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BRUNO KESSLER

FUTURE BUILT
ON KNOWLEDGE

Industrial revolutions
From muscles to AI

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1st

1760-1840

2nd

1870-1914

3rd

1970-2001

4th Industrial revolution
From global to local and back

New Hampshire,
Dartmouth College

1956

John McCarthy introduces *artificial intelligence*

Trento,
Italy

1985

IRST starts research activities on artificial intelligence

Trento,
Italy

2018

FBK celebrates 30 years of commitment to responsible R&I on artificial intelligence

The summer of the AI exploded

What is the future after the hot summer of AI?
We will have to be careful not to make the mistakes of the past.
Following trends and thinking that Deep Learning can solve all problems could reject us if not in a winter
...at least in the autumn of the AI.

As we have understood, technology has made extraordinary progress and is pervasive for the labor market, putting an important question for welfare:

- **Will the new technological revolution create more unemployment?**
- **Since the most advanced technologies are developed and managed by large multinationals, will this create further socio-economic inequalities?**
- **What do we "tell" the data?**

The change in numbers

- Many of the trades will not be replaced by AI, but automation will replace part of the work, we are talking about replaceable work rates (e.g. 30% of the cook's work, but the chef will not disappear - **McKinsey** Report **2018**);

- Within 5 years, 133 million new jobs will be created, compared to the automation (and therefore loss) of 75 million positions, with a net positive balance of 58 million new posts (**W**orld **E**conomic **F**orum **2018** Report).

- In the future we will have different, more specialized jobs, with a regeneration of the composition and their quality.

The central question

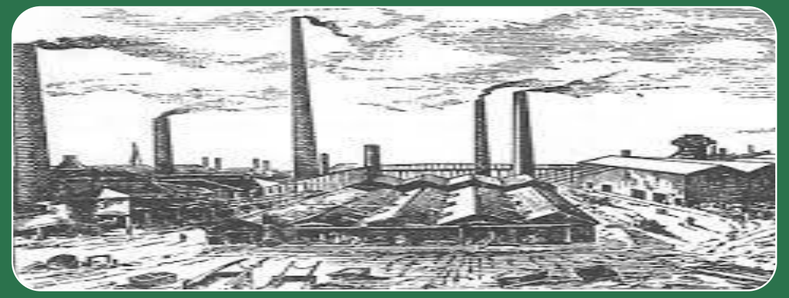
What are the conditions to be put in place
so that this balance is decidedly positive?

We are certain that the most important variable to consider in this epochal transition is the formation of people.

Today's educational system is a legacy of the past

The Factory Model of Education: assembling masses of students (**raw material**) to be processed by teachers (**workers**) in a centrally located school (**factory**).

Keeping up with today's world



Old model: passive learning

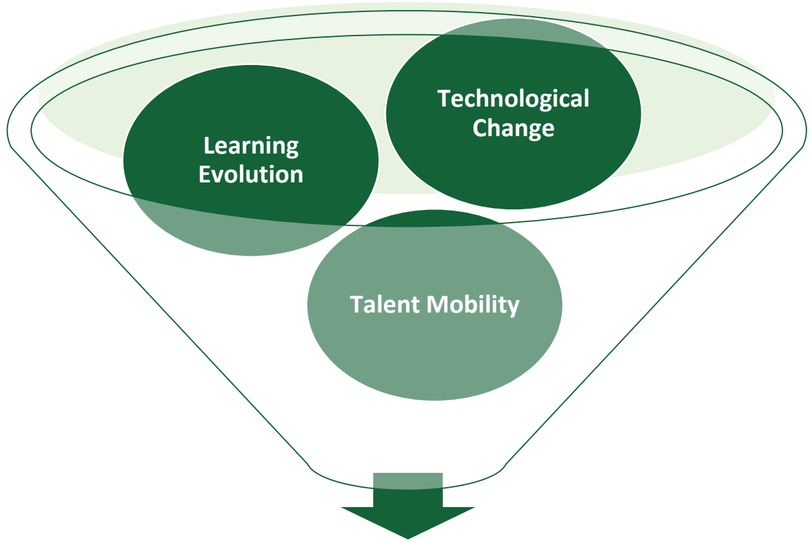
- Top-down management
- Standardization of knowledge
- Based on facts and procedures
- Focused on hard-skills
- Pre-determined duration of the educational cycle

New model: active learning

- Horizontal collaboration
- Creativity
- Critical thinking and problem solving
- Focused on hard and soft skills
- Long life learning, with many opt-ins and opt-outs

Flexibility necessary in an uncertain job market…

65% of children entering primary school today will ultimately end up working in job types that **don’t exist yet**



8 different job markets

Workforce autarkies

Mass movement

Robot replacement

Polarized world

Empowered entrepreneurs

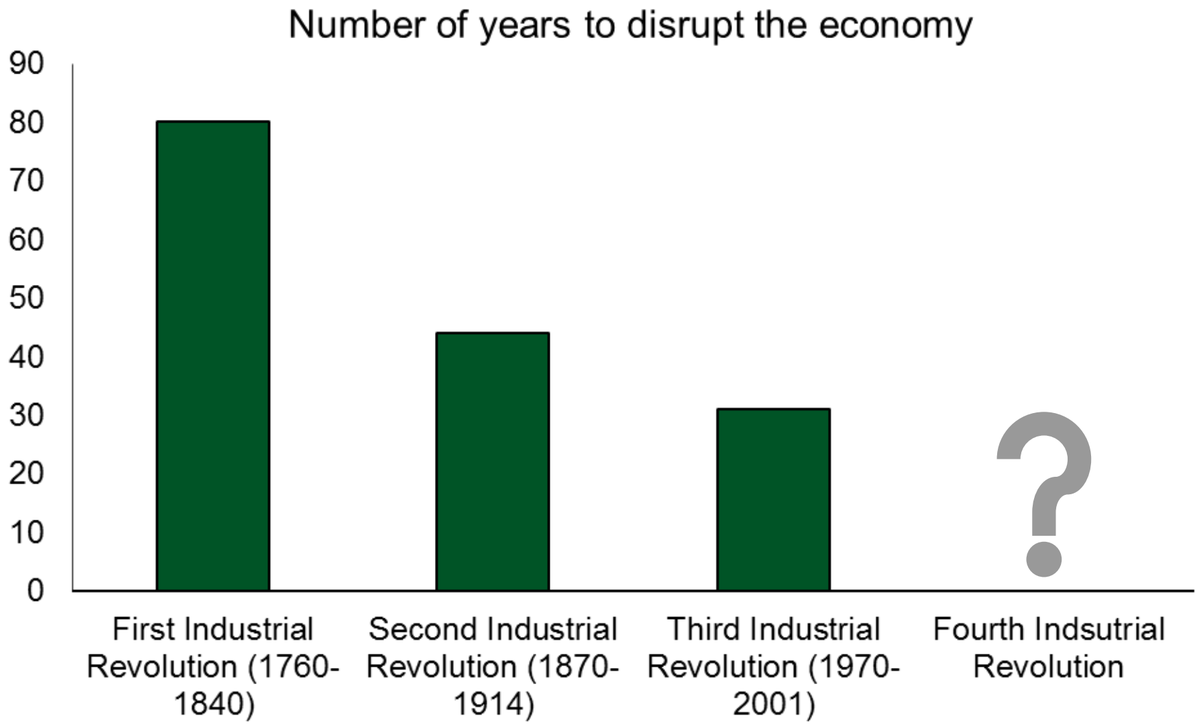
Skilled flows

Productive locals

Agile adapters

Source: WEF 2018

… at a time of exponential technological change

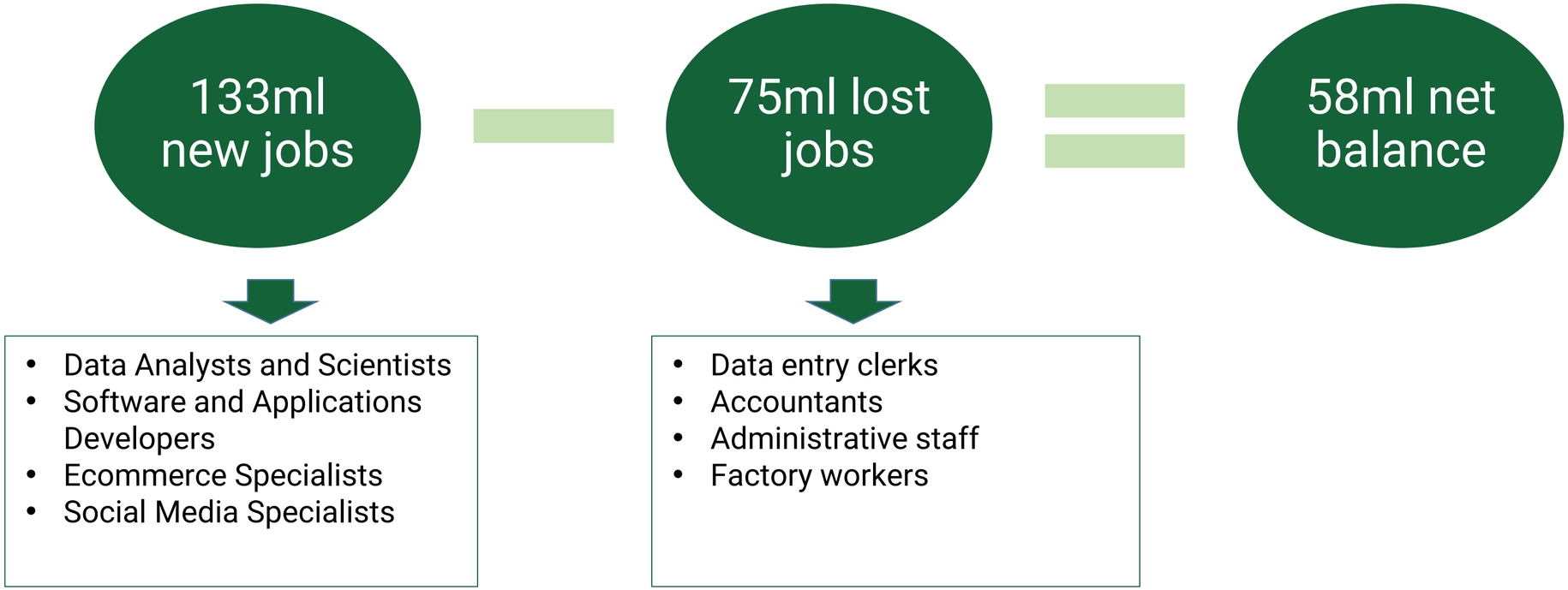


The progress we make in the 21st century might be 1,000 times the progress of the 20th century!

Ray Kurzweil, futurist

The end of work has not come yet…

By 2020, globally…



Source: WEF 2018

…completely new professions will emerge…

New medical doctors

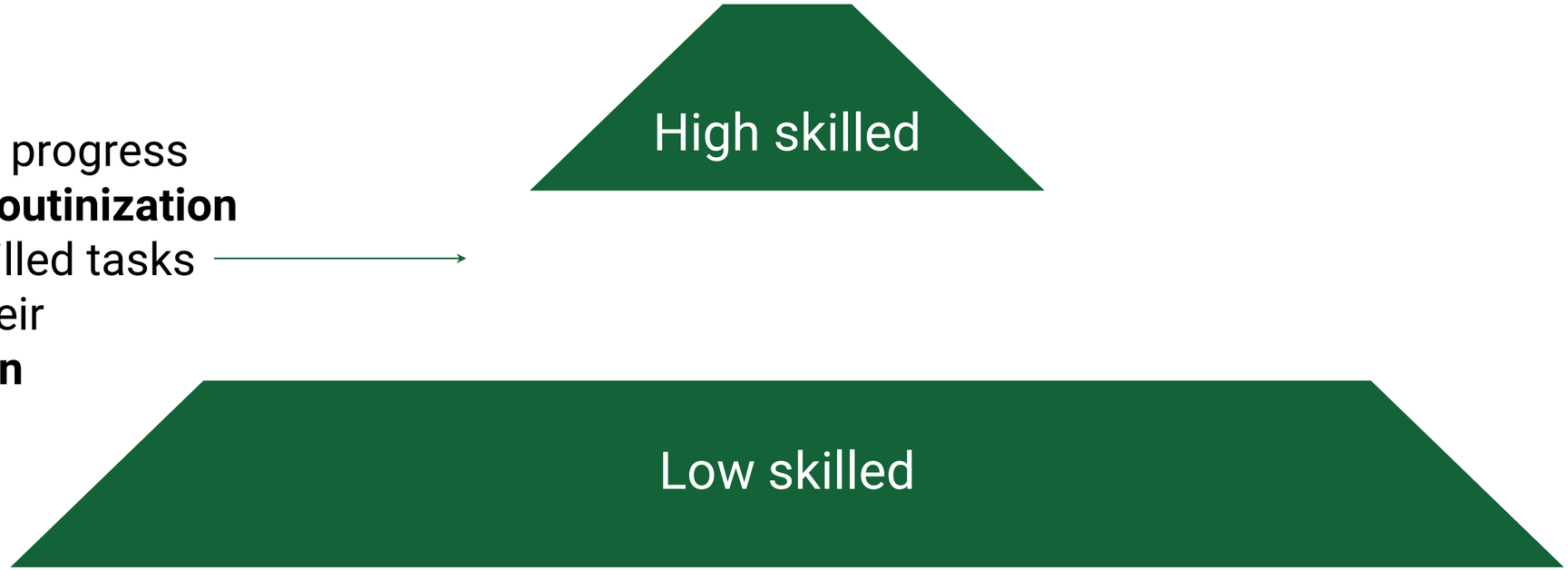
Digital architects

Nanotech/biotech professionals

AI educators

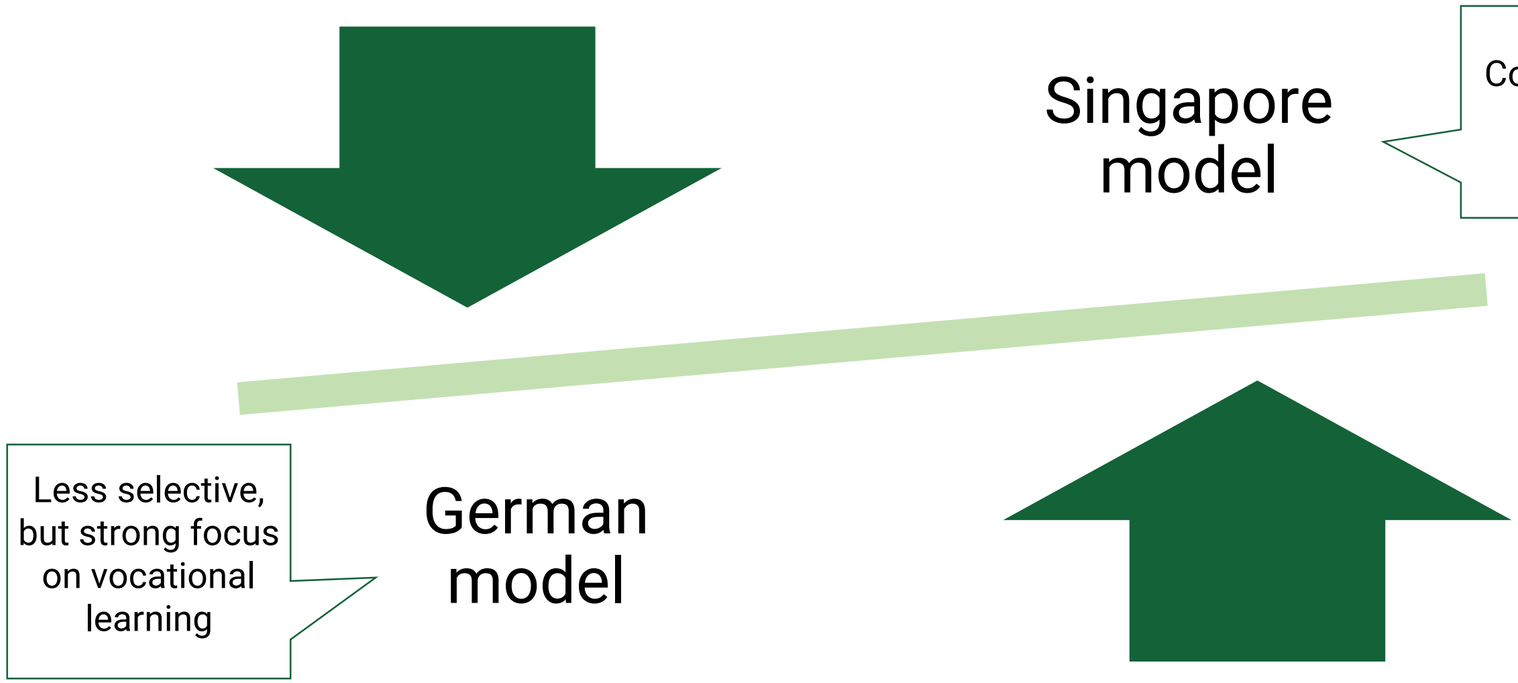
…heading towards a highly polarized labour market

Technological progress
first leads to **routinization**
of medium-skilled tasks
and then to their
automatization



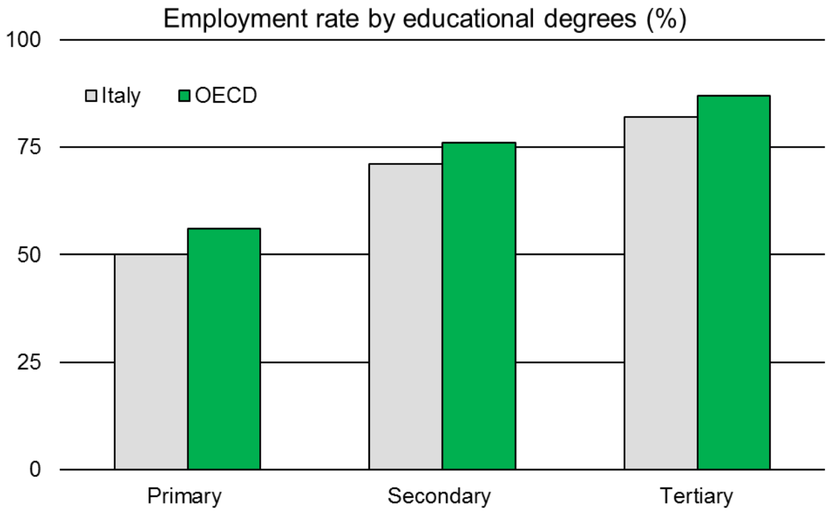
The educational model has to fill the middle

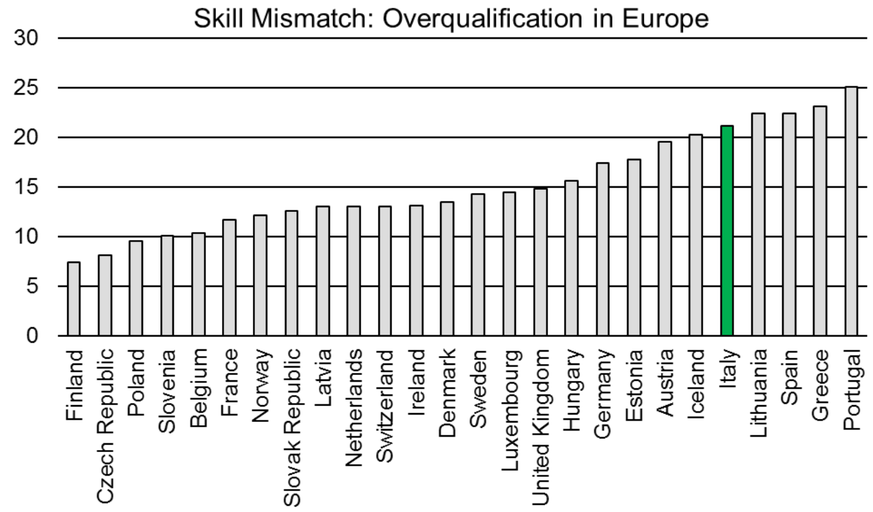
Training the elite, while bringing up the bottom of the pyramid:
not only a matter of university degrees



The Italian system needs reforming…

Already inadequate for the previous Industrial Revolution…





Source: OECD

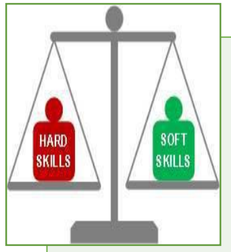
… and there is a lot of ground to cover

Automation Readiness Index

Rank	Country	Score
1.	South Korea	91.3
2.	Germany	89.6
3.	Singapore	87.3
4.	Japan	82.6
5.	Canada	81.8
6.	Estonia	79.5
7.	France	78.9
8.	UK	73.1
9.	US	72.0
10.	Australia	70.4
11.	**Italy**	**67.5**

The **Automation Readiness Index** measures countries' preparedness for the coming wave of intelligent automation (Economist Intelligence Unit).

Teaching how to learn



Cognitive and soft skills

Creativity (STEM + ART = STEAM)

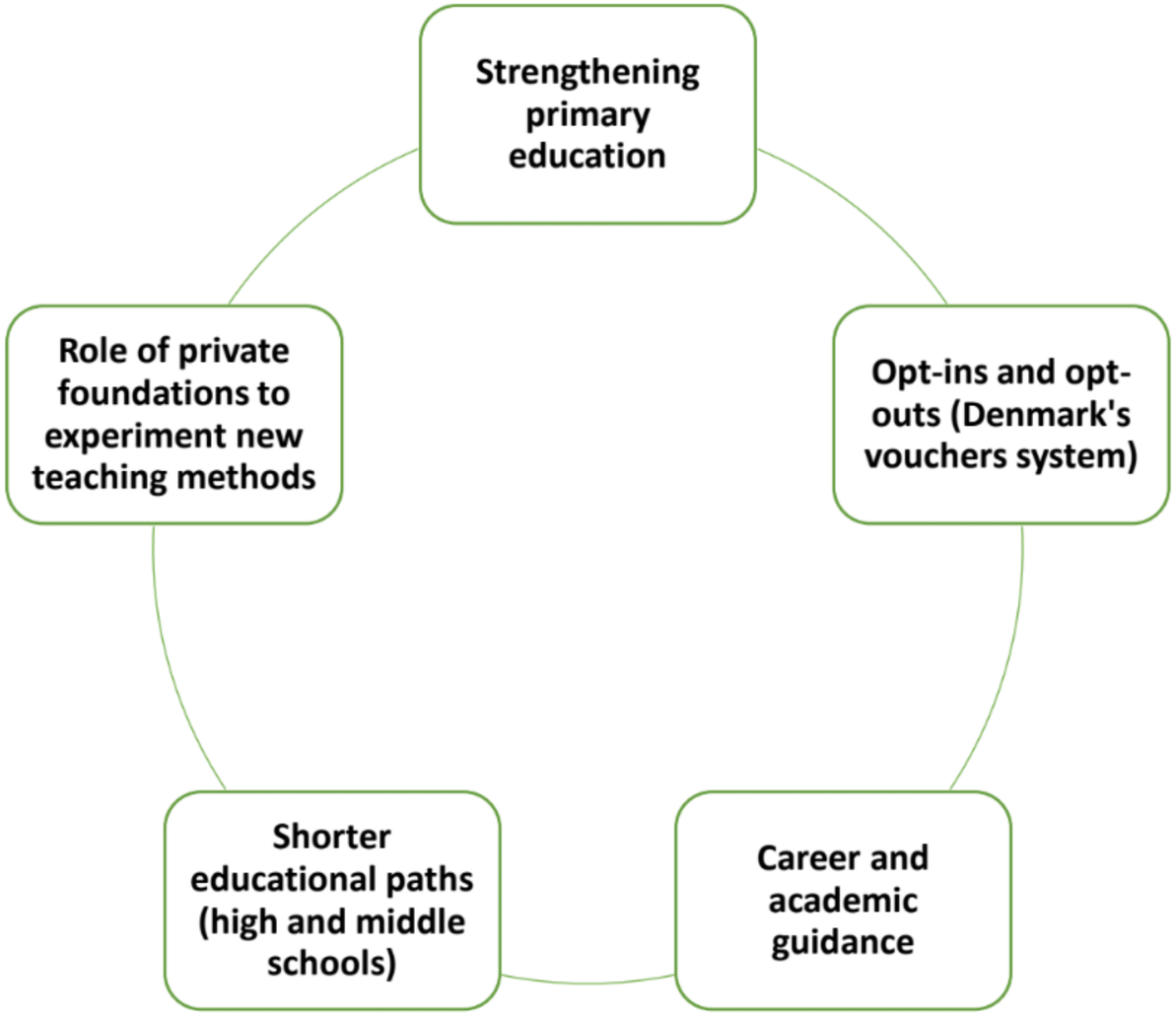
Problem solving (Aalborg model)

Teachers as “guide on the side”, not “sage on the stage"

Multidisciplinary approach

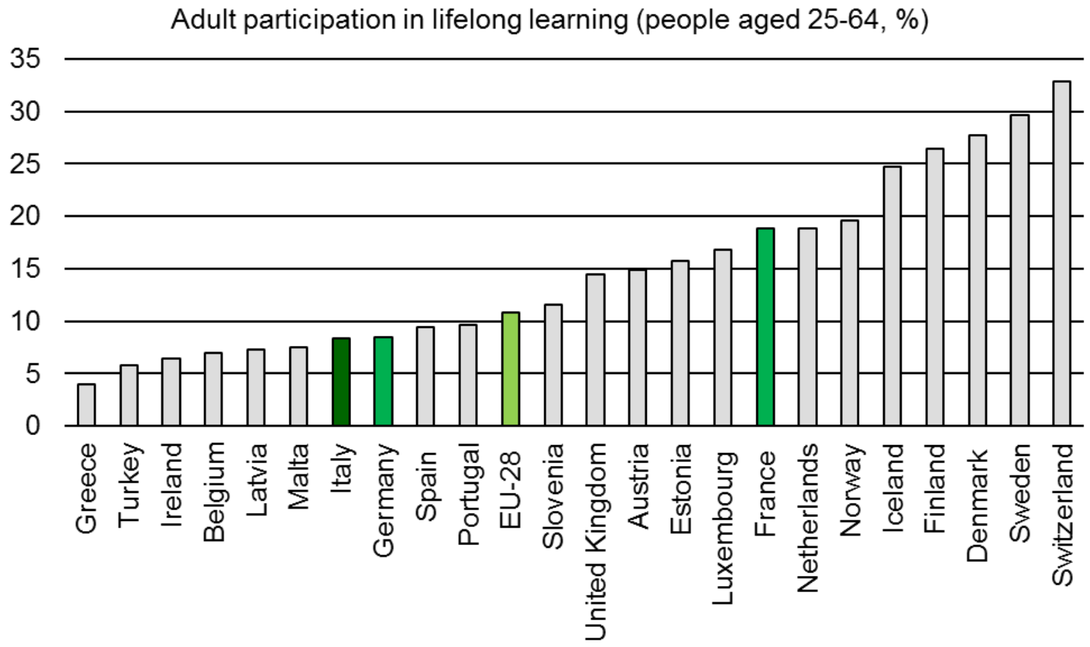
Experimenting new teaching methods

Building a flexible educational model



Managing the transition

Investing seriously in life-long learning, now and in the future

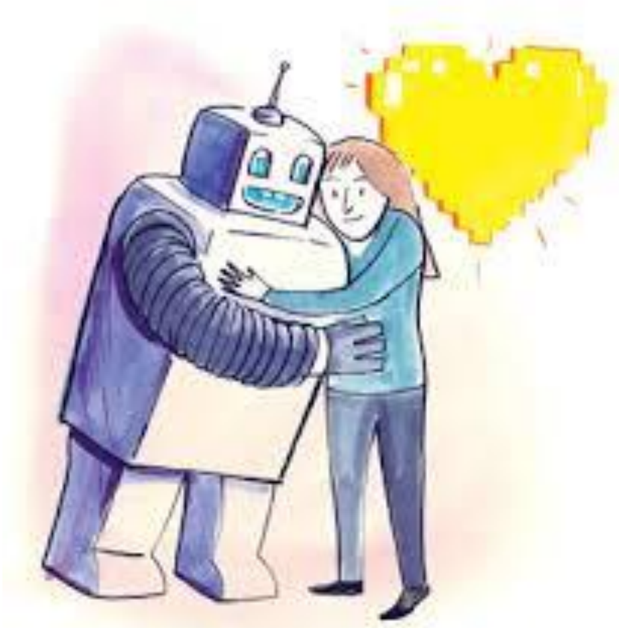


Best practice

Singapore Skills Future Initiative: employers identify skills needed over the next five years.

The responsibility of today's disruptors

AI should not replace human beings, but maximize their creativity



From robot to *co-bot*

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Human-aware Industry 4.0

“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”

Alvin Toffler, Future Shock (1970)

Thank you.

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