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Parallel session 1
Digitisation of economies and the 4th industrial revolution: changing work, jobs and skills

# SKILLS FOR A DIGITAL WORLD

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2016 MINISTERIAL MEETING

THE DIGITAL ECONOMY: INNOVATION, GROWTH AND SOCIAL PROSPERITY





**http://www.oecd.org/internet/ministerial/themes/jobs-skills/**

# Skills for a Digital World

**Policy objectives**

1. Ensure that ICT diffusion is accompanied by the development of the skills needed for effective use

2. Increase the responsiveness of national skills systems to these changes (OECD Skills Strategy)

3. Seize the learning opportunities created by digital technologies

# *Identifying the Demand of New Skills*

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# Identifying the demand of new skills

1. ***ICT specialist skills***

   Job requirement to program software, develop applications, manage networks, etc.

2. ***ICT generic skills***

   Job requirement of ICT use in daily work (i.e. send e-mail, find work-related information on the Internet, use software)

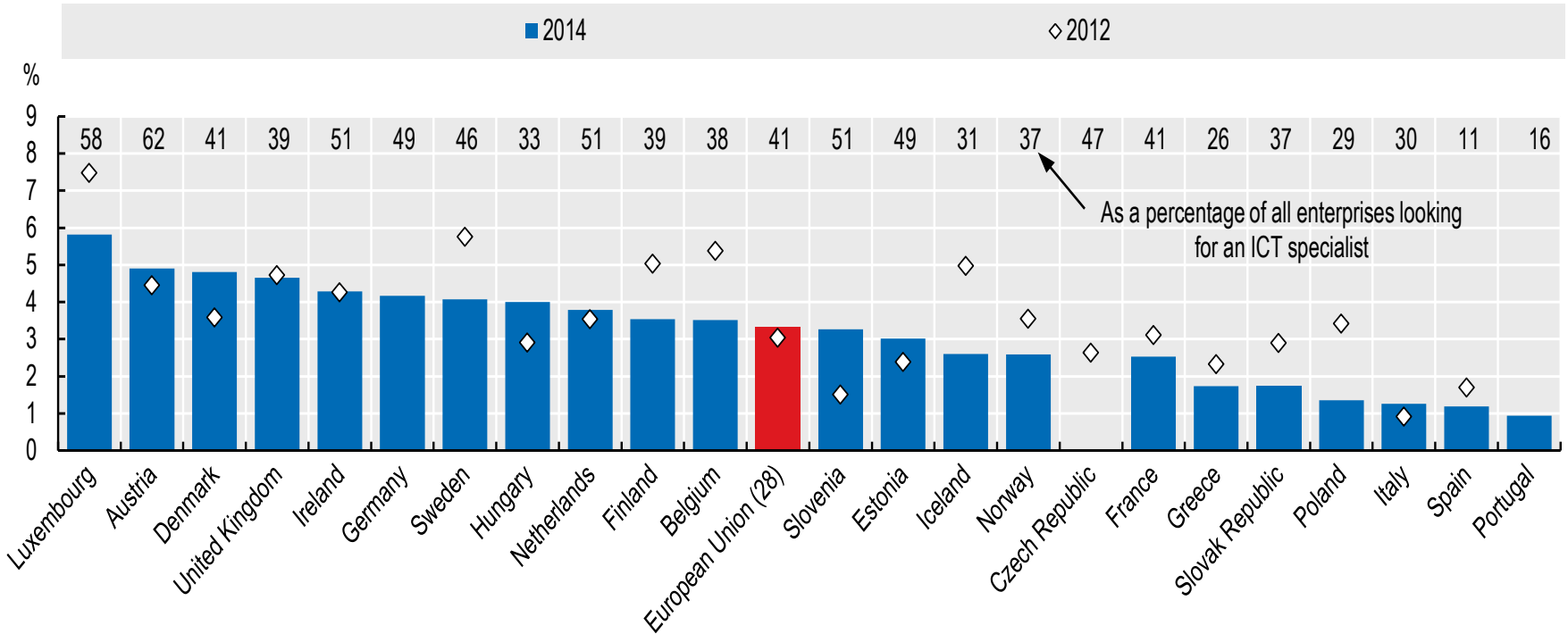
3. ***ICT complementary skills***

   Job requirement to carry out work in a technology-rich environment, e.g.: soft skills, e-leadership, etc.

# Shortage of ICT specialists is probably overrated…

## Enterprises that reported hard-to-fill vacancies for ICT specialists, 2012 and 2014

*As a percentage of all enterprises*




Source: OECD (2016) New Skills for the Digital Economy, *OECD Digital Economy Papers*, N. 258.

# Shortage of ICT specialists is probably overrated…

ICT specialists shortage should result in:

- Upward trend in job vacancy rates

*and/or*

- Longer job vacancy duration

*and/or*

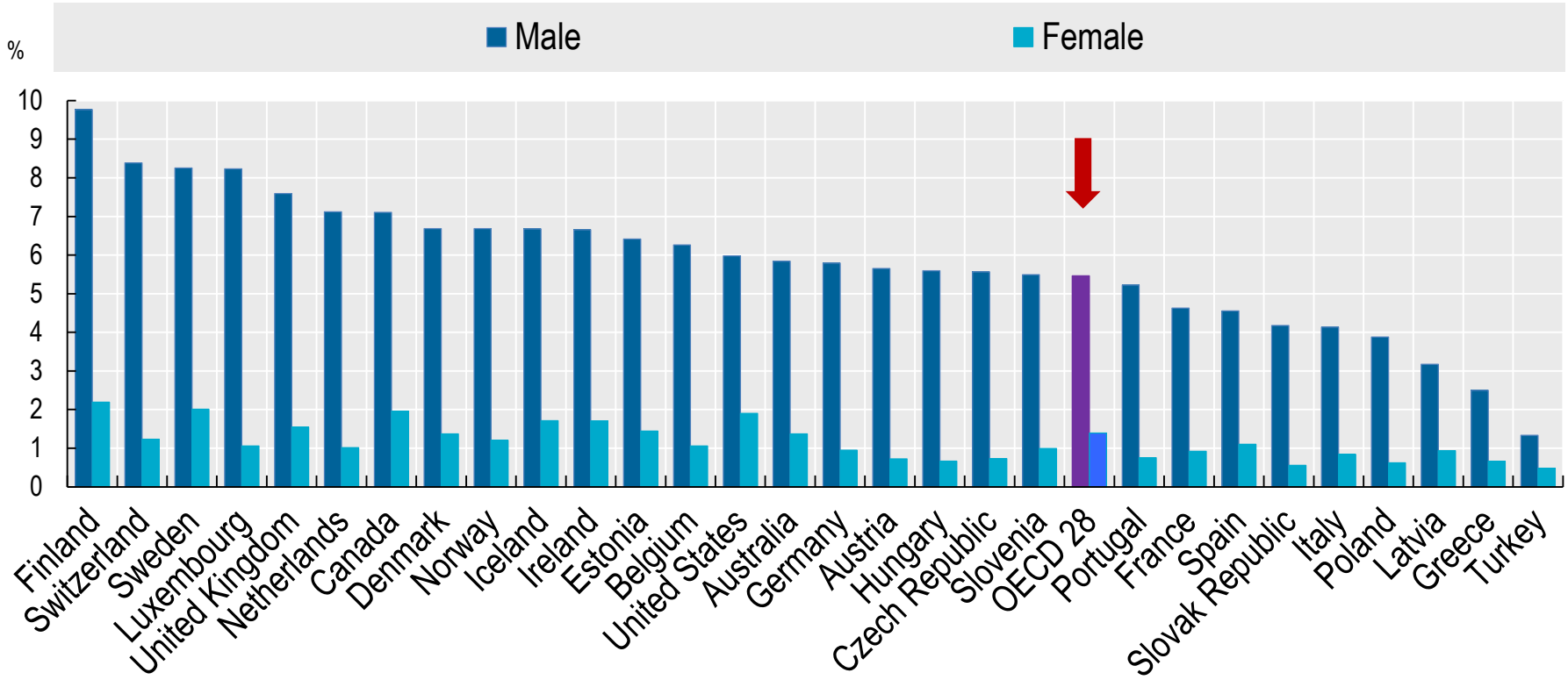
- Increase in wage rates

Weak evidence of the above

# … but more could be done for women

## ICT specialists by gender, 2014

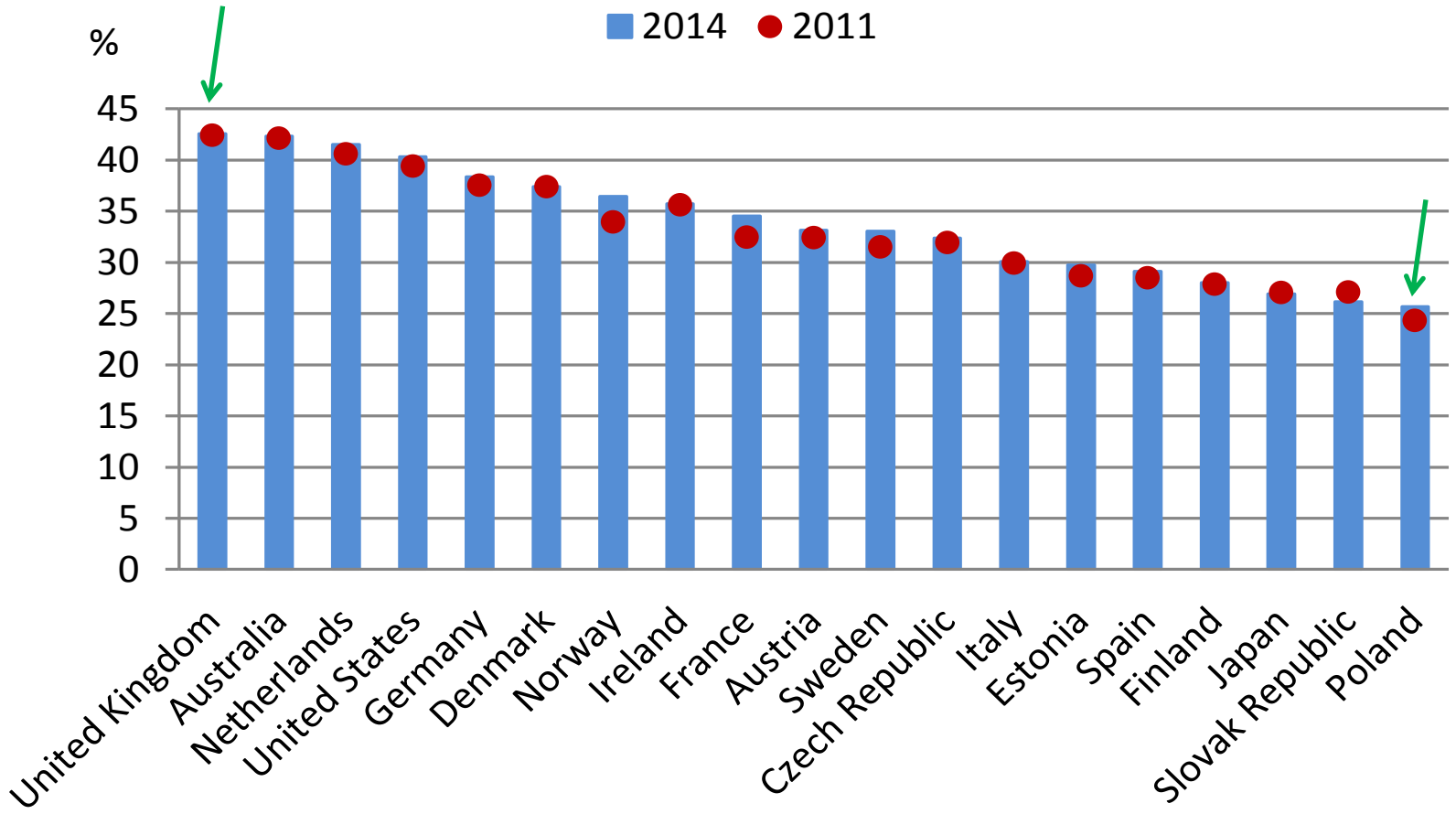
As a percentage of all male and female workers




Source: OECD (2016) Skills for a Digital World, *OECD Digital Economy Papers*, N. 250.

# Demand for **ICT generic skills** by country

Share of employed individuals using ICTs daily at work, 2011 and 2014




Source: OECD (2016) New Skills for the Digital Economy, *OECD Digital Economy Papers*, N. 258.

# Top-20 ICT-intensive occupations across countries

## ***18*** out of the top-20 ICT-intensive occupations are not ICT specialist occupations

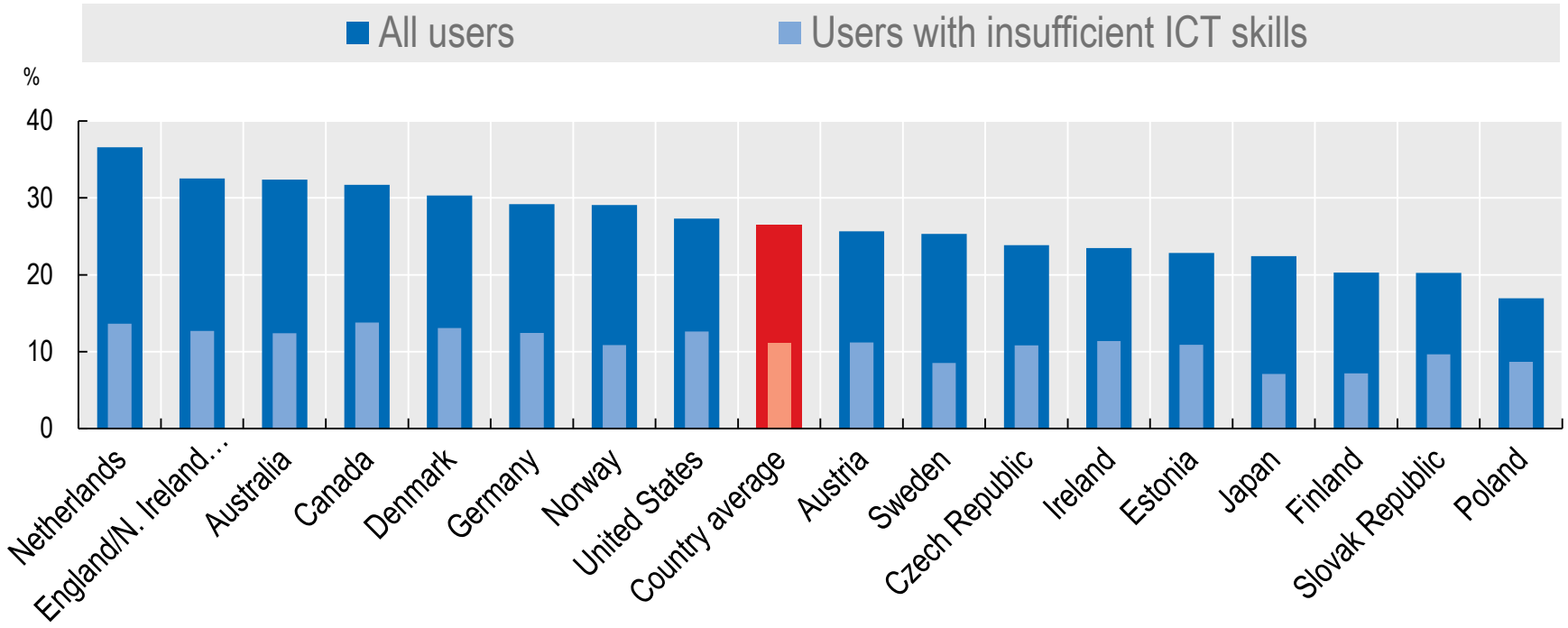
| Rank | Occupation | ISCO-08 | Frequency |
|---|---|---|---|
| 1 | ***Finance professionals*** | 241 | 100% |
| 2 | ***Administration professionals*** | 242 | 94% |
| 3 | ***Legal professionals*** | 261 | 94% |
| 4 | ***Business services and administration managers*** | 121 | 89% |
| 5 | ***Sales, marketing and development managers*** | 122 | 83% |
| 6 | ***University and higher education teachers*** | 231 | 78% |
| 7 | ***Administrative and specialised secretaries*** | 334 | 78% |
| 8 | ***Physical and earth science professionals*** | 211 | 72% |
| 9 | ***Authors, journalists and linguists*** | 264 | 72% |
| 10 | Information and communications technology service managers | 133 | 67% |
| 11 | ***Mathematicians, actuaries and statisticians*** | 212 | 67% |
| 12 | ***Engineering professionals (excluding electrotechnology)*** | 214 | 61% |
| 13 | Database and network professionals | 252 | 61% |
| 14 | ***Regulatory government associate professionals*** | 335 | 56% |
| 15 | ***Secretaries (general)*** | 412 | 56% |
| 16 | ***Numerical clerks*** | 431 | 56% |
| 17 | ***Professional services managers*** | 134 | 50% |
| 18 | ***Social and religious professionals*** | 263 | 50% |
| 19 | ***Financial and mathematical associate professionals*** | 331 | 50% |
| 20 | ***Business services agents*** | 333 | 50% |

Source: OECD (2016) New Skills for the Digital Economy, *OECD Digital Economy Papers*, N. 258.

# Few workers use ICTs daily, even fewer have sufficient skills

## Workers using office software at work every day

As a percentage of all workers

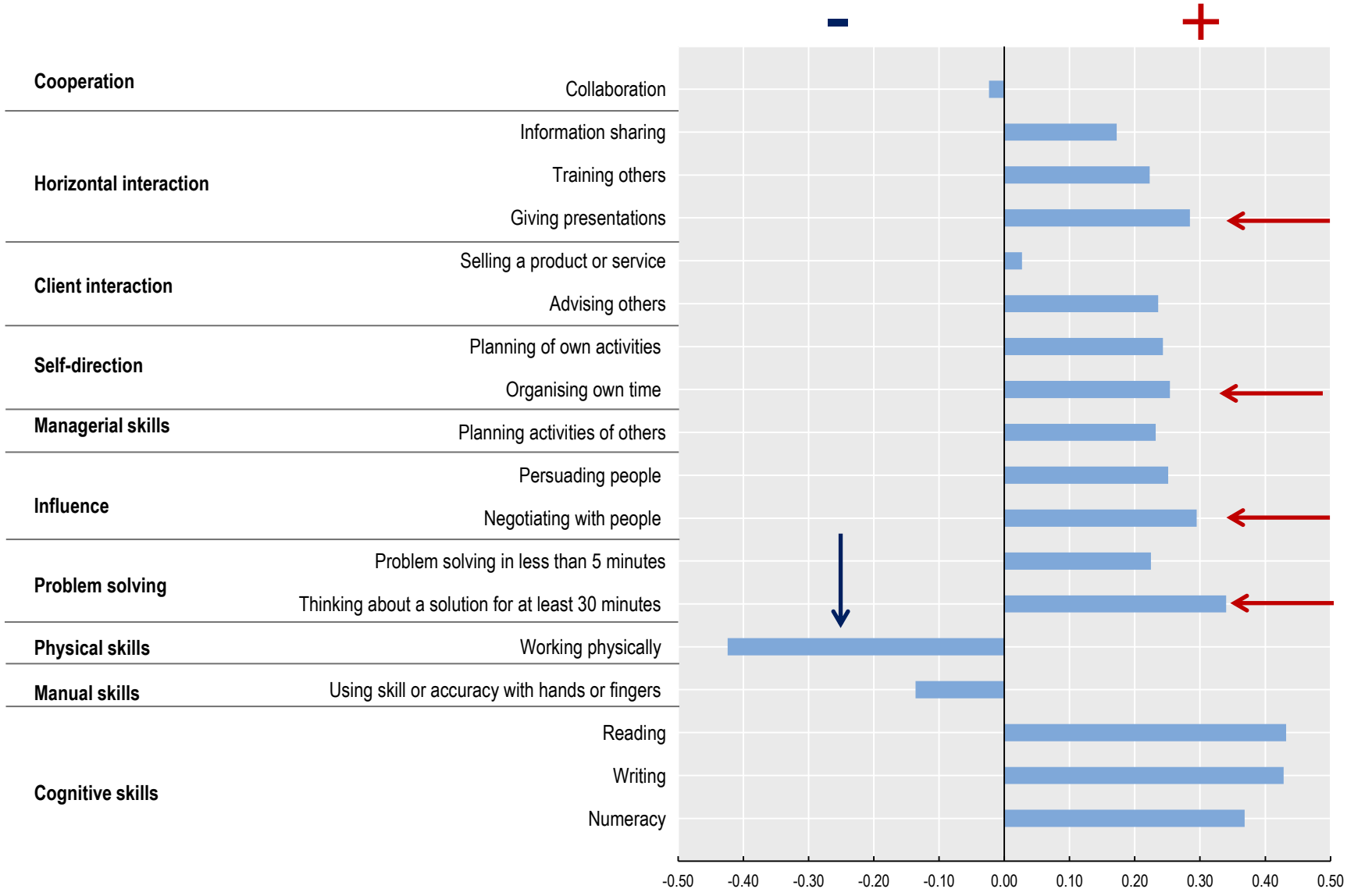



Source: OECD (2016) Skills for a Digital World, *OECD Digital Economy Papers*, N. 250.

# The demand for ICT-complementary skills

- ICTs are changing the way work is carried out
- Demand for ICT-complementary skills
- Ability to carry out work in a workplace shaped by ICTs, e.g.
  - Higher frequency of information calls for better capability to plan in advance and to adjust quickly
  - More horizontal work organisations calls for more cooperation and stronger leadership
  - Wider diffusion of information among workers increases the importance of management and coordination
  - The sales skills in face-to-face commercial transaction are not the same as in an anonymous e-commerce sale

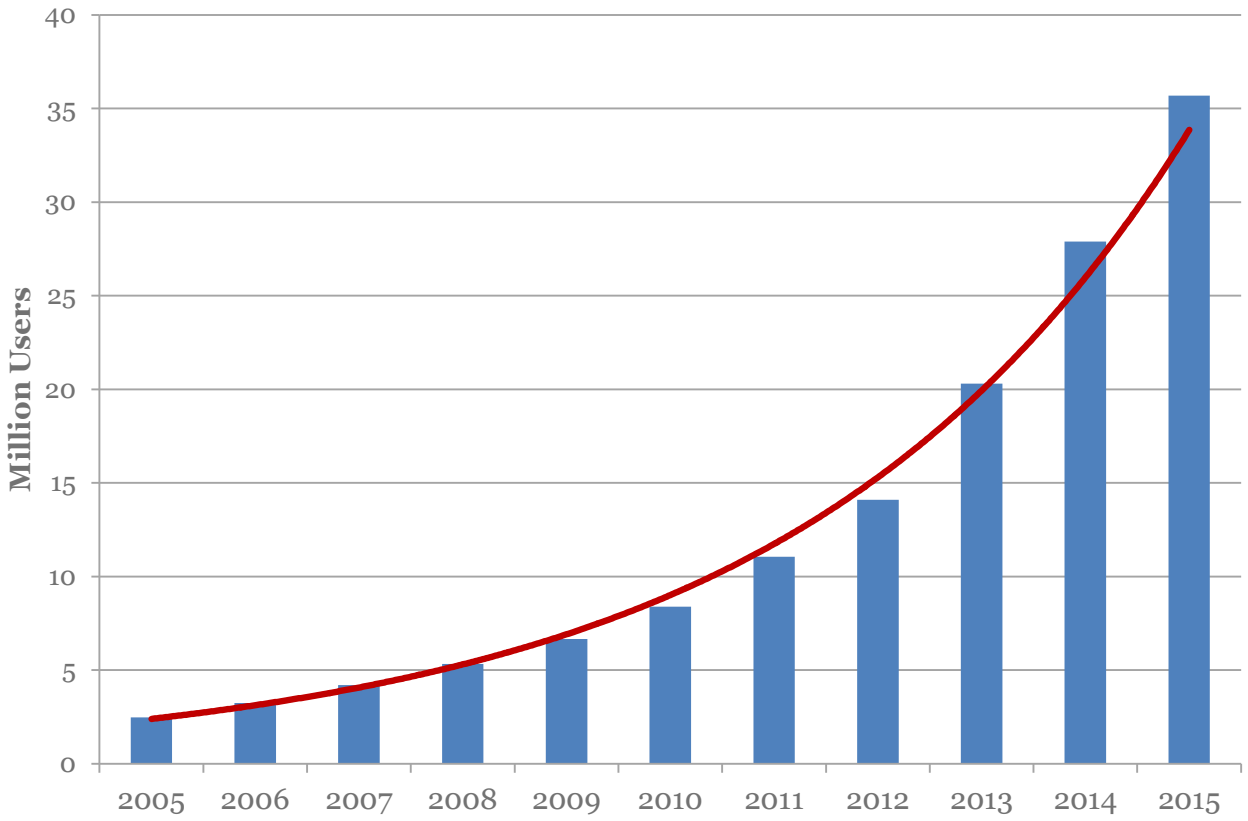
# ICT complementary skills




Source: OECD (2016) Skills for a Digital World, *OECD Digital Economy Papers*, N. 250.

# The responsibility for skills development may be shifting to workers

**Registered users on selected job-matching platforms (2005-2015)**




*Source*: OECD (2016) New Markets and New Jobs, *OECD Digital Economy Papers*, N. 255.

# *The OECD Skills Strategy: a Focus on the Digital Economy*

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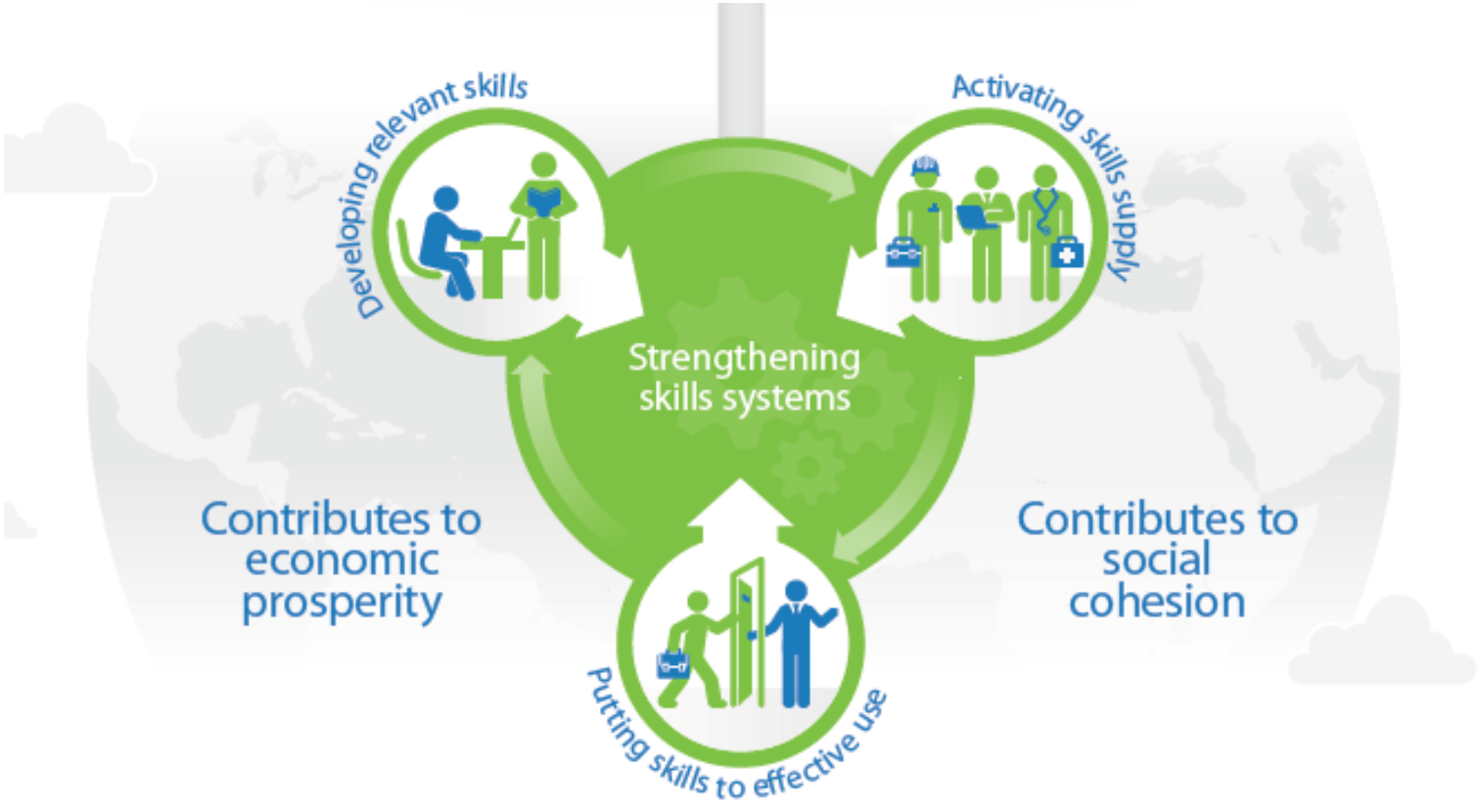
# The OECD Skills Strategy: 3 pillars




**Source: OECD Skills Strategy Diagnostic reports**

# Developing relevant skills for the digital economy

- Adapt to rapid changes in occupations and skills demand
- Foundation skills, digital literacies, higher order thinking, social and emotional skills are key:
  - Digital literacies are positively correlated with reading performance (PISA 2015)
  - More even distribution of foundation skills may mitigate the negative employment effects of digital technologies

# School examples

- North Union Local Schools, Ohio, USA: *individualized learning*
- Swiss “Call Them Emotions”: *promotion of life skills and socio-emotional competencies*
- Learners Network Nanaimo Ladysmith, British Columbia, CA: *learning as a socially constructed process*
- Mevo’ot a Negev school, Israel: *project-based learning*

# State/national examples

- **Sweden**: ICT education in curricula as learning outcome. “Every pupil …must be able to use modern technology as tool for knowledge seeking, communication, creation and learning”.
- **Germany**: national computer science contest for school children “Informatik-Biber”
- **Japan**: Curricular reform to strengthen critically and creatively thinking and problem solving. Cross curricular learning
- **Alberta, Canada**: new framework for critical thinking, problem solving and decision making as key cross-curriculum competencies
- **EU**: “European e-Competence Framework” and “e-Skills Strategy”

# Activating skills in the digital economy

- Rapid population ageing, high rates of youth unemployment and increasing dependency ratios…
- … call for skills-based labour market activation policies

Policy examples:

- **Spain**: EU Youth Guarantee programme to address digital skills gaps
- **Ireland**: “Fast Track Into Information Technology” for long term unemployed
- **Luxembourg**: e-skills for Women
- **Belgium**: Interface 3

# Activating skills in the digital economy

**Skills Assessment and Anticipation – digital skills**

- OECD survey: 29 out of 34 countries do some
- **Denmark**: CGE model forecasts skills needs over a 50 years (DREAM)
- **Australia**: Industry Skills Councils use interviews and focus groups
- **Canada**: Canadian Occupational Projection System (COPS) and Sectorial Initiative Programme
- **Ireland**, **Austria** and **Norway**

# Putting digital skills to effective use

- Changes in technology require lifelong learning to keep skills up-to-date
- Young people and older workers use digital skills less than prime age workers (PIAAC)
- Training is key for firms competing in the global economy
- Training opportunities uneven among workers

# Putting digital skills to effective use

Policy examples

- *Innovative Workplaces* (OECD, 2010)
- **Netherlands**: Technology Pact 2020 deals with obsolescence of ICT skills
- **Korea**: support for ICT training in SMEs
- **Ireland**: *Skillnets* promotes workplace training and upskilling by SMEs
- **EU**: LEAD program for SMEs as part of the e-Leadership Initiative
- **EU DIGICOMP** in **Italy**, **Spain** and the **UK**
- **Netherlands**: PPP Working Group on e-CF
- **UK**: Commission on Employment and Skills

# *Leveraging Digital Technologies for Better Skills*

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# Leveraging digital technologies for better skills

Digital technologies create new opportunities for education:

- Can foster new forms of learning
- Change expectations on the teaching profession
- Provide opportunities for lifelong learning
- Can better inform skills development
- Provide intelligence on labour markets

# Digital technologies foster new forms of learning

Technology can facilitate teaching practices, e.g. "***flipped classroom***"

Video lectures from ***The Khan Academy***:

- free up time from lecturing
- focus on interactive group learning
- focus on learners' specific needs

# Digital technologies foster new forms of learning

In technology-enabled learning environments, students work in groups and/or interact with each other

***Canada***: Elementary Connected Classroom (BC) students participate in videoconferencing, online collaborative work, online literature circles, and exchange of student-created multimedia content

# Digital technologies change expectations on teaching profession

- Over 50% of teachers report the need for professional development on the use digital technologies (TALIS 2012)

- **France** and **Italy** have developed programmes to foster teacher professional development in ICTs with online resources and competencies standards.

# Online courses provide opportunities for lifelong learning

Open Educational Resources (OERs) can be used to:

- efficiently target workplace training needs
- provide access to training for the unemployed

Examples:

- Deloitte encourages consultants to sign up for Coursera
- Yahoo reimburses selected ICT Coursera's courses
- Udacity's Nanodegree programmes provide ICT courses

But issues of recognition limit their use

# Data driven innovation can better inform skills development

OERs and digital administrative records enable the collection of data on skills development processes

Data analytics provide fine granularity that can help spotting weaknesses and address skills development needs

The ability to track individuals from early childhood to the labour market improve understanding of the school-to-work transition

# Digital technologies can provide intelligence on labour markets

Digital technology help to identify emerging skills needs, evolving demands and potential skills gaps in real time

Analysis of online vacancies can provide:

- detailed description of the skills required
- analysis of shifts in skills demands
- shifts in job profiles
- evidence of skills gaps at local level

# Key messages

- Digital skills are not only (mainly?) about ICTs
- Many lack ICT generic and complementary skills
- Increased importance of:
  - foundation skills
  - lifelong learning
- Two things we are bad at. Why?
- Seize the opportunities from digital technologies

# Further information

1. New Markets and New Jobs
2. Skills for a Digital World
3. ICTs and Jobs: Complements or Substitutes?
4. New Forms of Work in the Digital Economy
5. New Skills for the Digital Economy