BOOSTING EXCELLENCE AND OPENNESS IN SCIENCE

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BETTER POLICIES FOR BETTER LIVES

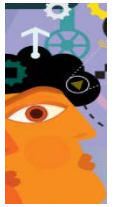
Outline

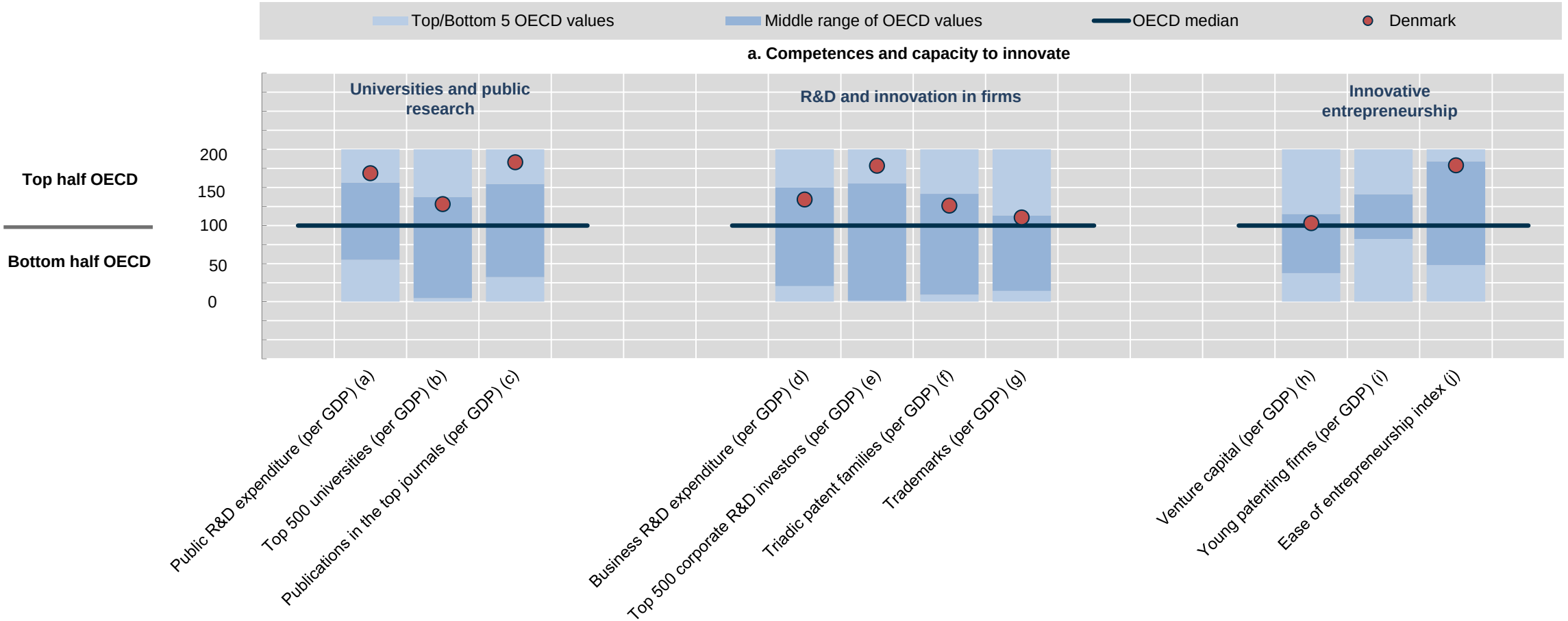
- The Innovation Performance of Denmark
- Public Research Funding
- Open Science

OECD STI Outlook 2014

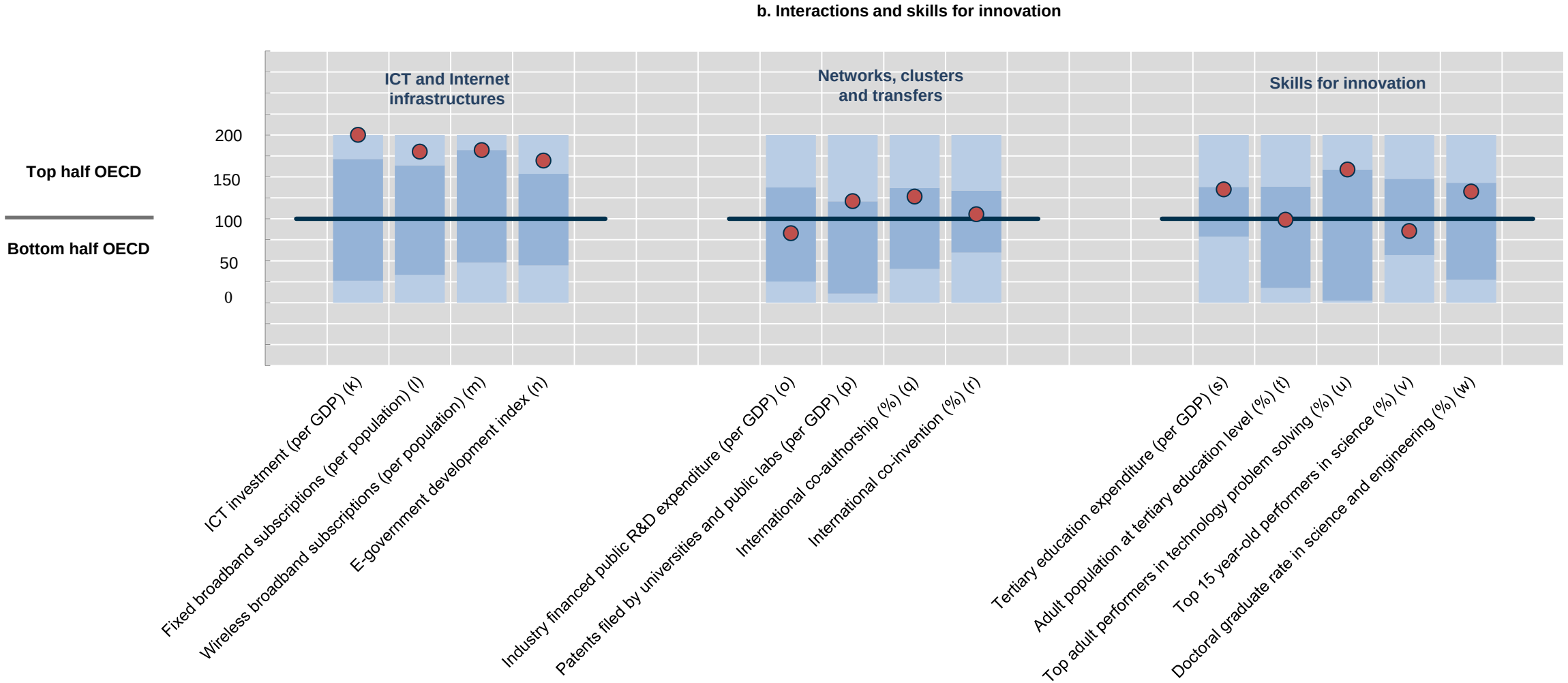
- **“What’s new in the field of science, technology and innovation policy? “**
- International review of key recent trends in STI for the STI policy community and analysts
- Based on latest STI policy information and indicators

The Innovation Performance of Denmark (1)





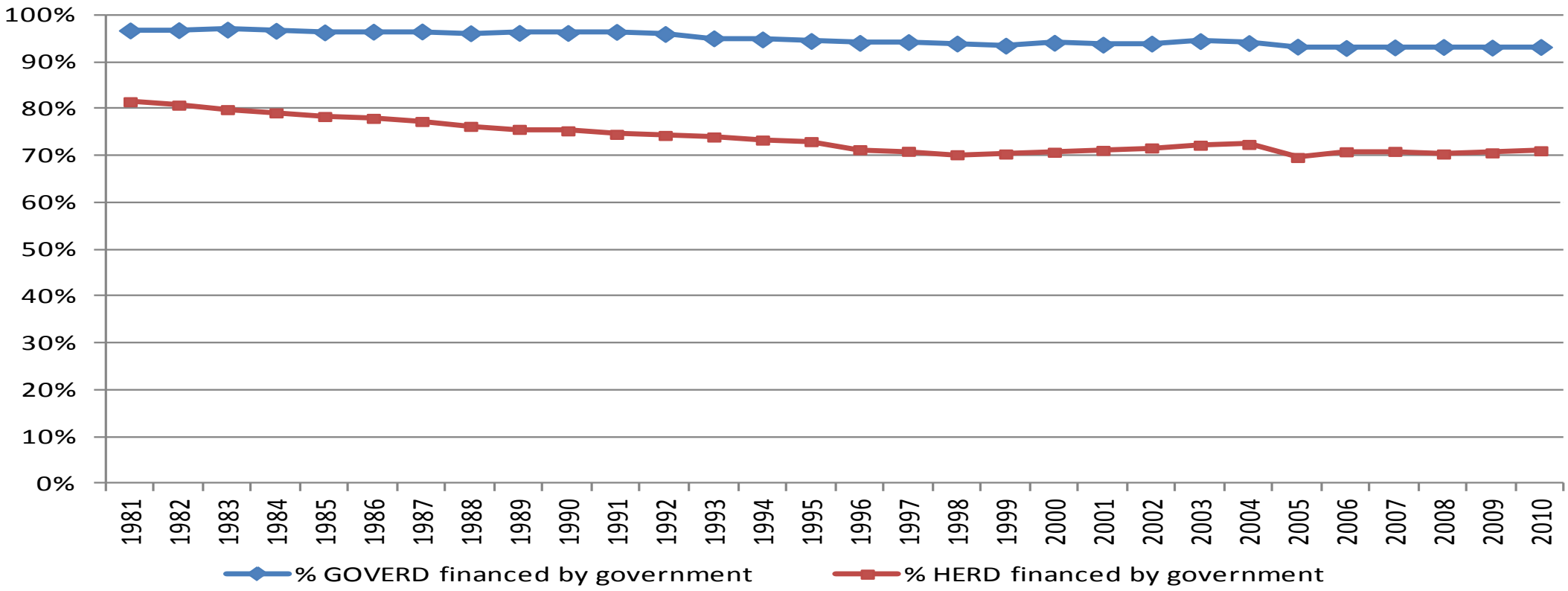
The Innovation Performance of Denmark (2)



Public research funding: Striving for Excellence

Government funds a large share of publicly performed R&D (USD 400 bn in 2012)

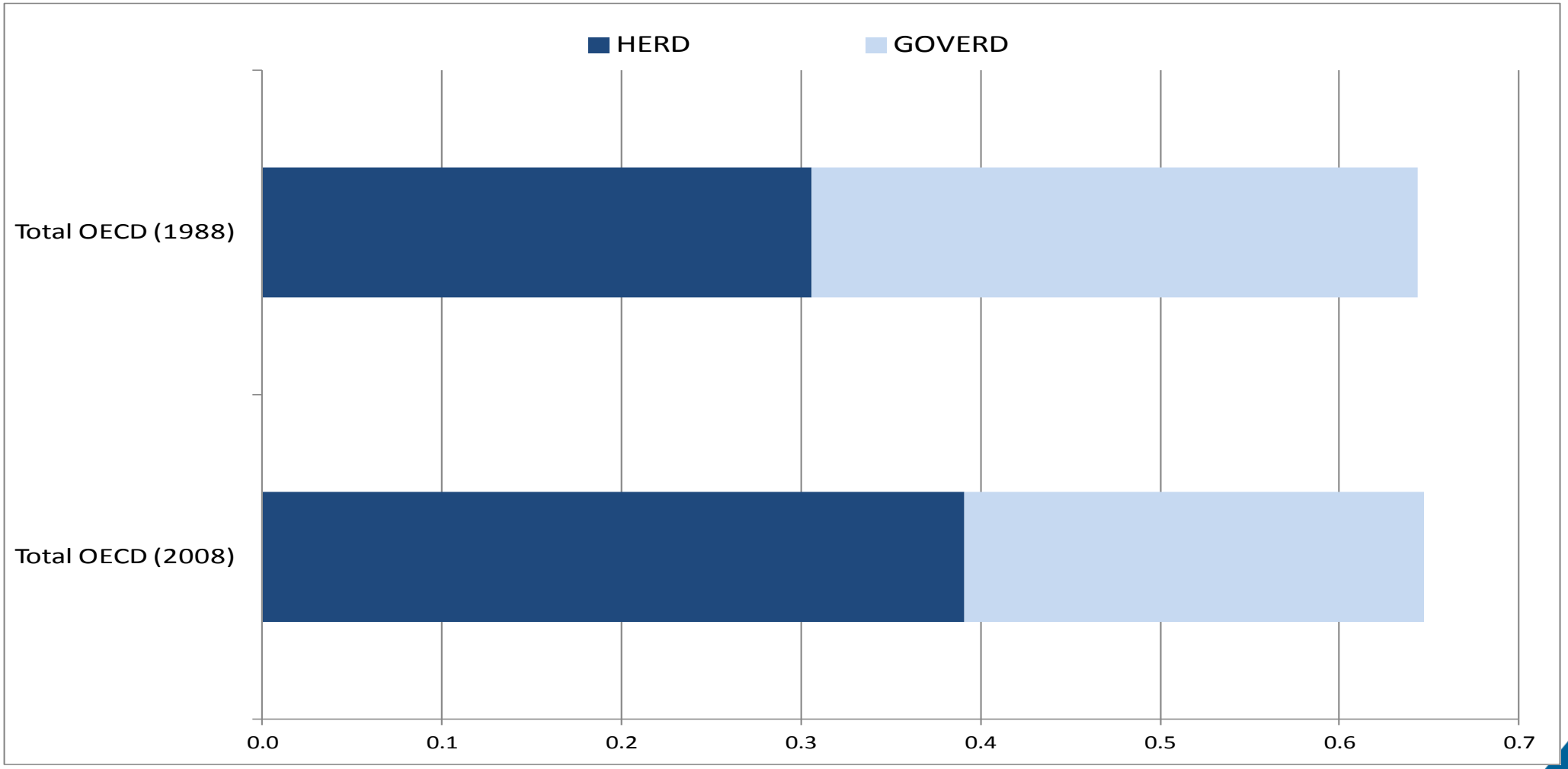
(2010: 71% of HERD and 93% of GOVERD in the OECD)



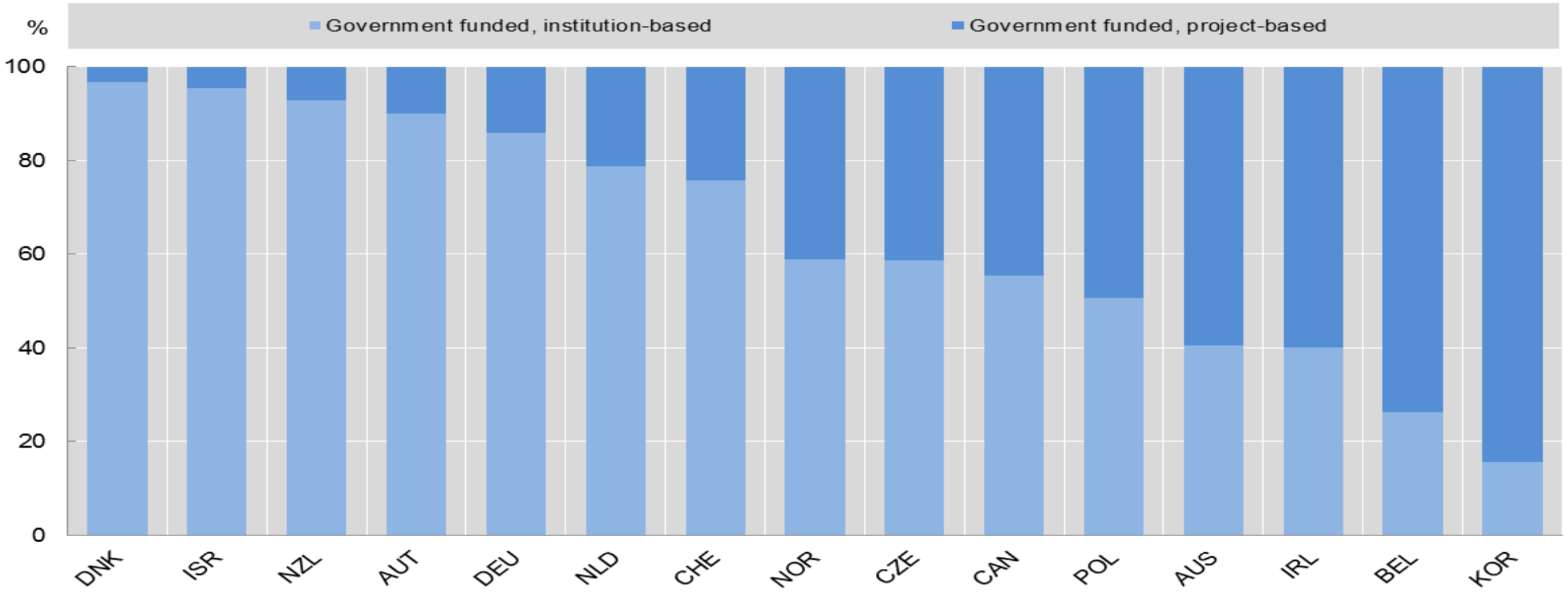
Source: OECD Research and Development Database, 2011

Switch in performers of R&D towards higher education sector

R&D performed in the government and higher education sectors as % GDP



Government funded R&D in higher education by type of funding, 2010



Source: OECD Scoreboard, 2013.

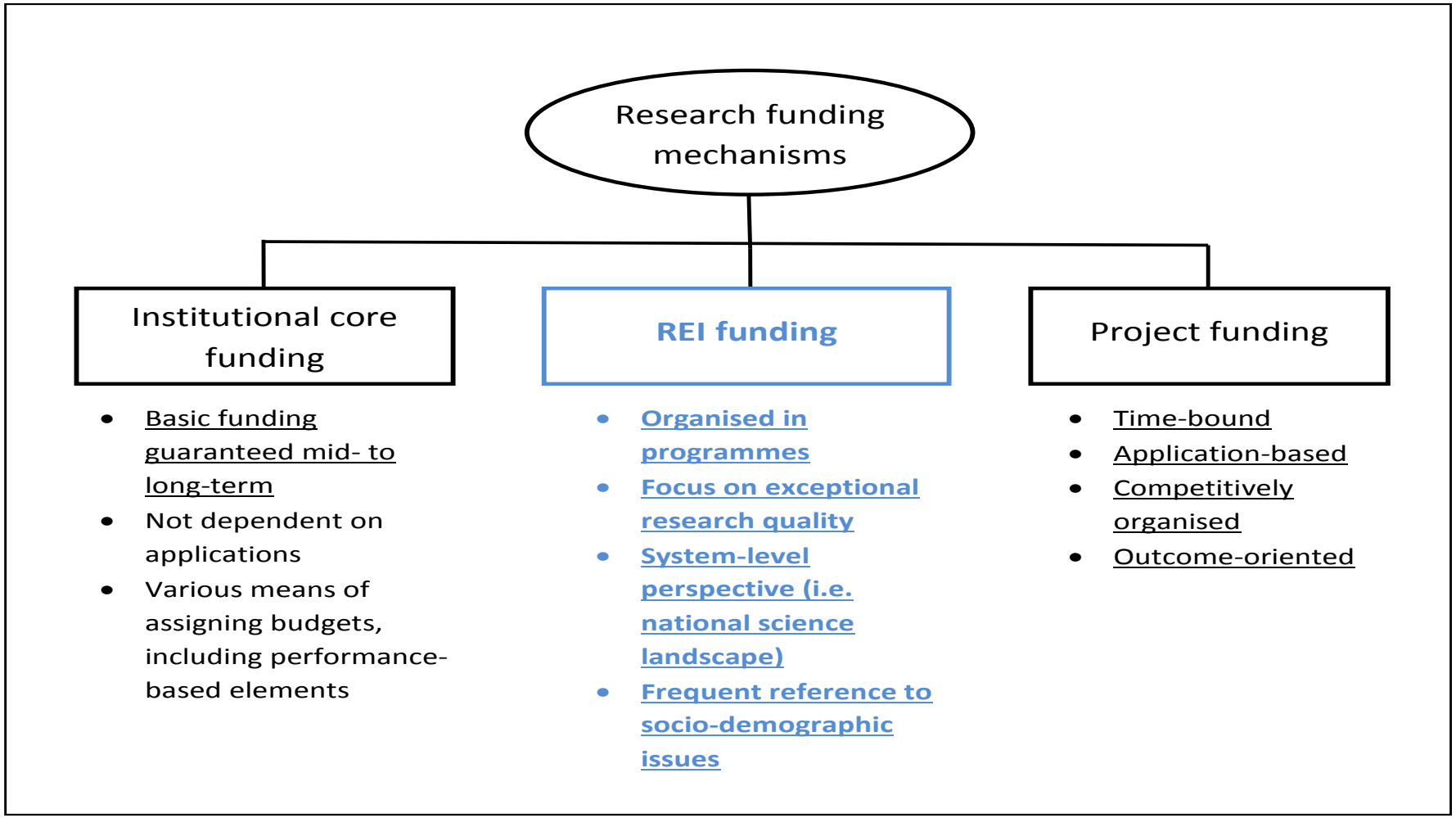
Performance-based funding for public research in tertiary education institutions

- Scope:
  - Experts commissioned to investigate models, indicators and impacts
  - Questionnaire survey completed by 13 countries
- Key findings:
  - Most schemes introduced since 2000
  - Main rationale: raise quality of research; but also others
  - Assessments commonly used for several rounds of annual funding
  - Open disclosure of processes and results in most countries
  - Similarities in indicators used: 3rd party income, publications, degree completions; differences in combinations and weighting, reliance on quantitative indicators and peer review, and use of additional indicators
  - Differences in budget impacts of schemes: while difficult to compare across countries, annual block funding affected ranges from 6% to 75%
  - Differences in the involvement of HEIs in designing schemes
  - Few formal evaluations of schemes – evidence suggests positive effects on research outputs and research management
  - Negative and unintended consequences also highlighted: e.g. narrowing of research focus on publications targeted at certain journals

Performance-based funding for public research in tertiary education institutions (2010)

Country	System	Year implemented/ major revision
United Kingdom	RAE moving to REF – research excellence framework	1986/current
Spain	CNEAI – National Commission for the Evaluation – *sexenio*	1989
Slovak Republic		1992/2002
Hong Kong, China	RAE	1993
Australia	Composite Index, Research Quality Framework (RQF), Excellence in Research for Australia (ERA)	1995/current
Poland	Ministry of Science and Higher Education – parametric evaluation	1991/1998-99
Italy	*Valutazione triennale della ricerca* (VTR)	Evaluation 2001-03/ funded 2009
New Zealand	Performance-based research funding (PBRF)	2003/current
Belgium (Flemish Community)	BOF key	2003/2008
Norway	Norwegian model (new model for result-based university research funding)	2006
Sweden	New model for allocation of resources	2009
Denmark	Implementation of the Norwegian model	Current
Finland	Funding formula for allocation of university resources	1998/2010

Promoting Research Excellence: New Approaches to Funding

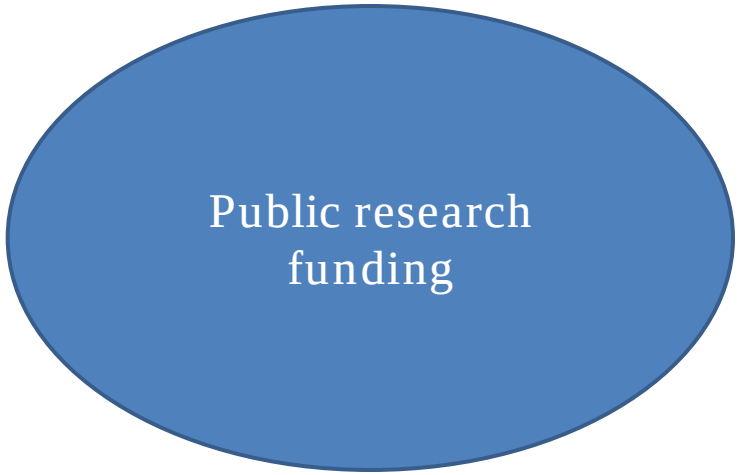


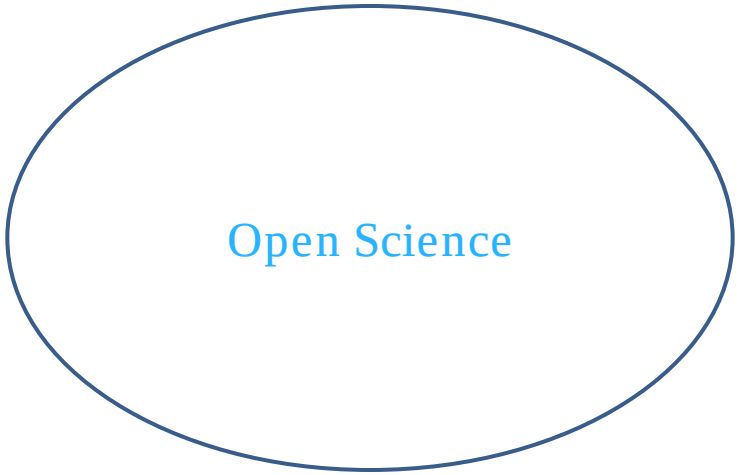
Overview of REIs in responding countries

Country	Name of REI	Start date	Maximum funding period for individual research unit
Australia	ARC Centres of Excellence	2003	7 years
Austria	Competence Centres for Excellent Technologies	2008	K1: 7 years K2: 10 years
Denmark	Investment Capital for University Research	2008	5 years
Estonia	Development of Centres of Excellence in Research	2001	7 years
Finland	Centres of Excellence (2008-13)	1995	6 years
Netherlands	Bonus Incentive Scheme	1998	No maximum set (will change in future)
New Zealand	New Zealand Centres of Research Excellence	2002	6 years
Norway	Norwegian Centres of Excellence	2002	10 years
	Centres for Research-based Innovation	2007	8 years
	Centres for environment-friendly energy research	2009	8 years
Poland	Leading National Scientific Centres	2012	5 years
Portugal	Multi-Year Funding Programme	1996	5 years
Russian Federation	National Research University initiative	2008	10 years
Slovenia	Centres of Excellence	2009	4 years
Sweden	Strategic Research Areas	2010	5 years
	Linnaeus Grants	2006	10 years
	Berzelii Centres	2006	10 years

Promoting Research Excellence: New Approaches to Funding

- Scope:
  - Research Excellence Initiatives (REIs)
  - Review of 27 REIs from 18 countries
- Key findings:
  - Combine features of both institutional and project-based funding – provide funding, but also prestige
  - Objective: competitiveness of research
  - Part of strategies to fund fewer institutions, selected on the basis of excellent performance and future potential
  - Selection panels tend to be internationally staffed
  - Variation in focus: young researchers, infrastructure, attracting international talent, cooperation with industry
  - Evaluation evidence remains weak – long-term effects remain unverified and evaluation efforts have yet to focus on effects on research landscape as a whole


Public research
funding

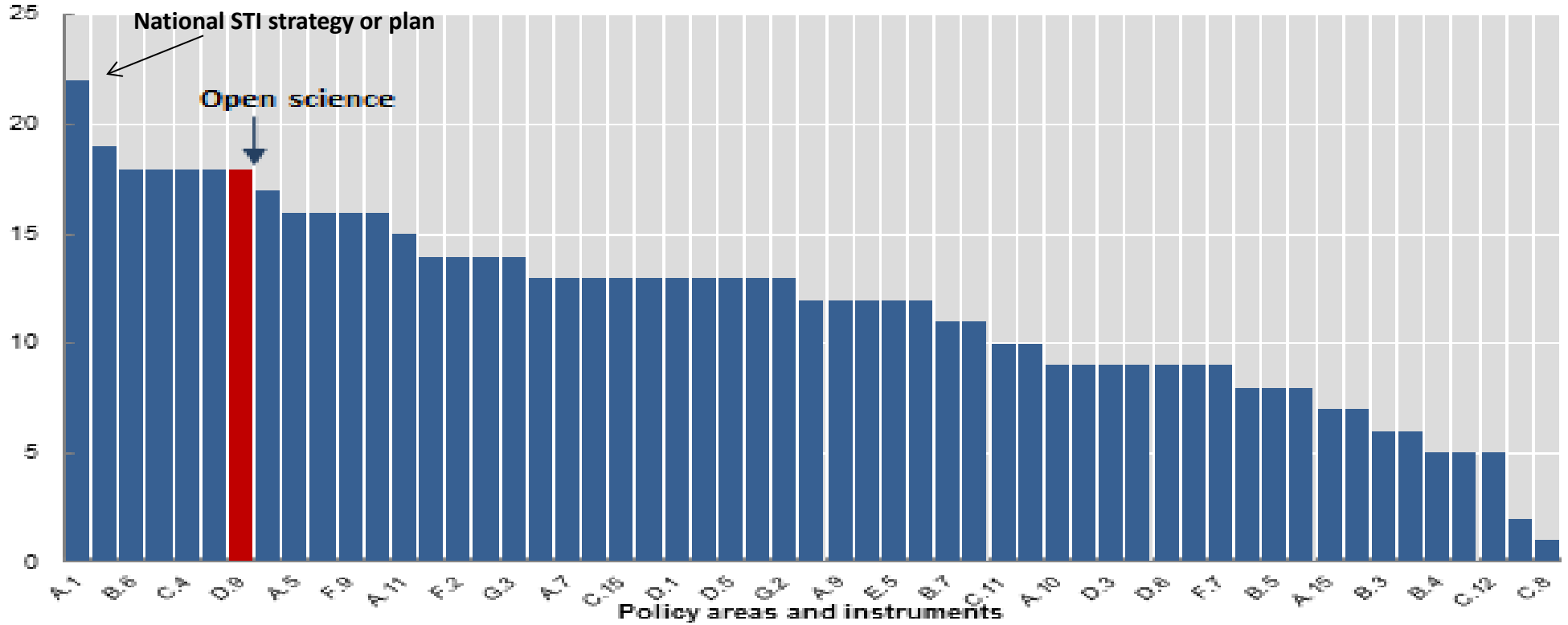

Open Science

Open Science: the evolution of science towards a more open and data-driven enterprise

- Three main aspects:
  - Open Access **Publishing** (OA)
  - Open **Data** Platforms (OD)
  - ICT based scientific **collaboration** between scientists, citizens, companies and society more broadly
- One single goal:
  - Make the outputs of publicly funded research results more widely accessible in digital format for the benefit of the scientific community, the business sector and society more generally

Open science: a hot issue for OECD and non-OECD countries

Number of countries reporting that the situation has recently substantially changed in the policy area, compared with other STI policy areas or instruments



Note: Simple counts do not account for the magnitude and impact of policy changes.

Source: Country responses to the STI Outlook policy questionnaire 2014.

The rationale for open science

- Efficiency of production and diffusion
  - Reduce duplication
  - Economies of scale (more research from the same data)
  - Multiply opportunities for international participation
  - Spillovers to science and innovation

OA can also contribute to innovation …but

- PubMedCentral show that 25% of the daily unique users are from universities, **17% from companies**, **40% are individual citizens** and the rest are government or other categories (UNESCO 2012)

- A recent study on R&D-intensive SMEs in Denmark (Houghton, Swan and Brown 2011) found that **48% of those SMEs consider research outcomes very important** for their business activities and more than 2/3 reported difficulties in accessing research material

- Ware (2009) conducted a survey on UK SMEs and found evidence that the equivalent of 10% to 20% of articles were not easily accessible for his survey respondents

Barriers to Open Access and Open Data remain

- Ownership of datasets
- Confidentiality
- Security issues
- Lack of incentives in the academic community
- Missing infrastructure and skills
- Adequate and sustainable funding?

What is the “right” balance
between openness and protection?

Open science policy trends: **enablers,** carrots and sticks

Policy measures may include different efforts and initiatives, such as:

enablers, *incentive mechanisms or mandatory rules*

Enablers are, for example, the **infrastructure** developed to share articles or data, initiatives undertaken to develop an **open science culture**, amendments to the **legal framework** to make them increasingly open-science friendly or the development of the **skills** necessary for researchers to share and re-use the research outputs produced by others.

Open science policy trends: enablers, **carrots** and sticks

Policy measures may include different efforts and initiatives, such as:

enablers, ***incentive mechanisms*** *or mandatory rules*

Carrots (incentive mechanisms) may be in the form of **financial incentives** to cover open access publishing or the release of datasets. They may also be in the form of **proper acknowledgment of open science efforts of researchers and academics**, for instance in the form of data set citations or career advancement mechanisms partly based on metrics that take into account open science or data sharing efforts.

Open science policy trends: enablers, carrots and **sticks**

Policy measures may include different efforts and initiatives, such as:

enablers, incentive mechanisms or ***mandatory rules***

Sticks (mandatory rules) are often implemented in the form of **requirements in research grant agreements** or in some cases are defined in national strategies or institutional policy frameworks.

Where are we now? Open Access policies…

- More widespread in OECD countries than open data poli
- However, few policies targeting incentives other than funding are in place
- Many initiatives to invest in open access “enablers” (online platform, repositories, …) but less attention to skills development

…Open Data policies

- Open data refers to access to the data that constitute the primary *inputs into new research, as well as the first-order results of that research*
- Less developed than open access policies, probably because data are more difficult to “treat” and “protect”
- Currently, incentive mechanisms for researchers are lacking

In conclusion

- Open access and open data can support better quality science, collaboration, innovation and public sector transparency.
- There is a plethora of (overlapping) initiatives, mostly on open access (less on open data), driven by governments, universities and researchers
- Skills development is essential and there is scope for further action to improve both open access capabilities AND the capacity to make use of open data
- Ensuring researchers face the right incentives for openness is also essential – this includes clarity on intellectual property

  Repositories are necessary but not sufficient conditions for openness

→ OECD study of policy trends to promote open access and open data, and their impact, will be finalised by end-2014.

OECD study on "big data" also being finalised.

Thank you!

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Innovationpolicyplatform.org