OECD STI OUTLOOK 2021

TIMES OF CRISIS AND OPPORTUNITY

OECD Science, Technology and Innovation Outlook 2021 - Insights for EU policy debates
Brussels, 12 February 2021

Key messages

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OECD STI Outlook 2021

- An OECD flagship publication
- Published every 2 years, since the mid-1990s
- Asks: “What’s new in the field of science, technology and innovation policy?”
- 2021 edition focuses on COVID-19
- Provides an international review based on latest policy information and indicators
- Based on work of the Committee for Scientific and Technology Policy (CSTP) and its working parties – the EC and most EU Member States are members
- Draws upon OECD STI statistical and qualitative data infrastructures

OECD STI Outlook 2021 – the narrative

Unprecedented mobilisation. Public research funders, private foundations and charities have set up an array of newly funded research initiatives worth billions of dollars in record time

Science and technology offer the only exit strategy from COVID-19. The pandemic has underscored more than in other recent crises the importance of science and innovation to being both prepared and reactive to upcoming crises

The pandemic has stretched research and innovation systems to their limits and exposed gaps and weak spots. There is an opportunity to reorient STI policies and direct science and innovation towards sustainable and inclusive futures

The STI system response to Covid-19 has been decisive, rapid and significant

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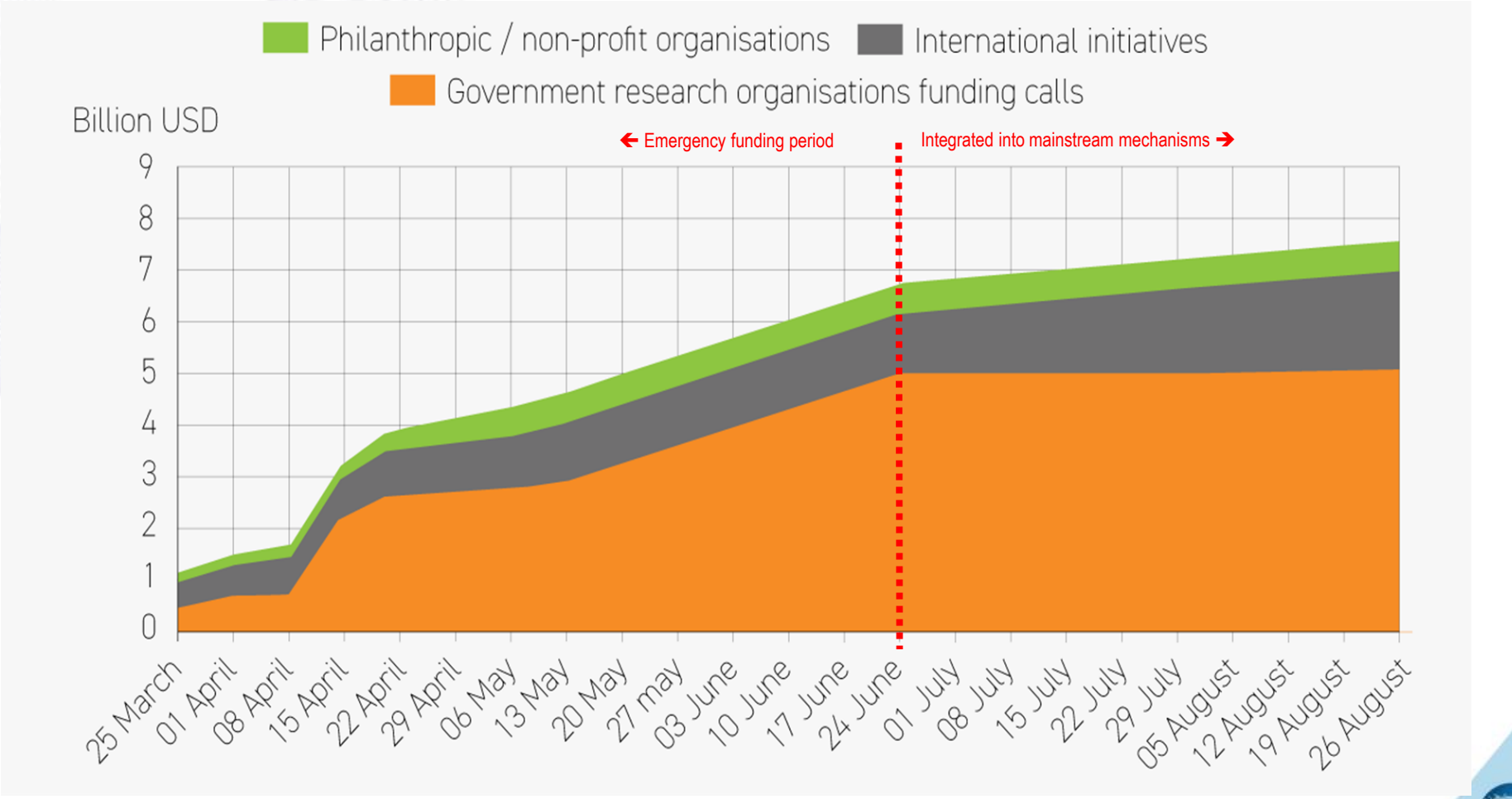
Research funding response to COVID-19

Evolution of COVID-19 research funding programmes and pledges

Funding for research and innovation has been supported by active government interventions around the world

But there are risks of indiscriminate diversion of research efforts

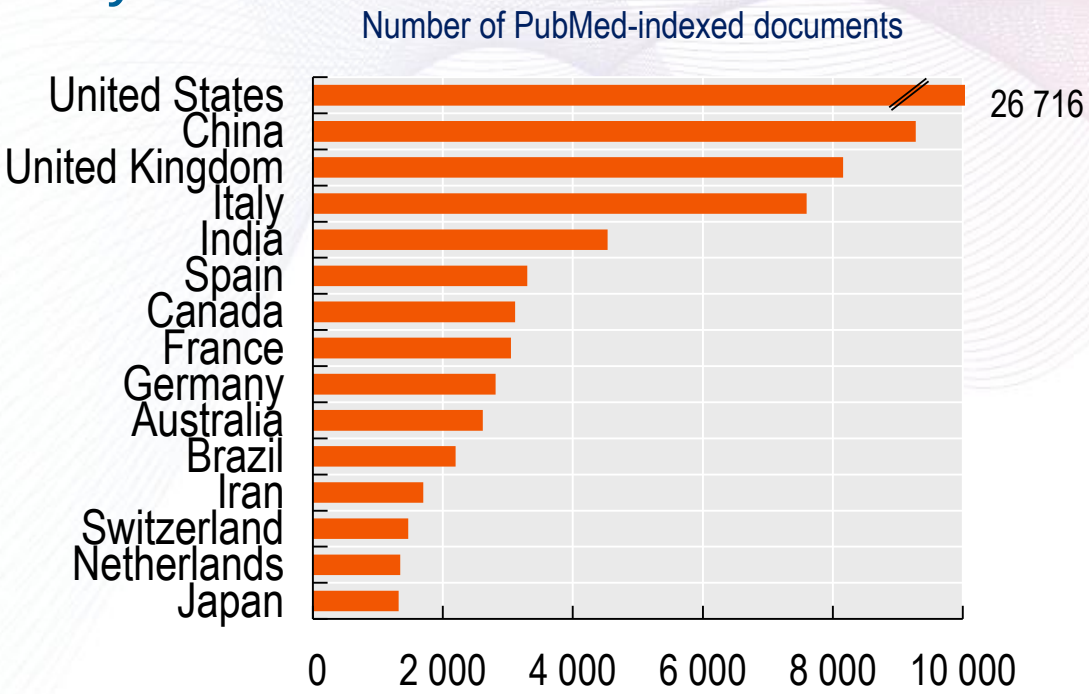


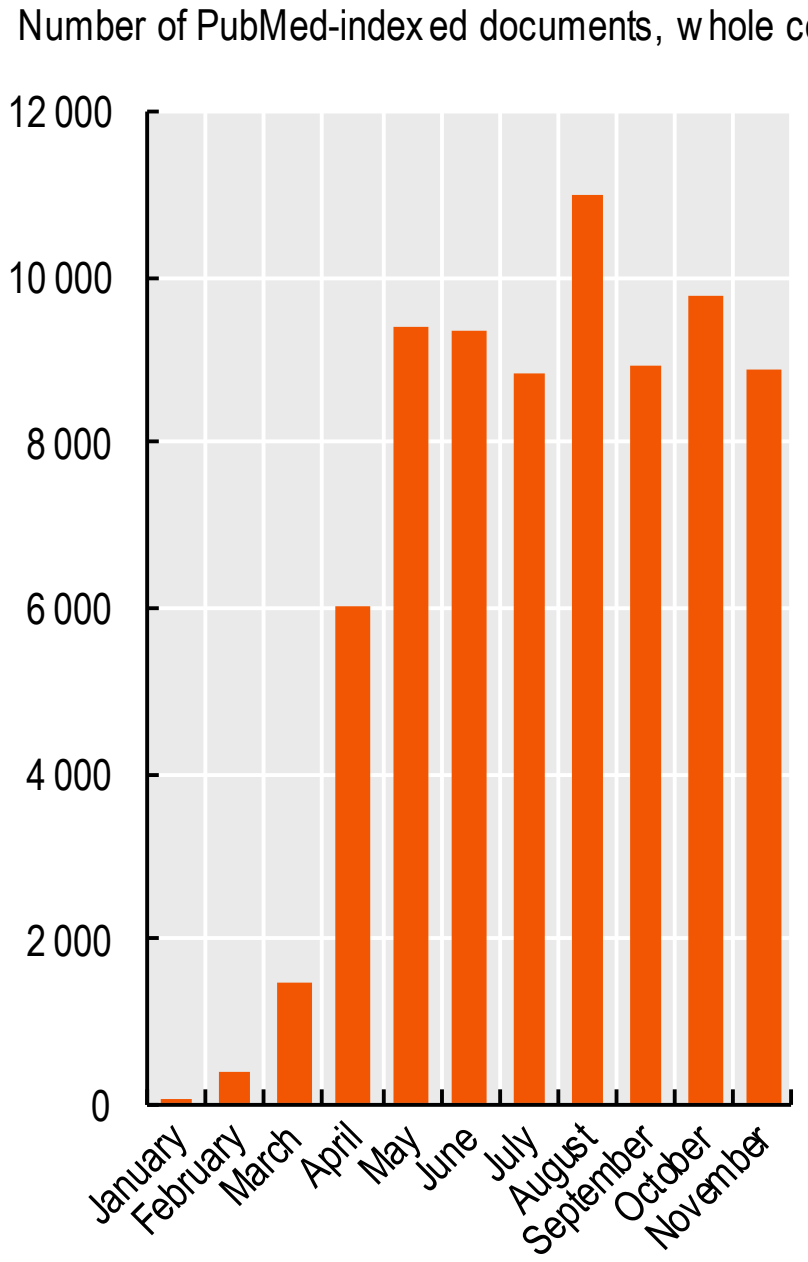
Source: Data gathered by OECD from public sources published by funders

Research performers' response to COVID-19

Trends in COVID-19 biomedical and life sciences research publications, 1 Jan to 30 Nov 2020

The COVID-19 pandemic has triggered an unprecedented mobilisation of the scientific community





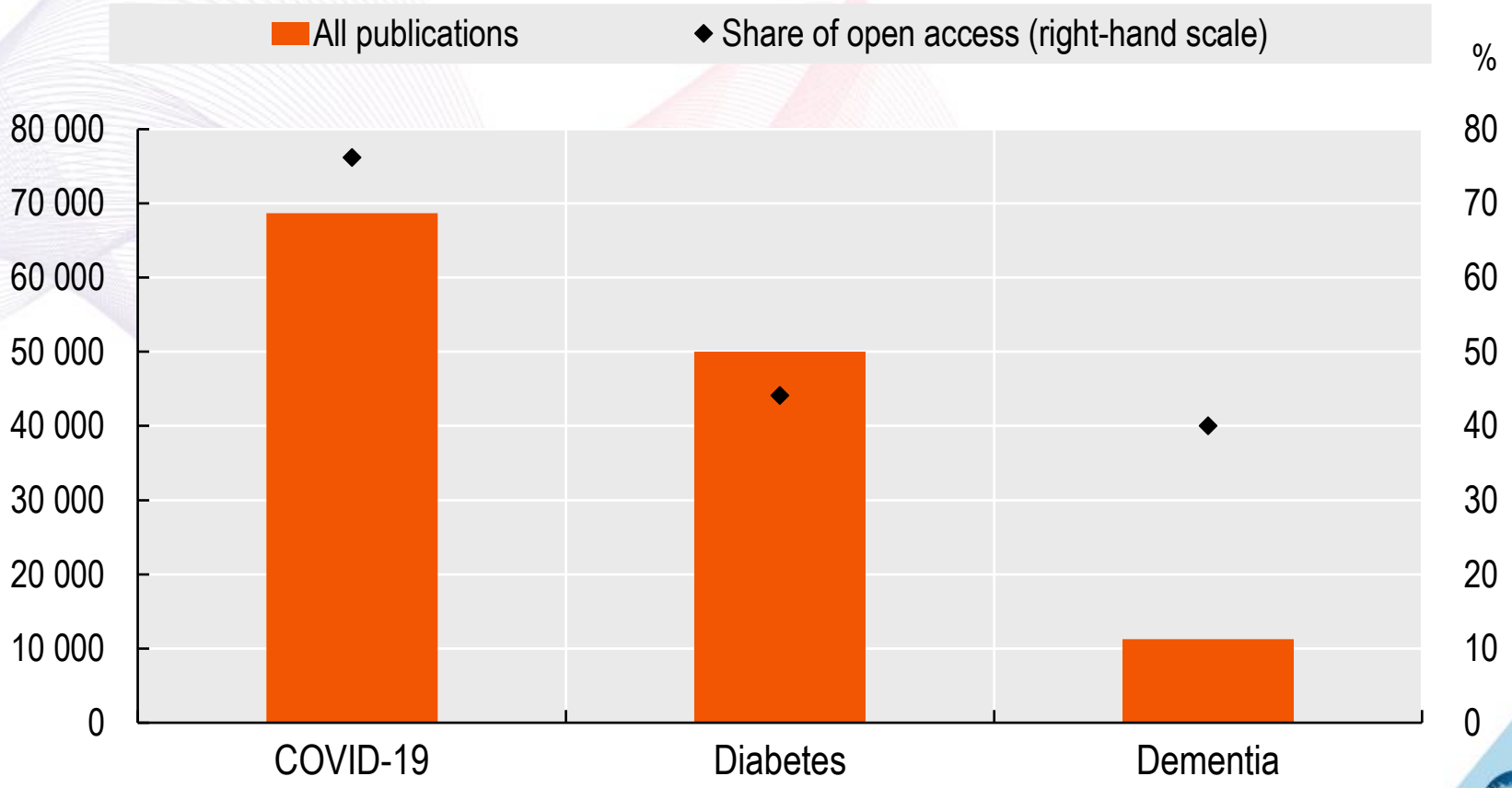
Source: OECD calculations based on US National Institutes of Health PubMed data, https://pubmed.ncbi.nlm.nih.gov/, (accessed 30 November, 2020).

COVID-19 is an accelerator of trends already underway

76% of COVID-19 scientific publications are open access, c.f. diabetes (43%) and dementia (40%)

This, along with other changes, could accelerate the transition to a more open science in the longer run

Open access of COVID-19, Diabetes and Dementia publications, January-October 2020

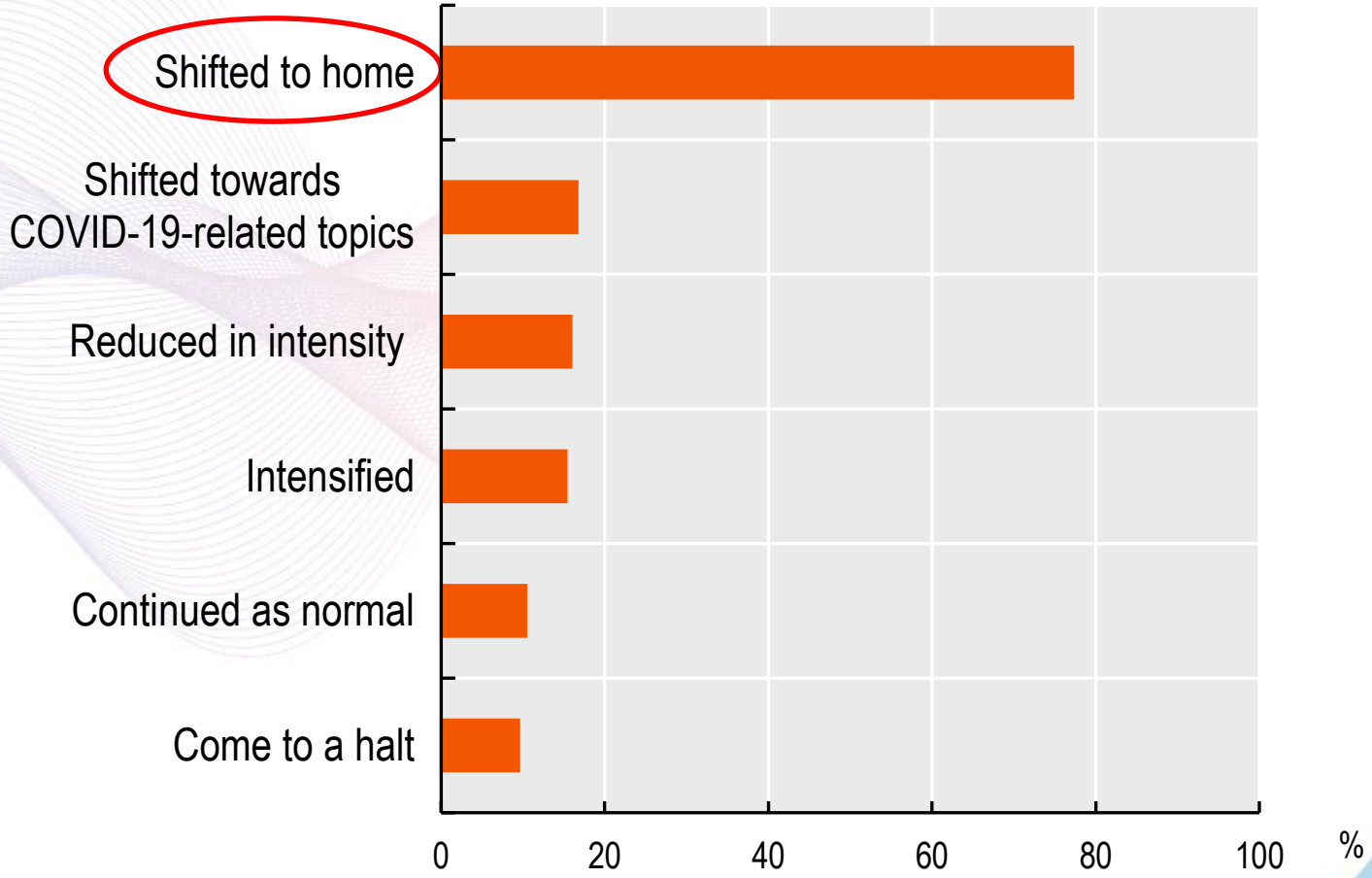


Source: OECD calculations based on US National Institutes of Health PubMed data, https://pubmed.ncbi.nlm.nih.gov/, (accessed 30 October, 2020).

COVID-19 as an accelerator of trends already underway

- Research and innovation activities have been severely disrupted by lockdowns and social distancing measures

Current impact of COVID-19 on scientists' work



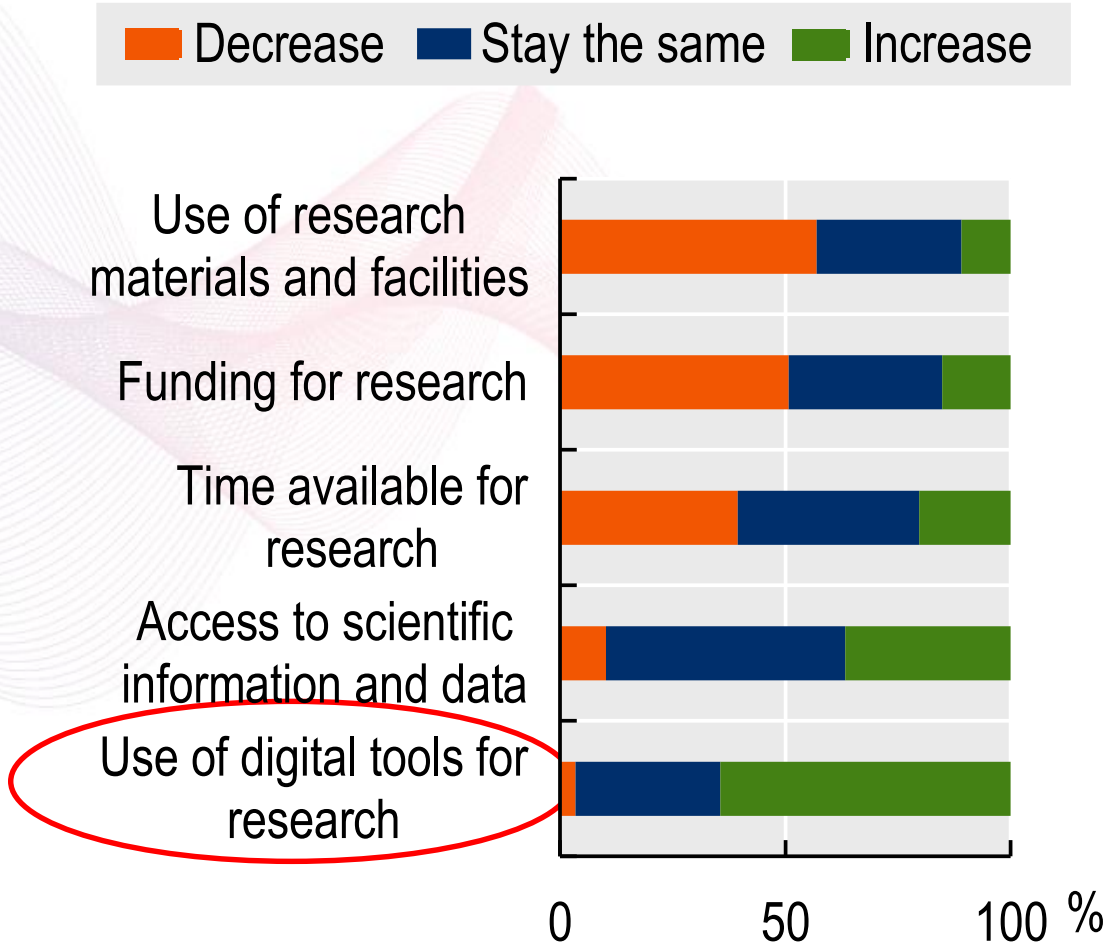
OECD Science Flash Survey 2020, https://oecdsciencesurveys.github.io/2020flashsciencecovid/, (accessed on 12 October 2020)

COVID-19 as an accelerator of trends already underway

- Research and innovation activities have been severely disrupted by lockdowns and social distancing measures

- Digital tools and open-data infrastructures have allowed scientists to continue to function outside their usual laboratory or field environments

Impact of COVID-19 on scientists' work

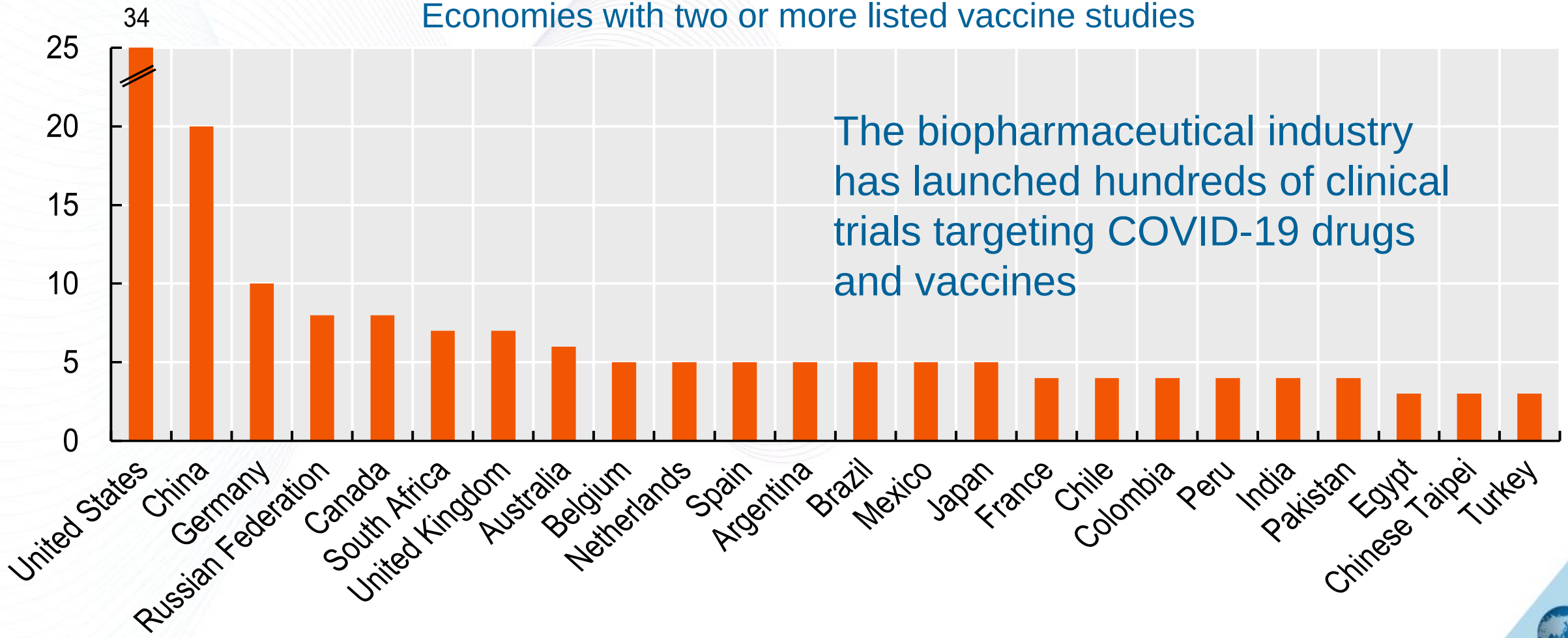


OECD Science Flash Survey 2020, https://oecdsciencesurveys.github.io/2020flashsciencecovid/, (accessed on 12 October 2020)

Business innovation response to COVID-19

Registered COVID-19 vaccine studies by economy

Economies with two or more listed vaccine studies



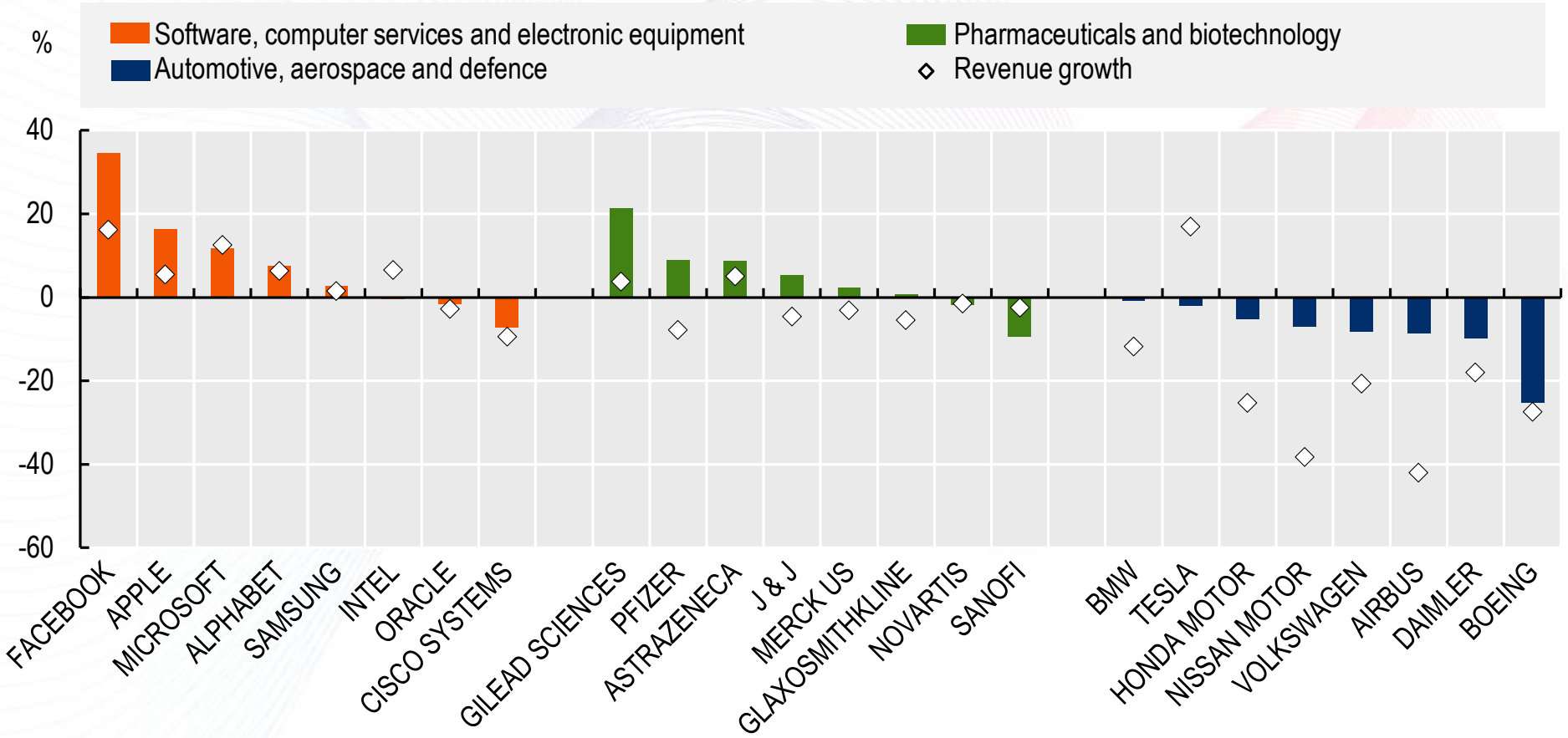
The biopharmaceutical industry has launched hundreds of clinical trials targeting COVID-19 drugs and vaccines

Source: United States National Institutes of Health, ClinicalTrials.gov, (accessed 8 December, 2020).

Business innovation response to COVID-19

R&D expense and revenue growth in selected companies

Percentage change between April-September 2019 and April-September 2020



Heterogeneous impact with R&D performance in the digital sector thriving and activity in R&D-intensive manufacturing sectors falling (e.g. automotive, electronics)

Source: OECD calculations based on published quarterly business financial reports, December 2020.

Are we facing a turning point for STI policy?

Digital technologies have mitigated effects of lockdowns

STI has proven an essential element of the resiliency countries have shown in the crisis up until now

There is unprecedented rapid development of vaccines

Could STI do even more to enhance societal and economic resilience?

However, there are long-standing problems in STI systems that hinder their abilities to address challenges like COVID-19 and climate change

There are other challenges, too, notably the climate emergency, that require STI to embrace a sustainability agenda

Does COVID-19 offer a disruptive moment for these problems to be addressed more aggressively by STI policy?

Looking forwards, to tackle the challenges of sustainability, inclusivity and resiliency, governments will need to reorient their STI policies

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The need to reorient STI policies

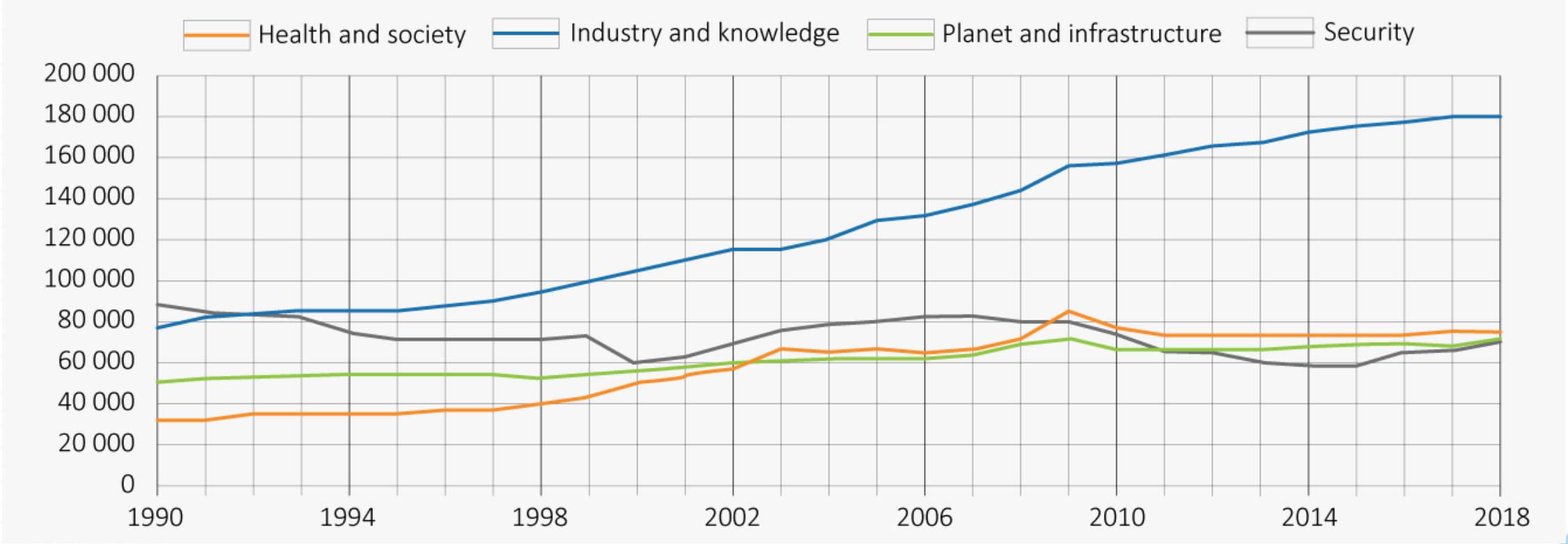
The pandemic is an opportunity to reorient STI policies and trajectories

The need to redirect govt support to societal challenges?

Much of the growth in govt spending on R&D over the last two decades has been directed towards industrial R&D (through tax incentives) and research in universities

Estimates of total government support for R&D by SDG-related cluster categories, 1990-2018

Million constant USD PPP prices



Source: OECD (2020). "OECD Main Science and Technology Indicators. R&D Highlights in the February 2020 Publication", Directorate for Science, Technology and Innovation. www.oecd.org/sti/msti2020.pdf.

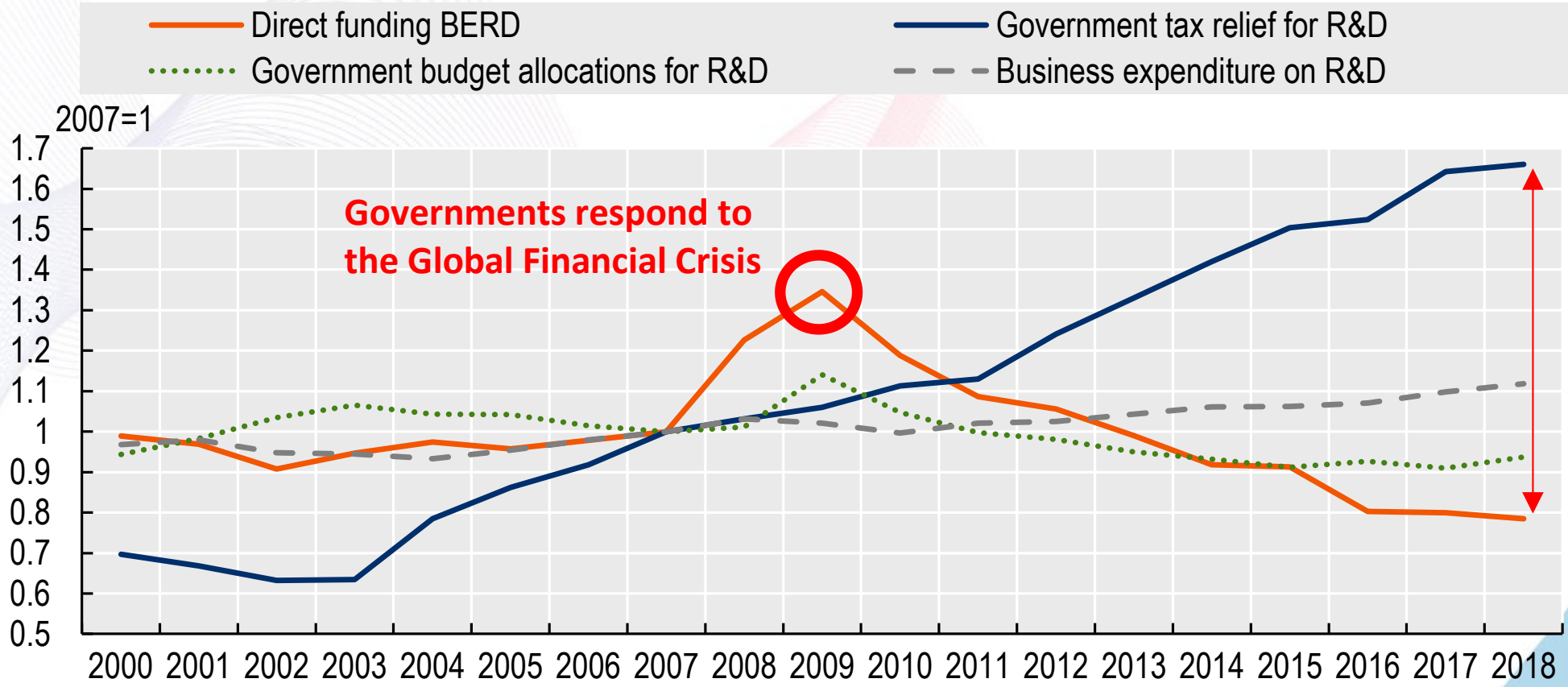
Moving towards a more targeted policy mix

Tax incentives have grown in the OECD while direct measures have declined

A new ambitious policy agenda is crucial for ensuring directionality

Govt spending on R&D will also need to be defended

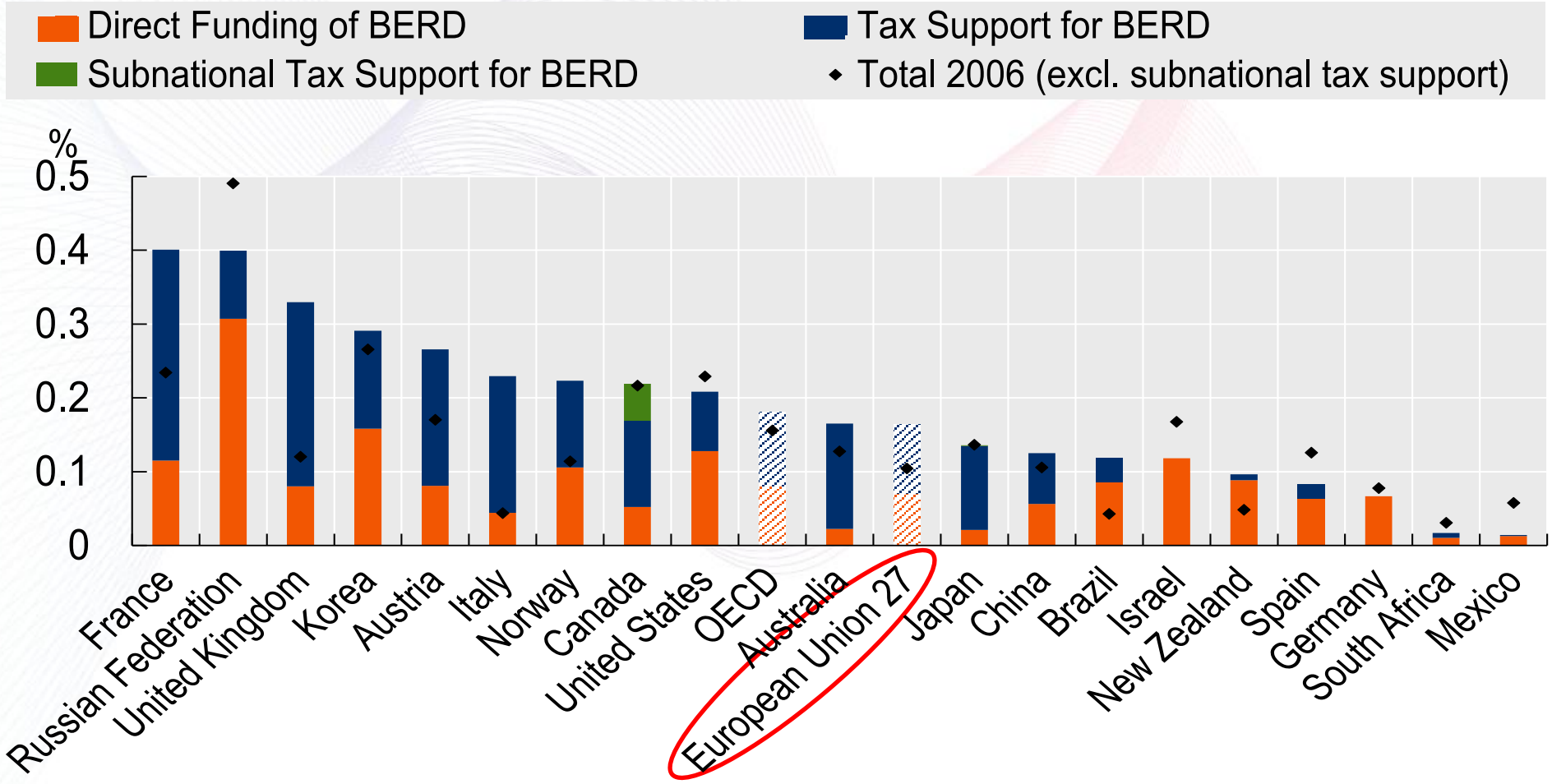
Shift in business R&D support policy mix OECD area, 2000-19



Source: *OECD R&D Tax Incentives Database*, August 2020, http://oe.cd/rdtax

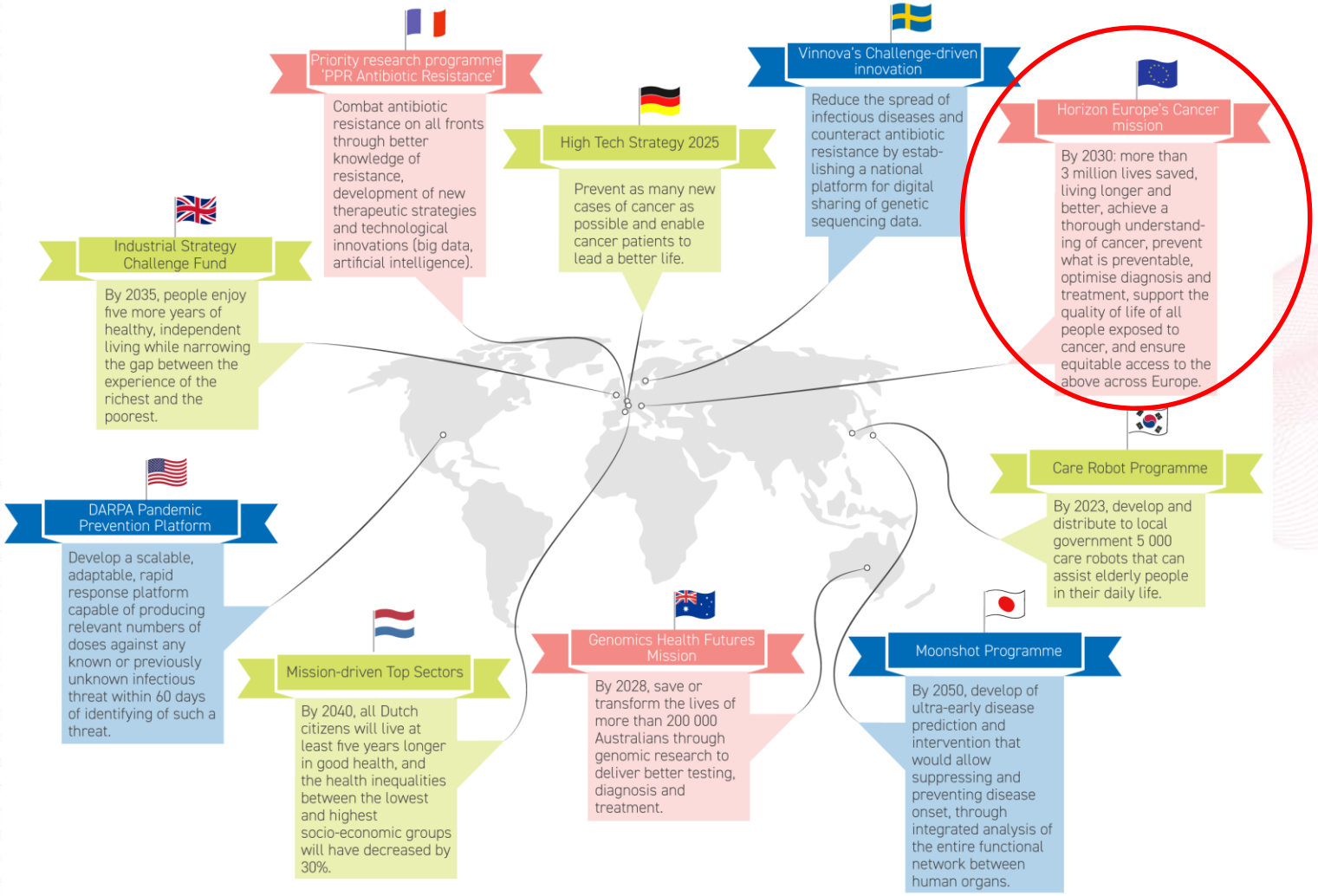
The use of tax incentives varies greatly across the EU27

Direct government funding and government tax support for business R&D (BERD) 2018 and 2006



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

We need systemic policies to solve systemic problems

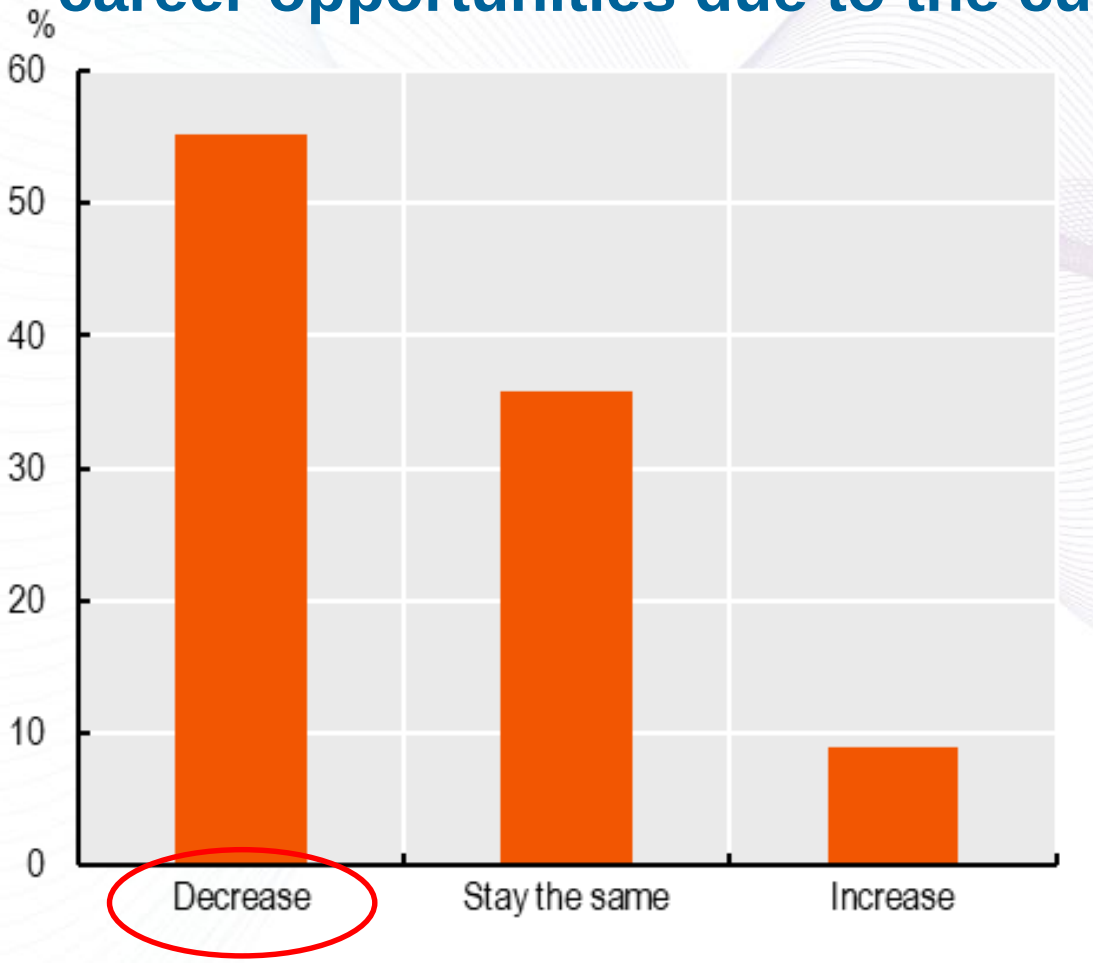


- There has been a recent surge of mission-oriented innovation policies, with different missions and designs
- One common principle: better targeted and coordinated interventions across all silos, for enhanced impact
- The EC's Horizon Europe has ambitious mission-oriented innovation policies, e.g. targeting cancer

Source: Online Mission-oriented innovation policy (MOIP) toolkit, https://stip.oecd.org/stip/moip

Reforming research careers to support diverse pathways

% of scientists who experienced or expect change in their job security and career opportunities due to the current pandemic crisis

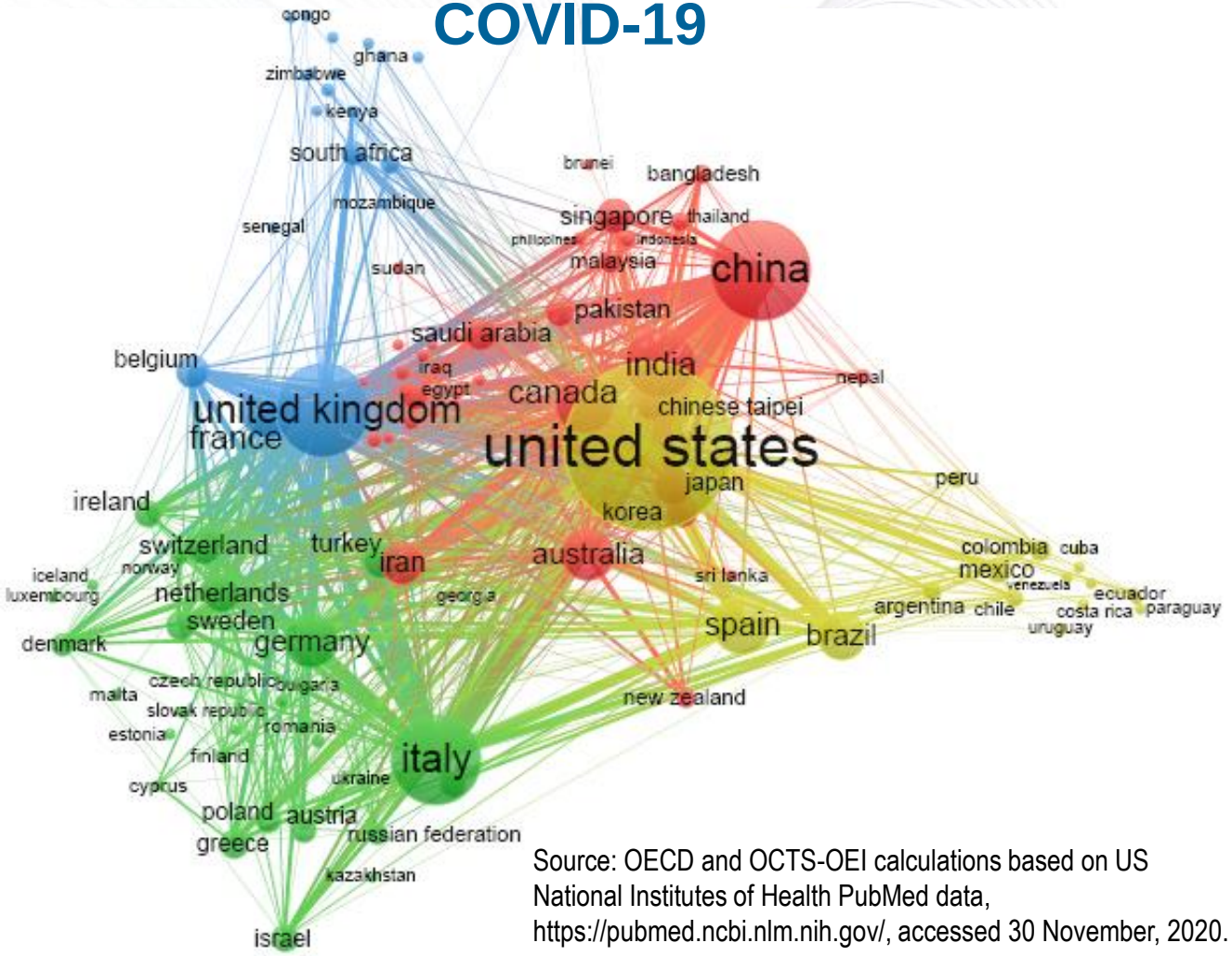


Reforming PhD and post-doctoral training to support a diversity of career paths is essential for improving the ability of societies to react to crises like COVID-19, and to deal with longer-term challenges like climate change that require science-based responses

OECD Science Flash Survey 2020, https://oecdsciencesurveys.github.io/2020flashsciencecovid/, accessed on 12 October 2020

International science collaboration has been critical

International scientific collaboration on COVID-19



Source: OECD and OCTS-OEI calculations based on US National Institutes of Health PubMed data, https://pubmed.ncbi.nlm.nih.gov/, accessed 30 November, 2020.

Science depends on the global knowledge commons for progress

A lot of international scientific co-operation on COVID-19 has been initiated by researchers themselves, and has built on existing ties

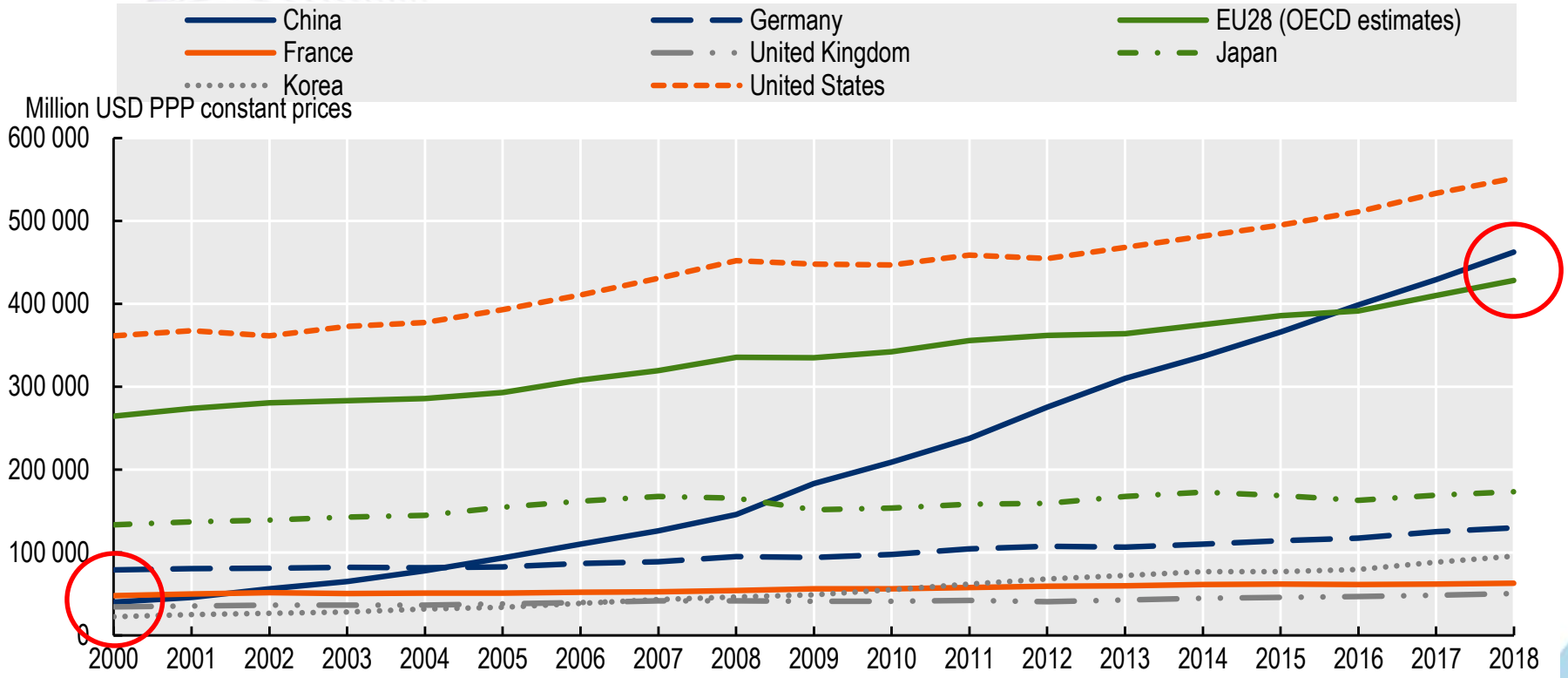
Research links between China and OECD countries have grown strongly in recent years, and this is reflected in patterns of COVID-19 co-publication

The ascendency of China

The prominence of China in these links is hardly surprising

China has become the world's second-largest R&D performer – 80% of the expenditure of the United States in 2018

Gross Domestic Expenditure on R&D (GERD), 2000-18



But there are concerns about a lack of reciprocity in these relationships that threaten their future

Source: OECD MSTI 2020/1, Aug. 2020

Acting globally to solve global problems is critical

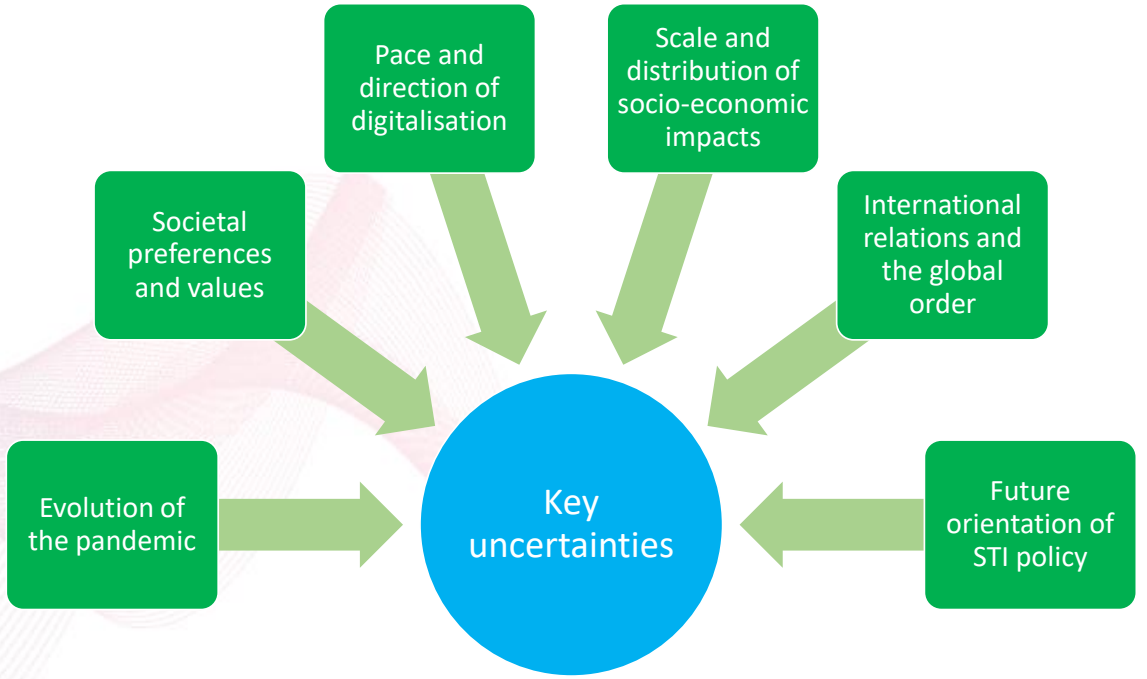
The ACT-Accelerator is driving unprecedented collaboration

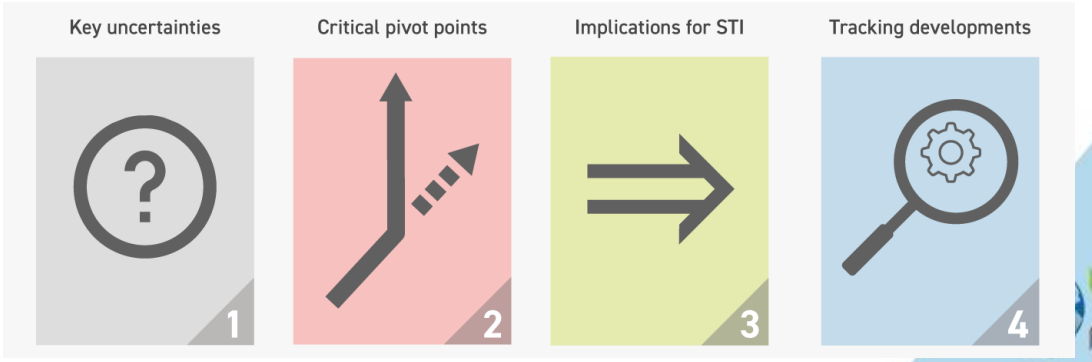
- Just as the pandemic is a global problem, it requires global solutions involving international STI co-operation and collaboration
- The impressive speed on vaccines has built on nascent global co-operation to develop new technology platforms to tackle emerging disease . . . and years of basic research funding
- There are surely lessons for tackling other global challenges

Source: WHO (2020), ACT-Accelerator: Status Report & Plan, September 2020 – December 2021

Building dynamic capabilities in government to meet the challenges ahead

- Many key uncertainties remain over the next few months and years
- Governments will also need to prepare more effectively against future shocks
- An increased policy emphasis on building resiliency => requires increased policy agility => and means governments need to possess the dynamic capabilities to adapt and learn in the face of rapidly changing conditions





OECD STI Outlook – take-away messages for the EU

The policy mix for business support – has Europe gone too far on R&D tax credits?

Missions: still lots to learn on how to do this – how can they maximise impact, citizen's engagement and EU-MS joint efforts?

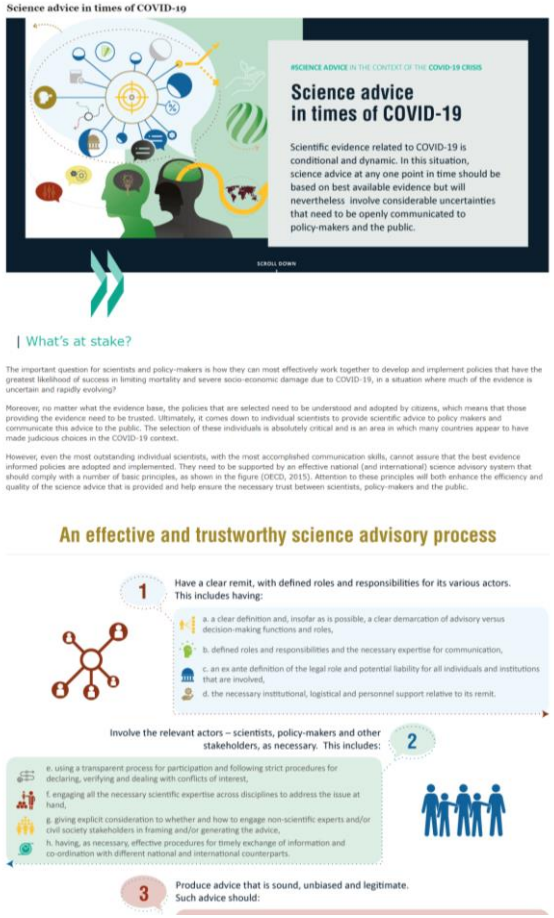
Scaling of start-ups – still a big problem for Europe in turning strong science into commercial success (role of European Innovation Council?)

Fundamental science – important, but a good mix is needed – does Europe have this right?

Reform of STI systems – essential to make the most of the massive European investments, e.g. through Next Generation EU

Transformative R&I policy – how will Europe equip itself to (re-)tune its STI policies to the changing times?

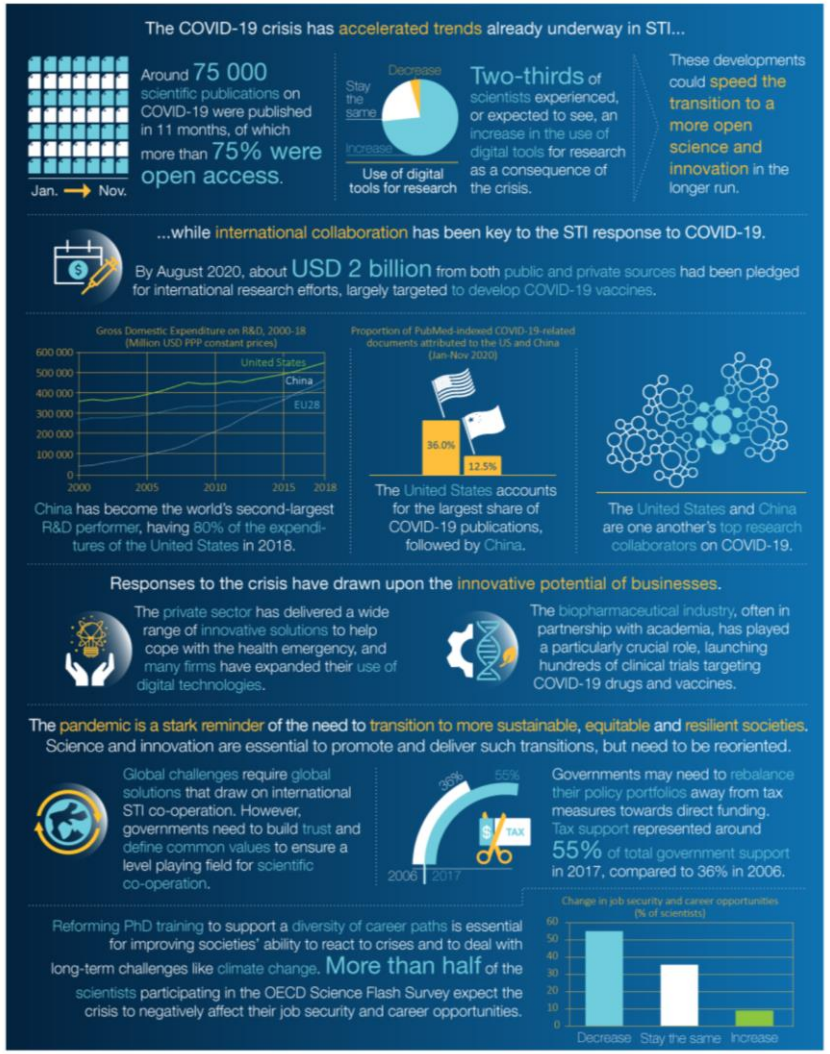
Learn more in the ‘dual format’ OECD STI Outlook



Book

Website online: oe.cd/sti-outlook

Also multi-lingual summaries, presentation, blog . . .



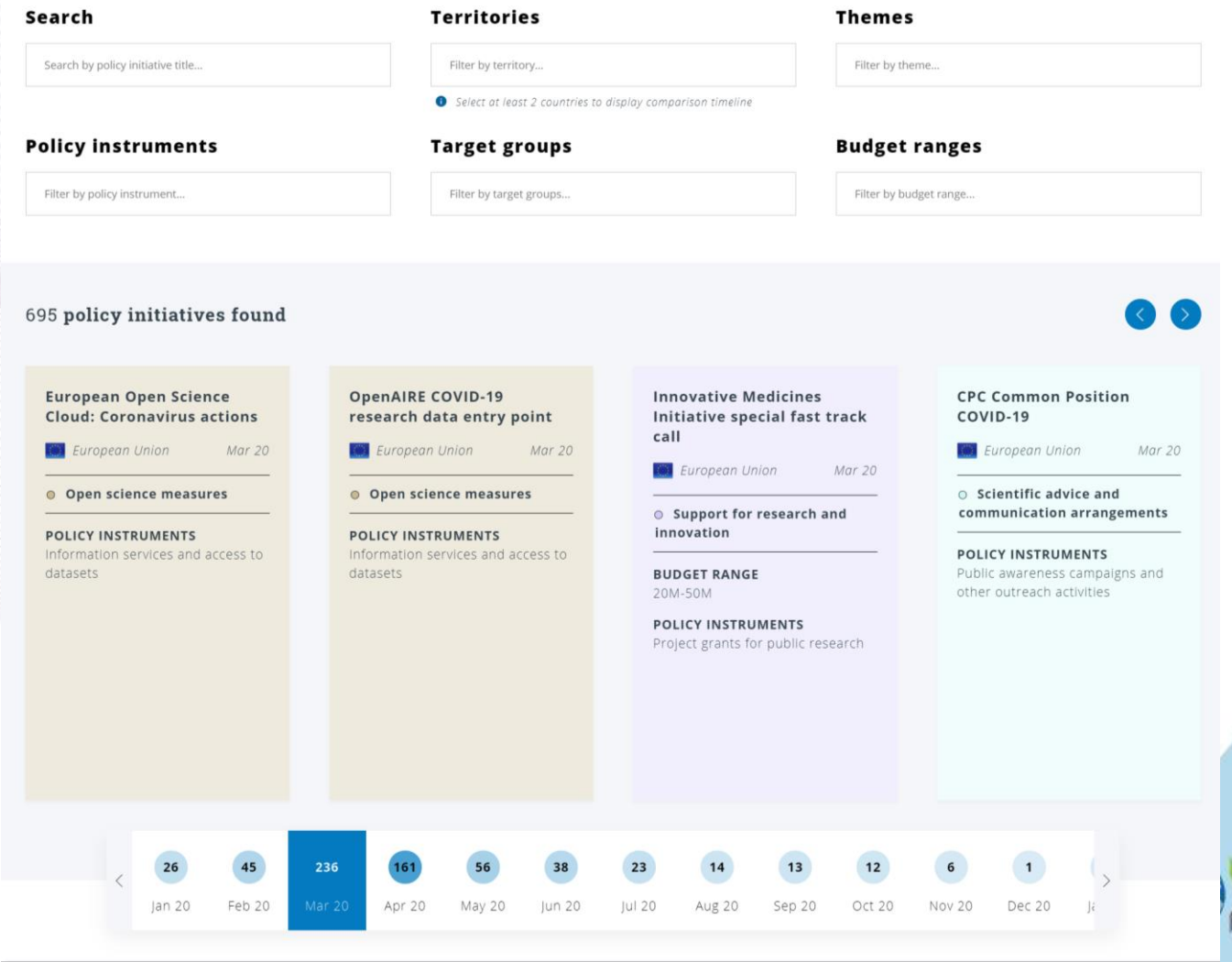
https://www.oecd.org/sti/oecd-science-technology-and-innovation-outlook-25186167.htm

STIP COVID-19 Watch: Stay informed on countries' STI policies to tackle COVID-19

https://stip.oecd.org/covid/

- Get the latest information on STI policy responses to the crisis across **+40 countries** and the EU, with timelines and other interactive charts

- Featuring information on **700 STI policy initiatives** targeting scientific advice and communication, collaboration mechanisms, new funding initiatives, impacts on the STI system, etc.



THANK YOU!

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