

Fondazione
Compagnia
di San Paolo

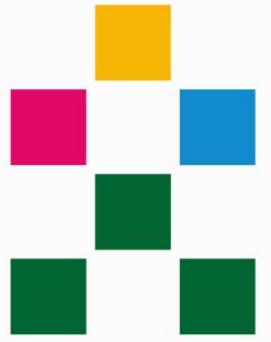
A new RenAIssance for the future of Education

Prof. Francesco Profumo, Chairman

*The “good” algorithm? Artificial Intelligence,
Ethics, Law, Health*

Vatican City, 27th February 2020

AI winter



When

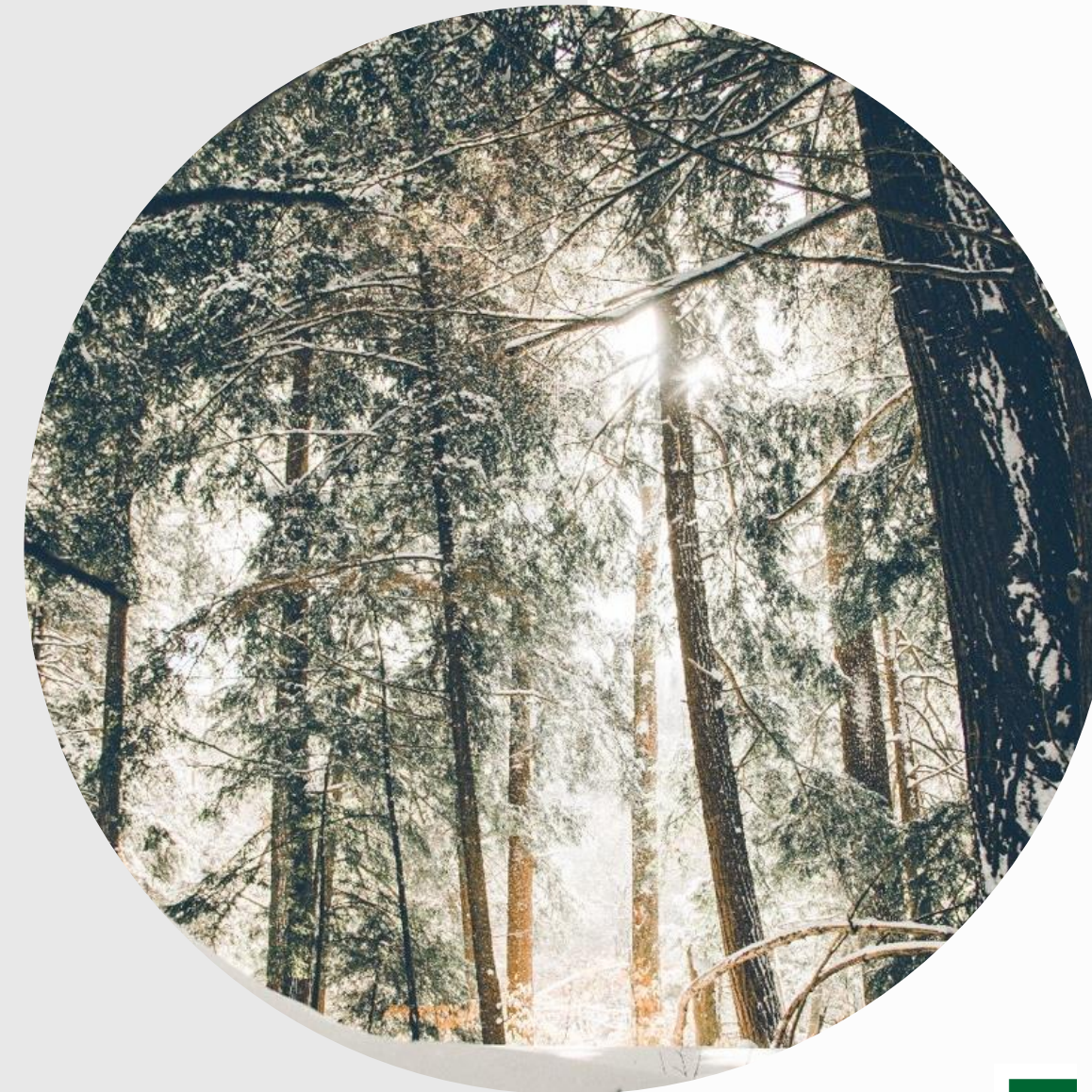
The '80s

Technological context

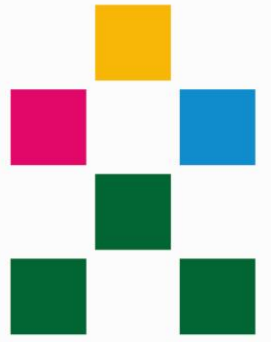
Experiments conducted in various research centers fail to fully meet the high expectations of impact on the market and on society

Example

"Toy examples" promising but not yet capable of responding to the typical complexity of real applications



AI spring



When

The '90s

Technological context

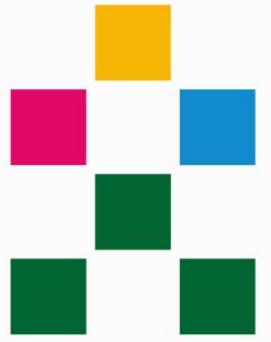
A significant increase in the reliability of the algorithms allows AI to go beyond the perimeter of the academy, reaching the most advanced industrial contexts

Example

NASA Deep Space 1 (first system to control a spacecraft without human supervision)



AI summer



When

After 2000

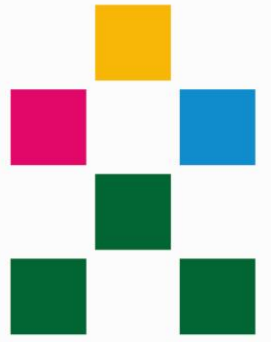
Technological context

AI becomes extremely pervasive, taking root in a lot of sectors and enabling profitable business models

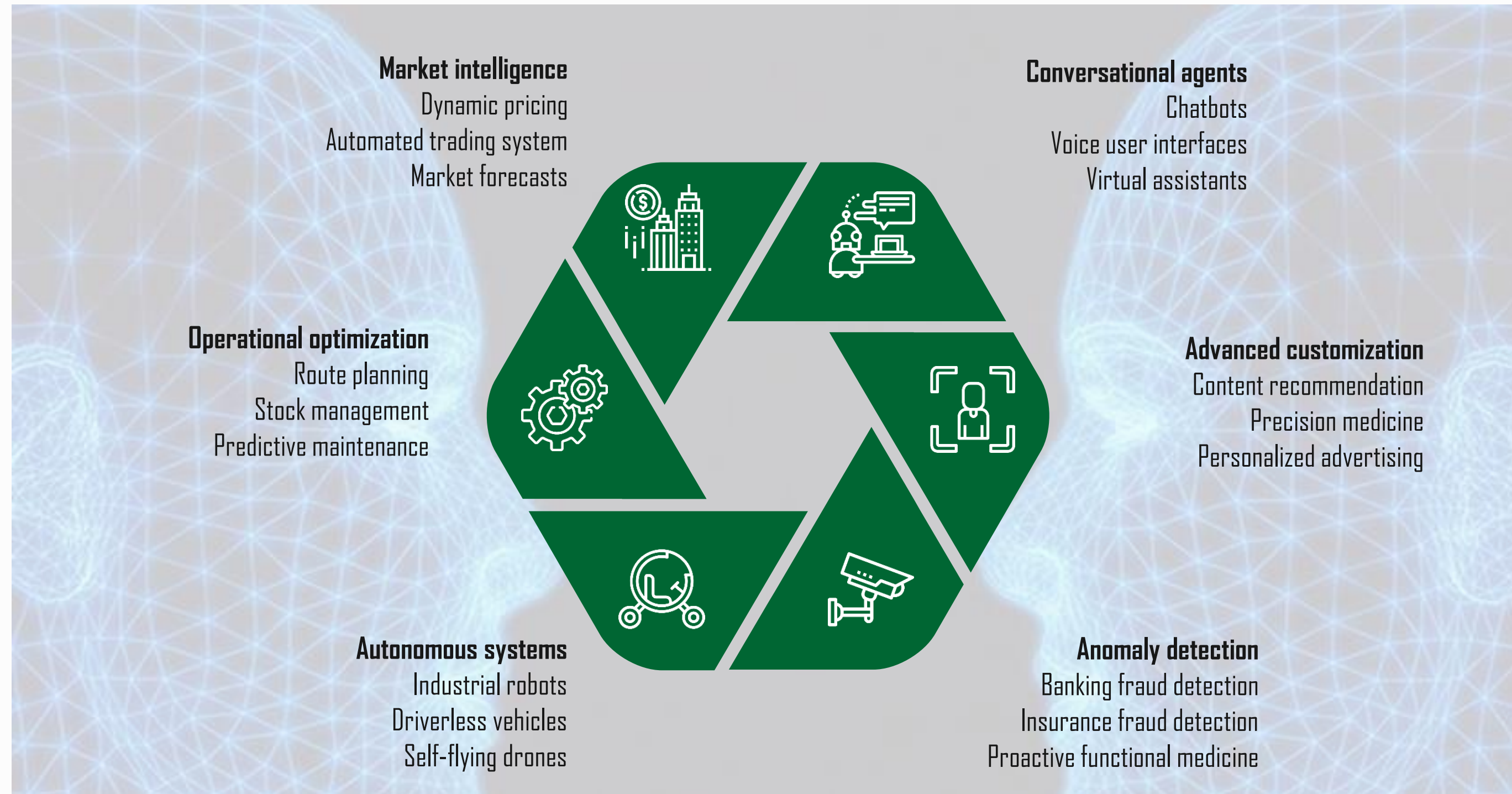
Example

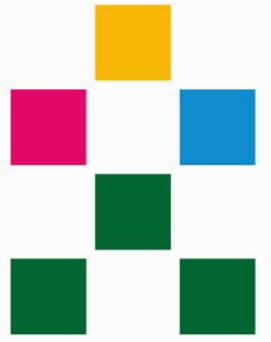
GAFA (Google, Amazon, Facebook, Apple)





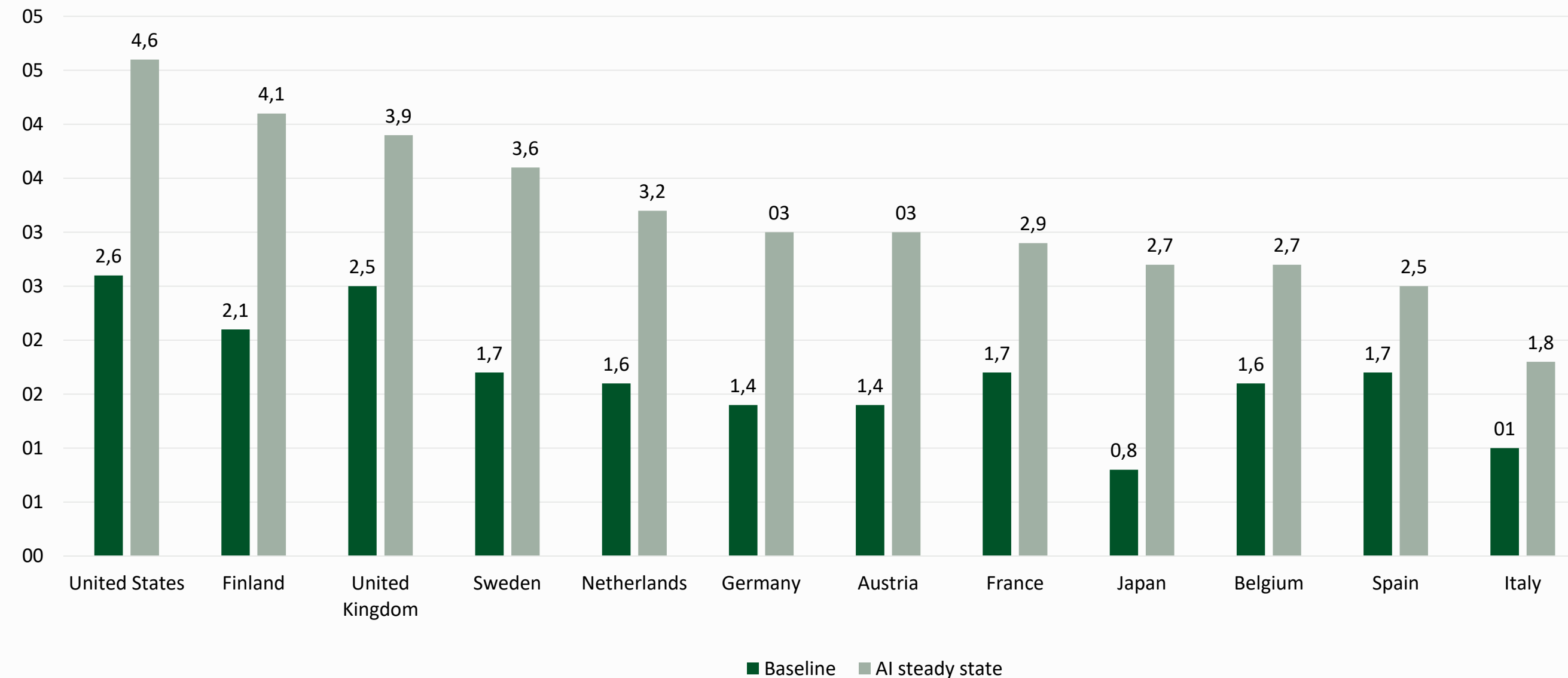
AI summer: AI in everyday life





AI summer: an additional economic output

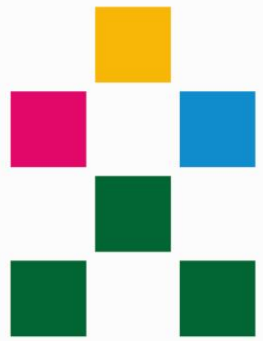
conomic impact of AI
the potential to double annual economic growth rates (%)



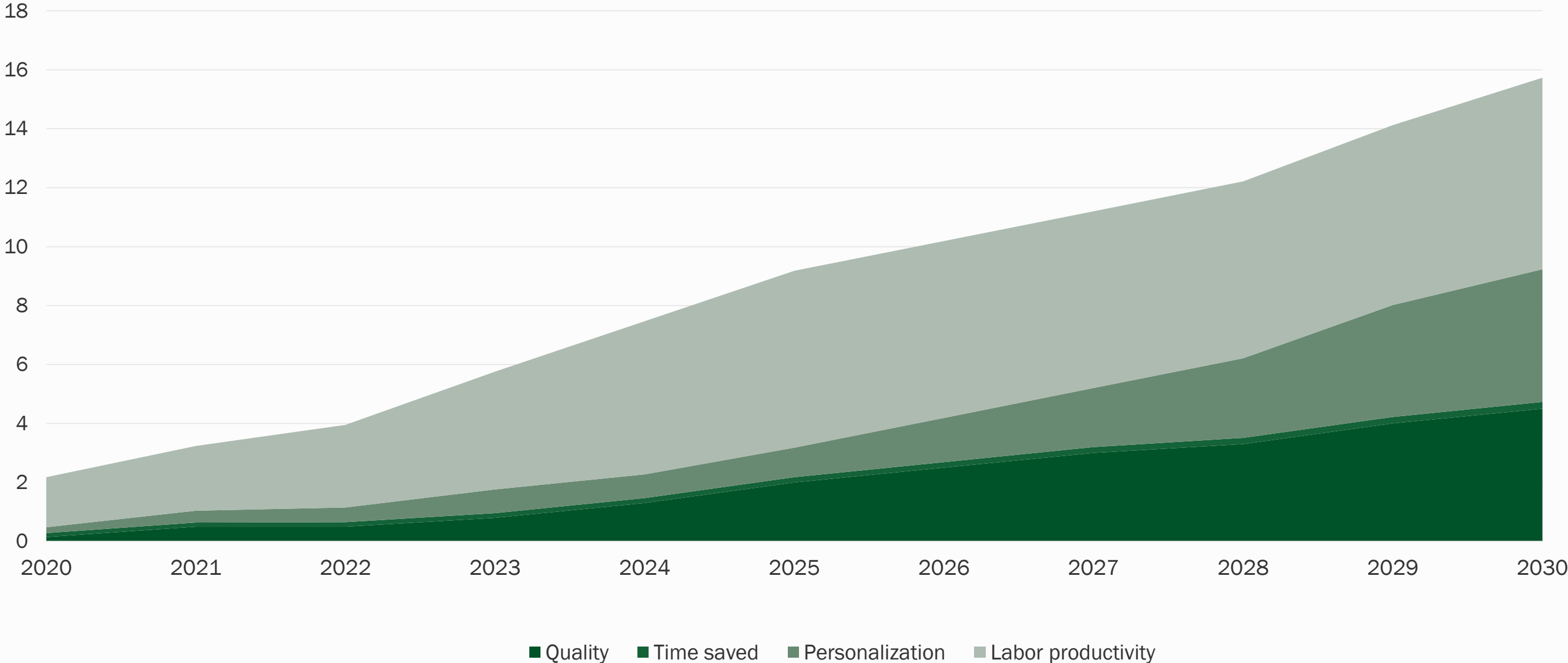
Source: Accenture and Frontier Economics

14%
Potential global GDP growth
by 2030

AI summer: an additional economic output (cont'd)



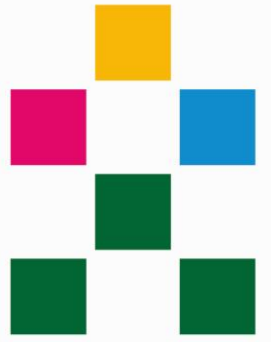
More efficiency and effectiveness
Trillions of \$



Source: PwC

\$15.7tr

Potential contribution to the global economy by 2030 from AI



The world we want: a future for all

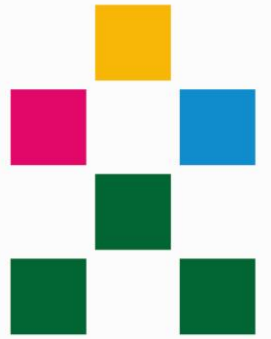


Towards 2030

The United Nations in 2015 set 17 goals to promote long-term human well-being

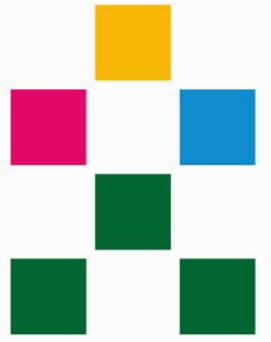
They are universally valid, meaning that all countries must contribute to achieve these goals

Education as driver of social mobility



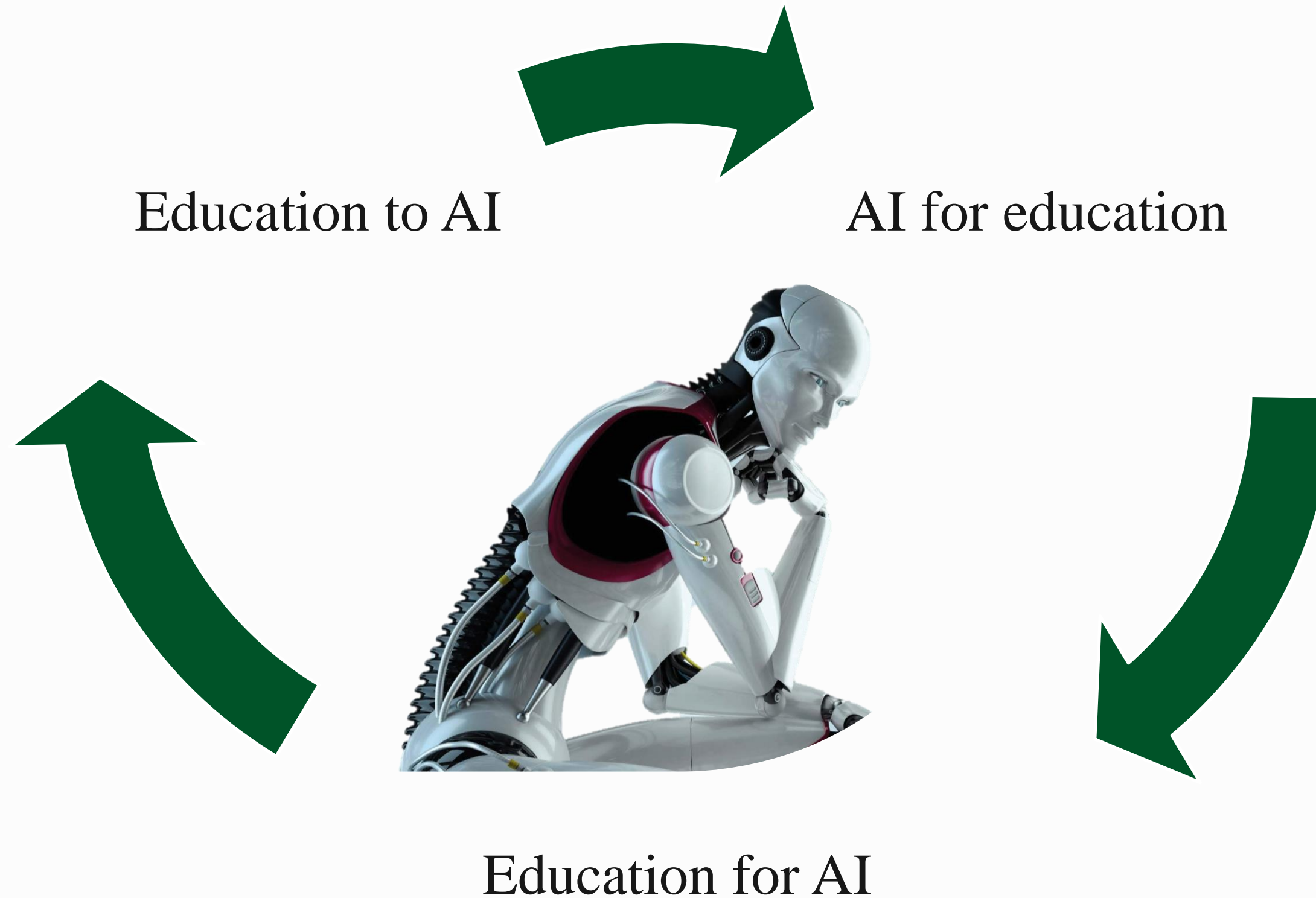
Towards 2030

Ensure **inclusive** and **equitable** quality education and promote **lifelong learning** opportunities for all

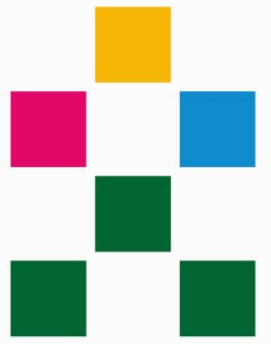


A new RenAIssance for the future of Education

How to rethink education in view of the increasing presence of AI: three perspectives



AI for Education: challenges



Good education: the best investment a society can make for its future

AI is playing an increasingly important role in building the future of teaching and learning.

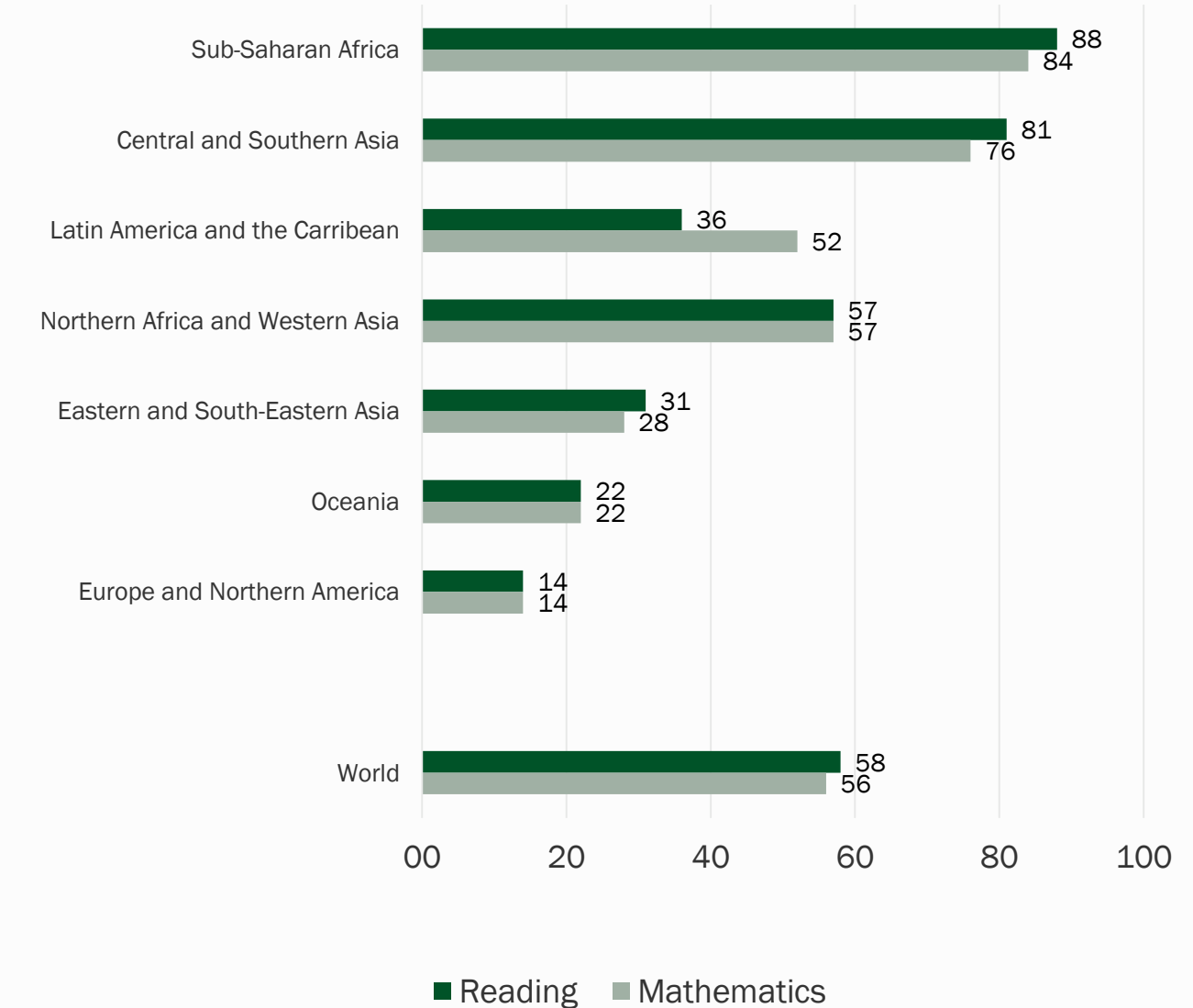
Main challenges:

- No child left behind: high disparities in educational opportunities by region, gender and socioeconomic background
- New educational models (from the one-to-many to many-to-many) and new market spaces for private actors
- Large amounts of data collected from students to manage

★ **More than half a billion children worldwide do not have basic skills** (source: United Nations)

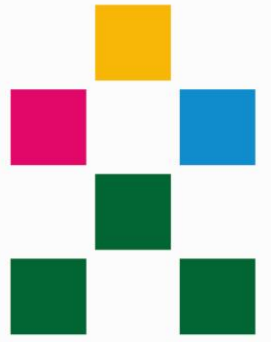
A global learning crisis

Children and adolescents not achieving minimum proficiency (%)



Source: United Nations

AI for Education: opportunities



Innovative teaching methods to leverage new technologies

For students:

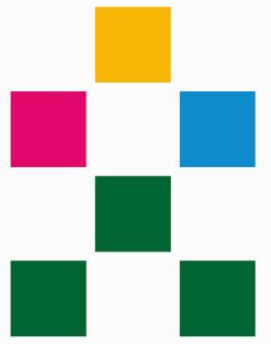
- Remove linguistic and logistic barriers, issues and inequalities
- Tailor and personalize learning, based on abilities, needs and experience (e.g.: AI-powered chatbots, smart notes, flashcards, virtual facilitators, autonomous assistants)

For teachers:

- Enhance new learning outcomes, improving quality provided
- Manage back office and administrative activities, offering more time to focus on educating students and research



Education for AI: challenges



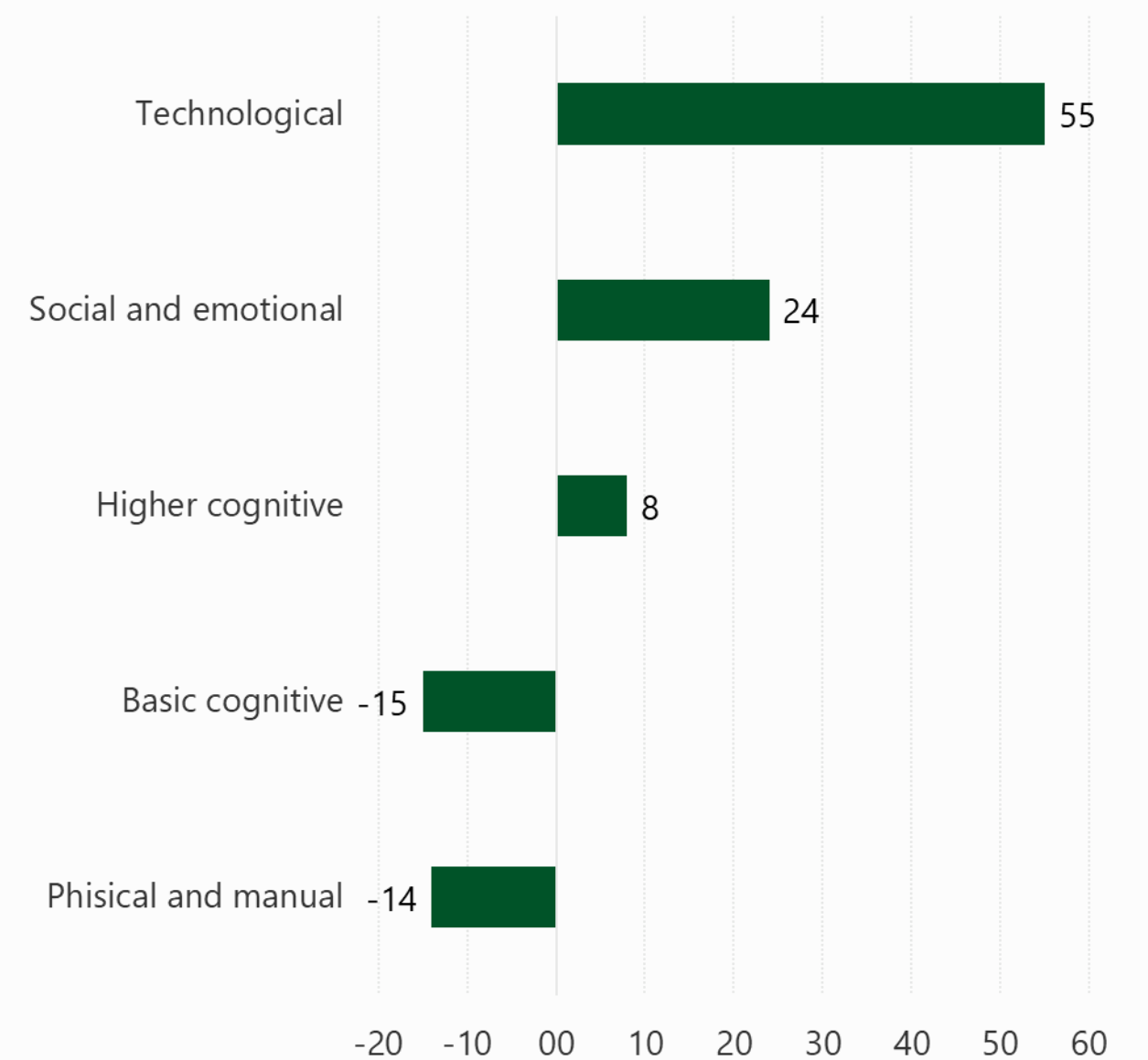
Disruption in labor market: be prepared to manage the change

- A new human-machine interaction: automation will reach 50 percent of work activities
- AI as job category killer (e.g.: transportation, retail, professional employment services, customer service)
- Increasing mismatch between skills and jobs: a development of competencies is needed, less routine skills will become more important

★ **The number of graduates in STEM is around 4 percent in EU, but demand for STEM jobs is expected to grow by around 8 percent by 2025** (source: European Commission)

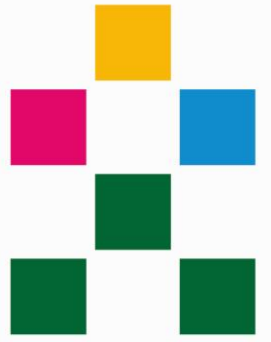
New skills for the future of work

Change in hours spent by 2030, %



Source: McKinsey

Education for AI: opportunities

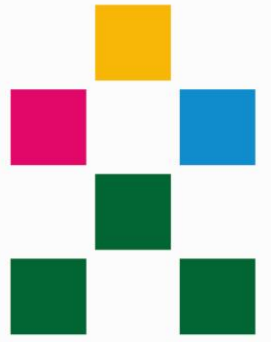


How to reinforce our educational system by developing new competencies

- Increase technological understanding (schools and universities)
- Support workforces in reskilling and upskilling (business community)
- Lifelong learning (all people)
- Create good environment to invest in people's capabilities (governments)



Education to AI: challenges



AI must be used for the good of our societies and the sustainable development

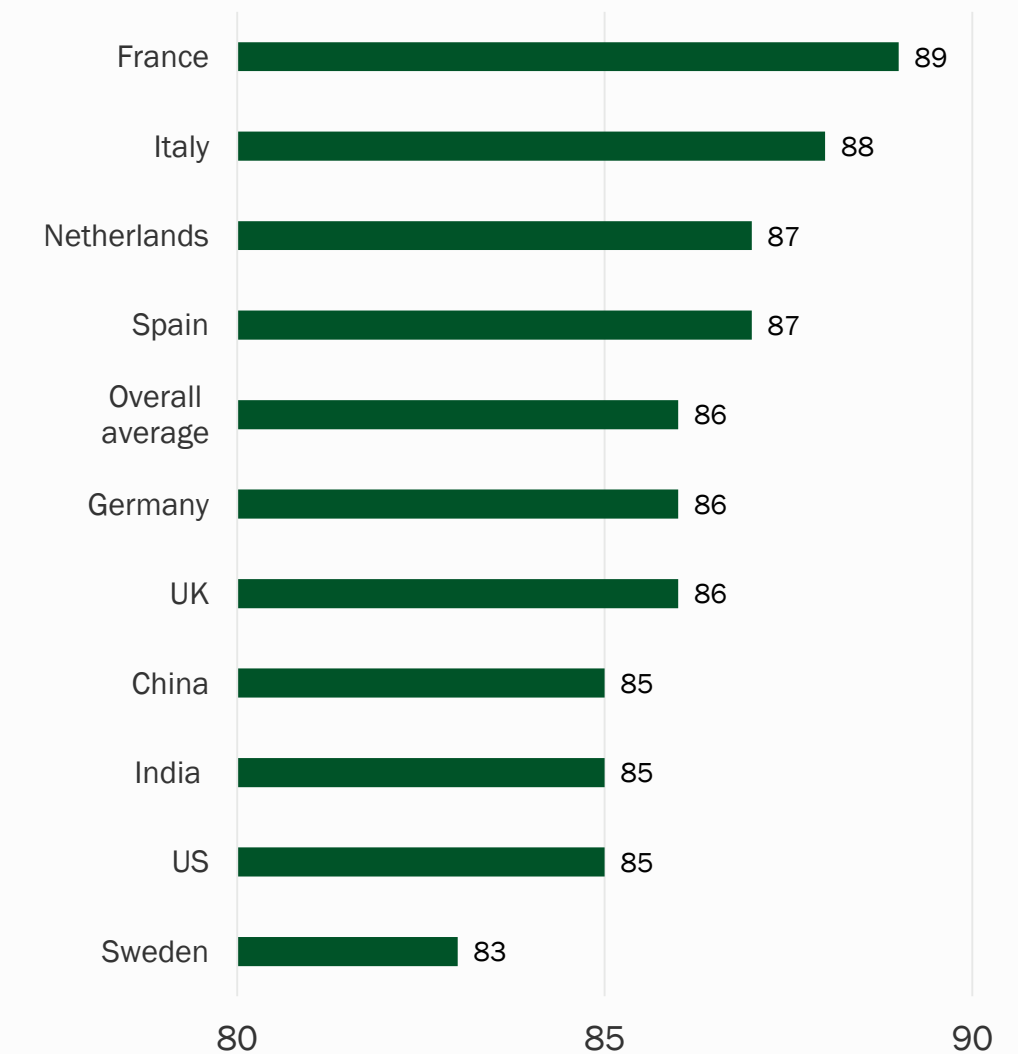
AI brings new challenges in terms of governance related to its interaction with human cognitive capacities and automatic decisions making:

- information asymmetry (only developers understand how algorithms are constructed and work)
- lack of a legal and regulatory framework (trade-off dilemma between data ownership, open access to data, and data privacy protection)
- mismatch 'good for people' vs. 'good for governments'

★ **Every day the world creates 2.5 quintillion bytes of data** (source: World Economic Forum)

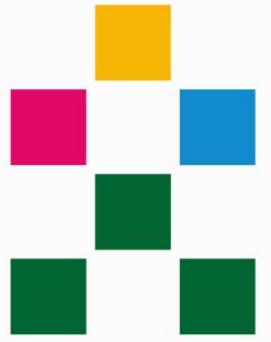
Business is concerned about AI

Organizations have experienced ethical issues with AI in the last 3 years (%)



Source: Capgemini Research Institute

Education to AI: opportunities

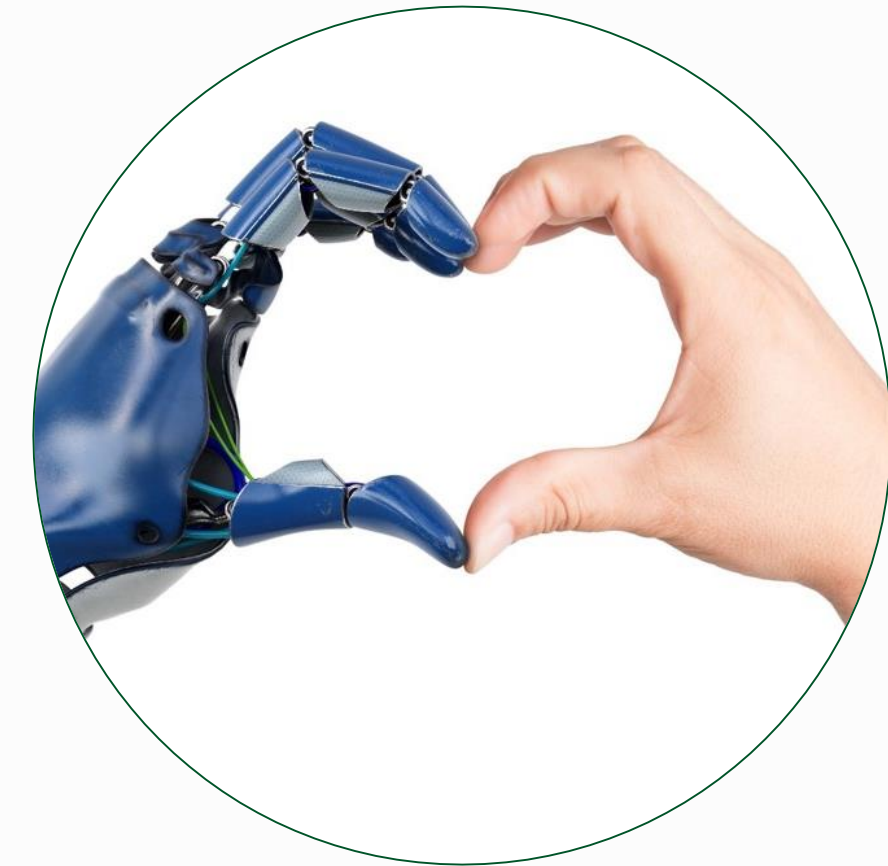


Ethical AI: the leading role of EU

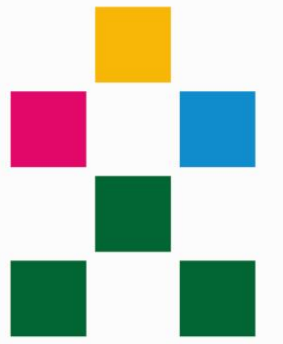
EU should exercise its leadership to promote a 'human-centric' approach to AI.

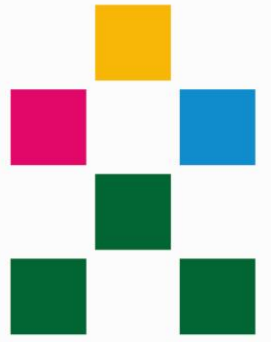
Seven key requirements defined in 2019 by the European Commission for achieving trustworthy AI:

- human agency and oversight
- technical robustness and safety
- privacy and data governance
- transparency
- diversity, non-discrimination and fairness
- societal and environmental well-being
- accountability



Disruption is the new normal





A future-proof education in the age of algorithms

- 65% of children entering primary school today will ultimately end up working in completely new job types that do not yet exist

(source: World Economic Forum)

- Due to accelerating technological changes, workers will have to modify 50-60% of their business-as-usual in the next 5 years

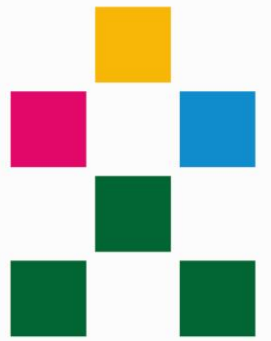
(source: EY)

- Over 20 new job categories will be created in the next 10 years

(source: Cognizant)

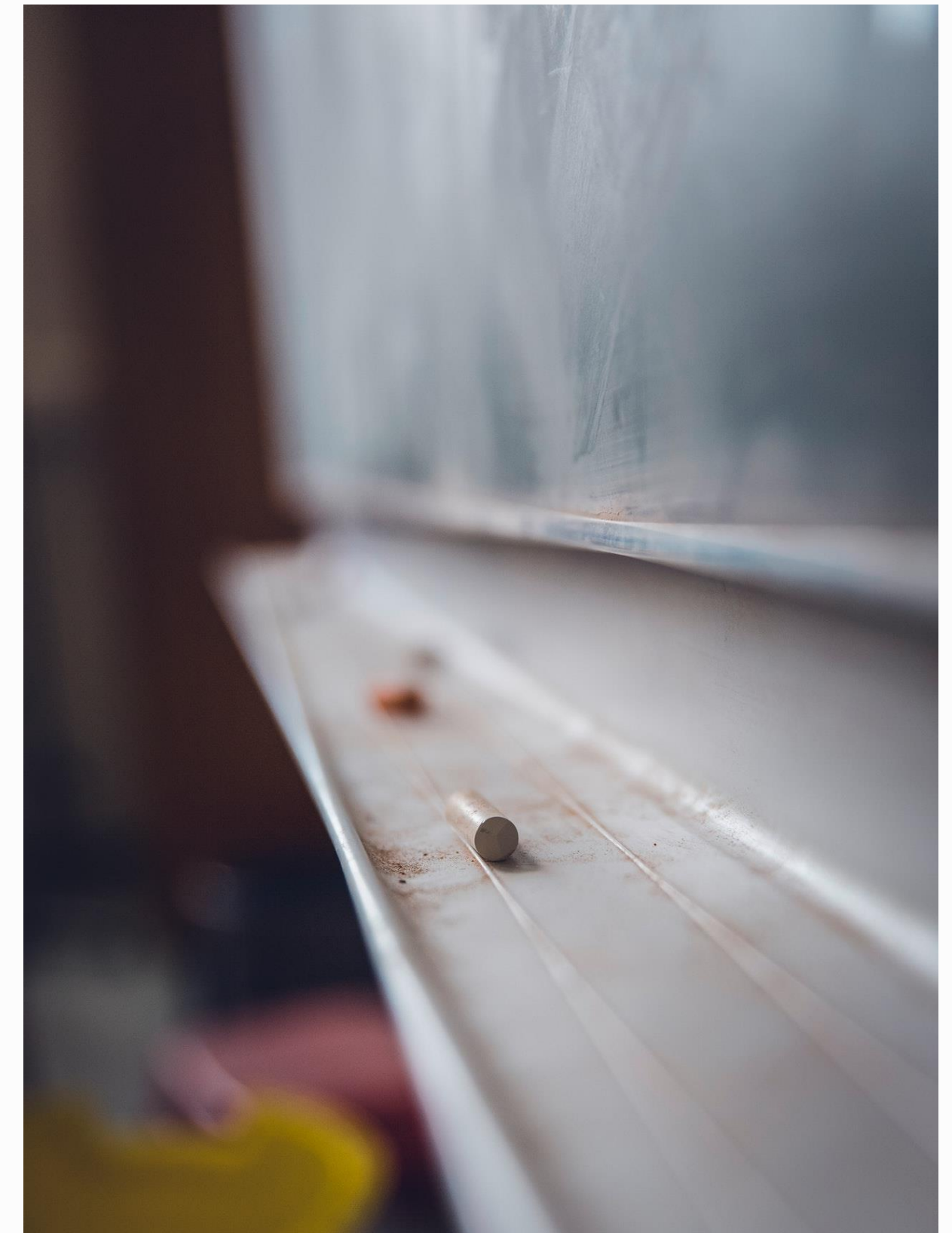


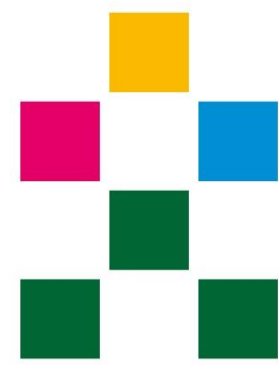
Education is simply the soul of a society as it passes from one generation to another



- Teach students how to learn
- A lifelong learning model: people will go back to school several times in their life
- Creativity and soft skills as the linchpin of the next-generation learning process
- Produce multi-disciplinary professionals, with robust STEM competencies and non-technical competencies

Let's build the future together!





Fondazione
Compagnia
di San Paolo

Dal 1563, il bene comune.