Responsible AI & National AI Strategies

European Union Commission

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Today's discussion

01

Opportunities in Artificial Intelligence

The growing sophistication of AI and machine learning technologies are transforming our lives – both as a consumer and as an enterprise.

Microsoft Xiaoice AI Can Replace Weathermen

Sense

Artificial Intelligence is becoming ubiquitous intelligence with the ability to see, hear, speak, smell, feel, understand gestures, interface with your brain, and dream

EVERYTHING is a Recommendation

FutureAdvisor
wealthfront
SigFig
Vanguard
Betterment

Think

AI is helping us do tasks faster, better and cheaper – **Automated Intelligence;** helping us make better decisions – **Augmented Intelligence,** or even taking over what we do – **Autonomous Intelligence**

IN TWO MOVES, ALPHAGO AND LEE SEDOL REDEFINED THE FUTURE

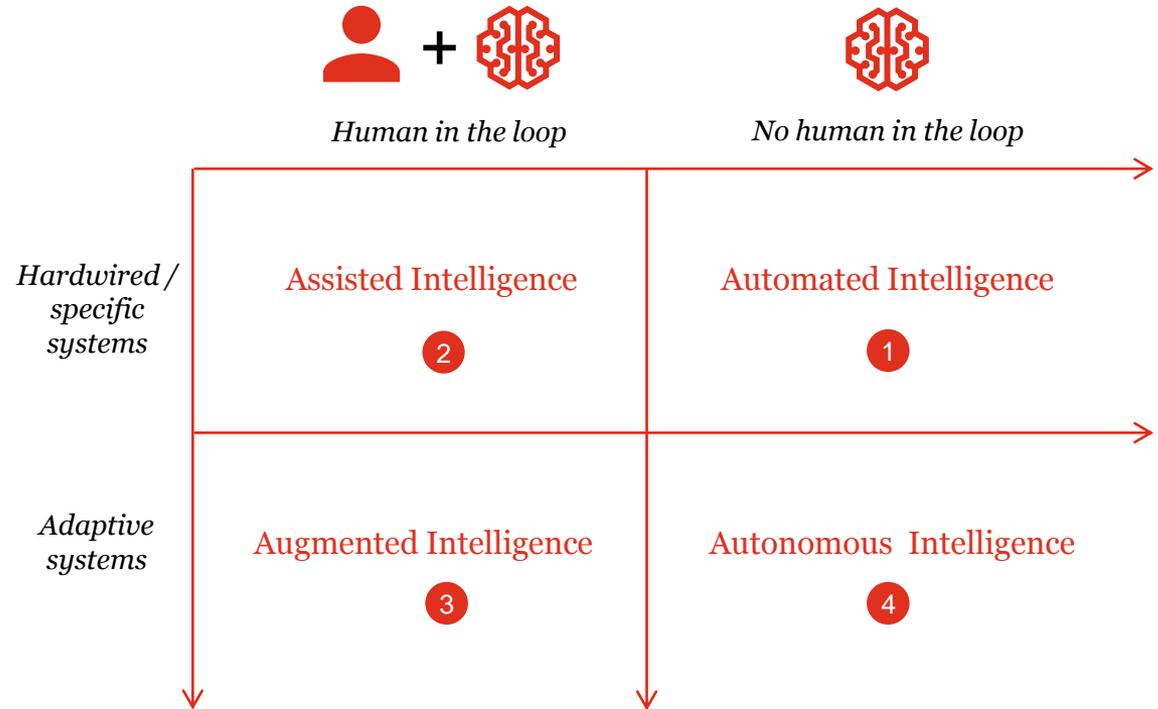Libratus, the poker-playing AI, destroyed its four human rivals

Sorry, fellow humans: It wasn't even close.

Act

Artificial Intelligence is **equaling or surpassing humans** in a number of other tasks – playing games, driving cars, recommendations (movies, books, finance, research), etc.

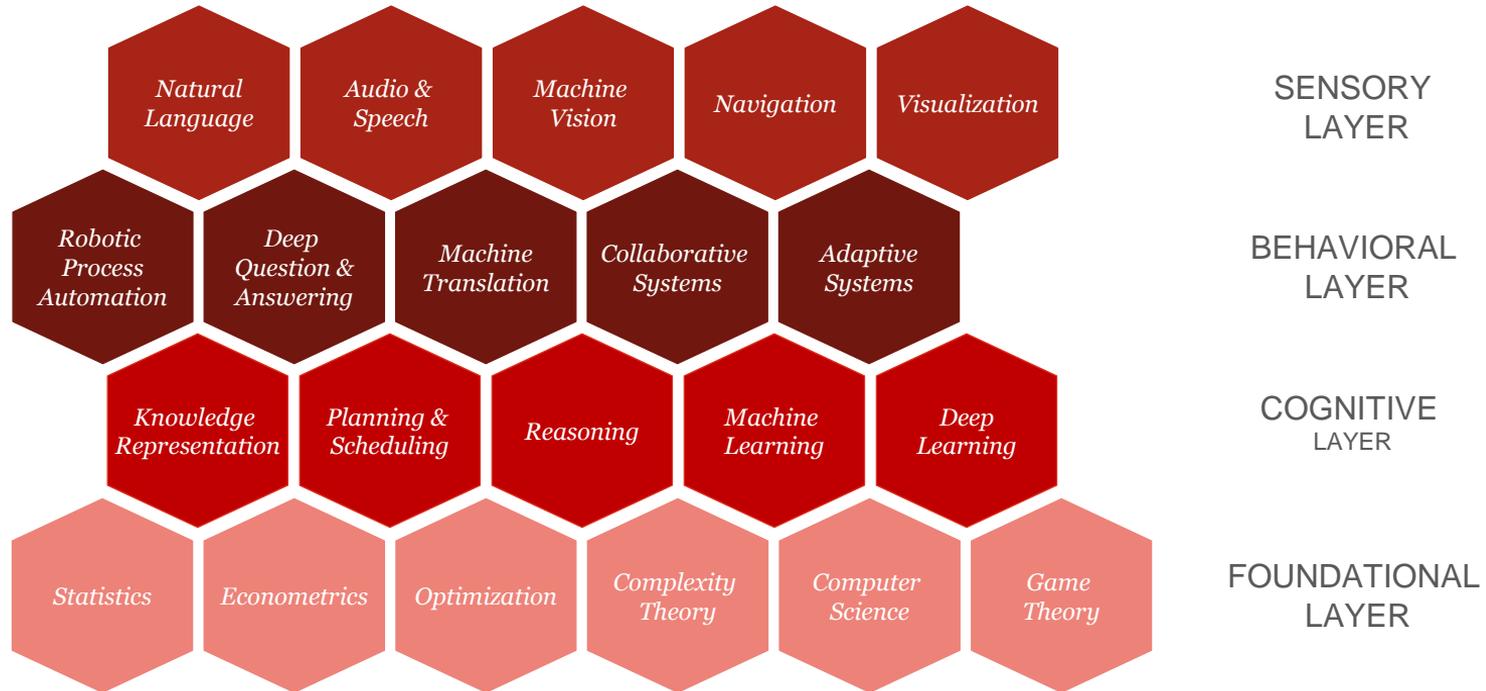# Artificial Intelligence: *Manual, Cognitive, Creative*

AI is helping us do tasks faster, better and cheaper – **Automated Intelligence**; helping us make better decisions – **Assisted & Augmented Intelligence**, or even taking over what we do – **Autonomous Intelligence**

Human in the loop   *No human in the loop*

	Human in the loop	*No human in the loop*
Hardwired / specific systems	Assisted Intelligence **2**	Automated Intelligence **1**
Adaptive systems	Augmented Intelligence **3**	Autonomous Intelligence **4**

AI covers a wide range of capabilities that spans the foundational, cognitive, system, and sensory layers.
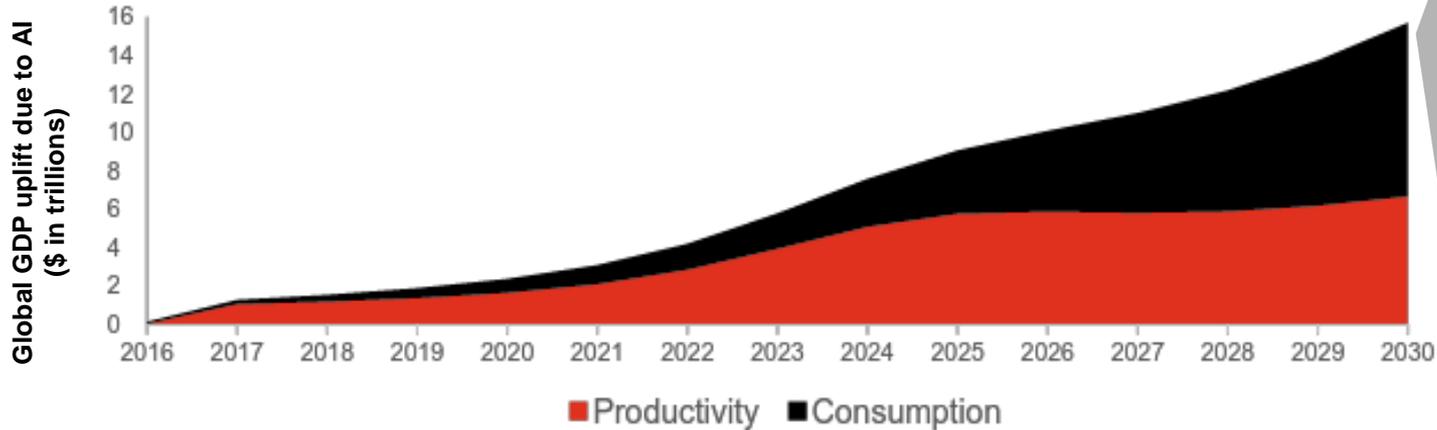
What is Artificial Intelligence?

Artificial Intelligence can be defined as the theory and development of systems that can continuously sense its environment, think, make decisions, and take actions that influence the environment to achieve its goals.

Natural Language	*Audio & Speech*	*Machine Vision*	*Navigation*	*Visualization*	**SENSORY LAYER**
Robotic Process Automation	*Deep Question & Answering*	*Machine Translation*	*Collaborative Systems*	*Adaptive Systems*	**BEHAVIORAL LAYER**
Knowledge Representation	*Planning & Scheduling*	*Reasoning*	*Machine Learning*	*Deep Learning*	**COGNITIVE** LAYER
Statistics	*Econometrics*	*Optimization*	*Complexity Theory*	*Computer Science*	*Game Theory* · **FOUNDATIONAL LAYER**

The AI Revolution is here, and goes beyond automation; huge opportunity exists for both productivity & consumption gains.

Global GDP Impact of AI through 2030

2030 IMPACT:
$15.7T

Consumption Contribution:
60%

Productivity Contribution:
40%

Global GDP uplift due to AI ($ in trillions)

16
14
12
10
8
6
4
2
0

2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

■ Productivity ■ Consumption

Are you ready to exploit the opportunities from AI & overcome the challenges?

02

Risks of
Artificial Intelligence
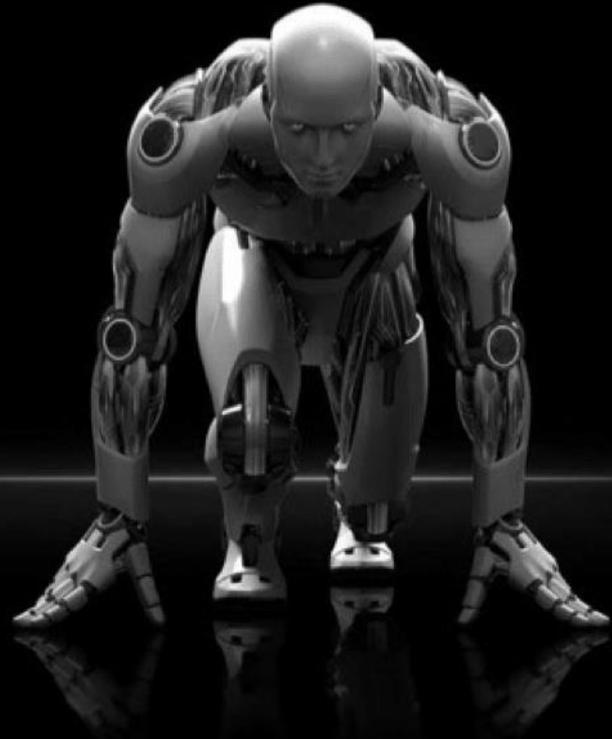
Some leaders in industry and science are wary of the rapid adoption of AI and the risks posed by AI

"I'm increasingly inclined to think that there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don't do something very foolish." — **Elon Musk**

"The automation of factories has already decimated jobs in traditional manufacturing, and the rise of artificial intelligence is likely to extend this job destruction deep into the middle classes, with only the most caring, creative or supervisory roles remaining." — **Stephen Hawking**

AI Risks fall under six broad categories with varying impact on individuals, businesses and society

Societal Risks
- Risk of Autonomous Weapons proliferation
- Risk of 'intelligence divide'

Economic Risks
- Job displacement risks
- 'Winner-takes-all' concentration of power risk
- Liability risk
- Reputation risk

Ethical Risks
- 'Lack of Values' risk
- Value Alignment risk
- Goal Alignment risk

Performance Risks
- Risk of Errors
- Risk of Bias
- Risk of Opaqueness or 'black box' risk
- Risk of Explainability
- Risk of stability of performance

Security Risks
- Cyber intrusion risks
- Privacy risks
- Open source software risks

Control Risks
- Risk of AI going 'rogue'
- Inability to control malevolent AI

Artificial Intelligence Risks

1 Performance Risks
2 Security Risks
3 Control Risks
4 Ethical Risks
5 Economic Risks
6 Societal Risks
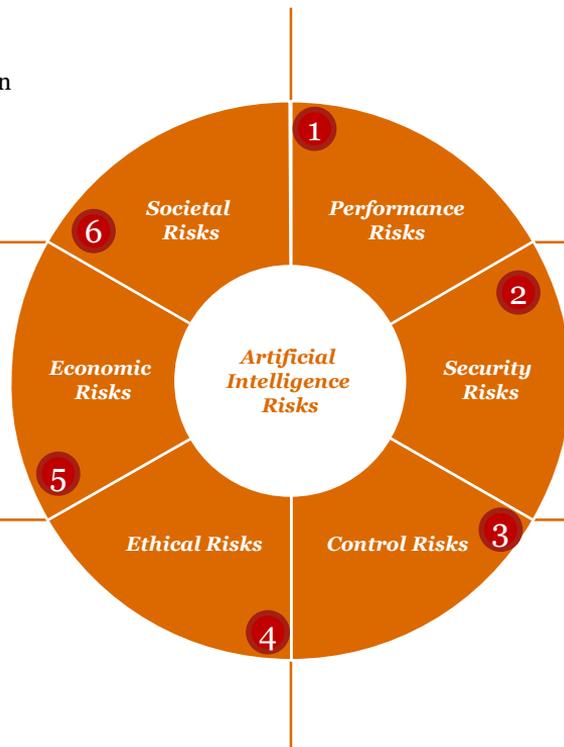
03

National AI Strategies & Regulations

A number of major economic powers are launching long-term AI strategies and initiatives
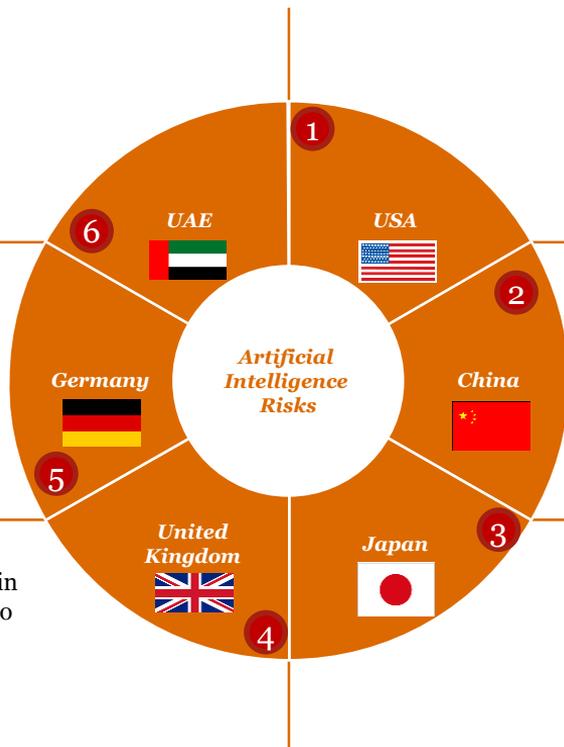

UAE
- UAE Strategy for Artificial Intelligence (October 2017)

Germany
- Ethics Commission: Automated and Connected Driving (June 2017)

United Kingdom
- Growing the Artificial Intelligence Industry in the UK (October 2017): Recommendations to
  - Improve access to data
  - Maximize UK AI Research
  - Improve supply of skills
  - Support uptake of AI

USA
- Unmanned Aircraft Systems (UAS) (Oct 2017)
- Big Data: A Report on Algorithmic Systems, Opportunity, and Civil Rights (May 2016)
- AI, Automation, and the Economy (Dec 2016)
- Preparing for the Future of Artificial Intelligence (Oct 2016)

China
- Next generation AI Development Plan (July 2017) with key focus areas and key guarantee measures addressing the Science & Technology as well as regulations and competitive policies

Japan
- Artificial Intelligence Technology Strategy (March 2017)
- New Robot Strategy (February 2015)

Artificial Intelligence Risks

1 USA
2 China
3 Japan
4 United Kingdom
5 Germany
6 UAE

04

Artificial Intelligence
Not-for-Profit Foundations

A number of major economic powers are launching long-term AI strategies and initiatives

OpenAI
- December 2015
- A non-profit AI research company, discovering and enacting the path to safe artificial general intelligence.

DeepMind Ethics & Society Principles
- October 2017
- Explore and understand the real-world impacts of AI: (a) to help technologists put ethics into practice, and (b) to help society anticipate and direct the impact of AI so that it works for the benefit of all

AI Now
- October 2017
- Launched at NYU as the first University-based research institute focused on the social implications of AI.

Future of Life Institute
- March 2014
- Focused on building Safe AI Systems and also broader ethical considerations

WEF Center for Fourth Industrial Revolution
- January 2017
- Focus on building sustainable AI solutions and maximizing the benefits to the entire society

Partnership on AI
- September 2016
- Established to study and formulate best practices on AI technologies, to advance the public's understanding of AI, and to serve as an open platform for discussion and engagement about AI and its influences on people and society

Diagram (circular): AI Not-for-Profit Foundations
1. Future of Life Institute
2. WEF Center for 4IR
3. Partnership on AI
4. AI Now
5. DeepMind Ethics & Society Principles
6. OpenAI
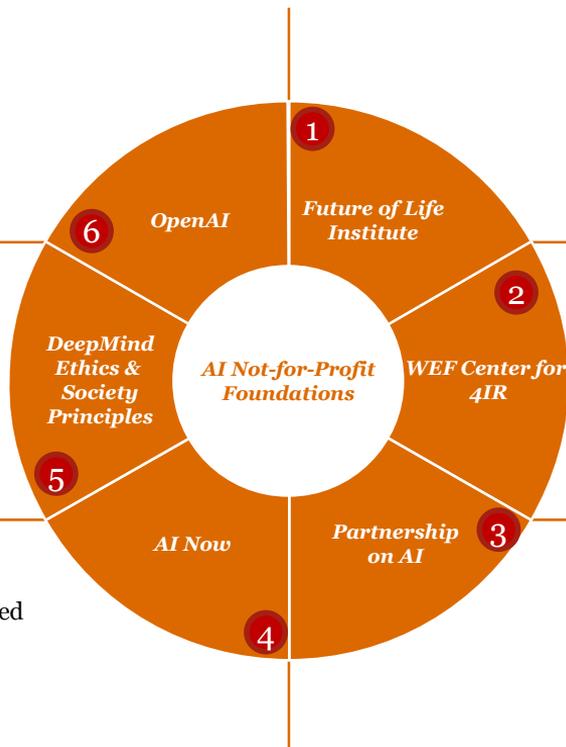
Responsible Artificial Intelligence

We define **Responsible Artificial Intelligence,** as the combination of building Robust AI systems that will engender 'trust' in today's AI system as well as work towards the development of AI that will be beneficial to society today and in the future.

Robust Artificial Intelligence, is concerned with the verification, validation, security and control of AI systems

- Reduce or eliminate software risks
- Reduce or eliminate security risks
- Reduce or eliminate control risks

Beneficial Artificial Intelligence, is concerned with maximizing the social benefit of AI

- Reduce or eliminate societal risks
- Reduce or eliminate ethical risks

A comprehensive EU AI Strategy should include the best elements of all the other national AI strategies

1. Specialized AI Technologies: Strategies that are specific to key AI technologies including industrial and service robots, drones, autonomous vehicles (e.g., Japan and Germany)

2. Strategies that are specific to foster key EU industries in AI – manufacturing, services, health, agriculture, etc. (e.g., Japan)

3. Guidelines on ethics for autonomous vehicles, drones, industrial robots etc. (e.g., Germany)

4. Strategies for basic AI R&D across three time horizons – now till 2030 (e.g., US, China, Japan)

5. Strategies for data, skills, research, and AI adoption (e.g., UK)

6. Strategies for automation, education, retraining, and social security

7. Regulations for Robust AI

Thank you.

Get in touch.

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