ICAMP

CONFERENCE 2024

LEARNING FACTORIES FOR ADVANCED MANUFACTURING IN EDUCATION

14-15 MAY

OSTERTAG event Centre
Aalen, Germany

Co-funded by the European Union

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Festo SE & Festo Didactic SE – The Company

LCAMP
Learner Centric Advanced Manufacturing Platform

Festo is a global player and an independent, family-owned company with companies in about 61 countries. We supply automation technology and technical education solutions for over 35 industries.

[Festo - Automation & technical education]

Festo SE Technology Center – Berkheim

Festo SE Technologiefabrik - Ostildern

Festo Didactich SE - Denkendorf

Megatrend Digitalization: Economic, Social & Technical Aspects

Social Transformation

- Aging Society & Migration
- **Critical Supply Chains**
- Instant demand and delivery
- **Sustainability**
- Generation Z
- **Near-Shoring vs. Off-Shoring**
- **Critical Manufacturing**
- Uncertainty as New Normal
- **Lifelong Learning**

Technological Transformation

- **Data Analytics**
- **Machine Learning / AI**
- Real-time connectivity
- IT/OT Conversion, IoT
- Digital twin, AR, VR
- Robots, AI & Quantum, autonomous systems
- **Re-Industrialization**

Business Transformation

- New ways of working
- Full automation and lot size 1
- Data driven Business models
- **Non-linear careers**

Learning Factories for Industry 4.0 – How to train „SME's workforce in Remote Areas in BW?

Industry 4.0 Project – Baden-Württemberg (Jan 2016 – 2019)

- **2016:** 16 Learning Factories for I4.0 were financed with 6,8 Mio €
- **2018:** 21 Learning Factories for I4.0 were financed with 4,8 Mio €


Ministerium für Wirtschaft, Arbeit und Wohnungsbau Baden-Württemberg

Suchbegriff eingeben

Ministerium Wirtschaft Innovation Arbeit Bauen Service

Sie sind hier: Startseite > Innovation > Schlüsseltechnologien > Lernfabrik 4.0

Teilen
Drucken
Als PDF speichern

DIGITALISIERUNG BW

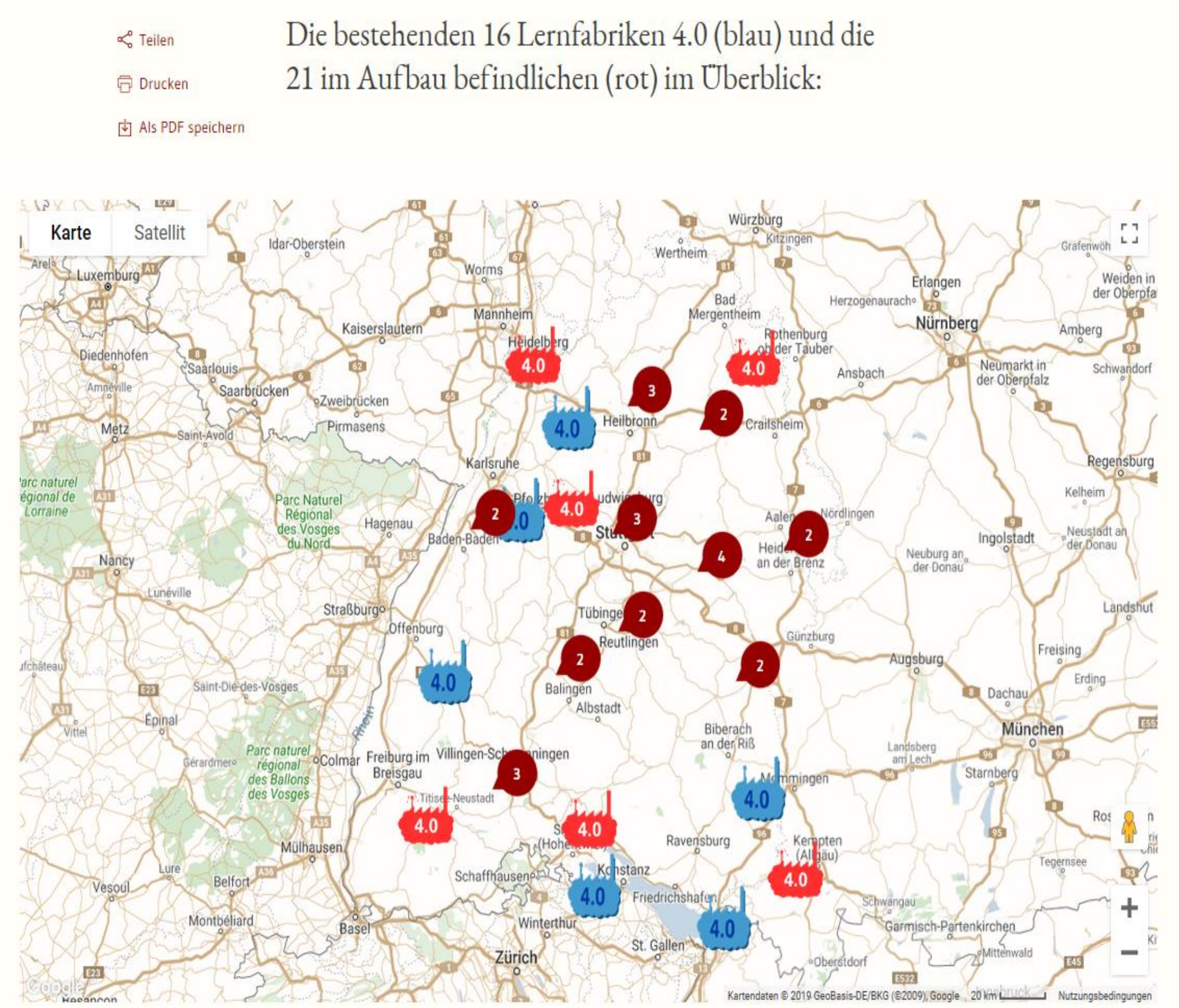
Text vorlesen 16.01.2019

Lernfabriken 4.0 in Baden-Württemberg

Die Lernfabrik 4.0 ist ein Labor, das im Aufbau und in der Ausstattung industriellen Automatisierungslösungen gleicht und in dem Grundlagen für anwendungsnahe Prozesse erlernt werden können. Maschinenbau und Elektrotechnik werden dabei durch professionelle Produktionssteuerungssysteme verknüpft. Ziel der Lernfabriken ist es, Fach- und Nachwuchskräfte auf die Anforderungen der Digitalisierung vorzubereiten.

Mit insgesamt 6,8 Millionen Euro förderte das Ministerium für Wirtschaft, Arbeit und Wohnungsbau seit dem Jahr 2016 die Einrichtung von 16 Lernfabriken 4.0 an beruflichen Schulen im Land. (Siehe Karte)

Nach einer erneuten Ausschreibung im Juni 2018 fördert das Wirtschaftsministerium derzeit den Aufbau von 21 weiteren Lernfabriken mit 4,8 Mio Euro.



VDMA Toolbox to analyze how Digitalization & Industry 4.0 can be implemented in Small & Medium Sized Enterprises (SME's)

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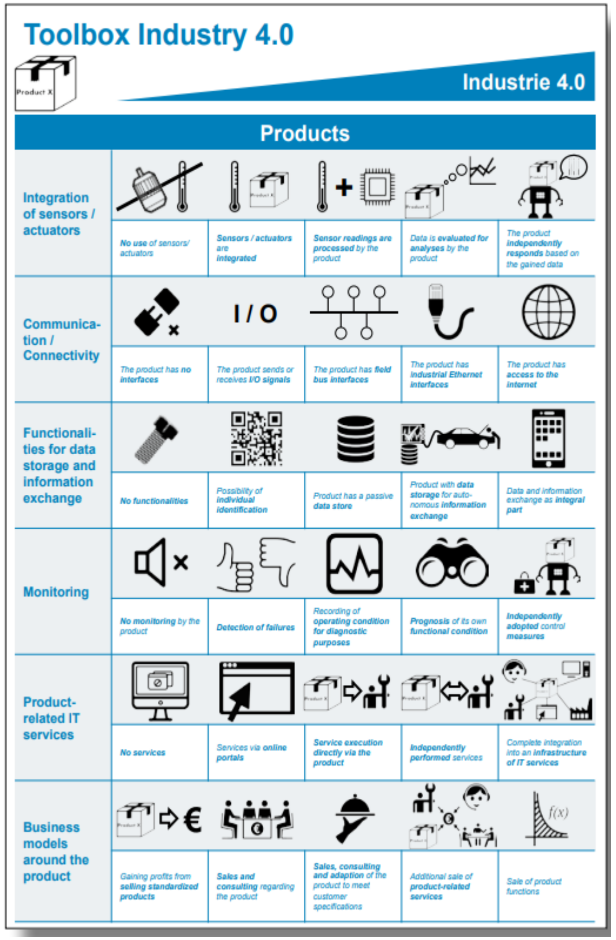
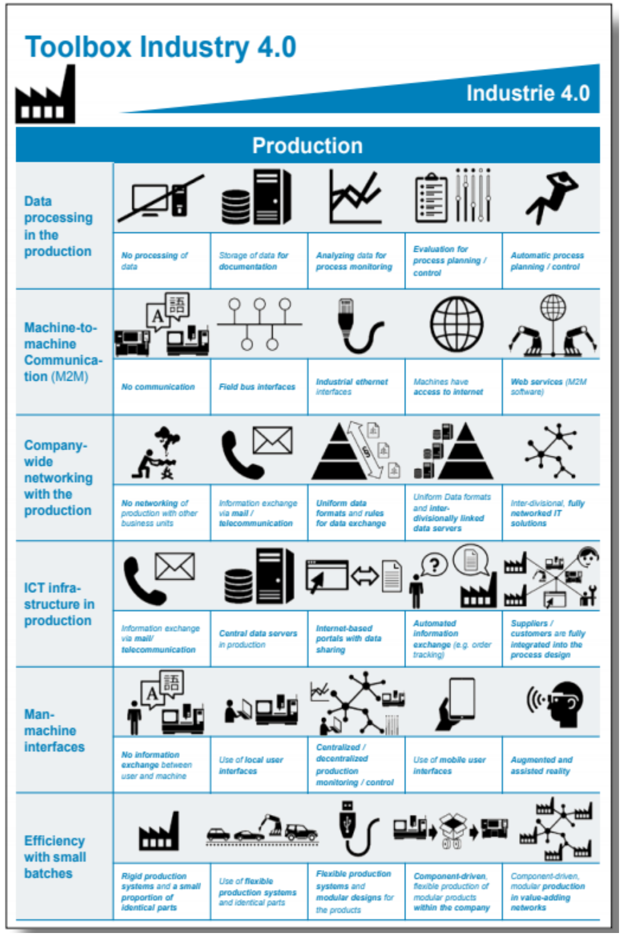


Toolbox Industry 4.0

Industrie 4.0

Products

Integration of sensors / actuators	No use of sensors/ actuators	Sensors / actuators are integrated	Sensor readings are processed by the product	Data is evaluated for analyses by the product	The product independently responds based on the gained data
Communication / Connectivity	The product has no interfaces	The product sends or receives I/O signals	The product has field bus interfaces	The product has industrial Ethernet interfaces	The product has access to the internet
Functionalities for data storage and information exchange	No functionalities	Possibility of individual identification	Product has a passive data store	Product with data storage for autonomous information exchange	Data and information exchange as integral part
Monitoring	No monitoring by the product	Detection of failures	Recording of operating condition for diagnostic purposes	Prognosis of its own functional condition	Independently adopted control measures
Product-related IT services	No services	Services via online portals	Service execution directly via the product	Independently performed services	Complete integration into an infrastructure of IT services
Business models around the product	Gaining profits from selling standardized products	Sales and consulting regarding the product	Sales, consulting and adaption of the product to meet customer specifications	Additional sale of product-related services	Sale of product functions

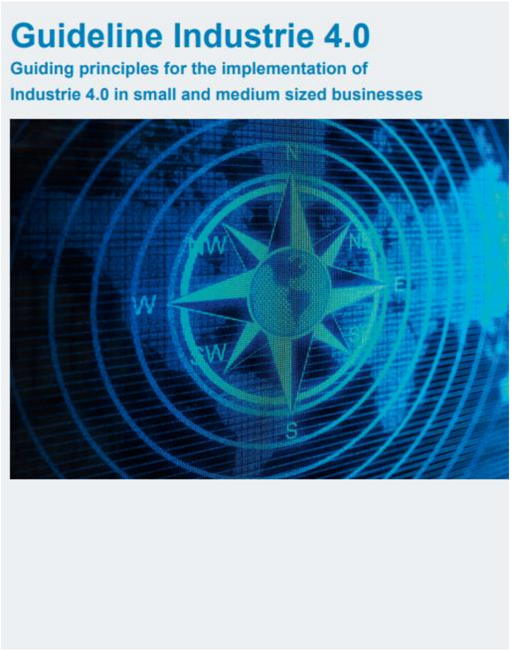


Toolbox Industry 4.0

Industrie 4.0

Production

Data processing in the production	No processing of data	Storage of data for documentation	Analyzing data for process monitoring	Evaluation for process planning / control	Automatic process planning / control
Machine-to-machine Communication (M2M)	No communication	Field bus interfaces	Industrial ethernet interfaces	Machines have access to internet	Web services (M2M software)
Company-wide networking with the production	No networking of production with other business units	Information exchange via mail / telecommunication	Uniform data formats and rules for data exchange	Uniform Data formats and inter-divisionally linked data servers	Inter-divisional, fully networked IT solutions
ICT infrastructure in production	Information exchange via mail/ telecommunication	Central data servers in production	Internet-based portals with data sharing	Automated information exchange (e.g. order tracking)	Suppliers / customers are fully integrated into the process design
Man-machine interfaces	No information exchange between user and machine	Use of local user interfaces	Centralized / decentralized production monitoring / control	Use of mobile user interfaces	Augmented and assisted reality
Efficiency with small batches	Rigid production systems and a small proportion of identical parts	Use of flexible production systems and identical parts	Flexible production systems and modular designs for the products	Component-driven, flexible production of modular products within the company	Component-driven, modular production in value-adding networks



Source:
VDMA Guidline Industry 4.0

Link:
Guideline Industrie 4.0 - vdma.org – VDMA

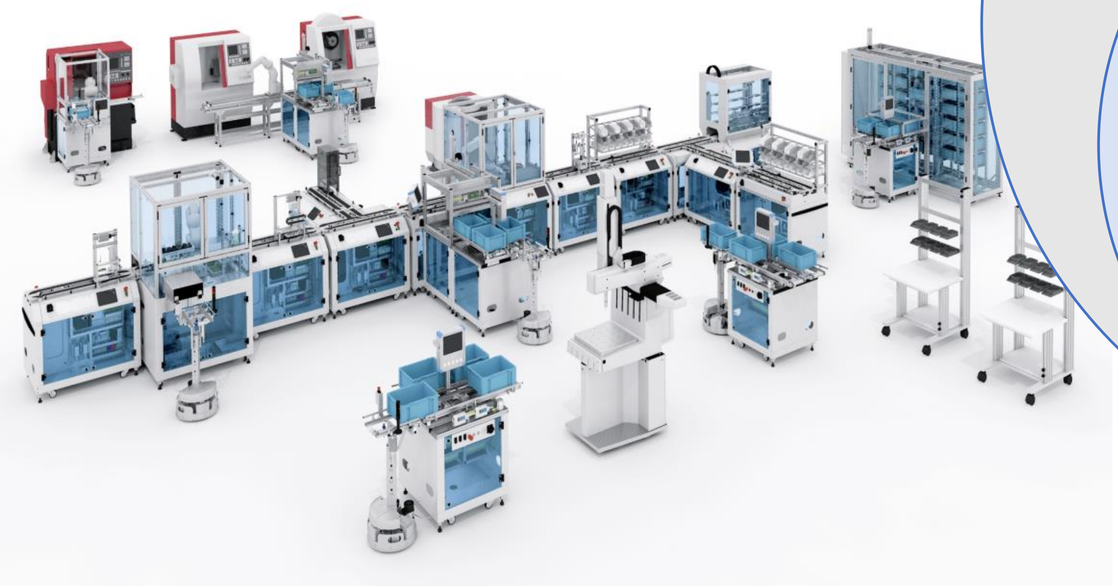
From Industry 4.0 to Artificial Intelligence (AI) & Machine Learning (ML) in Learning Factories

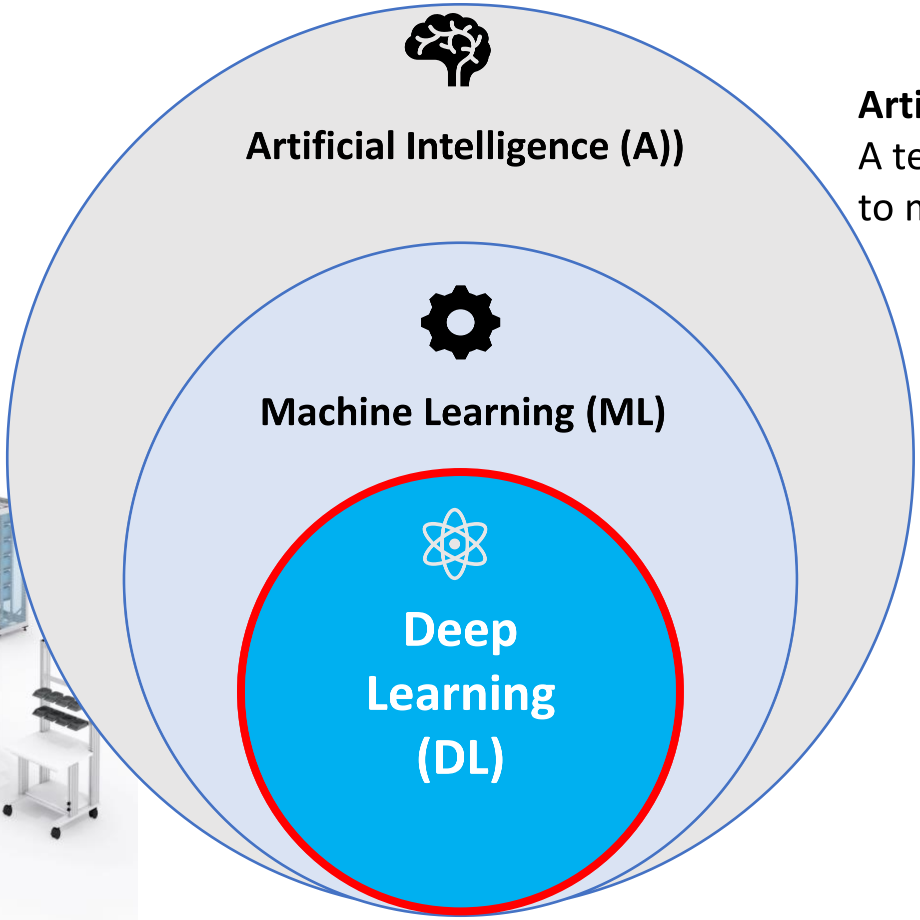
Since 2015 Ministry of Economic Affairs, Labor & Tourism supports vocational schools in setting up and equipping so-called "Learning Factories 4.0".

Trainees learn about digitalized processes and new technologies and practice how to use them under realistic conditions.

In 2020 the MoEALT launched a 3rd call for funding to take account of the rapid developments around Artificial intelligence applications.

14 of the existing learning factories. The aim is to acquire skills in the areas of AI, augmented reality and digital twins.





Artificial Intelligence (A))
A technique which enables machines to mimic Human behaviour

Machine Learning (ML)
Subset of AI technique which use statistical
Methods to enable machines to improve with
Experience.

Deep Learning (DL)
Subset of ML which make the computation Of multi-layer neural network feasible.

Festo Didactic – Learning Factories with AI & ML on different Levels

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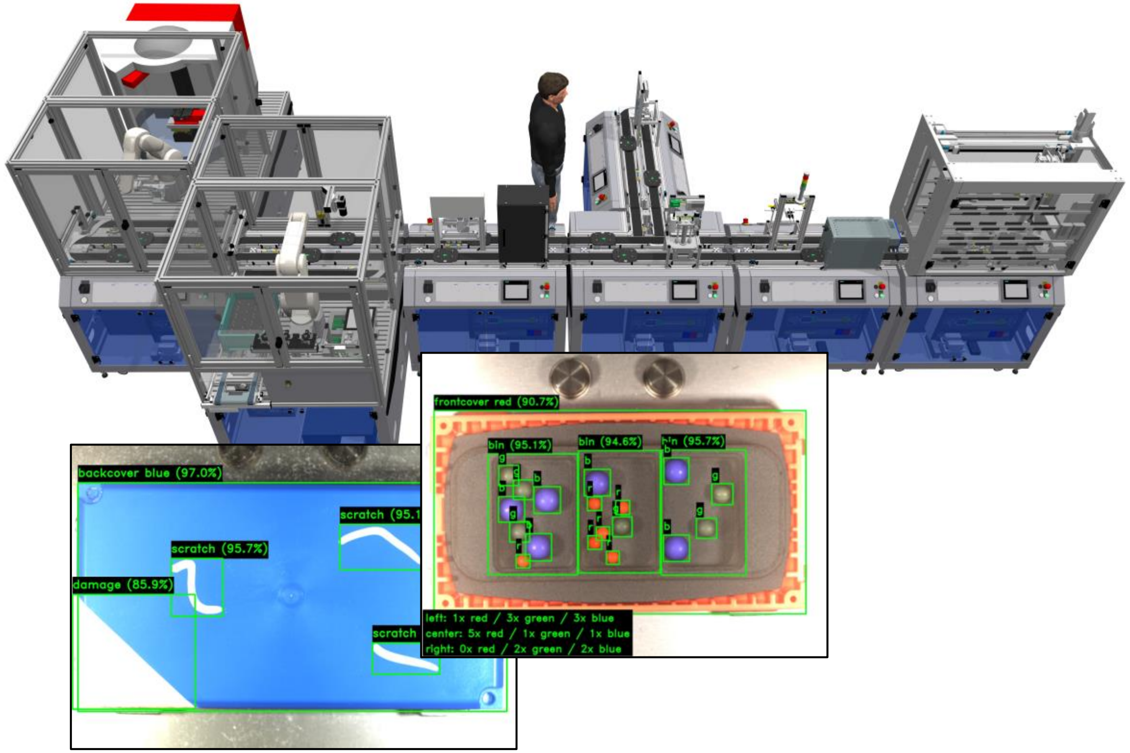
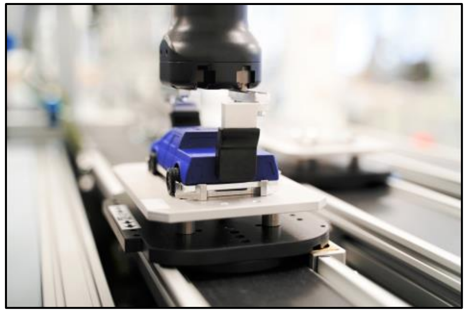
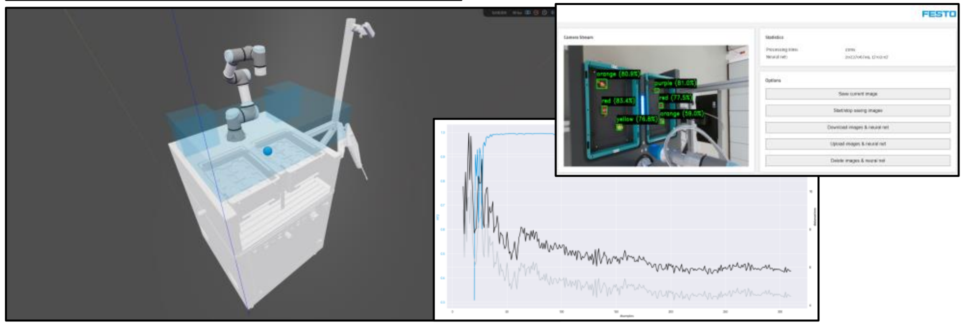
Level 1: Machine Learning Vision



We are the Engineers of Industrial Intelligence.

Level 2: AI-based Human Robot Collaboration





Festo AX - AI & ML Driven Data Analytics for Industry 4.0

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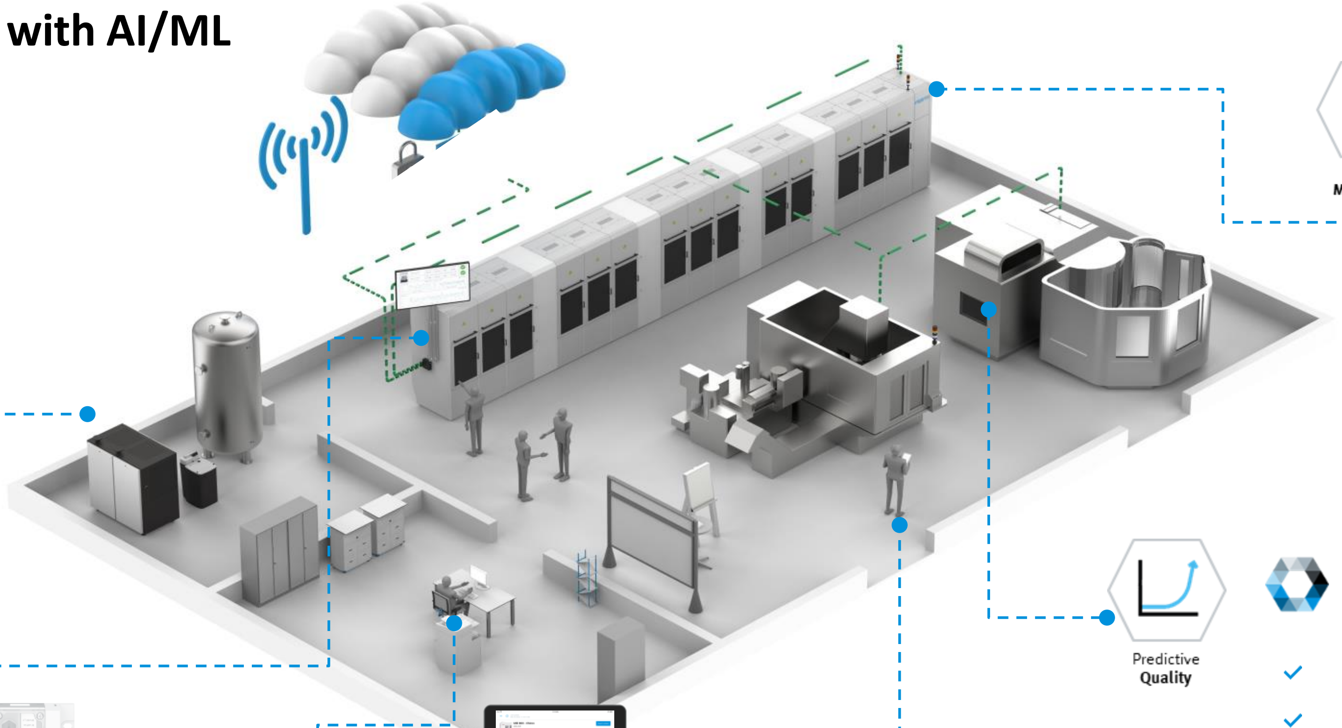
Level 3: Advanced Analytics with AI/ML



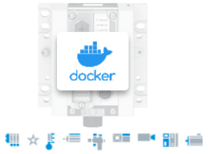
Festo AX Predictive Energy

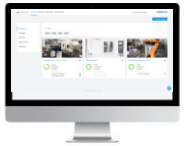
Predictive Energy

- Energy Monitoring
- Leakage Detection
- Compressor Optimization

Festo AX Connectivity

- OT/IT bridge
- Connect to OT equipment such as valve manifolds etc.
- Pre-Processing of data
- Transfer to AX or 3rd Party IT systems





Festo AX Smartenance

- Maintenance Management
- Incident Management
- Machine Logbook

Festo AX Predictive Maintenance

Predictive Maintenance

- Anomaly Detection for failure prediction
- Vendor independent

Festo AX Predictive Quality

Predictive Quality

- Continious Quality Monitoring
- Reduction of rework
- Up to 100% QA sampling

We are the Engineers of Industrial Intelligence.

Festo AX - AI & ML Driven Data Analytics for Industry 4.0 in Learning Factories

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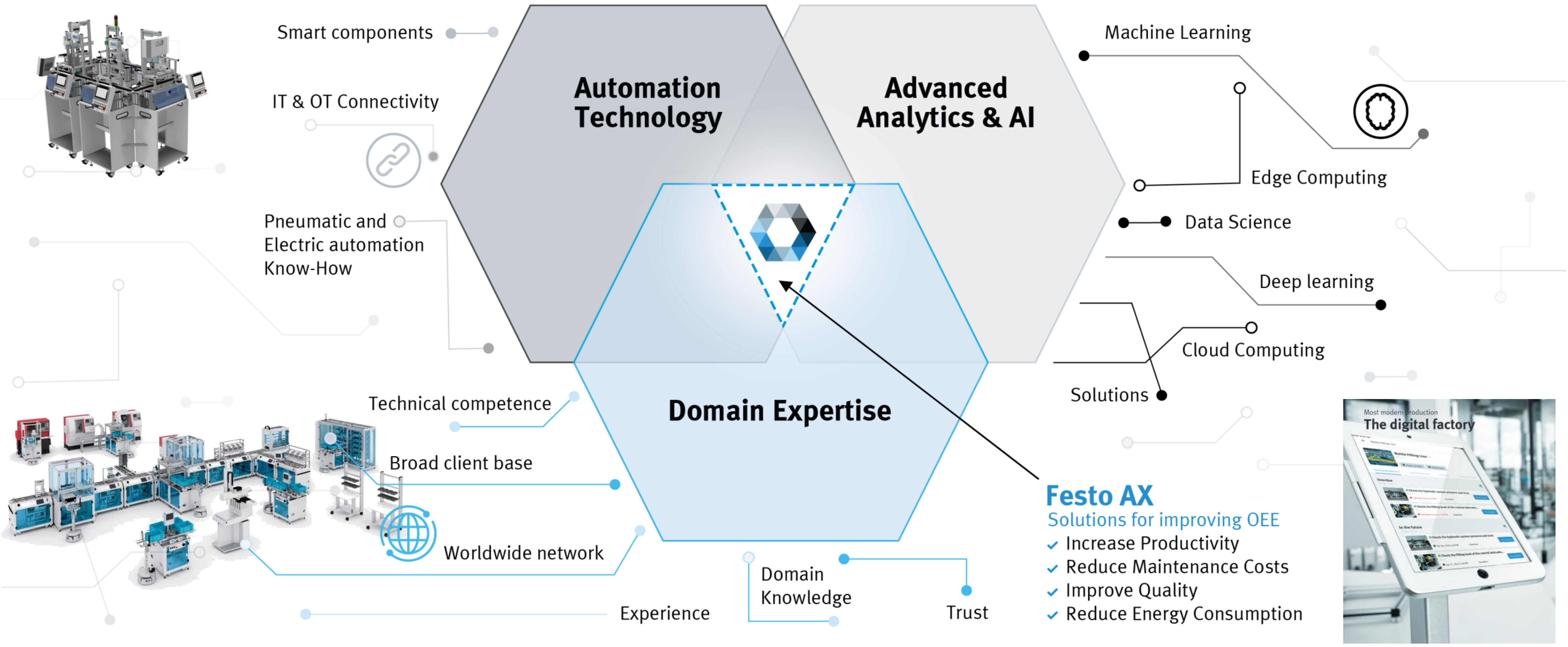

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Thank you & see you soon Festo Didactic tomorrow!