

THINKLab

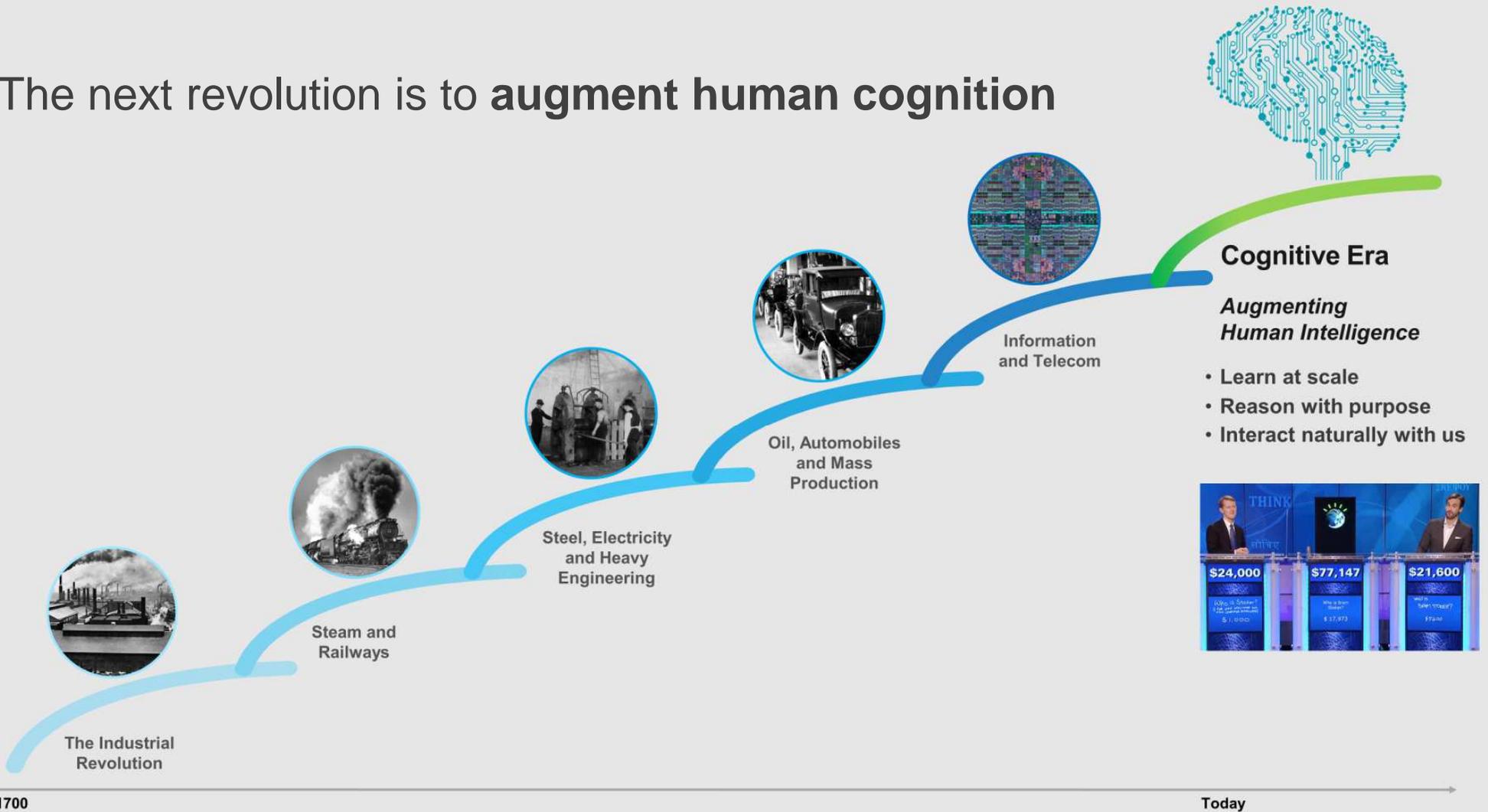
Künstliche Intelligenz und ärztliche Bildung – wohin führt der Weg?

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ThinkLab, IBM Research

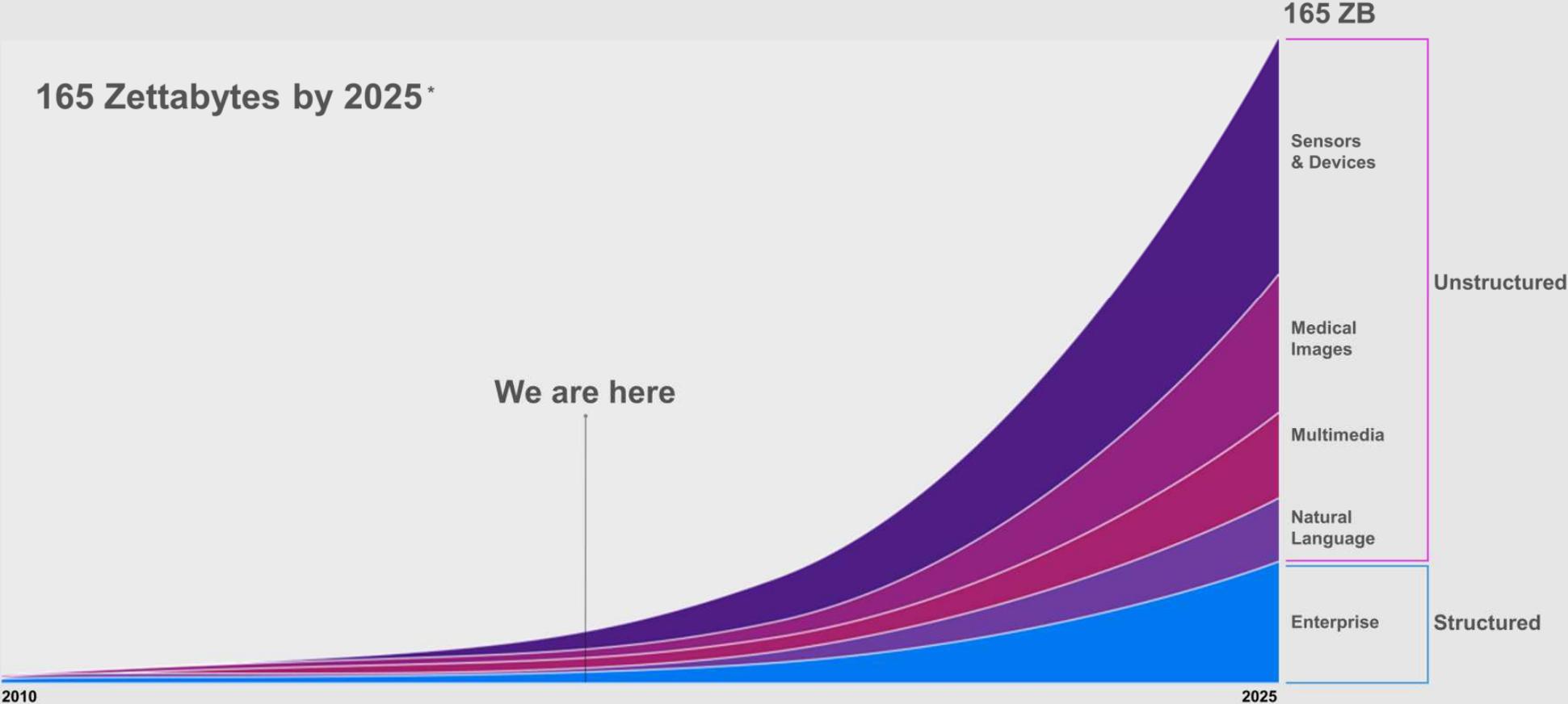
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The next revolution is to **augment human cognition**

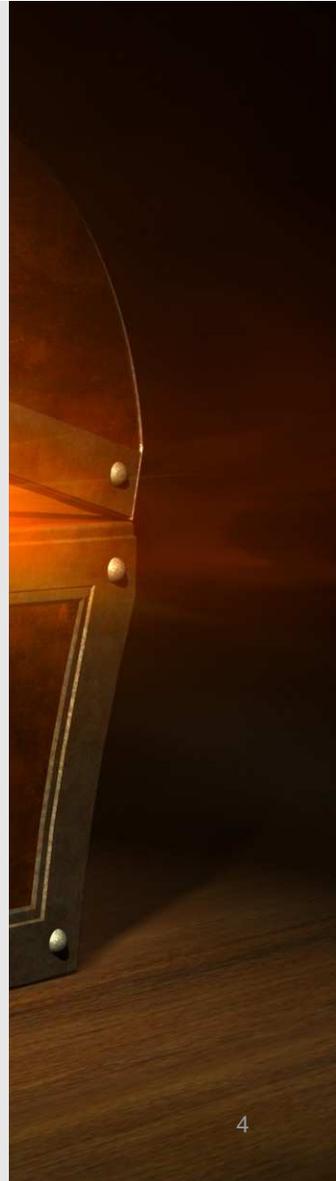


Data is growing exponentially and demands **new approaches**



*Source IDC. IBM projections based on analyst report

Unstructured data — “dark data” — accounts for **80% of all data generated today.**



Cognitive computing uses **all types of data**

Own data

- Customer records
- Transactional systems
- Predictive models
- Institutional expertise
- Operational systems



External data

- News
- Events
- Social media
- Weather
- Geospatial information

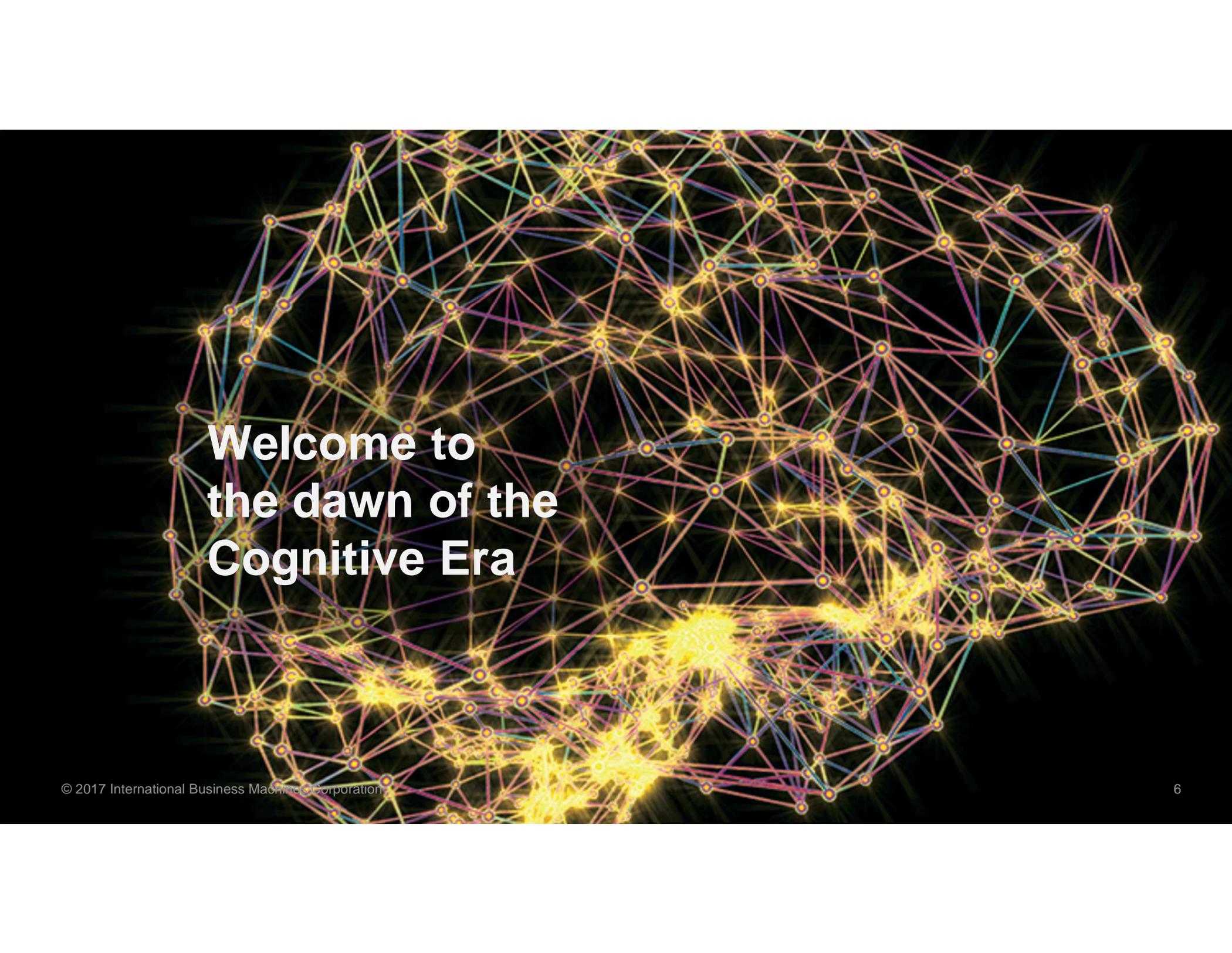


Arriving data

- Internet of Things (IoT)
- Sensory data
- Images
- Video

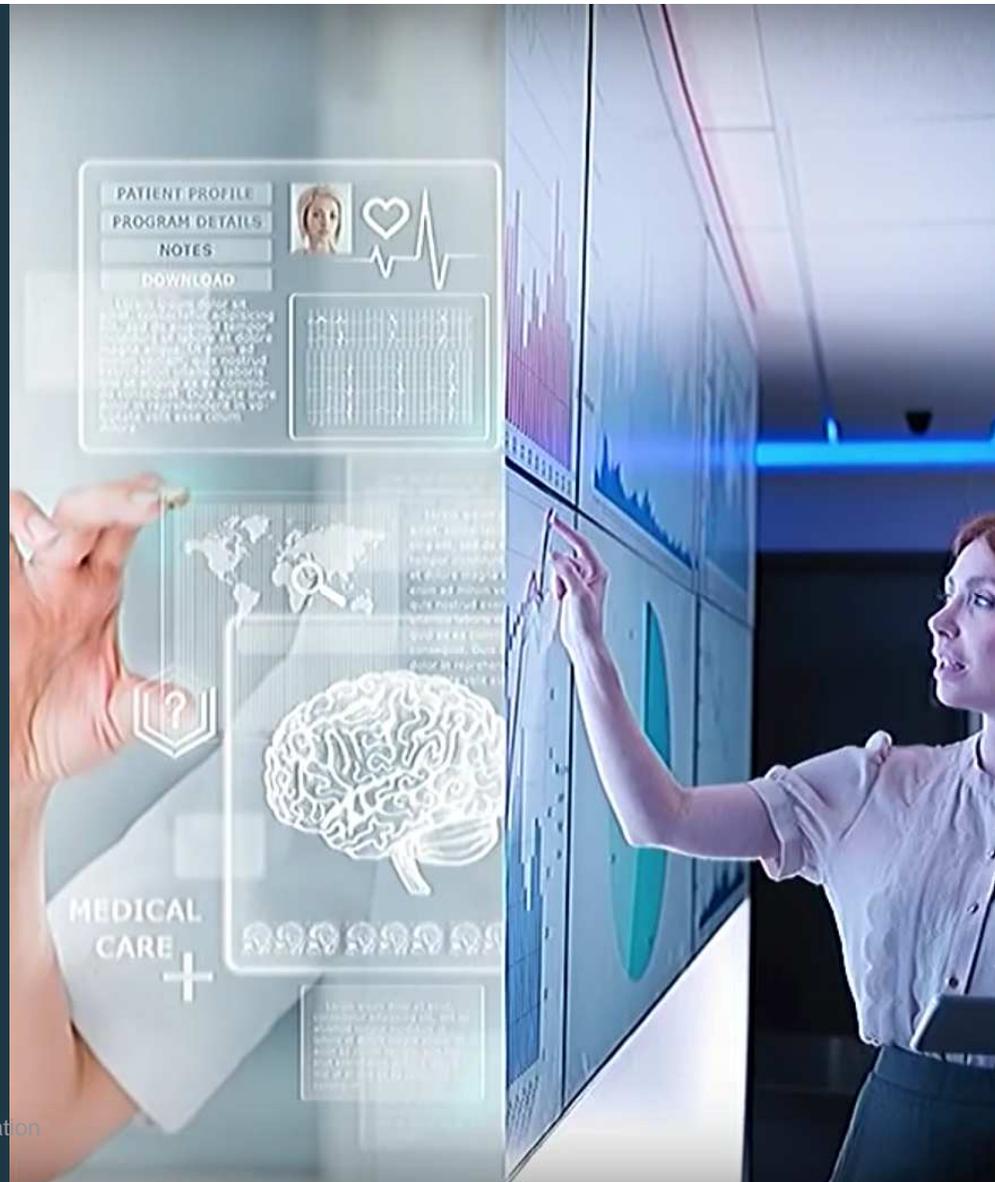
Structured and active

Unstructured and dark



**Welcome to
the dawn of the
Cognitive Era**

Cognitive systems must learn at scale, reason with purpose, and interact with humans naturally.



A vision of the **future**:
Everyone who needs expertise will have a **cognitive assistant**

Healthcare

Surface best protocol options
for practitioners

Finance

Enhance portfolio analysis
and risk management

Education

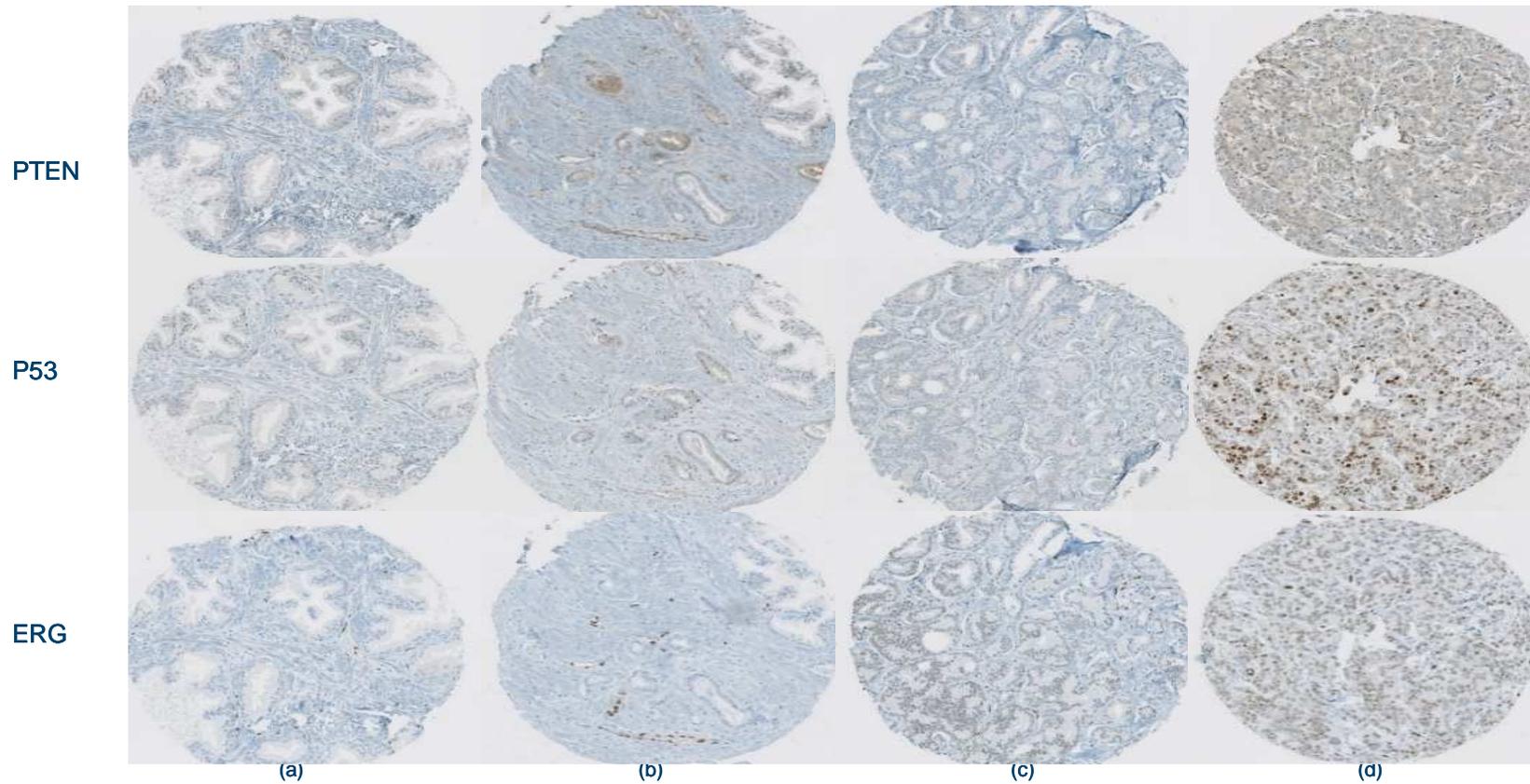
Deliver personalized programs
for students & teachers

Business Decisions

Analyze complex scenarios and
support strategic decisions

“Before I recalculate the findings, would you like to hear about the other important factors that may impact your decision?”

Digital Pathology: Image analytics



IHC prostate images of (a) normal, (b) GS=3+3, (c) GS=3+4/4+3 (d) GS=4+5

Working to transform Parkinson's disease care



1 in 1,000

expected to develop Parkinson's

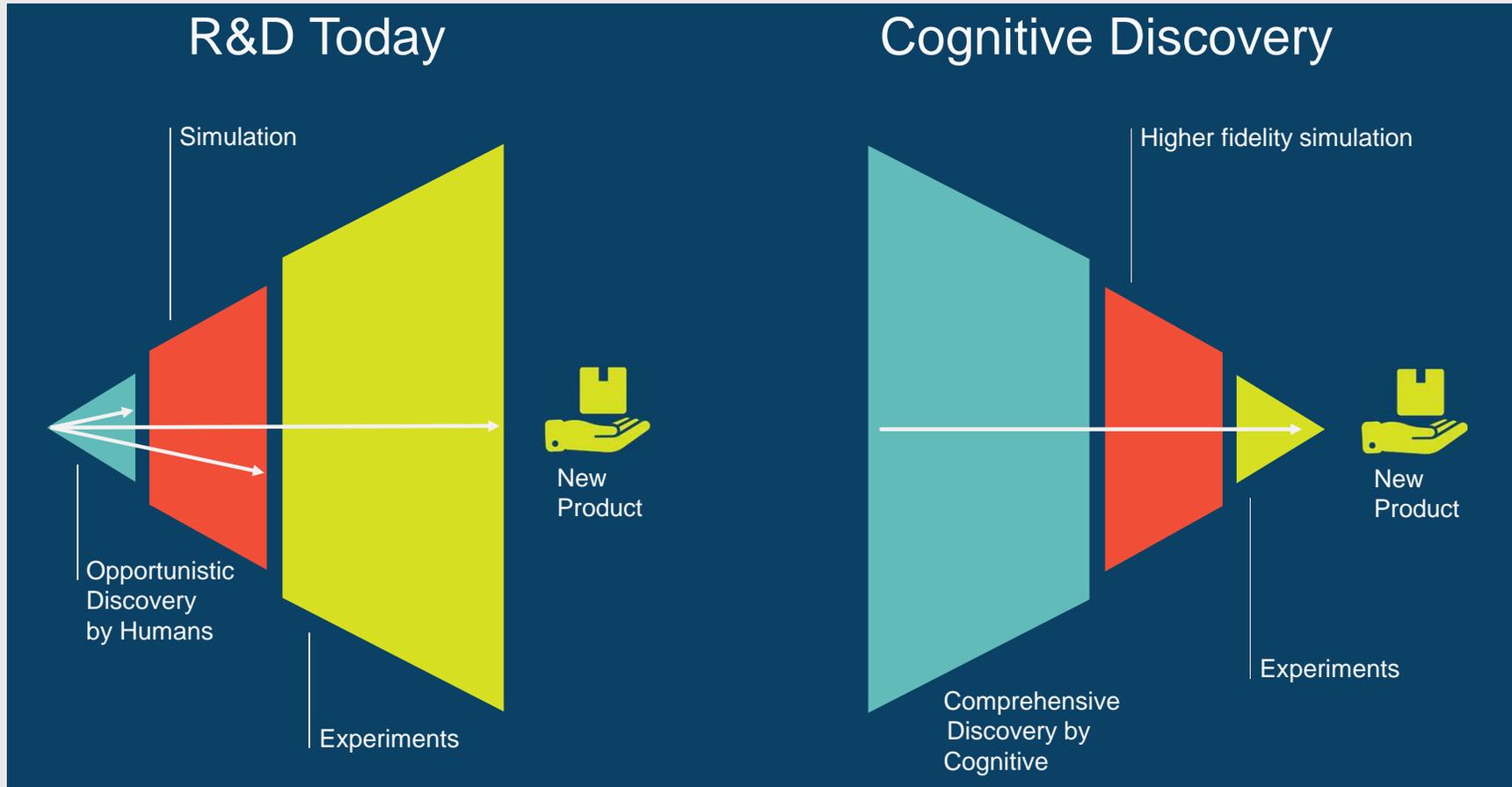
10%

are under 50 years of age

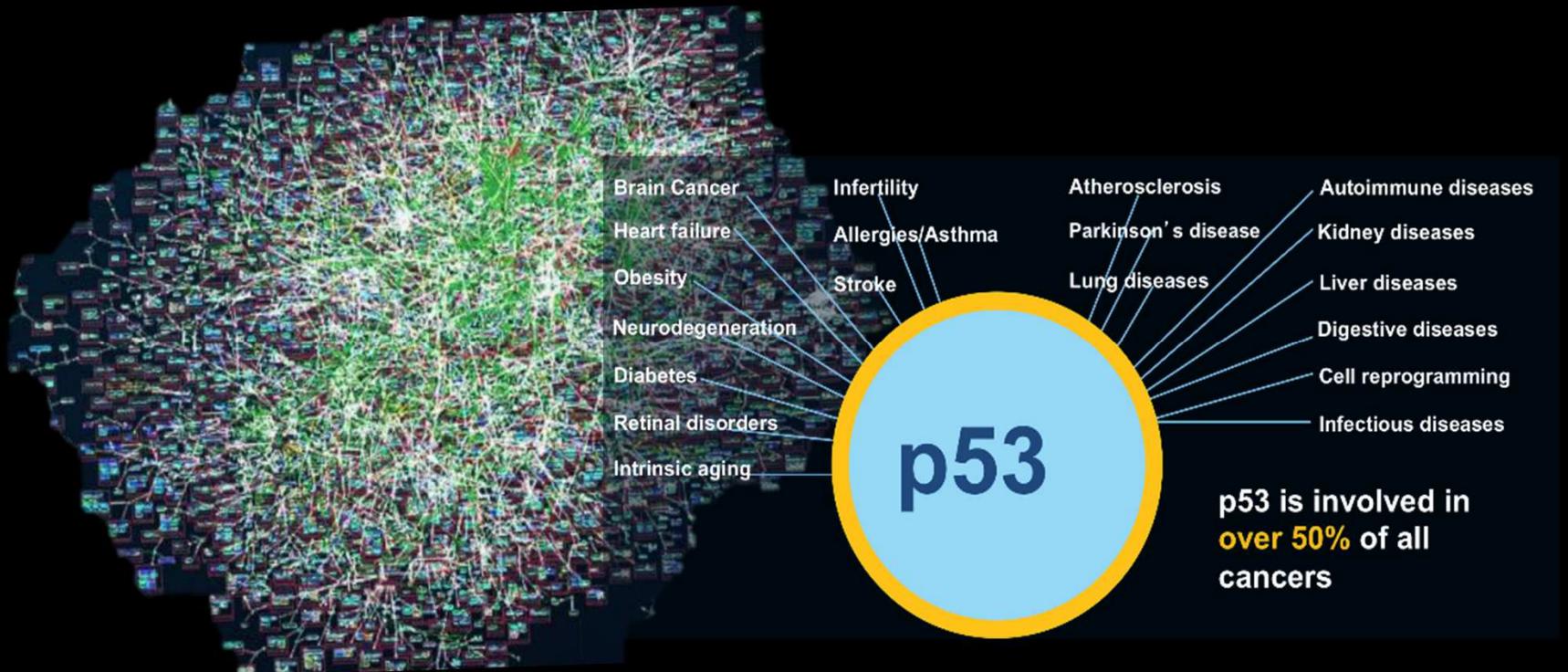
\$25 billion

in annual direct and indirect costs of care,
social payments and lost income

Research Assistant



Cognitive Discovery



Possible applications of IBM Watson in Medicine

- 1) Patient summary
- 2) stream computing and real-time analysis (e.g. intensive care)
- 3) Predictive disease management
- 4) Personalized treatment planning and treatment recommendation
- 5) Support regarding cohort selection
- 6) Direct interaction with IBM Watson (Second-opinion system)
- 7) ...



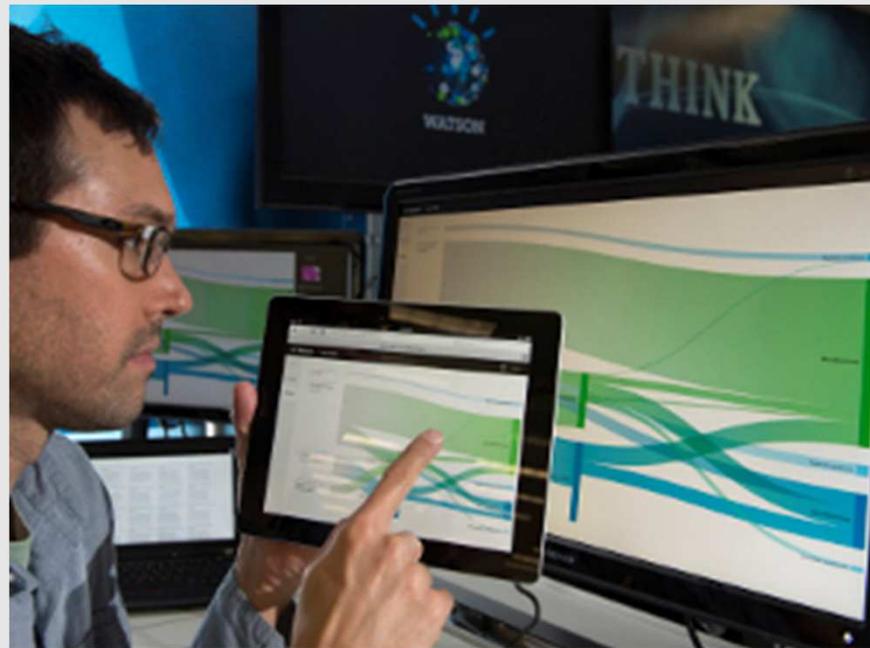


Implications for academic education and professional development in medicine

Implications can be identified on various levels

- Leveraging AI for personalized learning and teaching
- Training how to work with the AI system (e.g. when to trust an algorithm and when to trust the own intuition, asking the right questions)
- Enhancing human core competencies to optimize partnership of men and machine for the benefit of the patients (Digital humanism)
- Developing methods to cultivate critical thinking
- Developing a new research approach
- ...

Cognitive Tutor for medical students at Humanitas University



Personalized study platform through the choice of content, simulations, feedback and insights with the level of knowledge of the individual student, through a simple interface as an app.



Value judgement
Dilemmas
Intuition
Dreaming
Creativity
Design
Empathy
Holistic perception
Generalization
Abstraction
Common sense
Critical thinking

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Deep learning
Pattern discovery
Statistical reasoning
Large-scale math
Locating Knowledge
Fact checking
Eliminating bias
Endless capacity
Total recall

Principles for the Sustainable Development of AI

Purpose

Augment human intelligence, rather than replace it

Transparency & Trust

- When and for what purposes is AI being applied?
- Which sources of data and expertise create an insight?
- Prevent Bias and Misuse: AI systems need to be as transparent as possible (data sets, algorithms)
- How to embed values?

Economic Opportunity & Societal Implications

- Skills and knowledge to perform the work that will emerge in a cognitive economy
- Fundamental transformations in the way we live and work
- Legal and governance implications of AI



Partnership on AI
to benefit people and society



Cognitive systems are creating a new partnership between humans and computers that ***enhances, scales and accelerates*** human ***expertise and discovery.***



Thank You!