

The Future of Intelligent Industrial Manufacturing

Autonomy - Interoperability - Sustainability



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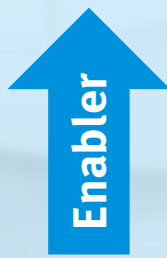
Technology Development



Customer specific production
Individualised products
Mass production, but individual design
Small lot sizes, one piece flow

Sustainability
High efficiency
Reusability of equipment
Avoid waste and emission

Digitization and networking
Digital & virtual factory
Business models in value chains
Connectivity and data analytics



Integrated components
Intelligent systems
Services

Holistic mechatronic design
Integrated functions
Miniaturisation (MEMS)

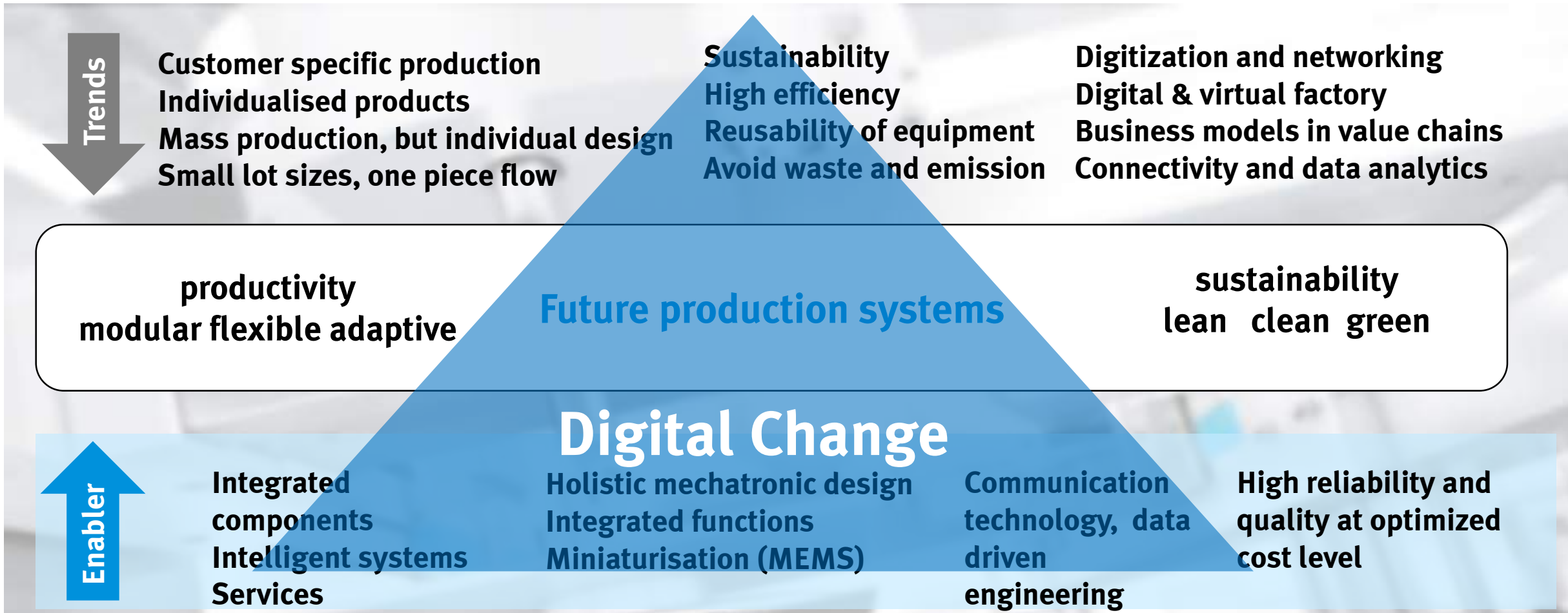
Communication technology, data driven engineering

High reliability and quality at optimized cost level

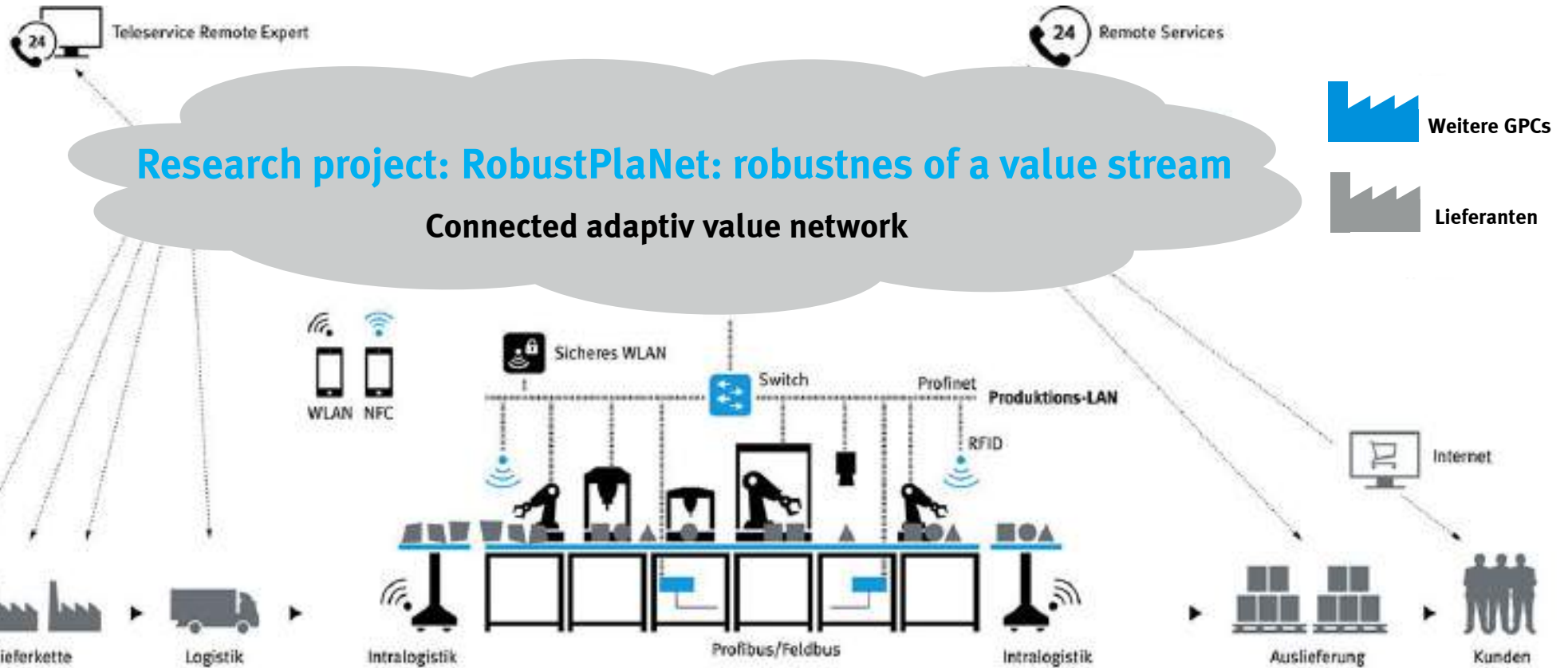
Autonomy



Autonomy through Technology Development



Autonomy: digital trust needs save data infrastructure



Example: Digital customer journey – Intuitive digital support for customers



Interoperability



Cooperation and open ecosystems permit plurality and flexibility.

- **Regulatory framework**
- **Standards and integration**
- **Decentralised systems and artificial intelligence**

Interoperability: Regional, National and International Networks (Examples)



Regional

- close cooperation partners with long-term relationships
- promoting skills of young people, researching future technologies, ...



National

- thinking, developing & testing I 4.0 concepts in networks
- I 4.0 research projects
- ManuFuture 2030 DE Strategy

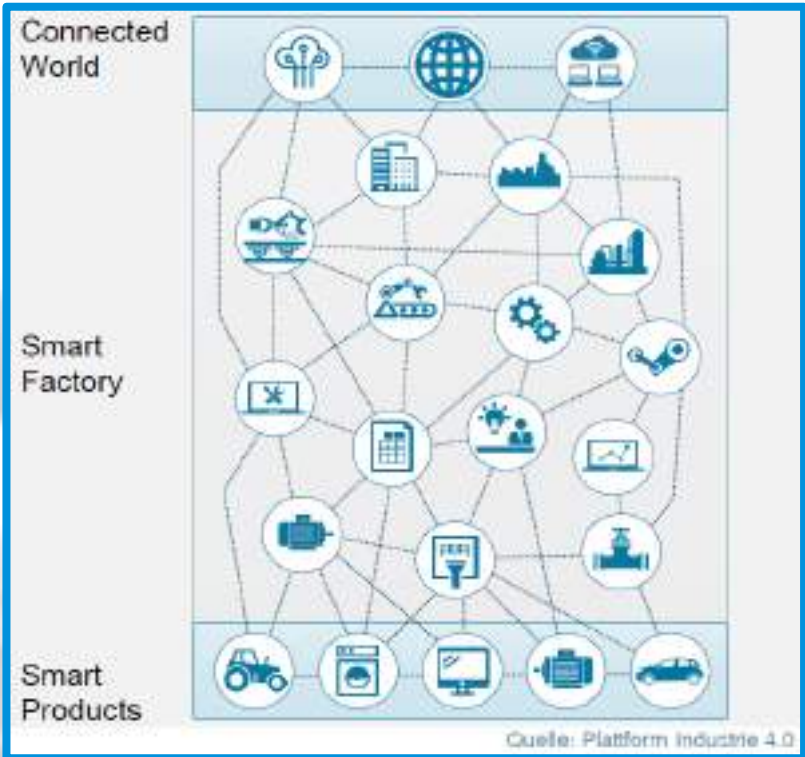
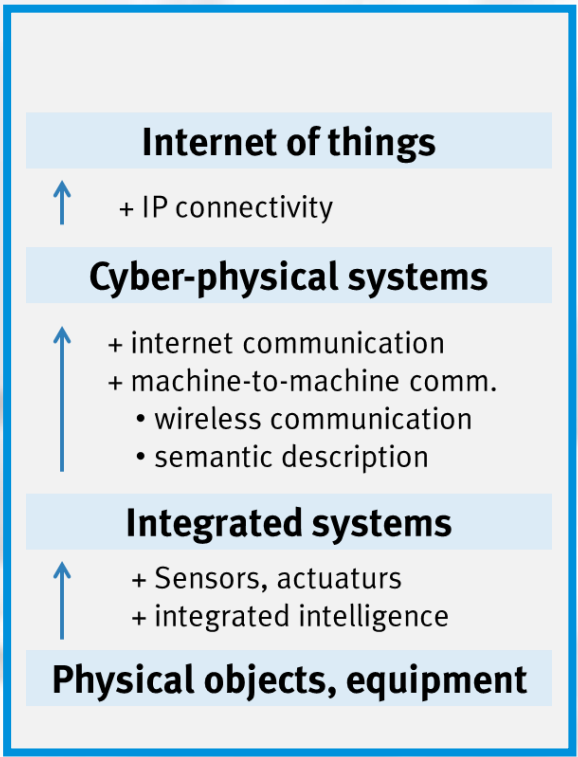


International

- Cooperation with excellent partners in networks and projects
- H2020 and EUREKA/ITEA-projects
- ManuFuture 2030 EU Vision



Interoperability: Decentralized systems and artificial intelligence



Three examples of AI application in manufacturing

AI for **collaborative robots**



AI for **production process control**



AI for **supply chain networks**

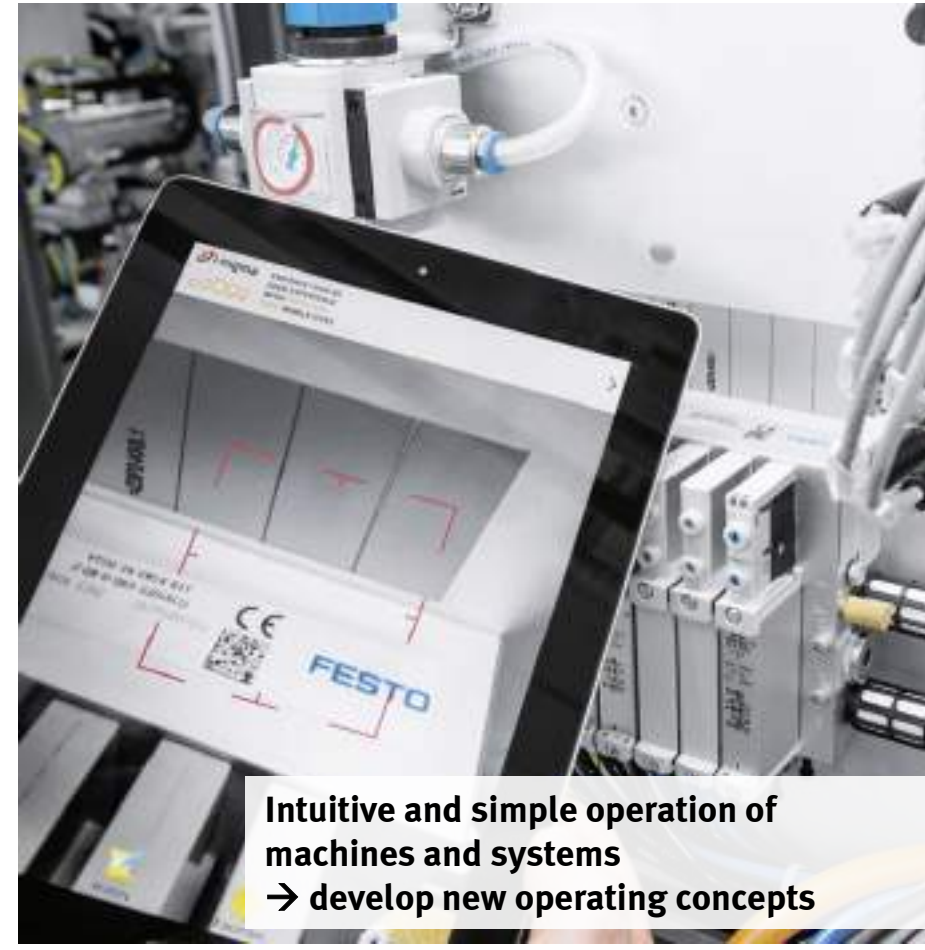


Sustainability



- Modern industrial value creation ensures high standard of living**
- **decent work and education**
 - **climate change mitigation and circular economy**
 - **social participation**

Work organisation in the digital industrial era: **new level of human-machine interaction**



Sustainability: decent work and education

- continuous development of competence- qualification is an integrated part of our life
- „How can I continuously extend my knowledge“ and „Where do I find appropriate material/know how“
- interdisciplinary knowledge – overcoming barriers of misunderstanding
- Implementing leadership and agility culture



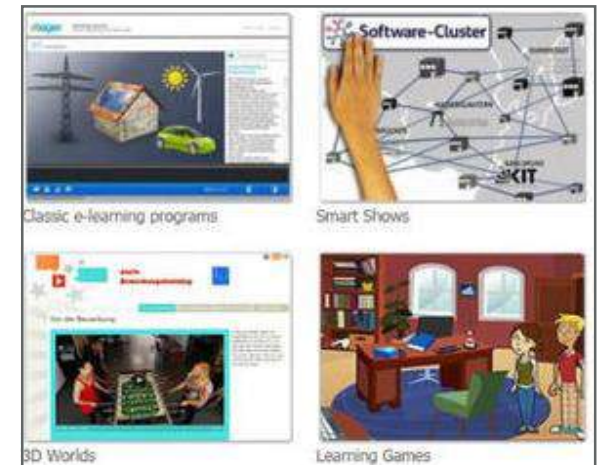
Technical education at general schools



Communities of Practice and knowledge networks



Tablet supported learning with Tec2Screen®



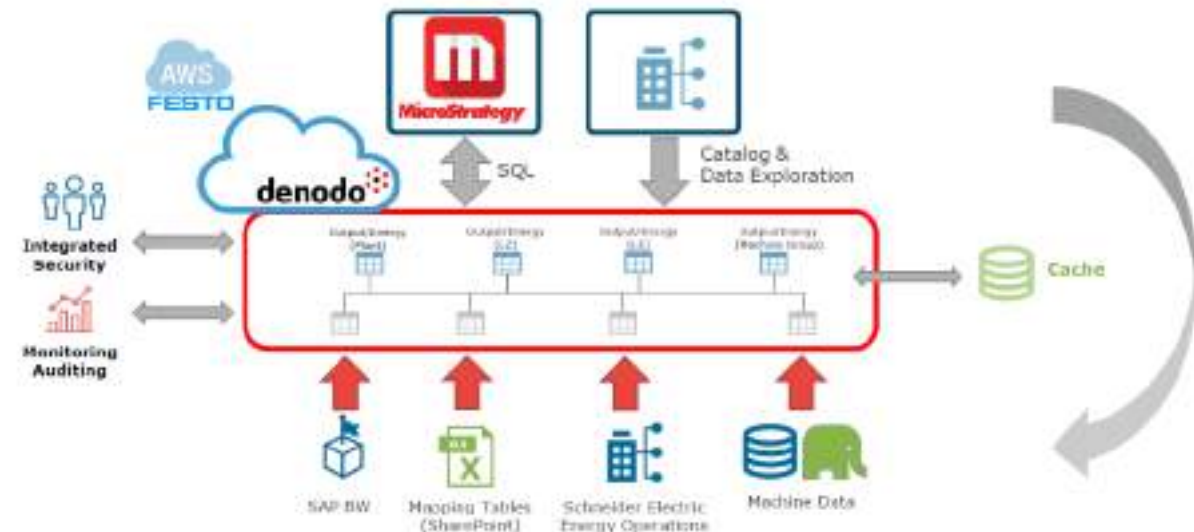
Blended learning
Mobile learning
Learning on demand

Sustainability: holistic energy management

Vertical system integration

- Holistic Integration of energy and production data in the ERP system
- E²M Unit: Measurement of air consumption, local evaluation and pre-processing, communication to upper control level
- Access to control data from all standard OPC UA clients of
- Continuous monitoring of machine data shows optimization potentials during operation
- Adaptable green cockpit for visualization of energy KPI on several management levels

Implementation of the Festo energy transparency system is demonstrated in the own factory



2030 VISION FOR INDUSTRIE 4.0

Shaping Digital Ecosystems Globally

Autonomy

Self-determination and free scope for action guarantee competitiveness in digital business models.

- Technology development
- Security
- Digital infrastructure

Interoperability

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2030 VISION FOR INDUSTRIE 4.0

Shaping Digital Ecosystems Globally

thank
you

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