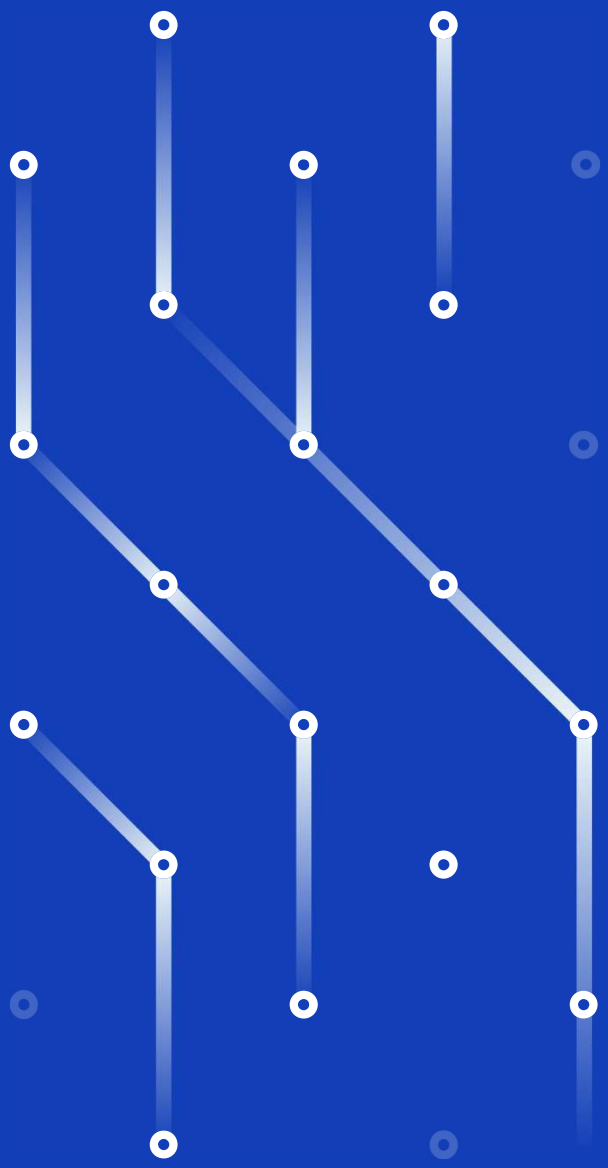
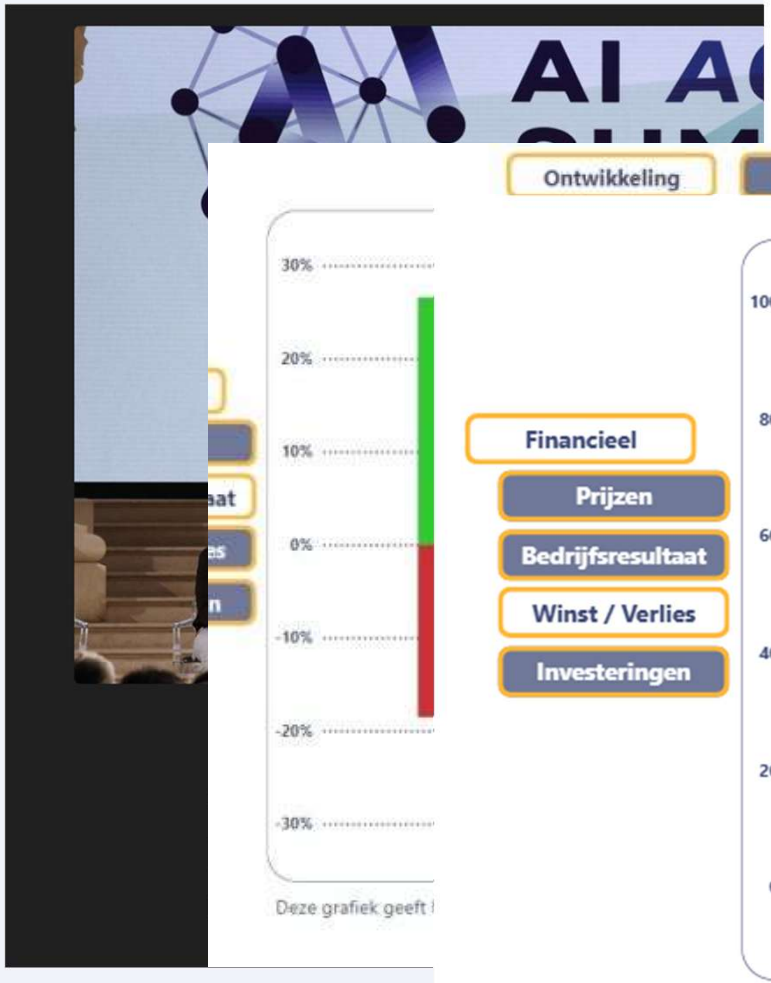


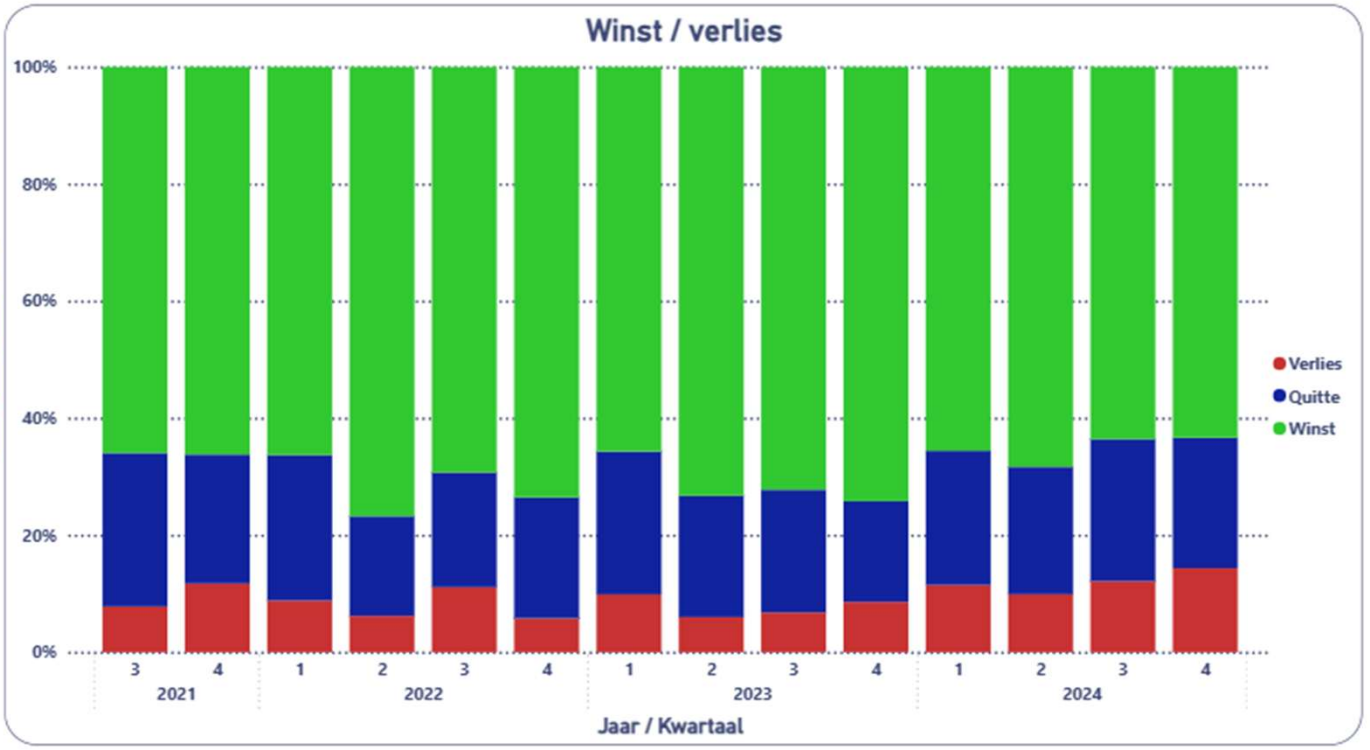
TNO innovation for life

In the news



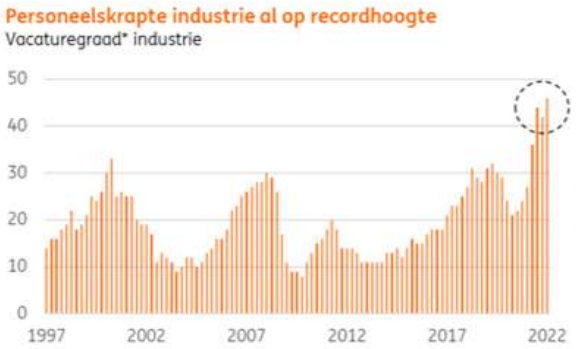

Net binnen
Algemeen
Economie
Sport
Media en Cultuur
Achterklap
Shop
Woensdag 12 februari 2025 | Het laatste nieuws het eerst op NU.nl

Ontwikkeling
Waardering
Verwachting
30%
20%
10%
0%
-10%
-20%
-30%
Financieel
Prijzen
Bedrijfsresultaat
Winst / Verlies
Investeringen


Winst / verlies
100%
80%
60%
40%
20%
0%
3
4
1
2
3
4
1
2
3
4
1
2
3
4
2021
2022
2023
2024
Jaar / Kwartaal
Verlies
Quitte
Winst

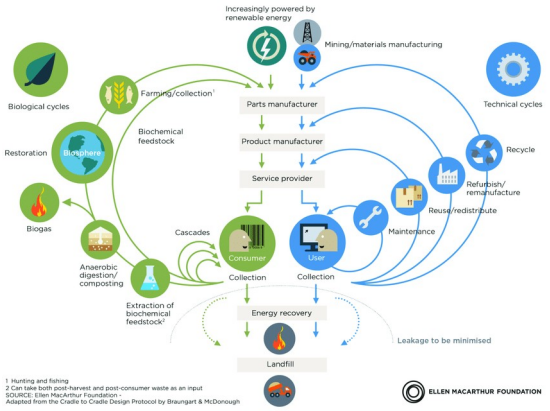
Industrial challenges (universal challenges?)

Staff shortage



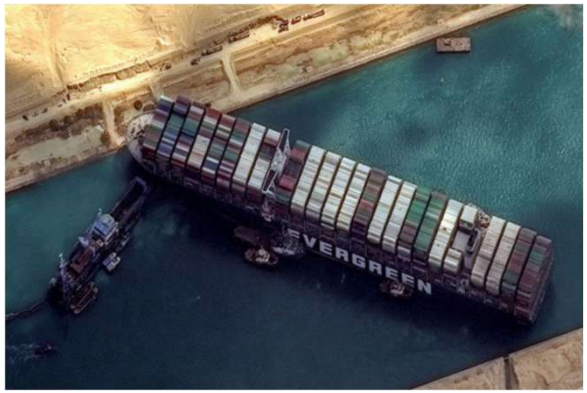
Productivity

Sustainability

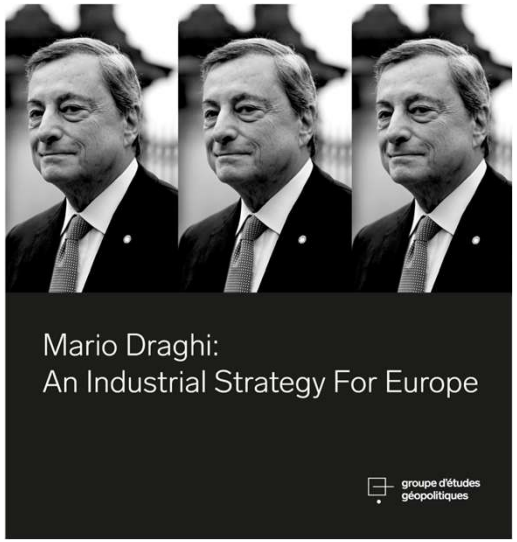


Industrial issues

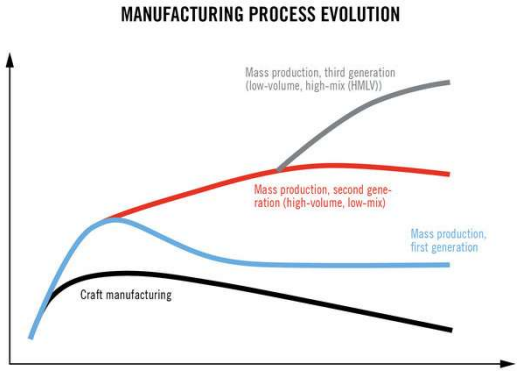
Resilience

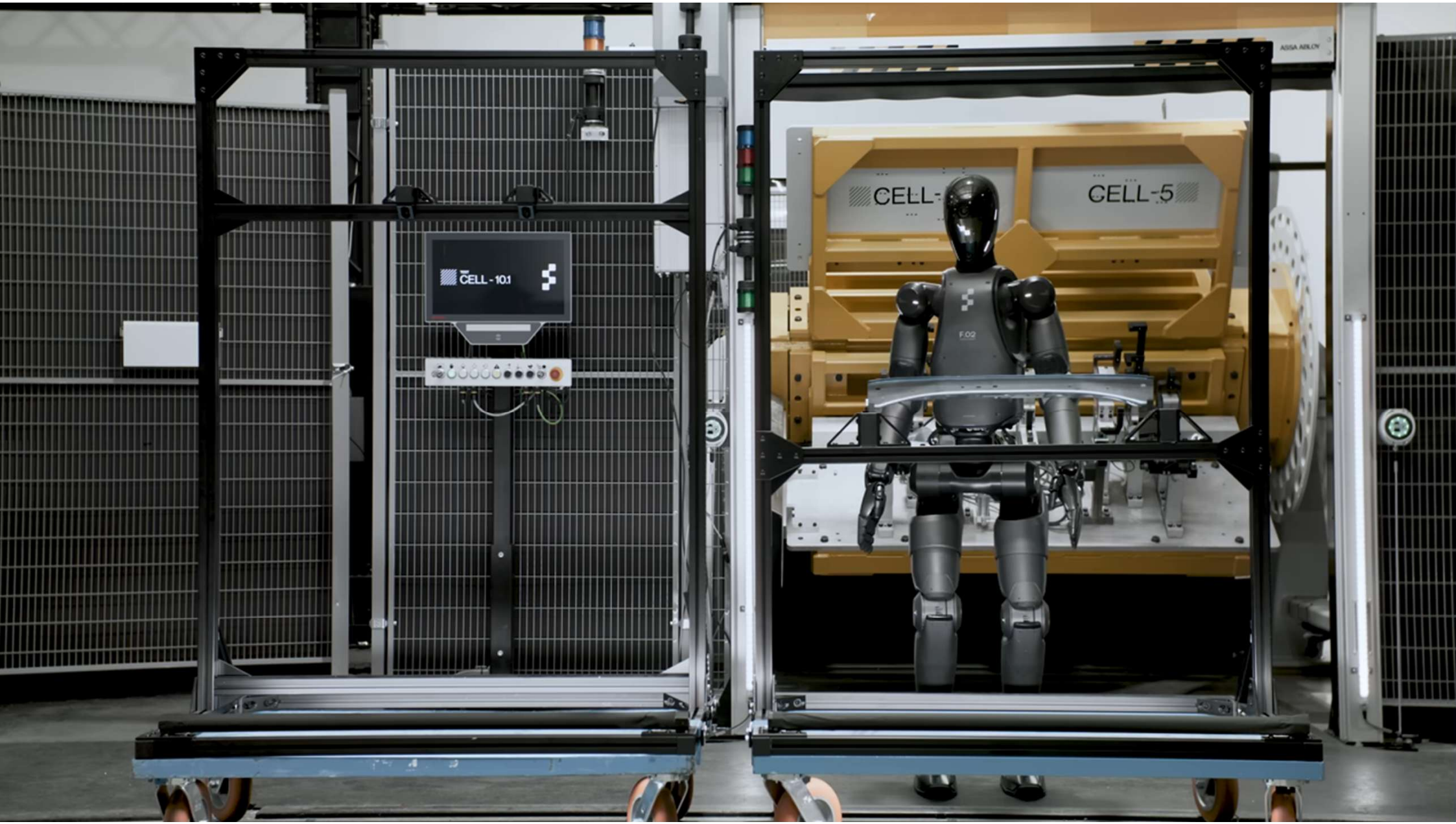


ReIndustrialisation EU



Fast changing customer demands




CELL - 10.1
CELL-5

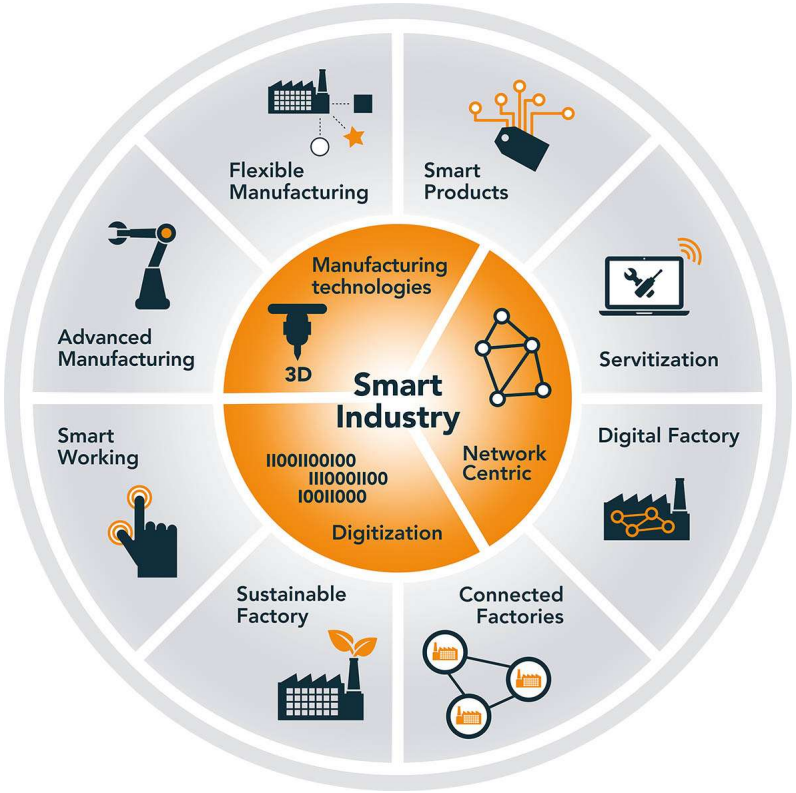
Radical Digitalisation

5 mei 2025

Jeroen.Broekhuijsen@tno.nl | Smart Industry

(made by chatGPT)

Smart Industry



Smart Industry

According to national branche organisation SmartIndustry.nl

Based on **three transitions**:

1) Radical digitalisation
2) Connecting products, machines and people
3) Adopt and develop new production technologies

Based on 8 Dutch focus areas

~~Radical~~ digitalisation?

Automation

‘If you always do what you always did, you will always get what you always got'

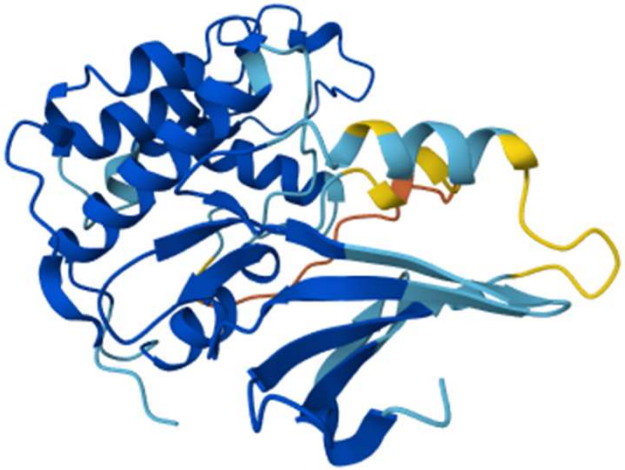
(Albert Einstein)

No!

Radical! digitalisation

Tesla builds cars in 1/3e of the time that Volkswagen needs

Alfafold, winner of the Nobel prize, speeds up research for proteins a million times faster



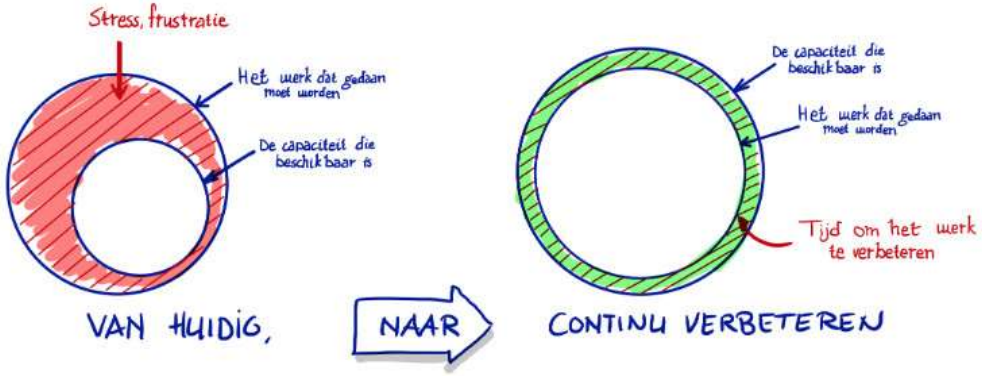
Gnome created a tenfold speedup in battery material research

Smart Industry

Technologie as a baseline to **change your business** and:

Directed and continuous attention by people and organisations for:

- Continuous improvement
- Based on data and vision
- To achieve and keep your unique position



Misconceptions on digitalisation

- Digitalisation is **NOT** the same work but faster / better / efficient and buy and done!
  - **Digitalisation is CHANGING** the way you work, your processes, with technology
- Can only be done if you have covered you bases → **Usually we have not**
- Digitalisaiton demands a vision on: **what are the essentiele choises** we as a company make!
- Not follow the trends (hype), but **adopt existing tech** in your organisation!

Radical digitalisation

Redesign your work given digital technology

Aimed at **Value for the user!**

In a **new organisation**

Simplify Process | **Simplify Work** | **Effortless Interaction** | **Clear Context** | **Fast Feedback** | **Increase Agency**

Must-haves for working radically

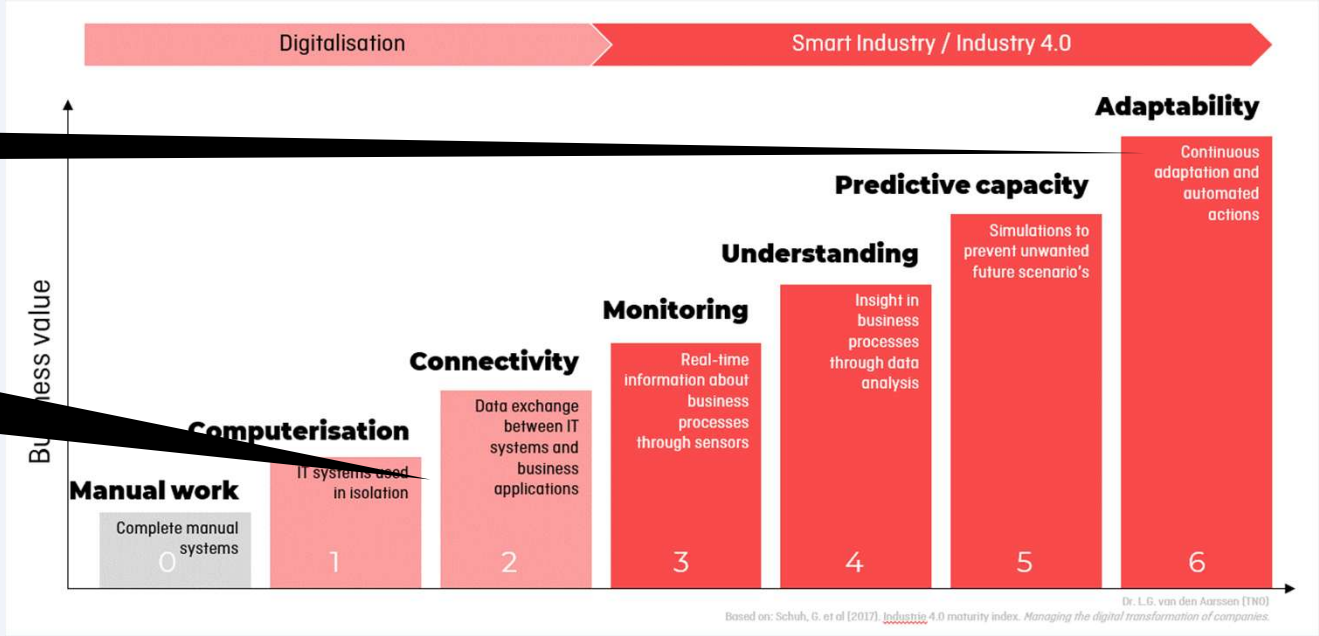
- Be ambitious, know what you want, have clear vision
- Collaborate cross-disciplinary involving everyone
- Do the impossible, reverse thinking
- Cover you bases: Apply existing technology
- Innovate based on your USP

Where are we?

Where are we with digitalisation?

We talk about this

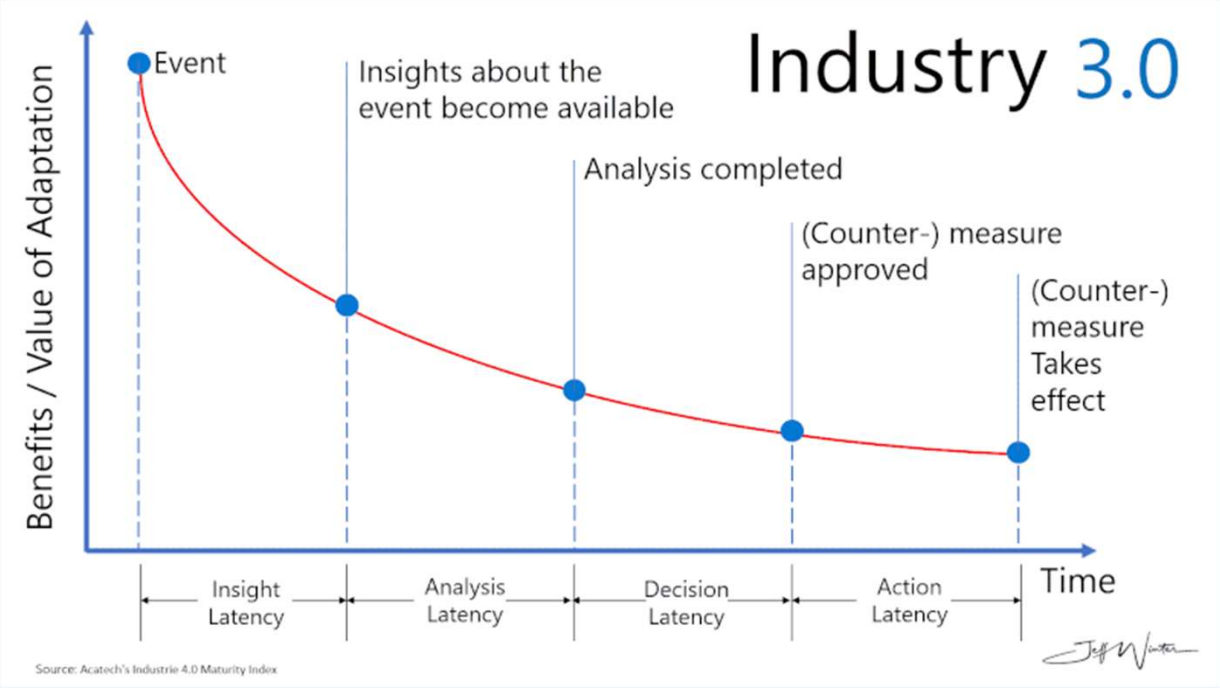
But most companies are still here

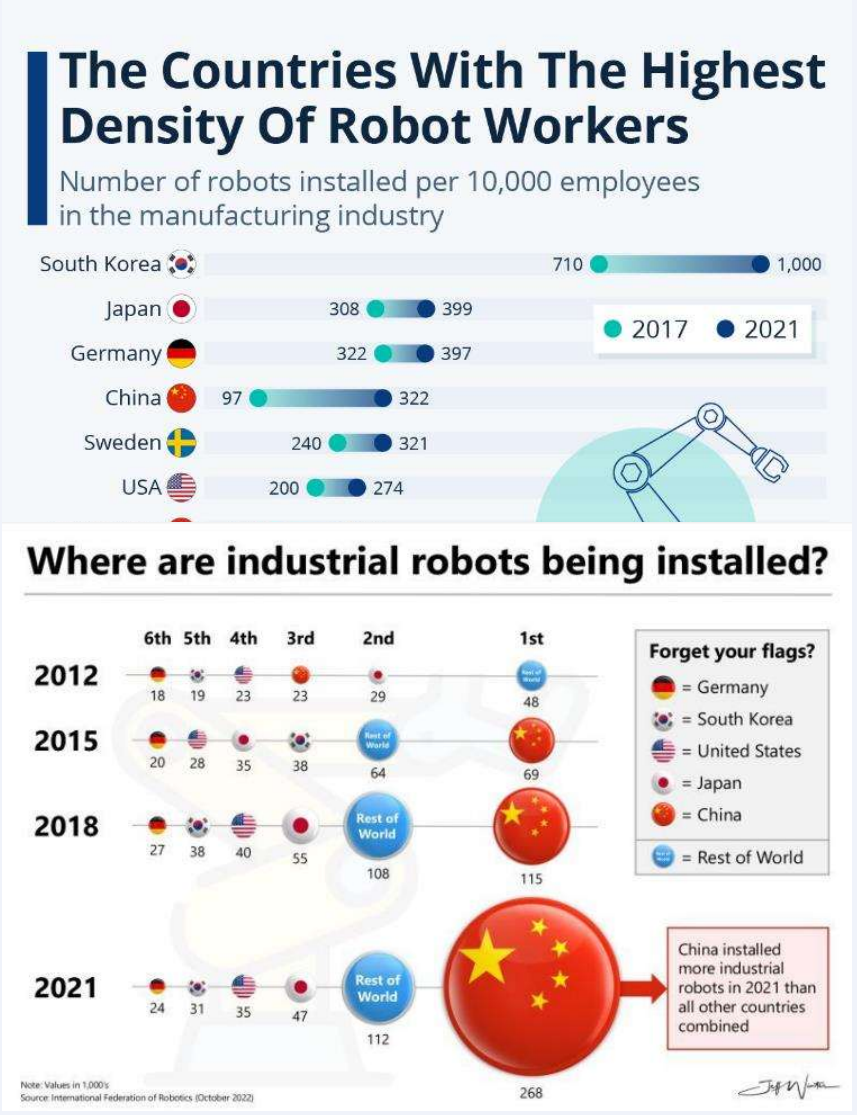


Only 8% of companies has advanced digitalisation

Perspective

Speed up, replace, change






TikTok
@ taiwantjr

Cover your bases!

More productive means less work, more results

- **Continuous improvement (People, Machines, Processes)**
  - **Lean** == minimize unneeded work, simplify
  - **Automate / robotize** == replace (repetitive) work by machines/robots
  - **Digitalisation** == Create insight and make work smarter based on connected systems
  - **Autonomous** == Self-steering based on insight

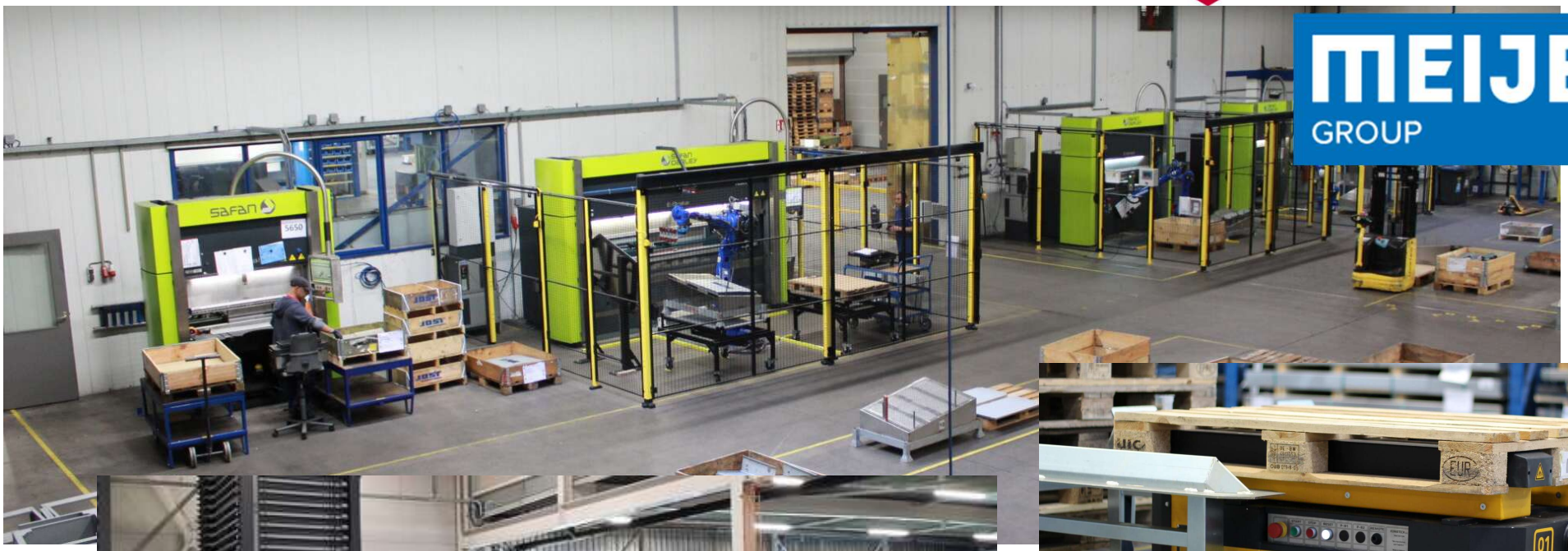
- **R&D & Innovation**
  - Create new methods / processes that radically change what you do

Where is AI?
What is radical?

SME examples

GOMA

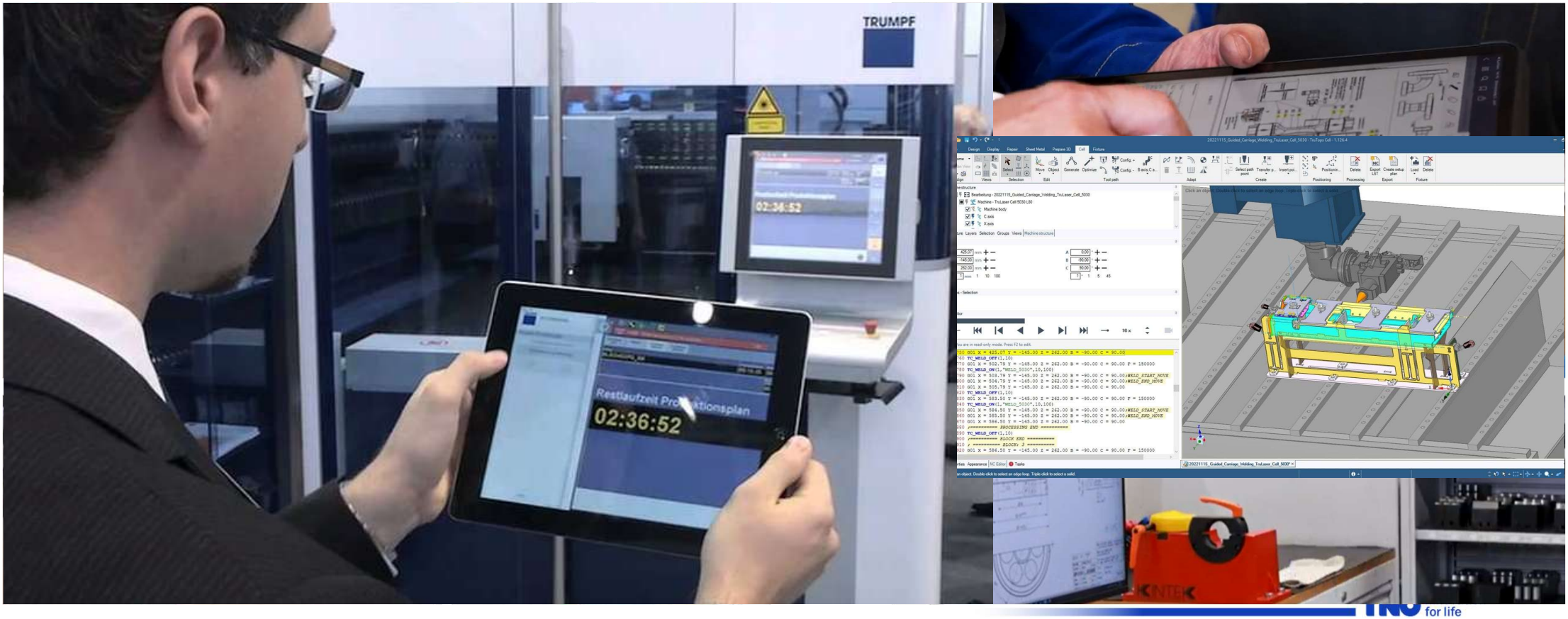
SUPLACON
plaatbewerking



MEIJER
GROUP
1921
100 YEARS
2021

Technologies now adoptable by SMEs

From paper → digital → expert in the system

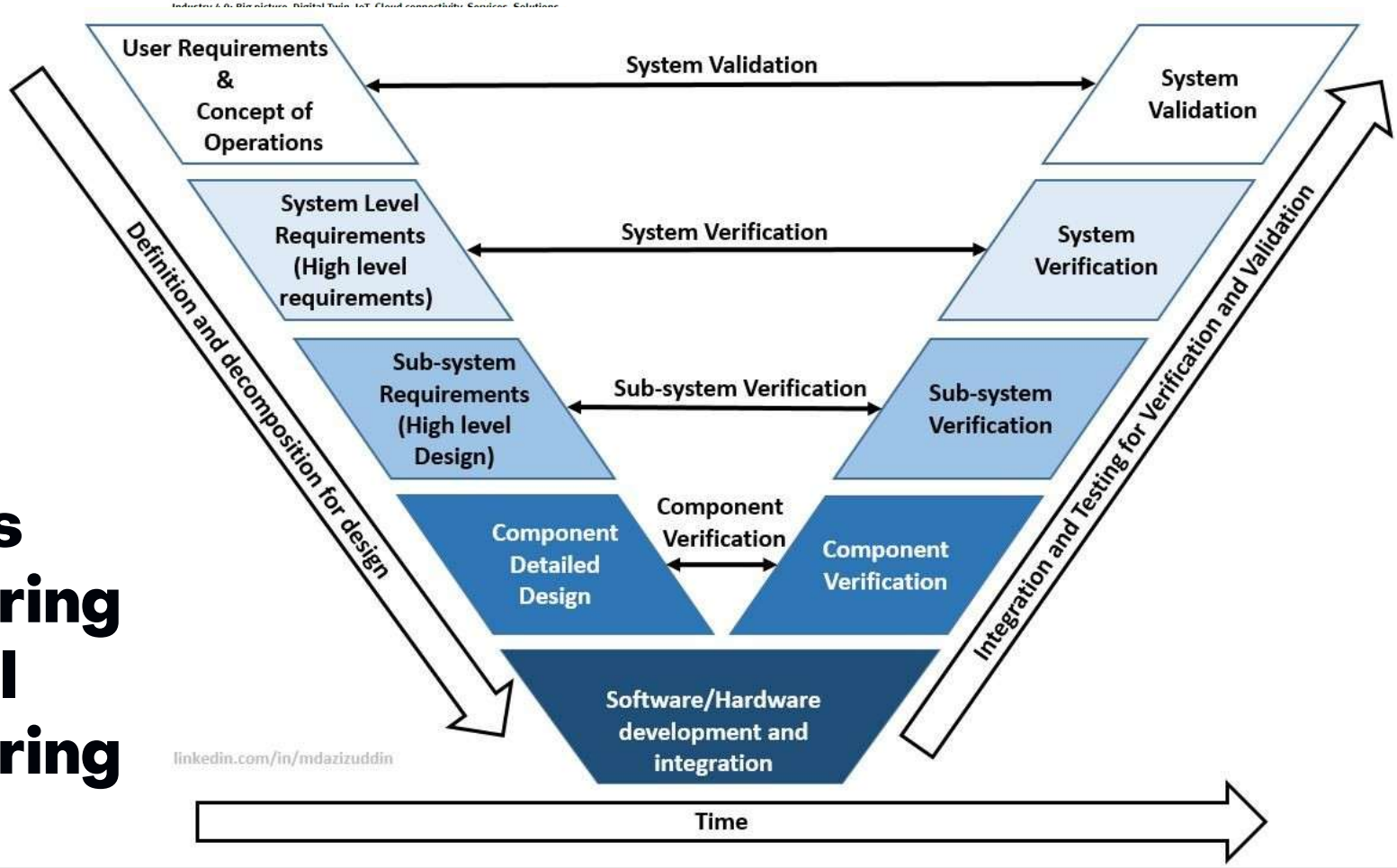


From catalogue, calling, engineering → online instant quotes → Collaborative supply chain→ DPP

From operator → robot → industrial line → automated ops

TNO innovation for life

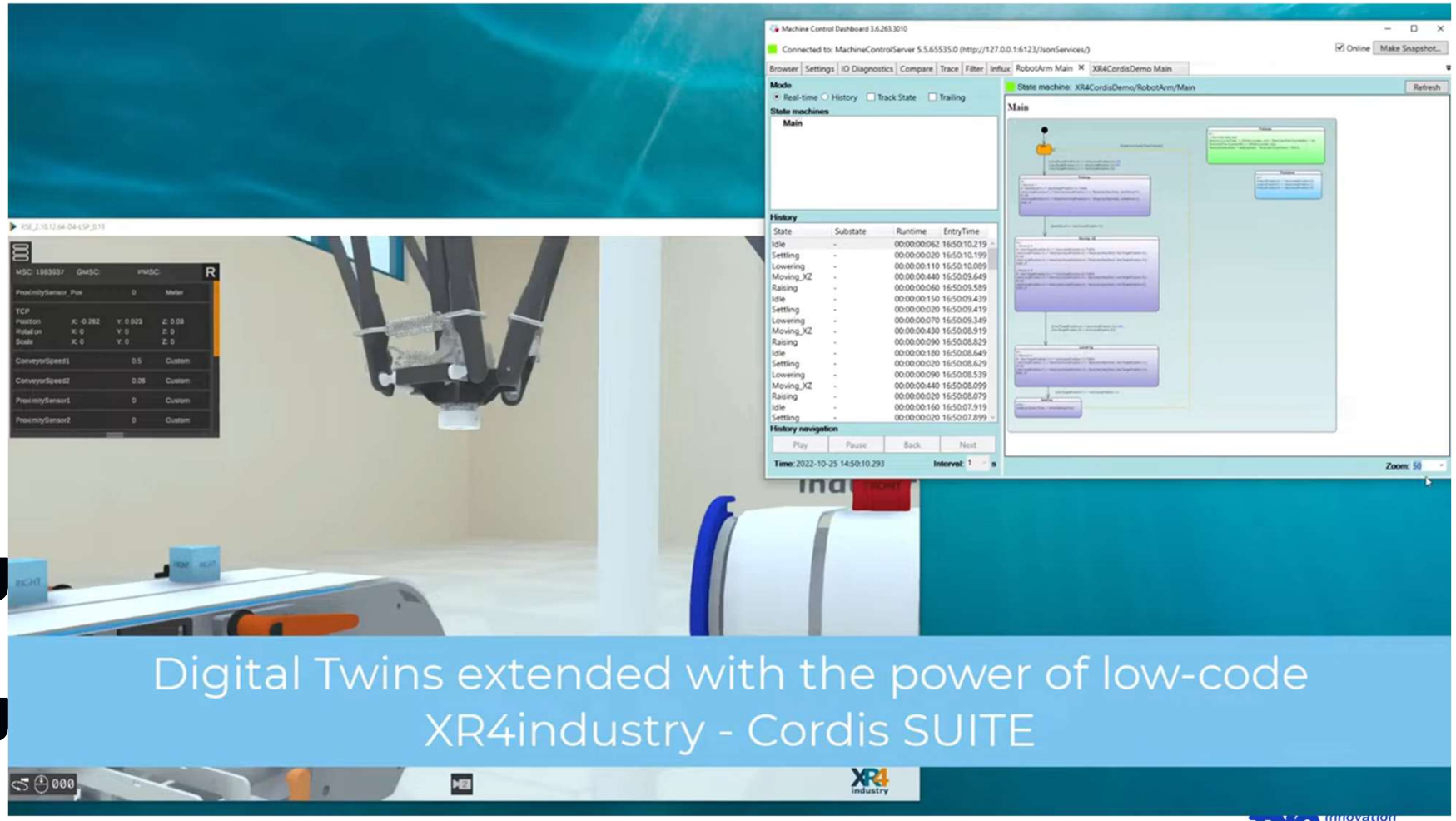
From single discipline → Multi-discipline → integrated



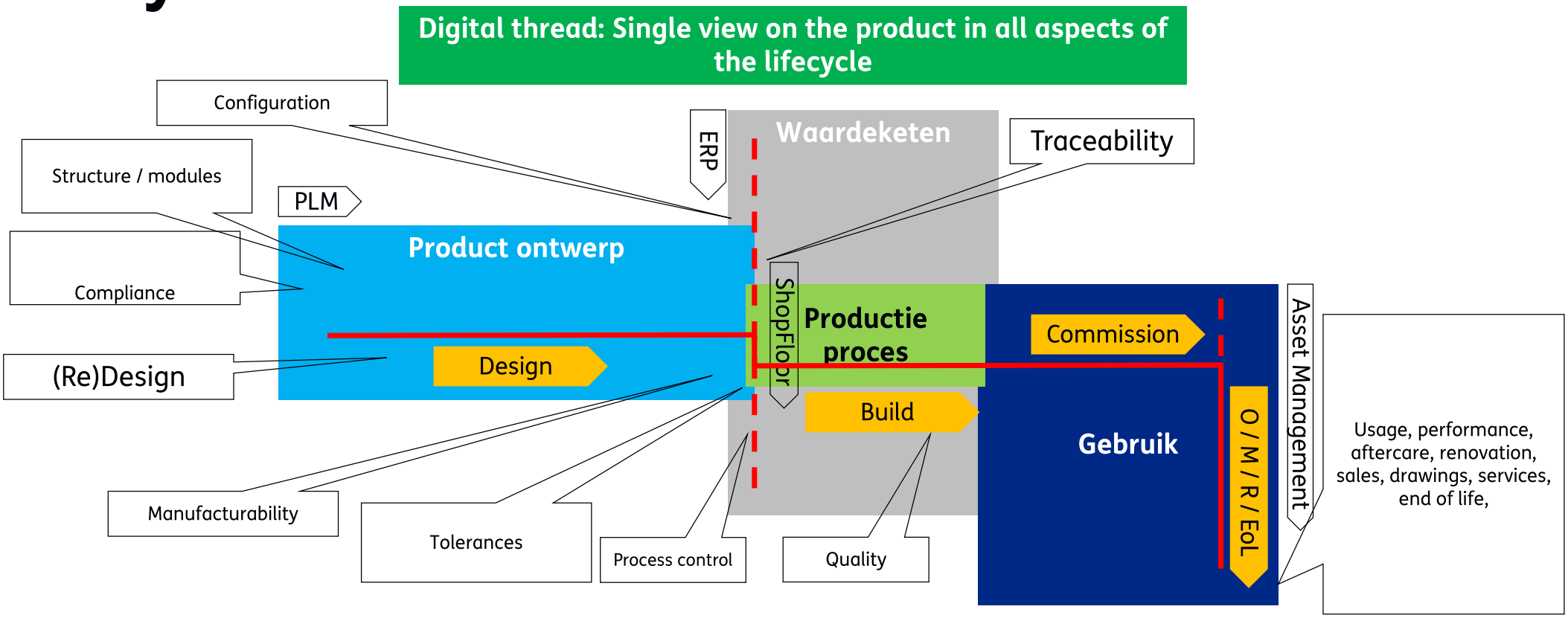
Systems Engineering & Digital Engineering

From single discipline → Multi-discipline → integrated

Systems Engineering & Digital Engineering



Lifecycle


Digital thread: Single view on the product in all aspects of the lifecycle
Configuration
Structure / modules
PLM
Compliance
(Re)Design
Product ontwerp
Design
ERP
Waardeketen
Traceability
ShopFloor
Productie proces
Build
Commission
Gebruik
O / M / R / EoL
Asset Management
Usage, performance, aftercare, renovation, sales, drawings, services, end of life,
Manufacturability
Tolerances
Process control
Quality
Design
Build
Commission
Operate
Maintain
Refurbish
End of Life

Aerospace?

Our technology protects

Is AI radical?

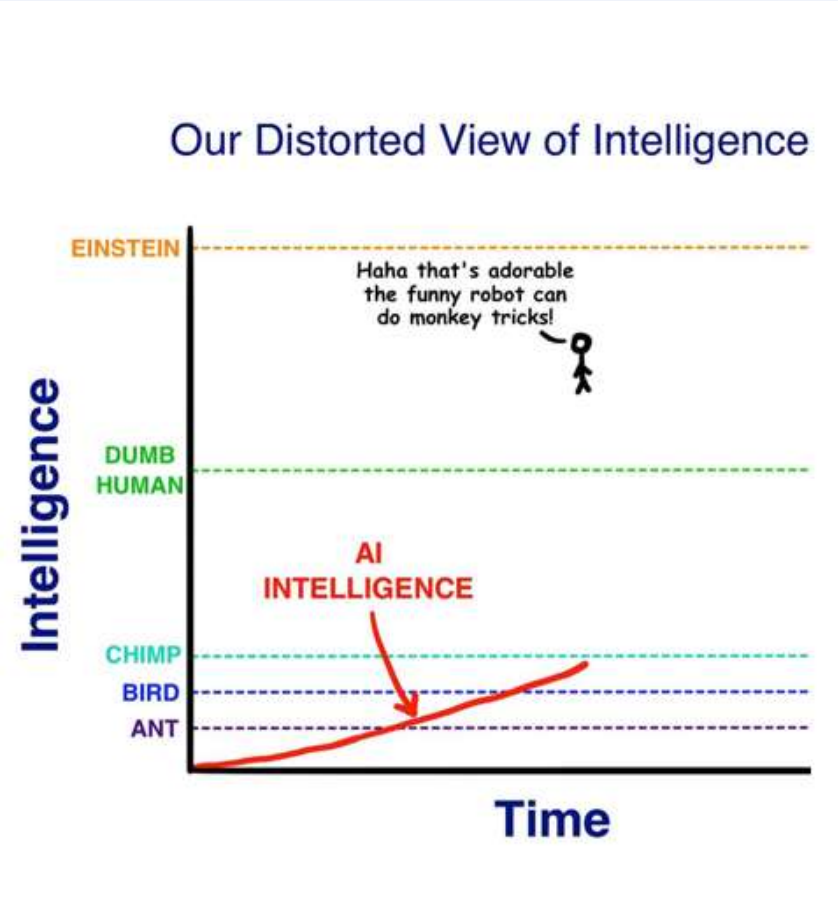
Kent de loodgieter je radiator niet?

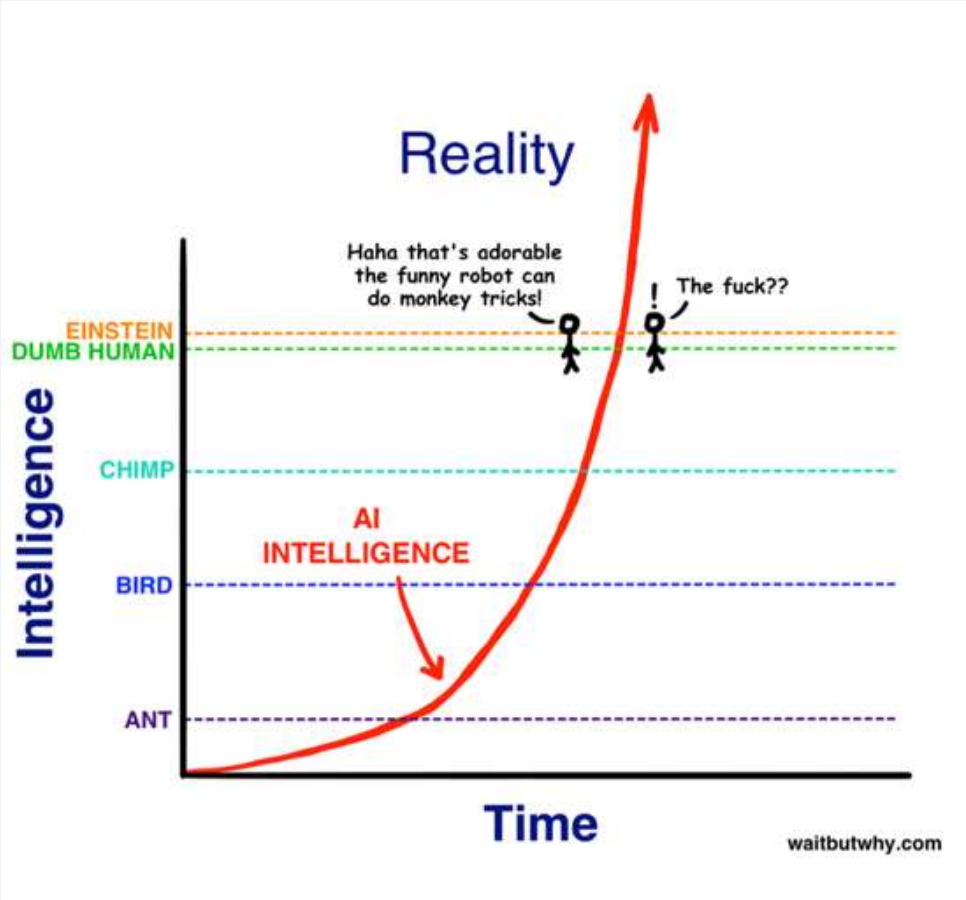
AI wel

Laat AI voor je werken
www.jobsolve.ai

PROJECTIE
BUILD WITH US

Rate of development





Knowledge leve current AI

Bachelor

Study level

Maart 2024

	Claude 3 Opus	Claude 3 Sonnet	Claude 3 Haiku	GPT-4	GPT-3.5	Gemini 1.0 Ultra	Gemini 1.0 Pro
Undergraduate level knowledge *MMLU*	86.8% 5 shot	79.0% 5-shot	75.2% 5-shot	86.4% 5-shot	70.0% 5-shot	83.7% 5-shot	71.8% 5-shot
Graduate level reasoning *GPQA, Diamond*	50.4% 0-shot CoT	40.4% 0-shot CoT	33.3% 0-shot CoT	35.7% 0-shot CoT	28.1% 0-shot CoT	—	—
Grade school math *GSM8K*	95.0% 0-shot CoT	92.3% 0-shot CoT	88.9% 0-shot CoT	92.0% 5-shot CoT	57.1% 5-shot	94.4% Maj1@32	86.5% Maj1@32
Math problem-solving *MATH*	60.1% 0-shot CoT	43.1% 0-shot CoT	38.9% 0-shot CoT	52.9% 4-shot	34.1% 4-shot	53.2% 4-shot	32.6% 4-shot
Multilingual math *MGSM*	90.7% 0-shot	83.5% 0-shot	75.1% 0-shot	74.5% 8-shot	—	79.0% 8-shot	63.5% 8-shot
Code *HumanEval*	84.9% 0-shot	73.0% 0-shot	75.9% 0-shot	67.0% 0-shot	48.1% 0-shot	74.4% 0-shot	67.7% 0-shot
Reasoning over text *DROP, F1 score*	83.1 3-shot	78.9 3-shot	78.4 3-shot	80.9 3-shot	64.1 3-shot	82.4 Variable shots	74.1 Variable shots
Mixed evaluations *BIG-Bench-Hard*	86.8% 3-shot CoT	82.9% 3-shot CoT	73.7% 3-shot CoT	83.1% 3-shot CoT	66.6% 3-shot CoT	83.6% 3-shot CoT	75.0% 3-shot CoT
Knowledge Q&A *ARC-Challenge*	96.4% 25-shot	93.2% 25-shot	89.2% 25-shot	96.3% 25-shot	85.2% 25-shot	—	—
Common Knowledge *HellaSwag*	95.4% 10-shot	89.0% 10-shot	85.9% 10-shot	95.3% 10-shot	85.5% 10-shot	87.8% 10-shot	84.7% 10-shot

December 2024

GPT-o3

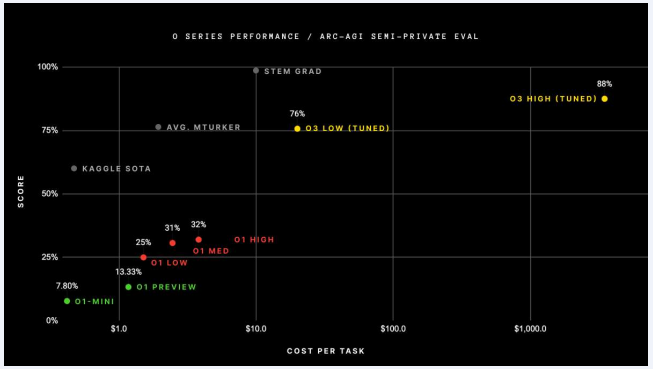
87%

97%

Master

Study level

Surprising result on the AGI test: 87%



Major leap in accuracy & costs

Will change the world in the same way Internet and smartphones have done.

We simply cannot imagine what's to come

TNO innovation for life

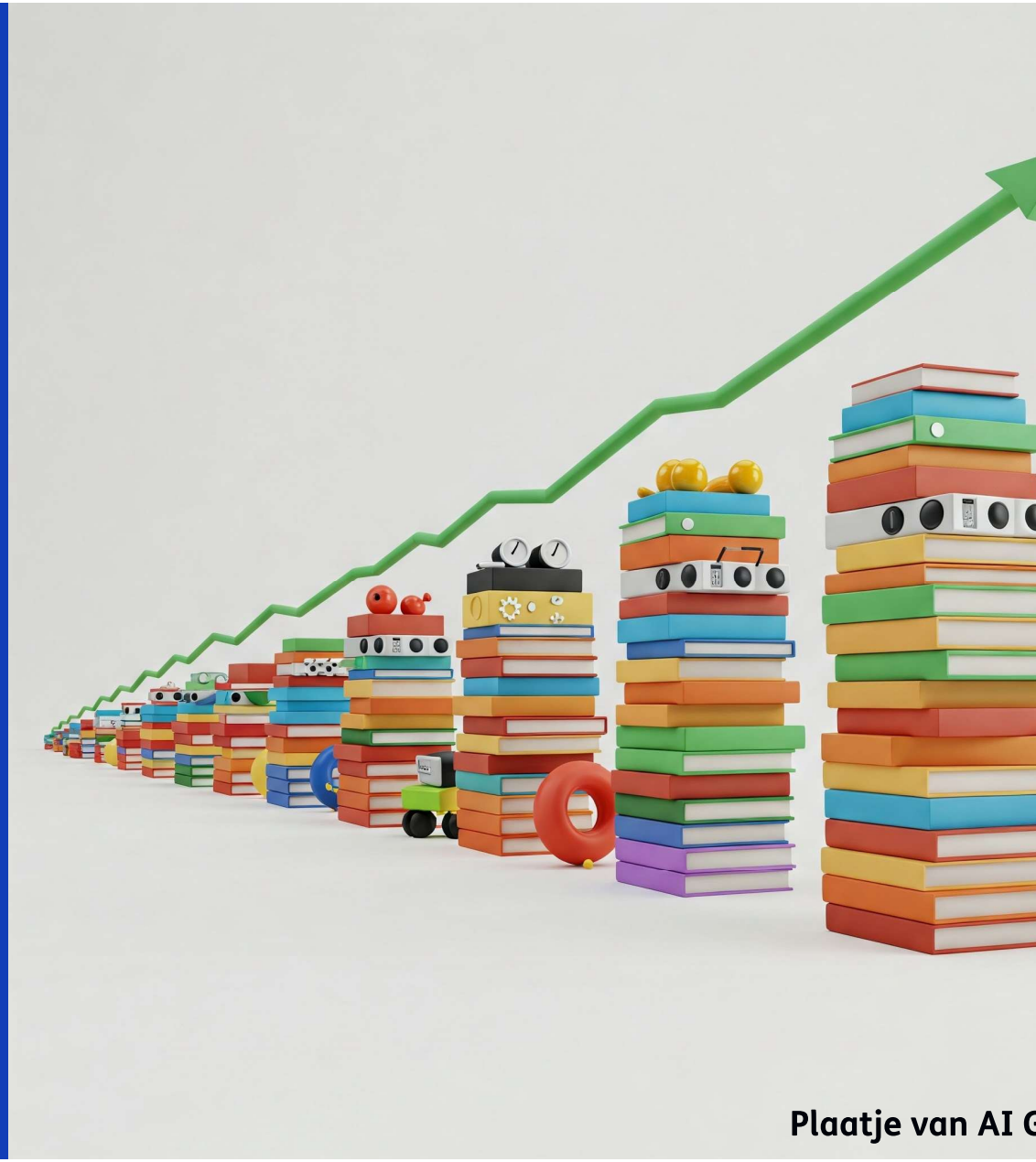
AI will double productivity!

Right?

Plaatje van AI Gemini*

Radical...

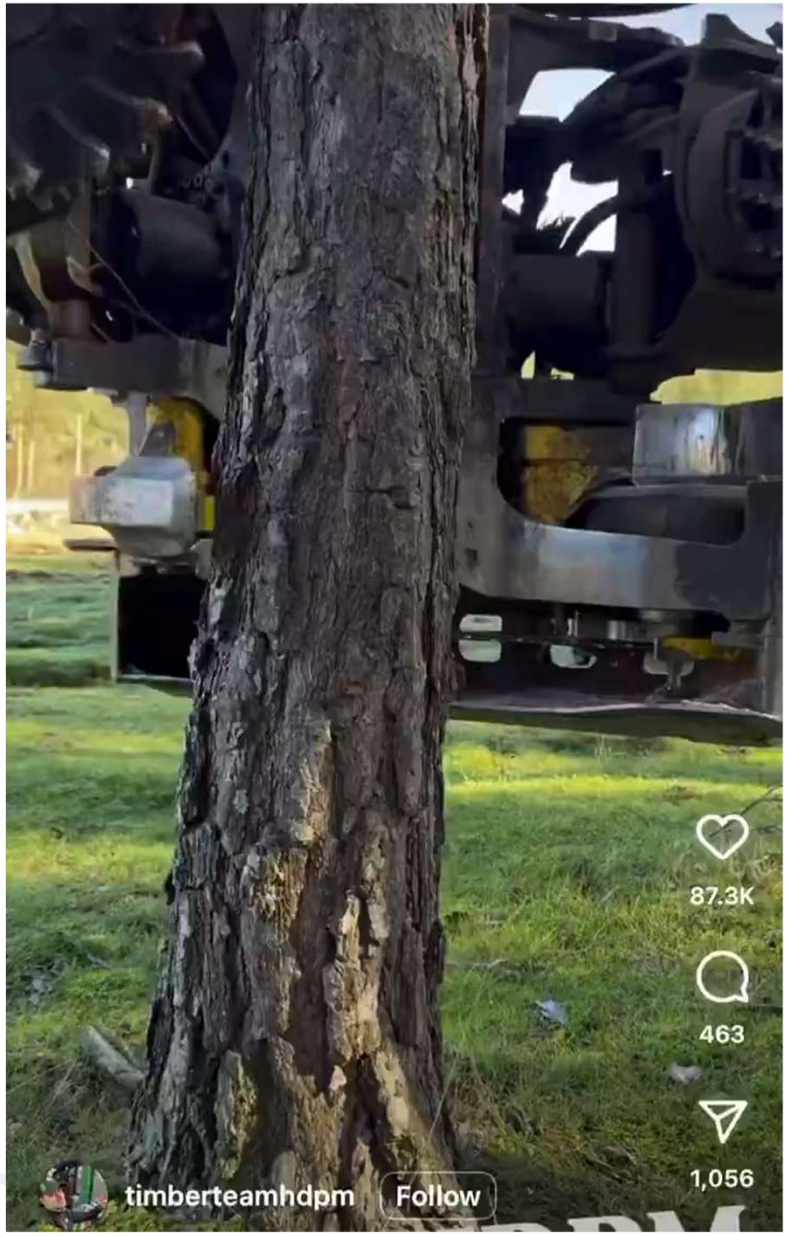
Increasing productivity



Plaatje van AI G

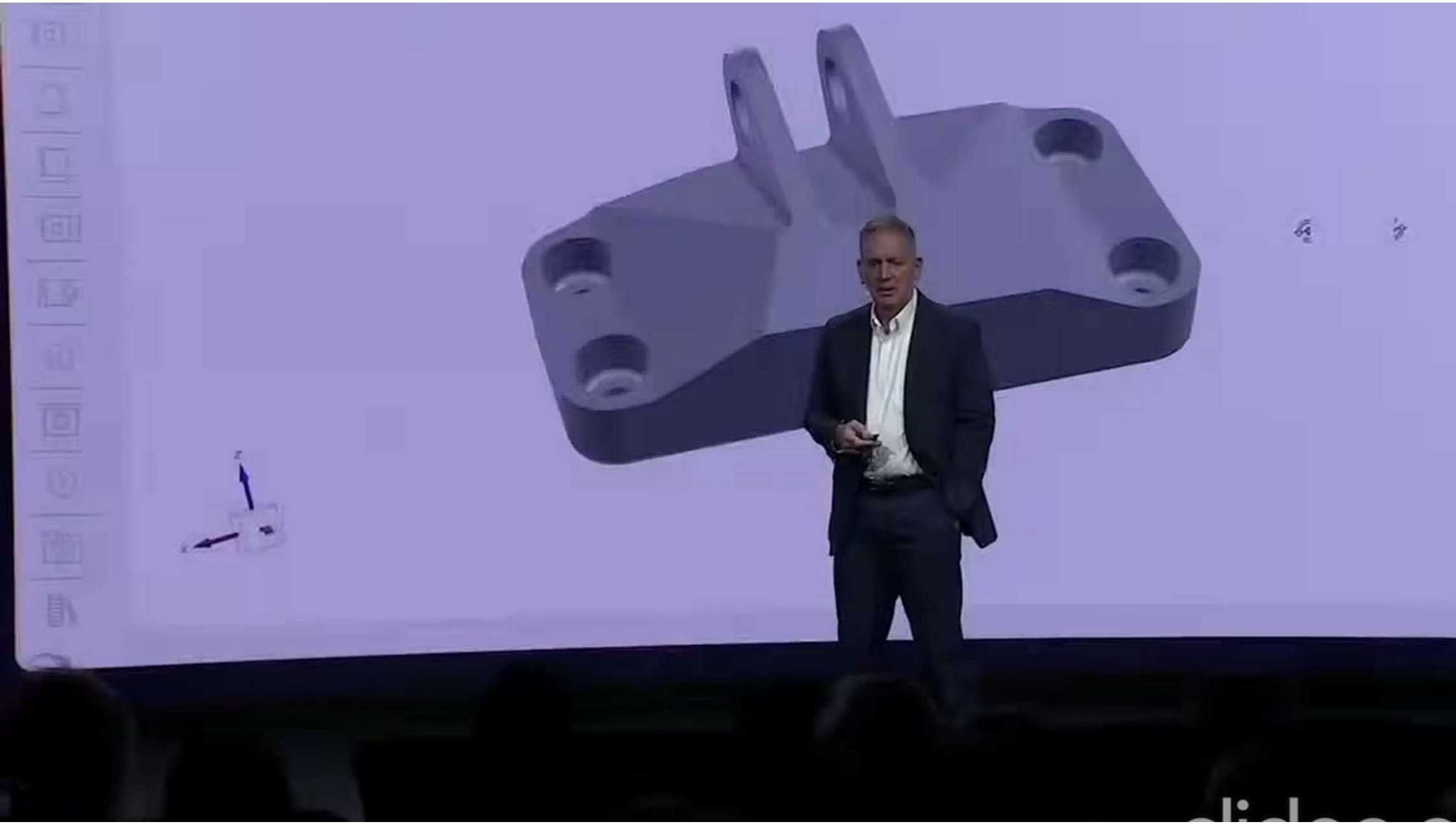
Is this radical?

Is this radical?



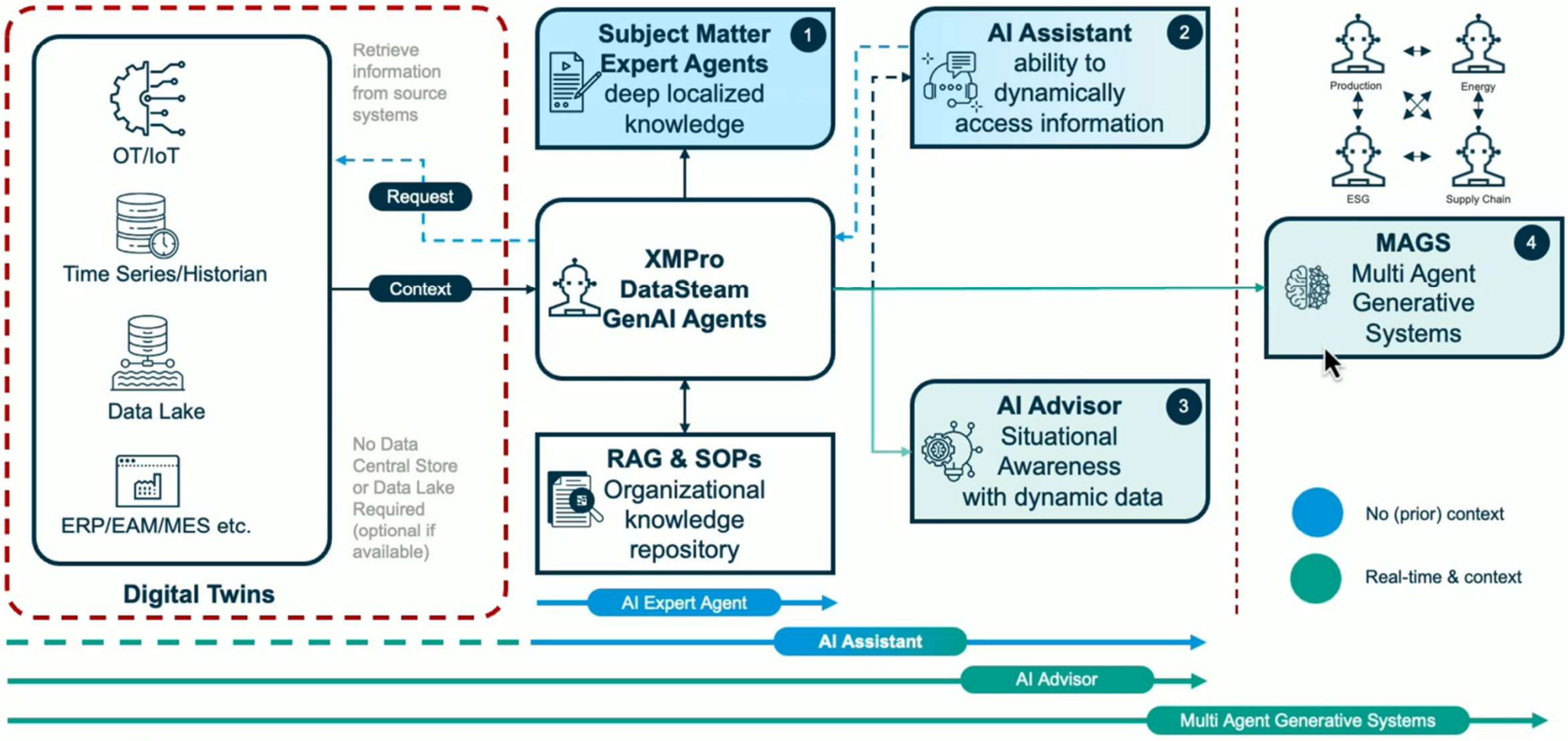
BRAINS4WORK
INSTANT INSTRUCTIONS

TNO innovation for life



XMPRO

The Roles that XMPro GenAI Agents Supports



What if.... (further ahead)

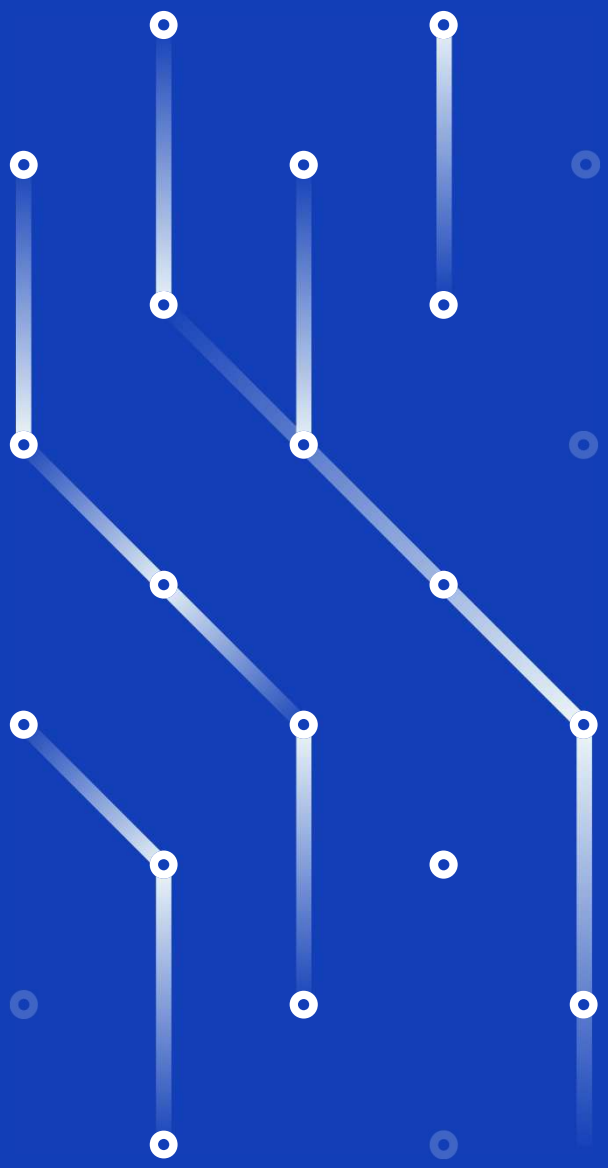
- You could redesign the factory / machine to work without operators? What would that look like? How would that work?

- The factory itself has agency? Which decisions would it then make?

What will YOU do?

What if...

- You can apply radical digitalisation everywhere in your company
- You do that collectively / collaboratively in your organisation
- Solutions actually end up in your tooling
- And you can stay sustainably competitive?
- Together with your supply chain partners
- And keep on doing this the rest of your life



TNO innovation for life