



18TH OECD/JAPAN SEMINAR

EDUCATION 2030

Andreas Schleicher
Director for Education and Skills, OECD

INSIDE: A 14-PAGE SPECIAL REPORT ON TECH STARTUPS

The
Economist

JANUARY 18TH-24TH 2014

Economist.com

If the French ran America
China cracks down on microblogs
New opportunities for organised crime
Regulators go soft on Europe's banks
Google and the internet of things

**Coming to an office
near you...**

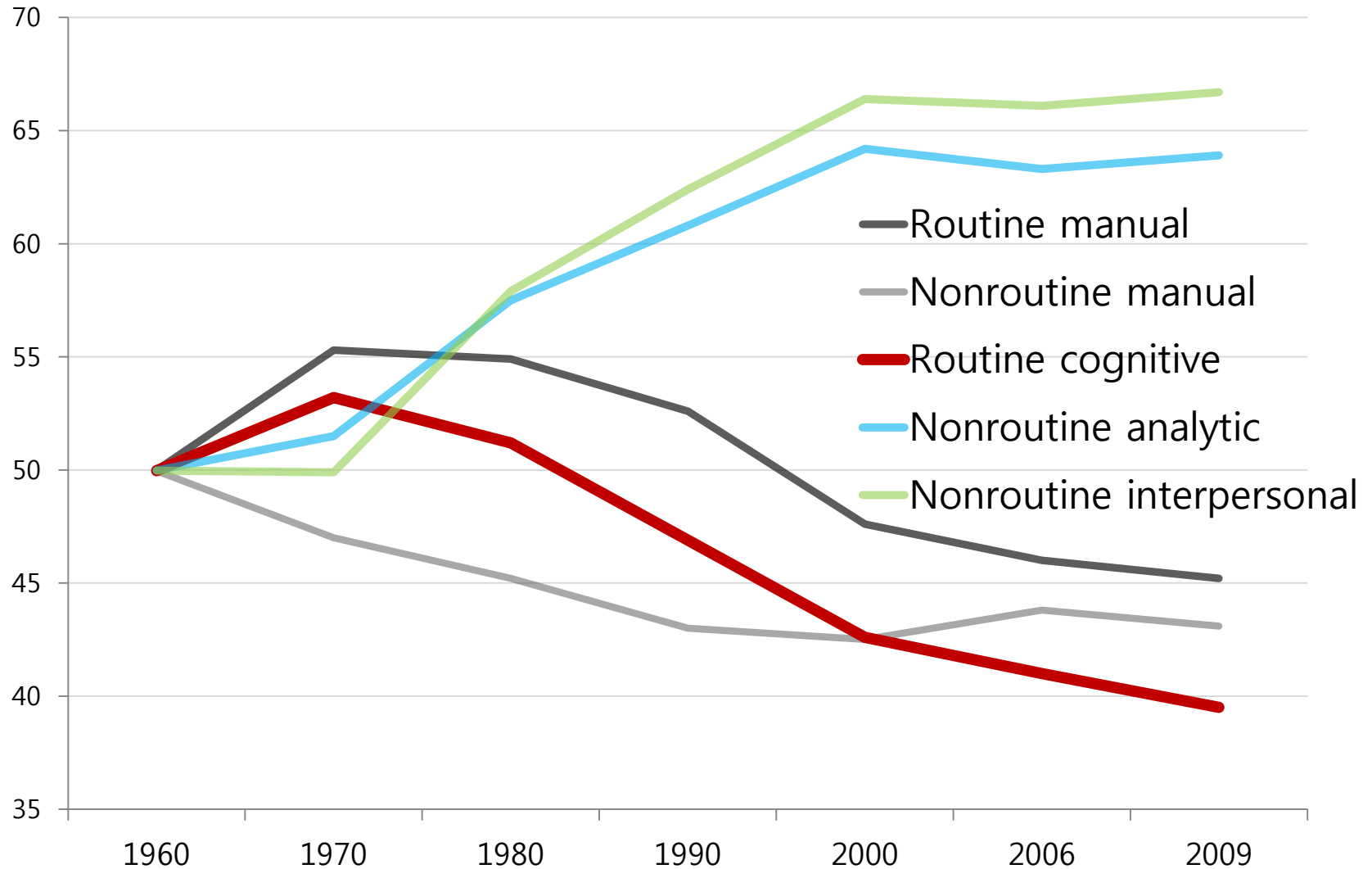
What today's
technology will do to
tomorrow's jobs

**The kind of things that
are easy to teach are
now easy to automate,
digitize or outsource**

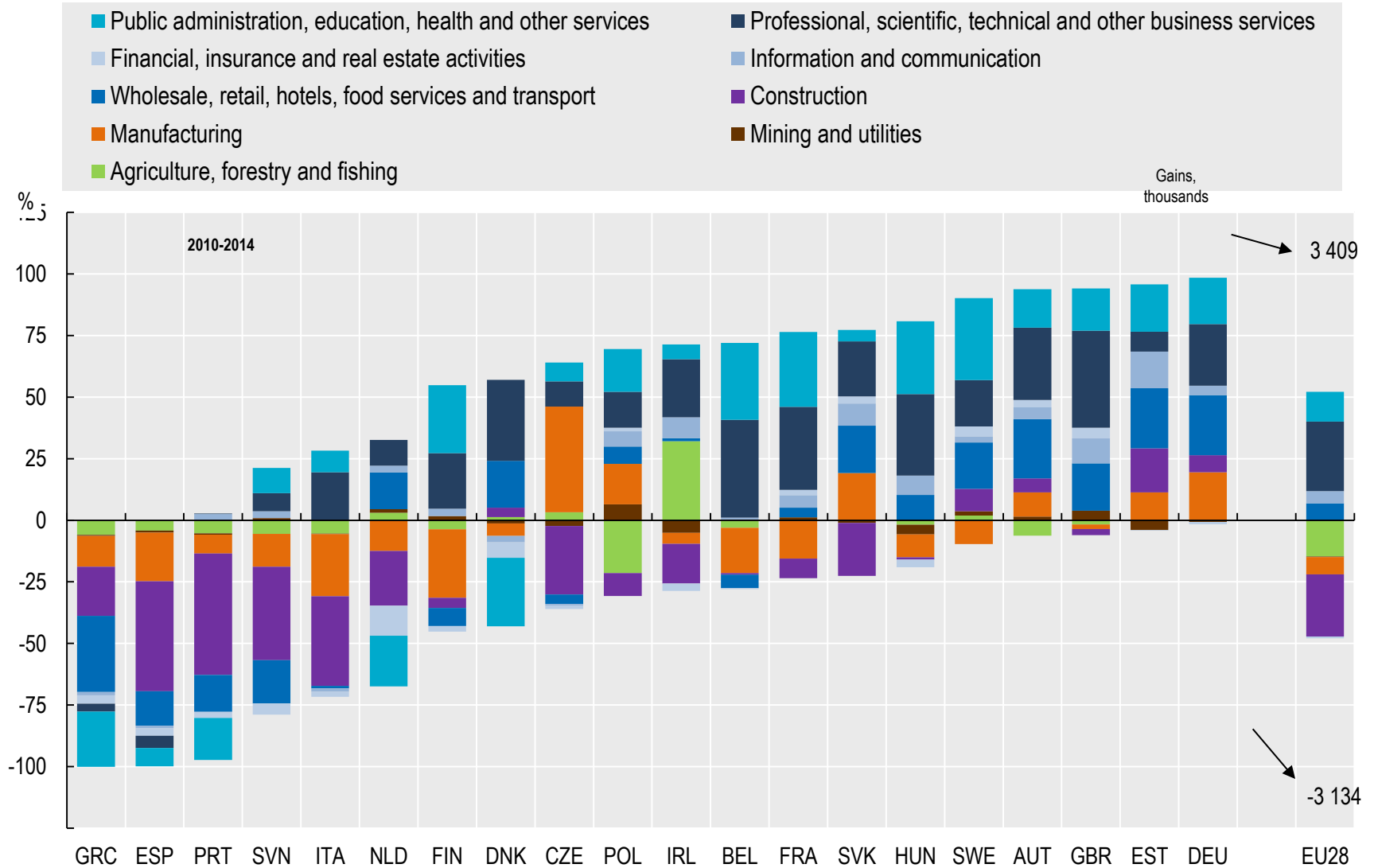
Changes in the nature of work

Trends in different tasks in occupations (United States)

Mean task input in percentiles of 1960 task distribution



Where people lost and gained jobs between 2010-14

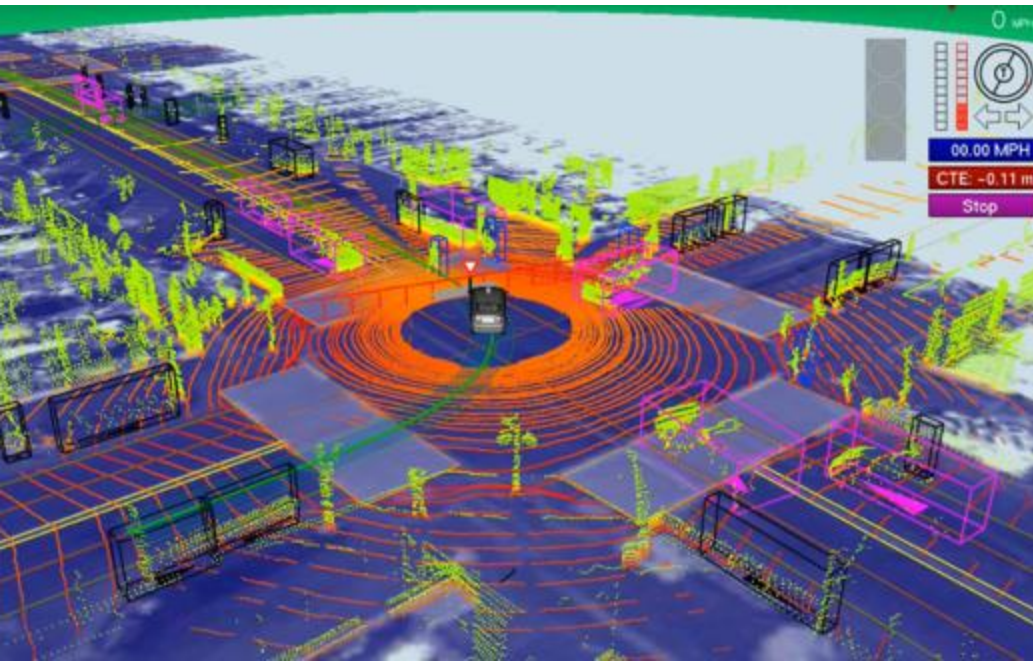


Robotics

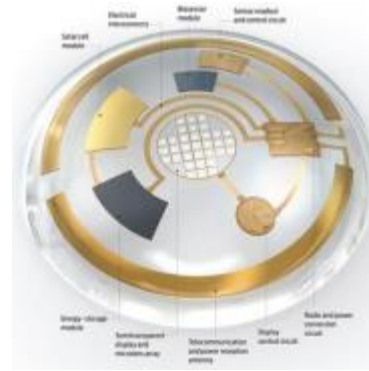


Google Autonomous Vehicle

>1m km,
one minor accident,
occasional human intervention



Augmented Reality



Inspired by: Center for curriculum redesign (CCR)



TomTom has 5 trillion data points on traffic, adding 6 billion per day.



BMW cars have 50 sensors, 7 cameras, could recognize open parking spots for other cars



GE expects to connect all its machines to the Internet, making them "smarter" and more efficient



Tesco exploits data on more than 100 market baskets a second and 6 million transactions a day

...unleashing firms that gain “scale without mass” ...



- 50\$B in sales,
- 54 000 employees,
- 1m / employee



US Average = 120k / employee



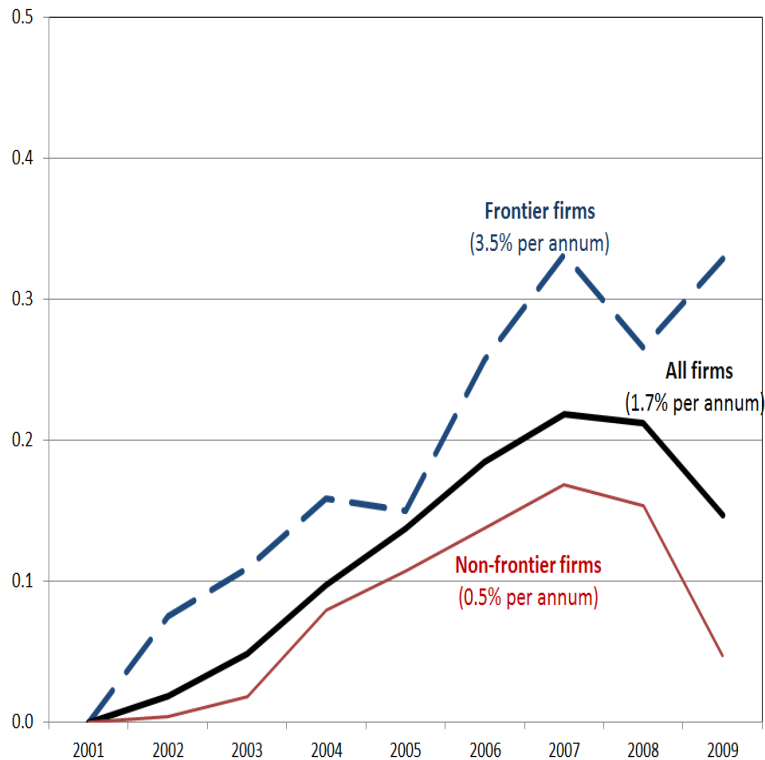
- 70\$B in sales
- 110 000 employees
- 600k / employee



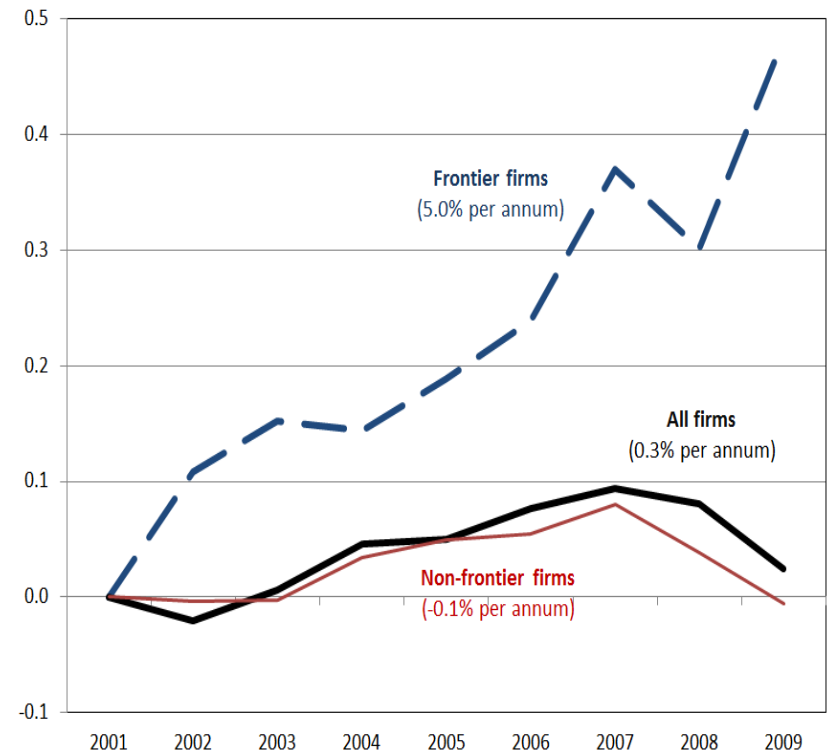
200k / employee

Labour productivity growth (2001 = 100)

Manufacturing

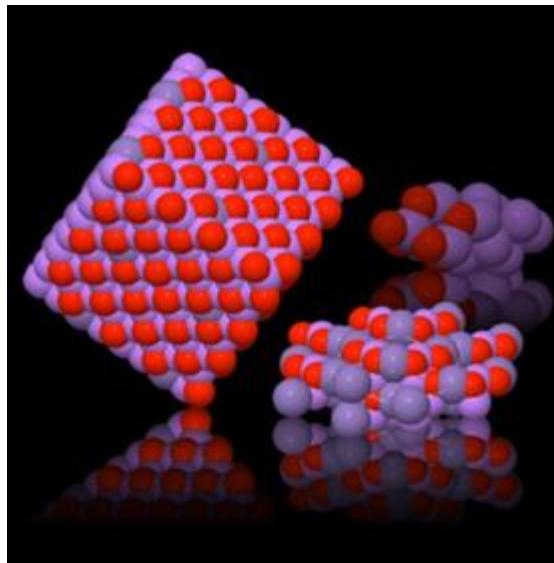
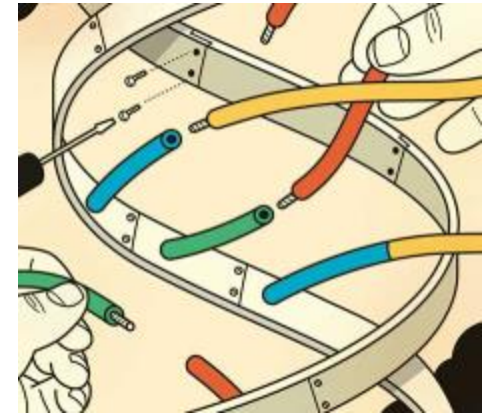


Services



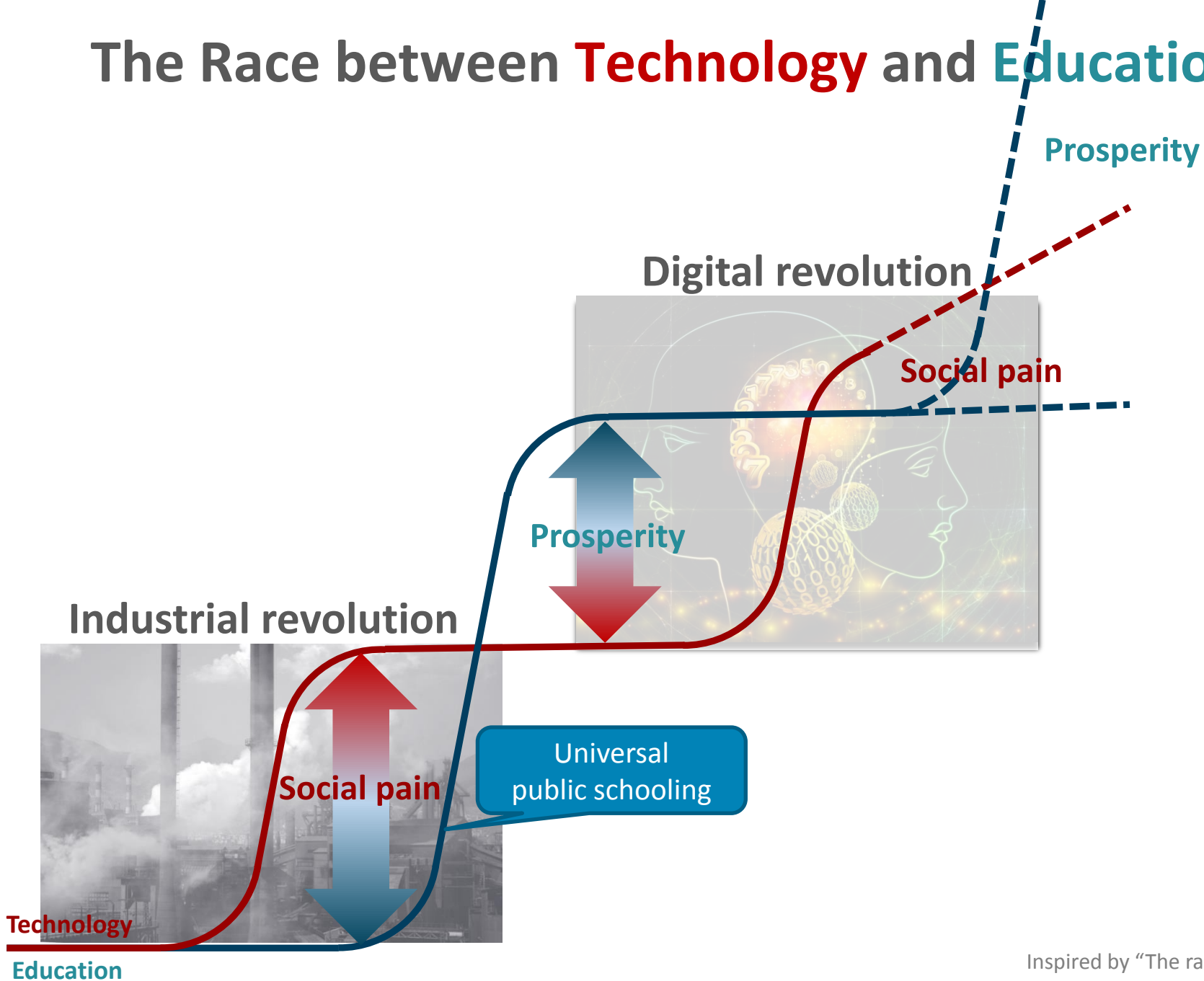
A lot more to come

- 3D printing
- Synthetic biology
- Brain enhancement
- Nanomaterials
- Etc.

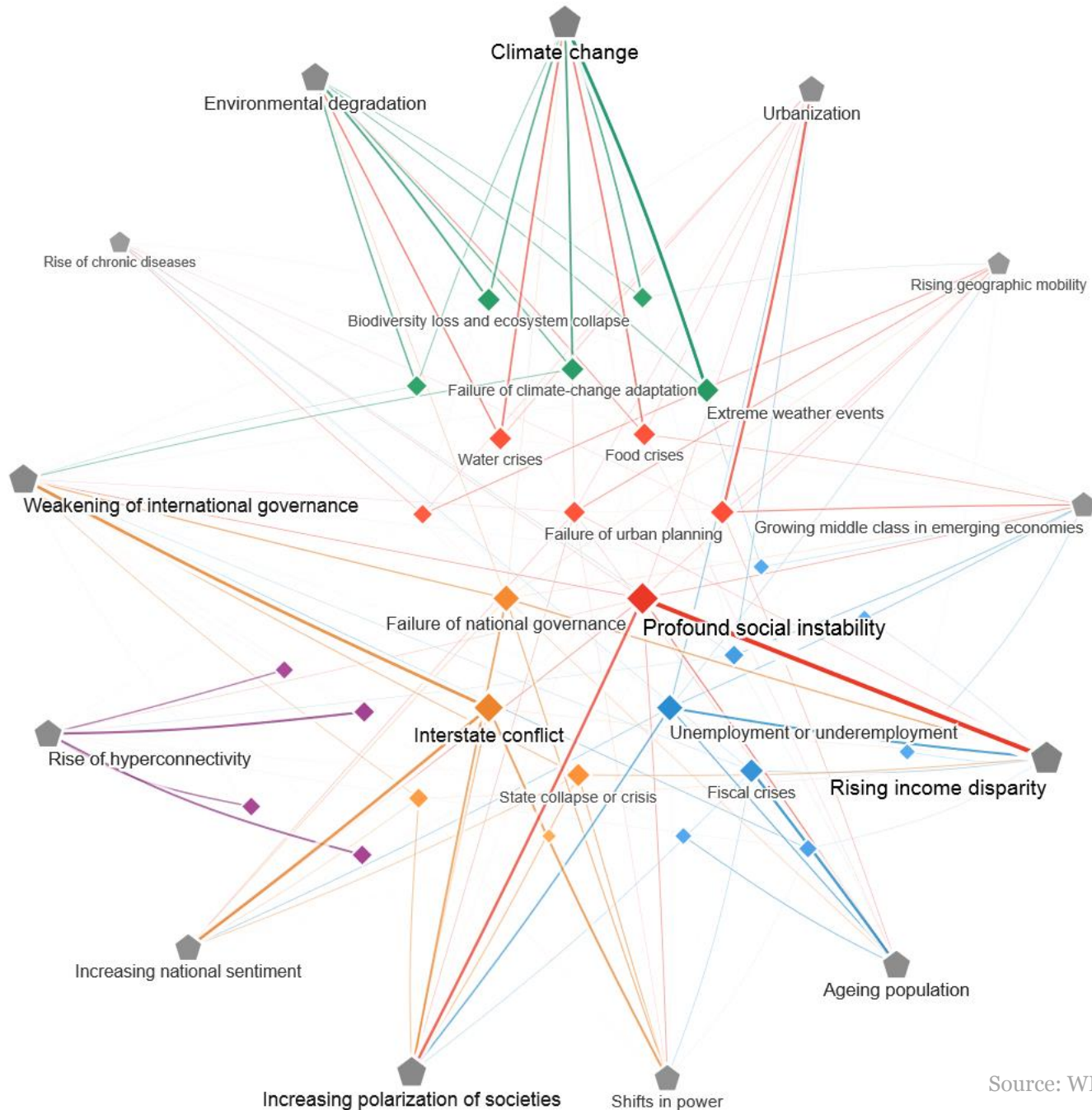


Inspired by: Center for curriculum redesign (CCR)

The Race between **Technology** and **Education**



Inspired by "The race between technology and education"
Pr. Goldin & Katz (Harvard)

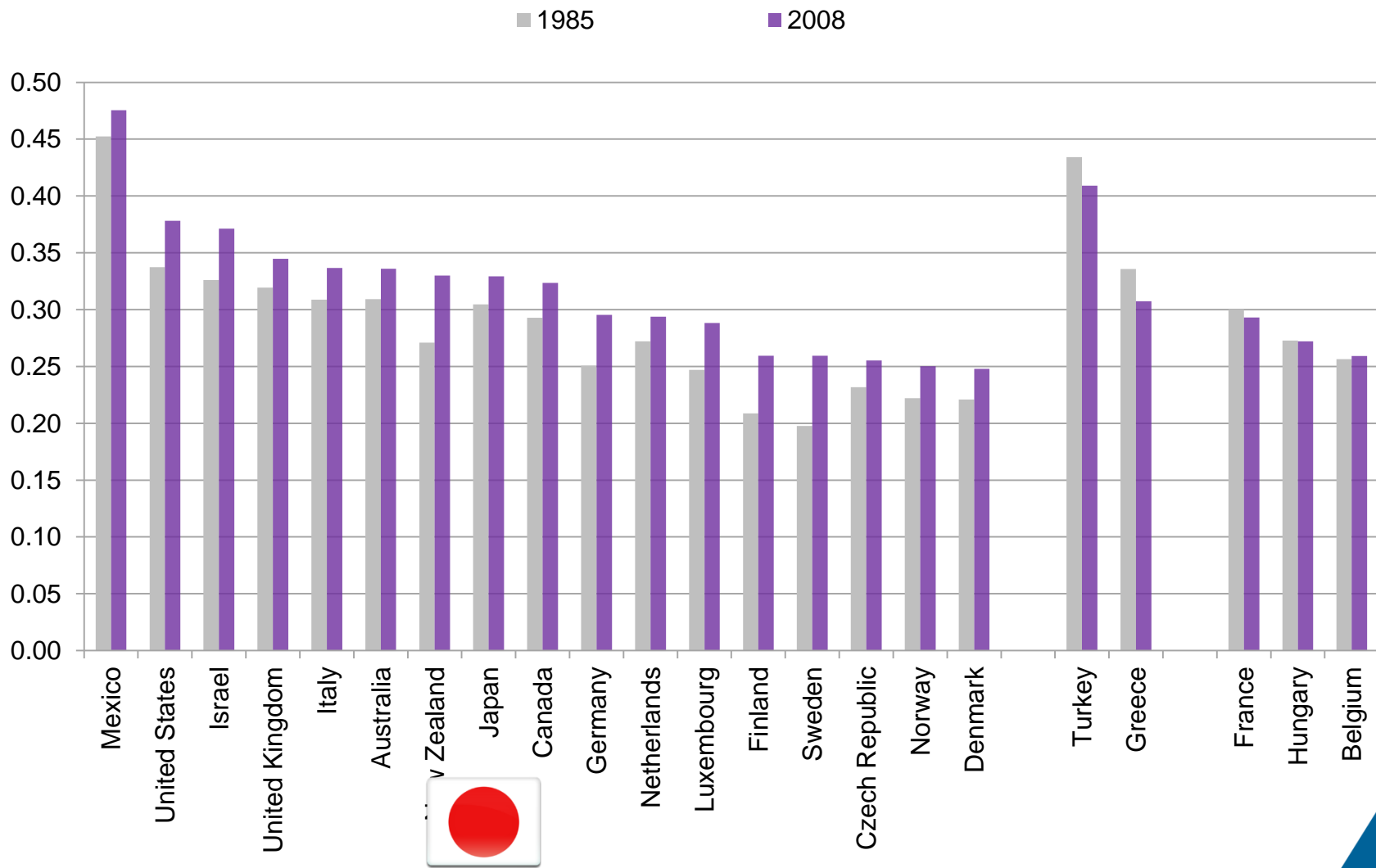


Source: WEF 2015 Global Risks

Survey respondents were asked to select between three and six trends and to identify for each the risk they believe is most interconnected.

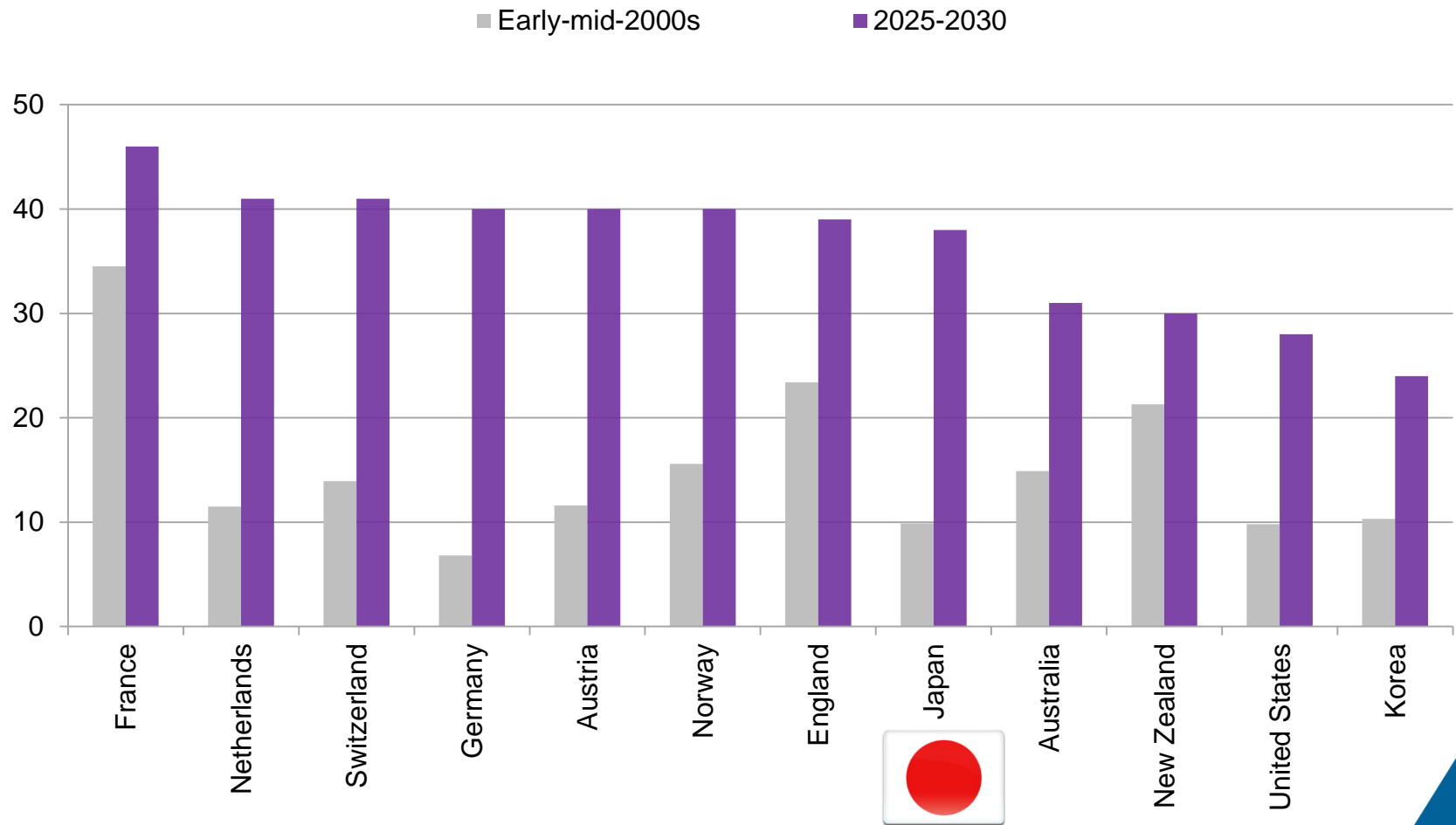
Growing unequal

Gini Coefficients for OECD countries, in 1985 and 2008



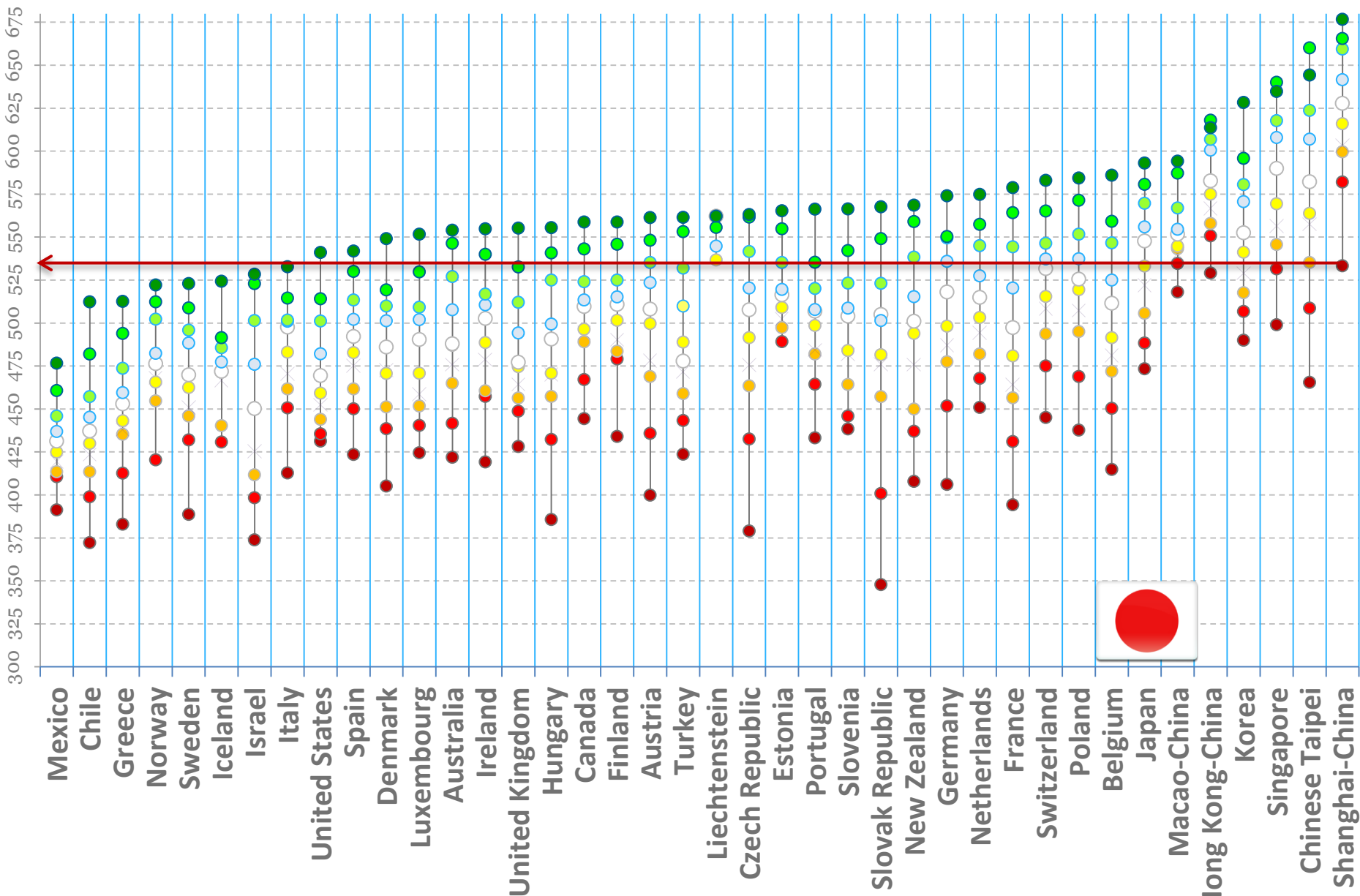
Home alone: the rise of single-person households

Number of one person households early-mid-2000s to 2025-2030 (projected)



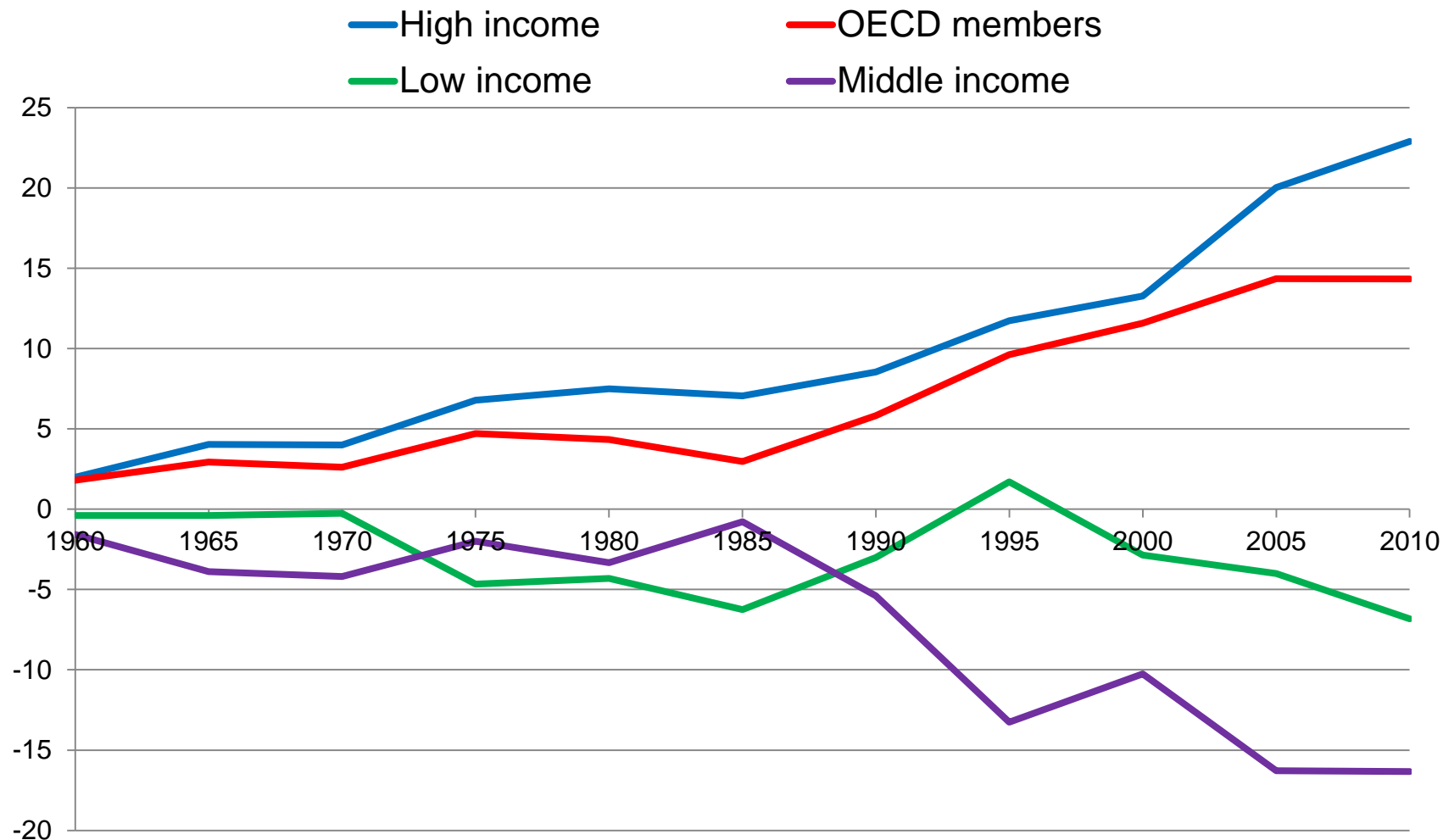
Poverty is not destiny

PISA math skills of 15-year-olds by decile of social background



Increasing migration towards the developed world

Net migration (in millions of people) into regions, with countries grouped by income level and OECD members, 1960-2010.



Source : OECD (2013), Trends Shaping Education.

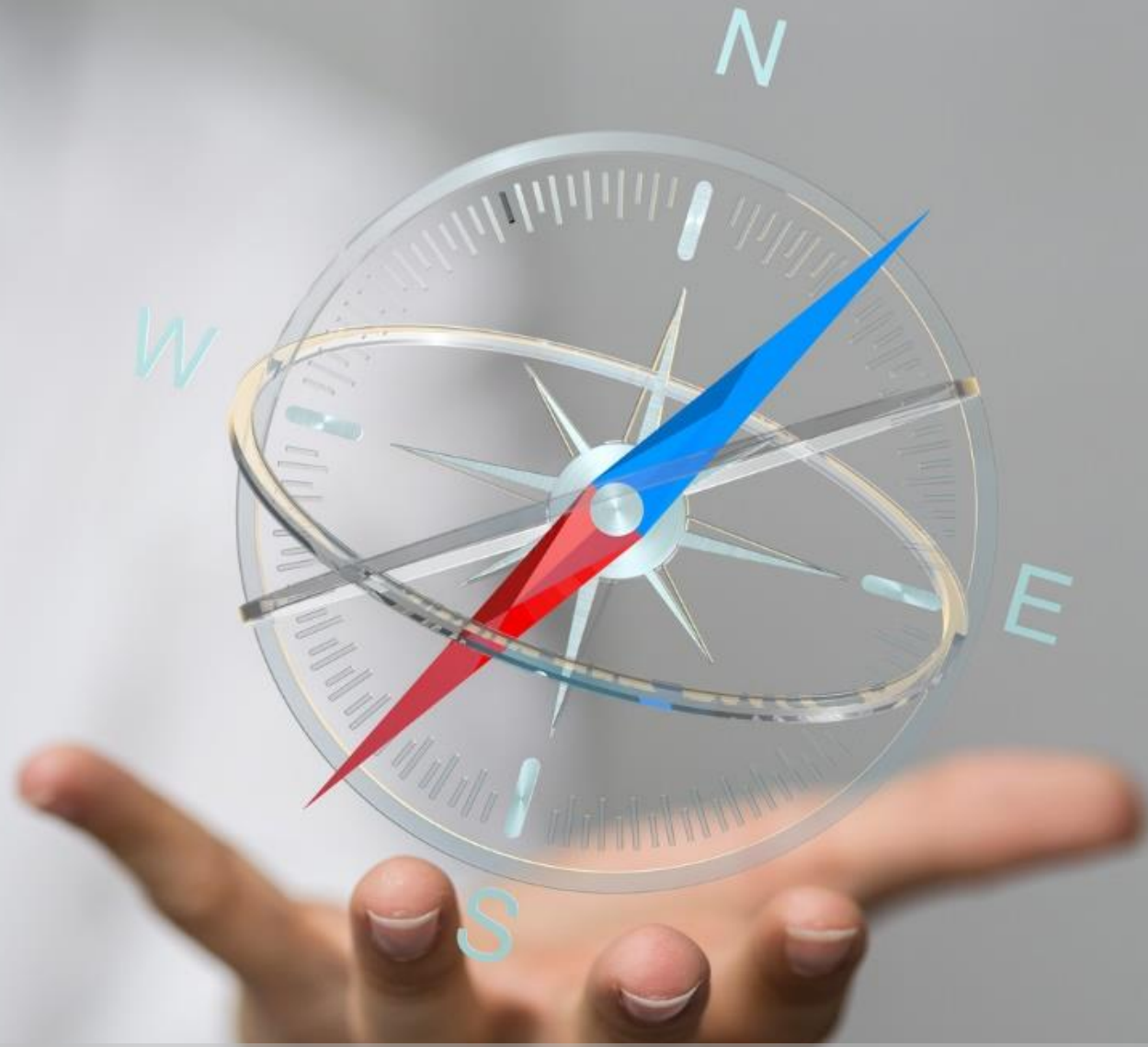
Primary source: World Bank (2012), *World Databank: Net Migration*.



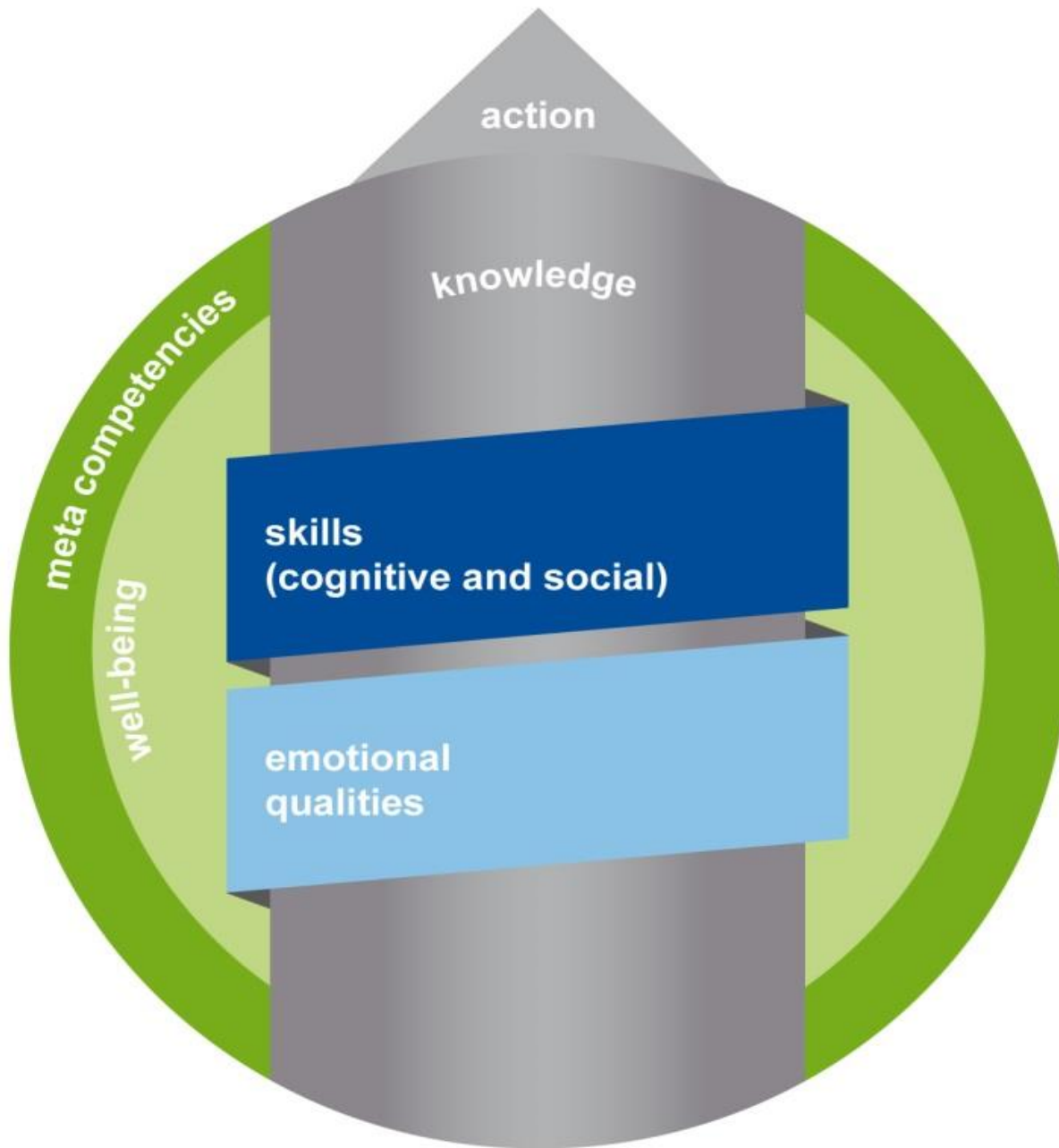
What does all this mean for education?



Education in the past



Education 2030





Knowledge

Concepts, processes, methods, tools

Examples of disciplinary knowledge

Reading,
writing

Mathematics

Natural
sciences

Social sciences

Foreign
languages

History

Economics,
politics and law

Geography

Art

Physical
education,
health
education

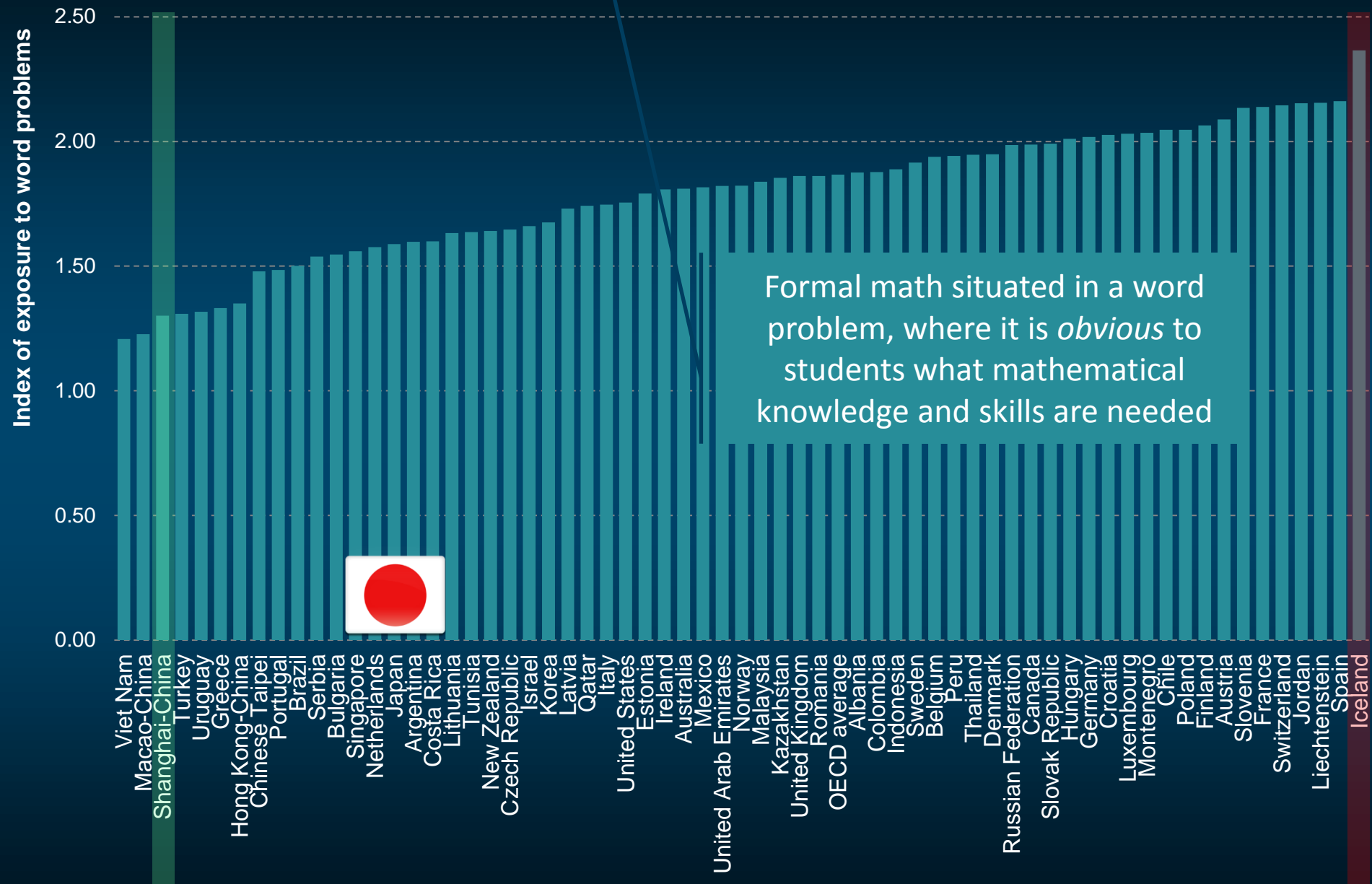
Math teaching \neq math teaching

PISA = reason mathematically and understand, formulate, employ and interpret mathematical concepts, facts and procedures

Focus on word problems



Fig I.3.1a



Formal math situated in a word problem, where it is *obvious* to students what mathematical knowledge and skills are needed

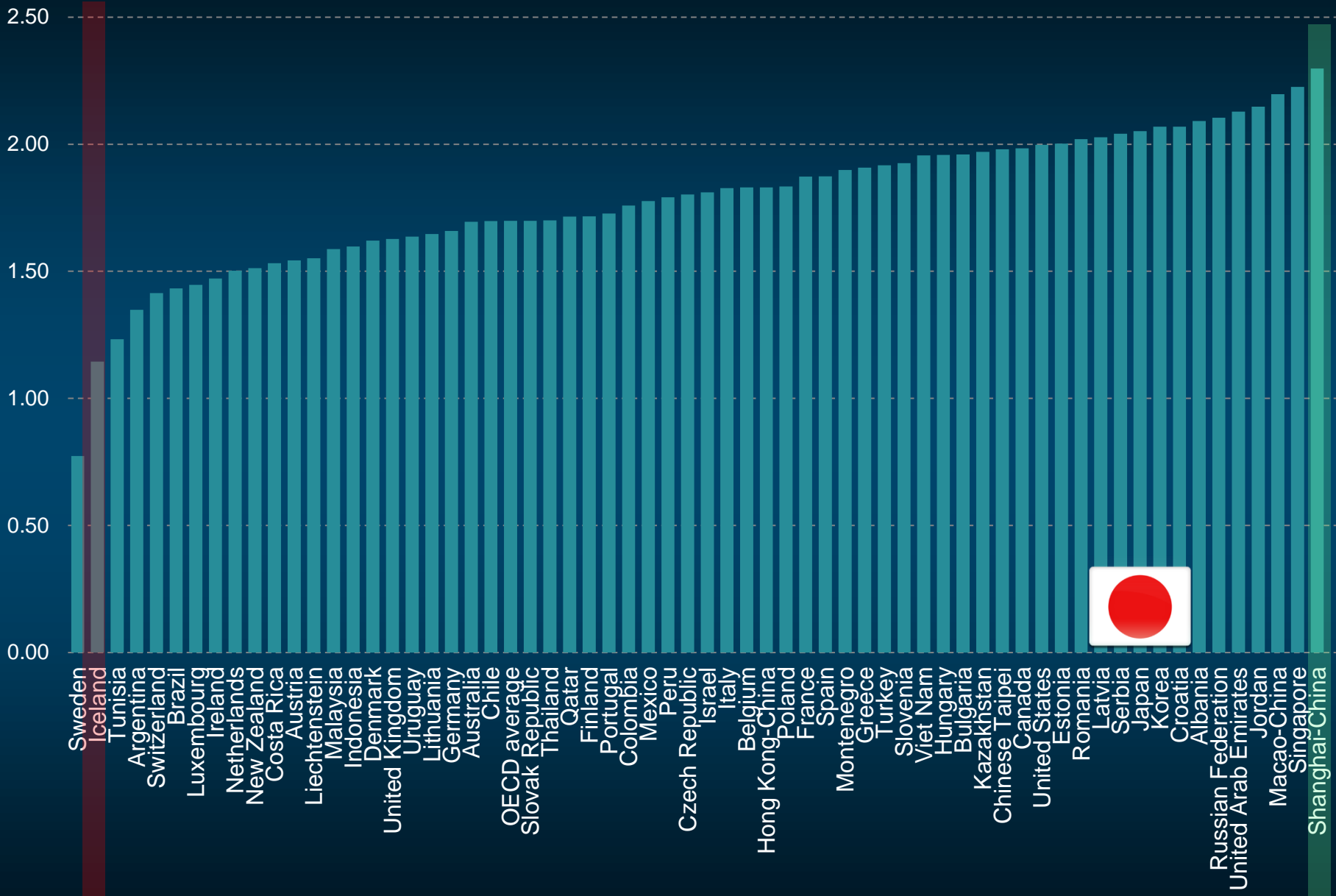


Focus on conceptual understanding



Fig I.3.1b

Index of exposure to formal mathematics



Examples of interdisciplinary knowledge

Financial literacy

**Cultural literacy/
intercultural
literacy**

Global knowledge

**Entrepreneurship,
Business,
Economics**

ICT literacy

Media literacy

**Ecology,
environmental
literacy**

STEM

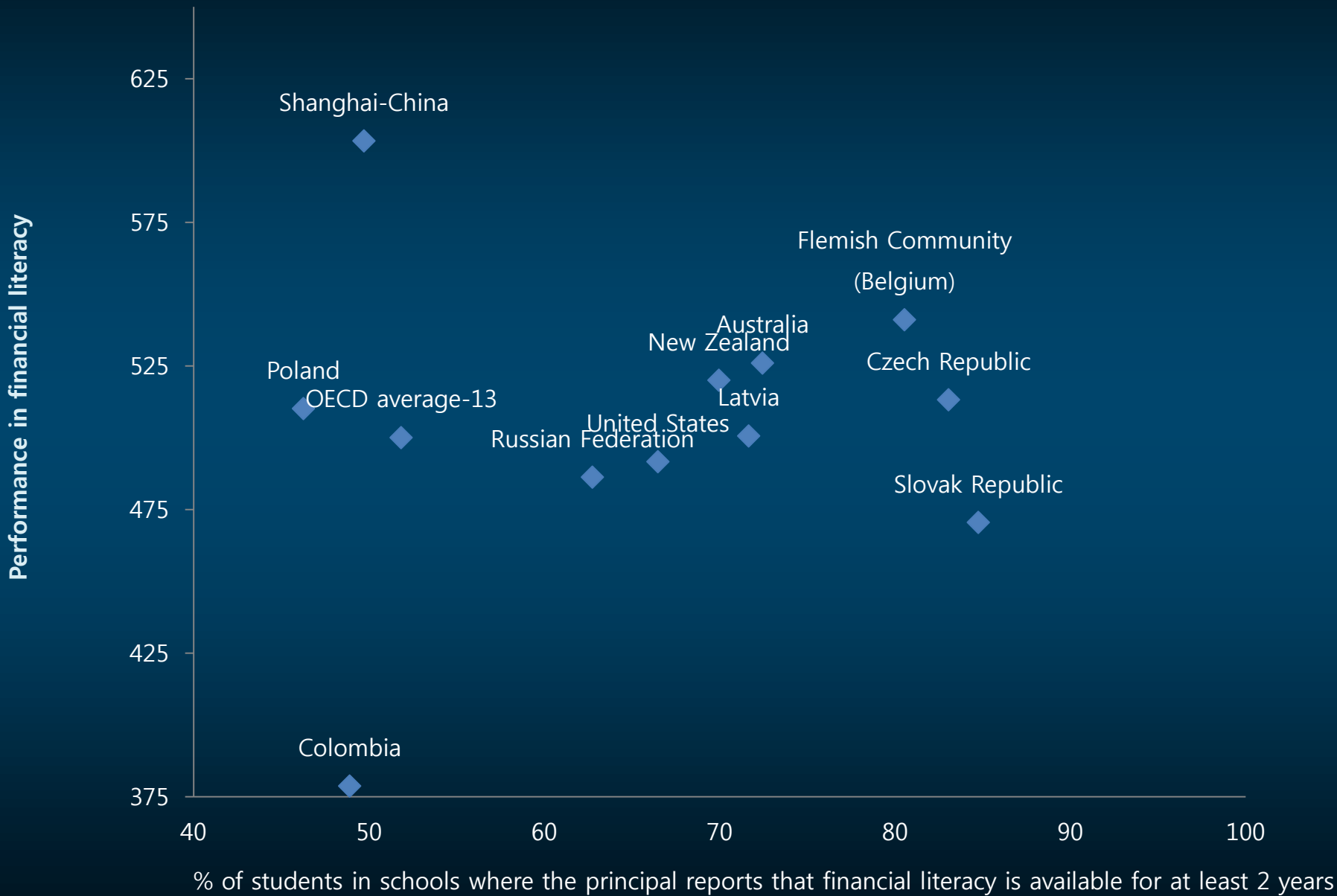
Programming

Engineering

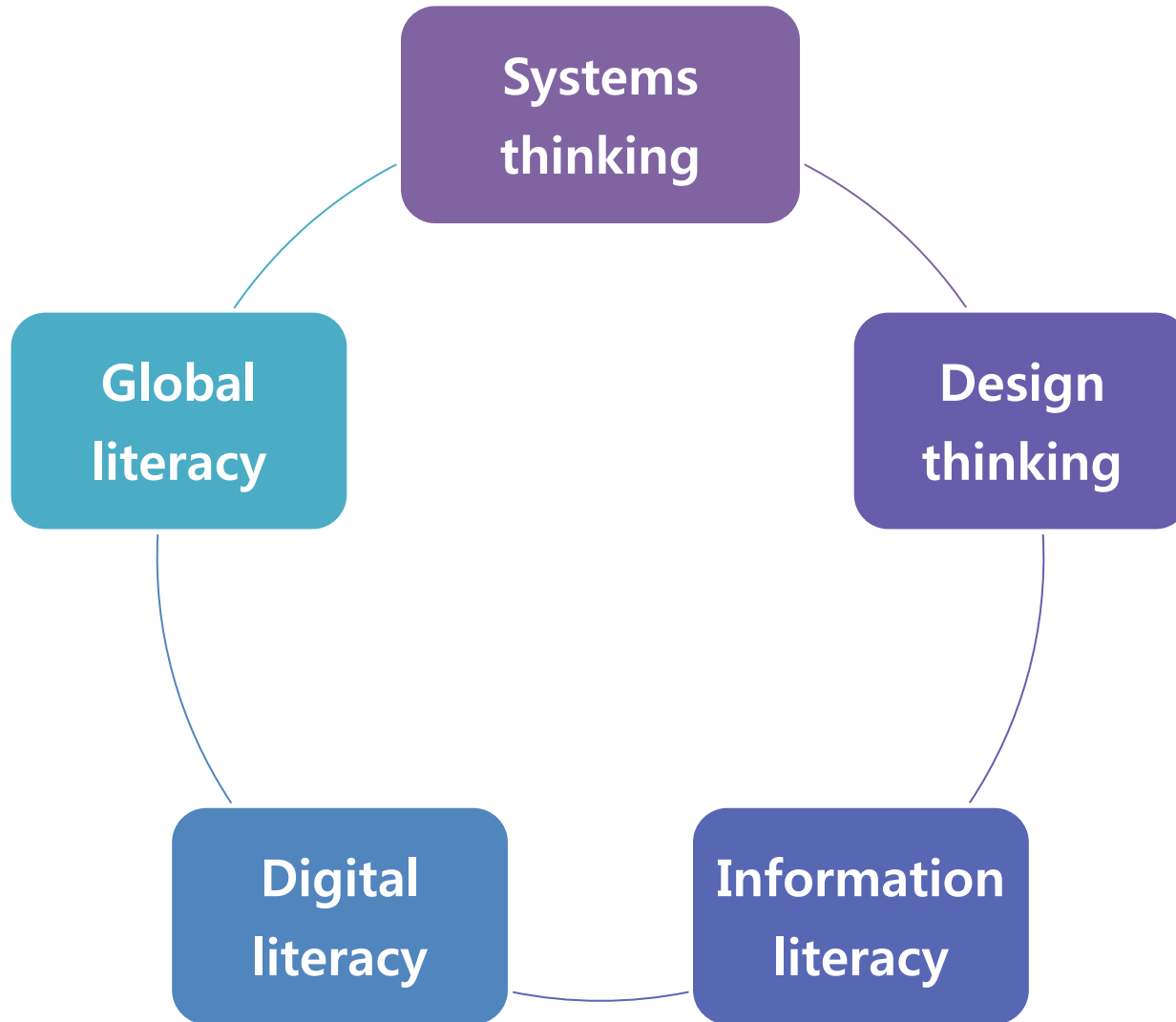
Robotics

**Practical/
vocational-related
knowledge**

Exposure and financial literacy



Some examples of themes in which knowledge can be developed



Selecting and prioritising what students should learn



Emotional

(e.g. beauty)

Cognitive

(e.g. creativity, critical thinking)

Disciplinary/practical use

(e.g. relevance to application in work and life)





Cognitive competencies

Examples of cognitive competencies

Problem Solving

Creativity

Critical Thinking

Analytical skills

Innovation

Synthesising

Systems thinking

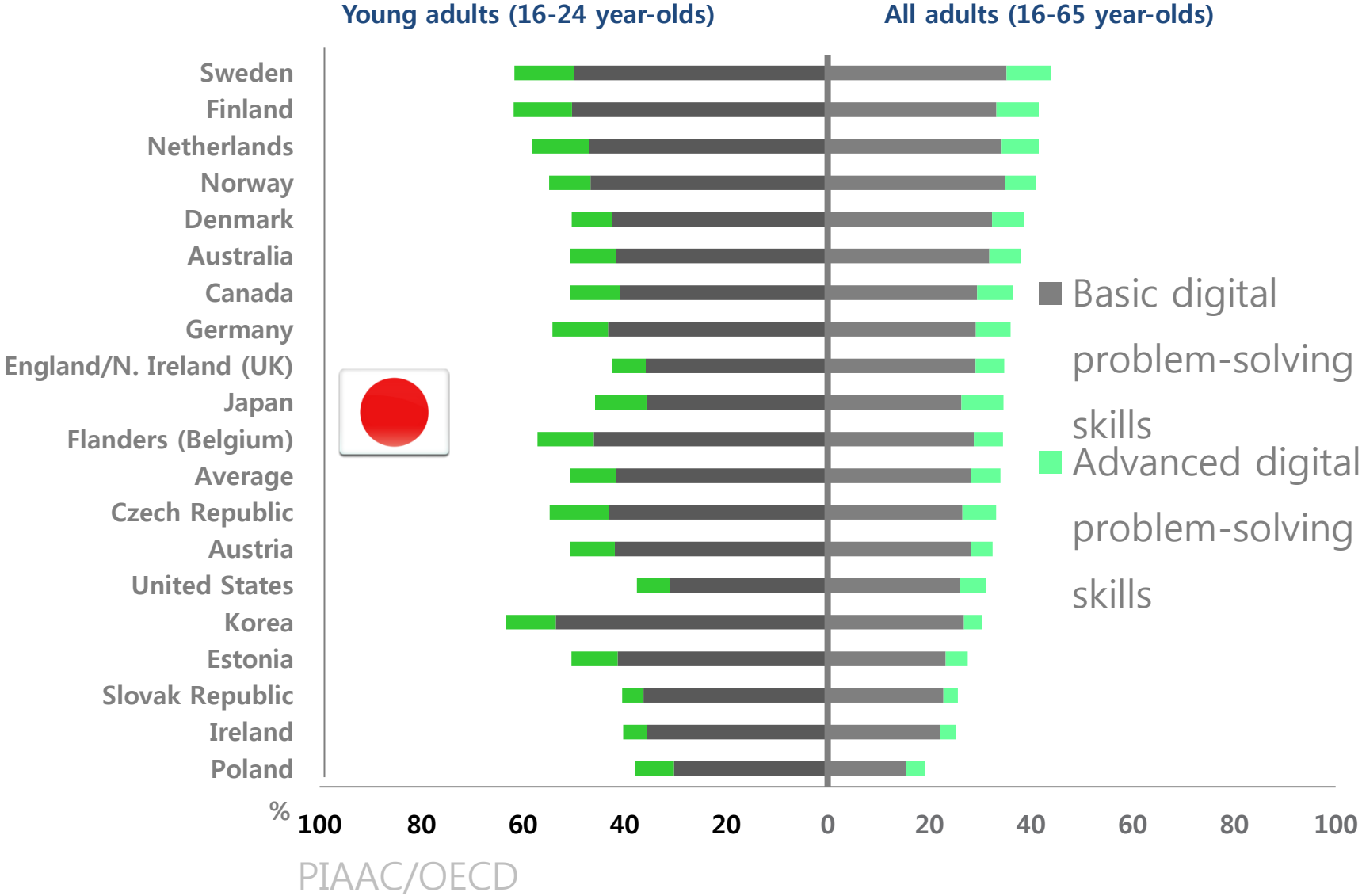
Researching

Foresight thinking

Higher order thinking skills

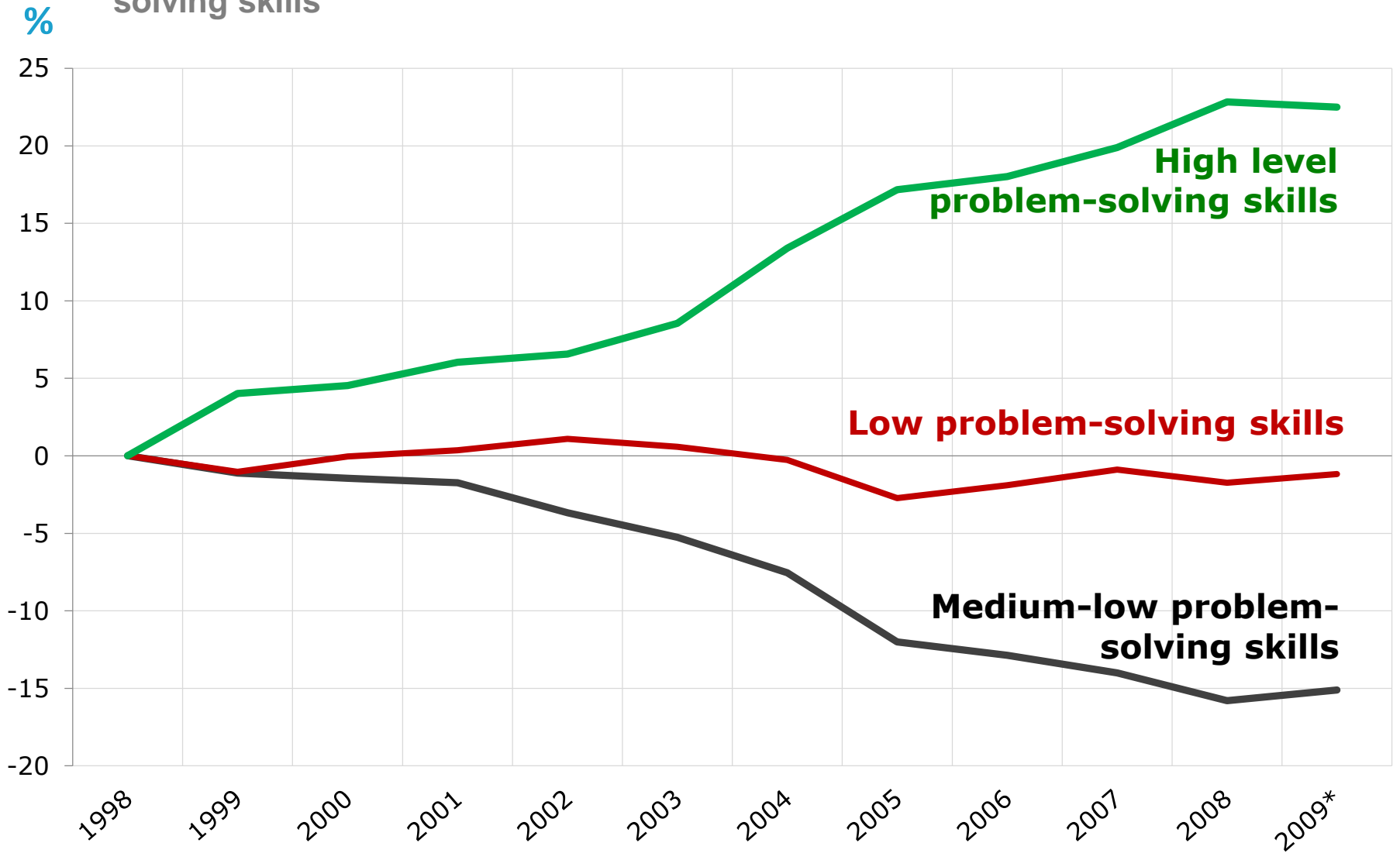
Data gathering

Digital problem solving skills of adults



Average is over

Evolution of employment in occupational groups defined by problem-solving skills





Social competencies

Examples of social Competencies

Collaboration

**Cross cultural
skills**

Communication

Team work

**Conflict
resolution skills**

Leadership

Collaborative problem solving competency is the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution.

Global Competence in PISA 2018

Global Competence is the capability and disposition to act and interact appropriately and effectively, both individually and collaboratively, when participating in an interconnected, interdependent and diverse world.



Physical competencies and well-being

Physical Competencies and Well-being

Subjective health

Health habits (good nutrition; making good choices about sleep and exercise)

**Kinesthetic ability
(the ability to coordinate movement)
dexterity, motor skills**

Risk-avoidance behaviours (avoiding substance abuse, smoking, drinking, unsafe sexual practices, and violence)

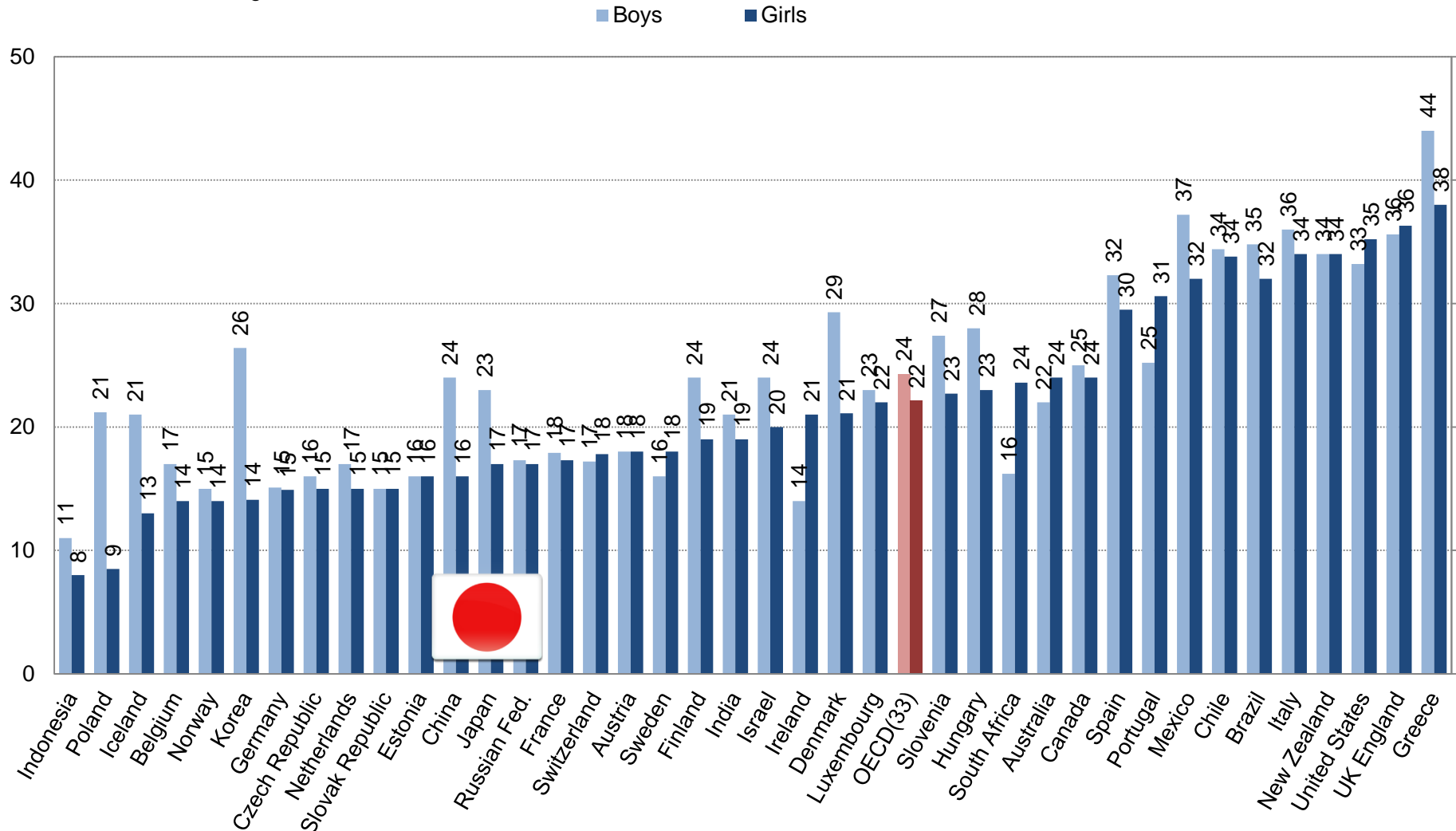
Health outcomes (e.g. obesity, body-mass index – BMI)

Ability to use physical tools, operations, functions including manual skills (ICT, new machines)

Overweight and obesity among children

Measured overweight (including obesity) among children, 2013 (or latest year)

% of children at various ages



Source: World Obesity Federation (2015), KIGGS (2003-06) for Germany and KNHANES (2013) for Korea.



Character qualities

Some examples of character qualities

Empathy

Resilience

Mindfulness

Inclusion

Curiosity

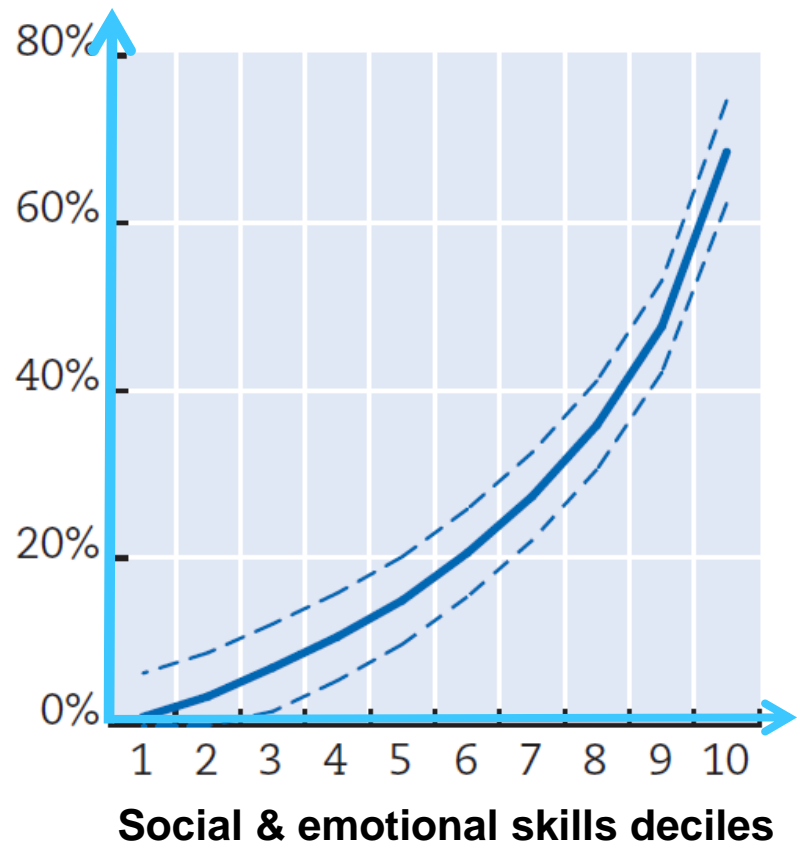
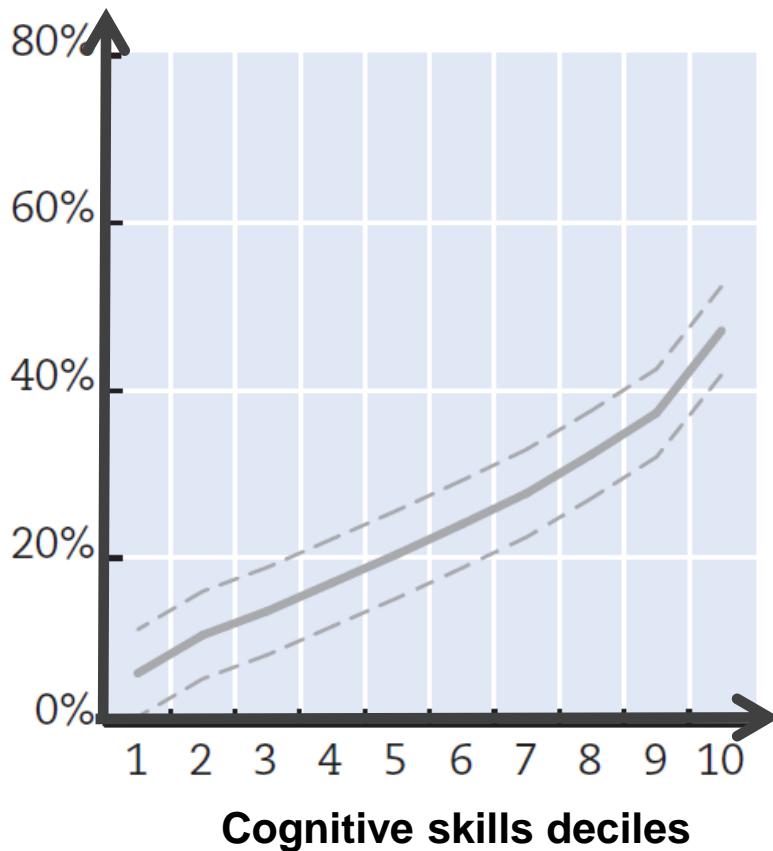
Ethics

Courage

Leadership

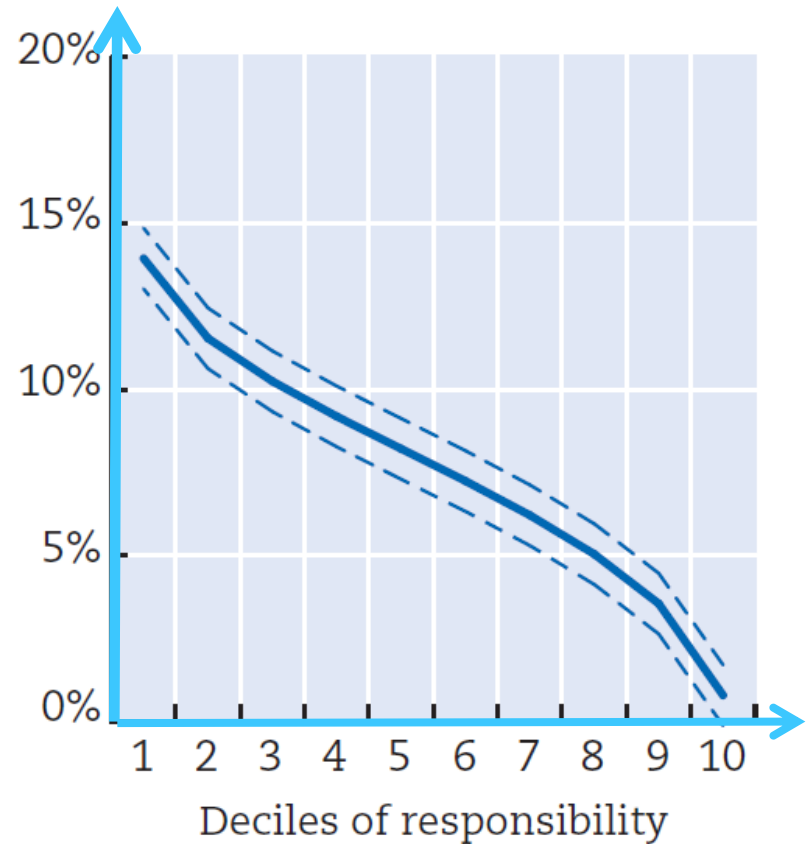
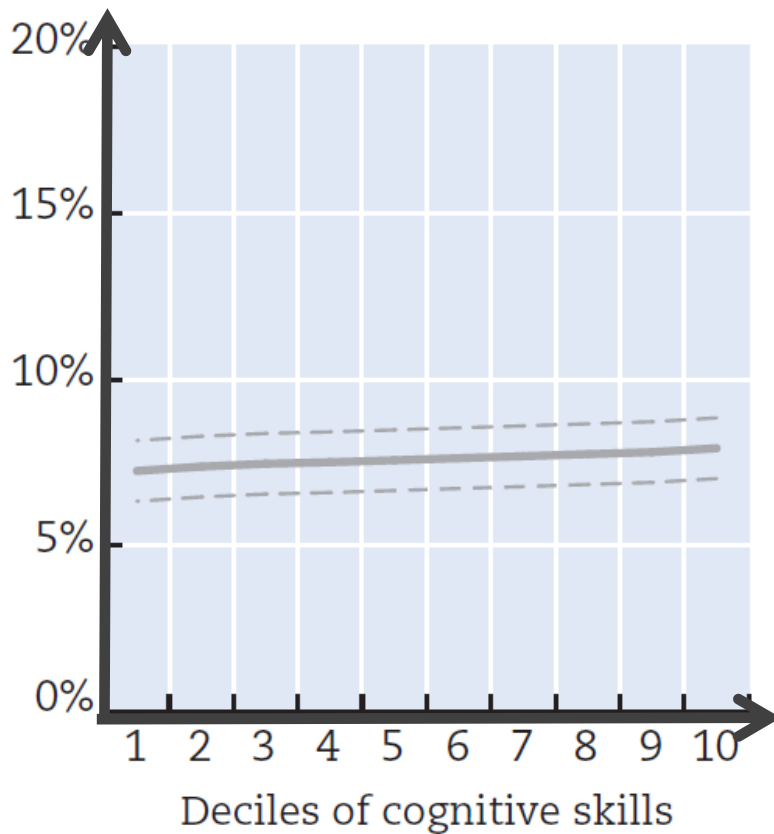
College Completion (USA)

Source: NLS
Y



Bullying at 15 (Korea)

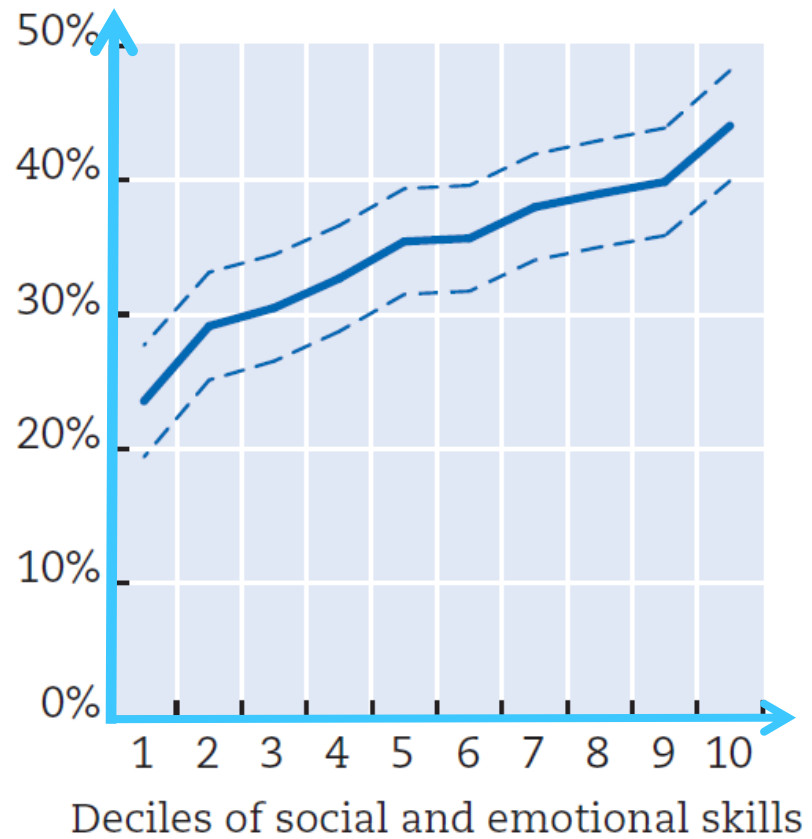
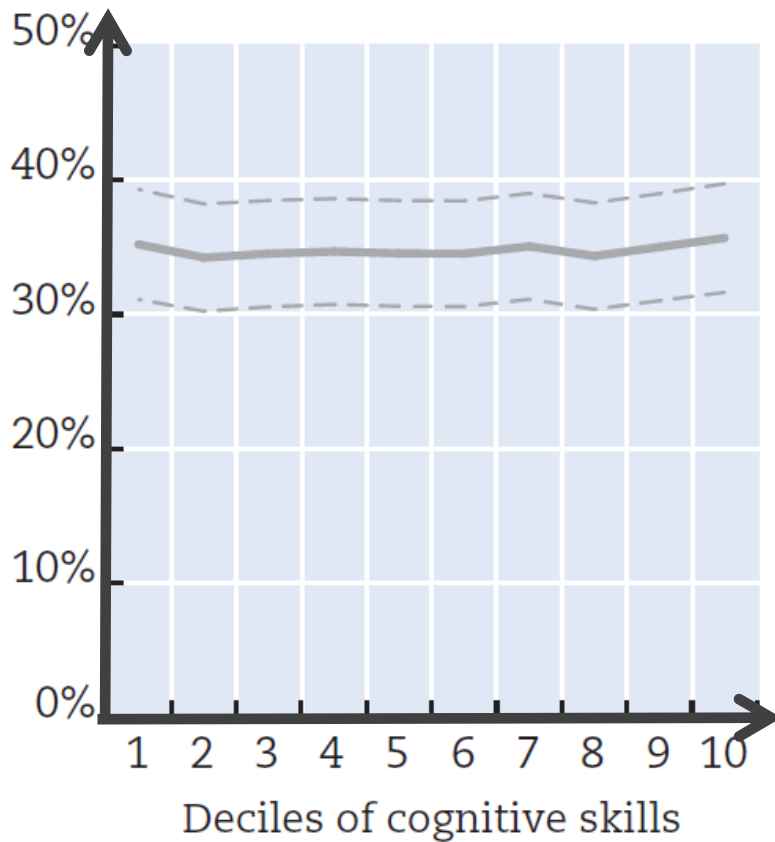
Source: KYP
S



OECD (2015)

Happy at 20 (New Zealand)

Source: CC



Country of origin and country of destination

Immigrant students' PISA performance by country of origin and destination

■ First-generation immigrants' score, after accounting for s

Students from Arabic-speaking countries in:

- Netherlands
- United Arab Emirates
- Denmark
- Finland
- Qatar

Percentage of students with an immigrant background who reported that they feel like they belong at school

Students from Arabic-speaking countries in:

- Finland
- Netherlands
- United Arab Emirates
- Qatar
- Denmark

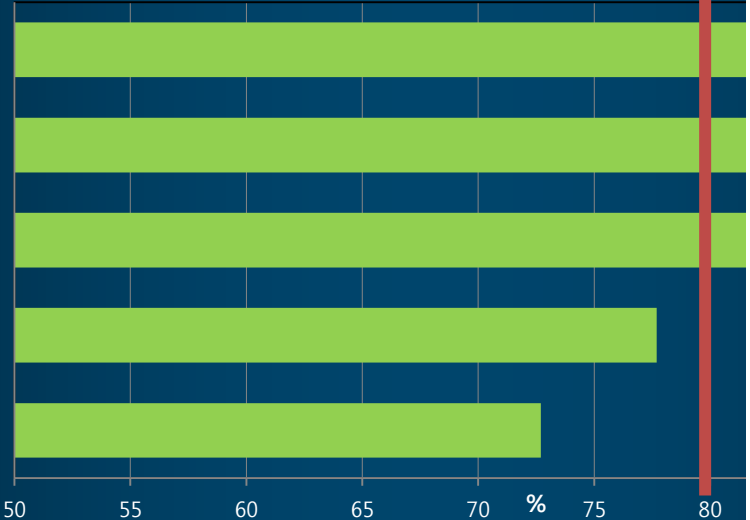
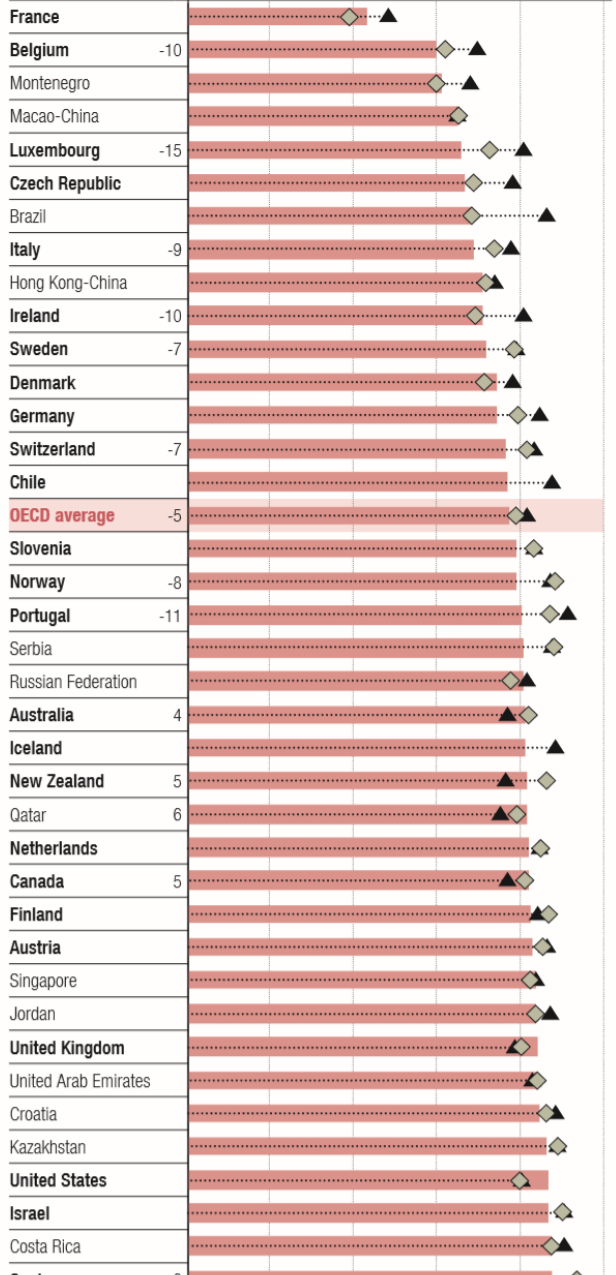
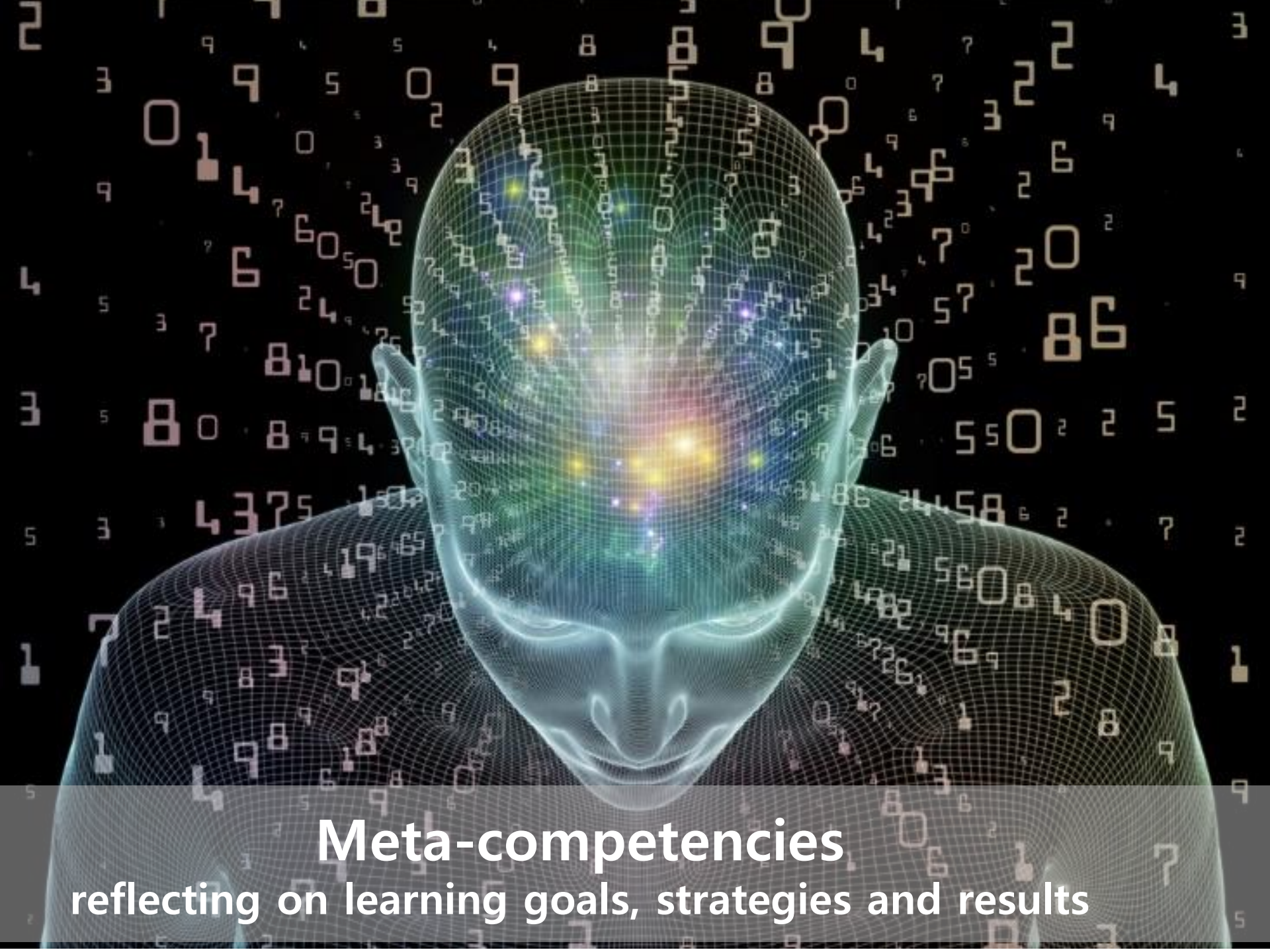


Figure 4: Sense of belonging at school, by immigrant background

Percentage of students who reported that they feel like they belong at school

■ First-generation immigrant | ◆ Second-generation immigrant | ▲ Non-immigrant





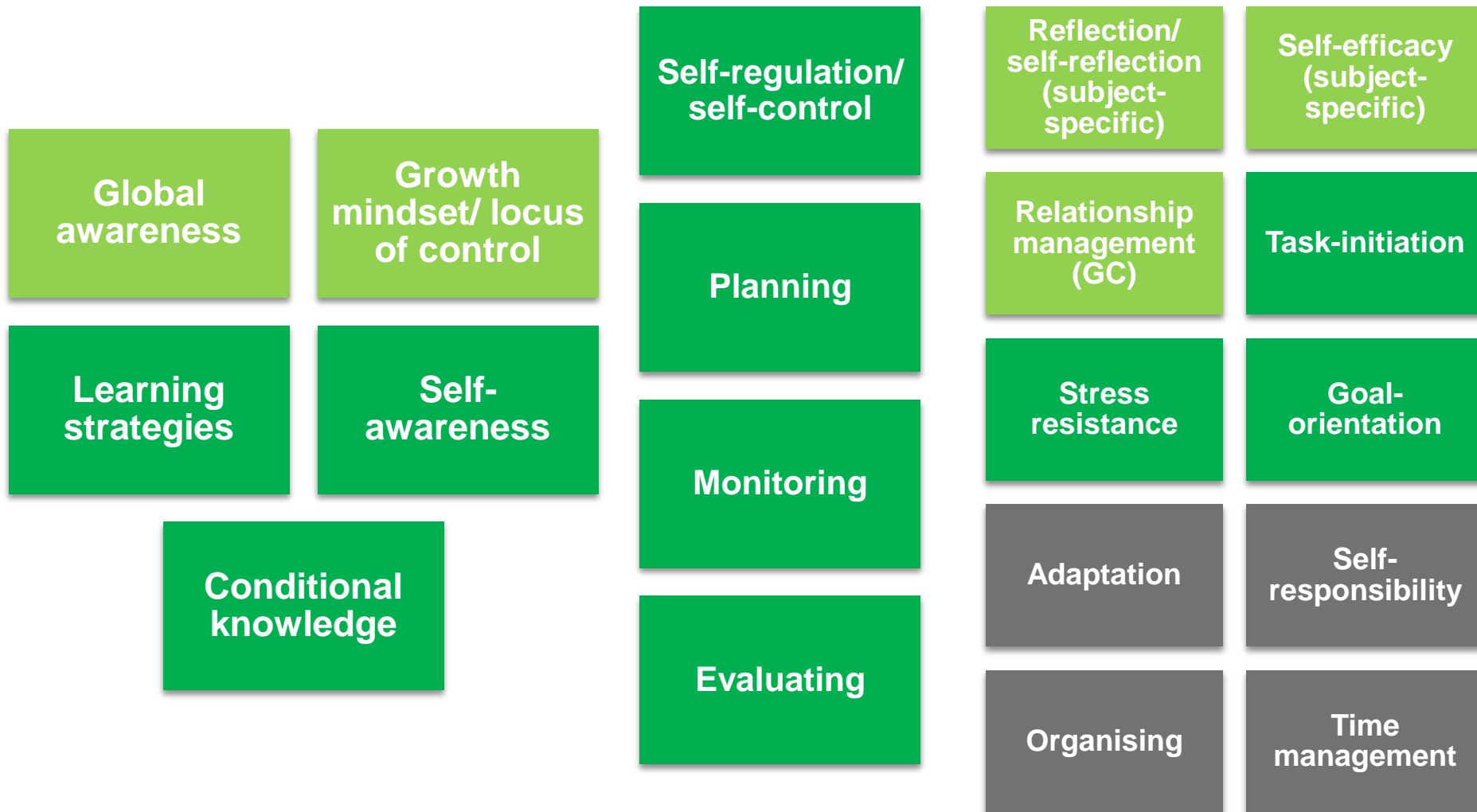
Meta-competencies

reflecting on learning goals, strategies and results

Metacognitive knowledge

Metacognitive regulation

Metacognitive reflection/ action

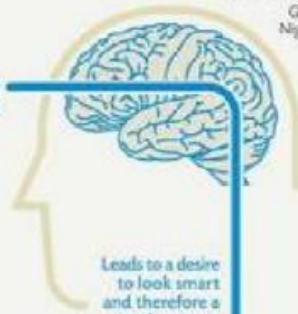


TWO MINDSETS

CAROL S. DWECK, Ph.D.

Graphic by
Nigel Holmes

Fixed Mindset
Intelligence is static



Leads to a desire
to look smart
and therefore a
tendency to...

CHALLENGES

...avoid
challenges

OBSTACLES

...give up
easily

EFFORT

...see effort as
fruitless or worse

CRITICISM

...ignore useful
negative feedback

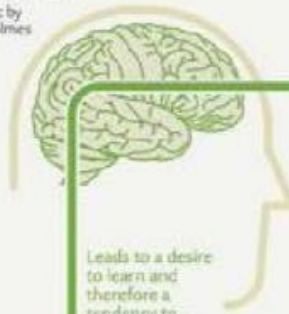
SUCCESS OF OTHERS

...feel threatened
by the success
of others

As a result, they may plateau early
and achieve less than their full potential.

All this confirms a **deterministic view of the world.**

Growth Mindset
Intelligence can be developed



Leads to a desire
to learn and
therefore a
tendency to...

...embrace
challenges

...persist in the
face of setbacks

...see effort as
the path to mastery

...learn from
criticism

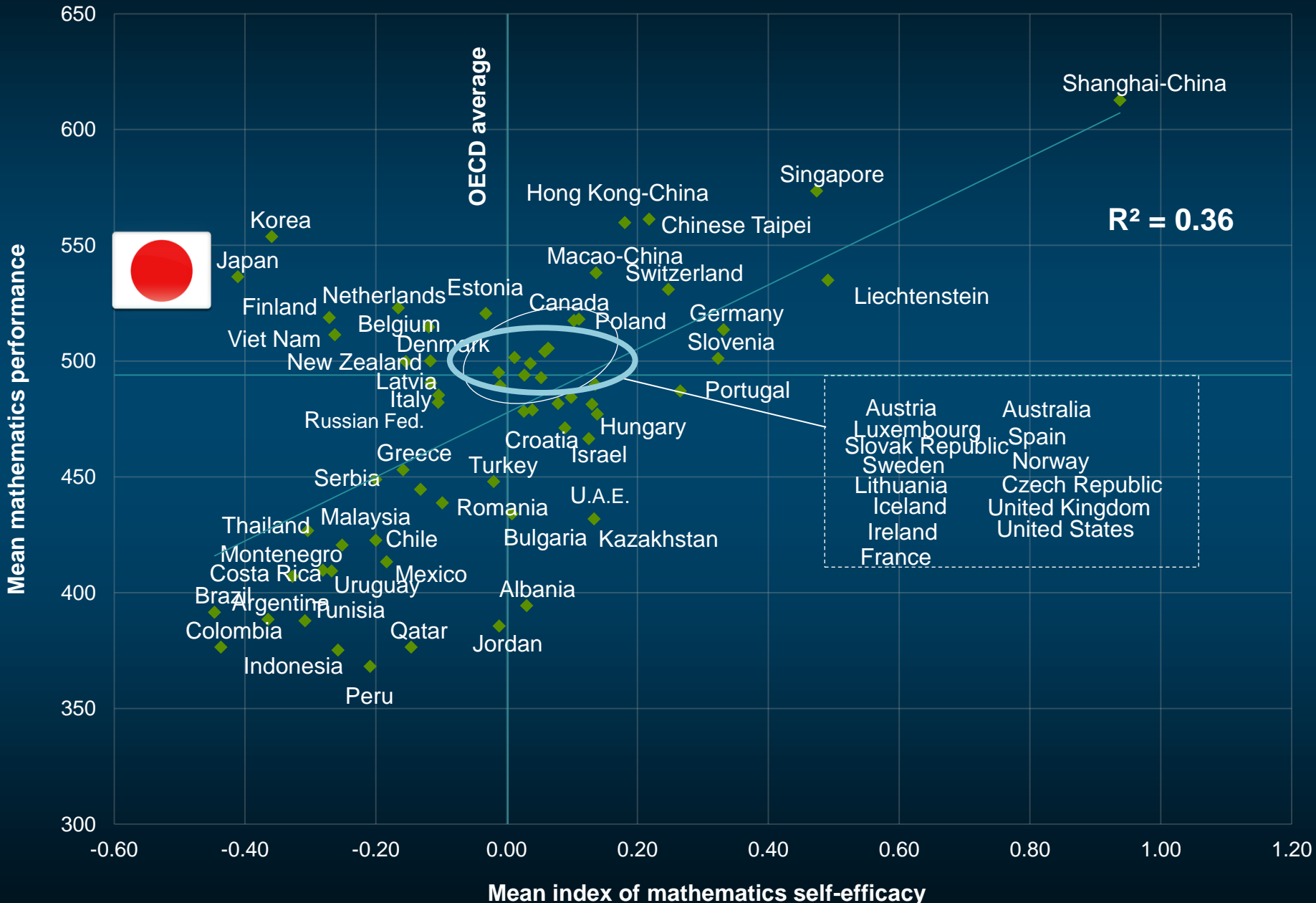
...find lessons and
inspiration in the
success of others

As a result, they reach ever-higher levels of achievement.

All this gives them a **greater sense of free will.**

Countries where students have stronger beliefs in their abilities perform better in mathematics

Fig III.4.5



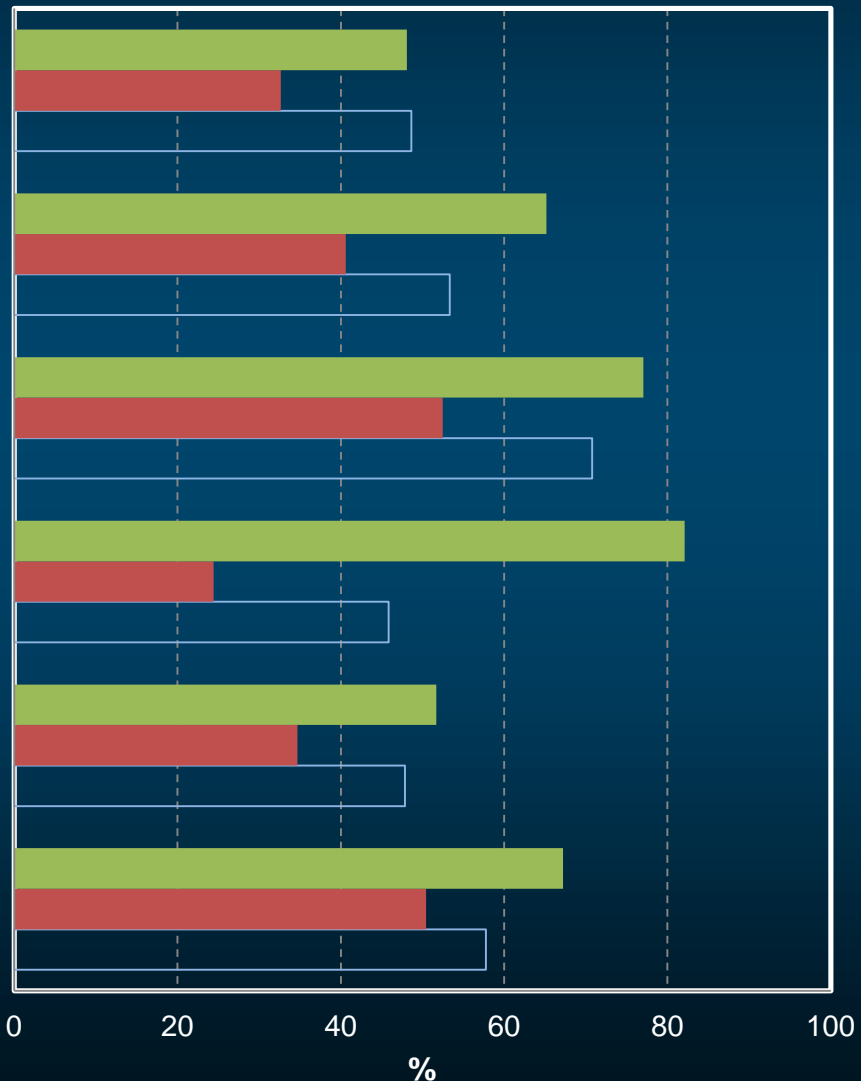
Perceived self-responsibility for failure in mathematics

Fig III.3.6

Percentage of students who reported "agree" or "strongly agree" with the following statements:

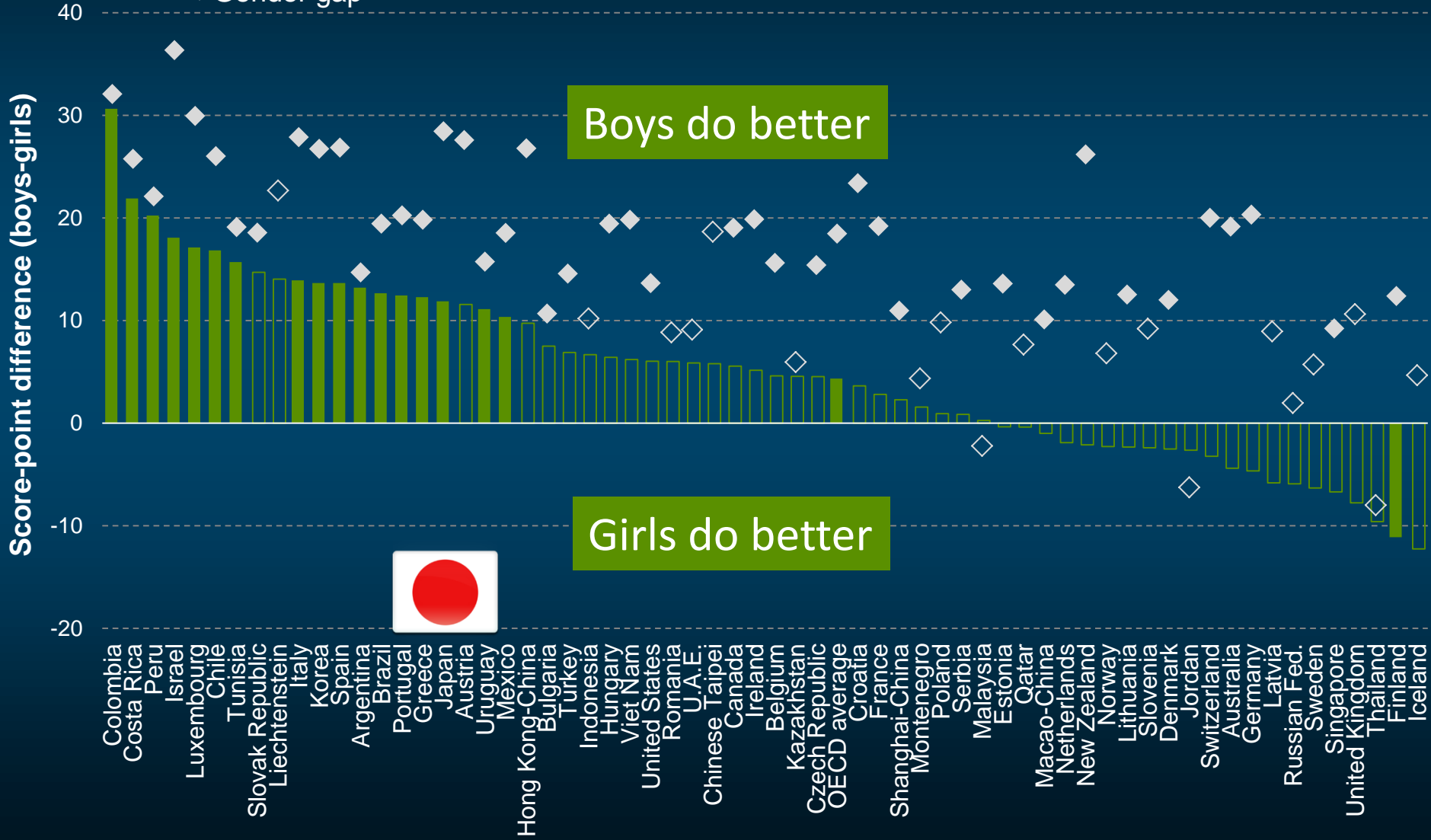
■ France ■ Shanghai-China □ OECD average

- Sometimes I am just unlucky**
- The teacher did not get students interested in the material**
- Sometimes the course material is too hard**
- This week I made bad guesses on the quiz**
- My teacher did not explain the concepts well this week**
- I'm not very good at solving mathematics problems**



Gender gap among the highest-achieving students (90th percentile)

- Gender gap adjusted for differences in mathematics self-efficacy between boys and girls
- ◆ Gender gap





Making change happen

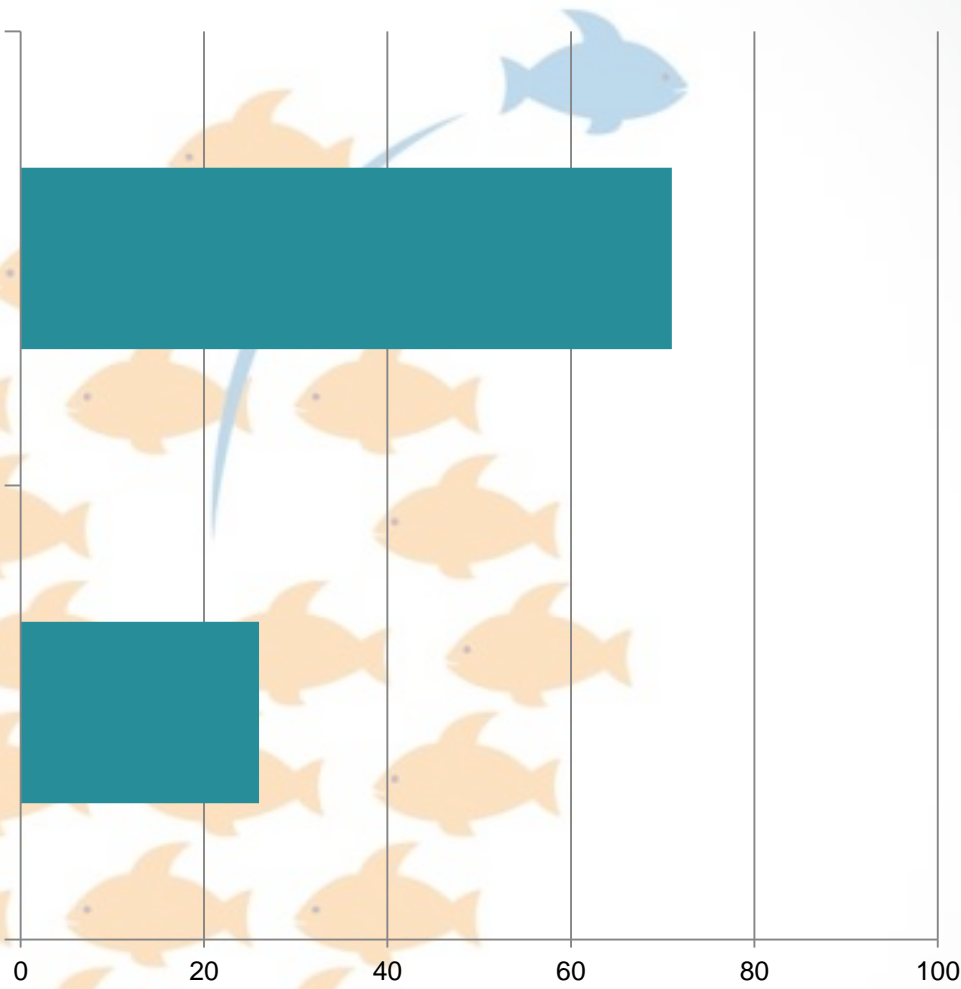
What do teachers say about innovation?

Percentage of lower secondary teachers

Average

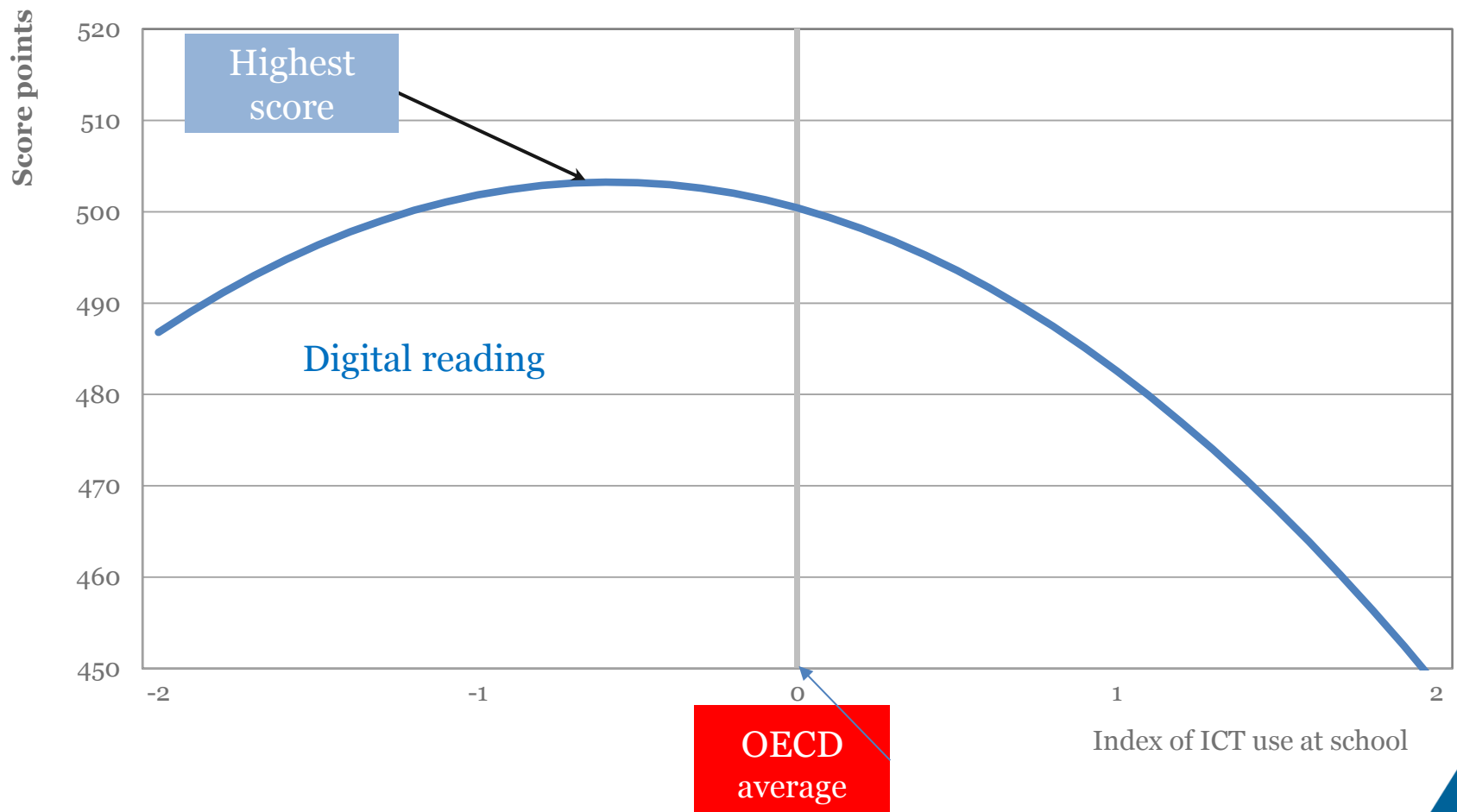
Innovative practices will be considered in appraisal with high or moderate importance

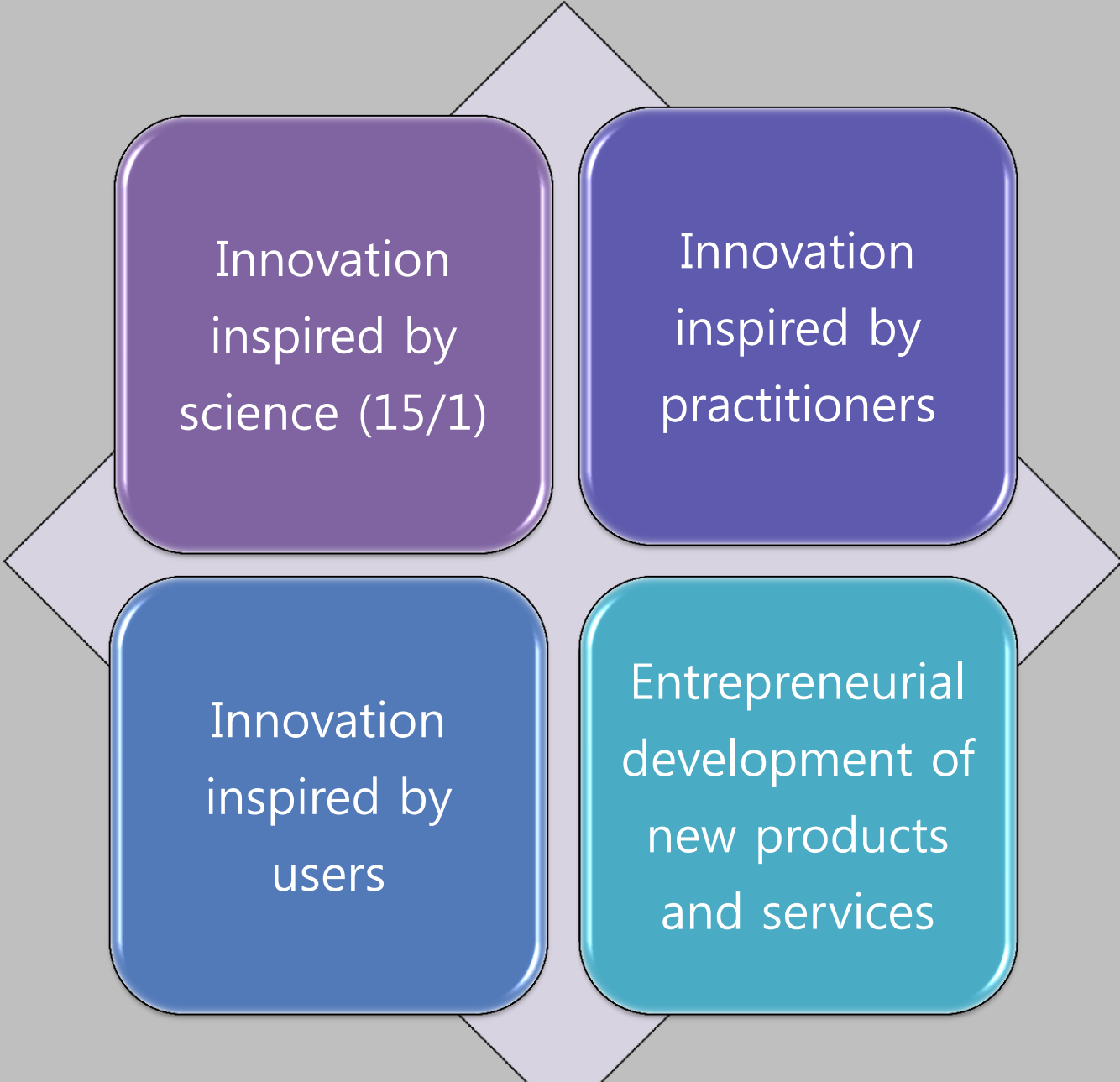
If I am more innovative in my teaching, I will be rewarded



Students who use computers at school only moderately score the highest in reading

Relationship between students' skills in reading and computer use at school (average across OECD countries)





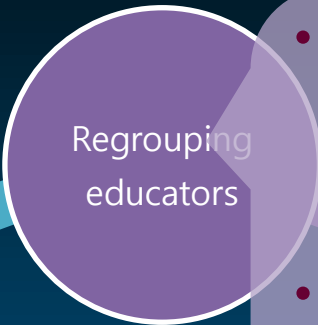
Innovation inspired by science (15/1)

Innovation inspired by practitioners

Innovation inspired by users

Entrepreneurial development of new products and services

Making change happen



- To gain the benefits of collaborative planning, work, and shared professional development strategies
- To open up pedagogical options
- To give extra attention to groups of learners



- To allow for deeper learning
- To create flexibility for more individual choices
- To accelerate learning
- To use out-of-school learning in effective & innovative ways



- **Make costs and benefits of educational innovation as symmetric as possible**
 - **Everyone supports innovation**
 - (except for their own children)
 - **The benefits for ‘winners’ are often insufficient to mobilise support, the costs for ‘losers’ are concentrated**
 - That’s the power of interest groups
 - **Need for consistent, co-ordinated efforts to persuade those affected of the need for change and, in particular, to communicate the costs of inaction**

Making change happen

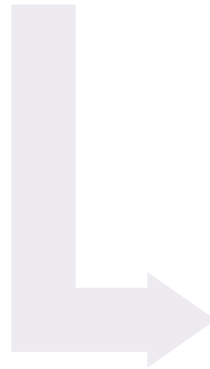
- **Given the uncertainties that accompany change, education stakeholders will always value the status quo.**
- **Successful innovations...**
 - are good at communicating the need for change and building support for change
 - tend to invest in capacity development and change-management skills
 - develop evidence and feed this back to institutions along with tools with which they can use the information
 - Are backed by sustainable financing
- **Teachers need to be active agents, not just in the implementation of innovations, but also in their design**

OECD Education 2030

What competencies are needed by students in 2030?



Internationally validated OECD 21st century curriculum framework



Making change happen in education systems

Curriculum guideline and reform

Assessment framework

Policy dialogue

Etc etc

Average school systems

High performers in PISA

Some students learn
at high levels



All students learn
at high levels

Uniformity



Embracing diversity

Curriculum-centred



Learner-centred

Learning a place



Learning an activity

Prescription



Informed profession

A group of children are running happily in a field of yellow flowers under a blue sky. The children are holding hands and appear to be in a circle, running in a clockwise direction. The children are wearing various colorful clothing, including a pink shirt, a blue shirt, an orange shirt, and a red shirt. The background is a clear blue sky with some light clouds.

THANK YOU

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and remember:

Without data, you are just another person with an opinion