Future trends in Science, Technology and Innovation Systems

based on the OECD STI Outlook

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CSTP-TIP Workshop on the Future Trends in STI Policy

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OECD
BETTER POLICIES FOR BETTER LIVES

STI systems

- Actors performing STI activities
- Infrastructures
- Policy design and implementation agencies
- Norms, values, ideas and ‘soft’ institutions
- Local, regional, national, transnational, global

The future of innovation policies

- **Knowledge triangle** at the top of policy agenda
- **Broaden the scope of policy intervention :**
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  - **Multi-level governance**
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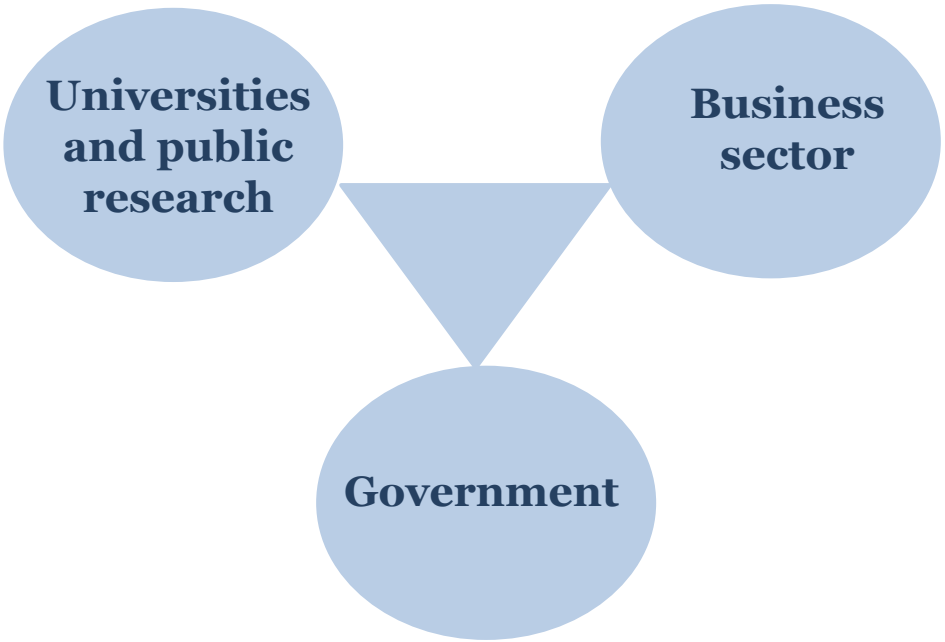
  - **Larger portfolio / mix of policy instruments**
- **Evaluation is key** but would require a 'whole of government' approach and persisting gaps in metrics.

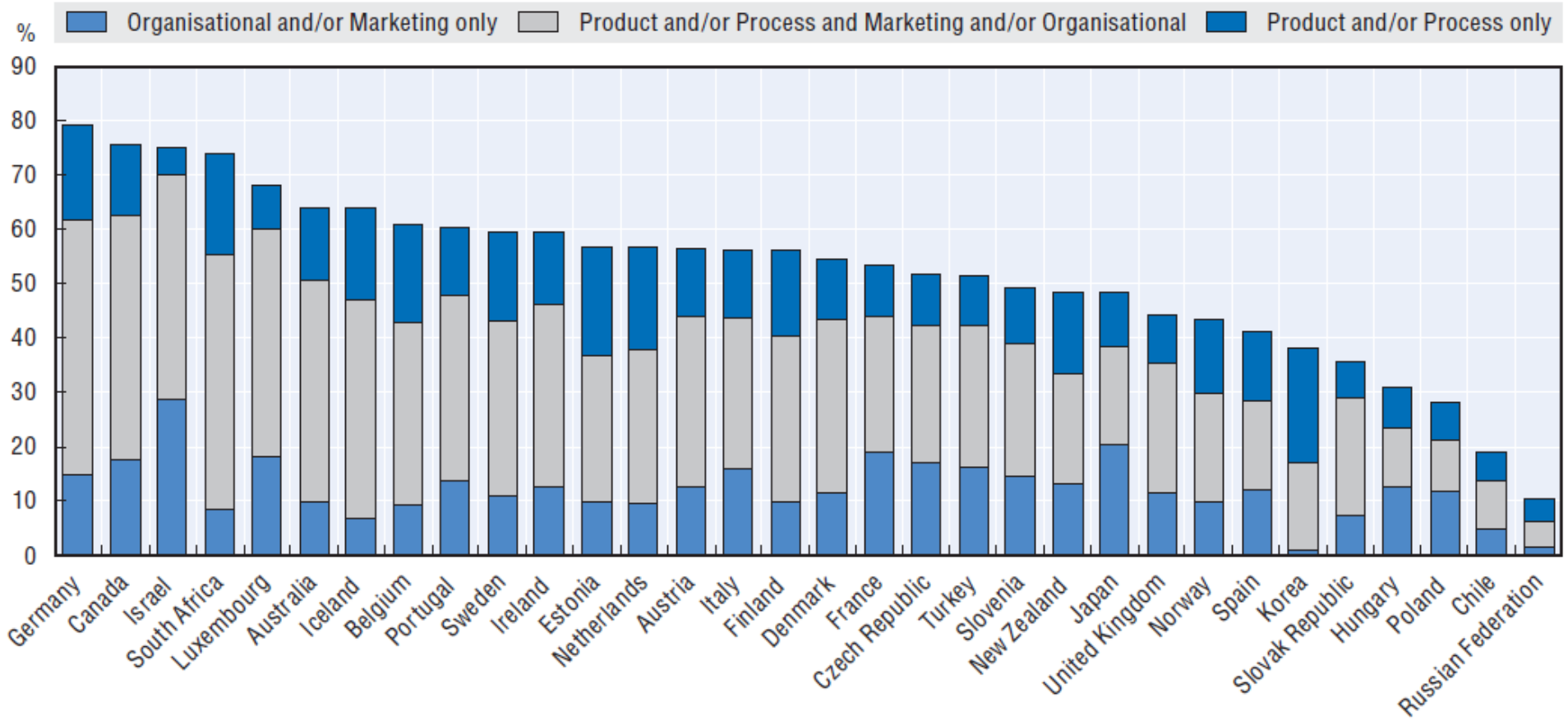
A broad approach of innovation policy



The actors: the “knowledge triangle”

Firms engage in mixed modes of innovation

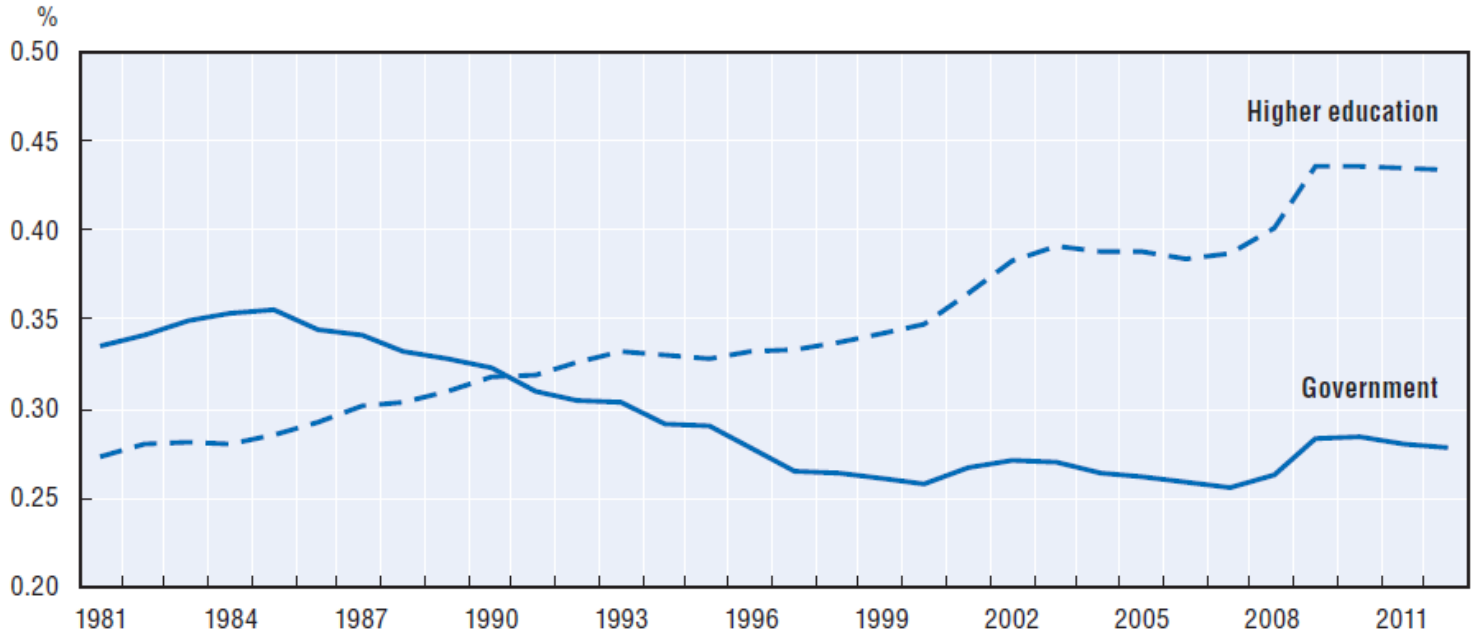
Innovative firms by mode of innovation, as a percentage of all firms (%), 2008-10



Source: OECD STI Outlook 2014 , Paris; based on OECD, Innovation statistics 2014, Eurostat (CIS-2010) and national data sources.

The rise of universities

R&D expenditure by the public sector, OECD, % of GDP

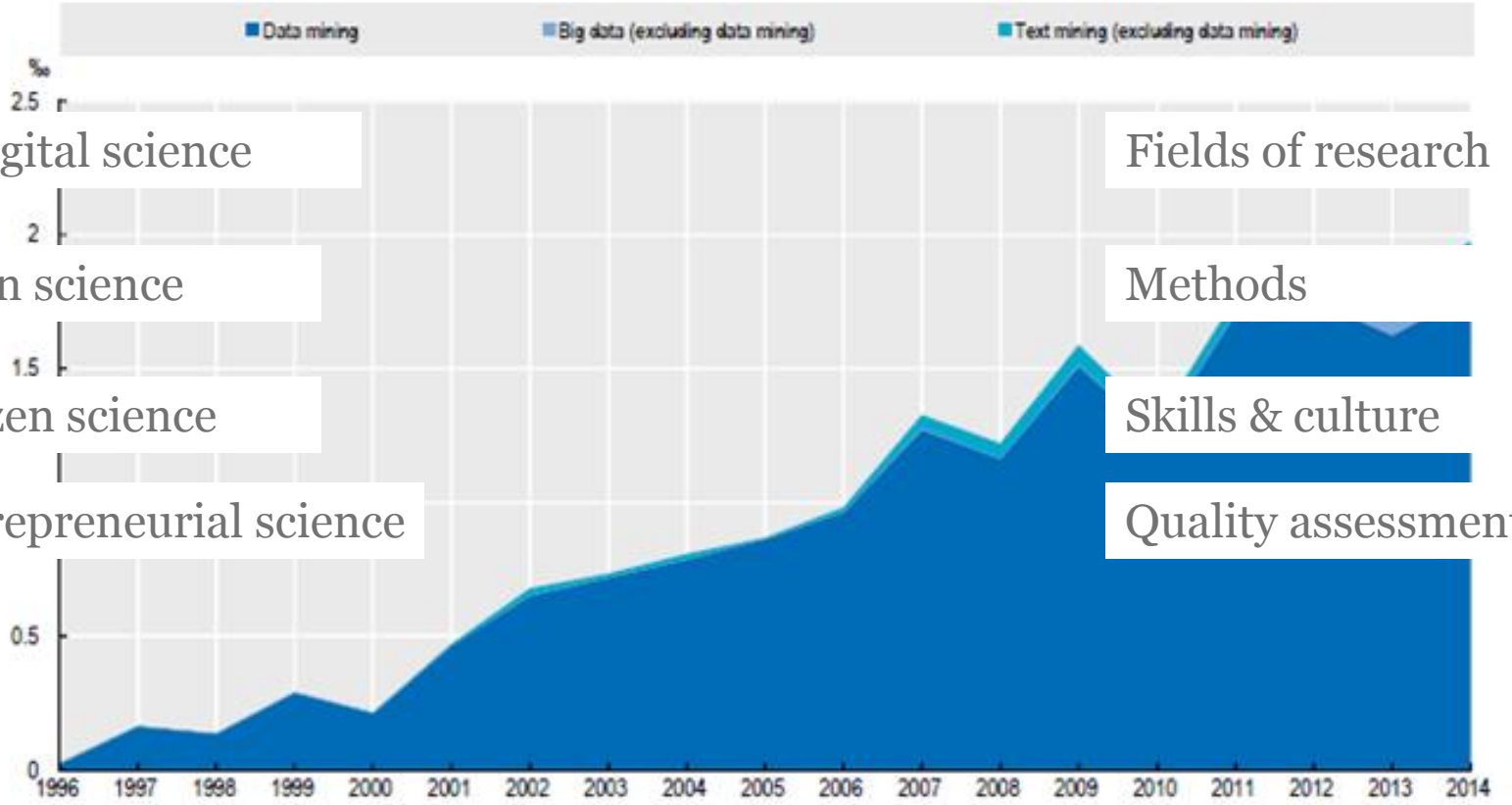


Source: OECD (2014), *OECD Science, Technology and Industry Outlook 2014*, Paris.

New ways of doing (data-driven) research

Figure 1.1 TDM-related scientific articles

1995-2014, per thousand article



Digital science

Open science

Citizen science

Entrepreneurial science

Fields of research

Methods

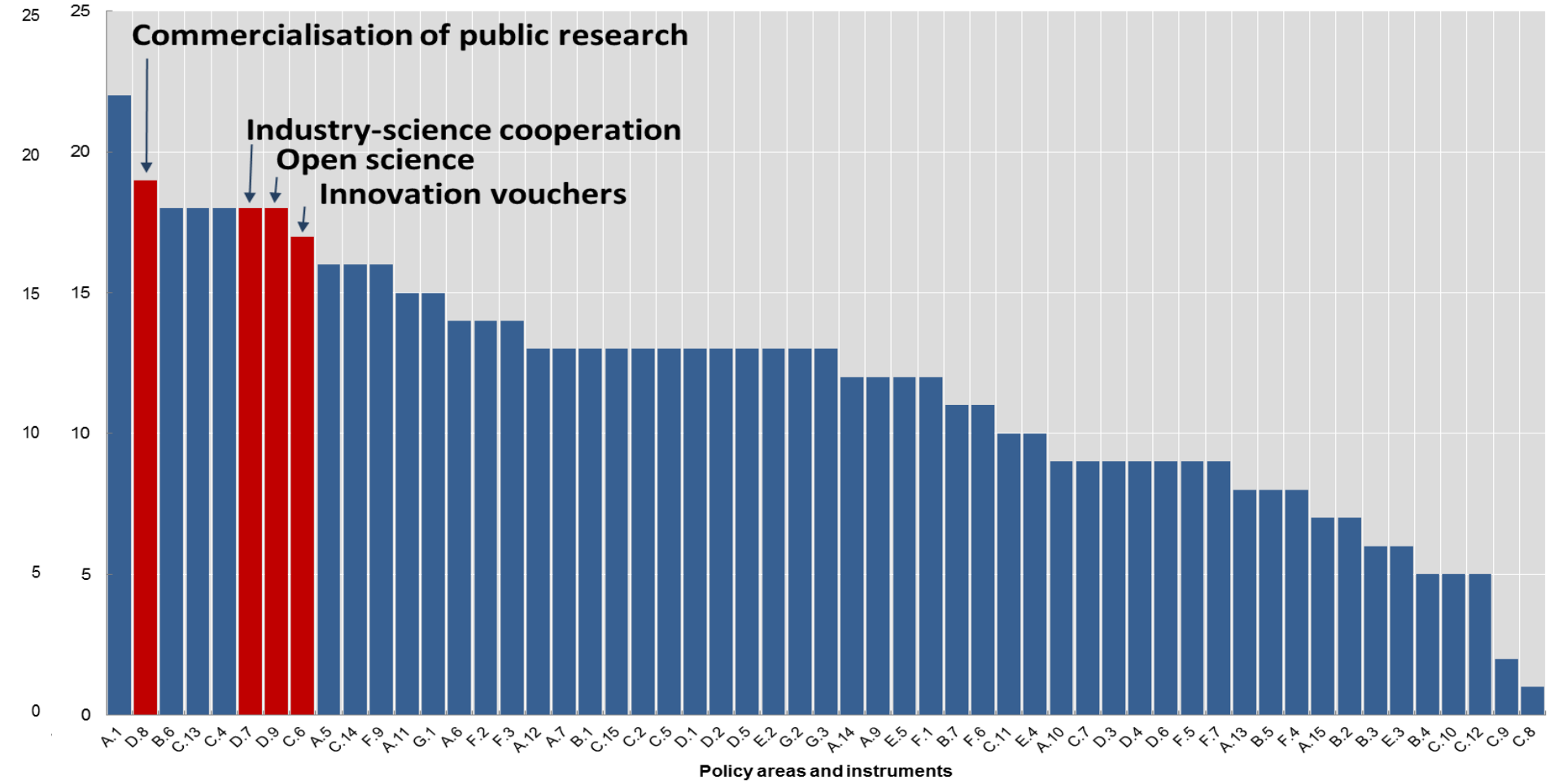
Skills & culture

Quality assessment

Source: OECD (2014), *Measuring the Digital Economy: A New Perspective*, OECD Publishing, Paris.

Knowledge transfer is a central objective of research policy

Substantial changes in various STI policy areas , country self-assessment, 2012-14



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

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A more utilitarian view of STI

- **The transition to a low-carbon economy** and the preservation of natural resources would require technological breakthroughs, deployment of existing technologies and new infrastructures, systemic changes (behaviours, governance).
- **Ageing** would require new technologies/services to assist the elderly remain active and autonomous longer, assist care providers, funding and better coordination between social care and health services.
- **Income inequality** has increased during the crisis. ICTs offer opportunities to support inclusive innovation. Education and training policies will be essential to avoid exclusion.

⇒ **Raising the status of innovation in the policy portfolio**

⇒ **Broaden the scope of policy intervention**

⇒ **More 'responsible' STI policies**

⇒ **Enlarge the number of actors involved in the policy**

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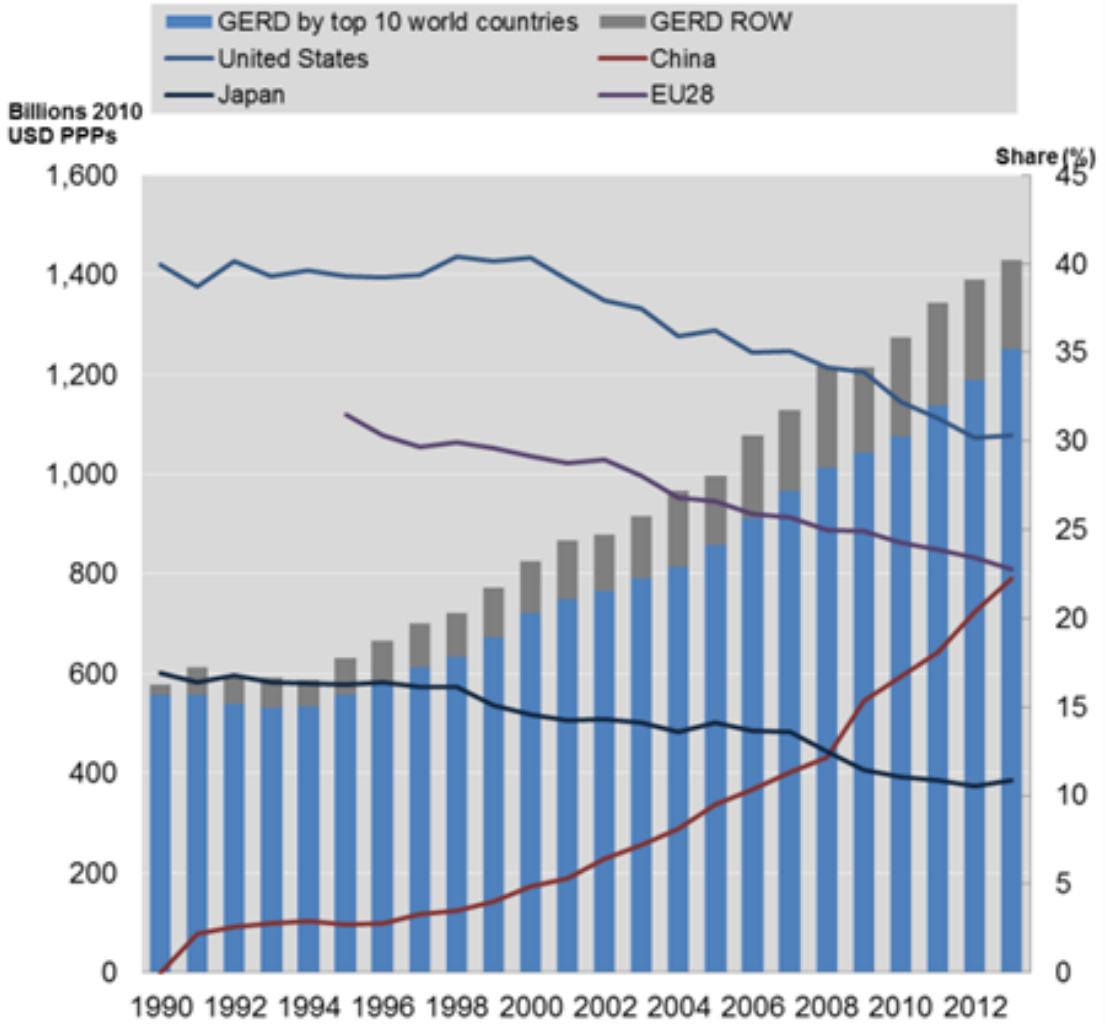
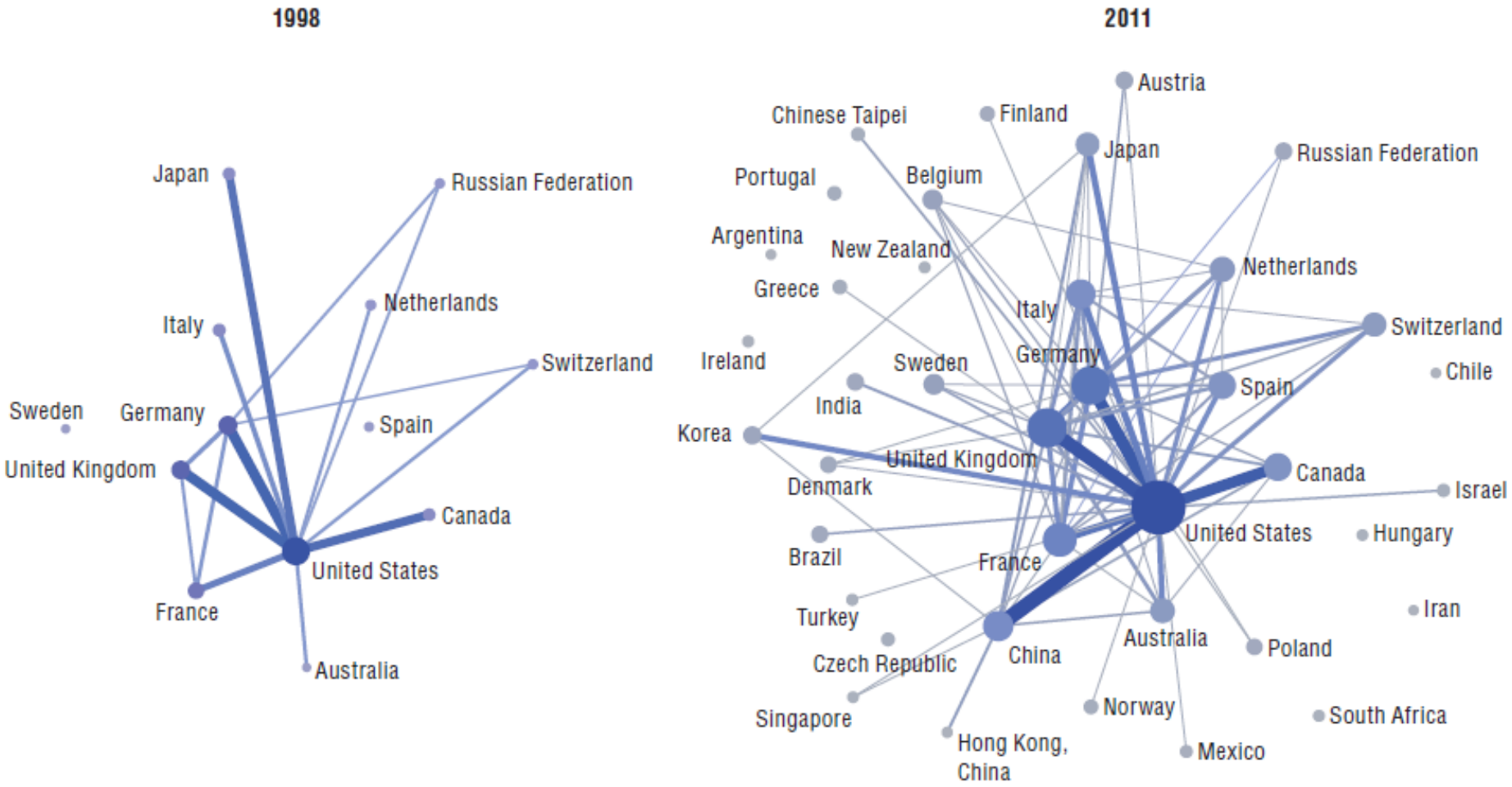
Growing research capacity worldwide



Source: OECD (2014), *OECD Science, Technology and Industry Outlook 2014*, Paris. Updates MSTI June 2015

Emergence of globally interconnected innovation hubs

Internationally co-authored documents, 2011 and 1998 (whole counts)



Source: OECD (2013), *OECD Science, Technology and Industry Scoreboard 2013*, Paris.

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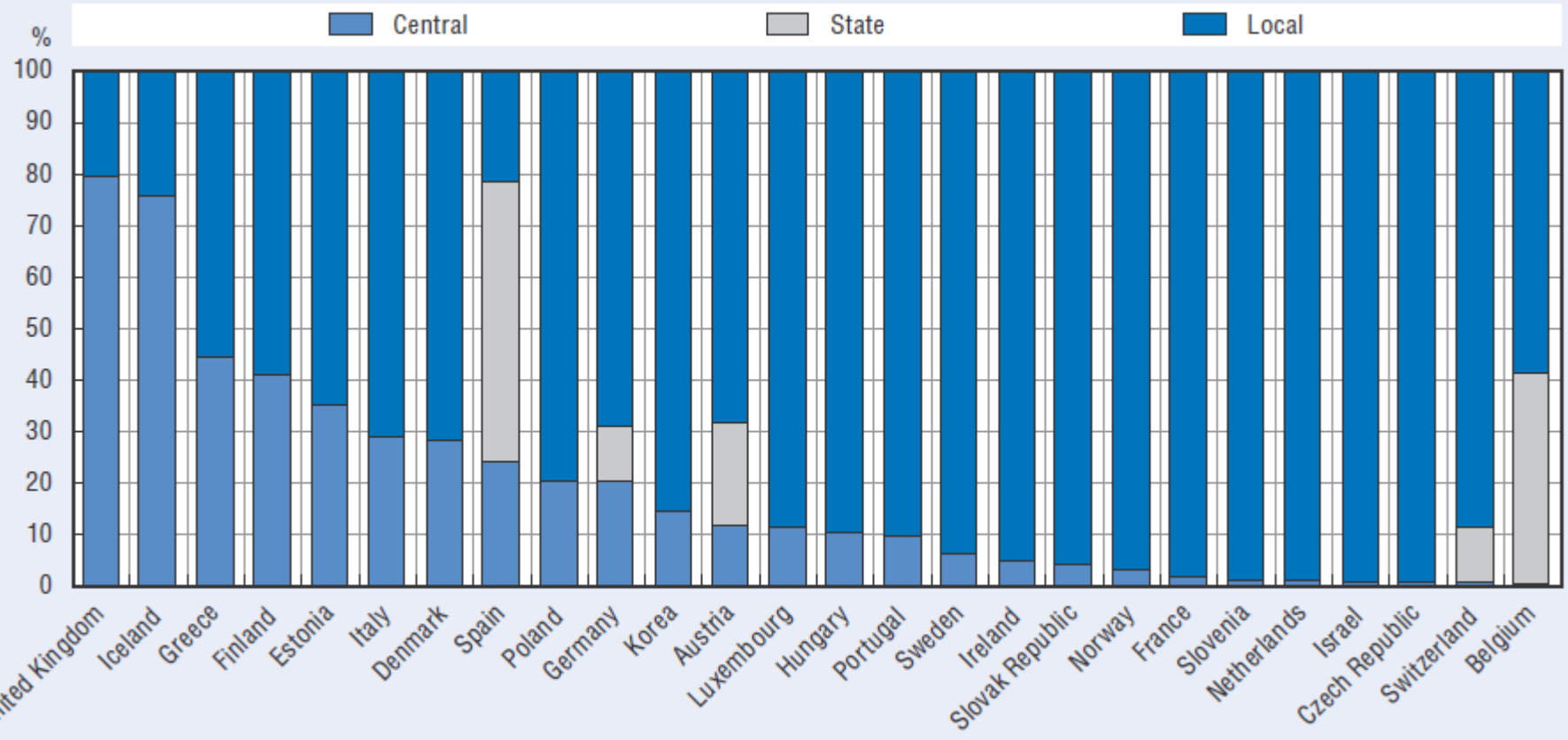
Multi-level governance

Figure 1.13. **Cities make a major contribution to green public investment**

Gross capital formation in environmental protection by level of government, percentage of total, 2012



Note: State government data only for Austria, Belgium, Germany and Spain.

Source: OECD, *National Accounts Database*, April 2014 based on OECD (2013), *OECD Regions at a Glance 2013*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/reg_glance-2013-en*.

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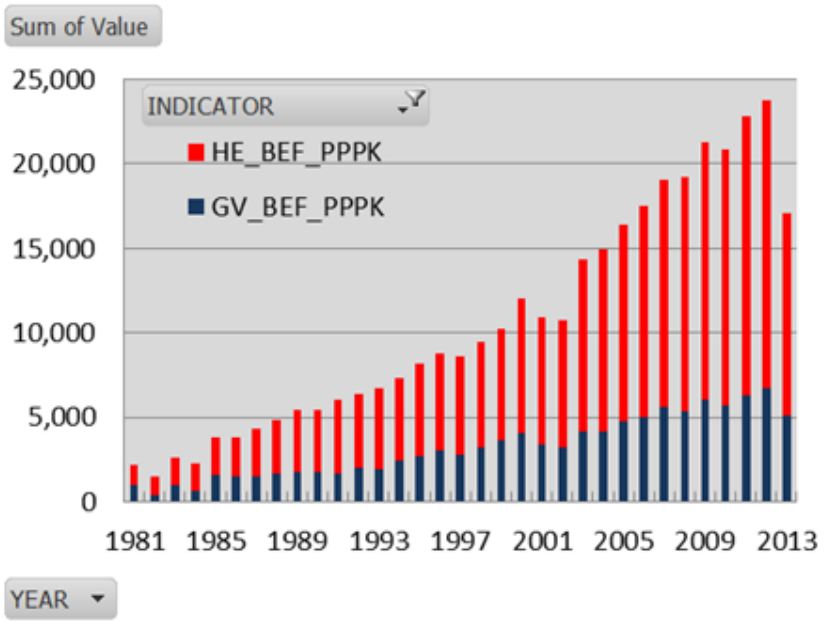
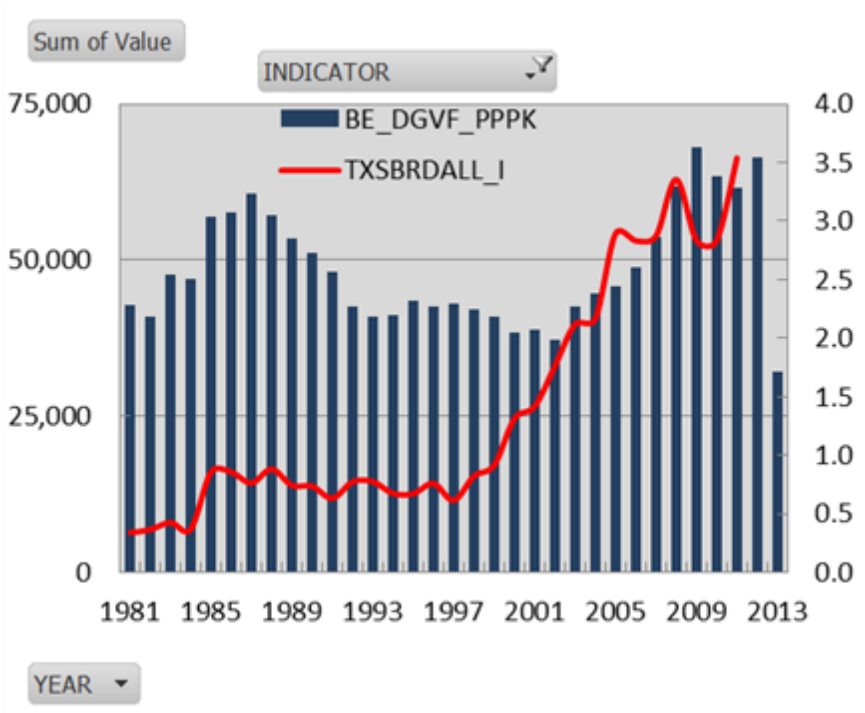
Cross-sectoral funding

Industry funding to public research: Universities take the lion's share



Public funding to business research: Tax incentives on the top of increasing subsidies



(Exploratory charts to be updated)

Source: OECD (2016, forthcoming), *OECD Science, Technology and Industry Outlook 2016*, Paris.

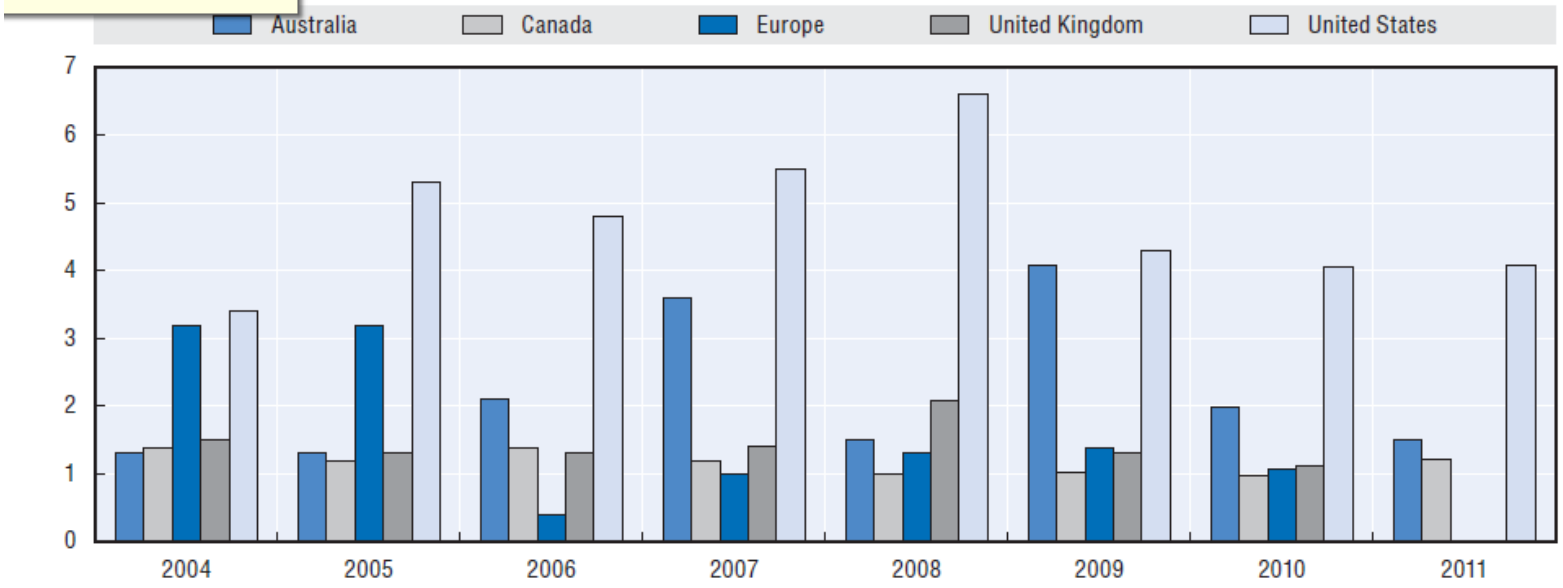
New strategic public-private partnerships

Signs of slowdown in technology transfer activities

- Prompted governments to rethink their TT policy and practices

Figure 6.6. **Licensing income from public research, 2004-11**

As a percentage of research expenditures



Source: OECD (2013), *Commercialising Public Research: New Trends and Strategies*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264193321-en*. Based partly on calculations and data from Australia's Department of Innovation, Industry, Science and Research (DIISR) (2011 and 2012), "Australian National Survey of Research Commercialisation: 2008 and 2009" and "2010 and 2011"; European Commission (2012), "Interim Findings 2011 of the Knowledge Transfer Study 2010-12", Bonn/Maastricht/Solothurn; US Association of University Technology Managers (AUTM) (2009-12), "Highlights of the AUTM U.S. Licensing Activity Survey: FY2008 [through] FY2011"; Canadian AUTM (2009-12), "Highlights of the AUTM Canadian Licensing Activity Survey: FY2008 [through] FY2011"; Higher Education Funding Council for England (HEFCE) (2009-12), "Higher Education – Business and Community Interaction Survey 2007-08 [through] 2010-11."

StatLink http://dx.doi.org/10.1787/888933151840

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Some major opportunities and risks….

- **Opening science** to address societal challenges
- **Digitalisation of science** is a major disruptive force
- System thinking and **system innovation**
- **Fiscal consolidation** / budgetary constraints
- More attention to managing **socio-technical risk and uncertainty**
- Greater use of **evaluation**, but persisting gaps in **metrics**

… By 2030

- **Opening science** to address societal challenges
  - **Open science is there**
- **Digitalisation of science** is a major disruptive force
  - **Science 2.0 is the dominant form of doing research**
- System thinking and **system innovation**
  - **The circular economy is a major system innovation**
- **Fiscal consolidation** / budgetary constraints
  - **There's no more money!**
- More attention to managing **socio-technical risk and uncertainty**
  - **Data-driven innovation is ubiquitous**
- Greater use of **evaluation**, but persisting gaps in **metrics**
  - **Metrics miss the mark**

Questions?

- **Future needs for skills and infrastructures** should be tackle now. Which ones and how?

- How to raise organisational capabilities ? In ministries, agencies, universities, firms etc.

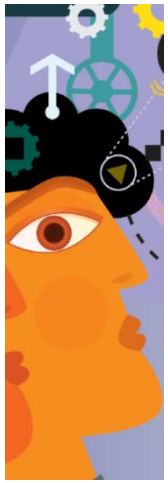
- **How to address inevitable fragmentation**? Improve coordination mechanisms?

For further question…

www.oecd.org/sti/outlook

www.innovationpolicyplatform.org/sti/e-outlook

www.innovationpolicyplatform.org/oecd-stio-forward-look NEW!



Thanks!

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