

Background: The manufacturing industry is pressured to transform production systems and competencies to reap the benefits of Industry 4.0 technologies. Disruptive technologies such as artificial intelligence, machine learning, internet of things, digital platforms, etc. are promised to perform a more effective production but often lack human-centric perspectives on decision-making and learning. **The aim** is to understand how industrial digitalization can approach human and artificial intelligence through learning for a future digitalized manufacturing.

Intelligent applications and instances of Industry 4.0

Machine learning applications

By utilizing IoT, big-data and machine learning it is possible to continuously monitor and analyze thousands of various machine parameters. A data-driven analysis gives useful insights into machine behavior which can be used to predict when a machine part should be replaced or if the produced product will have quality defects, built on intelligent algorithms.

Production flow simulations

Discrete event simulation gives a potential extension towards digital twins for analysis of production systems and logistic flows. Simulation models support the understanding of consequences of production changes and variations, thus facilitating decision making for an adaptable and resilient industry.

Interactive user-driven apps

User-studies on visualization of IoT-sensor based applications will enhance:

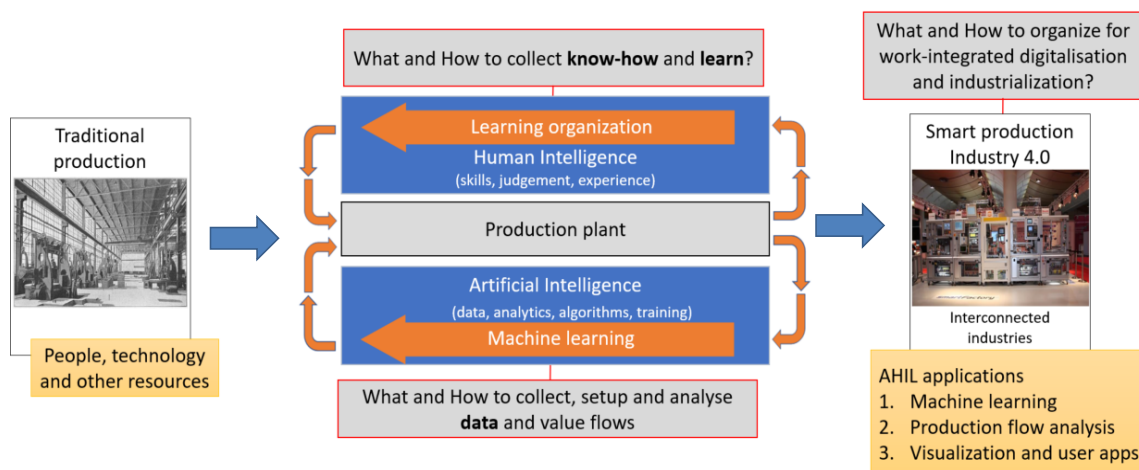
- Alignment of Industrial IoT and Real-time analytics systems to make human sense of data and derive knowledge for effective work routines
- Decision support for operators, technicians and managers

Best practice for industrial digitalization

Qualitative research studies on how machine and human intelligence are interlinked related to industry capabilities, digital strategies and human-centric experiences. Inter-disciplinary and cross-functional lessons learned are contributing to general knowledge and best practice of industrial digitalization and learning.

A general model for learning and organizing of Industry 4.0 initiatives

The model unpack AI and focus “Human in the loop” to bridge AI and Human interaction through an integrated learning loop across boundaries of silos, systems and organizational structures.



Co-production with industrial partners

Siemens Energy (Trollhättan and Finspång) and GKN Aerospace (Trollhättan) are collaborating partners and provide real digitalization cases for realizing I4.0 applications.

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