EU Danube Region Strategy
PA 8 LIGHTHOUSE

DIGITALIZATION, ARTIFICIAL INTELLIGENCE, METAVERSE & VIRTUAL WORLDS

Industry 5.0: Operator 4.0

Scientific Association for Mechanical Engineering (GTE), Hungary

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Basics

Name: Industry 5.0: Operator 4.0

Country: Hungary

Scoring: 46/50

Project Coordinator:

Scientific Association for Mechanical Engineering (GTE)

https://www.operator4.com/industry-5-0-laboratory/

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Key Project Data:

2024 – 2026

20.000 €

Own funding of Scientific Association for Mechanical Engineering and Operator Department itself

Partners in the project:

University of Pannon - Veszprém, Technical University of Budapest

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About the project

The **Industry 5.0 laboratory** at the University of Pannonia in Hungary demonstrates how a company can develop and apply the enabling technologies of Industry 4.0 to make a human-centered working space.

The **Operator Department** of the laboratory focuses on the **development of smart, resilient, socially sustainable and competitive factories of the future**, where people work with the help of **advanced technological solutions**. The Department examines people as smart and skilled workers (operators, technicians, supervisors and managers) who cooperate in **human-centered cyber-physical production systems** with the **help of automation, robotics and artificial intelligence-based technologies.**

The Division aims to understand the full spectrum of industrial activities involving people in order to effectively **leverage the best approaches in terms of both human and technological capabilities** for superior operational performance. Furthermore, they analyze the evaluation of these systems from the point of view of safety and ergonomics in order to reduce physical and cognitive efforts of workers and to help in terms of occupational health and safety regulations.

INNOVATION

SUSTAINABILITY

SCALABILITY

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Key activities and objectives, methodology

Enabling Resilient Operator 5.0 and human-driven intelligent systems, human-machine collaboration in manufacturing

- Designing adaptive work environments
- Deploying exoskeletons
- AR/VR tools
- Smart wearables to enhance physical and cognitive resilience of operators

Resulting Objectives

- Strengthening preexisting systems and self-resilience
- Ensuring workforce well-being
- Fostering human-automation symbiosis

Methodological foundation

The approach followed a layered exploration of human-centric transformation, merging empirical observation with conceptual framing.

- Combination of structured inquiry and contextual interpretation
- Focus on intersection of digital and organisational maturity with the evolving role of the human operator
- Quantitative and qualitative insights in combination to uncover patterns in operator involvement and more
- Aligns with the ethos of Industry 5.0, embracing complexity and focusing on the dynamic interplay between people, systems, and technology
- No isolation of technical progress from human experience

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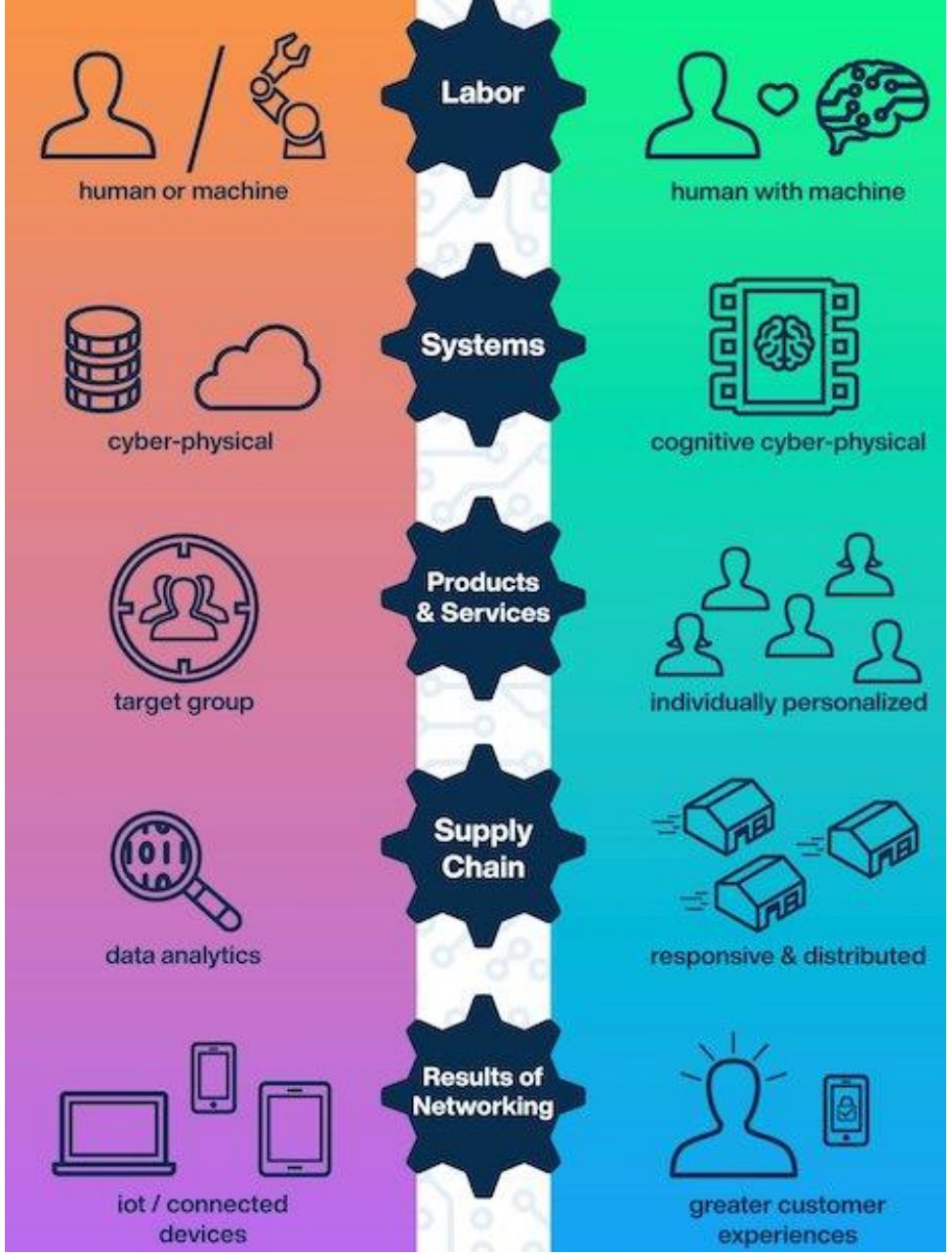

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Competitiveness

Industry 4.0

Industry 5.0

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Impact

Impact of human-centric Industry 5.0 research:

- Increased productivity through optimised task distribution between humans and machines
- Greater innovation from operators empowered in design and feedback loops
- Skill transformation, leading to higher-value jobs and reduced job displacement fears
- Resilience and well-being contribute to workforce sustainability and retention
- Human-machine symbiosis ensures that digital transformation remains inclusive, ethical, and sustainable
- Growing recognition of the value of human-machine symbiosis

→But: Cultural shift, trust and redefinition of roles necessary
→Therefore: Importance of tangible benefit definition

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Replication Learnings and further steps

Important to not start with the technology, but with trust-building and co-creation. Transformation succeeds where people are not only consulted but actively empowered as co-designers of the future workplace

Tip: Need for dialogue-driven engagement strategies, fostering cross-sectoral learning environments, and co-developing solutions with the workforce from the outset

Next steps: Extended cooperation and comparative survey in several parts of Germany for Operator 5.0, furthermore: Comparison on the European level

→ **Across Europe, it is key to Industry 5.0 leadership, ensuring that digital transformation remains inclusive, ethical, and sustainable with human-centric approach**

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