



Indicators of human resources and skills

2nd International Workshop
***Sharing Best Practices in
R&D Statistics***

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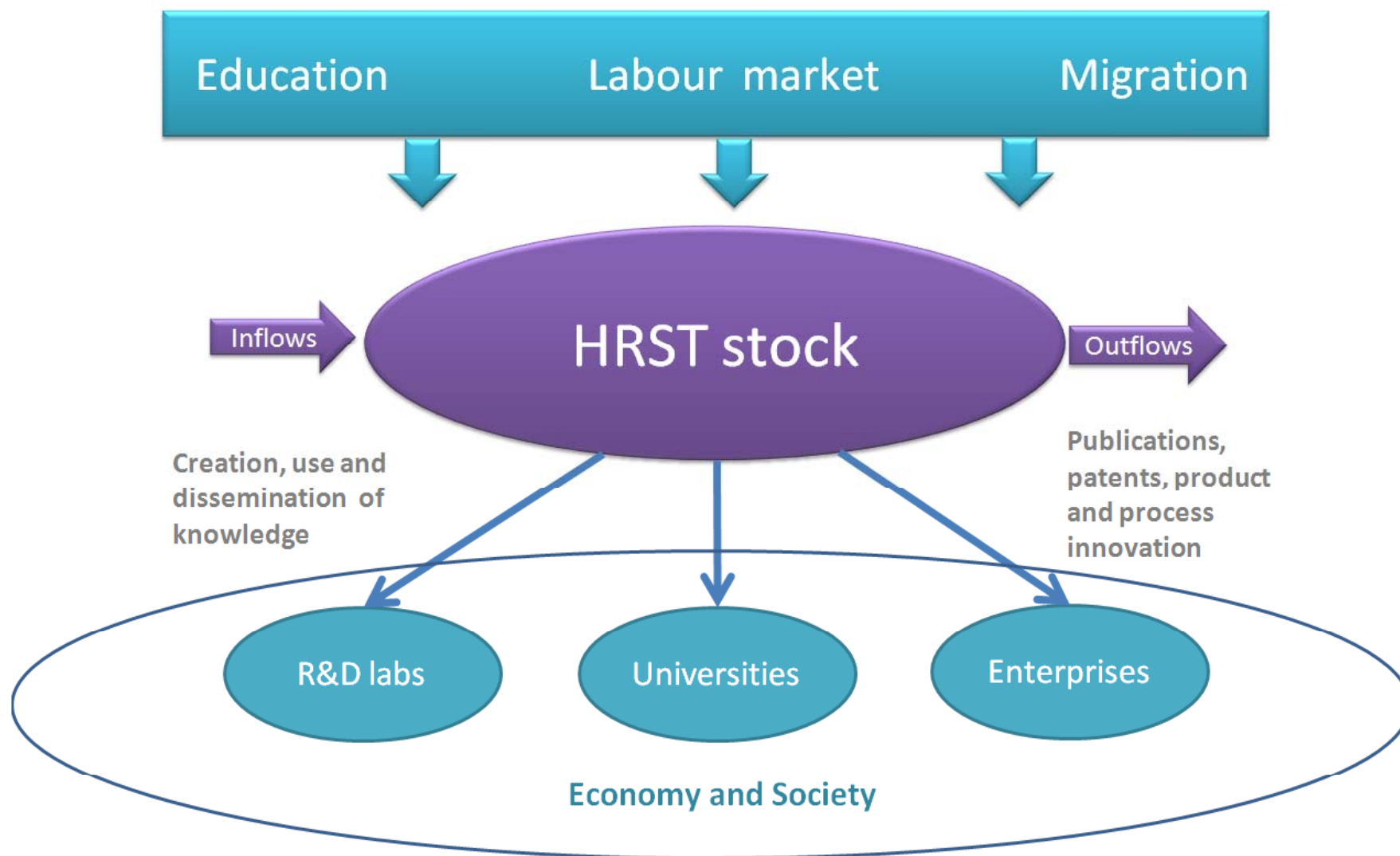
Introduction

- Longstanding recognition of :
 - The importance of human capital in the economic activity
 - The important role of highly skilled workers in a knowledge based economy
- The contribution of human resources in science, technology, innovation and R&D is an important component for the measurement framework

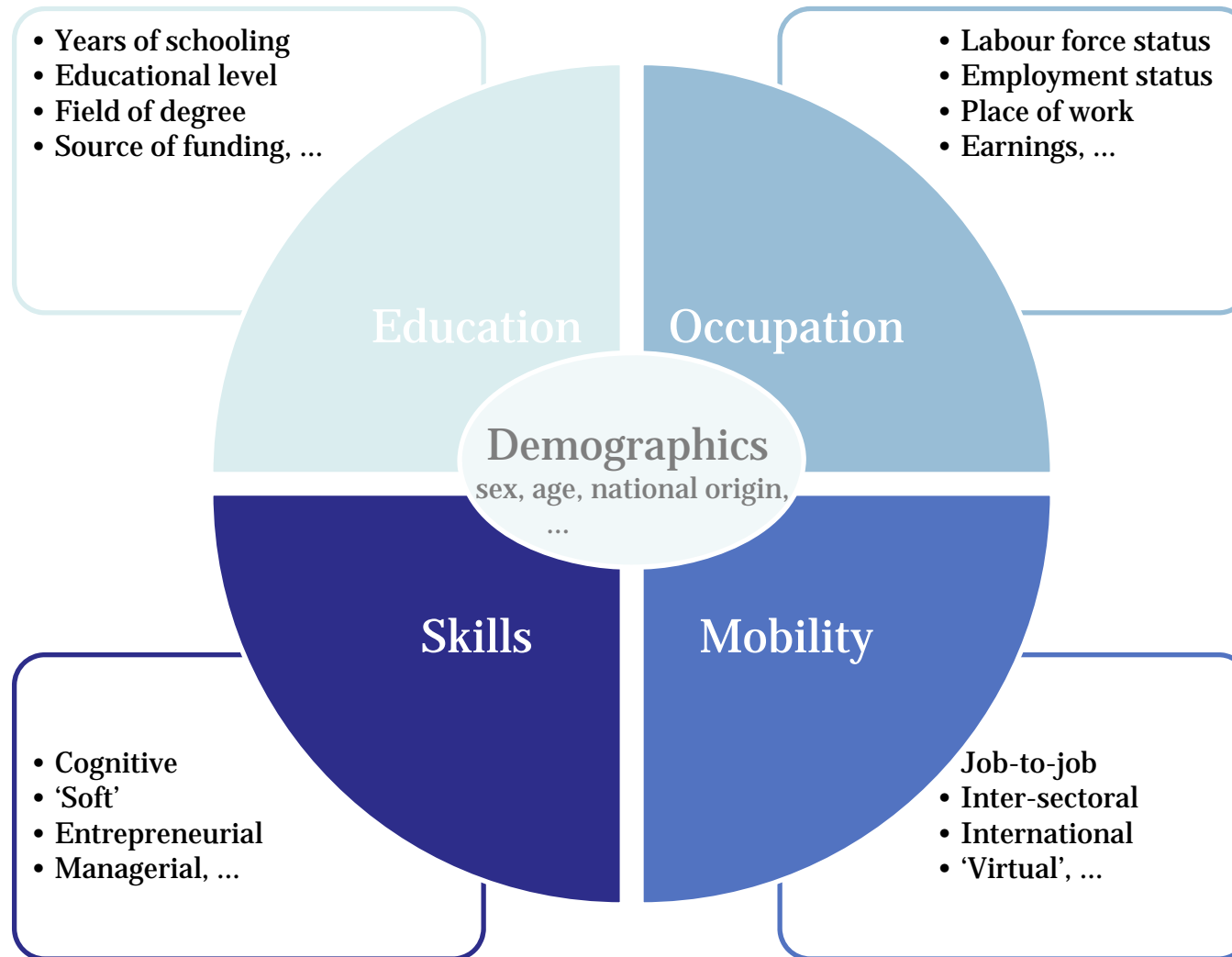
OECD DSTI work on human resources

- ✓ Mobilising human resources for innovation (2000)
- ✓ Innovative people, mobility of skilled personnel in national innovation systems (2001)
- ✓ International mobility of the highly skilled (2002)
- ✓ Changing demand and supply for S&T professionals in a globalised economy (2006)
- ✓ Women in Scientific Careers: Unleashing the Potential (2006)
- ✓ The global competition for talent (2008)
- ✓ Tertiary education for the knowledge society (2008)
- ✓ Skills for innovation [DSTI/STP/RIHR(2010)8]

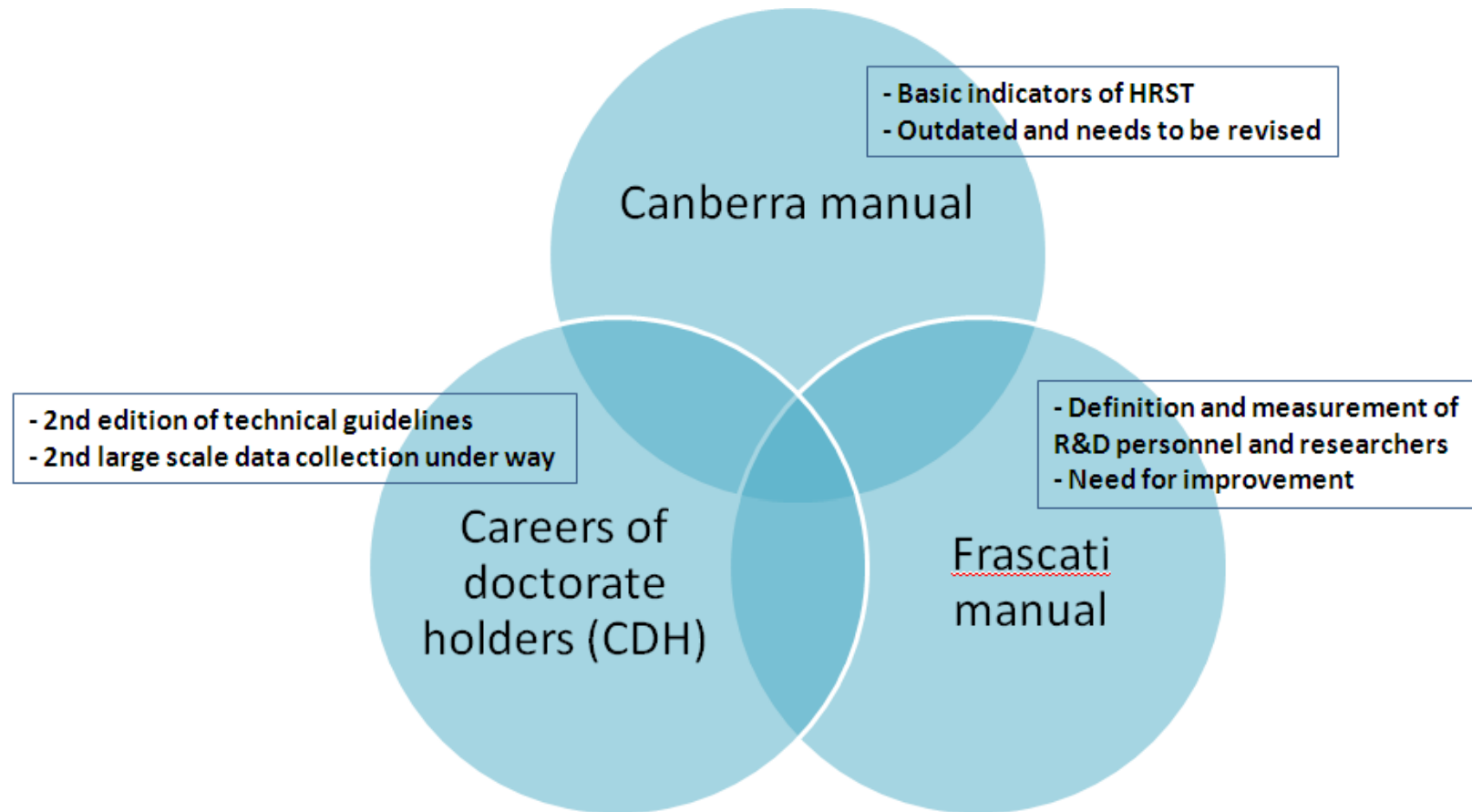
Contribution of human resources in science, technology, innovation and R&D



HRST main measurement dimensions



HRST measurement framework





Definition of HRST in the Canberra manual

HRST are people who fulfil one or other of the following conditions:

- a) successfully completed education at the third level in an S&T field of study (ISCED-97 5/6);
- b) not formally qualified as above, but employed in a S&T occupation where the above qualifications are normally required (ISCO-88 1&2&3).



Typical data sources for HRST

- **Education statistics**
- **Labour force surveys**
- **Censuses**
- Population registers
- National administrative systems for regulating and monitoring immigration
- Administrative systems relating to temporary residence or work permits for non-nationals
- Specific surveys



OECD data sources for HRST

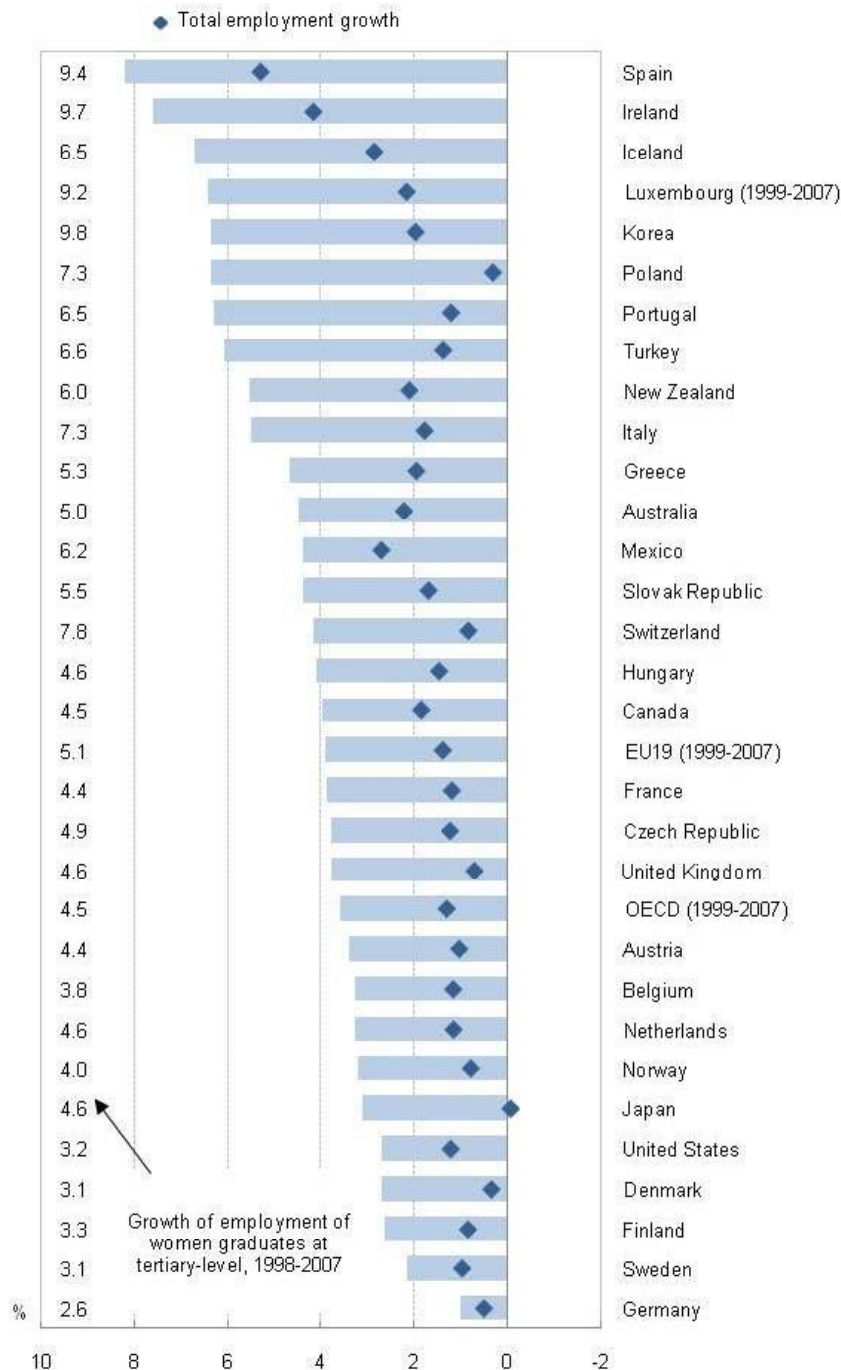
- OECD Education database
- OECD Educational attainment database
- Database on immigrants in OECD countries (DIOC)
- OECD ANSKILL database
- OECD/UIS/ Eurostat CDH data collections
- OECD R&D database
- External databases (e.g. NSF, IIE)



List of indicators in 2009 STI Scoreboard

www.oecd.org/sti/scoreboard

- International mobility of doctoral students
- Foreign scholars in the United States
- New graduates at first-stage university level
- New graduates at doctoral level
- Human resources in science and technology
- Employment of tertiary-level graduates
- Employment of doctorate holders
- Earnings by educational attainment



Employment growth of tertiary level graduates, 1998-2007

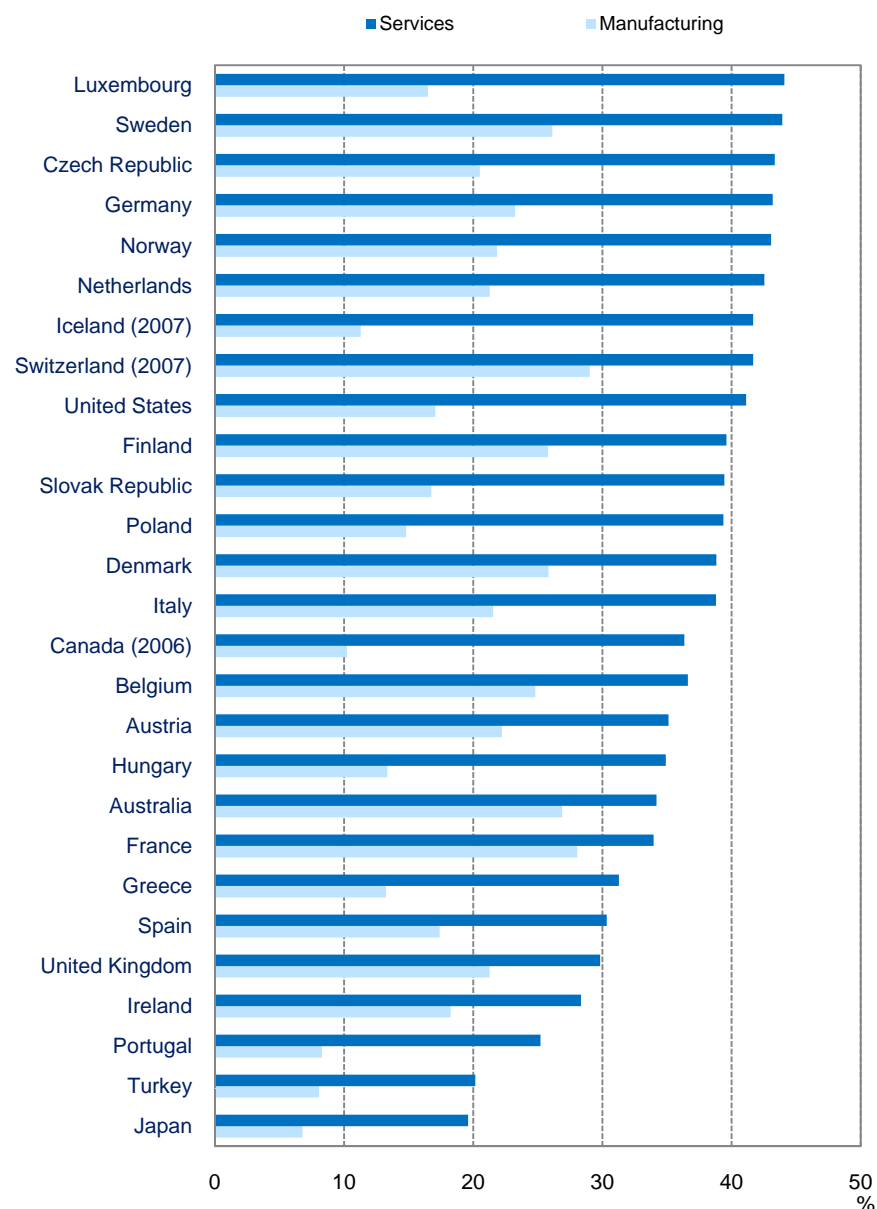
Average annual growth rates

The OECD Educational Attainment Database provides data on population at different levels of education distributed by sex, age and work status (employed, unemployed, inactive). It is compiled from member countries' labour force surveys and/or the European labour force survey. Adjustments are made to ensure comparability across countries, notably concerning national levels of education, which are recoded according to the International Standard Classification of Education (ISCED 1997).

Share of HRST employees by industry, 2007

As a percentage of total employees in the industry

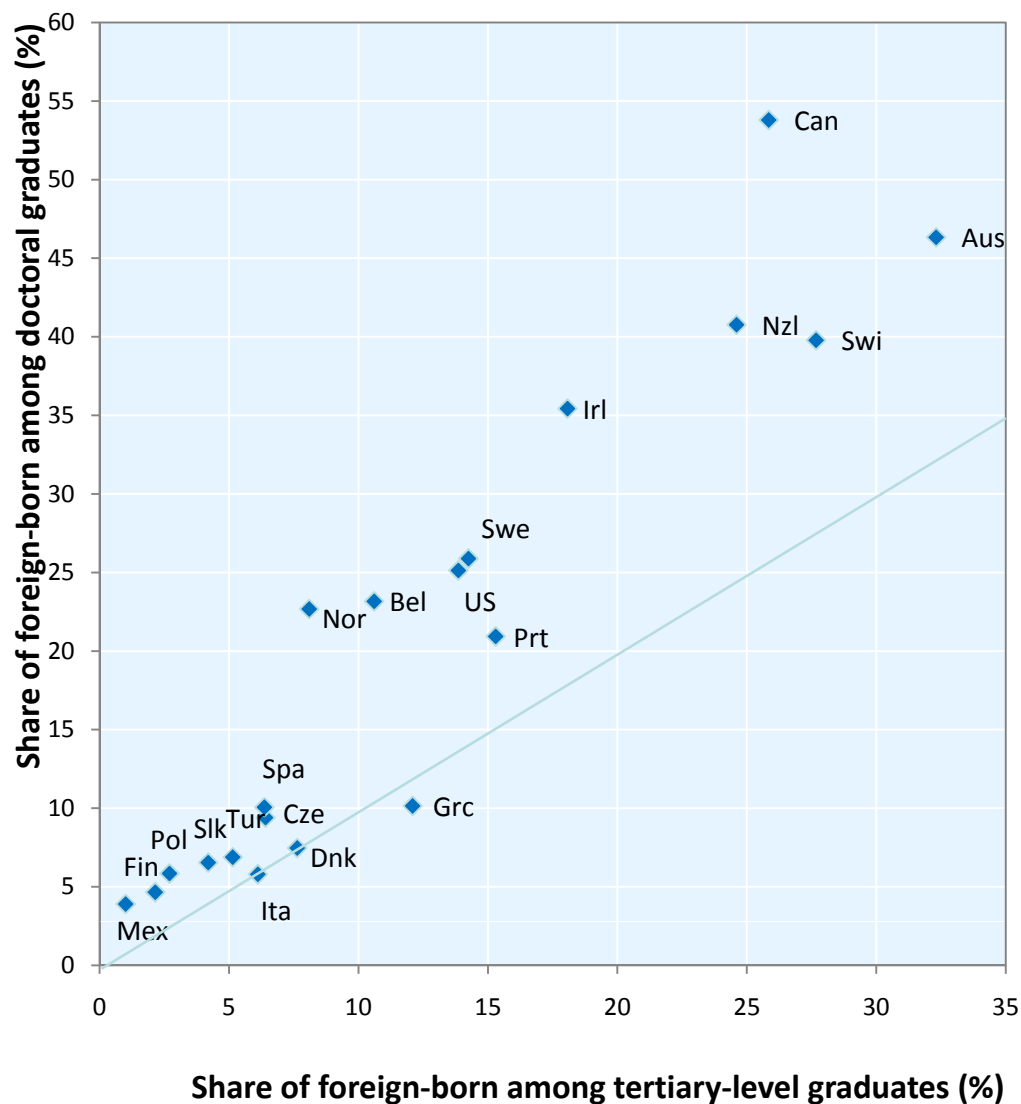
The OECD's ANSKILL database aims to provide information at the industry level about employment and skill composition. The database matches industry data at the 2-digit level (classified according to the International Standard Industrial Classification [ISIC] Revision 3) to occupations at the 2-digit level (classified according to the International Standard Classification of Occupations [ISCO] – 88). It also includes an additional proxy for skills, in the form of data on educational attainment of employees (classified on the basis of the International Standard Classification of Education [ISCED-97]). The database covers 26 countries, mostly over the 1997-2005 period (although 7 countries have a much more limited time coverage).



Internationalisation pattern of the highly skilled population

These data come from the Database on immigrants in the OECD countries (DIOC):

The data are based on population censuses of OECD countries for the 2000 census round, which included information on demographic characteristics (age and gender), duration of stay, labour market characteristics (labour market status, occupations, sectors of activity), fields of study, educational attainment and place of birth. Data can be downloaded from www.oecd.org/migration/dioc.





Careers of Doctorate Holders (CDH) project www.oecd.org/sti/cdh

- HRST cover a very broad and heterogeneous population
- The Canberra manual recommends focus on more specific sub-populations of interest
- Doctorate holders are the most qualified and are trained for research → they play a key role in the creation and dissemination of knowledge and innovation



Careers of Doctorate Holders (CDH) project

www.oecd.org/sti/cdh

- A joint OECD/Eurostat/UNESCO project launched by the OECD Secretariat in 2004
- An expert group formed of representatives from national statistical bodies (participation on a voluntary basis)
- Technical guidelines: methodological guidelines, model questionnaire and output tables to report data at the international level
→ OECD Working paper DSTI/DOC(2010)1



Careers of Doctorate Holders (CDH) project

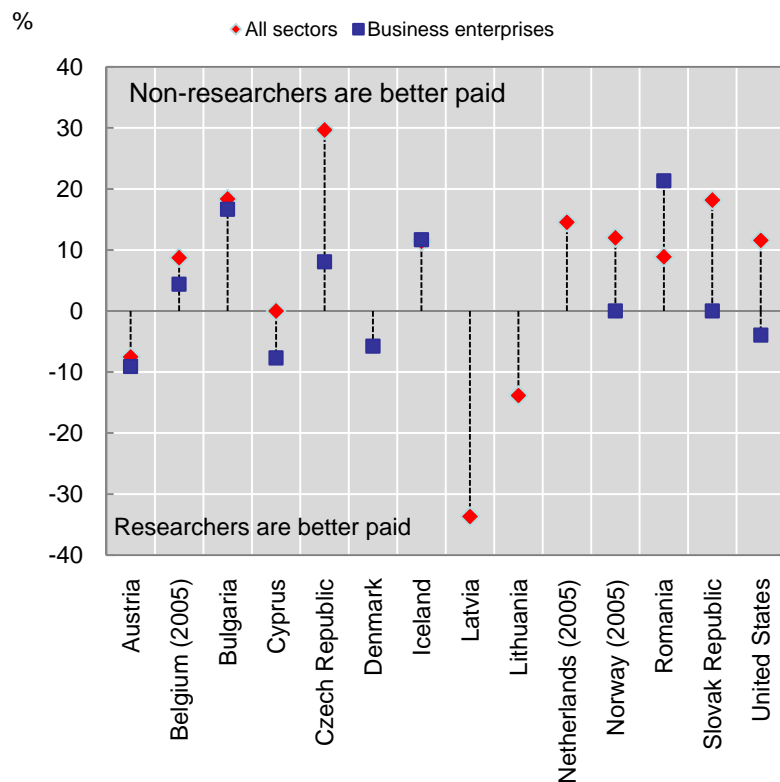
www.oecd.org/sti/cdh

- First pilot data collection in 2005 (7 countries)
→ OECD Working paper DSTI/DOC(2007)2
- First large scale data collection in 2007 (25 countries) provided a rich set of data
→ OECD Working paper DSTI/DOC(2010)4
- Next data collection under preparation for 2010
- Data collected on personal, educational, labour market, employment and mobility characteristics as well as perception and satisfaction with work

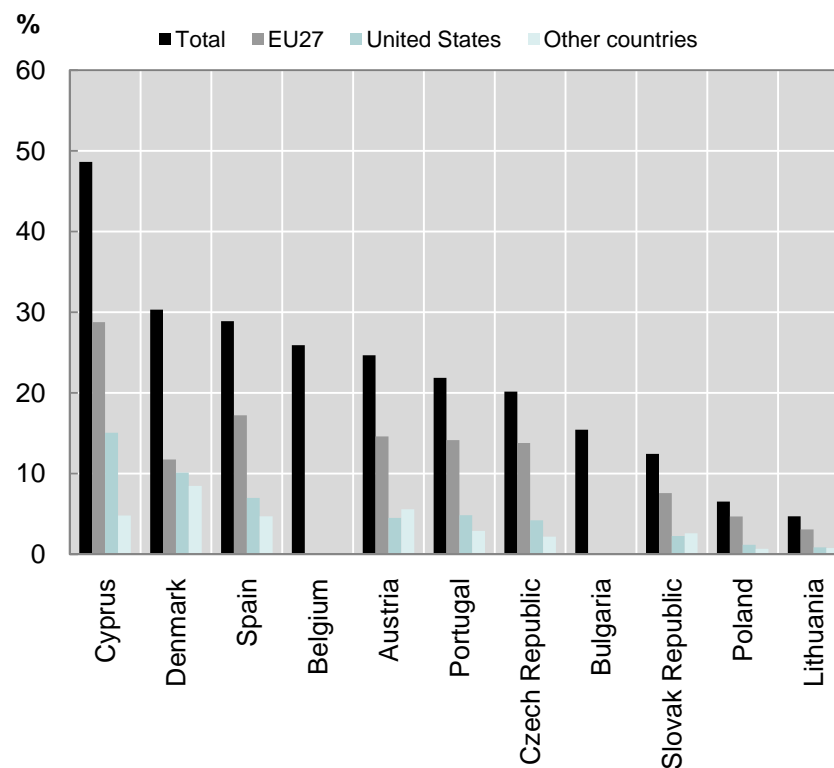
Careers of Doctorate Holders (CDH) project

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Percentage difference in median gross annual earnings, 2006



Percentage of national citizens having lived/stayed abroad in the past ten years, 2006



Looking forward: HRST

Basic indicators of HRST are available but definitions are broad and aggregate numbers mask very heterogeneous situations across

degrees, occupations, FOS, industries, countries, etc.

→ need for different levels of analysis: macro (basic aggregates), meso (e.g. ANSKILL) and micro

→ need to target specific populations: researchers, doctorate holders, ...

→ need for in depth analyses through the use of micro data, econometric analyses, linked employer/employee surveys, etc. → “Take the LEED”
[DSTI/EAS/STP/NESTI(2009)12/REV1]



Looking forward: R&D personnel and researchers

- Indicators of R&D personnel and researchers are:
 - Not sufficiently developed to respond to policy needs
 - Are challenged by diverse initiatives to respond to these needs (e.g. EC study on the remuneration of researchers in the public and private sector, the MORE project, the DIME project on external engagement of researchers, ...)
- There is an urgent need for addressing the measurement of R&D personnel and researchers in a more comprehensive way in the Frascati manual

Looking forward: skills

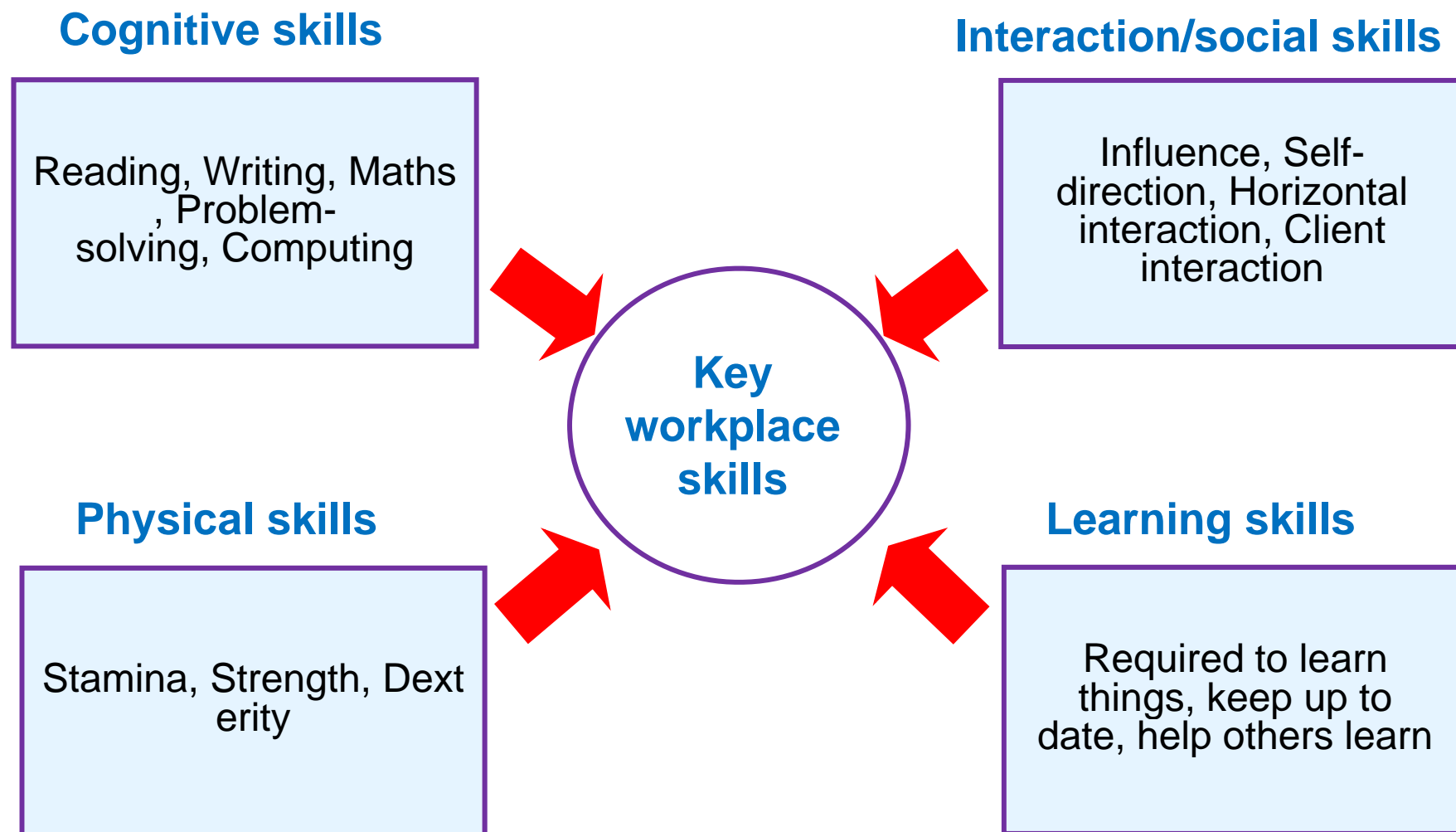
- The measurement of skills is complicated by the lack of an agreed definition
 - Skills are often approximated by qualification/degree level or occupation
- Common families of skills cover: basic skills (reading, writing, numeracy, 'digital-age literacy'), academic skills, technical skills, generic skills, 'soft' skills, leadership, entrepreneurship, creativity [DSTI/STP/RIHR(2010)8]

Looking forward: skills

- The OECD PIAAC survey: Programme for the International Assessment for Adult Competencies
 - builds on previous international surveys of adult skills, allowing literacy levels to be compared over a 13-17 year period for some countries;
 - assesses adults' literacy and numeracy skills and their ability to solve problems in technology-rich environments;
 - collects a broad range of information from the adults taking the survey, including how their skills are used at work (Job Requirement Approach module) and in other contexts such as the home and the community;
 - will take place across OECD and partner countries in 2011 with results published in 2013



Key generic works skills measured by the JRA module



Looking forward: skills

- The experience gained from the PIAAC JRA module could be taken forward
 - in other surveys on human resources (e.g. CDH)
 - in innovation surveys as a complementary module to measure skills for innovation at the individual level?
- The CIS 2010 includes a module on creativity and skills with two questions at the enterprise level: one on employment of individuals with certain skills and the other one on methods to stimulate new ideas or creativity

What to do next?

- Continue consolidating, developing, expanding:
 - Our methodological framework (Canberra, CDH, Frascati, skills?)
 - Our databases and indicators (ANSKILL, CDH, R&D personnel and researchers, other HREST)
- Develop measures at all levels of analysis (macro, meso, micro)
- Develop new measures in some challenging areas such as earnings, mobility, skills, etc.
- **This needs strong policy support and involvement of the statistical community, matched with the necessary resources at both international and national levels.**

Thank you!

laudeline.auriol@oecd.org