AHK Deutsch-Ungarische Industrie- und Handelskammer
Német-Magyar Ipari és Kereskedelmi Kamara

ADVANTAGE AUSTRIA

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25 YEARS FOR SWEDISH COMPANIES IN HUNGARY

THE SWEDISH CHAMBER OF COMMERCE

Veranstalter

netzwerk digital

SZTAKI

Neumann János Egyetem

INDUSTRY 4.0 OVERVIEW - AI POWERED LEARNING/PILOT FACTORY CONCEPT

Dr. Zsolt János Viharos

Institute for Computer Science and Control (SZTAKI), senior research fellow

John von Neumann University, deputy dean of science, lecturer

Hungarian Artificial Intelligence Coalition, MI²4.0 project team

CENTRE OF EXCELLENCE EPIC
Production Informatics and Control

ELKH Eötvös Loránd Research Network

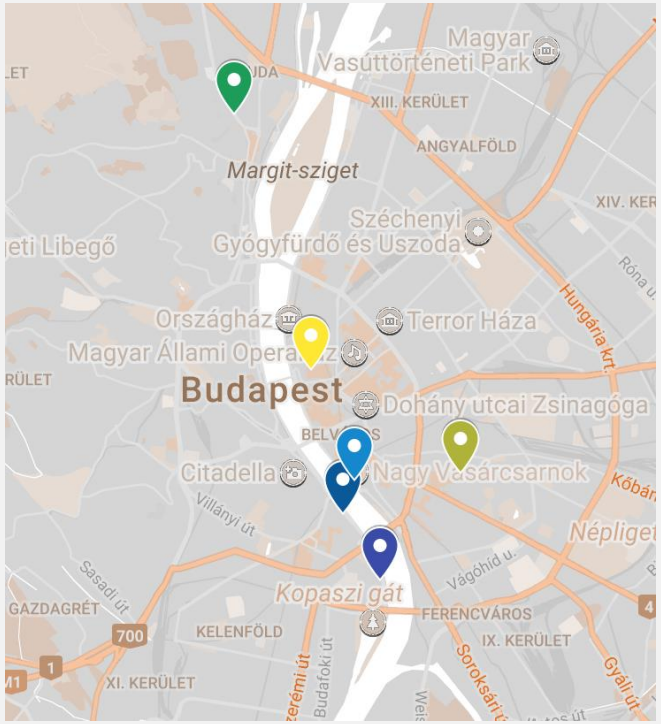
Agenda

- **SZTAKI & John von Neumann University**
- **Global AI trends**
- **Hungarian Artificial Intelligence Coalition** & **Hungary's Artificial Intelligence Strategy** & **Industry 4.0**
- **AI powered Learning/Pilot Factory concept**
  - Benchmarks
  - Ecosystem
  - Activities & services – knowledge transformation
  - Generalization
- *Q&A*

SZTAKI – In a nutshell

- **Some facts**
  - Established in 1964
  - EU CoE in IT, Computer Science and Control, 2001
  - Virtual Inst. on Product. and Business Management (PBM)
  - Fraunhofer Project C. for Prod. Manag. and Informatics, Fraunhofer PMI, 2010
  - EU CoE in Production Informatics and Control, 2017 (EPIC)
  - Common legal entity: EPIC InnoLabs Ltd, 2018
  - 45 FP7 projects, 14 H2020 projects, ERC advanced grant, …
  - I4.0 National Techn. Platform, 2016
  - Large number of industrial partners
- **Basic research**
  - Computer science
  - Systems- and control theory
  - Engineering and business intelligence
  - Machine perception and human-computer interaction
- **Applied research and innovation**
  - Vehicles and transportation systems
  - Production informatics and logistics
  - Energy and sustainable development
  - Security and surveillance
  - Networking systems and services, distributed computing
- **Budget**
  - 11 MEuros/year
  - ~30% basic funding
- **Staff**
  - 250+ (FTE)
  - ~100 with scientific degree
  - 7 members of the Hungarian Academy of Sciences
  - 15 with DSc degree
  - 70+ with PhD degree
  - ~15 members in Hungarian Academy of Engineering
  - 4 members of CIRP Monostori, L.; Váncza, J.; Kádár, B.; Erdős, G.

SZTAKI, education activities – Universities



www.sztaki.hu

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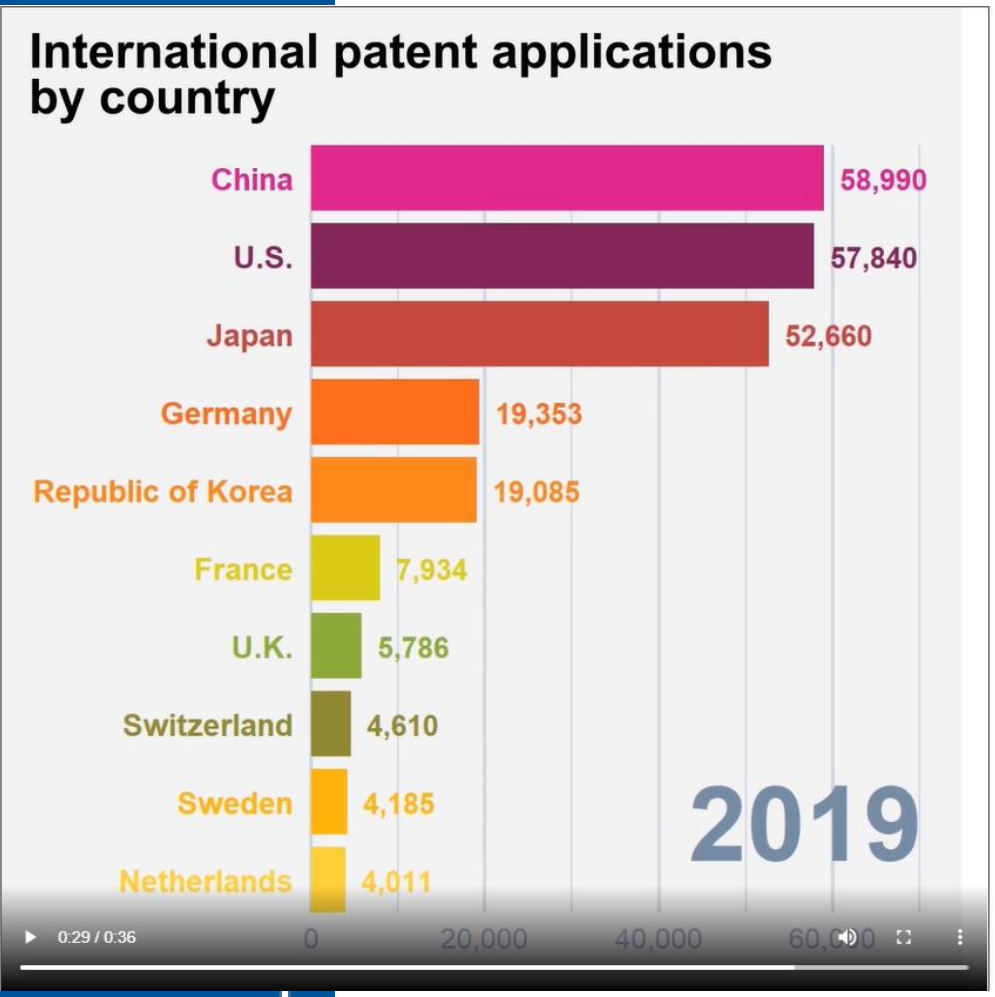


Is China Taking the Lead in AI?

sloanreview.mit.edu/article/is-china-taking-the-lead-in-ai/

Apps · Proman 1.0 - EMI P... · Neptun.Net PE_OW... · Kecskeméti Egyete... · Sci-hub (do) · Library Genesis cikk... · Zsolt János Dr. Viha... · Fájlok - SZTAKI Nex... · EPIC new - Google...

MITSloan Management Review

Topics Spotlight Magazine Webinars & Podcasts

FRONTIERS

Is China Taking the Lead in AI?

China is investing heavily in AI, but assessments that it has developed a technological edge over the United States are an oversimplification.

Jeffrey Ding, interviewed by Frieda Klotz • April 30, 2020 READING TIME: 8 MIN

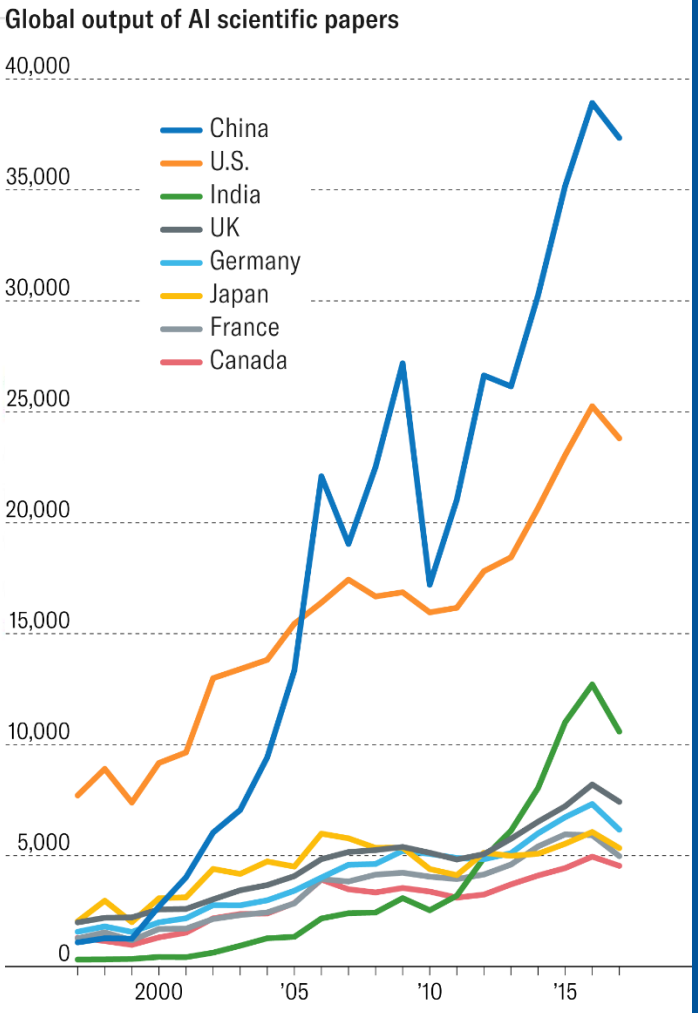
SUBSCRIBE BUY SHARE

Image courtesy of Carolyn Ann Geason @Calonyr11

In 2017, the Chinese government announced plans to "lead the world" in artificial intelligence by 2030. The announcement has fed considerable uneasiness in the United States and elsewhere about the scope of China's aspirations and the

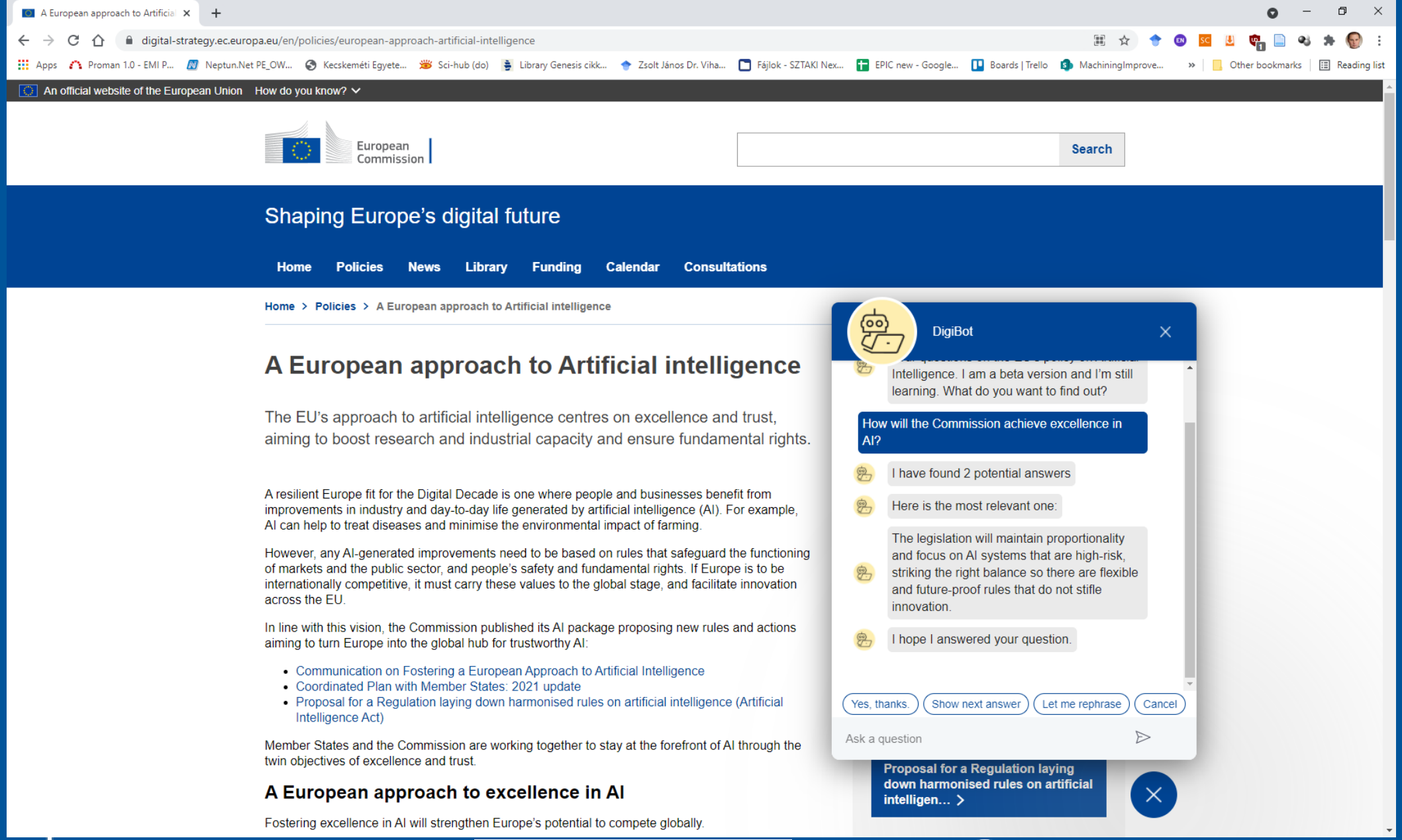
Where New AI Research Comes From

How many papers are published in each country annually?



Source: *China AI Development Report 2018*, China Institute for Science and Technology Policy at Tsinghua University

HBR


A European approach to Artificial intelligence
digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence
An official website of the European Union How do you know?
European Commission
Search
Shaping Europe's digital future
Home Policies News Library Funding Calendar Consultations
Home > Policies > A European approach to Artificial intelligence
A European approach to Artificial intelligence
The EU's approach to artificial intelligence centres on excellence and trust, aiming to boost research and industrial capacity and ensure fundamental rights.
A resilient Europe fit for the Digital Decade is one where people and businesses benefit from improvements in industry and day-to-day life generated by artificial intelligence (AI). For example, AI can help to treat diseases and minimise the environmental impact of farming.
However, any AI-generated improvements need to be based on rules that safeguard the functioning of markets and the public sector, and people's safety and fundamental rights. If Europe is to be internationally competitive, it must carry these values to the global stage, and facilitate innovation across the EU.
In line with this vision, the Commission published its AI package proposing new rules and actions aiming to turn Europe into the global hub for trustworthy AI:
Communication on Fostering a European Approach to Artificial Intelligence
Coordinated Plan with Member States: 2021 update
Proposal for a Regulation laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)
Member States and the Commission are working together to stay at the forefront of AI through the twin objectives of excellence and trust.
A European approach to excellence in AI
Fostering excellence in AI will strengthen Europe's potential to compete globally.
DigiBot
Intelligence. I am a beta version and I'm still learning. What do you want to find out?
How will the Commission achieve excellence in AI?
I have found 2 potential answers
Here is the most relevant one:
The legislation will maintain proportionality and focus on AI systems that are high-risk, striking the right balance so there are flexible and future-proof rules that do not stifle innovation.
I hope I answered your question.
Yes, thanks.
Show next answer
Let me rephrase
Cancel
Ask a question
Proposal for a Regulation laying down harmonised rules on artificial intelligen... >

AI Hungary

ai-hungary.com/en

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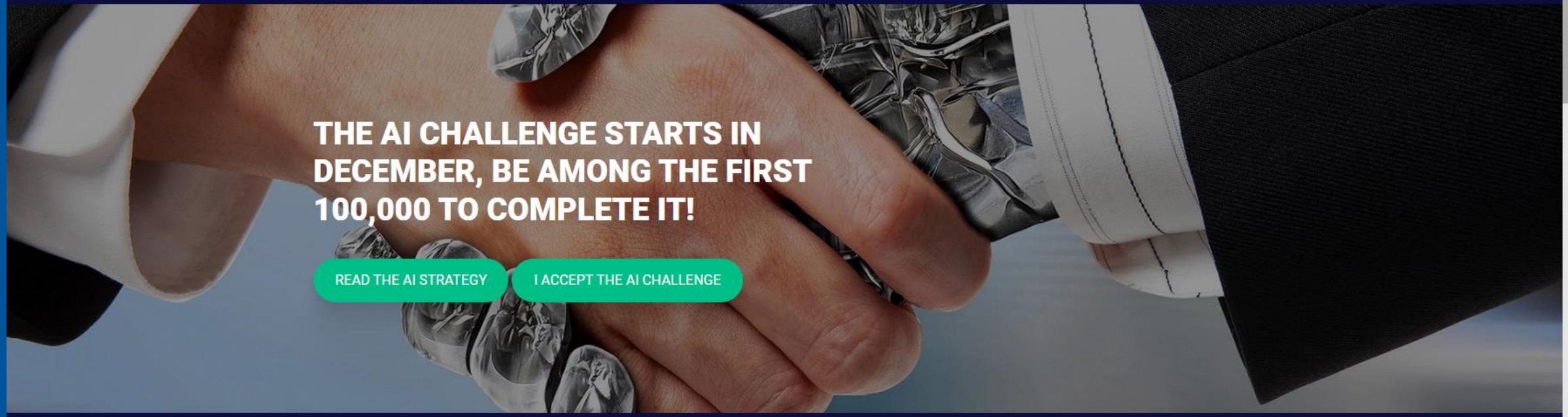
artificial intelligence coalition

Founded in 2018

AI COALITION ACCELERATORS AI ACADEMY NEWS & PRESS AI MARKETPLACES AI CHALLENGE LOG IN en / hu



Raising awareness

Easy-to-understand AI developments via awareness raising, interactive exhibits and education programs.

Developing the economy

Integrating AI into business and government processes by building marketplaces and profiting from EU-wide cooperations.

Implementing the AI strategy

Policy consultation and facititating decision-making with AI strategy, impact assessments and project team work.

MISSION

The mission of the AI Coalition is to

propel Hungary to the European forefront in the area of AI developments;

strengthen the competitiveness of domestic enterprises through extensive dissemination and utilization AI-based use-cases;

facilitate the participation of Hungarian start-ups and SMEs in AI development activities in partnerships with large enterprises, universities or international partners;

make sure that the government, as a user of AI-powered solutions, should be actively engaged in developing the local AI ecosystem by systematically utilizing the national data asset pool.

MEMBERS

Our organization is continuously expanding. Among our members are the cream of the crop of the local business and research community as well as academia and government.

369
member organizations

900+
experts

6
working groups

FULL LIST OF MEMBERS →

Hungary's Artificial Intelligence Strategy

2020-2030

May 2020

Transformative programmes

- Self-driving vehicles – autonomous systems
- Health consciousness in a digital world
- Climate-driven agriculture
- Data wallet and personalized services
- AI-supported development of personal competences
- Automated administrative procedures in Hungarian
- Energy networks focused on renewable sources of energy

Sector specific focus areas

Development of AI

- Machine detection, machine recognition
- Intelligent manufacturing, logistics
- Language technology
- Reliable AI
- Anonymization
- Mathematical foundations of AI

Manufacturing
Healthcare
Agriculture
Public Administration

Sectoral efficiency development

- Logistics
- Transport
- Energy

Foundation pillars

AI value

- Setting the data economy in motion
- Research, development and innovation
- Incentivising uptake

Rules

- Education, competence development and societal preparedness
- Infrastructure development
- Regulatory and Ethical Framework

AI artificial intelligence coalition

digital success programme

MINISTRY FOR INNOVATION AND TECHNOLOGY

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NJE

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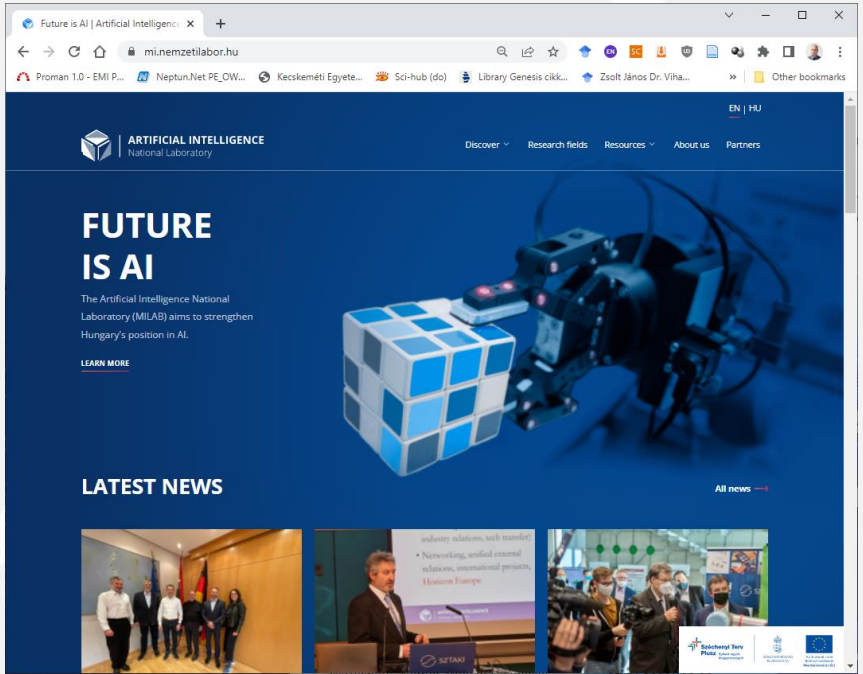
ARTIFICIAL INTELLIGENCE
National Laboratory

- **Foundations of AI and ML**
- **Machine vision, perception**
- **Sensors, IoT, telecommunications**
- **Healthcare, medical applications**
- **Natural language processing**
- **Privacy, Security**

https://mi.nemzetilabor.hu/



- Institute for Computer Science and Control (SZTAKI, leader)
- Rényi Institute of Mathematics
- Technical University Budapest
- Eötvös University Budapest
- Semmelweis University of Medicine
- University of Szeged
- University of Győr
- Institute of Experimental Medicine
- Centre for Social Sciences
- Special Service for National Security

SZTAKI

MŰEGYETEM 1782

INSTITUTE OF EXPERIMENTAL MEDICINE

SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

tk

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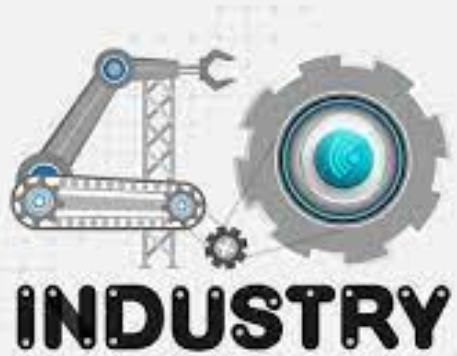
Hungary's Artificial Intelligence Strategy

2020-2030

May 2020



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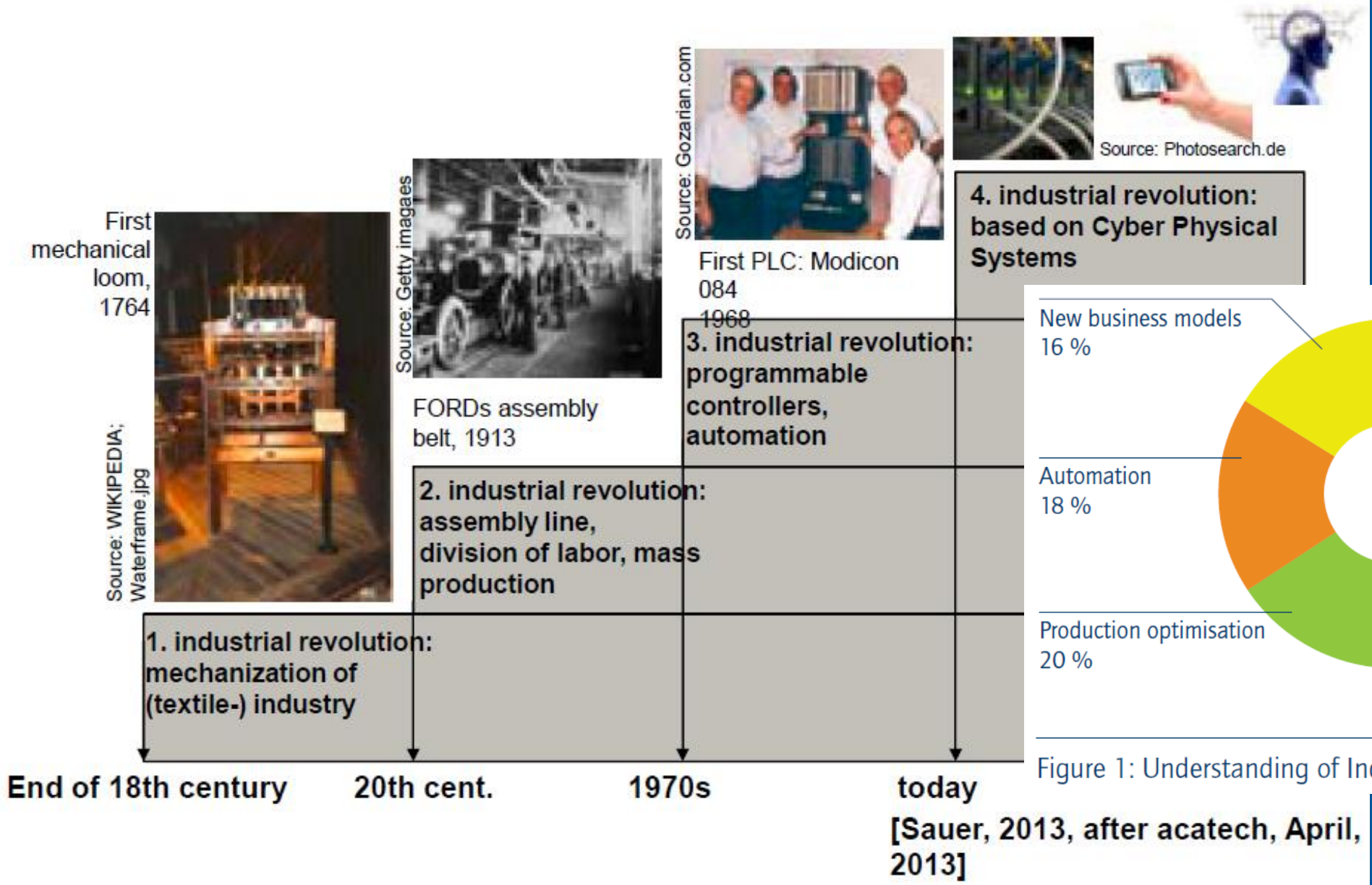


2016, Acatech Industrie 4.0 in a Global Context: Strategies for Cooperating with International Partners (acatech STUDY)

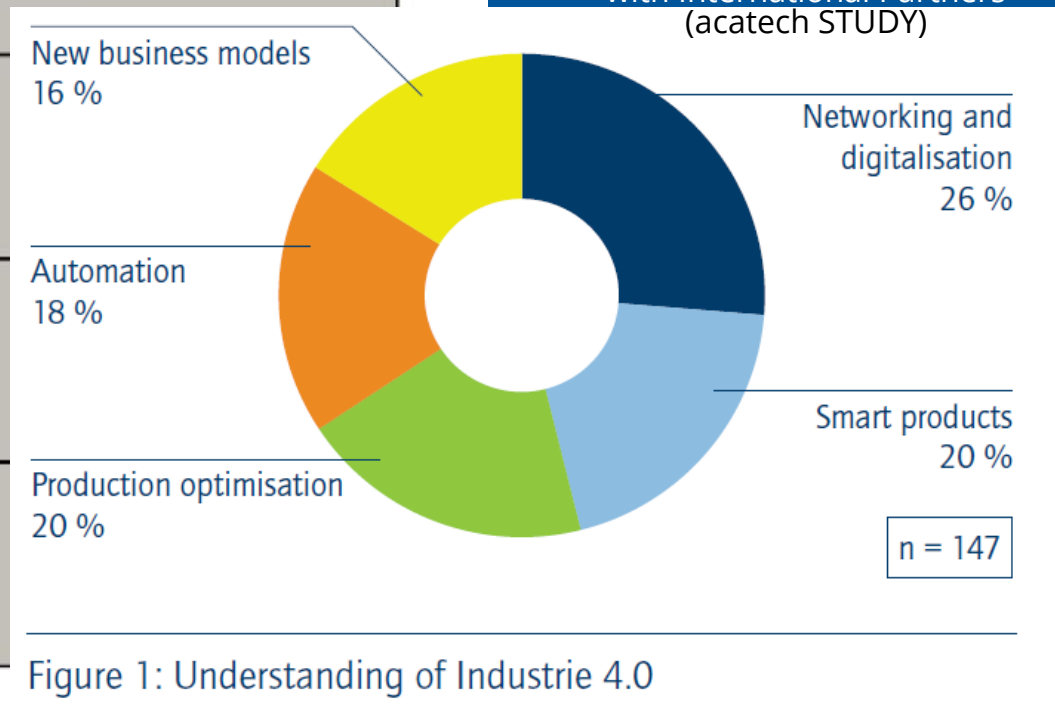
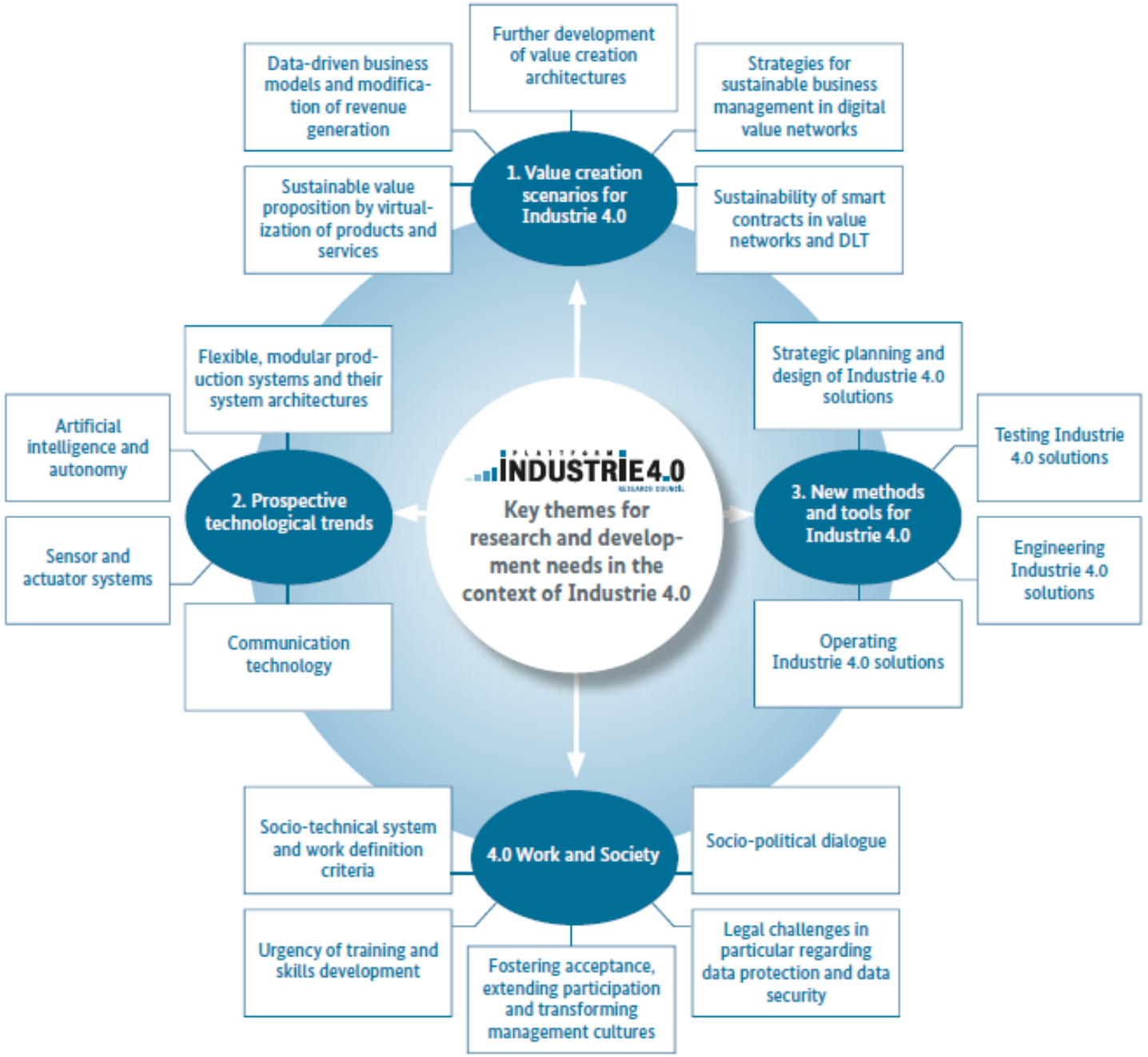


Figure 1: Understanding of Industrie 4.0

Key themes for research and development needs in the context of Industrie 4.0



PLATTFORM INDUSTRIE 4.0

RESEARCH COUNCIL

Key themes of Industrie 4.0

Research and development needs for successful implementation of Industrie 4.0

Design and production
PRpetuum GmbH, Munich

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4.2.1 Manufacturing and autonomous systems – "Smart, personalised, environmentally conscious manufacturing"

AI process-driven smart manufacturing by small, medium-sized and large enterprises, based on new business models, catering to individual requirements, with environmentally conscious manufacturing technologies.

Optimising existing processes

Processes need to be optimised and their operational efficiency needs to be improved with the help of AI; moreover, manufacturing model projects need to be implemented, with a focus on quality, inventory management, workforce, energy and resources used, as well as the availability of tools and equipment.

Prioritised functions in the short term: regulating the parameters of production processes, support for on-site decisions; quality control with AI tools, online product testing; layout and process simulation, factory optimisation; predictive maintenance; high-precision indoor and outdoor positioning systems using 5G and AI technology; robotic control support using AI solutions; different applications of artificial vision in manufacturing; creating an open IT architecture for production; manufacturing in the city.

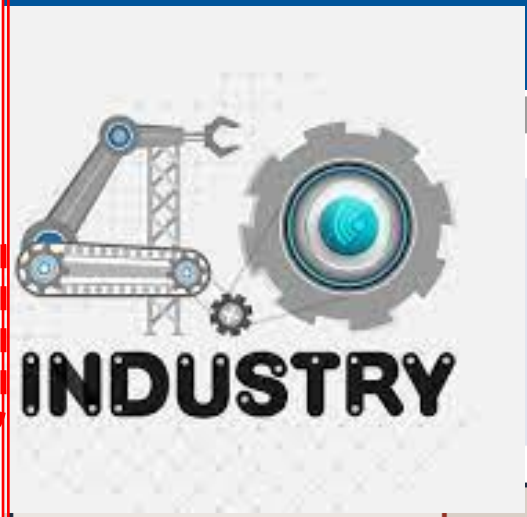
Prioritised functions in the medium term: Use of AI in 6G networks and in manufacturing; after-sales product tracking, AI-based data processing, estimating and indication of servicing requirements; drone management in industrial applications (model factory, model area); critical machine to machine (M2M) communication, automated management of the operation of multiple IoT devices and private communication devices in industry (model area); supplier chains, product tracking; optimisation of manufacturing logistics; optimisation of energy management; cybersecurity in manufacturing.

Organizing an innovation ecosystem; introducing new business models

Basic and applied research projects need to be organised and aligned to industry requirements centrally, and an innovation ecosystem also needs to be organised (by the National AI Laboratory, currently being established) in order to improve efficiencies and launch new processes in manufacturing. Introduction of an AI maturity model and its measurement across the entire range of production. Growth exceeding that enabled by the organic development of operational efficiency can only be achieved by comprehensively redesigning manufacturing or by constructing a new business model at the manufacturing company concerned.

SME transformation projects

Projects facilitating transition in parallel with earlier goals need to be implemented for the SME sector – a key component of the Hungarian economy – if manufacturing SMEs are also to remain competitive.



Automated administrative procedures in Hungarian

Energy networks focused on renewable sources of energy

Manufacturing
Healthcare
Agriculture
Public Administration

Sectoral efficiency development
- Logistics
- Transport
- Energy

ncentivising uptake

Rules

Education, competence development and societal preparedness

Infrastructure development

Regulatory and Ethical Framework

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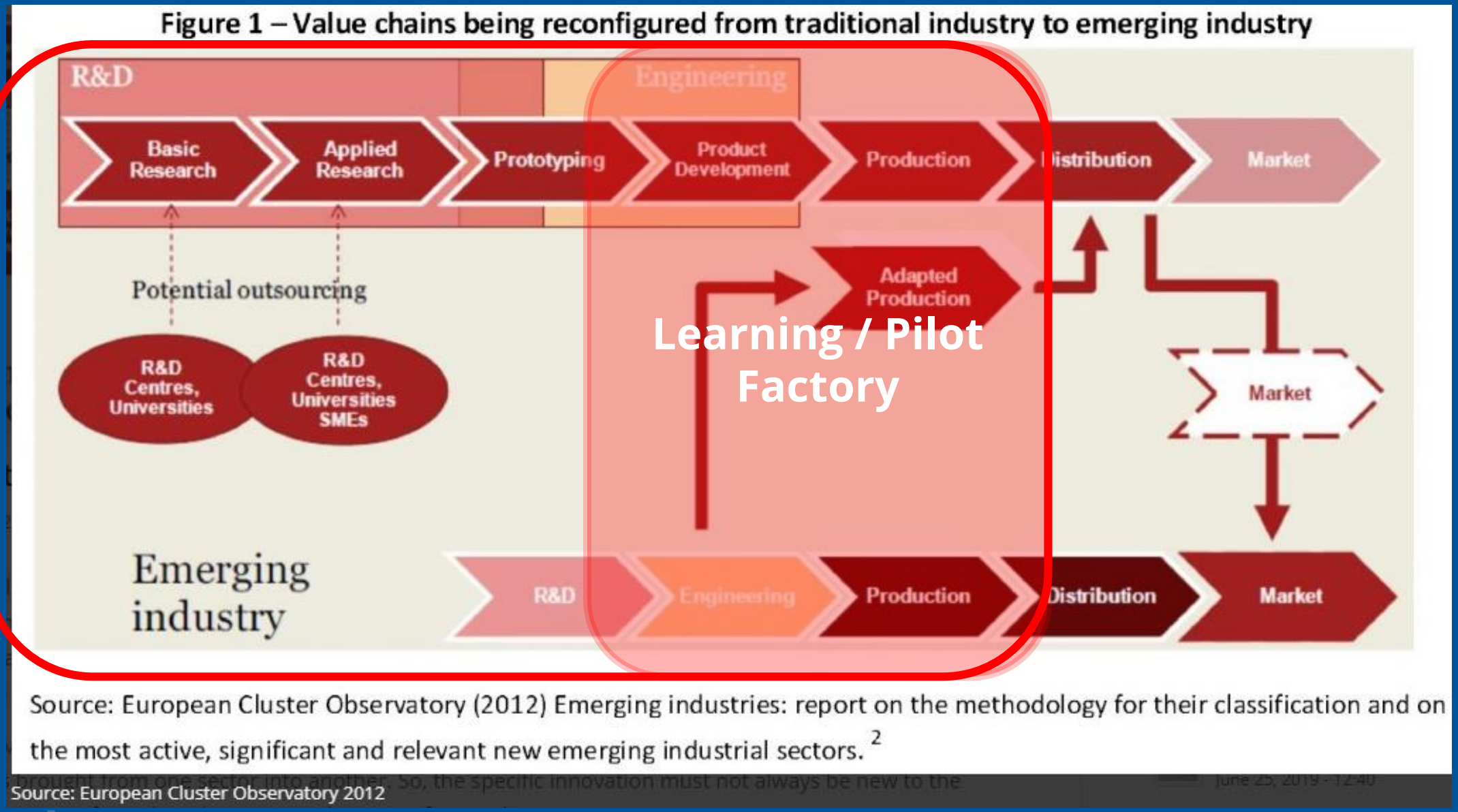


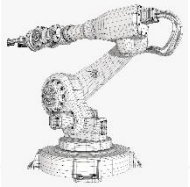
Source: European Cluster Observatory 2012

Mission

DRIVERS

Strong **need for production developments** in Hungary

National **know-how is given and available**

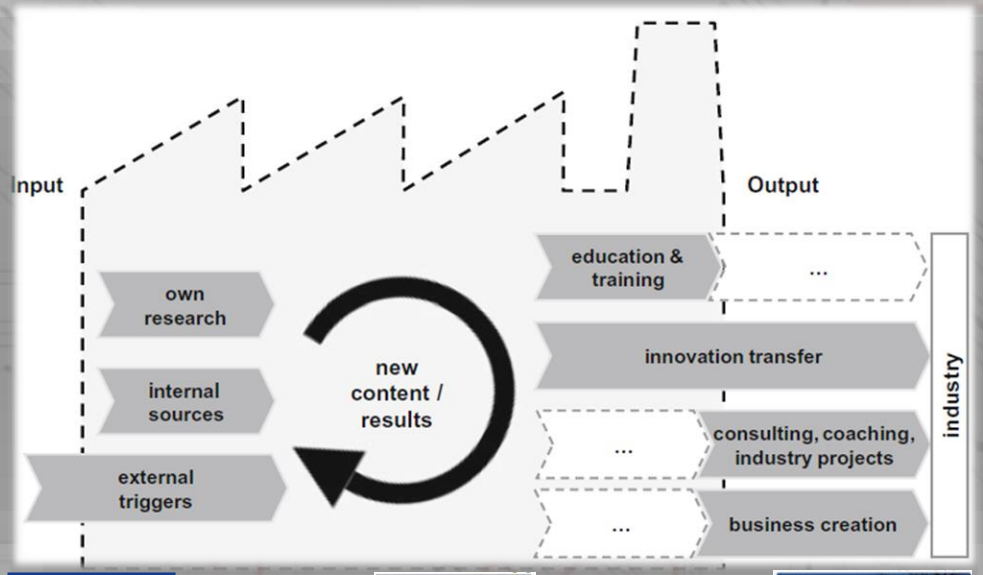


Industry 4.0 ecosystem is evolving

The **Learning Factory is** an **actual, global trend**

Strong **support for manufacturing initiatives in EU**

Learning/Pilot Factory



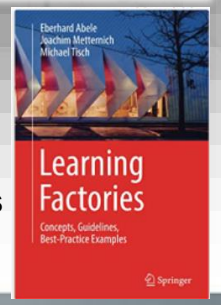
IALF

CLF2022

International Association of Learning Factories

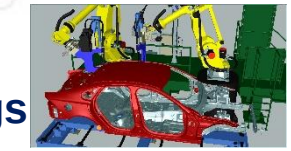
12th Conference on Learning Factories 2022 (CLF)

Abele, E.; Metternich, J.; Tisch, M.: **Learning Factories - Concepts, Guidelines, Best-Practice Examples,** ***Book, Springer Nature*****, 2019**, 474 p.



RESULTS

Generating **novel developments/fundings**



Advanced manufacturing and development can be **speeded up**

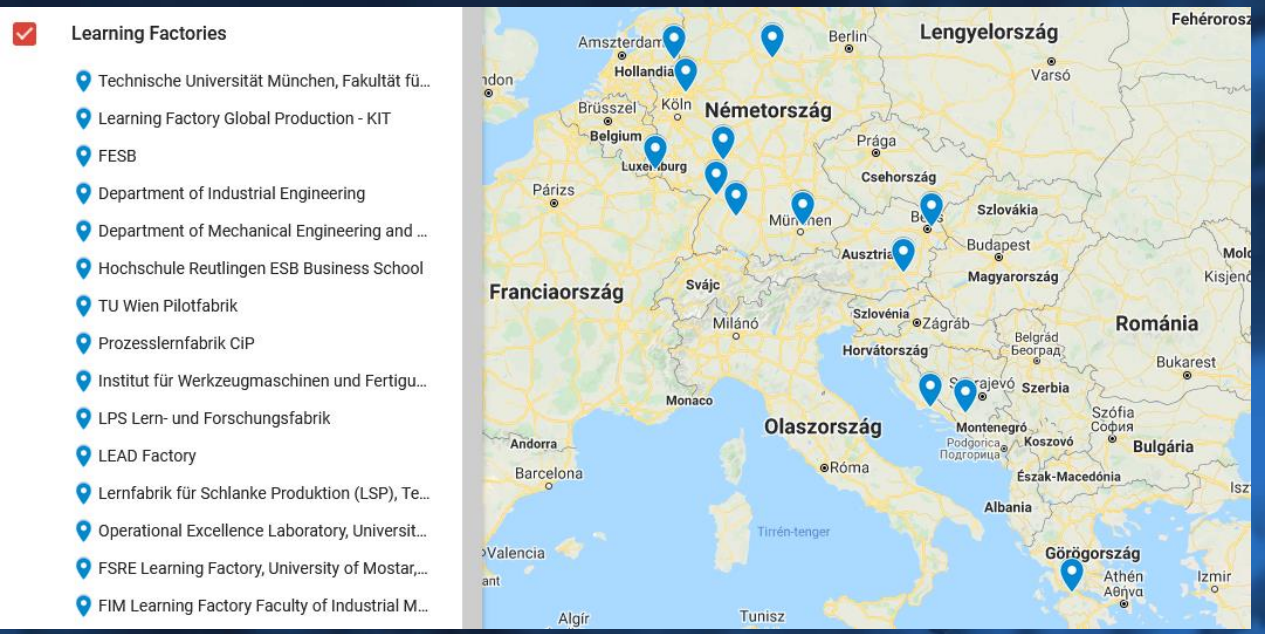
Collaborations with **EU level strategies, projects, markets**

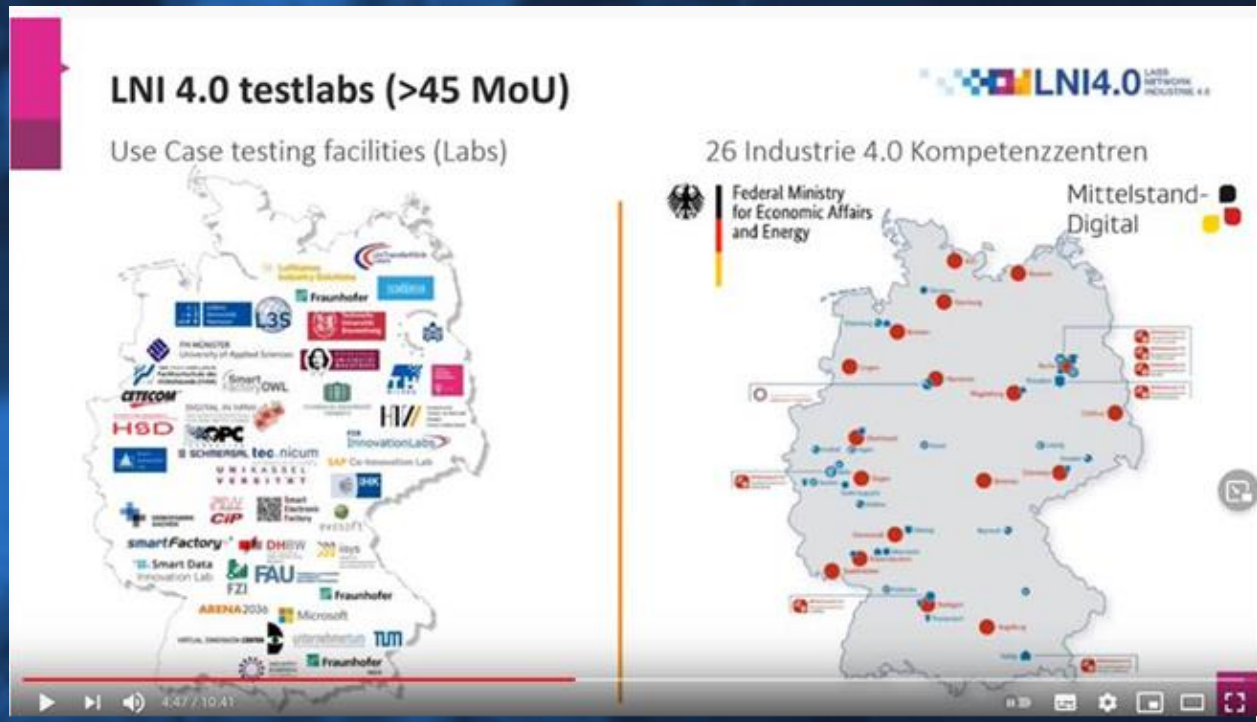
Connections to **national** and **globaly preferred sectors and networks**

Circular economy and production **investments generation**

Benchmark Learning / Pilot Factories

Test Labs / Competence Centers





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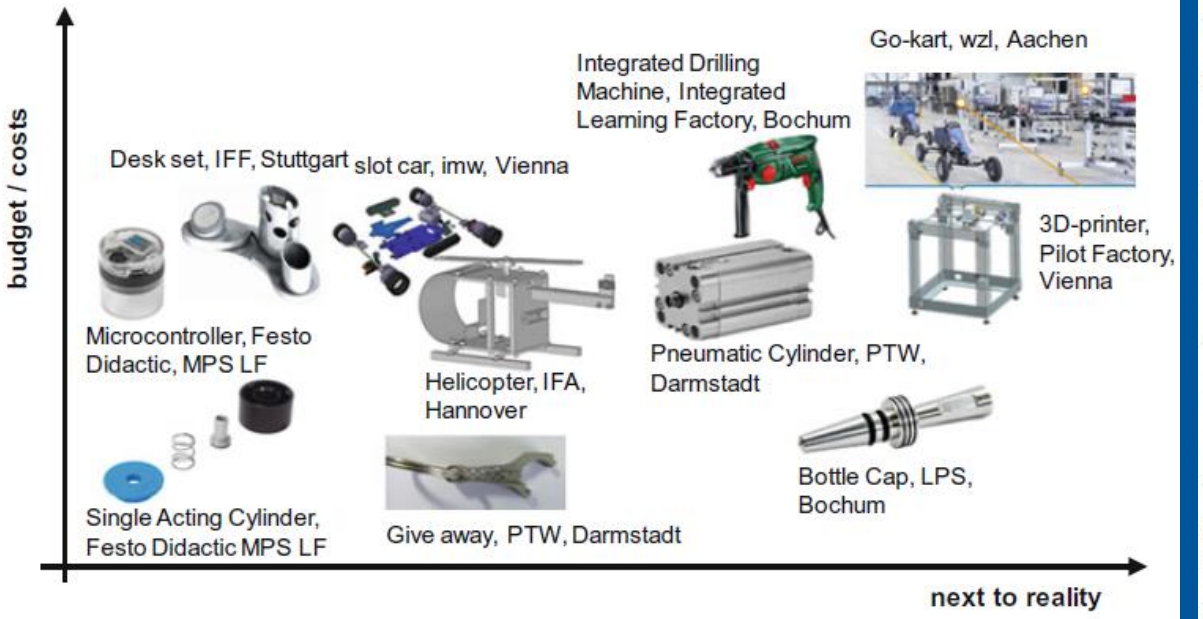
Physical & virtual benchmarks are available



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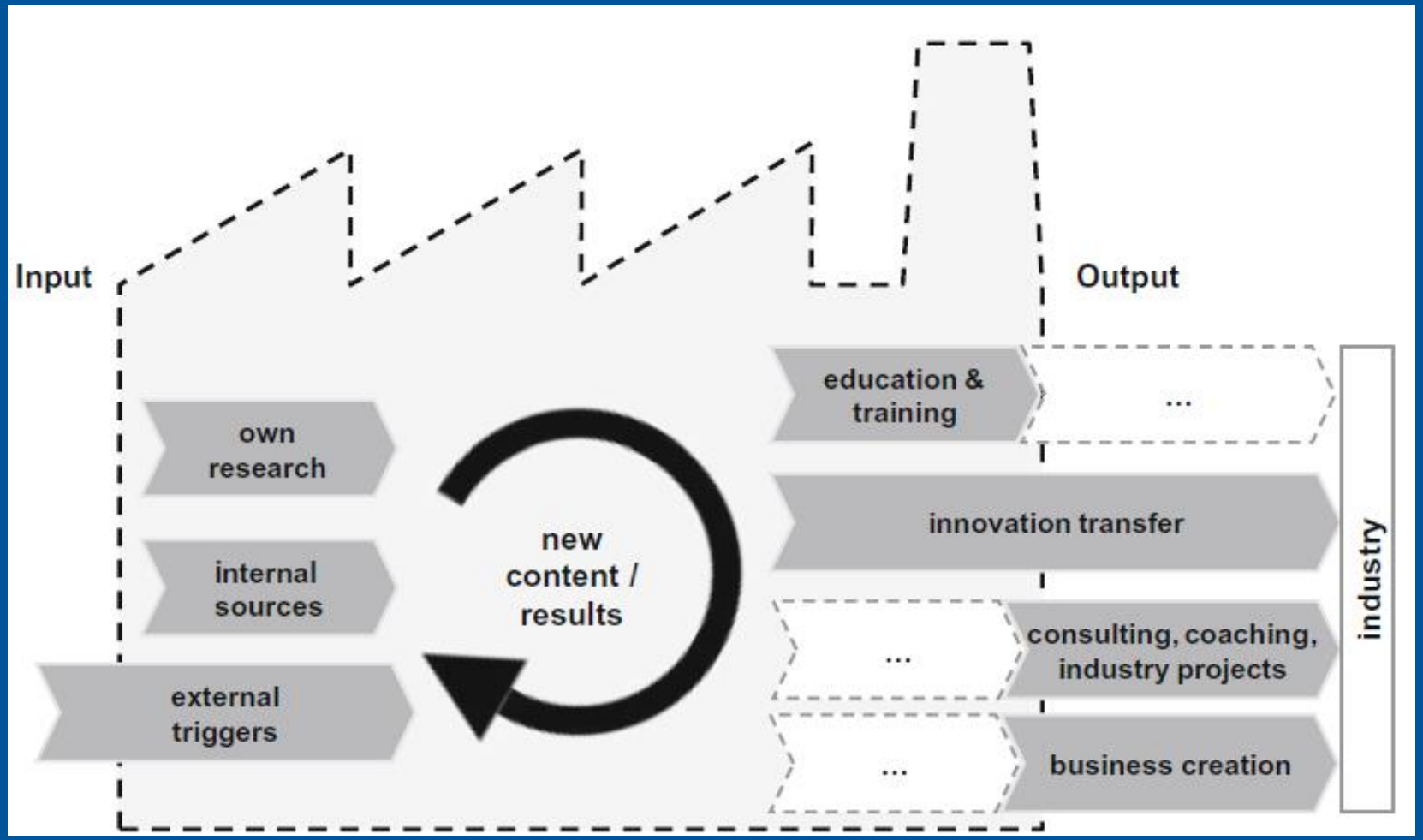
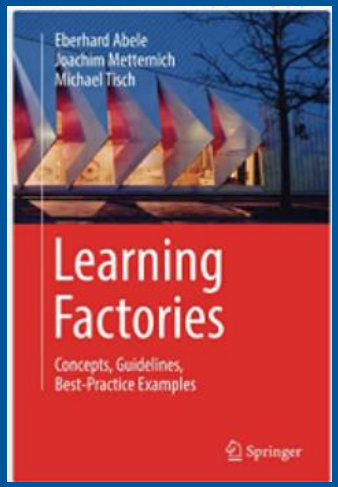
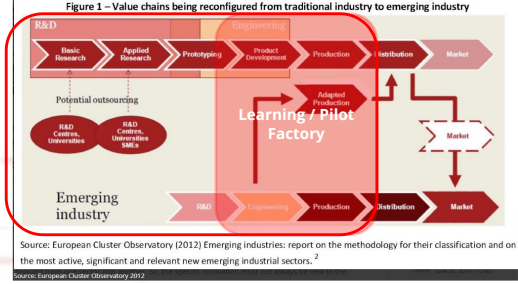
Learning / Pilot Factory general model





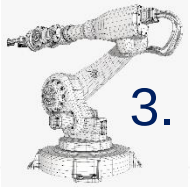
Abele, E.; Metternich, J.; Tisch, M.: **Learning Factories - Concepts, Guidelines, Best-Practice Examples, *Book, Springer Nature*, 2019**, 474 p.

Services

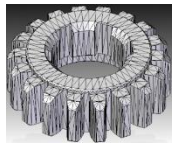


1. **Physical factory**

2. Regional **use-cases, Labs**, **trainings**



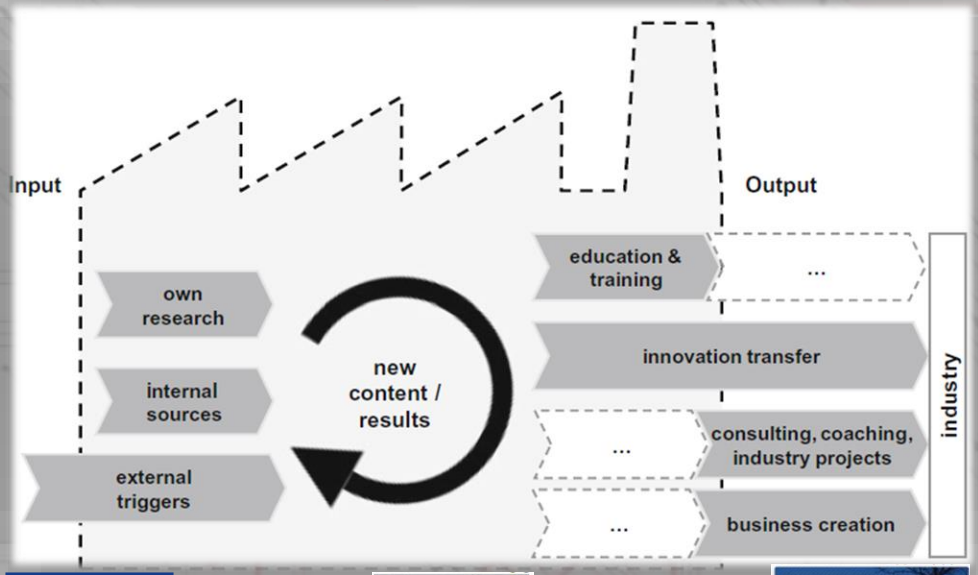
3. **Pilot/test** production



4. Production **demonstrations**

5. Production, as **service**

Learning/Pilot Factory



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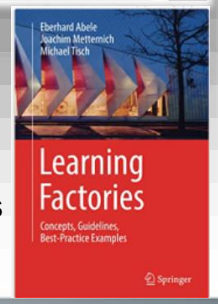
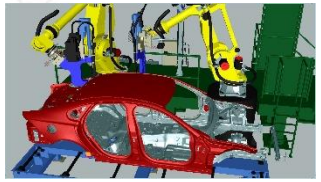


6. **Virtual manufacturing** services



7. Production **consulting**, **Industry 4.0 maturity**

8. **Collaborations**, R&D&I, start-up support

9. **Learning Factory** regional & EU **network**

10. Novel **Business Models**

Q&A

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Dr. Zsolt János Viharos, contact: viharos.zsolt@sztaki.hu
Institute for Computer Science and Control (SZTAKI), senior research fellow
John von Neumann University, deputy dean of science, lecturer
Hungarian Artificial Intelligence Coalition, MI²4.0 project team