

EFFRA
perspectives

VTT examples

AI in Agile and Cognitive Manufacturing Industry

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Artificial Intelligence for Manufacturing



EFFRA

EUROPEAN FACTORIES OF THE FUTURE
RESEARCH ASSOCIATION

Framework for the future Manufacturing Partnership (2021 – 2027)



IMPACT

- People
- Planet
- Competitiveness
- Products of the Future



CO-CREATION THROUGH MANUFACTURING ECO-SYSTEMS

- **Excellent, responsive and smart factories**
Scalable first-time-right manufacturing
Agile and robust manufacturing
- **Zero-environmental impact, customer-driven value networks**
Demand and customer-driven manufacturing networks
Circular economy (symbiotic manufacturing networks)
- **Parallel product and manufacturing engineering**
Concurrent, holistic and collaborative product-service engineering
Virtual end-to-end life-cycle engineering from product to production lines, factories and networks
Manufacturing smart and complex products
- **Human-driven Innovation**
Co-creation in European knowledge networks
Human & technology complementarity



ENABLING TECHNOLOGIES & APPROACHES

- Advanced and smart material processing technologies and process chains
- Smart mechatronic systems, devices and components
- Intelligent and autonomous handling and robotics, assembly and logistic technologies
- De-manufacturing and recycling technologies
- Simulation and modelling (digital twins)
- Robust and secure industrial communication technologies, distributed control architectures
- Data analytics, artificial intelligence and deployment of digital platforms
- New business and new organisational approaches

Requirements

There is a need for

- **incorporation of domain knowledge into the AI approaches;**
- **the organisation to transform towards digital manufacturing in general;**
- explanation and traceability of the methods used
- handling of missing data or too small amounts of data;
- development of methods with a very low error rate;
- methods with low configuration and engineering effort.

Research must demystify the topic of AI for manufacturing

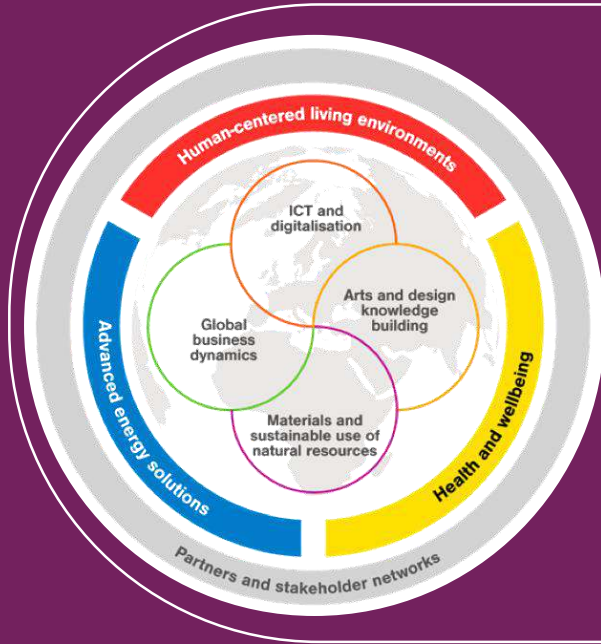


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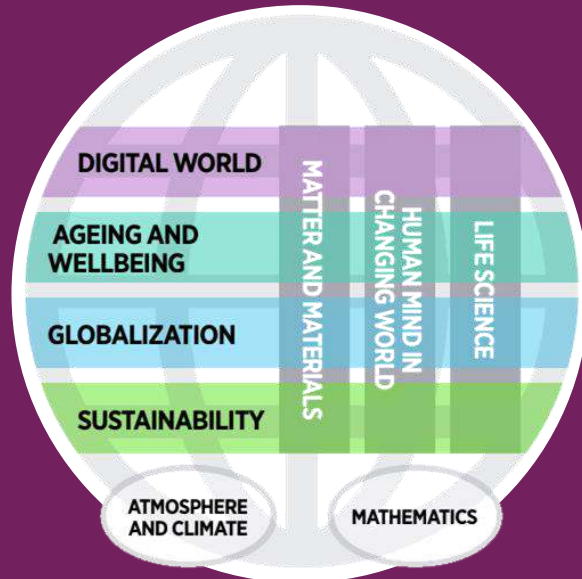
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FCAI: Strategic commitment

AI Impact



Strategic focus: Aalto University

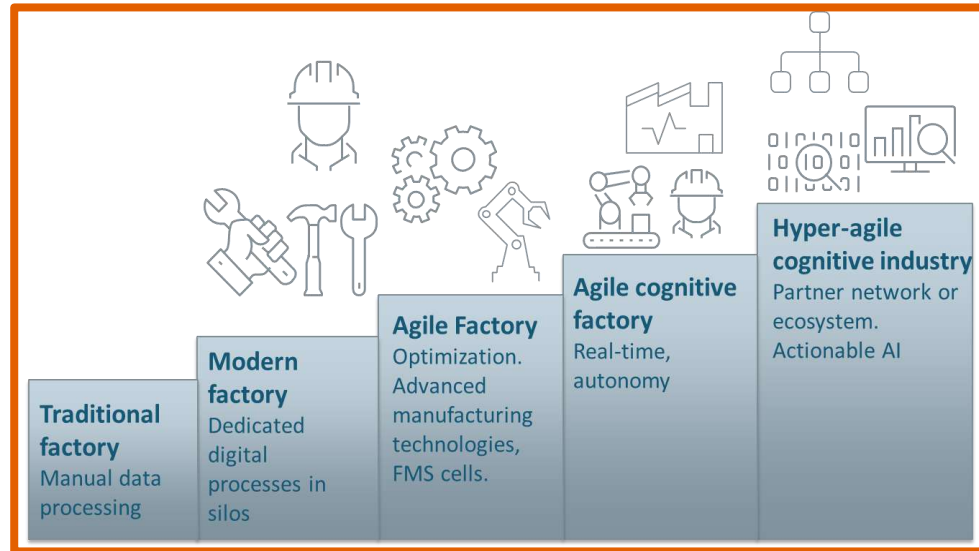


Strategic focus: University of Helsinki

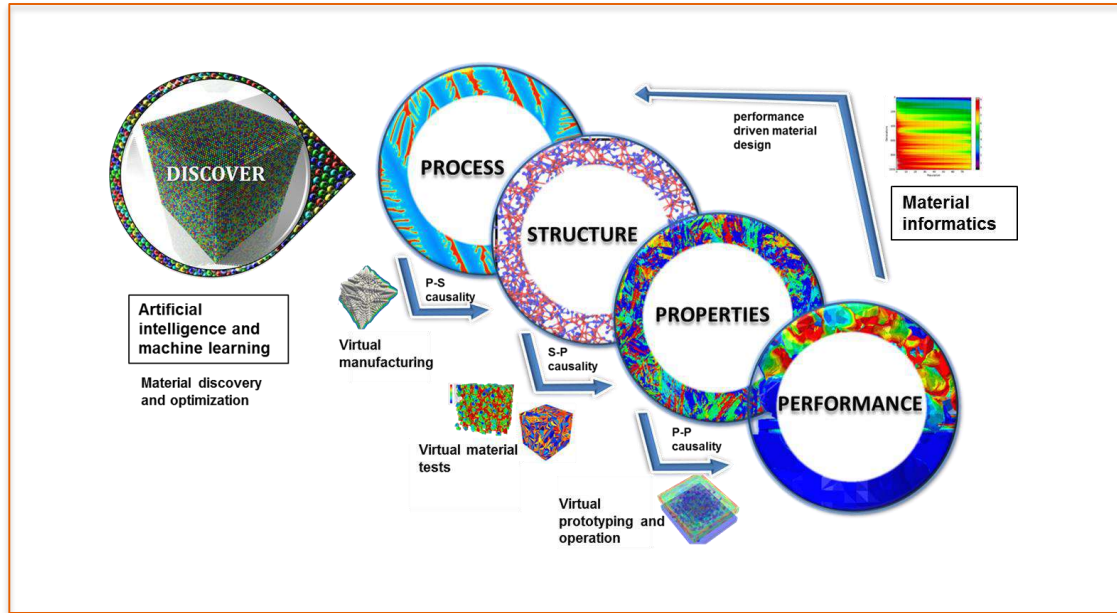


Strategic focus: VTT

Artificial Intelligence in Agile and Cognitive Manufacturing Industry



Example 1: VTT ProperTune™



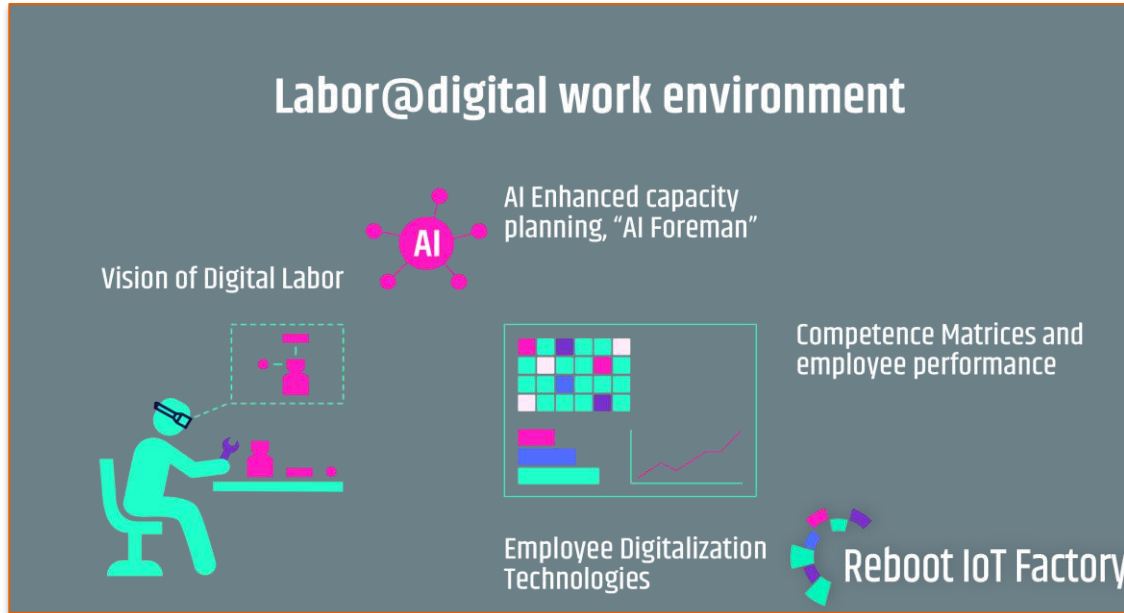
Optimised
materials solutions

Service life
increase by 1.5 – 4

Solution
performance
increase by 3-7

Time savings

Example 2: Reboot IoT Factory – AI Foreman



Ethics, user acceptance and legislation

Enhanced capacity planning

Preferable work practices

Increased work satisfaction

Productivity

Example 3: PULP MILL optimisation

Savings of 700 truck loads

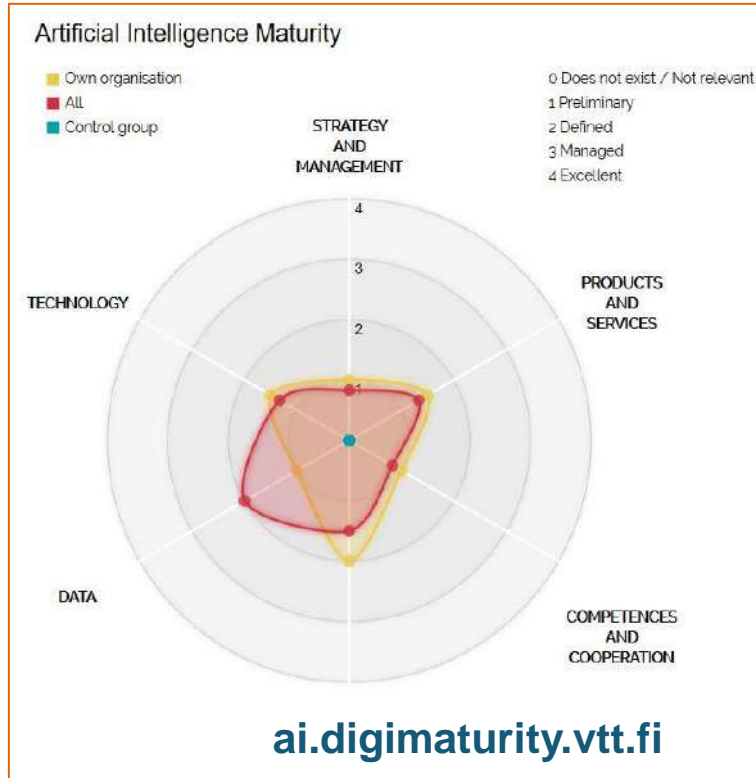


A real time pulp
quality control

Yearly saving of
~ 700 truck load

Competitiveness
& sustainability

Example 4: AI Maturity analysis



Where do you stand in AI

Understand elements of AI

Prioritise development steps

Artificial Intelligence in Agile and Cognitive Manufacturing Industry

- Applying AI needs a transition to digital manufacturing
- All levels are affected
- Huge potential
- Manufacturing understanding is necessity
- Strategic commitment - FCAI

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