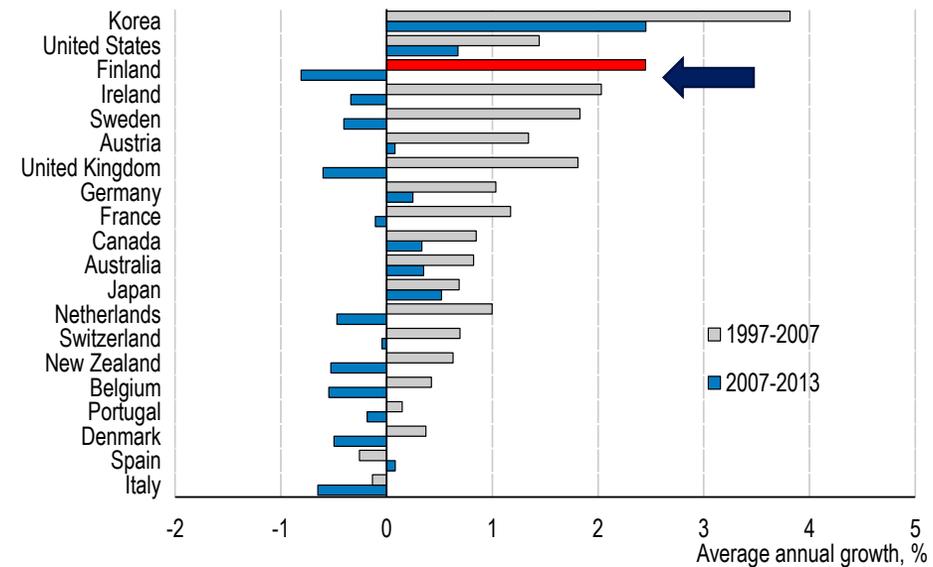
A “lost decade” for Finland in 2008–2017: economy suffered, productivity declined, R&D in a dip



Labour productivity, GDP per hour worked
index 2005=100



Total Factor Productivity growth, average
growth rate



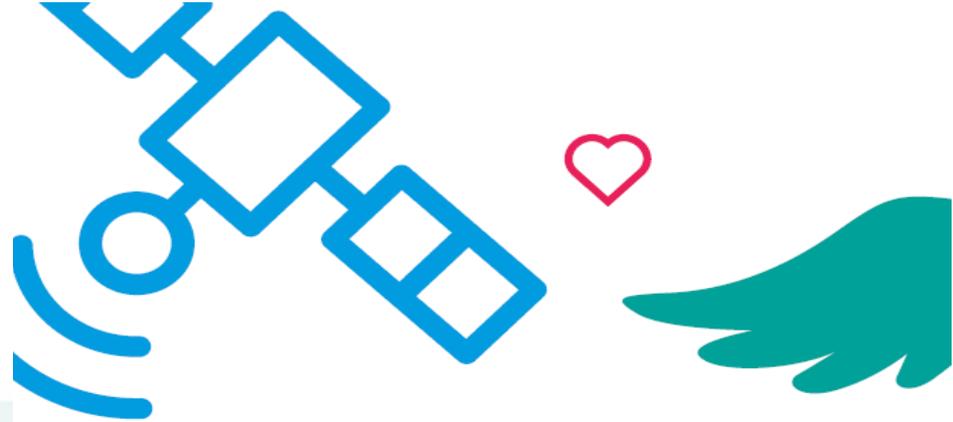
- Labour productivity stalled in the 2010s. This was markedly a different phase compared to the period of rapid growth before the Financial crisis in 2008. Productivity fell in manufacturing and hardly grew in services. The productivity gap vis-à-vis OECD peer countries widened.
- The volume of GDP in 2016, in real terms, was still below that of 2008. Finally the economic recovery started in 2017 and lasted until the COVID-19 pandemic. And now we are again seeking for recovery and new (sources of) growth.



OECD Reviews of Innovation Policy

FINLAND

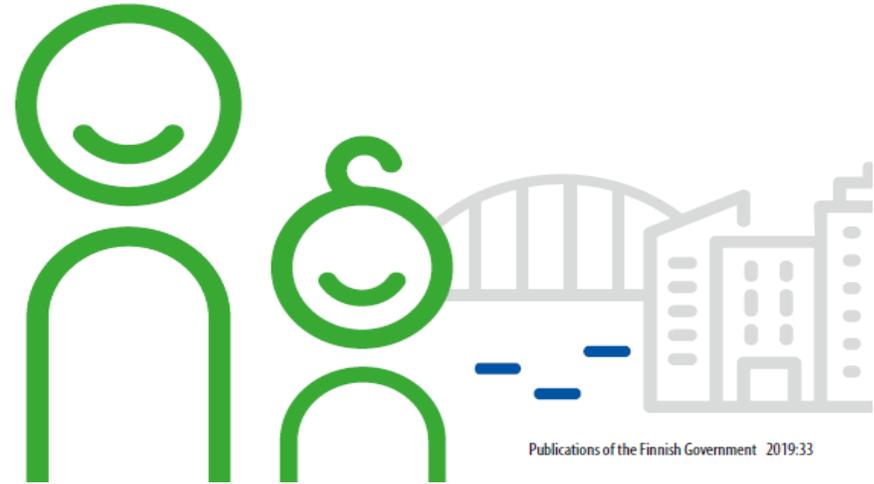
2017



Programme of Prime Minister Sanna Marin's Government 10 December 2019

INCLUSIVE AND COMPETENT FINLAND

– a socially, economically and ecologically sustainable society



Publications of the Finnish Government 2019:33



Tackling Finland's (economic) challenges requires the following actions:

Re-balance R&D policy: raise R&D funding, more emphasis also on applied research and development as well

- Strengthen the entire innovation process; applied R&D & KETs require more resources

Boost innovation in the business sector and extend innovation to SMEs

- Aim at radical innovations
- Increase schemes for PPPs; enhance SME's participation

Enhance the contribution of higher education institutions to the society

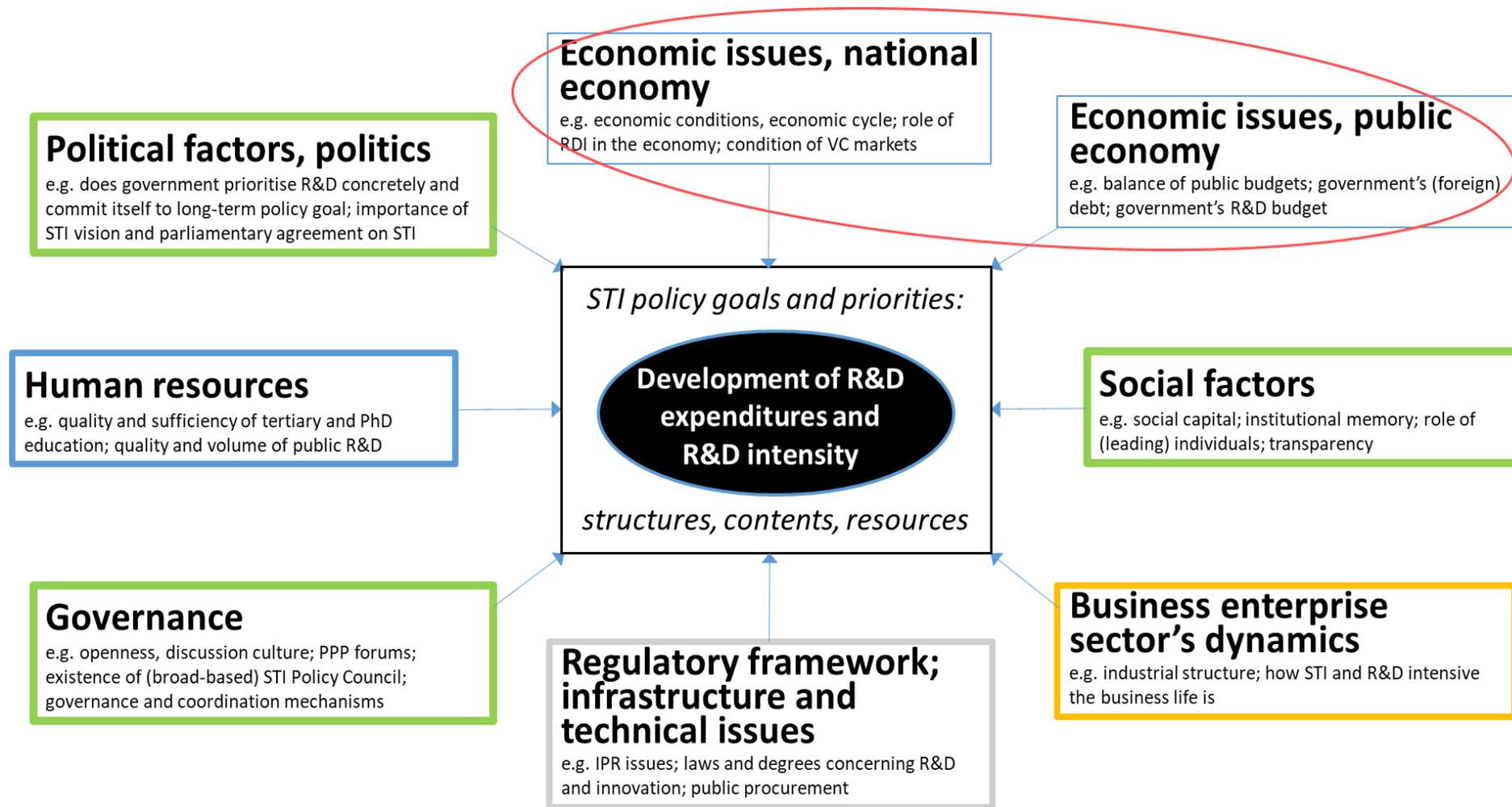
- Fostering specialisation and consolidation of HEIs
- Revise funding formulas for R&D organisations

Increase internationalization throughout the innovation system

- FDI and foreign R&D attraction, incentives
- Attract foreign talents

Relaunch the STI governance and create a new vision!

Drivers of R&D intensity and the volume of R&D expenditures at a national level: a multi-factor model.



Recent developments in Finnish STI policy: Government's mid-term policy review (29.4.2021)



- Government decided the major policy lines for the rest of its term until early '23.
- The review emphasises policies to strengthen growth, reach carbon neutrality and reduce inequality. R&D plays a great role in the policy positions: **R&D is hot again!**
- The previous time R&D and innovation have received as much positive attention was in the government term of 2007–2011.
- The target is to raise R&D intensity to 4% by 2030. In 2019, it was 2.8%. Government's share of financing is 30%. Reaching the objective means the increase of the funding level by 600 million € every year.
- *A parliamentary working group* will be set up soon. Measures that lead to 4% target will be sought after. The Government decides i.a. in the 2022 budget session. New budgeting ways will be discussed (e.g. multi-annual budgeting).
- Many other supportive STI policy measures were raised, such as: exploitation of the Recovery and Resilience Facility (*RRF*) funding; drafting of *industry renewal strategy* and *entrepreneurship strategy*; new PPP model for *Industry–Academia collaboration*; enhancing the commercialization of public R&D results.

Caroline Paunov and Sandra Planes-Satorra

OECD Directorate for Science,
Technology and Innovation

*Structural challenges for R&D policies
in the context of COVID-19*

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**R&D policies for better
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WORKING PARTY ON INNOVATION AND TECHNOLOGY POLICY

Structural challenges for R&D policies in the context of COVID-19

Caroline Paunov and Sandra Planes-Satorra

OECD

21 May 2021



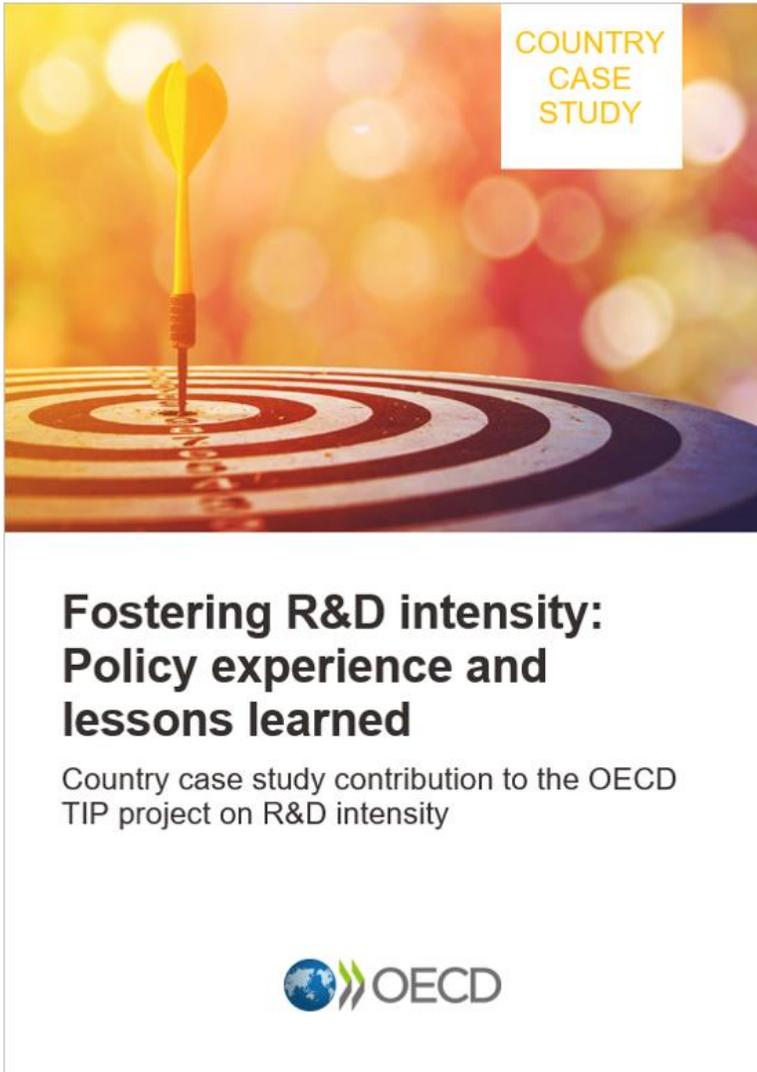
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Insights based largely on **11 case studies** produced in the context of the TIP project on R&D intensity



Australia
Finland
France
Germany
Greece
Hungary
Ireland
Korea
Netherlands
Poland
European Union

Find them at: oe.cd/tiprd

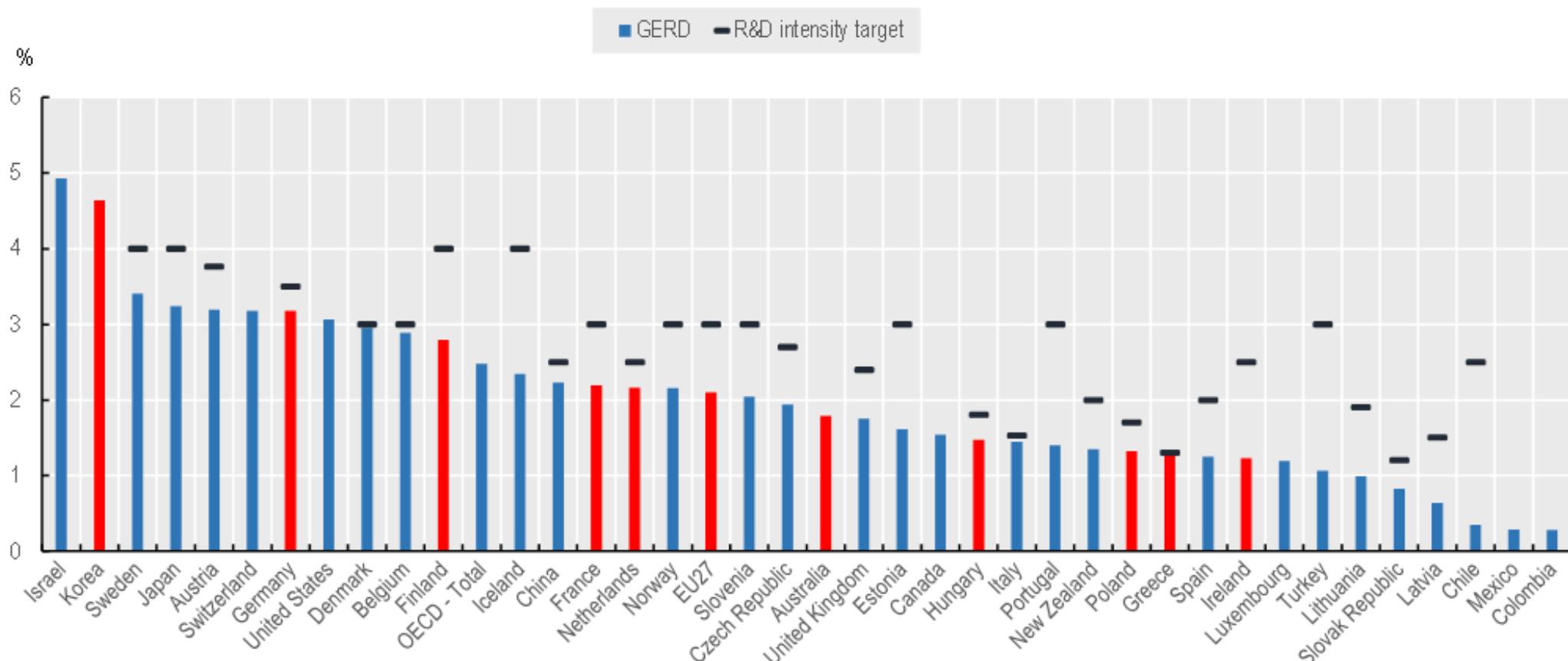


Many countries have R&D intensity targets

Reaching them has not always been a simple task

R&D intensity and targets in selected economies, 2019

As percentage of GDP



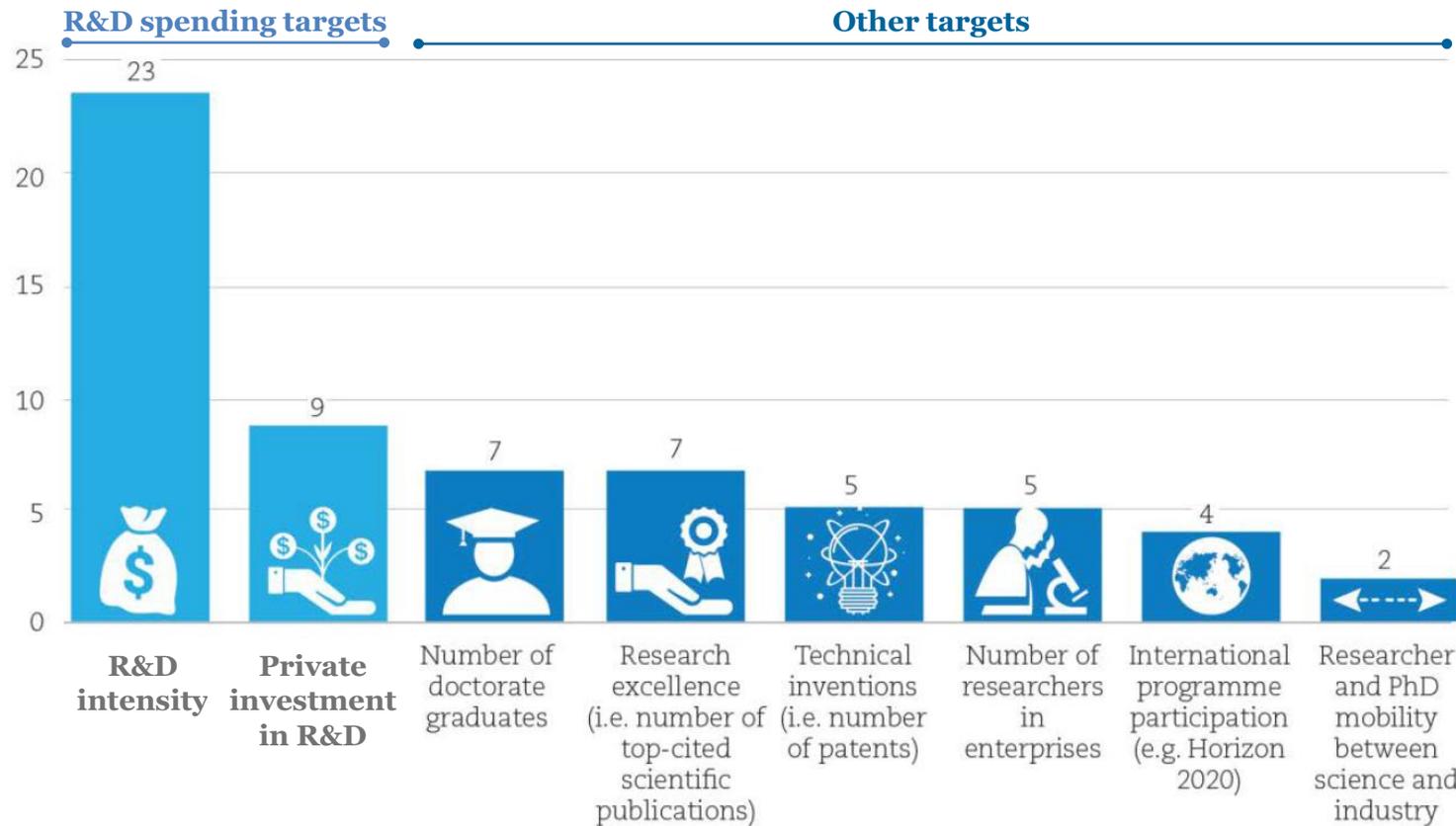
Notes: The graph illustrates the Gross domestic expenditure on R&D (GERD) as a percentage of GDP. Ten countries and the European Union, that contributed case studies to the TIP R&D project, are highlighted in red. The graph also illustrates the current R&D intensity targets across countries. For most countries, targets are for 2020, except for Chile (2021), Turkey (2023), Germany (2025), United Kingdom (2027), and Finland, Norway and Portugal (2030).

Source: OECD (2021), "Main Science and Technology Indicators", OECD Science, Technology and R&D Statistics (database), <https://doi.org/10.1787/data-00182-en> (accessed on 01 April 2021).



Some OECD countries have also set targets against other objectives, but to a much lesser extent

Number of countries with quantitative targets included in national STI strategies

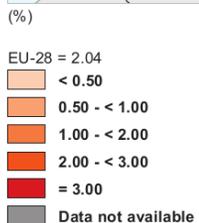
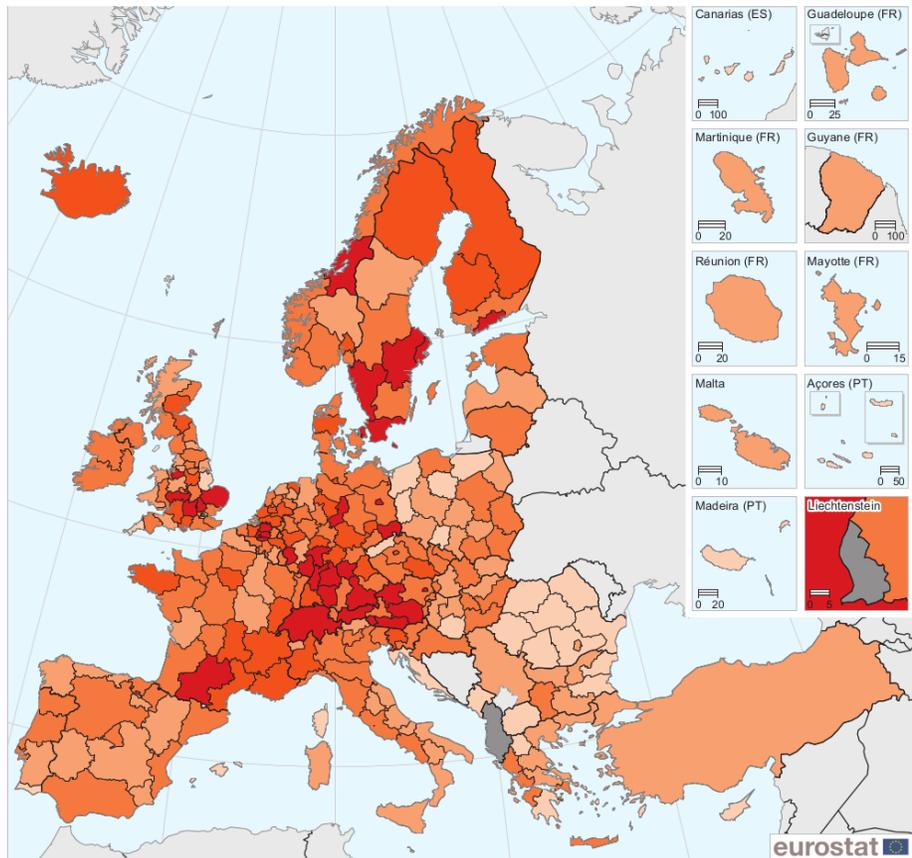


Source: OECD Science, Technology and Innovation Outlook 2018, based on the OECD Database on Governance of Public Research Policy – RESGOV (<https://stip.oecd.org/resgov/>). The methodology is described in Borowiecki, M. and Paunov C. (2018), “How is research policy across the OECD organized?: Insights from a new policy database”, *OECD Science, Technology and Industry Policy Papers*, No. 55, OECD Publishing, Paris, <https://doi.org/10.1787/235c9806-en>.
Note: It showcases only countries where the national STI strategies have quantitative targets.



Observation 1: R&D intensity levels do not reflect geographic, sectoral and firm disparities

R&D intensity, by NUTS 2 regions, 2015 (%)



Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat — GISCO, 04/2018



Stephen Roper, Warwick Business School:

“In the UK, R&D intensity has been stable over past years ...

... but R&D activity is increasingly concentrated in London and South-East England, meaning that territorial disparities are increasing”

Case study Hungary:

“Half of the R&D capacities are located in the capital city”

Case study Korea:

“Large companies accounted for 77.5% of business R&D spending in 2014”

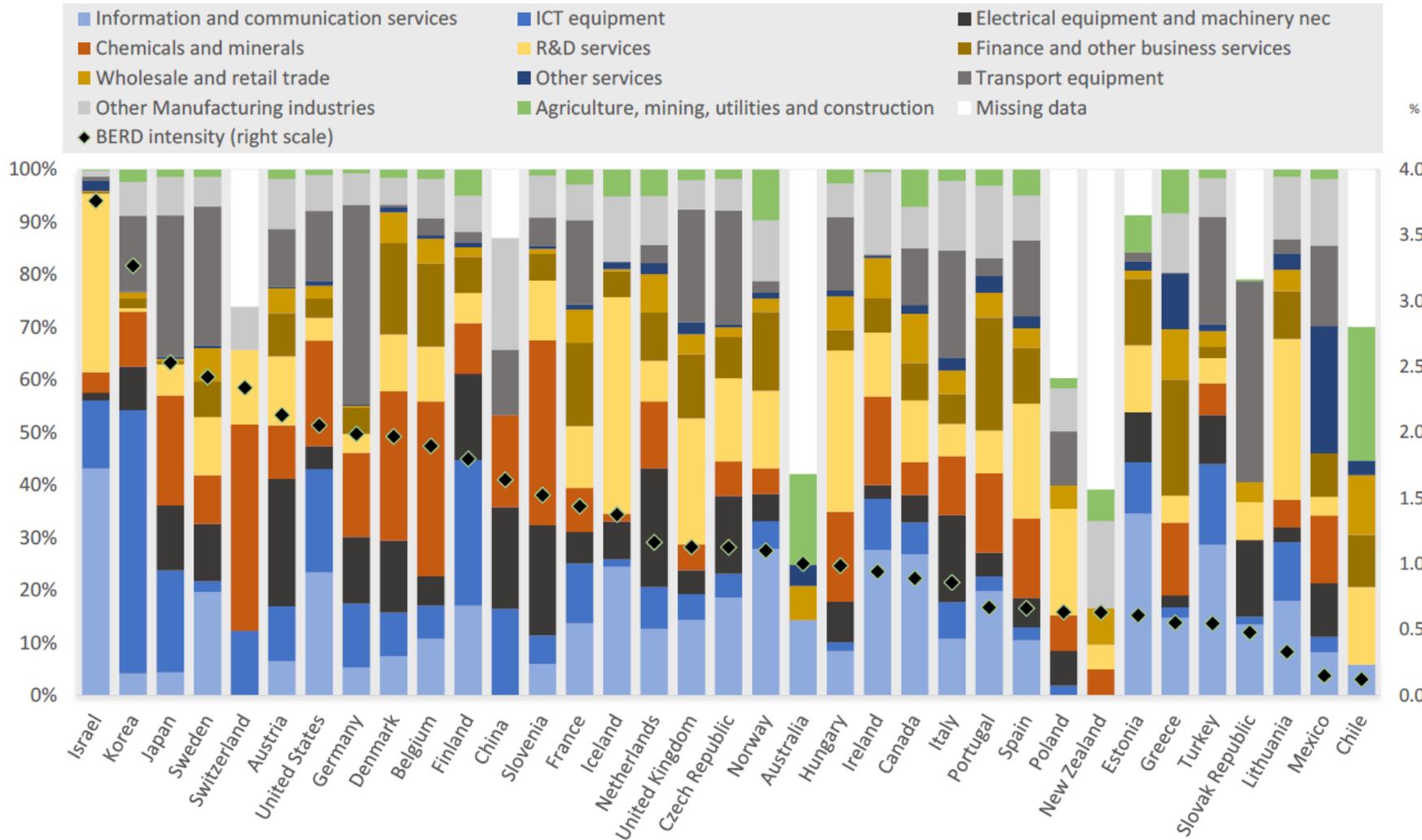
How to reconcile R&D intensity and inclusiveness objectives?



Observation 2: Industrial structures are a key driver of R&D intensity

BERD distribution by industry, 2017

Industry shares (left scale) and total BERD as percentage of GDP (right scale)



- **Role of R&D varies across sectors:**

Manufacturing sectors tend to invest more than services

- R&D intensity as a reflection of **industry composition** (e.g. Germany/Japan/Korea vs. Netherlands/UK)

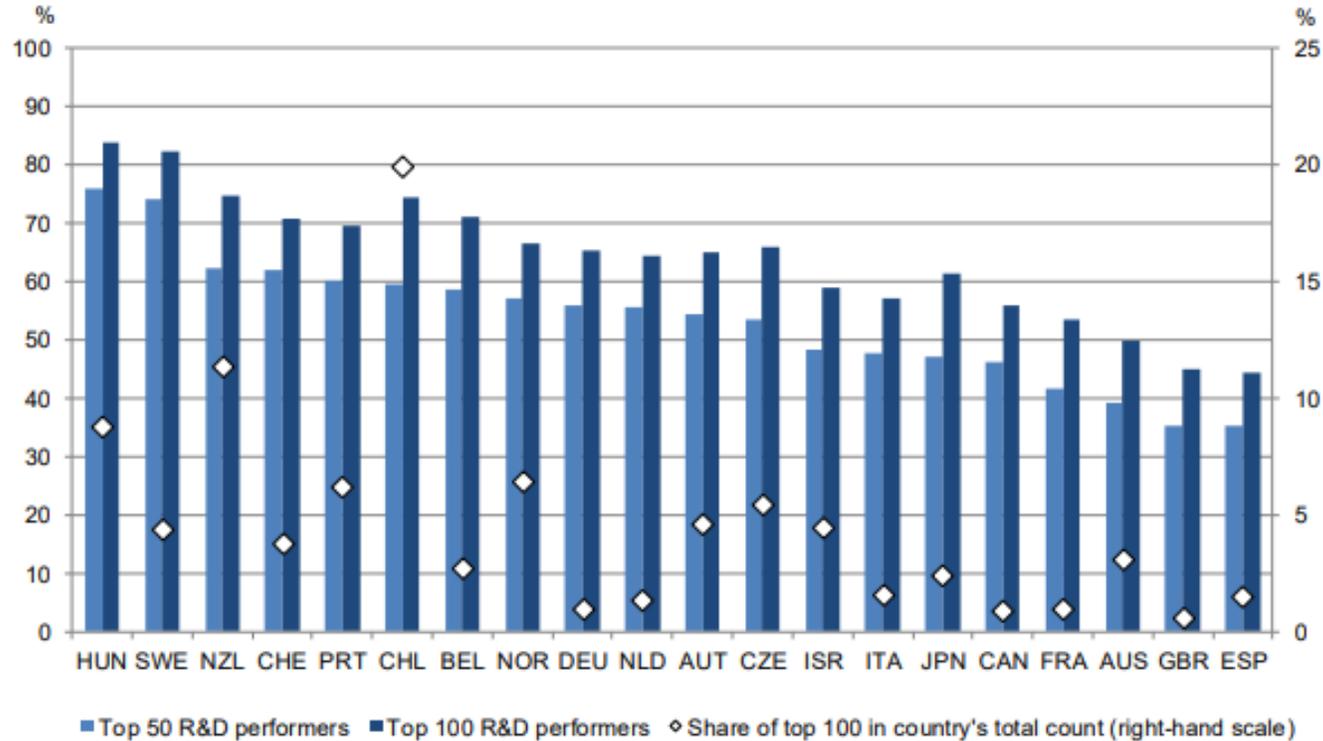
- But **not always**: case of Israel



Observation 3: R&D is often concentrated in a few leading firms

Top 50 & 100 performers account for a large share of total business R&D

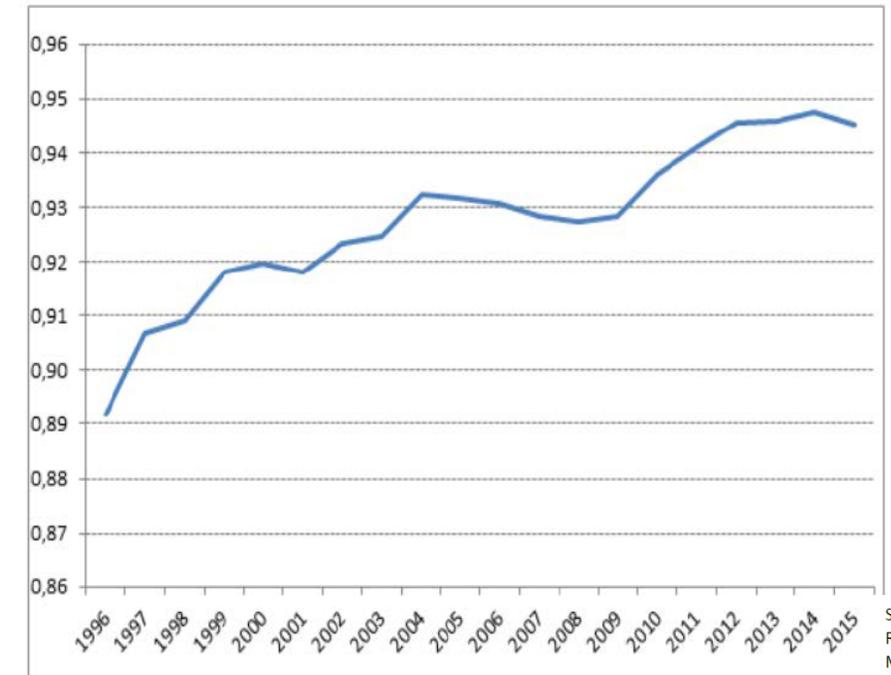
% of domestic business R&D expenditure, 2017



Source: OECD (2020), based on microBeRD project database, <http://oe.cd/microberd>, June 2020.

Concentration of innovation intensity is increasing over time in Germany

Gini coefficient of innovation expenditure, 1996-2015



Source: Hünemann and Rammer (2018), ZEW-Mannheim Innovation Panel

Source: Bettina Peters (ZEW Mannheim), Presentation in the R&D intensity workshop, London -12 April 2019

EU case study: “The top 25 R&D investors in the EU account for half of the expenditure of the top 1000 investors”

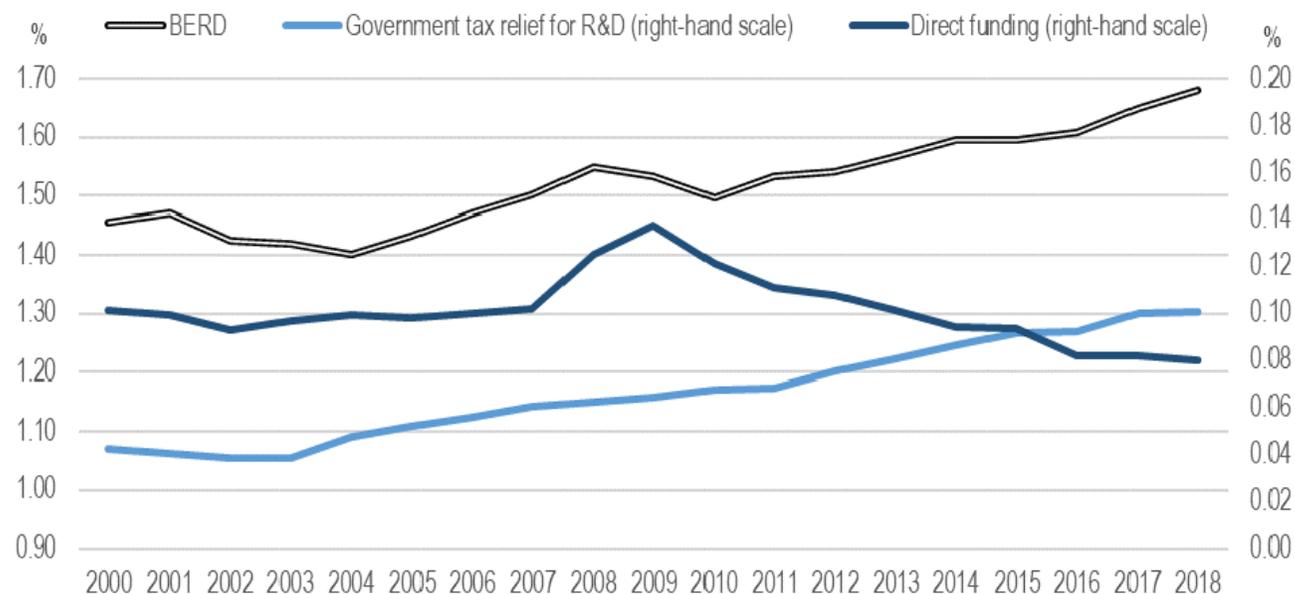


Observation 4: Policy mixes in support of business R&D are shifting towards tax incentives in many countries

In 2020, **32 out of 37 OECD countries** offered R&D tax incentives at the central government level, up from 19 in 2000

Increase of tax incentives vs. direct funding for BERD in OECD countries

BERD, government tax relief for R&D & direct support for BERD, % of GDP, 2000-18



Note: OECD-GTARD figures exclude Israel where relevant data are not available. Direct support estimates include government R&D grants and public procurement of R&D services, but exclude loans and other financial instruments that are expected to be repaid in full. EU government-financed BERD in 2018 based on OECD estimate.

Source: OECD R&D Tax Incentives Database, <http://oe.cd/rdtax>, December 2020.

Implications to consider:

- Lower **management costs**
- Best suited to support **R&D projects closer to market**
- **Different effectiveness** across firms sizes and across countries
- Limited policy **directionality to support specific actors** (e.g. SMEs, start-ups, less innovative regions, specific sectors)
- Ambiguous implications for **MNEs'** R&D investments

What is the most efficient policy mix?



A number of policy lessons from case studies

- 1. R&D targets should not be used in isolation**
 - Ireland's National Innovation Strategy 'Innovation 2020' includes a range of targets complementing R&D intensity
- 2. Funding targets should be accompanied with a strategic vision and direction**
 - Increasing directionality of STI policy after COVID-19
 - Importance of long-term and predictable public investments in R&D
- 3. R&D strategies need to be tailored to specific R&I ecosystems**
 - Importance of framework conditions
 - Less technologically advanced countries to focus on enhancing absorptive capacities, addressing internal social needs and adopting existing technologies, rather than developing new-to-the-world technologies
- 4. Participatory governance models and political commitment are essential for systemic changes**
 - Cross-governmental coordination
 - Rethink governance models to engage all stakeholders in STI policy design

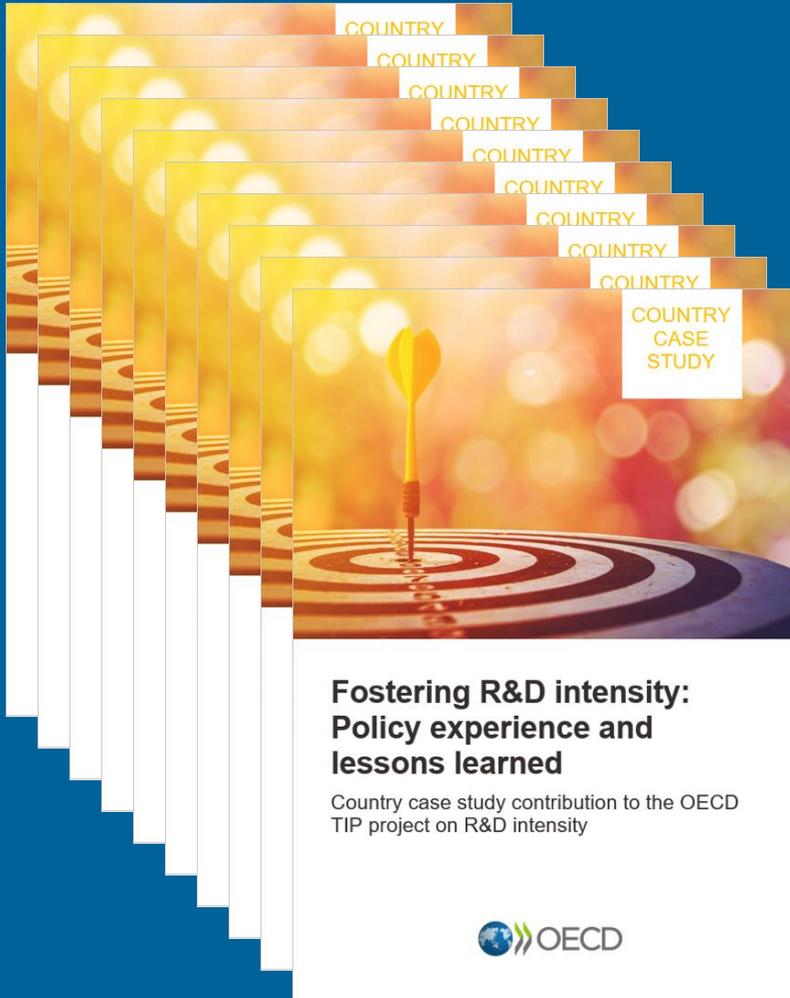


Thank you to all case study authors and peer-reviewers

| Country case study | Authors | Peer reviewers |
|--------------------|--|---|
| Australia | Wayne CALDER, Clarissa LAI, Lyndall MILWARD-BASON, Lauren CHA and Nicholas MORTIMER | Job TEURLINX (Netherlands) |
| Finland | Matthias DESCHRYVERE, Arho SUOMINEN and Kai HUSSO | Agni SPILIOTI, Vasileios GONGOLIDIS and Antonios GYPAKIS (Greece) |
| France | Esther GOREICHY, Fayçal HAFIED, Guillaume ROULLEAU | - |
| Germany | Susan SCHULZ | Kai HUSSO (Finland), Hyuk HAN and Yoonbeen LEE (Korea) |
| Greece | Agni SPILIOTI, Vasileios GONGOLIDIS, Antonios GYPAKIS and Georgia MAZIOTI | Arho SUOMINEN (Finland) |
| Hungary | Krisztina SOVAGO | Jaroslaw SARUL (Poland) |
| Ireland | Ian HUGHES | Susan SCHULZ (Germany), Wayne CALDER (Australia) and Matthias DESCHRYVERE (Finland) |
| Korea | Hyuk HAN and Yoonbeen LEE | Arho SUOMINEN (Finland), Susan SCHULZ (Germany) |
| Netherlands | Job TEURLINX and Piet DONSELAAR | Ian HUGHES (Ireland), Jaroslaw SARUL (Poland) and Wayne CALDER (Australia) |
| Poland | Jaroslaw SARUL | Kai HUSSO (Finland) |
| European Union | Coordinated by Ruzica RAKIC and Ana CORREIA under the guidance of Román ARJONA and Jessica LARSSON. Co-drafted by the team of the "R&I Strategy and Foresight" Unit of DG Research and Innovation (European Commission). | Ian HUGHES (Ireland) and Kai HUSSO (Finland) |



Find out more in the 11 country case studies



Find the case studies and synthesis report at:

oe.cd/tiprd

See short video:

<https://youtu.be/o4seyrqNfZw>

**R&D policies for better post-pandemic futures:
new approaches and tools**

WORKING PARTY ON INNOVATION AND TECHNOLOGY POLICY

Virtual event | 20 and 21 May 2021

REPORT

vtresearch.com/rd-post-pandemic

Ministry of Economic Affairs and Employment of Finland

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BETTER POLICIES FOR BETTER LIVES

PANEL 3

Industry perspectives on R&D activities and policy support

Matthias Deschryvere, Senior Research Scientist, VTT
Technical Research Centre for Finland

Annu Nieminen, Founder & CES, Upright

Jaakko Hirvola, CEO Technology Industries of Finland
Annu Niemine, Founder & CEO, Upright

Timo Ahopelto, Founding partner of Lifeline Ventures

Gerhard Huemer, Director for Economic and Fiscal Policy,
SMEunited

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High-level policy roundtable: Innovation and innovation policy post-COVID-19

Alessandra Colecchia, Head of Science and Technology Policy Division, OECD Directorate for Science, Technology and Innovation

Julien Guerrier, Director of the Common Policy Centre, DG Research and Innovation, European Commission

Michiel Sweers, Director of Innovation and Knowledge, Ministry of Economic Affairs and Climate Policy, The Netherlands

István Szabó, Vice President for Science and International Affairs, National Research, Development and Innovation Office of Hungary

Carlo Andrés Altamirano Allende
Head of Planning Communication and International Cooperation,
National Council on Science and Technology, Mexico

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High-level policy roundtable: Innovation and innovation policy post-COVID-19

István Szabó, Vice President for Science and International Affairs, National Research, Development and Innovation Office of Hungary



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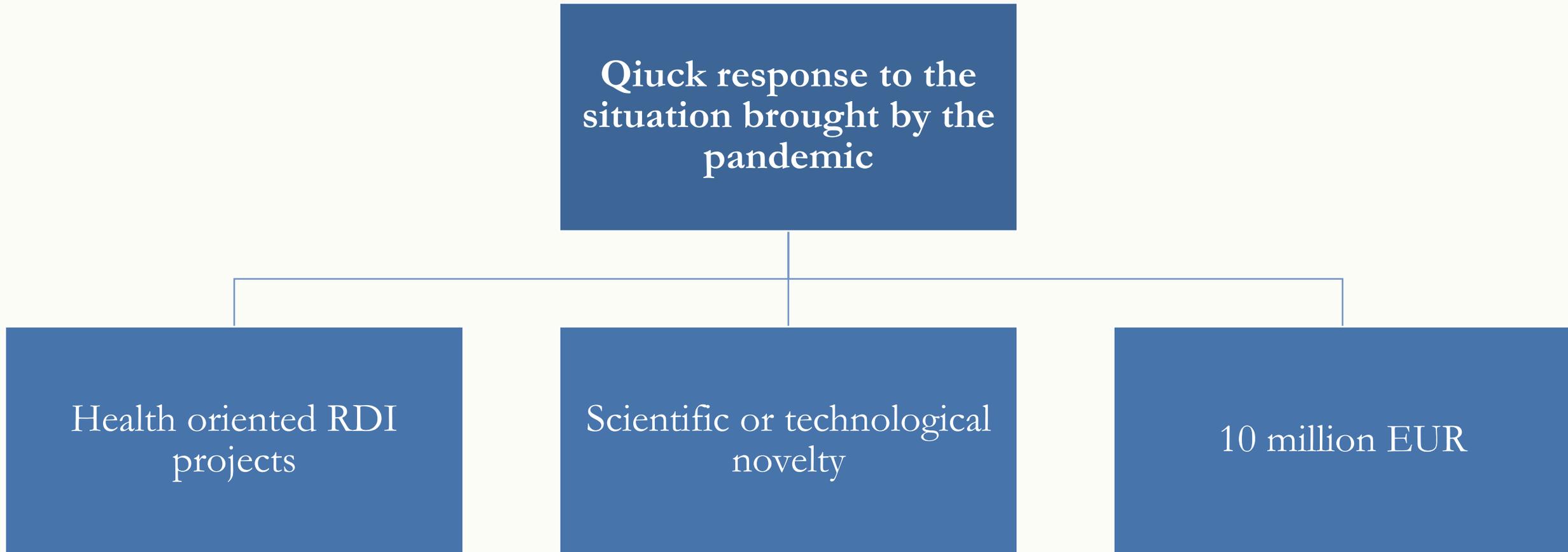
Renewing the Hungarian innovation ecosystem in the Post-Covid era

István SZABÓ PhD, Vice President

National Research, Development and Innovation Office



Immediate reaction: Covid Fund 2020



Structural changes: pillars of Post-Covid innovation policy of Hungary

Challenge based RDI

Global megatrends,
social, economic,
technological
challenges

National Laboratories

Institutional approach

Sustainable
institutional system
beyond project based
calls

Science Parks

Cooperation oriented framework

Universities as centres
of innovation
ecosystem

Regional Innovation
Platforms



Structural changes: pillars of Post-Covid innovation policy of Hungary

Konwledge utilization

RDI capacities and stakeholder demand

University
Innovation
Ecosystem

Focusing of resources and projects

Concentration of limited resources

Thematic Excellence
Programme

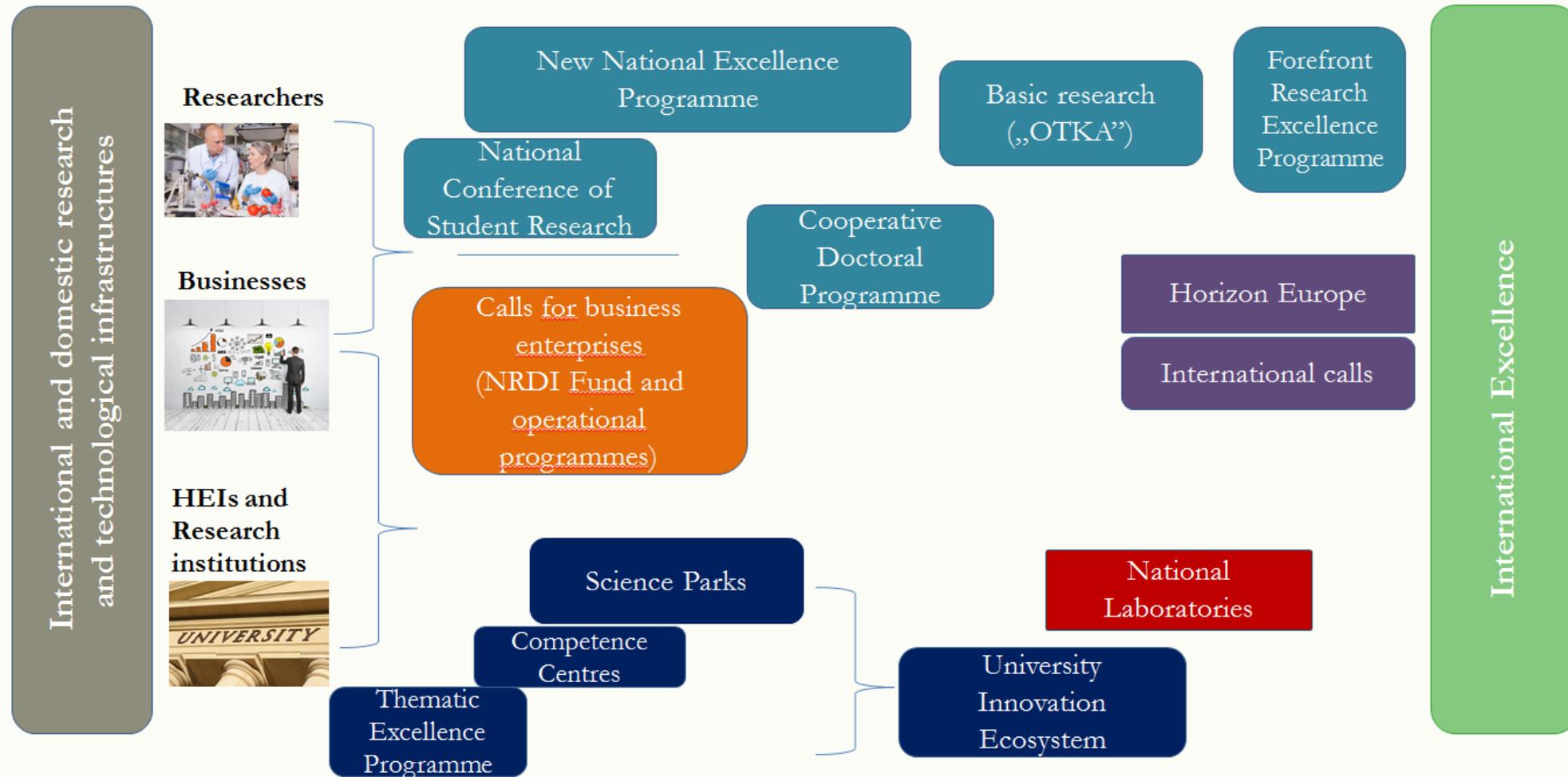
HR capacities of R&D

Flexible carrier path
and applied R&D
topics

Cooperative
Doctoral
Programme



Landscape of RDI programmes



Thank you for your attention!



High-level policy roundtable: Innovation and innovation policy post-COVID-19

Carlo Andrés Altamirano Allende

Head of Planning Communication and International Cooperation,
National Council on Science and Technology, Mexico



STI policies in a post- pandemic Future in Mexico



R&D activities in times of Covid: A solutions-oriented approach



Multidisciplinary
Approach

High-risk investments

Capacity development in
priority areas

Cross-sector
collaborations

Open Science

COVID-19 RESEARCH CALL FOR PARTICIPATION

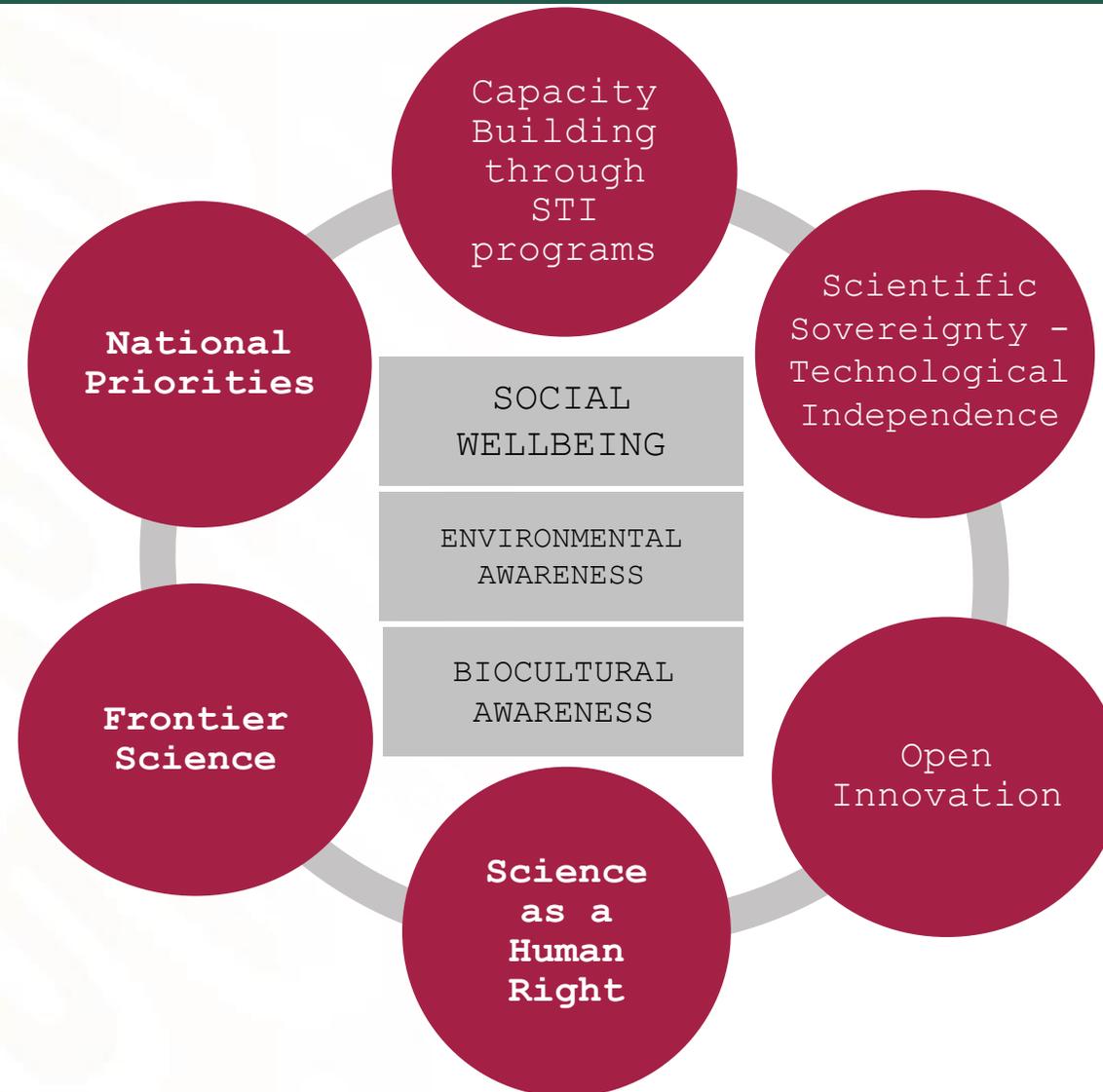
Research areas

- | | |
|--|---|
| 1 Clinical trials to secure treatments for COVID-19 | 7 Socio-cultural practices |
| 2 Invasive emergency ventilators | 8 Gobernance |
| 3 Diagnostic/prognostic tools | 9 Communication |
| 4 Epidemiological studies | 10 Population and territory |
| 5 Effective therapeutic alternatives. | 11 Individual and social wellbeing |
| 6 Environmental stability of SARS CoV2. | 12 Education |

New STI policy approach in México

Articulation

To coordinate and take advantage of the installed capacities through the articulation of all the actors in the STI ecosystem for open and rapid innovation



PRIORITIES

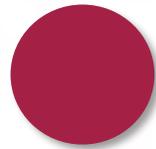
Science, Technology and Innovation as key component to solution-based approached for the nation's biggest challenges

STI policies that strengthens public science at the core of social and environmental wellbeing, with criteria of inclusion, equity, social and economic justice.

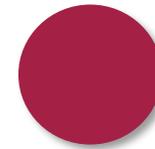
We promote public-private partnerships are promoted with the aim of achieving scientific sovereignty and technological independence.



STATE PATENTS



REVENUE FOR THE
STATE



EMPLOYMENT AND RETAINING OF
HIGHLY SKILLED NATIONAL
CAPACITIES

CIENCIA POR MÉXICO



CONACYT
Consejo Nacional de Ciencia y Tecnología





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