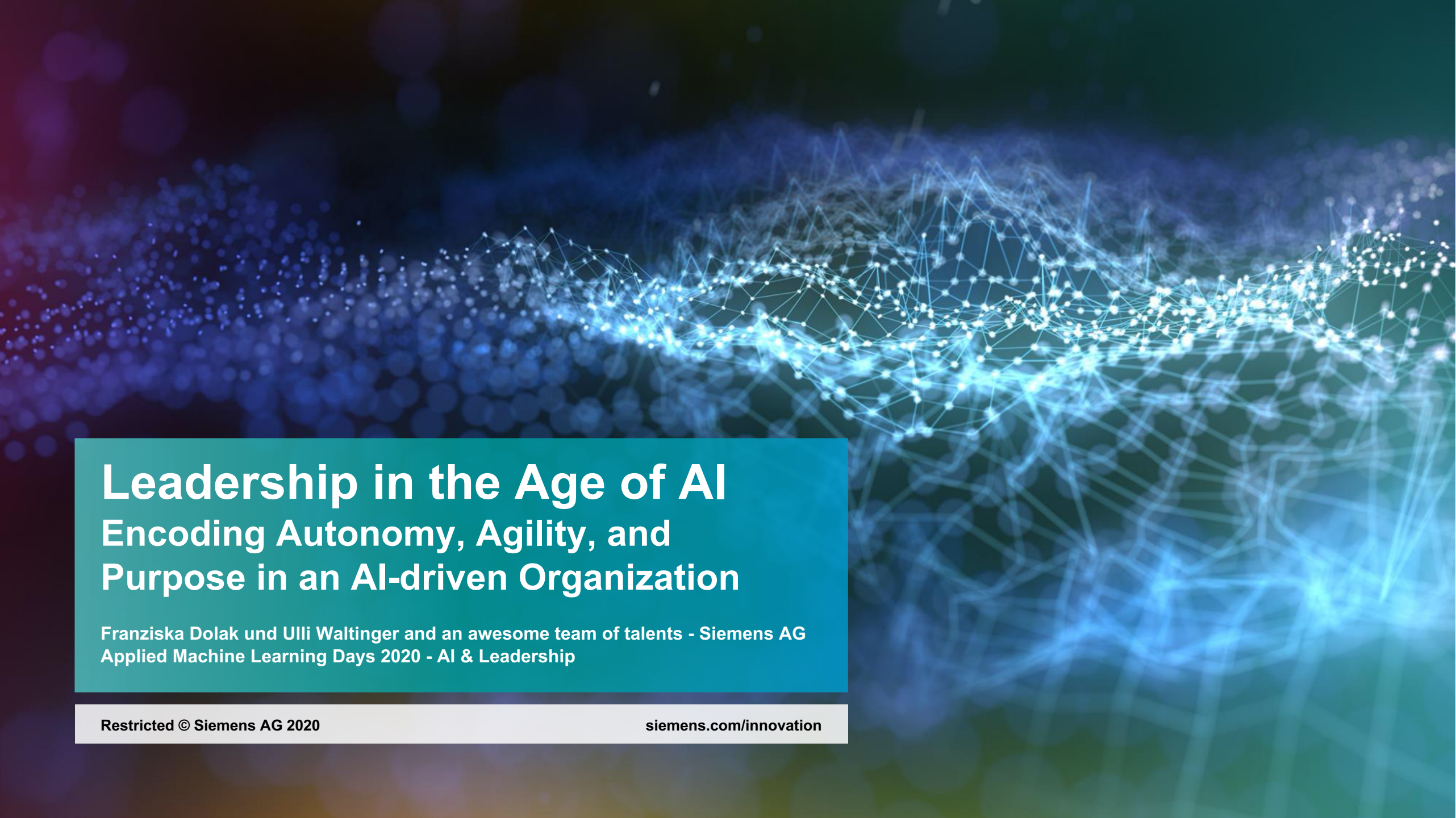

Leadership in the Age of AI

Encoding Autonomy, Agility, and Purpose in an AI-driven Organization

Franziska Dolak und Ulli Waltinger and an awesome team of talents - Siemens AG

Applied Machine Learning Days 2020 - AI & Leadership

Research and Development in Digitalization and Automation – AI at Siemens with over 200+ researchers 1000+ BU colleagues

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Cybersecurity **Enabling Digitalization**

Digitization is fundamentally changing innovation processes and creating completely new business models

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New Technologies

Digital Technologies

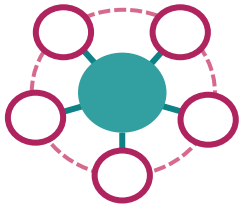
Business Models

Exponential development

Eliminate the weakest elements in the value chain

Supply chain

Eco Systems



“Uncertainty is the monster that lives under the bed of every CEO”

John D. Stoll, Wall Street Journal 2019

Utopia 60s/70s

"All the News That's Fit to Print"

The New York Times.

LATE CITY EDITION

U. S. Weather Bureau Report (Page 56) Forecast: Warm, humid with late afternoon and evening showers today and tomorrow. Temp. range: 84—70. Yesterday: 83.9—69.9.

VOL. CVII . . No. 36,690. NEW YORK, TUESDAY, JULY 8, 1958. FIVE CENTS

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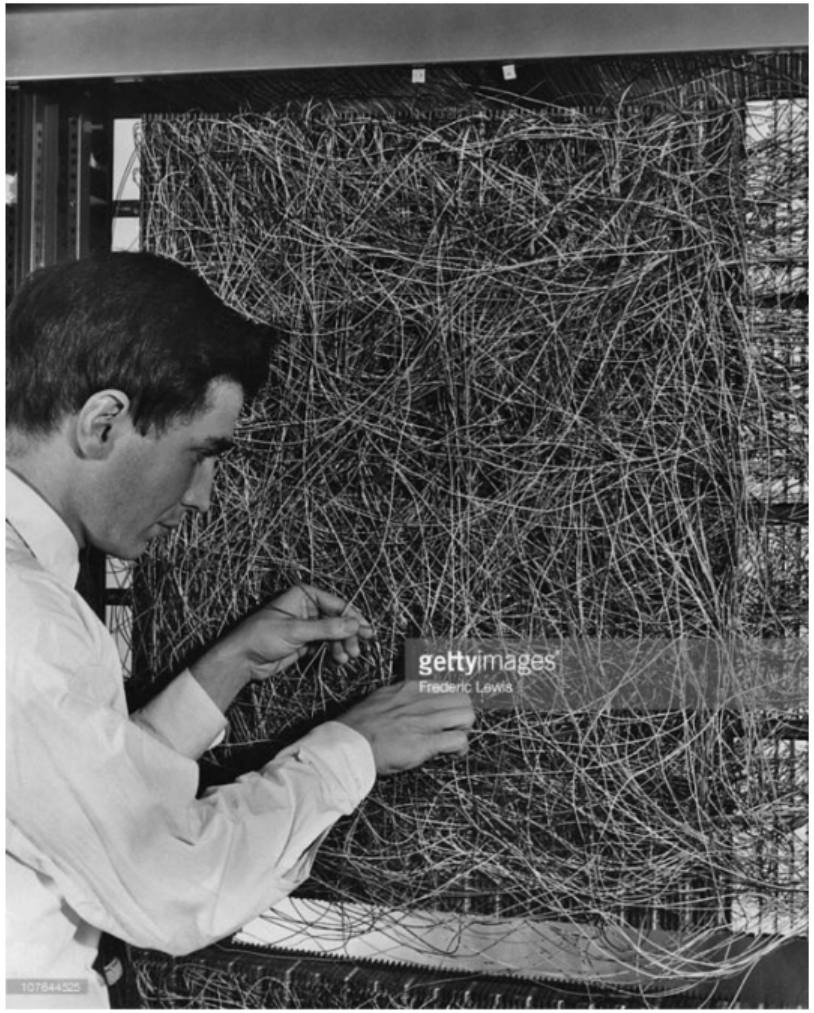


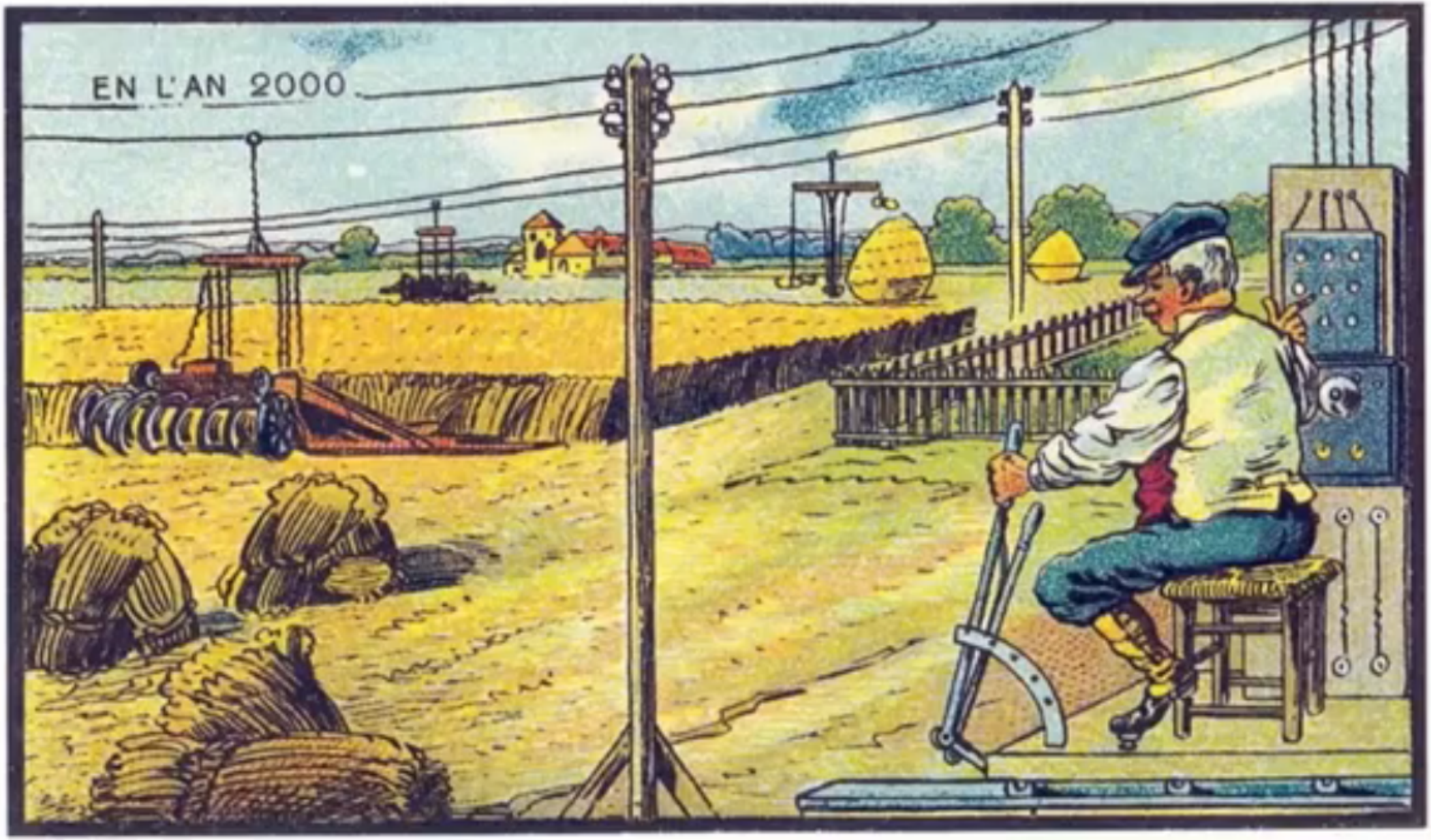
NEW NAVY DEVICE LEARNS BY DOING

Psychologist Shows Embryo of Computer Designed to Read and Grow Wiser

WASHINGTON, July 7 (UPI) —The Navy revealed the embryo of an electronic computer today that it expects will be able to walk, talk, see, write, reproduce itself and be conscious of its existence.

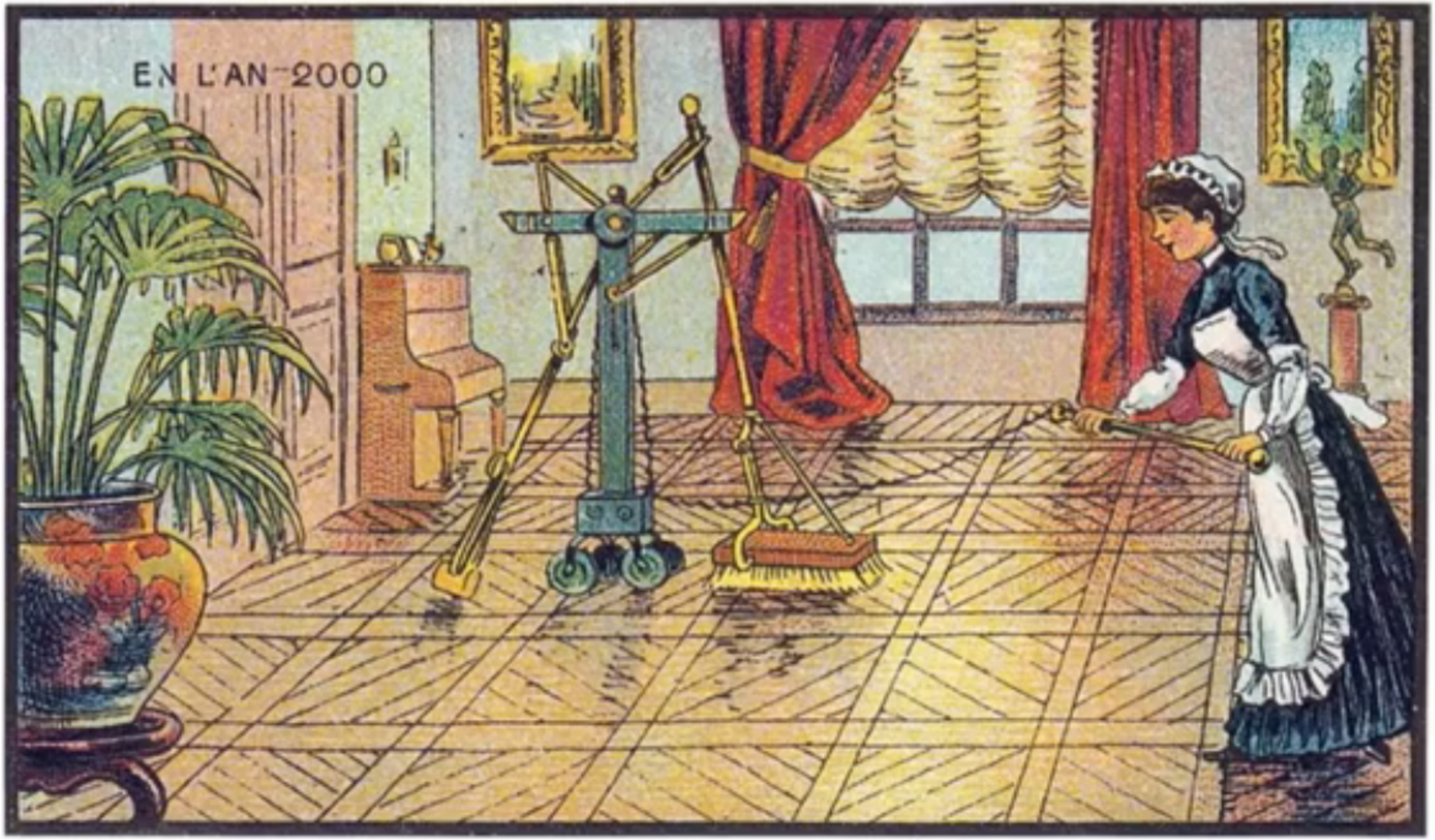
Already 1958 … the Navy revealed the embryo of an electronic computer today that it expects will be able **to walk, talk, see, write, reproduce itself and be conscious of its existence.**

https://www.nytimes.com/1958/07/08/archives/new-navy-device-learns-by-doing-psychologist-shows-embryo-of.html



A Very Busy Farmer

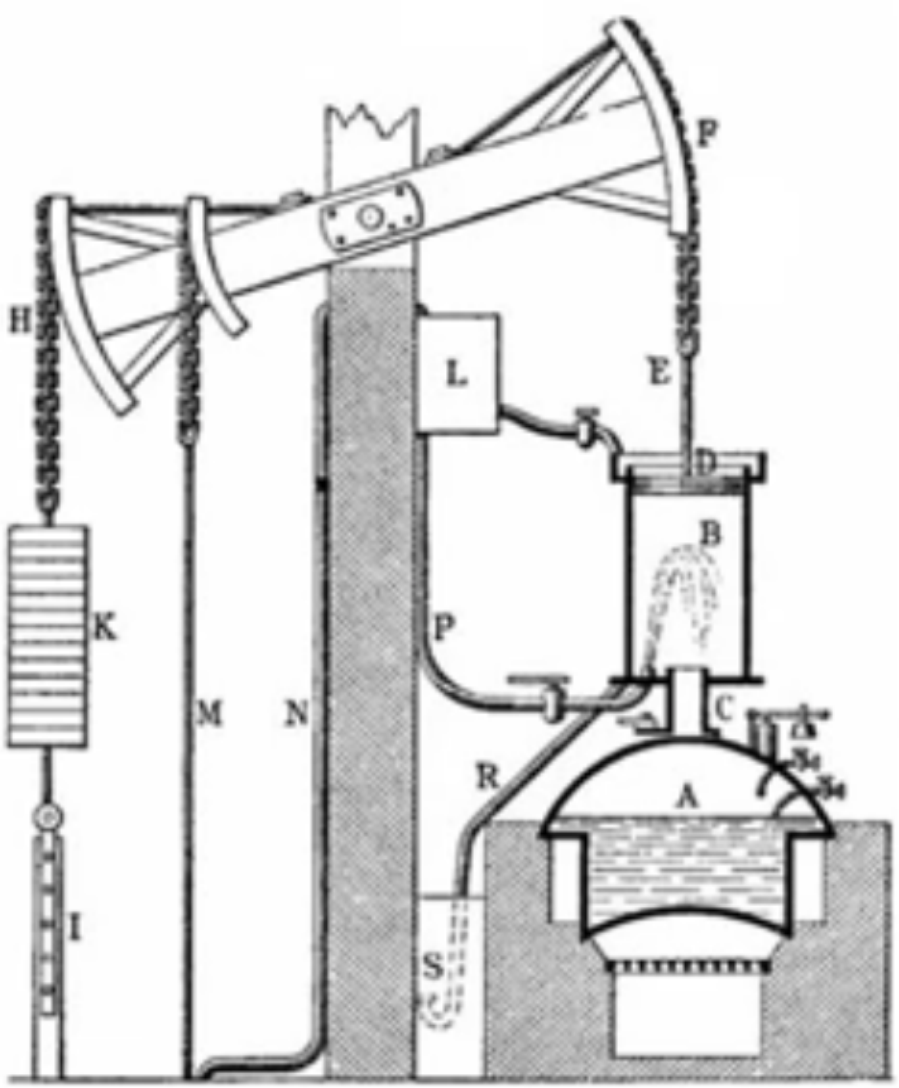
Jean-Marc Côté, et al. France in 1899



Electric Scrubbing

Jean-Marc Côté, et al. France in 1899

Disruptions of the past—and ahead?



Thomas Newcomen, 1712

1812: British law:
Machine breaking: Death-penalty

"We will never lay down Arms [until] The House of Commons passes an Act to put down all Machinery hurtful to [the common people], and repeal that [law] to hang Frame Breakers."

Luddismus – Fear of loosing it`s social status within the industrialization


0:00 / 0:44
Rachel Botsman, DLD Munich 2019

Business itself is becoming more complex, unpredictable, and dynamic…

The more we automate work and decision making, the more important it becomes to thoughtfully manage and support the remaining human-based activities

The Data-driven Society … or the Revenge of the Neurons

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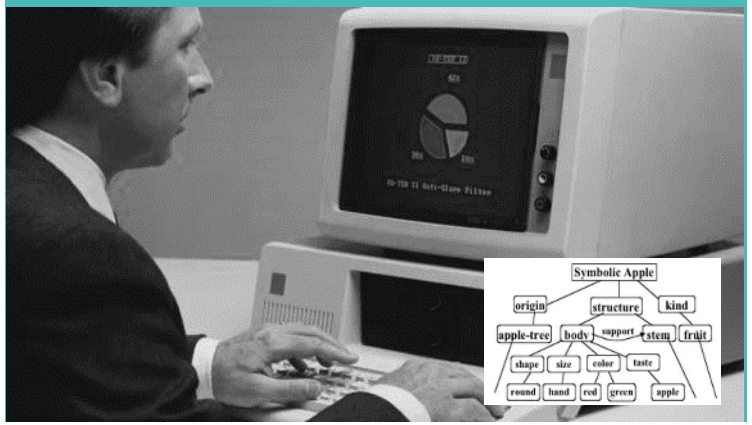
Human-driven

- Systems only do what human explicitly define
- … though relying on the human condition

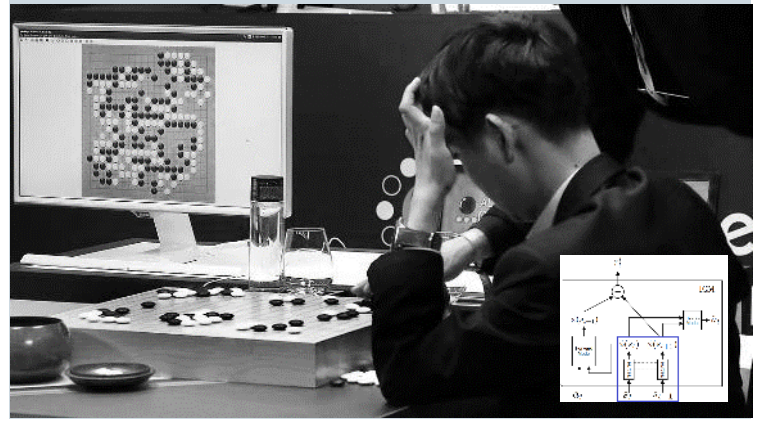


Data-driven

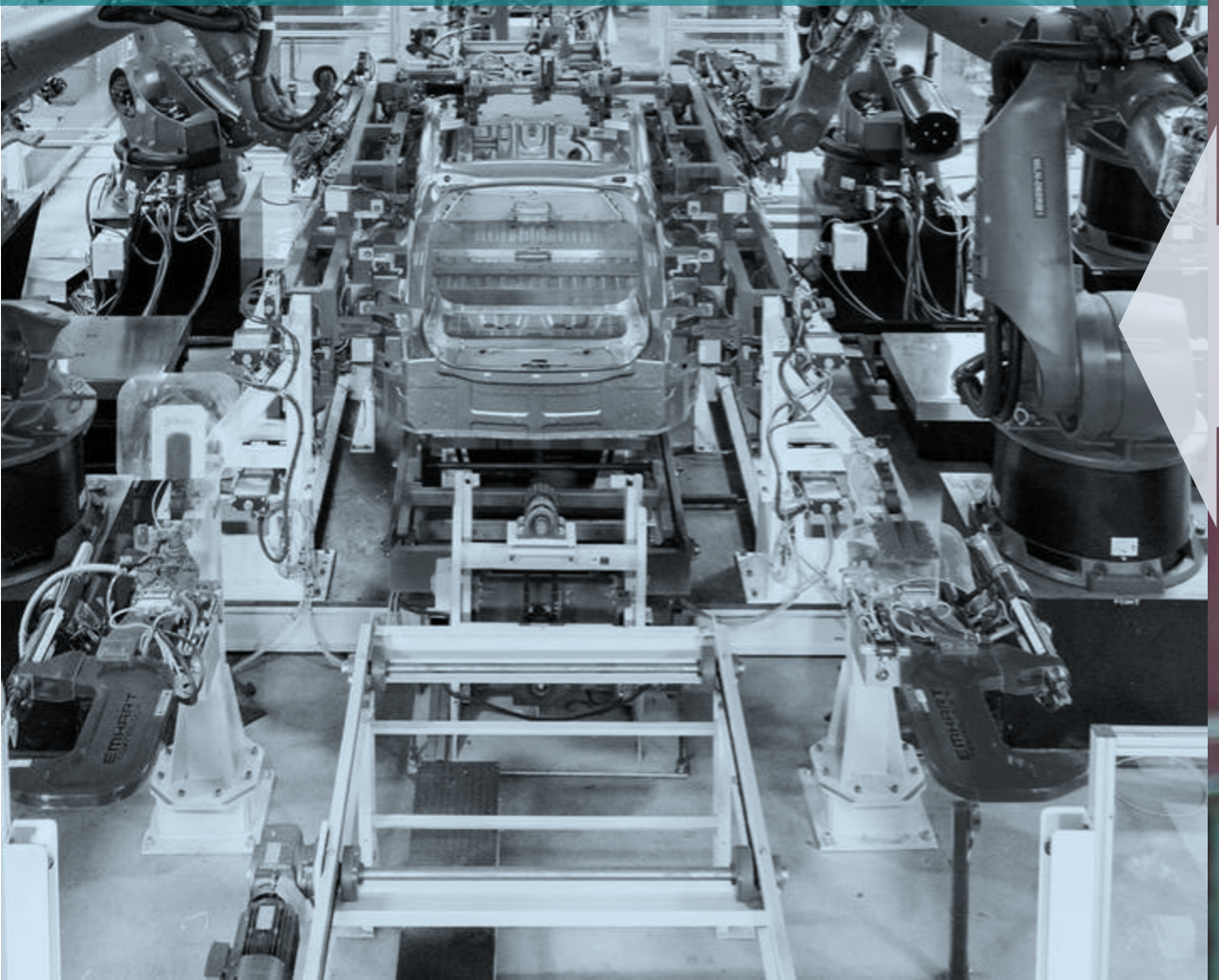
- Systems only do what they learn from data
- … though relying on the data condition

System-driven

- Systems autonomously explore-exploit curiosity-driven its environment
- … though relaying on self-supervision and systems condition



B2B:Industrialization targeted to optimize efficiency and productivity



B2C: Digital Consumer targets attention and desirable behavior

AI Operation Model - a systematic approach to identifying, assessing, prioritizing, and subsequently implementing use cases

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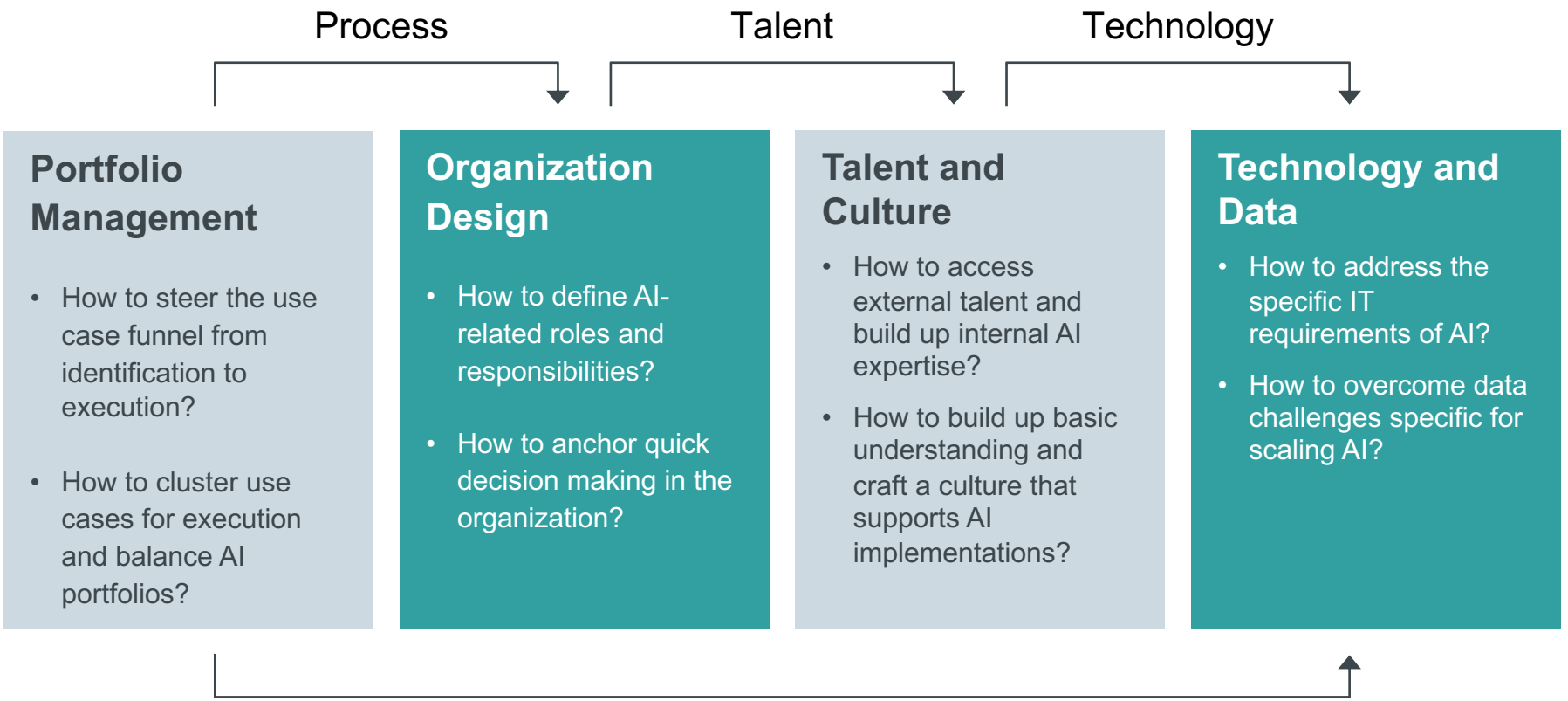

Drive the successful execution of the AI agenda*

Vision/Mission | Value | Principles

*Porsche Consulting, 2019

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Technology

Open source software development plays a huge role in the rise of AI, and many of the top AI engines are available under open source

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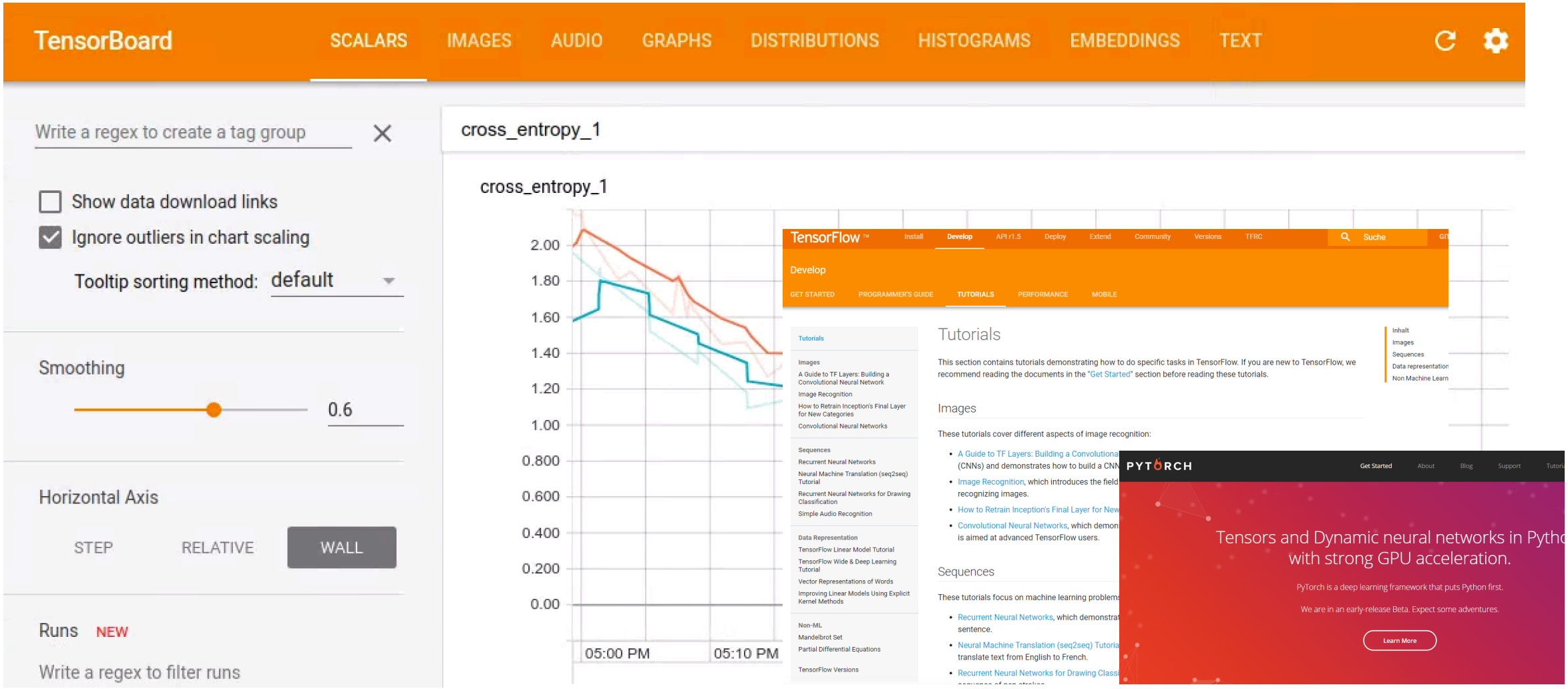

TensorFlow: An open-source machine learning framework for everyone, 2018
http://pytorch.org/ , 2018

https://arxiv.org/list/cs.AI/recent

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Cornell University Library

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arXiv.org > cs > cs.AI

Search or Article ID | All fields

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Artificial Intelligence

Authors and titles for recent submissions

- Tue, 16 Oct 2018
- Mon, 15 Oct 2018
- Fri, 12 Oct 2018
- Thu, 11 Oct 2018
- Wed, 10 Oct 2018

[total of 105 entries: **1-25** | 26-50 | 51-75 | 76-100 | 101-105]
[showing 25 entries per page: fewer | more | all]

Tue, 16 Oct 2018 (showing first 25 of 30 entries)

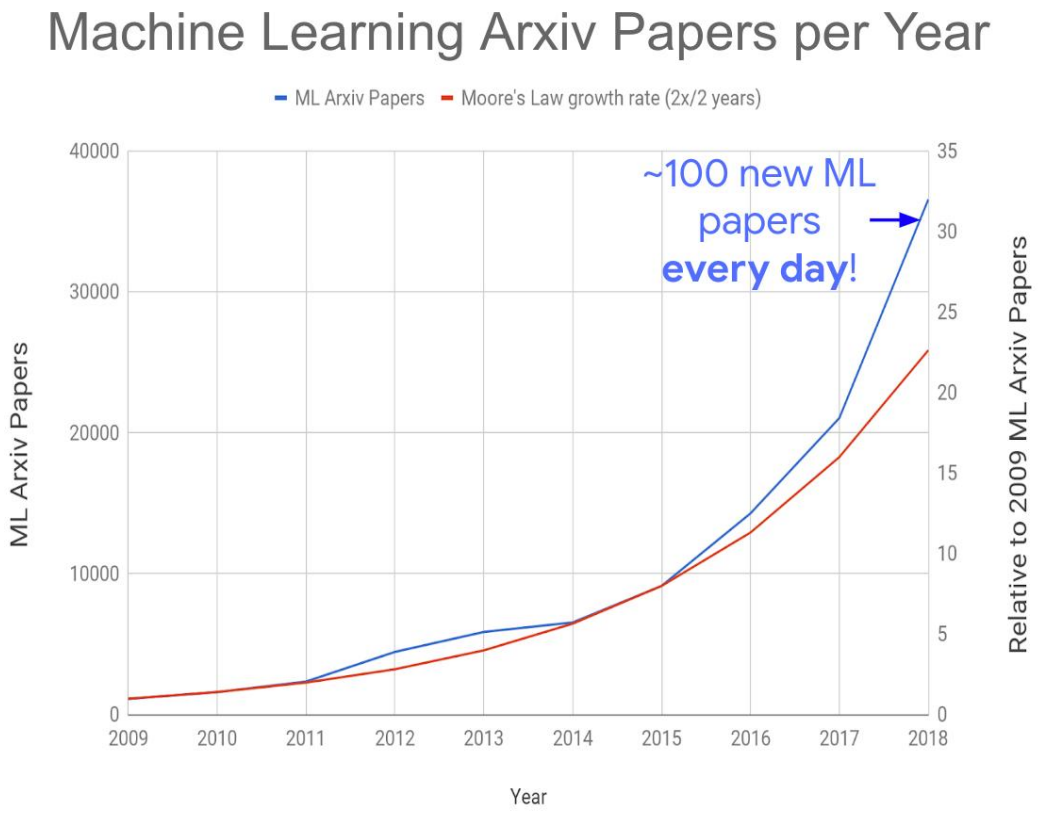
[1] arXiv:1810.06374 [pdf, other]
SmartPM: Automatic Adaptation of Dynamic Processes at Run-Time
Andrea Marrella
Comments: Postprint of PhD Thesis of Andrea Marrella, published on October 2013
Subjects: **Artificial Intelligence (cs.AI)**

[2] arXiv:1810.06338 [pdf, other]
Towards Providing Explanations for AI Planner Decisions
Rita Borgo, Michael Cashmore, Daniele Magazzeni
Comments: Presented at the IJCAI/ECAI 2018 Workshop on Explainable Artificial Intelligence (XAI) (this http URL). Stockholm, July 2018
Subjects: **Artificial Intelligence (cs.AI)**

[3] arXiv:1810.06284 [pdf, other]
CURIOUS: Intrinsically Motivated Multi-Task, Multi-Goal Reinforcement Learning
Cédric Colas, Olivier Sigaud, Pierre-Yves Oudeyer
Subjects: **Artificial Intelligence (cs.AI)**

[4] arXiv:1810.06078 [pdf, other]
Assessing the Potential of Classical Q-learning in General Game Playing
Hui Wang, Michael Emmerich, Aske Plaat
Subjects: **Artificial Intelligence (cs.AI)**

[5] arXiv:1810.06045 [pdf, other]
Dexterous Manipulation with Deep Reinforcement Learning: Efficient, General, and Low-Cost
Henry Zhu, Abhishek Gupta, Aravind Rajeswaran, Sergey Levine, Vikash Kumar
Comments: this https URL
Subjects: **Artificial Intelligence (cs.AI)**; Robotics (cs.RO)



https://twitter.com/JeffDean/status/1135114657344237568

The Open Source Momentum: OS could stitch together M87's black hole 55 million light years away from across the globe

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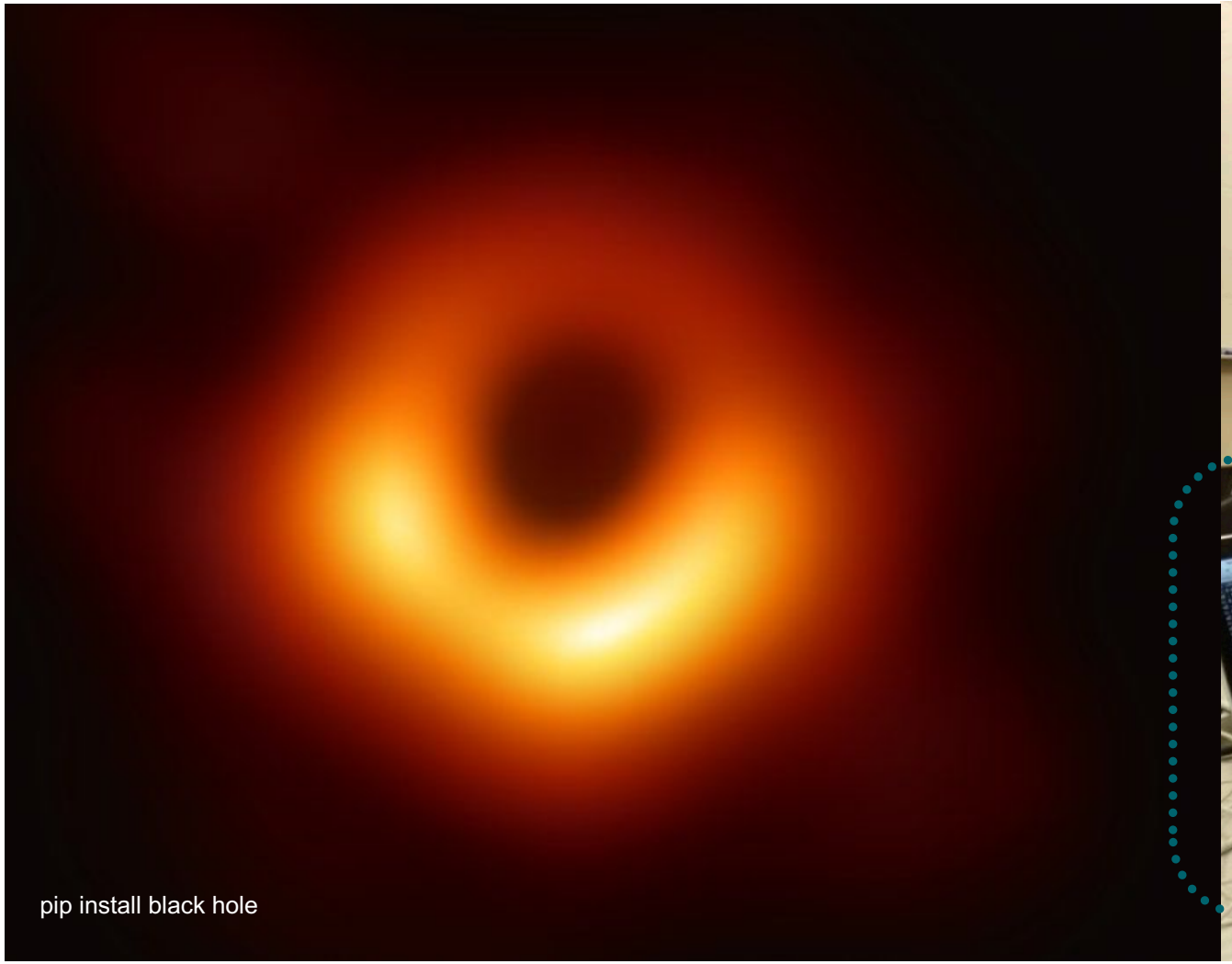

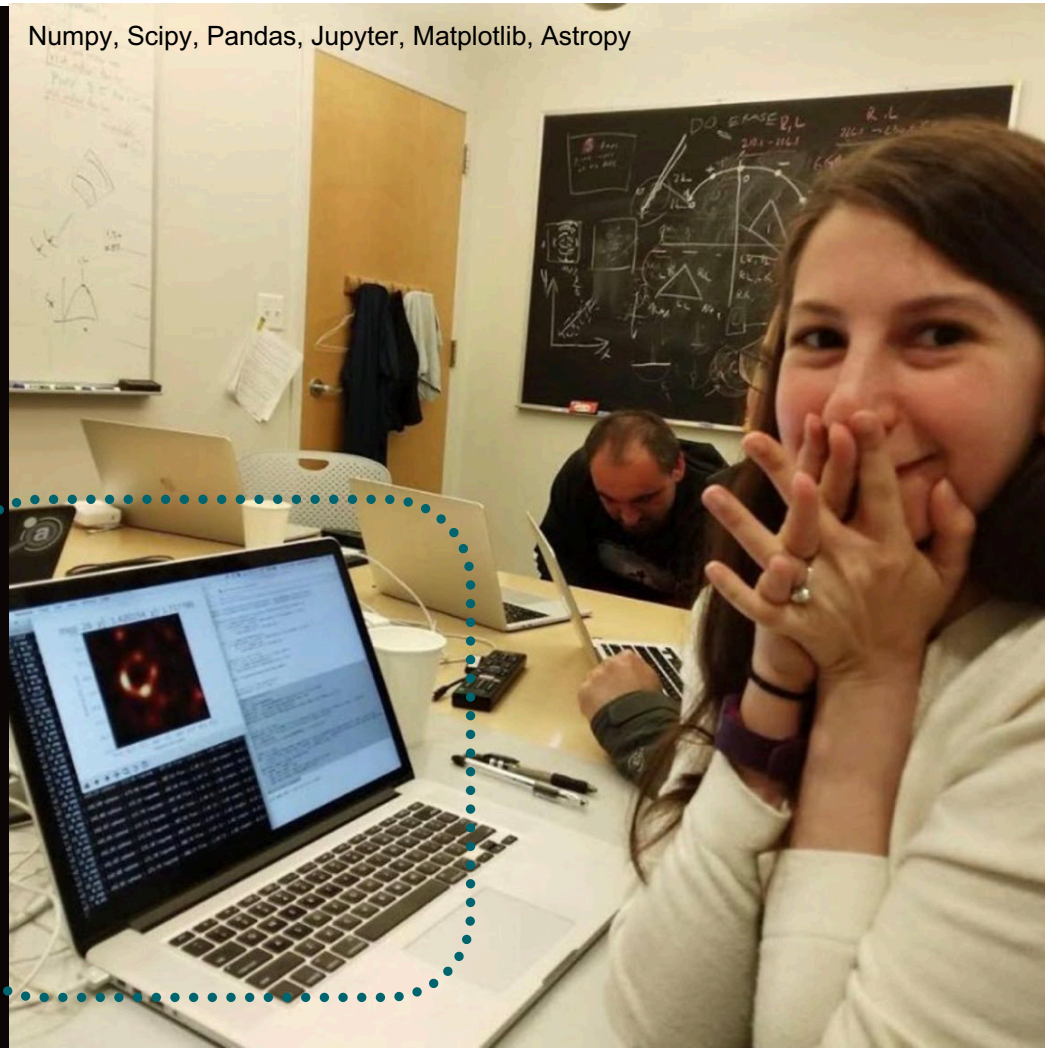

Katie Bouman https://twitter.com/TamyEmmaPepin/status/1116014974508371971

Scaling AI: framework with reusable modules drives rapid adoption of AI

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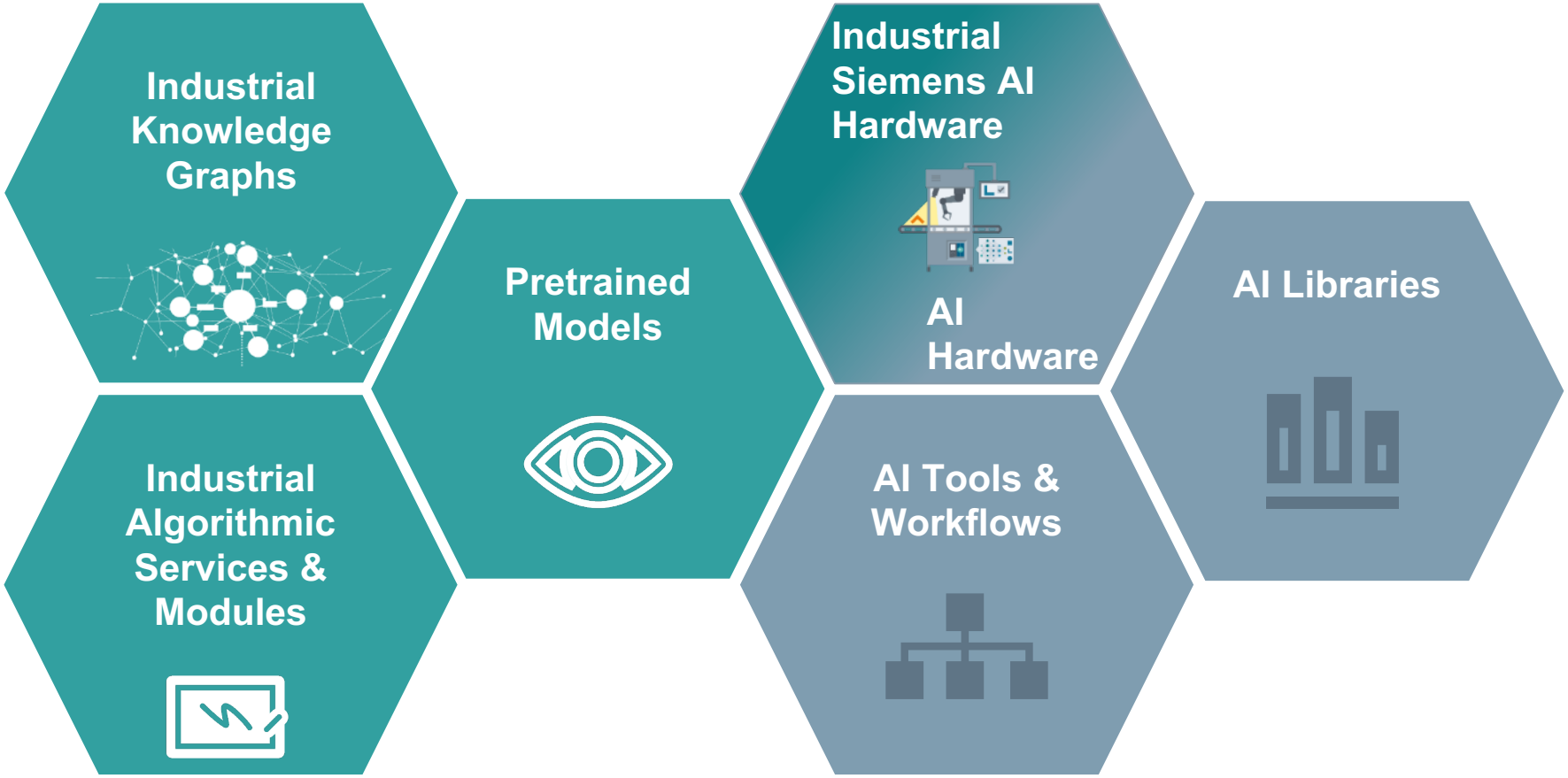

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Talent & Culture

“How do you create a culture that makes that possible? It’s simple: Don’t be a jerk. How much do you cheer for them? Not because they’re right, they took the risk to say that?”

Astro Teller, Google X, 2019

The Impact of Uncertainty - People desire but reject creative ideas

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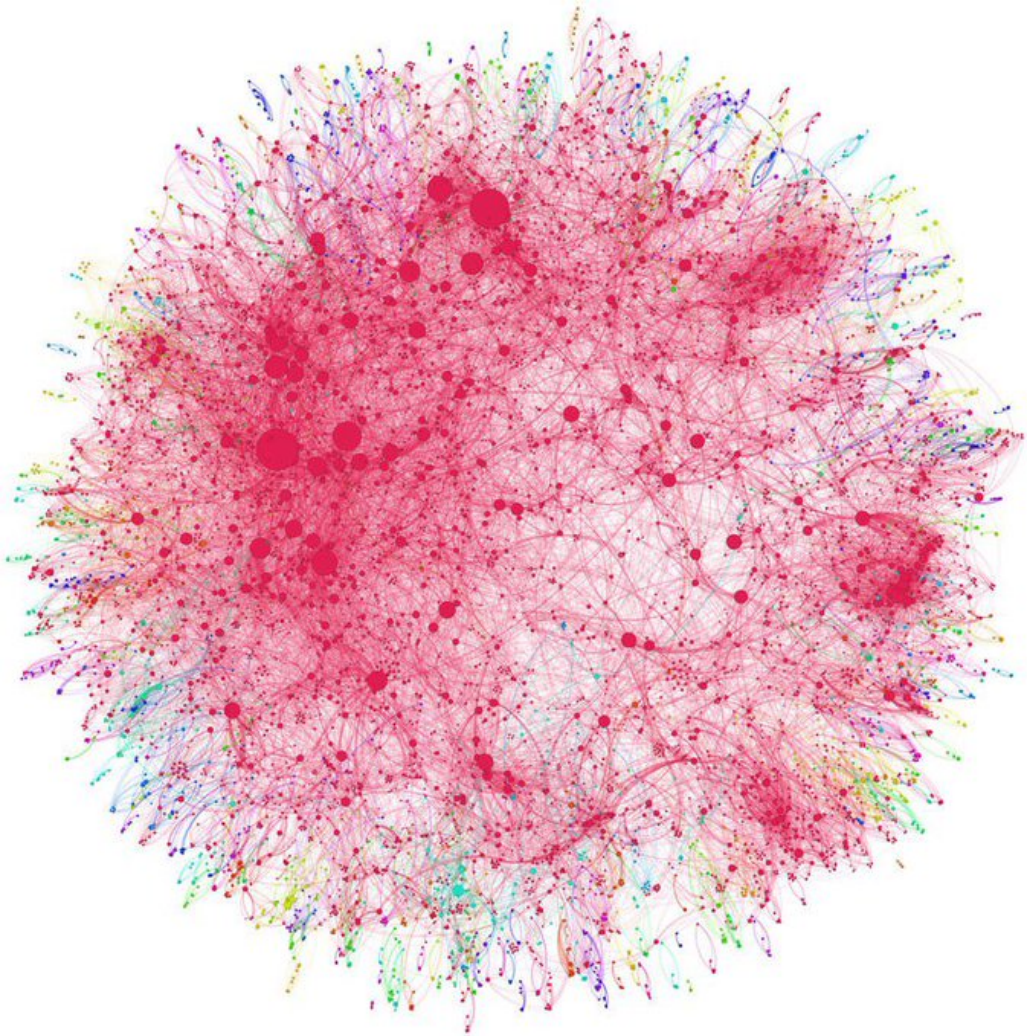
The more complex the world the more we demand simplification

- Negative bias toward creativity (relative to practicality) when participants experienced uncertainty
- Bias against creativity interfered with participants' ability to recognize a creative idea.
- Concealed barrier that creative actors may face as they attempt to gain acceptance for their novel ideas



https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1457&context=articles

PTeams: Large teams develop - small teams disrupt in science and technology

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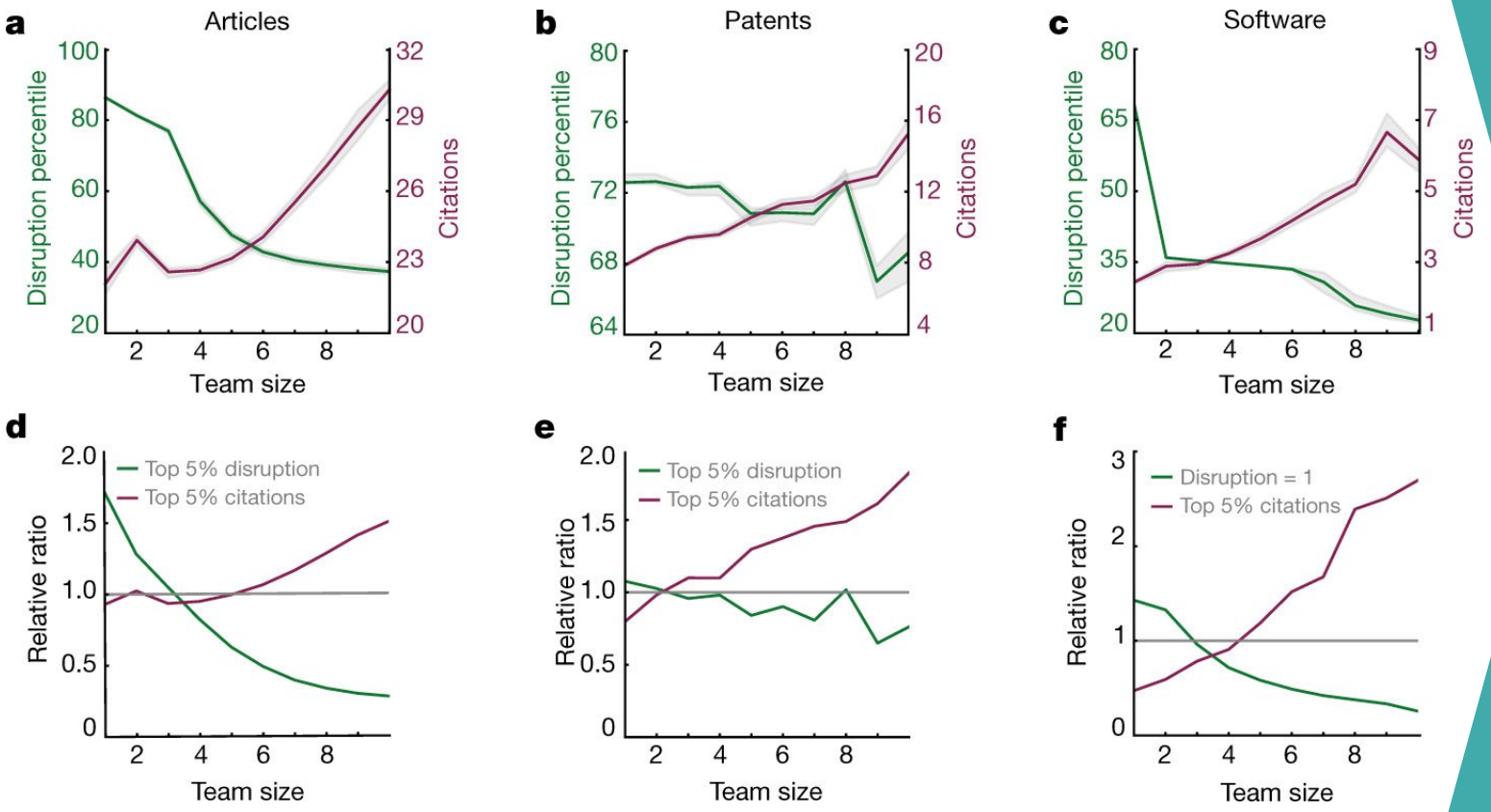

Team Size vs. Impact

- Small teams remember forgotten ideas, ask questions, create new directions;
- Large teams chase hotspots, forget less popular ideas, answer questions, stabilize established paradigms

https://go.nature.com/2NfeRVp

GTeams: Who is on a team matters less than how the team members interact, structure their work, and view their contributions

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Psychological Safety:
Air cover & safe zones

Can we take risks on this team without feeling insecure or embarrassed?

Clarity
Clear goals & defined roles

Are goals, roles, and execution plans on our team clear?

Impact
Purposeful impacts greater good

Do we fundamentally believe that the work we're doing matters?

Dependability
Get things done & meet expectations

Can we count on each other to do high quality work on time?

Meaning
Personal significance

Are we working on something that is personally important for each of us?

- 200+ interviews
- 250 attributes
- 180+ active teams

- Psychological safety the most important of the five dynamics
- Harness the power of diverse ideas
- Incentivize positive failure culture
- Reduce fear of hierarchies
- Motivate sharing of risk taken

https://rework.withgoogle.com/blog/five-keys-to-a-successful-google-team/

Principles of the business transformation that foster a culture of innovation

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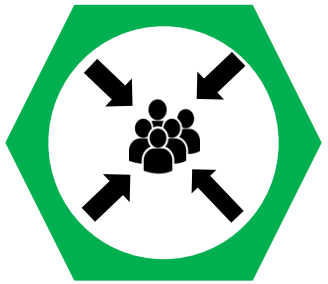
Think Big

Mandate, Sponsorship and Support



Right people in the right place

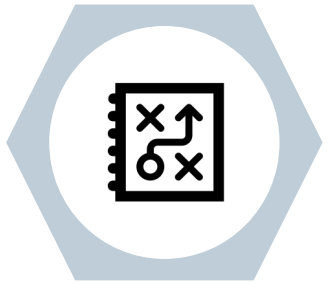
New culture

Building the right thing, the right way

Delivering small, fast and frequently

Integrated feedback loops

Scaling Lessons Learned



Adapting approach through validated learning

Demonstrating evidence for further investments

*By Barry O'Reilly
Siemens AG - Siemens AI Lab

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Process

Managing the challenges of tomorrow? Do we need to reflect on the horizons? What are your moonshots?

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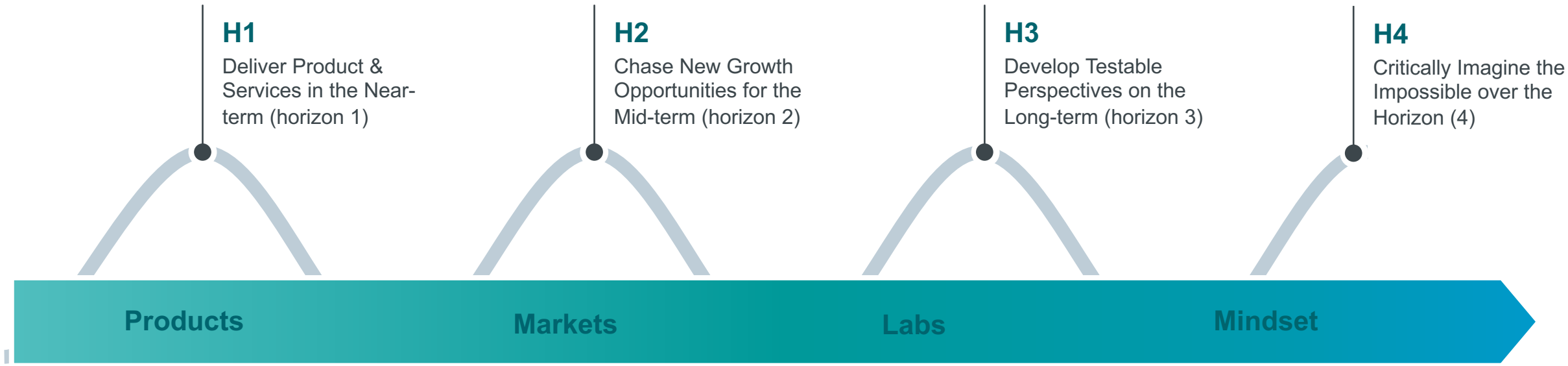

Digitalization accelerated trust leaps that occur when we take risks and do something new in a fundamental different way

Rachel Botsman, 2019

High rate of failing AI projects – the technology is there, but the ecosystem needs to be improved

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Lack of DevOps skills

Data quality issues

Undefined task/purpose

Lack of AI skills

Wrong expectations

Poor communication

Fuzzy KPIs

> **85% of AI projects will be stopped at proof-of-concept phase.”**
>
> **Gartner, 2018**

Improper team setup

Unproven customer value

Bad model performance

Unrealistic timelines

Infrastructure not ready

Bad/wrong data

Why experimentation is key … it is all about learning
Risk is probability, uncertainty is lack of probability

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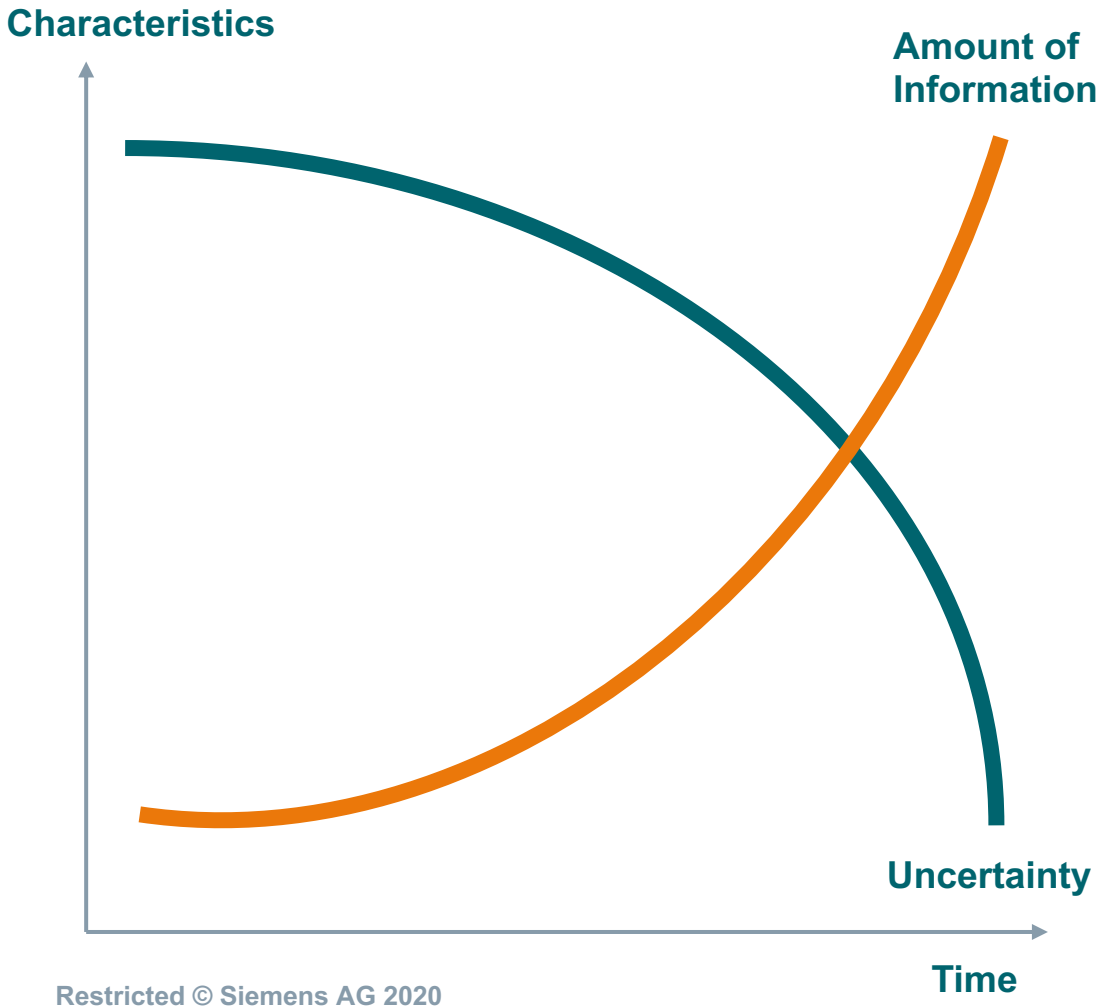

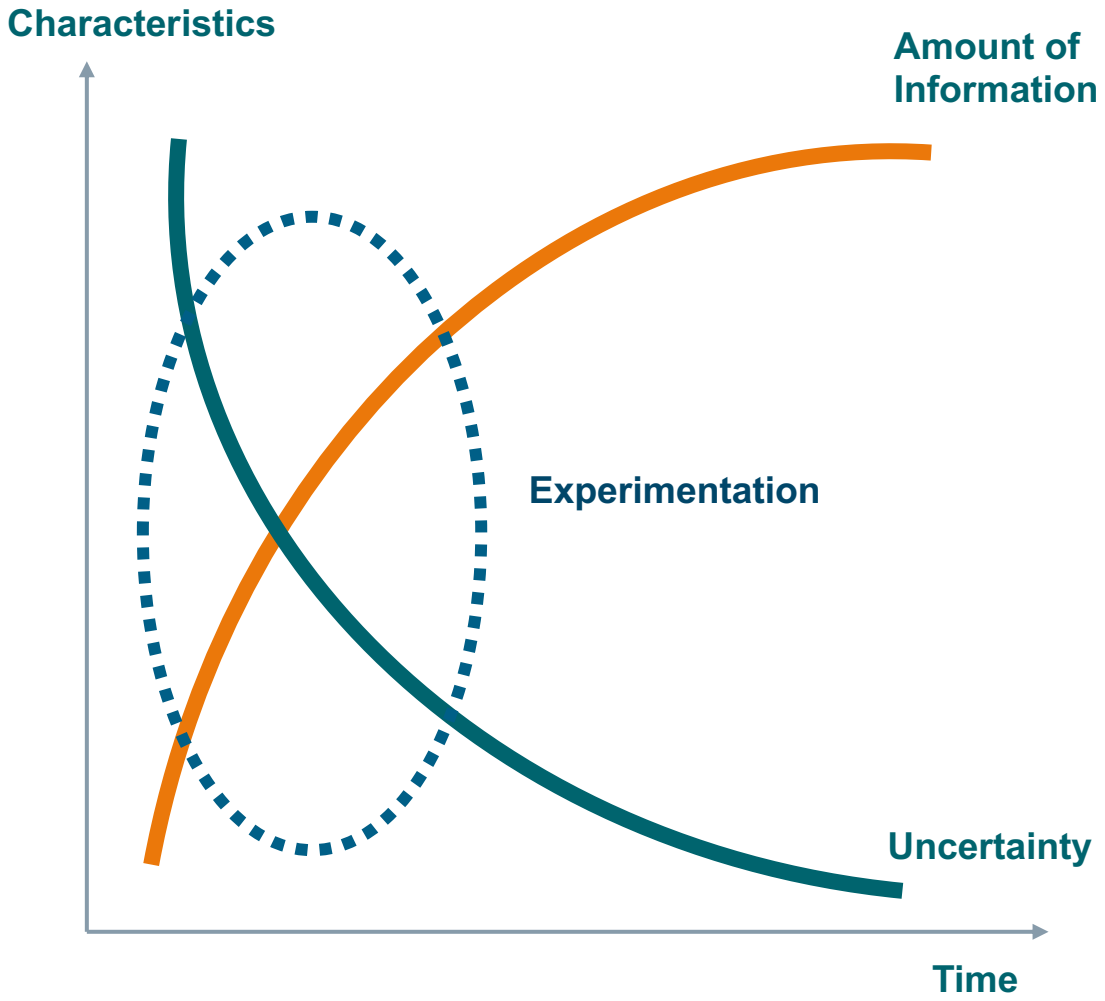

Breaking points of most projects …

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Customer value co-creation framework

Understand and ideate

Digitalization impacts your business!

Think outside the box!

Create value proposition

Walk in customers' shoes!

Develop **future offerings!**

Design value creation logic

Innovate your **business model!**

Understand your **ecosystem!**

1

Pilot and implement

Start **pilot** as reference case!

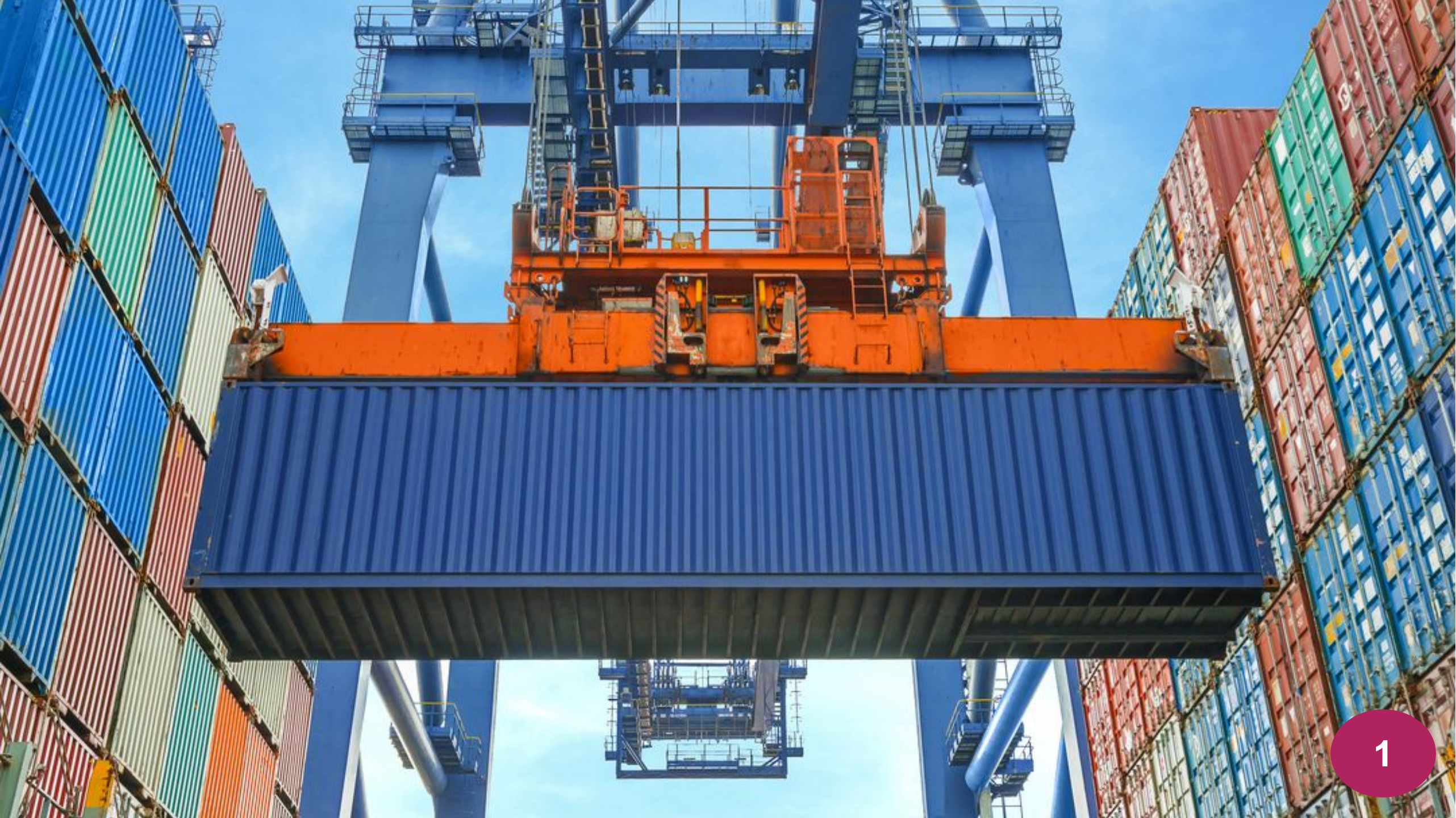
Set-up **business plan!**

2

Scale

Ramp-up and **industrialize!**

Enter new markets **and globalize!**



Testing an AI idea can be cheap and fast – with the right people, project setup and co-location

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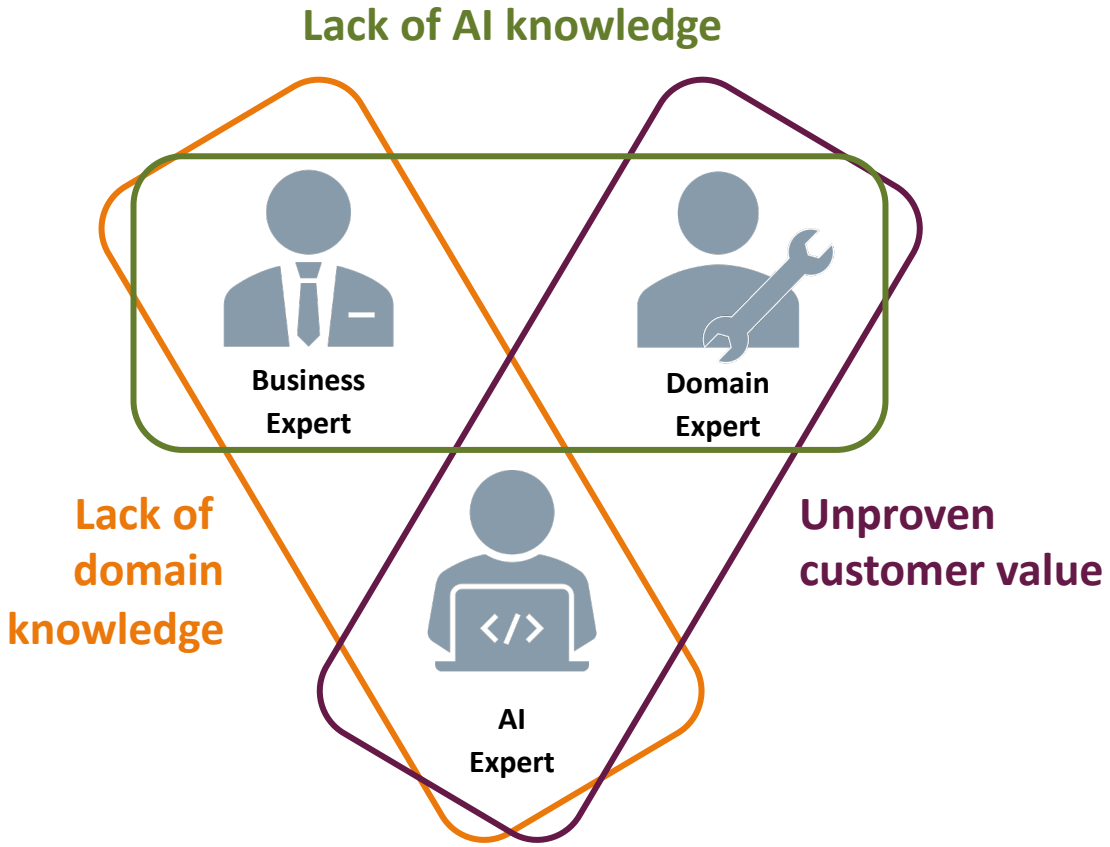

The key success factors

Be there from the start
We support the shaping of project goals and setup from the very beginning

Co-locate the team
No distractions, all the expertise in one (physical!) room

Fast go/no-go decision
Implement and test a proof of concept of the AI idea in 5 days

Empowerment is key - put people first towards the organization's accountability

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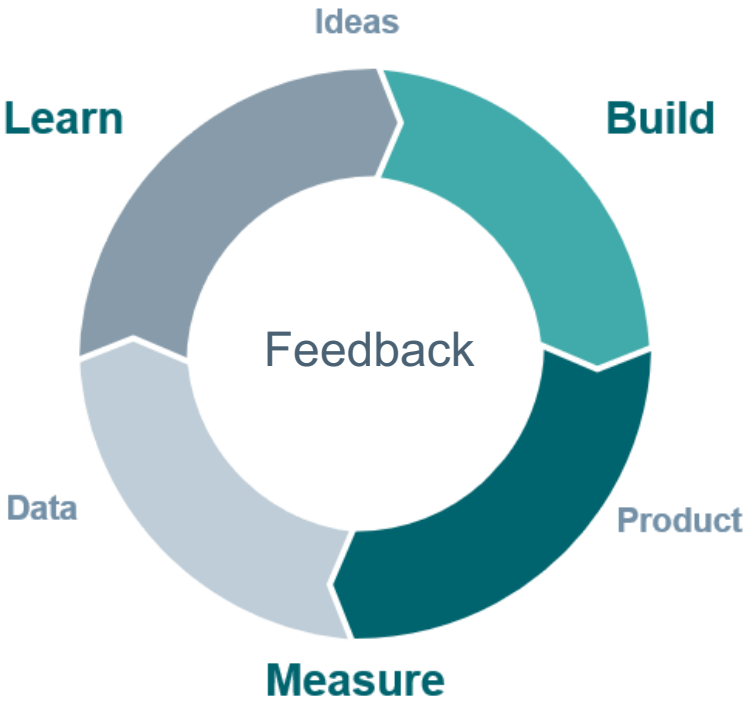
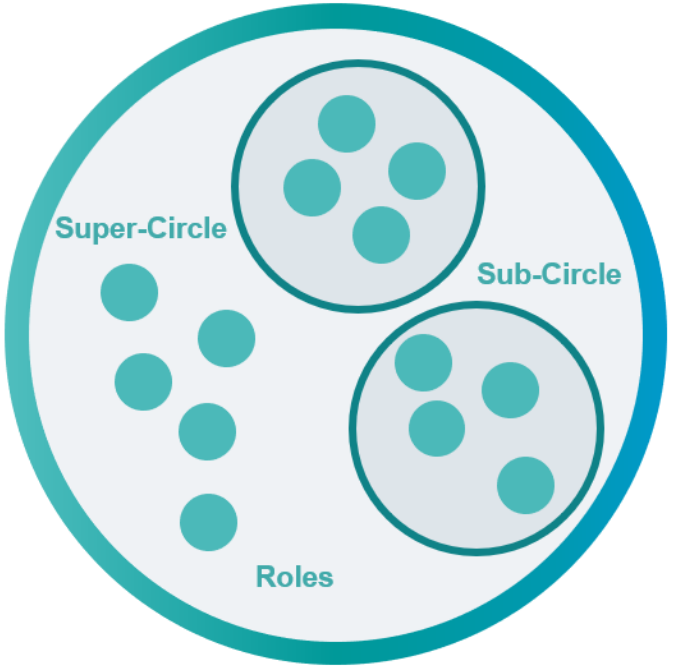
The ability to experiment, learn, and pivot is embedded in an AI-driven company - culture is key





Eric Ries: The Startup Way. 2017
Siemens AG - Siemens AI Lab

Siemens builds a dedicated ecosystem for development of industrial AI solutions

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People and processes

- **Empower:** Train non-experts on state of AI and AI project management
- **Change the culture:** Foster a data-driven mindset for new products
- **Accelerate:** Speed up the development process and time to market

- **Empower:** Train developers/AI experts to become AI experts/developers
- **Change the culture:** Foster a data-driven mindset for development
- **Accelerate:** Provide specialized tools and concepts for industrial AI development

Tooling and concepts

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Thought Leadership

“Professional responsibility […] is not to discover the laws of the universe, but act responsibly in the world by transforming existing situations into more preferred ones.”

Herb Simon, 1996

AI solutions are based on a powerful set of technologies and create multifold benefits – if used responsibly

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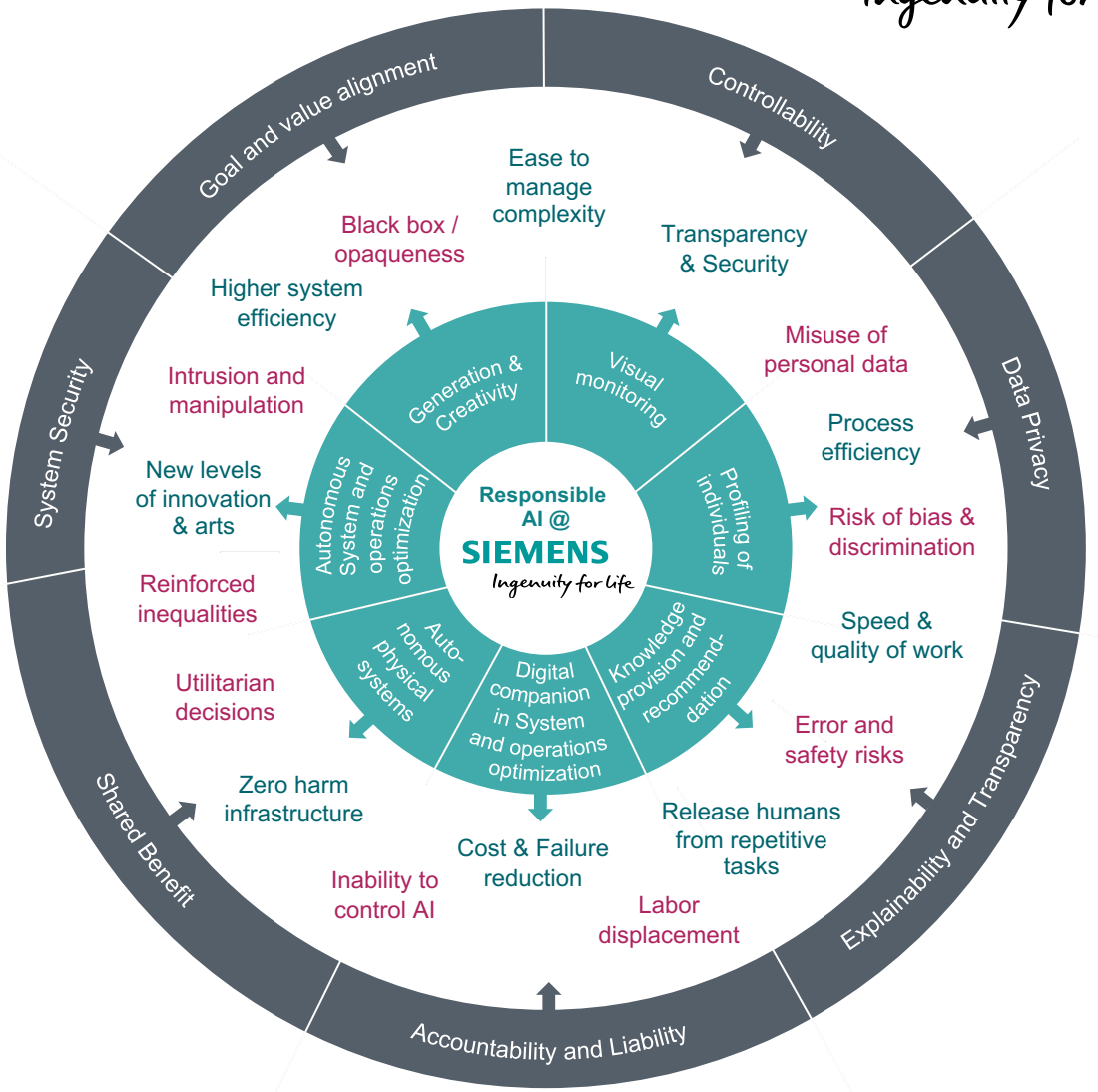
1. **AI comes along with plenty of capabilities suited to address several use case areas…**
2. **…that create several benefits…**
3. **…and are accompanied by risks**
4. **Technology and regulation can help to mitigate the risks and find the right balance**



Text: Benefits
Text: Risks

Every data is biased … there is no „un-bias“ button

“The problem is not biased data. The problem is our flawed belief that, with enough data, our current algorithms can substitute for human problem-solving.”

Vivienne Ming,, FT, 2020

We must ensure that the year 2024 doesn’t look like a page from the novel 1984

Microsoft - Brad Smith - 2018

AI solutions are based on a powerful set of technologies and create multifold benefits – if used responsibly

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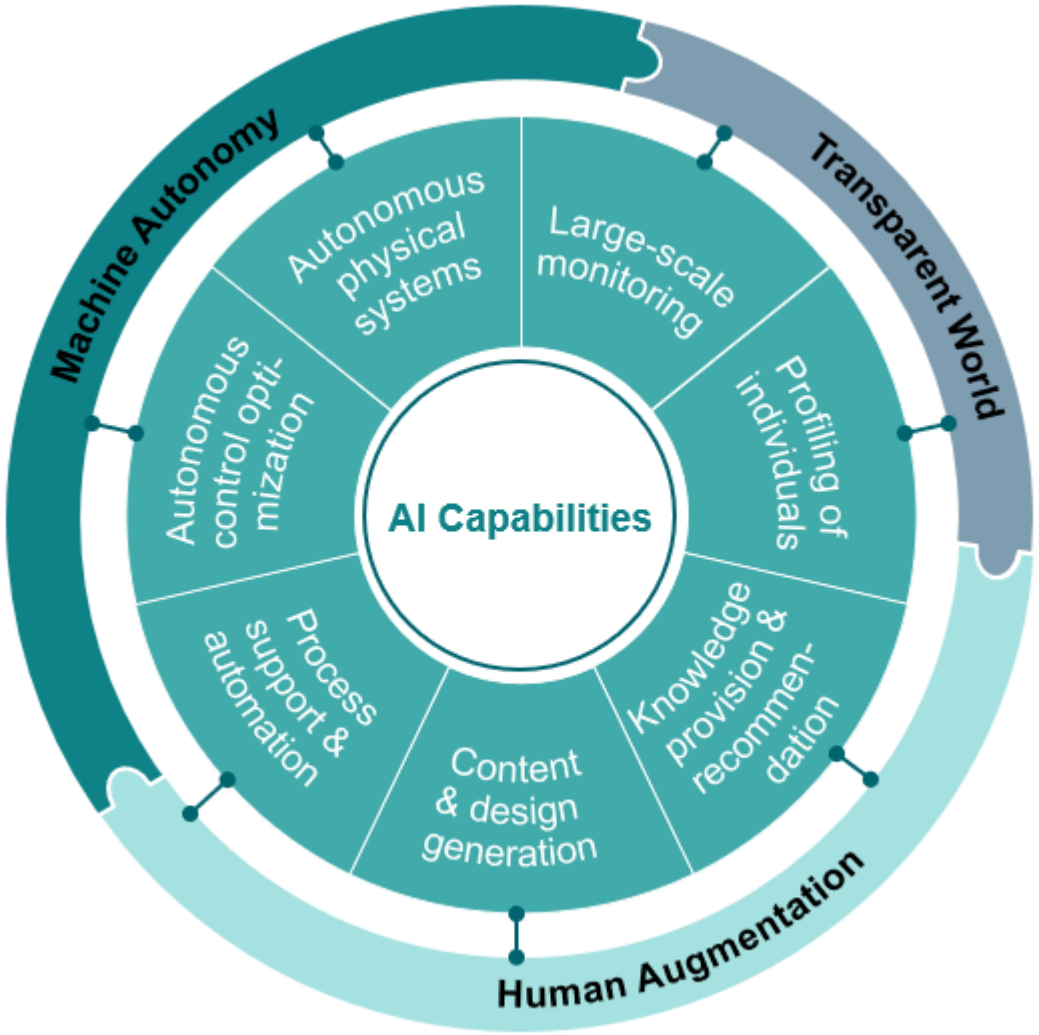
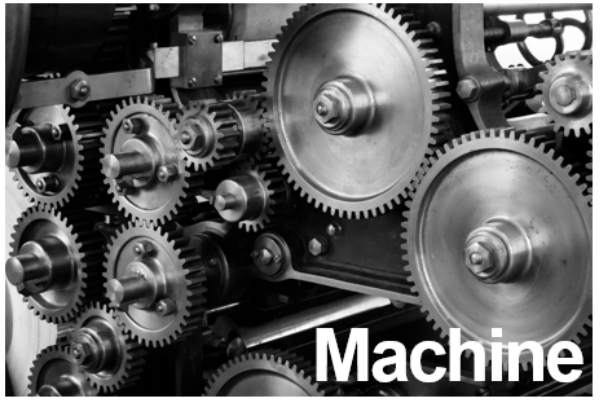


world



autonomy

augmentation

Implementation levers

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Rules & regulations

Co-creation

Trustworthy Technology

AI & domain knowledge


This is a call
for engagement
Trust is not neccerarly about transparency but about interaction

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Let's create a future-oriented society together with Responsible Industrial Artificial Intelligence

01

Shape sustainable development

Increase our positive economic, societal and environmental impact and thus contribute to achieving the Sustainable Development Goals

02

Foster inclusiveness & shared benefit

Ensure diversity, fairness and inclusiveness by co-creating value for all stakeholders in a multidisciplinary approach

03

Safeguard human oversight

The design of AI systems should always convey the objectives clearly defined humans

04

Guarantee data governance & privacy

Protect fundamental rights of partners, respecting their right to the protection and governance of personal and non personal data

05

Ensure system security & safety

Apply honest, credible, holistic rules and concepts as standards for security and safety

06

Endorse explainability

Create awareness, trust and acceptance by explaining the rationale of AI solutions whilst safeguarding intellectual property

07

Promote accountability & liability

Make policies and processes clear and accessible to guide stakeholders to take responsibility