



PRECARITY AND THE RESEARCH WORKFORCE OF THE FUTURE

Carthage Smith, OECD Global Science Forum

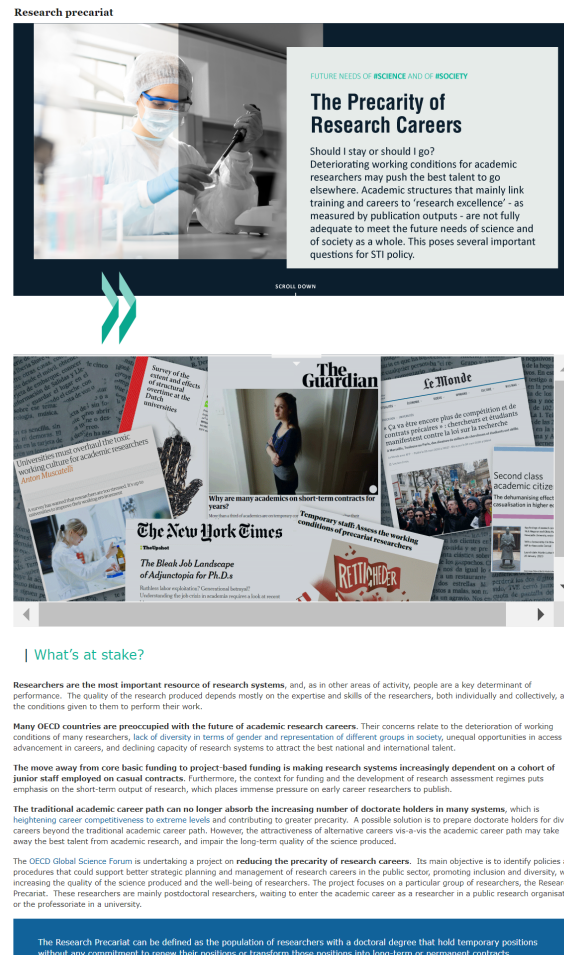
NBER Conference on *Investments in Early Career Scientists:
Data and Research Gaps?* 5 Nov, 2021



OECD inputs for policy making on research careers



Chapter 3: Challenges and new demands on the academic research workforce



Website online:
oe.cd/sti-outlook



STI policy papers
www.oecd-ilibrary.org





Project methodology

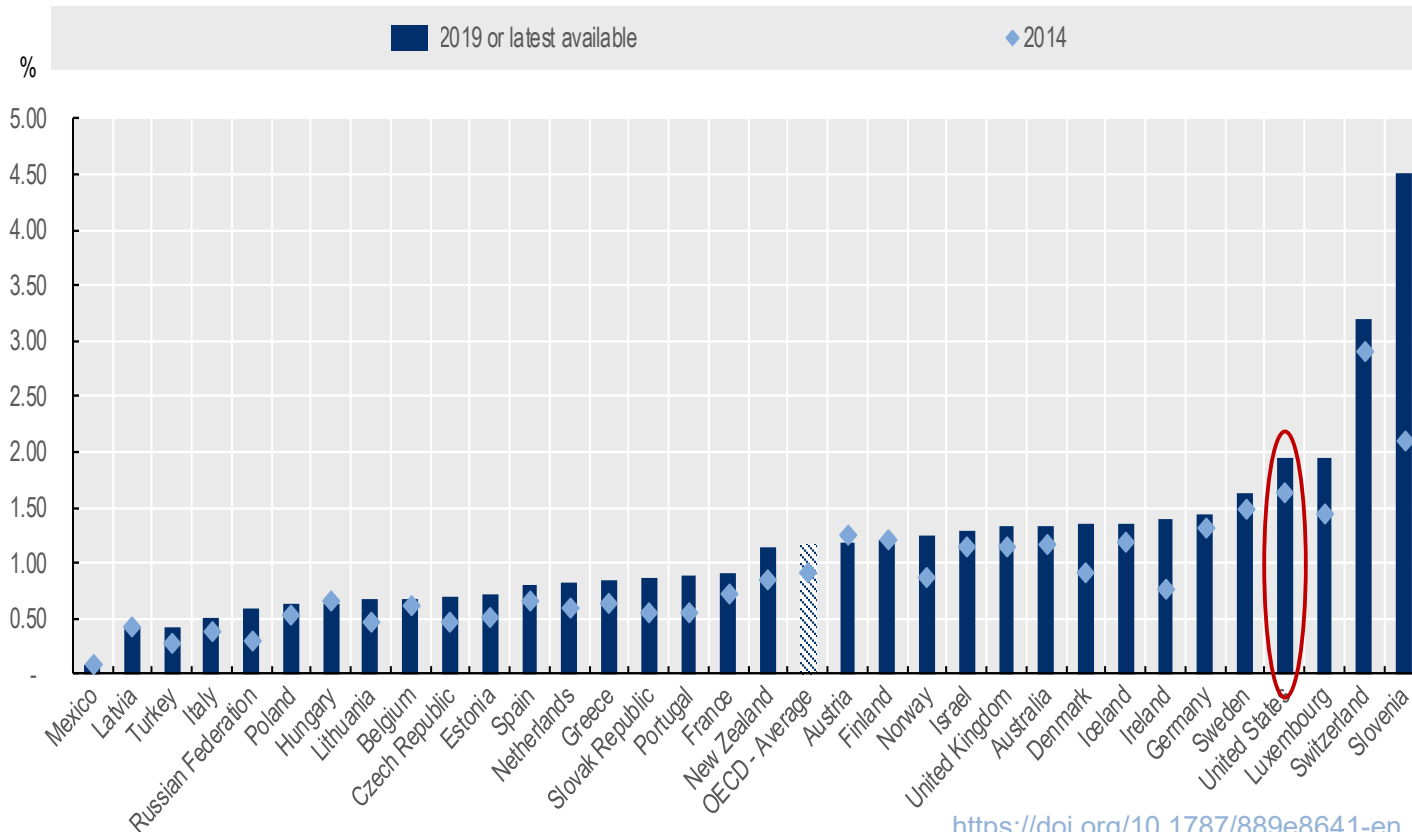
- Identified and analysed existing data on doctoral and postdoctoral careers
- Desk-top analysis of the literature and development of a conceptual framework
- Detailed *de novo* country notes from 15 OECD countries
- Panel interviews with different stakeholders (circa 100 persons in 12 countries)
- 2 international workshops



Supply and demand

Share of doctorate level attainment in the population

25-64 years, 2014 and 2019 or latest year available



<https://doi.org/10.1787/889e8641-en>

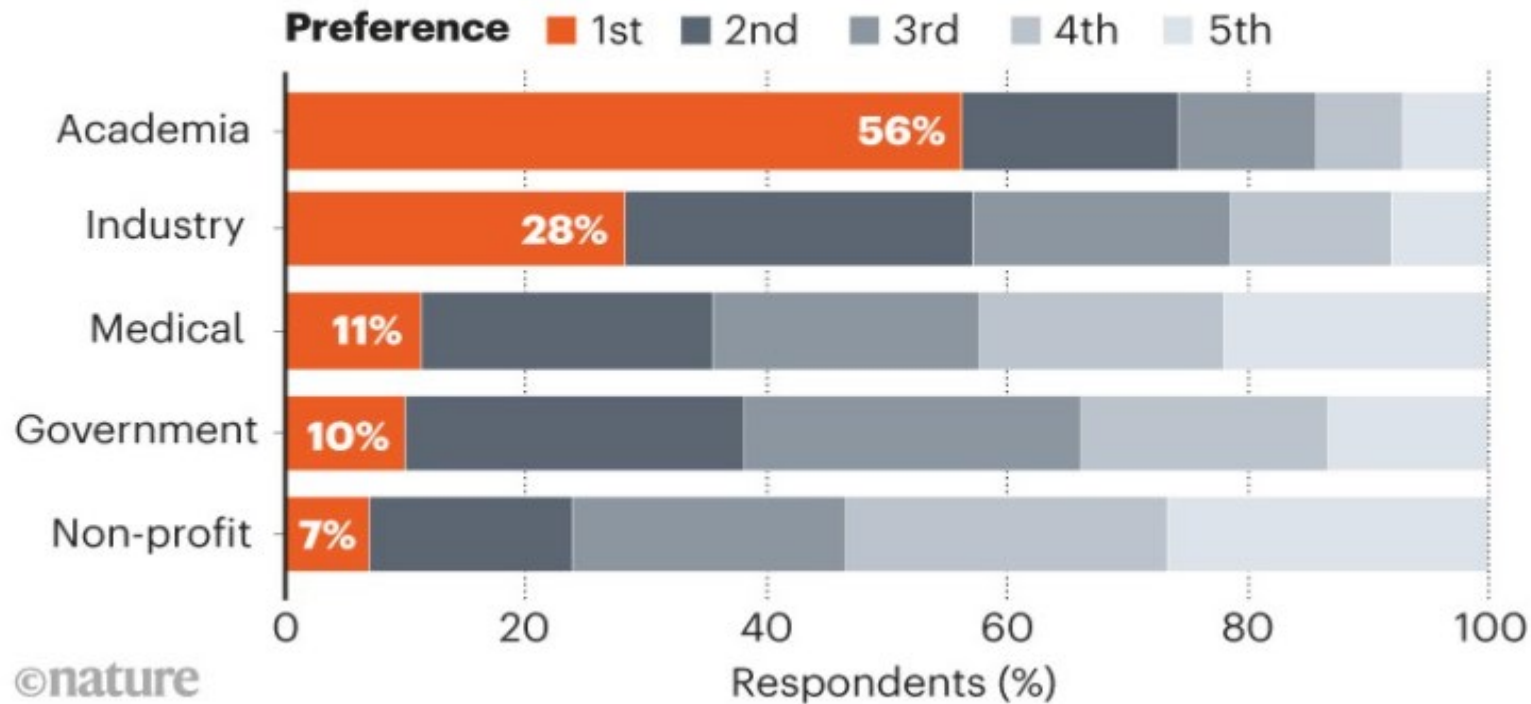
- The OECD average share of 25-64 year-olds with a doctorate is around 1%, and this share has been increasing.
- The share of doctorate holders in the population (25-64 year olds) of OECD countries **has increased by 25%** during the 5-year period 2014-2019.



Great expectations?

What doctoral candidates want to do when they have their PhD

Q: Which of the following sectors would you most like to work in (beyond a postdoc) when you complete your degree?



PhD candidates want to work in academia – a worldwide pattern

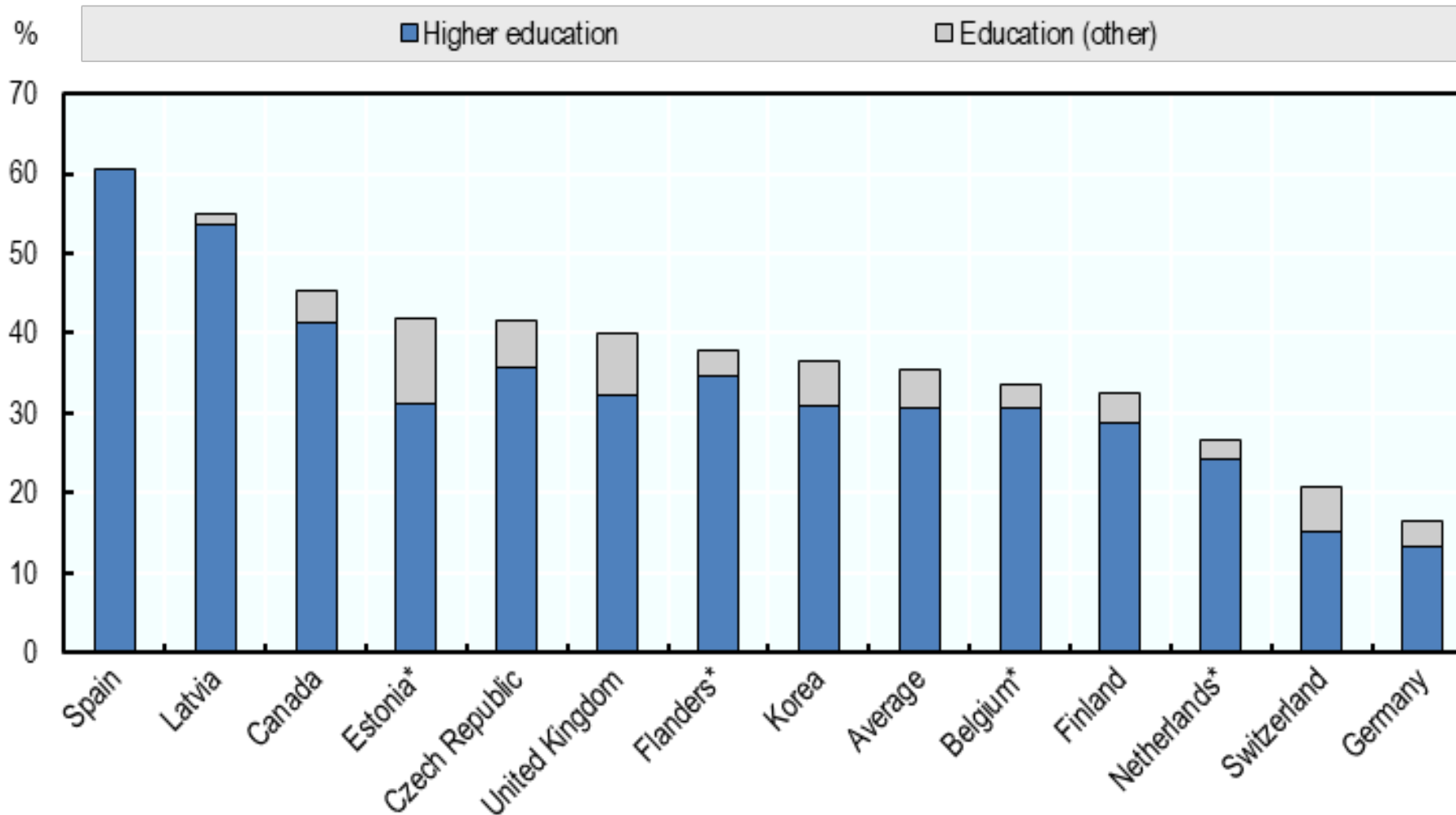
Source: *Nature* PhD Survey 2019

Source: 2019 *Nature* Survey of PhD Students <https://www.nature.com/articles/d41586-019-03459-7>



Where do PhDs actually lead?

Doctoral training is a stepping stone to multiple roles



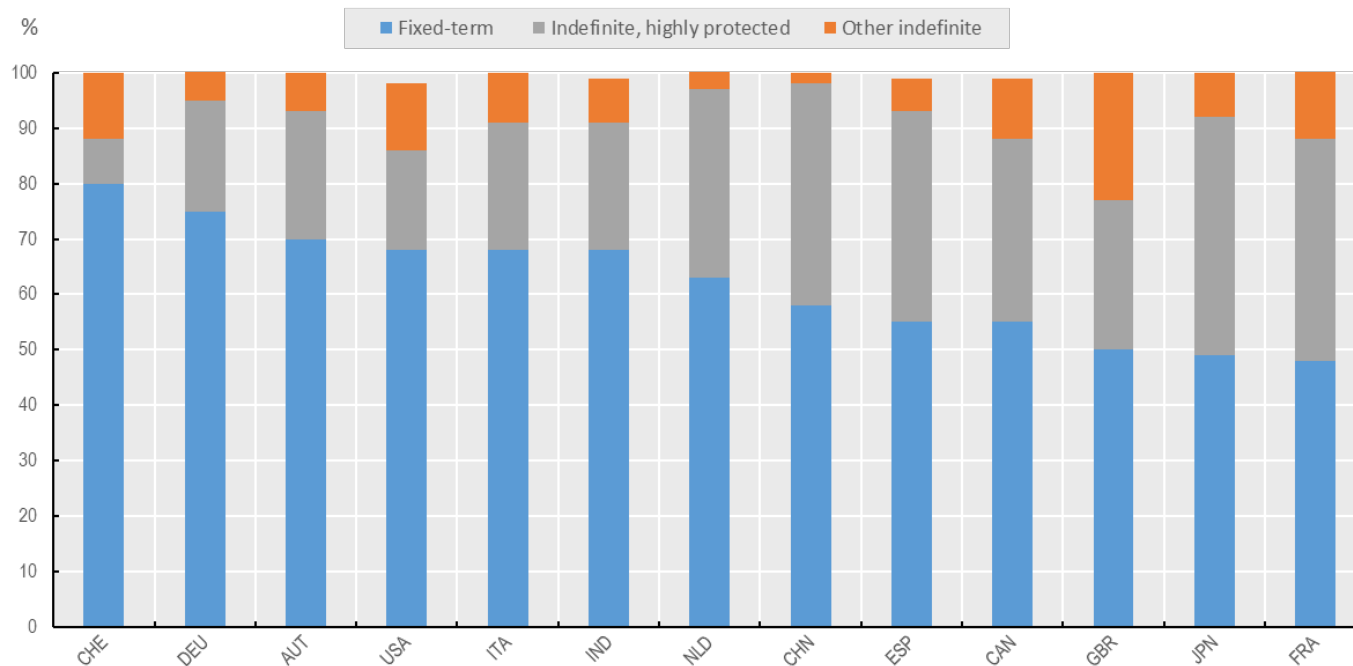
A minority of
doctorate holders
are employed in
higher education
in most OECD
countries



Supply and demand

Job security of corresponding authors, by country of residence

Percentage of corresponding authors under 45, 2018, selected economies



<http://oe.cd/issa>

- **The traditional academic career cannot absorb the increasing number of doctorate holders wishing to stay in academia**
- Around one third of the OECD labour force are in temporary or part-time jobs or are self-employed, but **the scale of precarity is much higher in the academic research sector**, especially among early-career researchers.



The effects of precarity

- Affects the well-being and mental health of researchers
- Decreases the attractiveness of research as a career choice
- Negates efforts to promote diversity and gender equality
- Ultimately affects research choices (safe vs risky) and the quality of science



Different perspectives: Funders; employers, researchers, policy-makers

Permadox is a way for universities to get low cost labour

There is no shortage of contracts but they are precarious

Those transitioning to industry cannot go back to academia due to assessment criteria

Students feel that the situation is risky and so fewer are doing PhDs

Lack of control and sense of urgency leads to mental health problems

Need to change the mindset of PIs

Female postdocs have difficulties to continue after having children

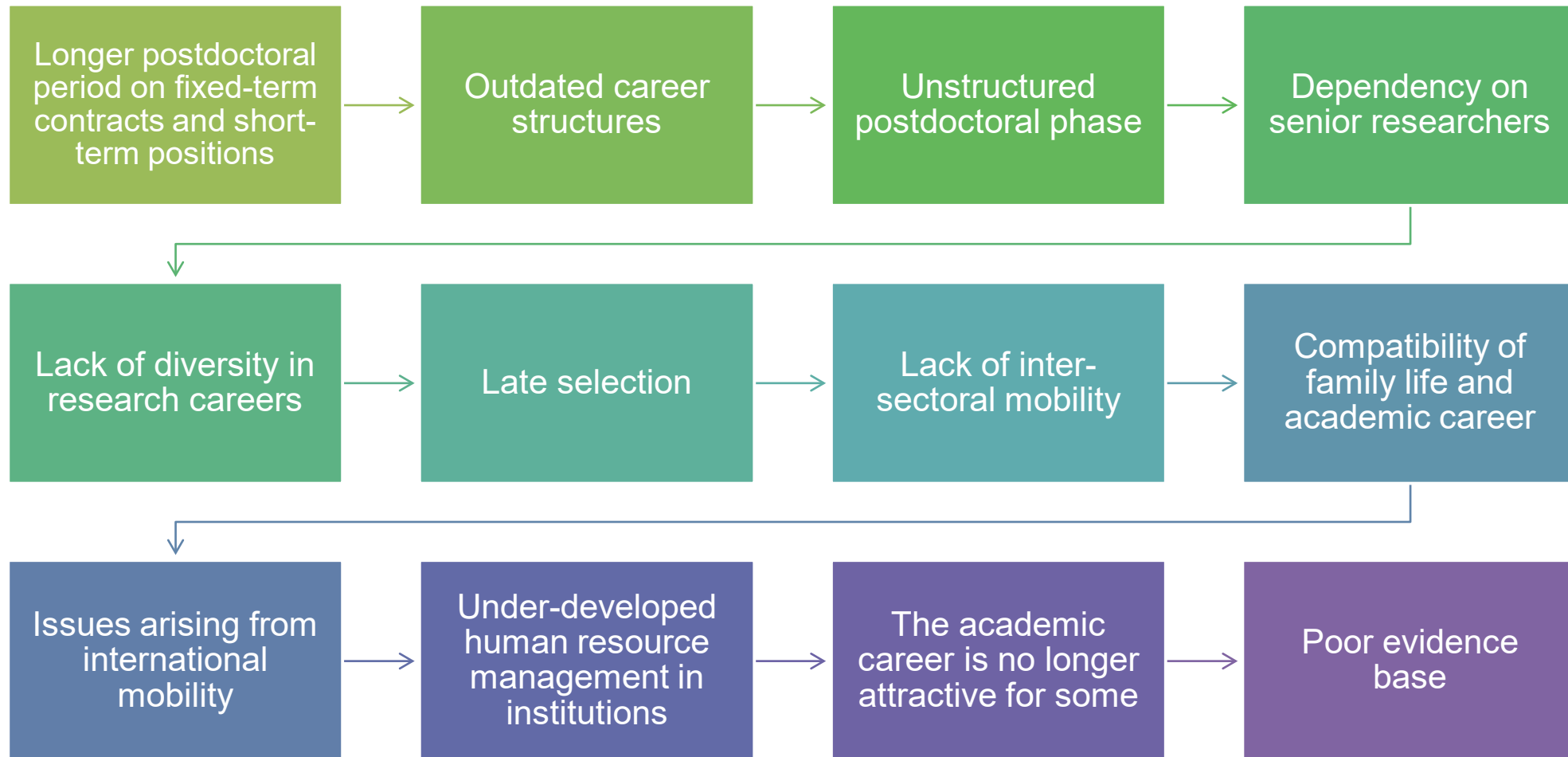
Need to move from funding people to initiate structural change

There is no problem of unemployment of PhDs but one of career development

International staff are in worse conditions than national staff



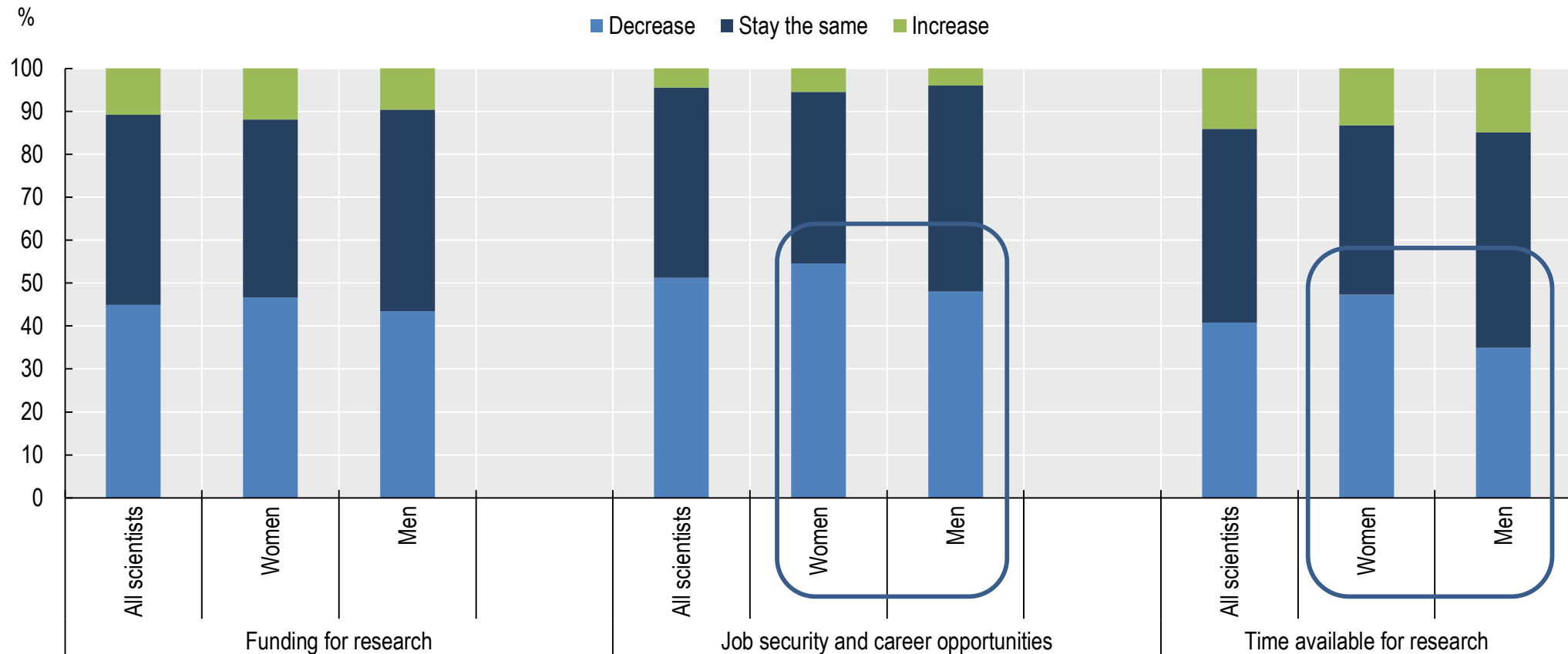
Challenges and causes





The COVID-19 pandemic is making things worse, particularly for women

Perceived impact of the crisis on scientific work - Percentage of responses by respondent profile





9 overarching policy recommendations

1. Improve working conditions and offer more transparent, predictable and flexible career prospects for postdoctoral researchers
2. Offer broad professional development during postdoctoral training
3. Promote equal opportunities, diversity and inclusion in research careers by identifying and addressing existing biases and challenges (re. *OECD STI Outlook, 2018*)
4. **Establish better links between research assessment and funding, and human resource management policy objectives**



Policy recommendations

5. Improve institutional practices regarding human resource management in research
6. **Promote inter-sectoral mobility of researchers**
7. Support the international mobility of researchers
8. **Develop the evidence base on research careers**
9. Include all relevant stakeholders in the governance and coordination of research and ensure concerted, systemic action



Policy Options with regard to funding (rec 4)

- Adopt **evaluation criteria** that go beyond bibliometrics
- **Attach conditions to awards** that promote good HR management :
 - Require adherence to sector-wide agreements (e.g. Concordat, European charter)
 - Include evaluation criteria related to the quality of the research environment (e.g. REF in UK)
 - Provision of professional development to postdoctoral researchers
 - Level of independence of postdoctoral researcher relative to PIs
 - Equity, diversity and inclusion strategies and practices
- Examine and monitor the **balance between core basic funding and project funding** and impact on precarity
- Take into account **supply and demand** for doctorate holders in different fields of R&D, when ‘feeding the doctorate pipeline’



Policy options for Inter-sectoral mobility (rec. 6)

- Offer **broad training** beyond academic skills during doctoral education
- Offer **work-based learning opportunities** during doctoral education, including for fields that are not market-facing (e.g. AHSS)
- **Remove barriers to mobility** between sectors (e.g. enable portability of pension rights)
- **Recognise professional experience and skills** acquired in other sectors in recruitment and promotion processes
- **Counter perceptions of failure** associated with transition out of academic research by publishing evidence on labour market outcomes of doctoral holders in different sectors and their career satisfaction
- **Monitor** distribution of doctorate holders in different sectors through registry data and use this data to inform policy and evaluate policy impact.



Policy options: developing the evidence base (rec 8)

- **Collect, analyse and publish registry data on all researchers**, including those on fixed-term contracts and other forms of non-standard employment via offices for national statistics.
- Follow the **guidelines of the Frascati Manual** to make statistics comparable across countries (OECD, 2015[1]).
- **Track the career trajectories of doctorate holders** through regular surveys (e.g. use the Career of Doctorate Holders (CDH) survey already developed by the OECD).
- Implement **regular surveys on the experience of postdoctoral researchers** (e.g. use the module on early-career researchers of CDH (Auriol, Schaaper and Felix, 2012[2]), which will allow for international comparisons).
- **Evaluate the effectiveness of policy implementation** regularly using the developed evidence base (e.g. implement 5-year cyclical reviews with recommendations for the next cycle).



2. Digital Skills



Enhancing access to research data during crises
Lessons learned from the COVID-19 pandemic

OECD Global Science Forum (GSF)

Virtual workshop hosted by the Research Data Alliance (RDA)
23 April 2021, via Zoom, 12:30-16:00 CET (Paris time)
[Http://oe.cd/RDAworkshop](http://oe.cd/RDAworkshop)

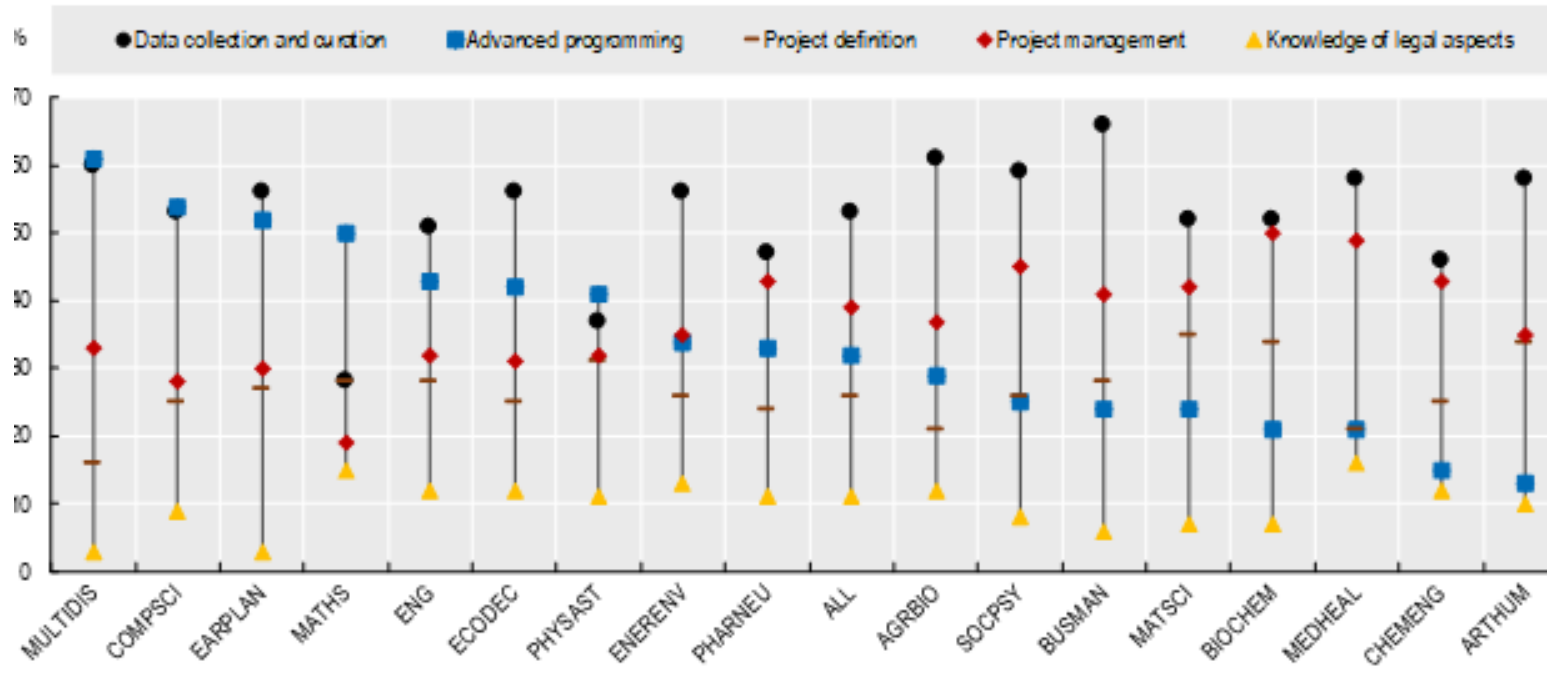
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Digital skills: Different needs in domains

Figure 5.3. Most important skills for scientific authors' research work

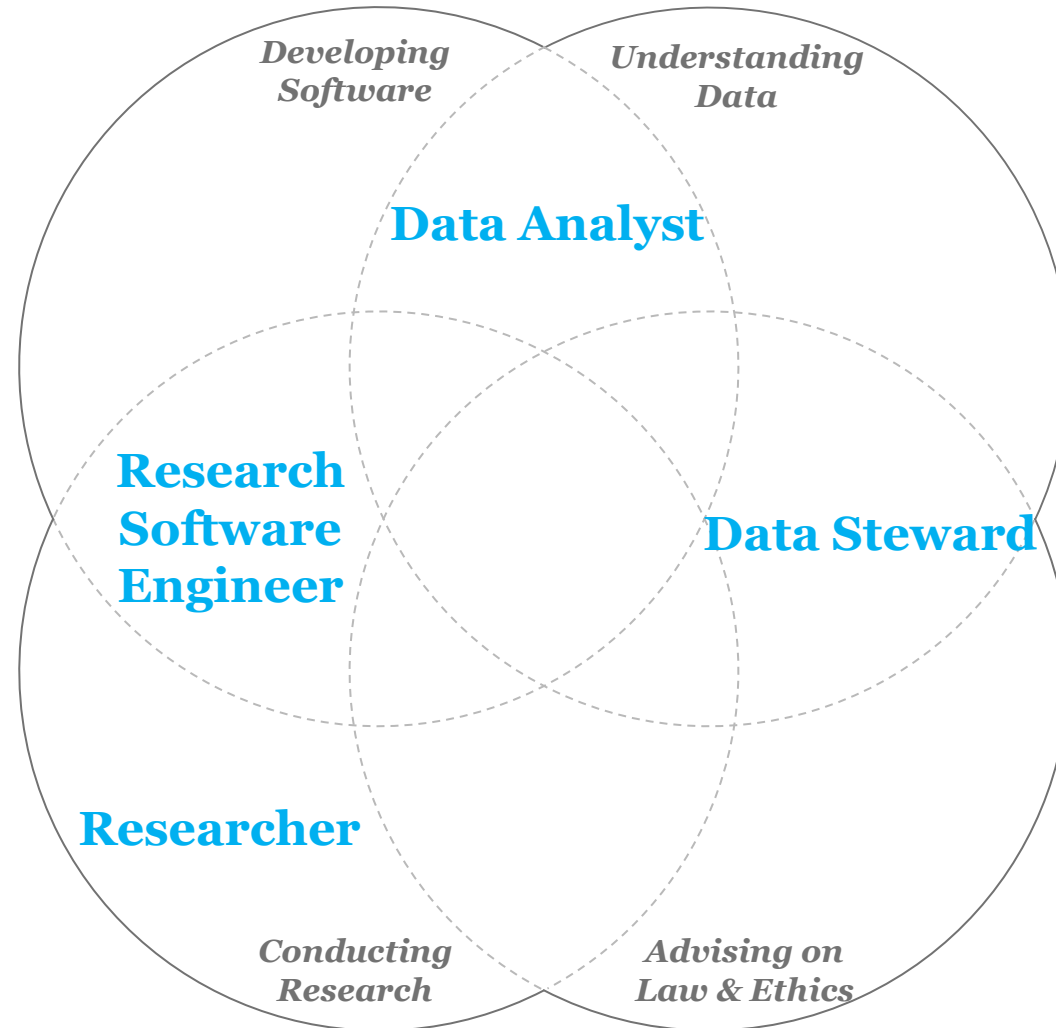
Percentage of authors who deem each type of skill as important



Source: OECD, 2020. *Charting the Digital Transformation of Science*



Digital skills, frameworks & roles





What is needed = 5 focus areas

Integrate digital workforce capacity development into broader science policy frameworks and actions, e.g. for open science and research integrity.

Enablers for digital workforce capacity development

Identify the key competencies, skills and roles required for data-intensive science in different contexts.

Defining needs: digital skills, frameworks and roles

Career paths and reward structures

Implement changes in academic evaluation and reward systems in order to attract and retain diverse digitally skilled staff.

Provision of training

Support training in foundational digital skills and more specialized skills for scientists and research support professionals.

Community development

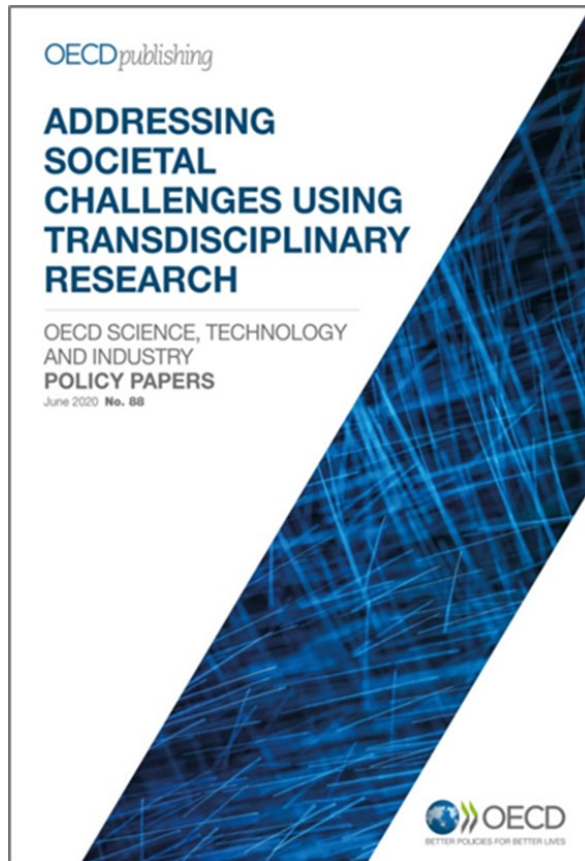
Support development of communities for new professional roles, learners and trainers.



3. Transdisciplinary research for societal needs

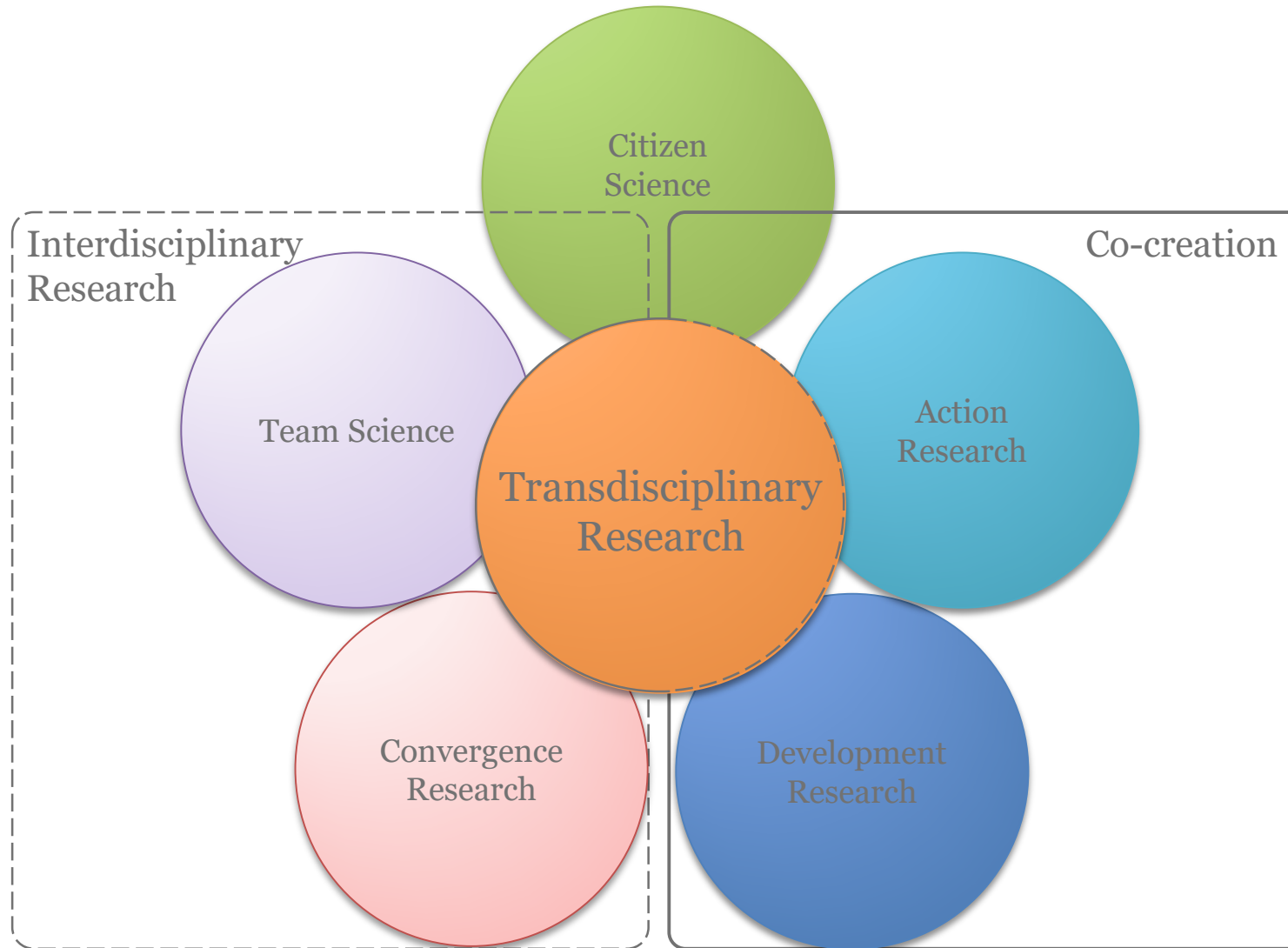
Key features of transdisciplinary research:

1. Collaboration between **natural and social sciences/humanities**
2. Engagement of **non-academic stakeholders**, such as public officials, citizens and commercial or not-for-profit organisations





Transdisciplinary research and related concepts





Recommendations on TDR training and careers

Research Funders

- Emphasise the **evaluation of societal as well as scientific outputs** and impacts.
- Support capacity building and the participation of non-academic stakeholders.

Universities

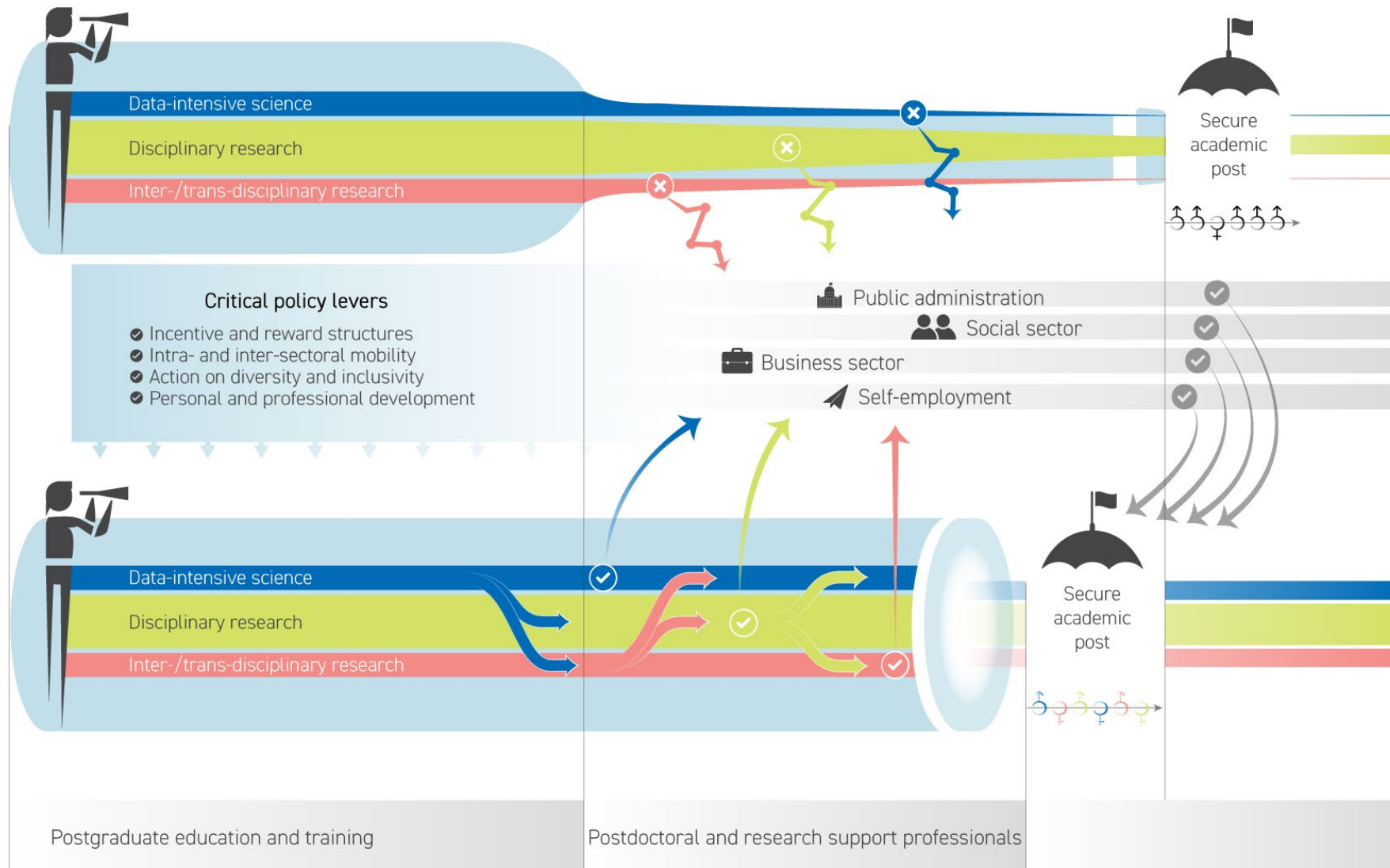
- Introduce TDR learning modules into science education and postgraduate training courses.
- Support early career researchers who engage in TDR projects.
- Change evaluation and promotion criteria for individuals so that they are **judged on their contributions to stakeholders outside of science too**.

Academic community

- Support early career researchers who wish to engage in TDR.
- Contribute to the development of new STI indicators and measures that **value multiple research outputs**.



Converging challenges – relieving the bottleneck





Need for systemic changes to the academic system

- Universities and research providers/employers are the central actors
- Policy mandates and incentives (measures and indicators) shape institutional behaviour
- Funding and funder actions are an important influence
- Need systematically collected data on all research staff and their career trajectories to inform policy. (Policy experimentation, monitoring and adaptation)
- All actors need to work together.



- *“The Government should provide a reasonable number of undergraduate scholarships and graduate fellowships in order to develop scientific talent in American youth. The plans should be designed to attract into science only that proportion of youthful talent appropriate to the needs of science in relation to the other needs of the nation for high abilities.”*

Vannevar Bush, Science, the Endless Frontier , 1945



Policy levers

Legal and regulatory regimes

- Science policy legislation
- Employment law
- Equal opportunities legislation
- Career statutes

Financial incentives

- Funding of research organisations
- Funding of individual and team projects

Informational mechanisms

- Collection, analysis and publication of information on researchers and research careers

Organisational levers

- Research councils
- Observatories
- National coordination bodies