



DIGITALISATION AND EVIDENCE-BASED SCIENCE AND INNOVATION POLICY

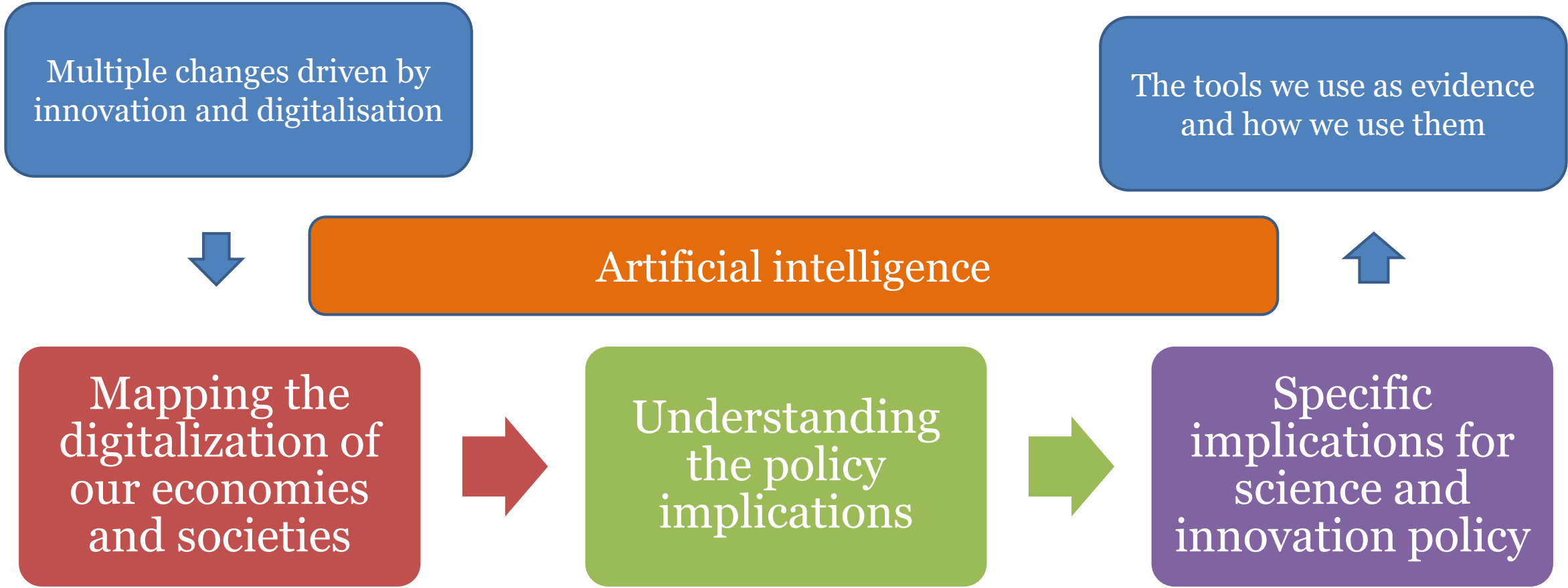
Jornada sobre Inteligencia Artificial aplicada a las políticas públicas de ciencia, innovación y emprendimiento -Sesión sobre la postdigitalización de la política científica, de innovación y emprendimiento

Madrid, 26 June 2019

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OECD Directorate for Science, Technology and Innovation



Context and outline of presentation



Multiple changes driven by innovation and digitalisation

The tools we use as evidence and how we use them

Artificial intelligence

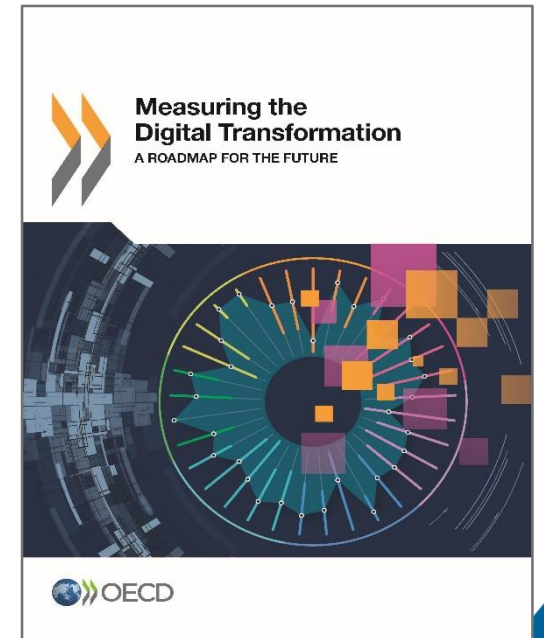
Mapping the digitalization of our economies and societies

Understanding the policy implications

Specific implications for science and innovation policy

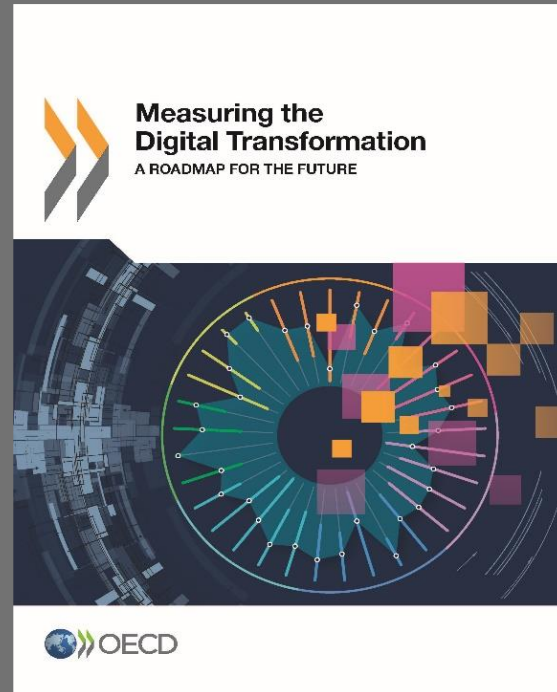


Digitalisation in recent OECD work





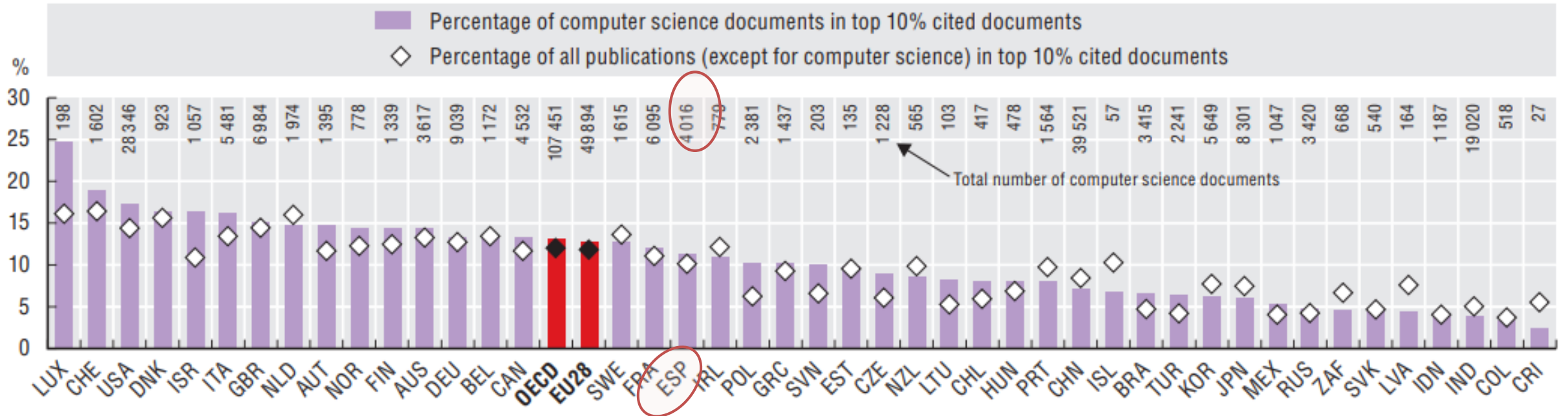
DIGITALISATION OF SCIENCE AND INNOVATION





Computer science publication output

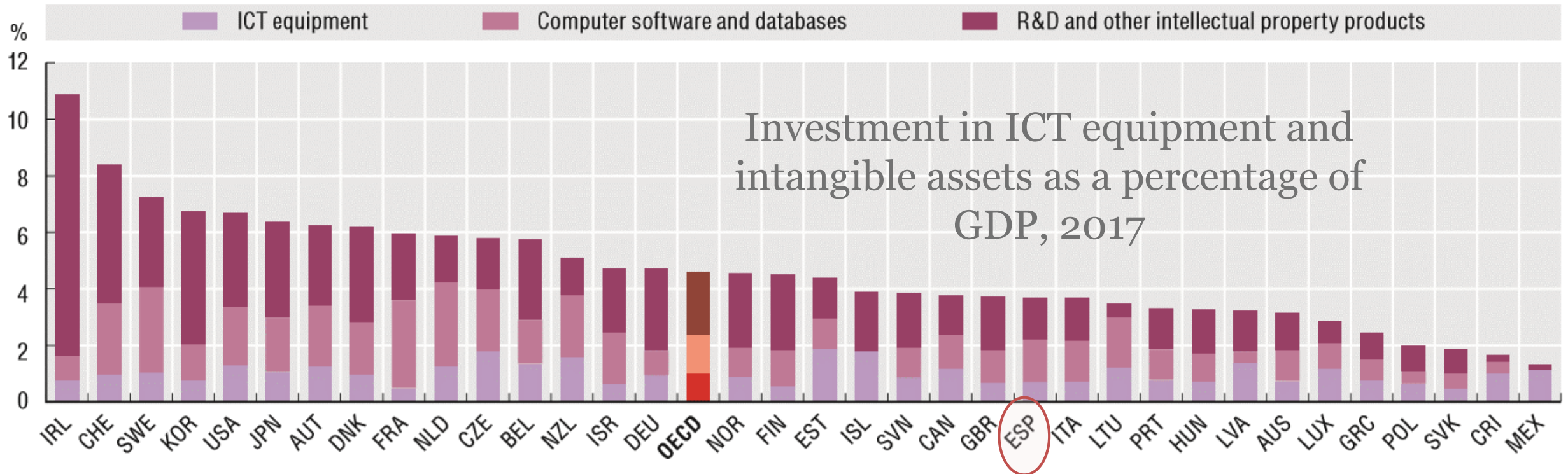
Top 10% most-cited documents in computer science by country, 2016
As a percentage of documents in the top 10% ranked documents, by field, fractional counts



Source: OECD calculations based on Scopus Custom Data, Elsevier, Version 1.2018; and 2018 Scimago Journal Rank from the Scopus journal title list (accessed March 2018), January 2019. See chapter notes. StatLink contains more data.



INVESTMENT AND NOVATION

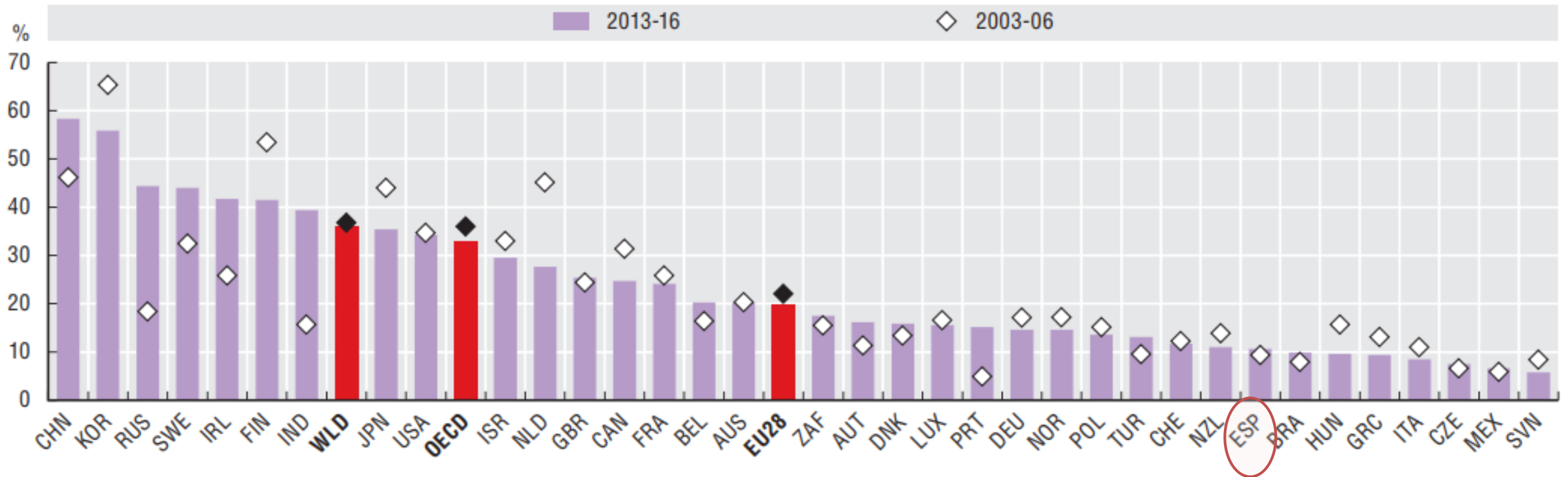


Source: OECD (2019), *Measuring the Digital Transformation*, based on OECD, National Accounts Statistics; Eurostat, National Accounts Statistics and national sources, February 2019.



ICT patenting intensity

Patents in ICT-related technologies, 2003-06 and 2013-16
As a percentage of total IP5 patent families, by country of ownership



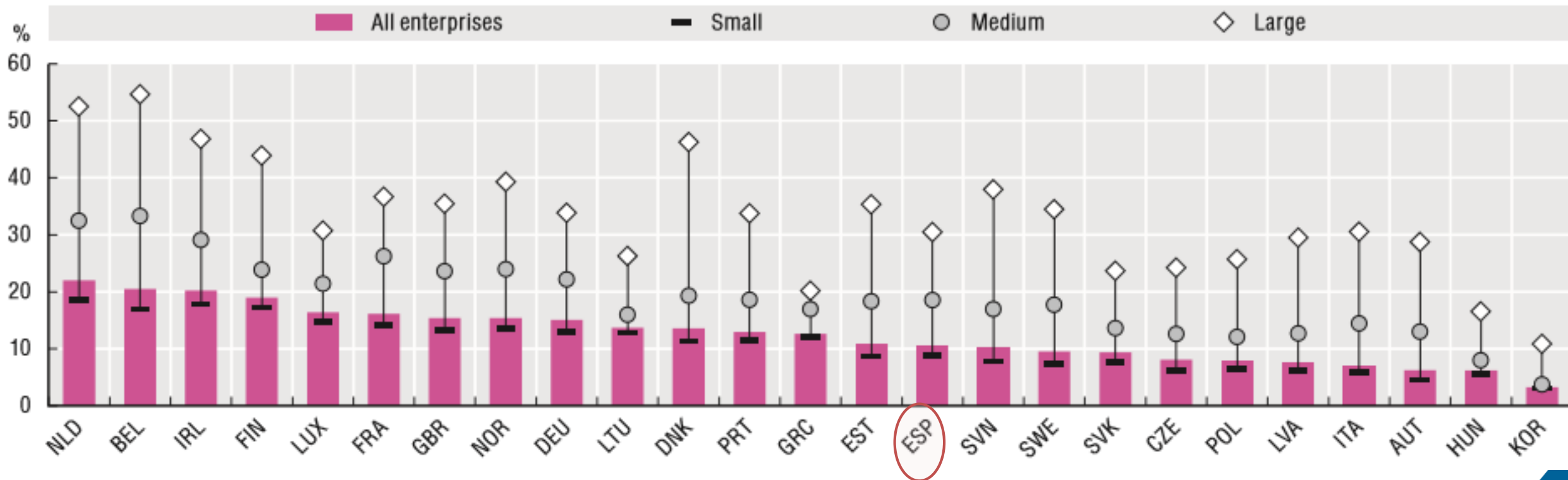
Source: OECD, STI Micro-data Lab: Intellectual Property Database, <http://oe.cd/ipstats>, November 2018. See chapter notes. StatLink contains more data.



INCREASING EFFECTIVE USE



Enterprises performing big data analysis, by size, 2018
As a percentage of enterprises in each employment size class



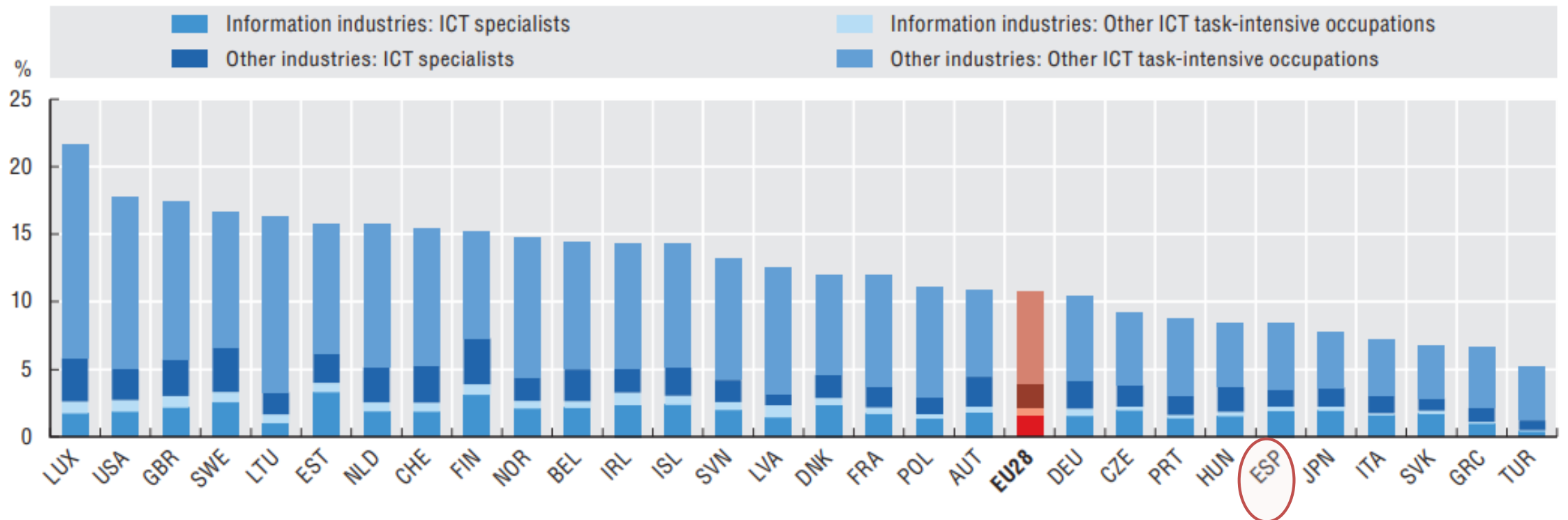
Source: OECD (2019), *Measuring the Digital Transformation*, based on OECD, ICT Access and Usage by Businesses Database, <http://oe.cd/bus>, December 2018.



ICT and jobs

Employment in ICT specialist and ICT task-intensive occupations within and outside information industries, 2017

As a percentage of total employment



Source: European Labour Force Surveys, national labour force surveys and other national sources, December 2018. See chapter notes.

StatLink <https://doi.org/10.1787/888933930535>



The OECD Going Digital Toolkit



A RESOURCE TO BENCHMARK,
VISUALISE, PLAY WITH DATA AND READ
ABOUT POLICY RESEARCH

<http://www.oecd.org/going-digital-toolkit>

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Data and data flows

Data and data flows drive innovation, new products, business models and markets, and have become an important source of value.

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Development

Digital technologies and data can drive growth and sustainable development across the world, but digital divides must be addressed.

Digital government

Digital government leverages digital technologies and data to deliver holistic and user-centred services, public sector innovation and stronger civic engagement.

Digital technologies

An ecosystem of interdependent digital technologies, driven by increases in computing power and declines in costs, underpins digital transformation.

Gender

Gender equality is not only a fundamental human right, it is also a cornerstone of a prosperous, modern society and it serves as a basis for inclusive growth.

Productivity

Digital technologies and data hold promise to boost productivity and growth, but it is essential to realise this potential and ensure it is broadly shared.

Skills

In a fast-moving digital landscape, people need the right mix of skills – foundational, ICT and complementary skills – to thrive in work and life.

SMEs

SMEs create jobs, spur innovation and underpin growth across the economy, but also face challenges in successfully adopting and using digital technologies.

BENCHMARKS

Explore the Toolkit

The Going Digital Toolkit includes indicators, policy guidance and related publications to help countries realise the promises of digital transformation.

www.oecd.org/going-digital-toolkit

#GoingDigital

COUNTRY VIEW

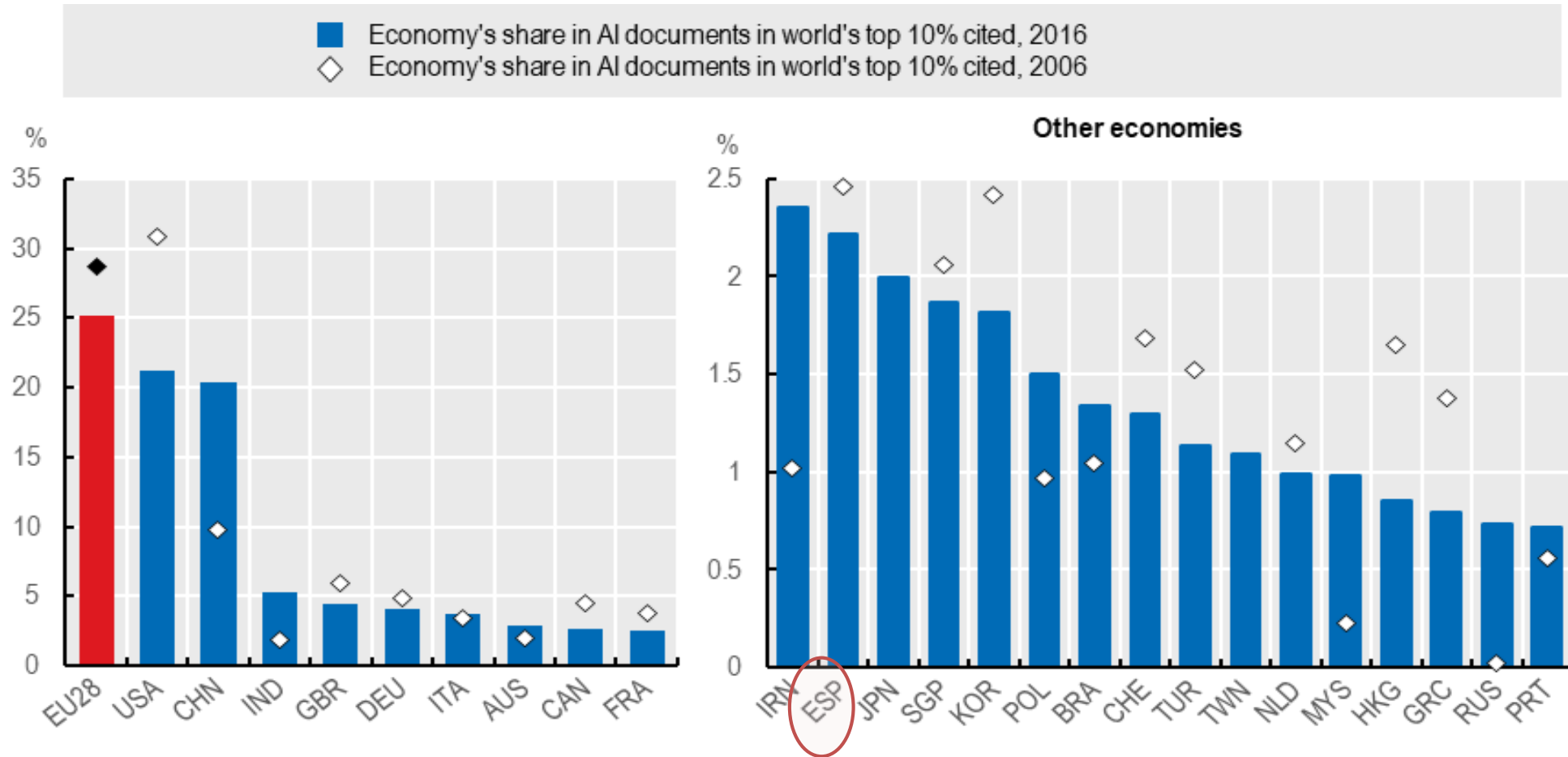


ARTIFICIAL INTELLIGENCE



Production of top-cited scientific publications related to AI, 2016 and 2006

Economies with the largest number of AI-related documents among the 10% most cited publications



Note: Global shares based on fractional counts by economy.

Source: OECD (2019). Measuring the digital transformation. OECD calculations based on Scopus Custom Data, Elsevier.



OECD Recommendation of the Council on Artificial Intelligence (Adopted May 2019)

AI system:

An AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments.

AI systems are designed to operate with varying levels of autonomy



Main content of OECD Recommendation

- Principles for responsible stewardship of AI
 - Inclusive growth, sust. developot & wellbeing
 - Human centred & fairness
 - Transparency & explainability
 - Robustness, security & safety
 - Accountability



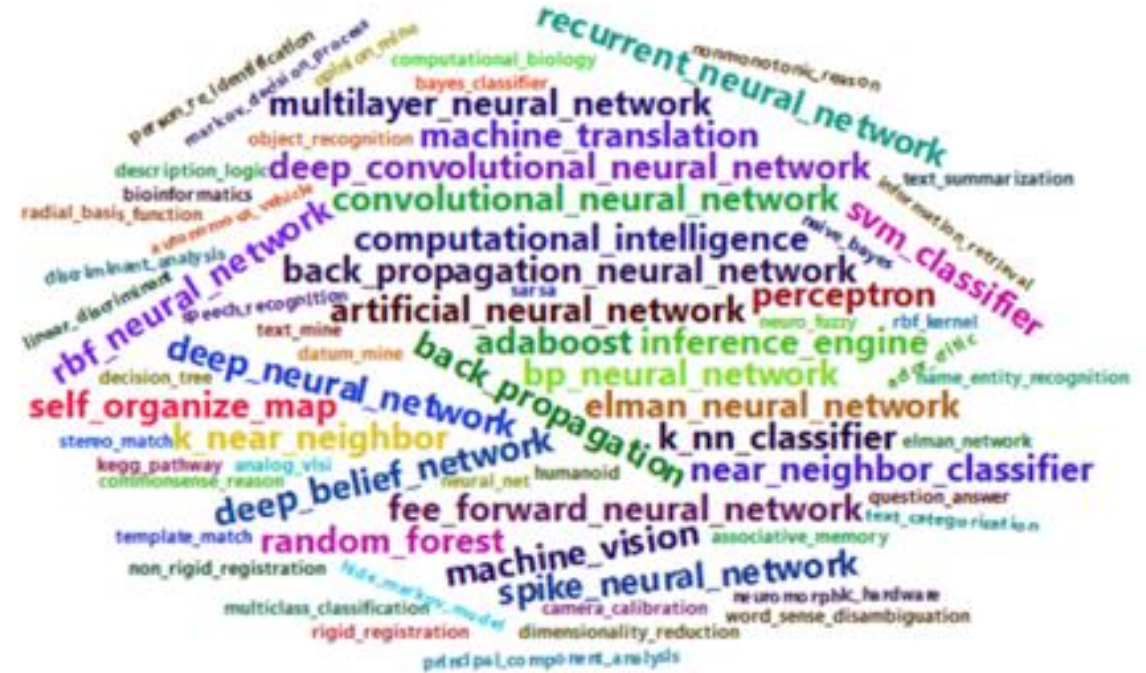
- Recommendations
 - Investment in R&D and unbiased data
 - Enabling ecosystem for AI
 - Apt policy environment (controlled environments for testing)
 - Human capacity & preparedness for job transformation
 - International co-operation



Identifying AI-related content in government funded R&D projects (US NIH and NSF funding example)



Text analyses

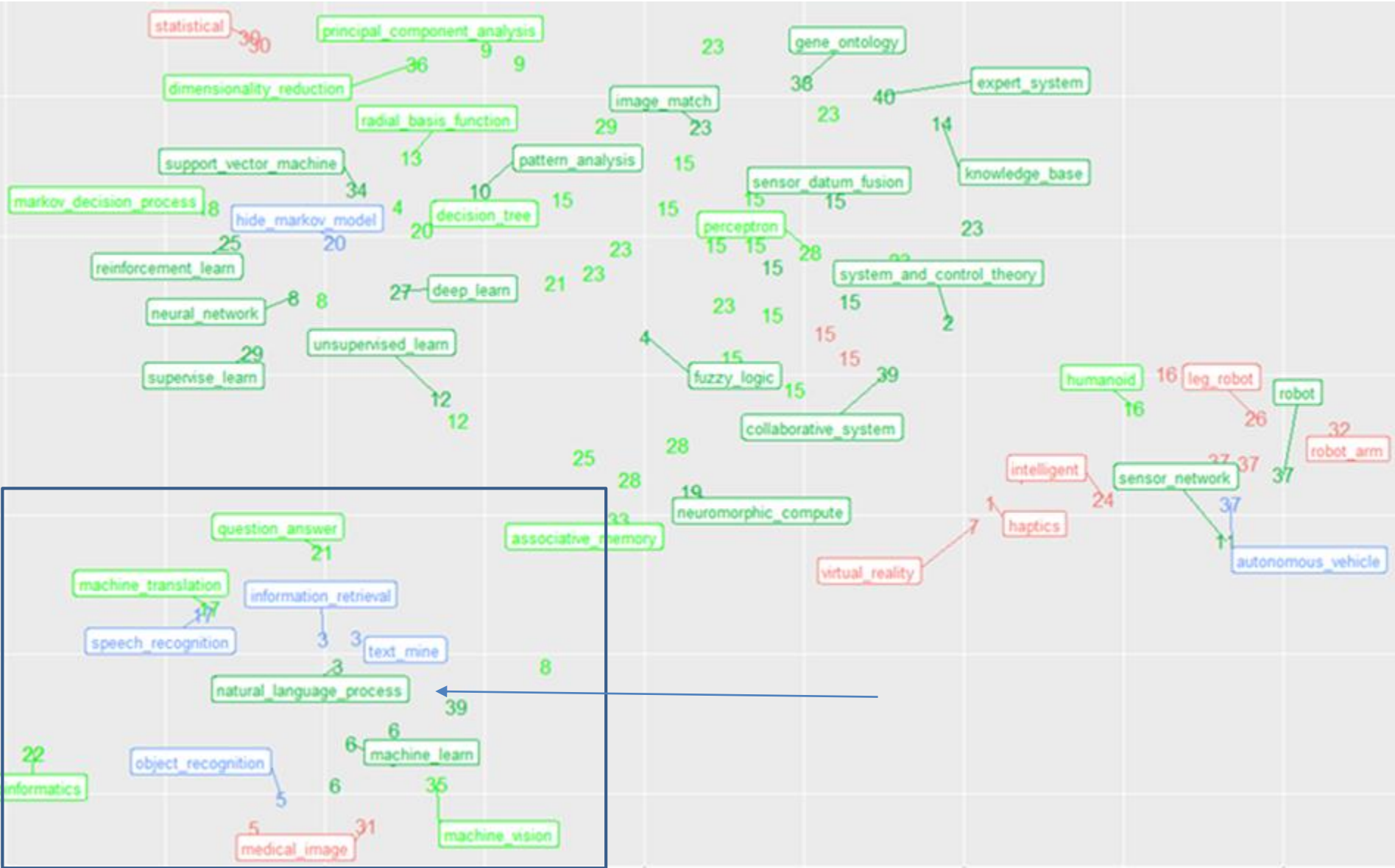


Initial AI key terms from two keyword sets (MeSH and Cockburn)

Semi-automatically retrieved additional AI key terms from Scopus, NIH and NSF data

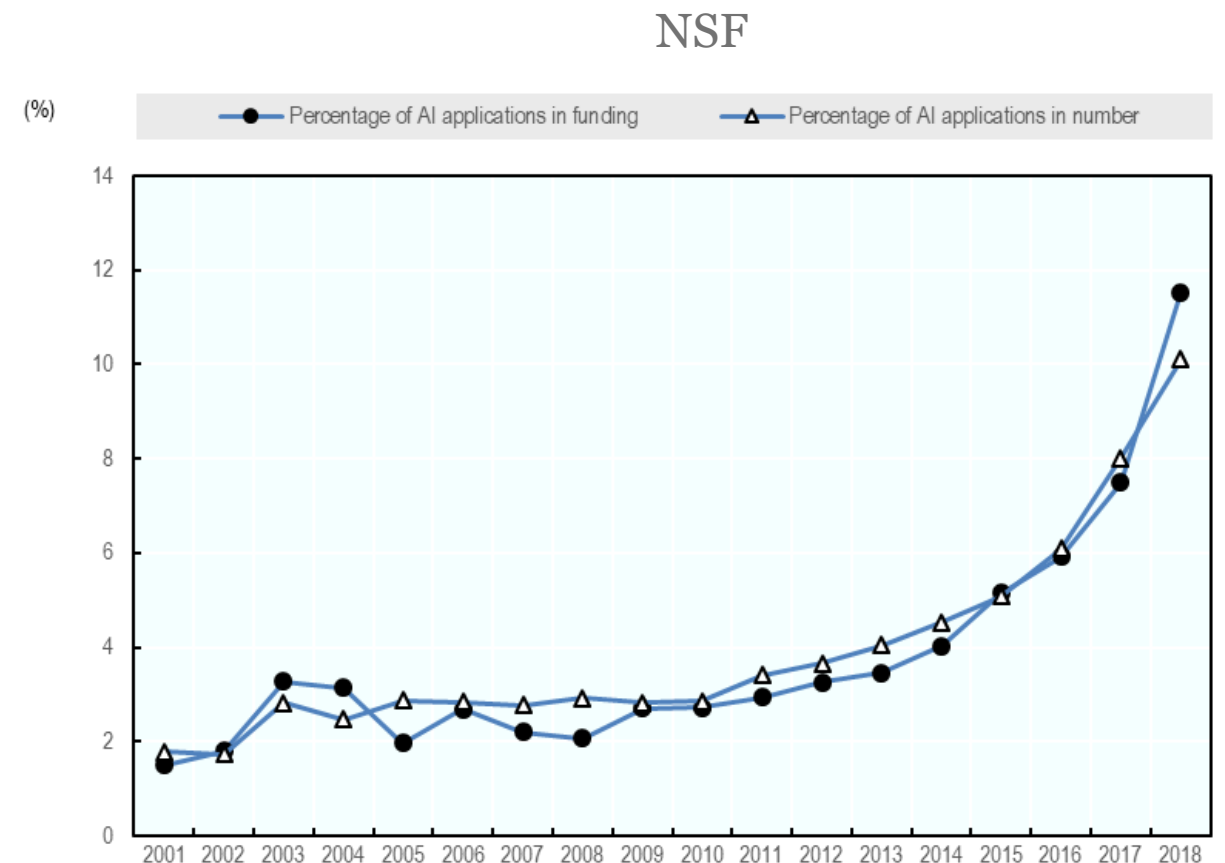
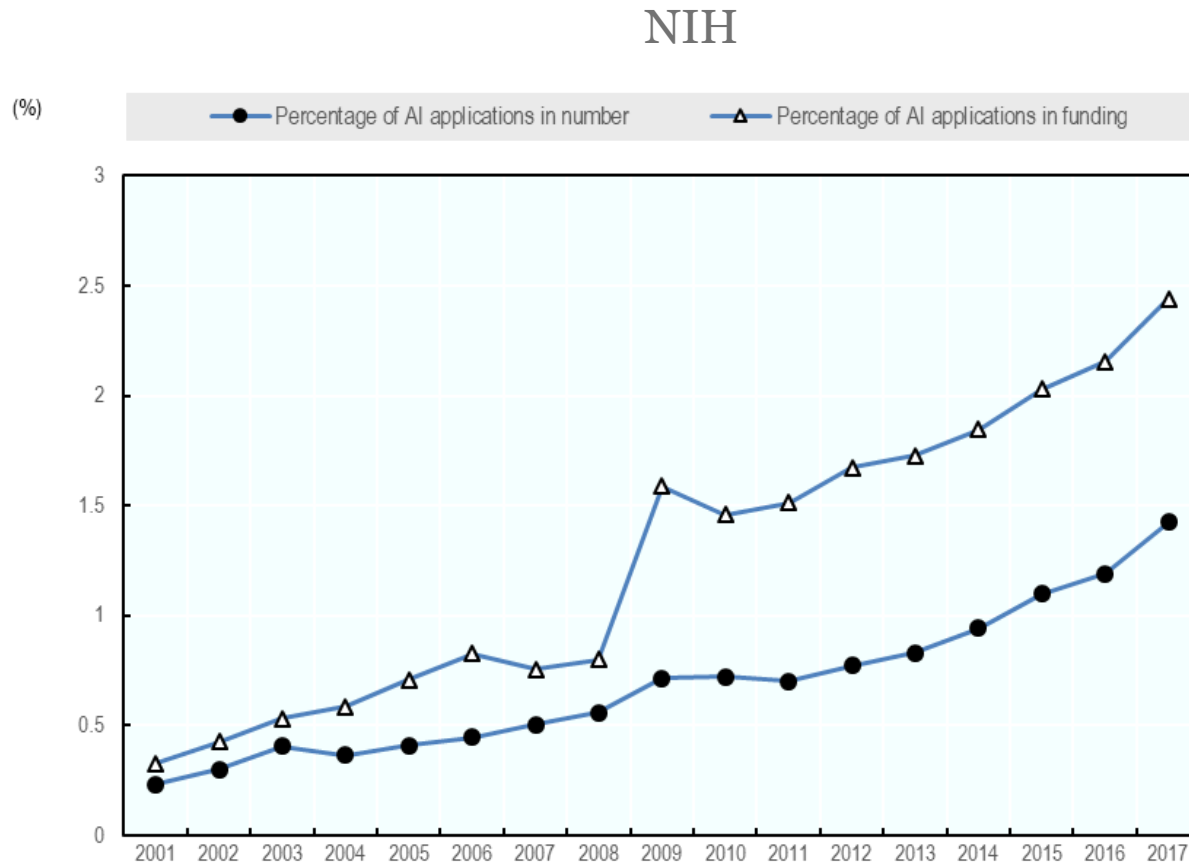


AI-related terms in the NSF project corpus





AI-related project funding at US NIH and NSF



Note: These are experimental indicators

Source: OECD analysis based on NIH Reporter and NSF Award Search data.



SCIENCE AND INNOVATION POLICY AND ADMINISTRATION GOING DIGITAL



The OECD DSIP project

Is STI policy and administration “going digital”?



A **digital science and innovation policy** initiative entails the...

...adoption or implementation by public administrations

.. of new (or re-used) procedures and infrastructures relying on intensive use of digital technologies and data resources

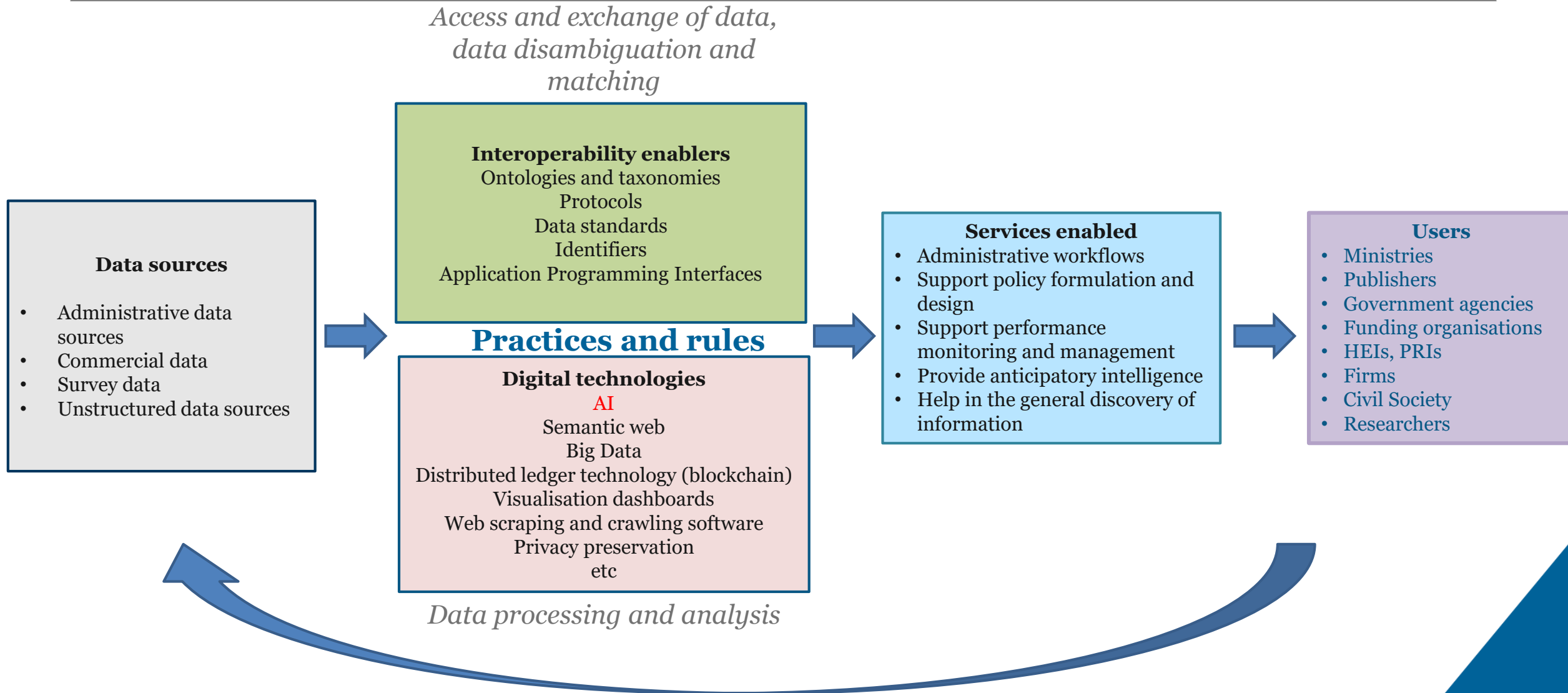
... to support the formulation and delivery of science and innovation policy

What is the **transformation potential** and possible **pitfalls** of using digital tools and sources in science and innovation policy-making

How can OECD facilitate **mutual learning** between countries that are planning, developing or using DSIP systems.



A stylised conceptual view of a DSIP initiative

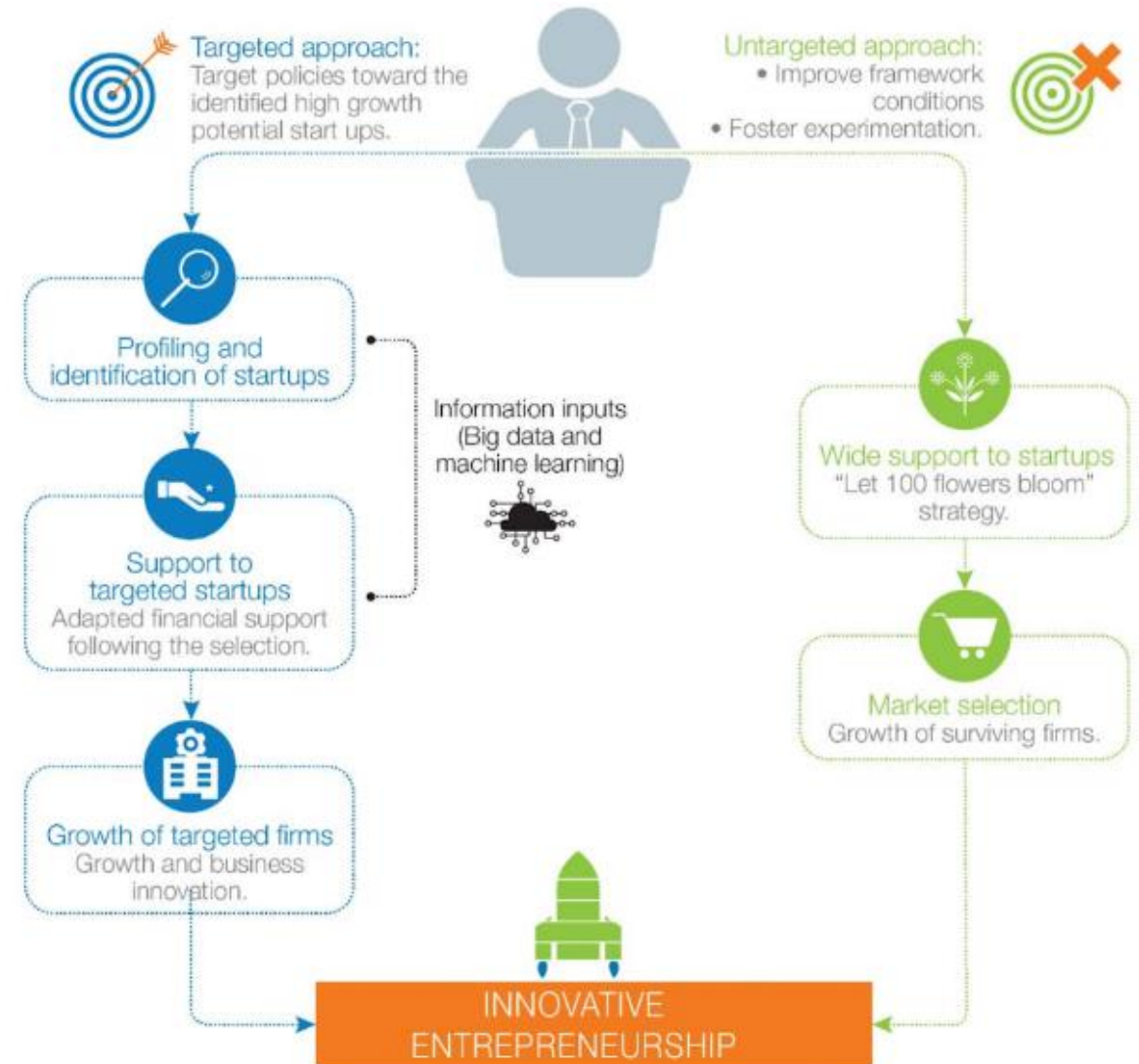




Possibilities for science and innovation policy

Which areas generate sufficient data?

- R&D grants and tax incentives
 - Is it R&D?
 - Is it truly an SME?
 - Which firms should be audited?
- Public procurement of innovations
- Venture capital.
 - Where does promise lie?
- IP examination
 - Are claims truly new? How to classify?
- ... several others...
 - esp. low visibility tasks





IP SEARCH

GET YOUR IP



COMMERCIALISE YOUR IP

Is your idea, invention or brand available?

Before applying for your intellectual property right, you should do a comprehensive search to make sure that it isn't already registered.

IP SEARCH

-  Search patents [Australian \(AusPat\)](#)
-  Search trade marks [Australian \(Intellectual Property Australia\)](#)
-  Search designs [Australian \(ACOS\)](#)
-  Search plant breeder's rights [PBR database](#)

ASK ALEX FOR HELP  

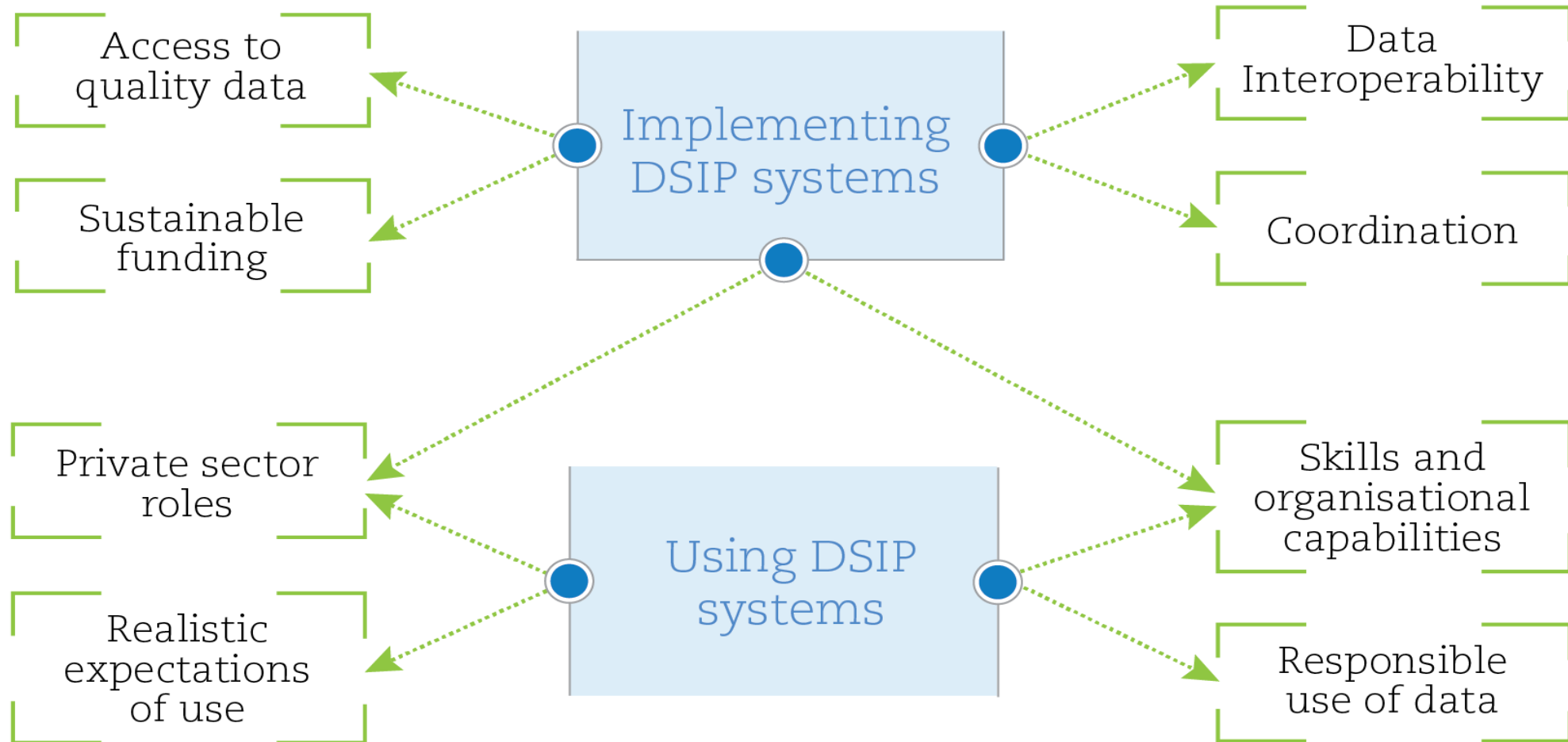
Hello, I'm Alex, IP Australia's virtual assistant. I can assist with general intellectual property rights information and online services questions. We have information about your [privacy](#).

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Issues arising in implementing and using DSIP systems





OECD DSIP project outputs

- Chapter in **STI Outlook 2018**
- *A case study report on the **DSIP landscape in Norway**; (Draft)*
- ***The final DSIP report** (approx. 120 pages; to be completed by Q3 2019) with the following chapters: (Work in progress)*



Overview of DSIP



Meeting the interoperability challenge



DSIP and the future of research assessment



The private sector in DSIP

- *A contribution to the **CSTP synthesis report on digitalisation**;*



Reality checks: basic capability questions

- A lot of “*not so big*” data languishing in administrative silos
- Governments paying third parties for their own data
- Different parts of government speaking different “languages” – *broken interoperability*
- Willingness to review the legal/institutional framework? Truly not allowed to share?
- Degree of utilisation of operational researchers, statisticians and data scientists within public administration
- Culture and norms driving institutional maturity to make use of data to inform decision making



IMPLICATIONS FOR STATISTICS

1. Making the **digital economy visible** in economic statistics
2. Understanding the **economic impacts** of the digital transformation
3. Measuring **well-being** in the digital age
4. Designing **new** and interdisciplinary **approaches to data collection**



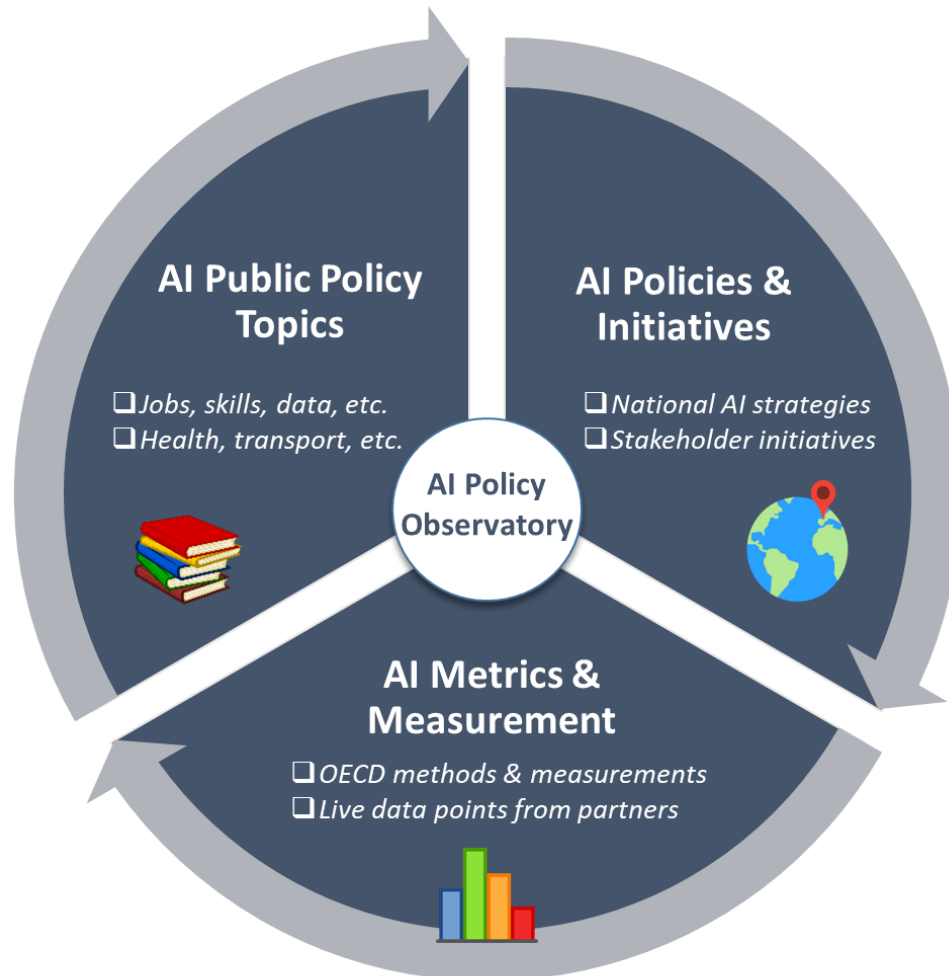
1. Transformative technologies (notably IoT, AI, Blockchain)
2. Data and data flows
3. Skills in the digital era
4. Trust in online environments
5. Governments' digital strengths



OECD AI Policy Observatory

An online hub for AI information, evidence and policy options

Core pillars:



Characteristics

Multidisciplinary

Evidence-based

Multistakeholder



Thank You / Gracias por su atención



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ADDITIONAL SLIDES