

# Digitalisation @Festo

- Integrated Strategy
- Business
- Product
- Processes



## Which are the goals of Industry 4.0?

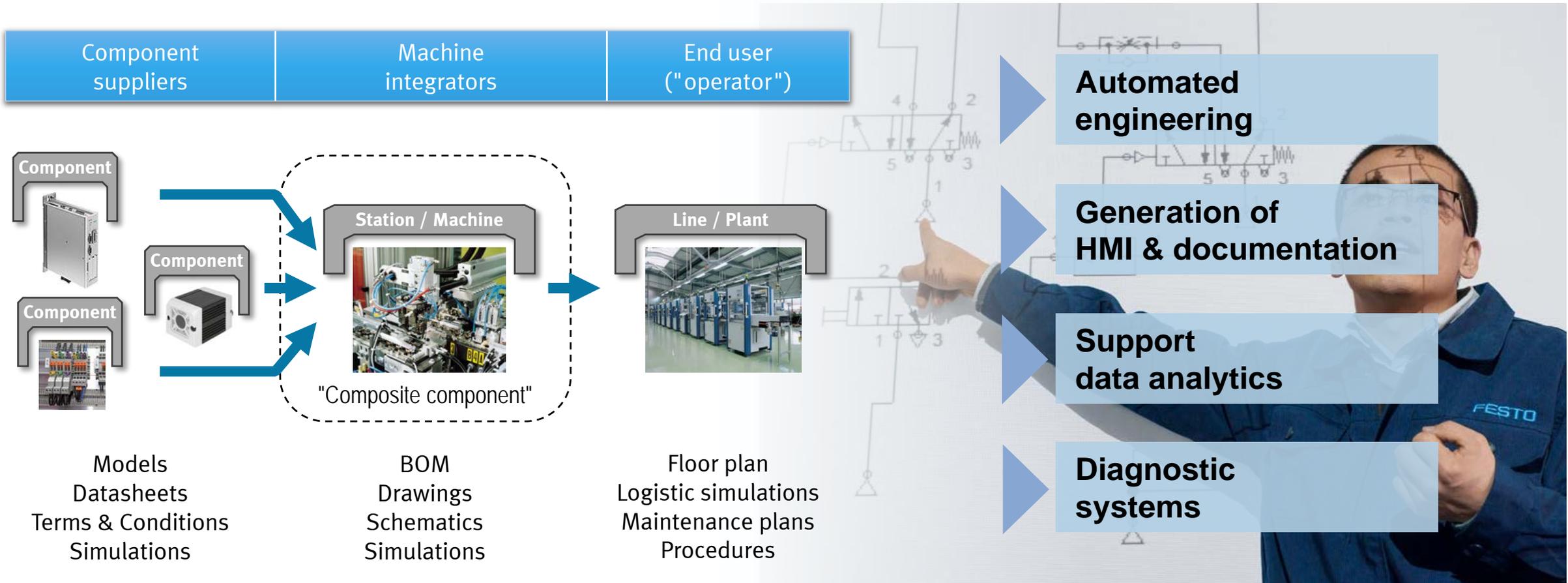
- **Basic-Function: No accidents**
- **No information of and for drivers**
- **Rigid traffic flows**



- + Auto**
- + Navigation**
- + Net**

- **Networking: Traffic lights adapt to traffic situation**
- **Adaption: Your car can choose a different route**
- **Energy efficiency: Your car brakes optimally**
- **Business Model: What would you pay for your green wave?**

The Administration shell is used for the **entire factory lifecycle** ..  
 .. and enables benefits for **engineering and operation**



## Current status of Platform Industrie 4.0

### International specification of the Administration shell



France / Italy / Germany

### International reference architecture for Smart Manufacturing

#### Joint Working Group 21



China, France, Germany, Italy, Japan, Korea, Sweden, USA, ..

### Information exchange by Administration shell

Many different initiatives committed to one unifying information exchange format

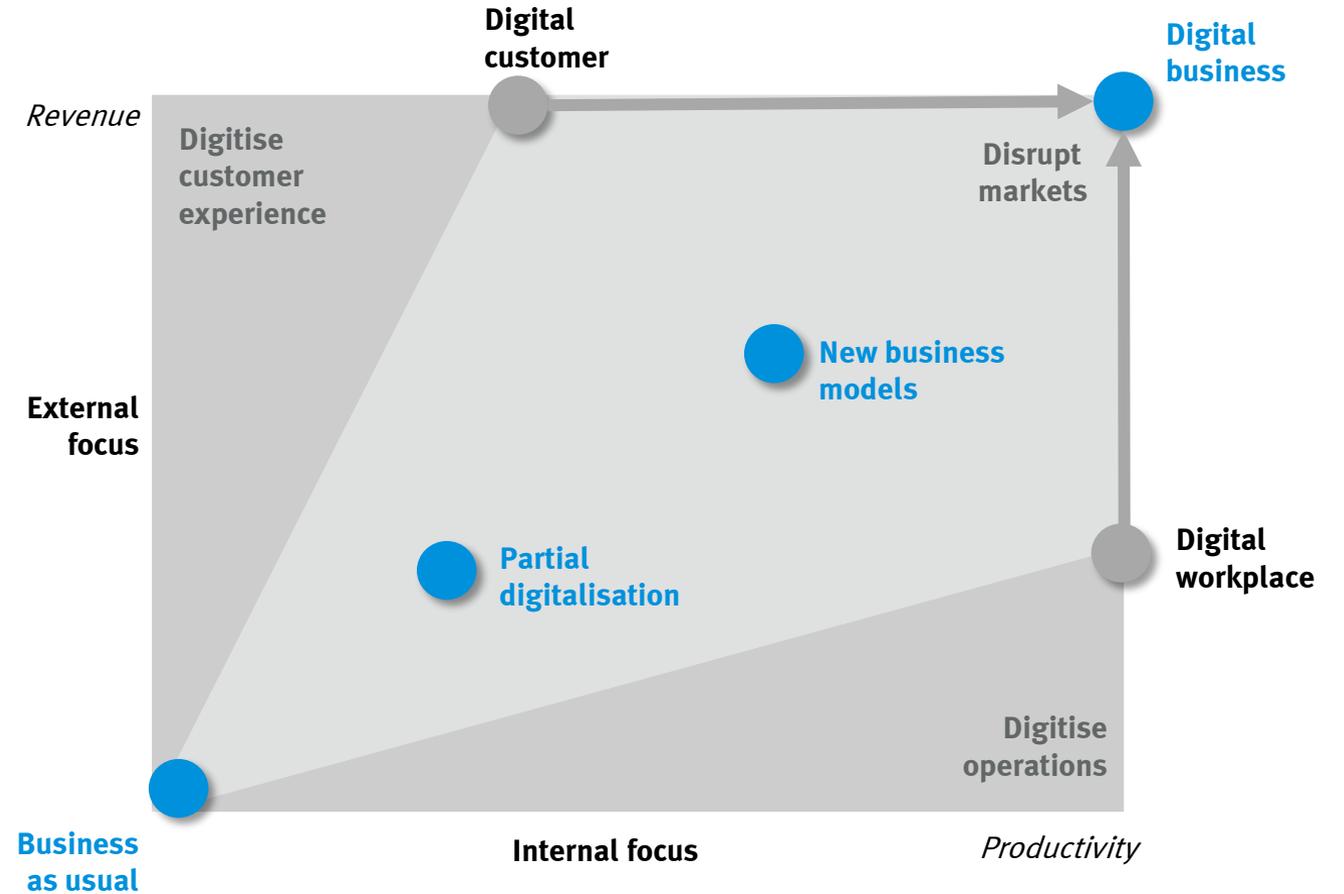


Currently under development

## Strategic dimensions and objectives of digitalisation at Festo

### Objectives for digitalisation at Festo

- ❖ Increase productivity
- ❖ Sell added value
- ❖ Secure growth
- ❖ Expand innovation leadership



# Digitization Program - Overview



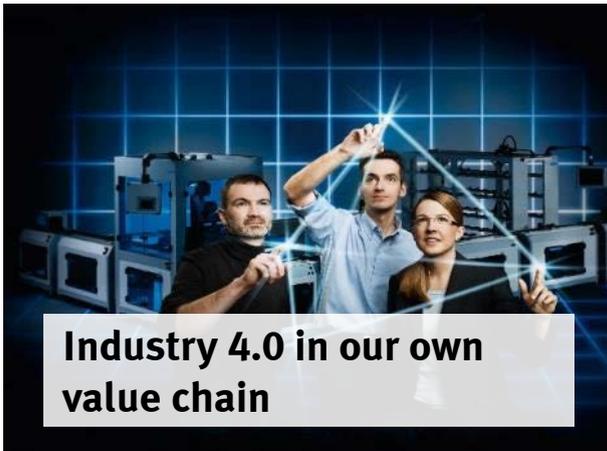
**Smart Products**



**Smart Services**



**Digital Customer Journey**



**Industry 4.0 in our own value chain**



**Working environment and Qualification**



**Culture and Mindset**

## DIGITAL OFFERING

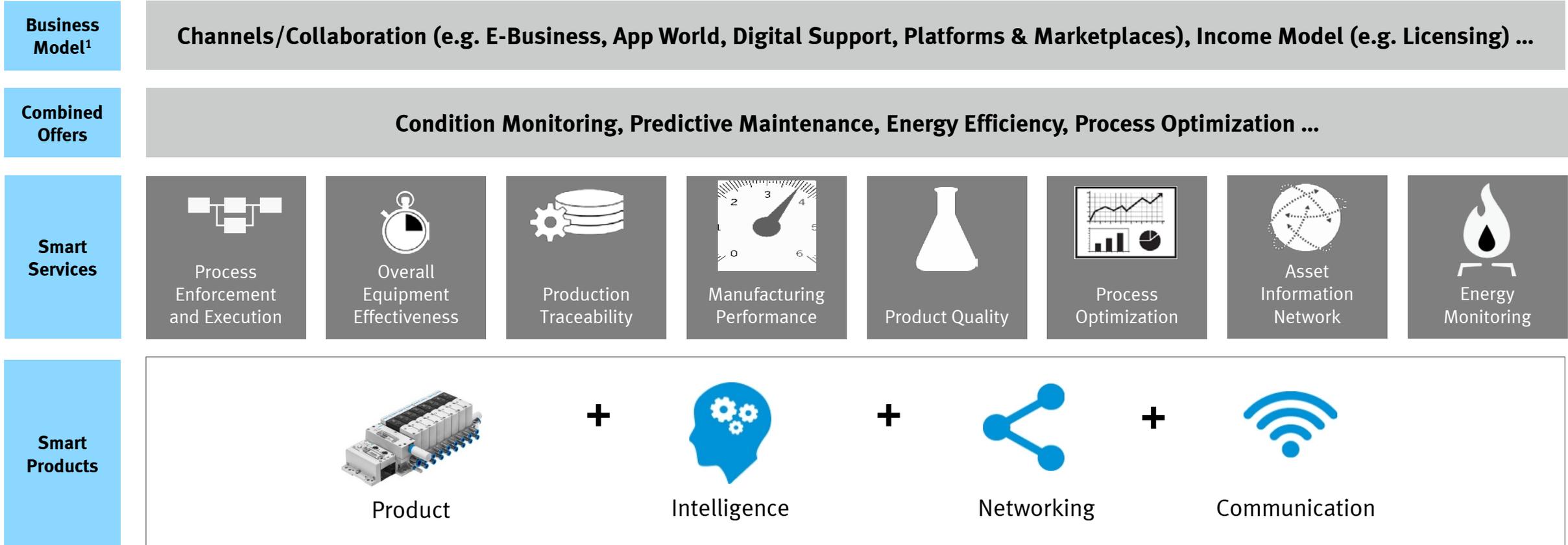
CREATE ADDED VALUES FOR OUR CUSTOMERS

SELL DIGITIZATION

## DIGITAL TRANSFORMATION

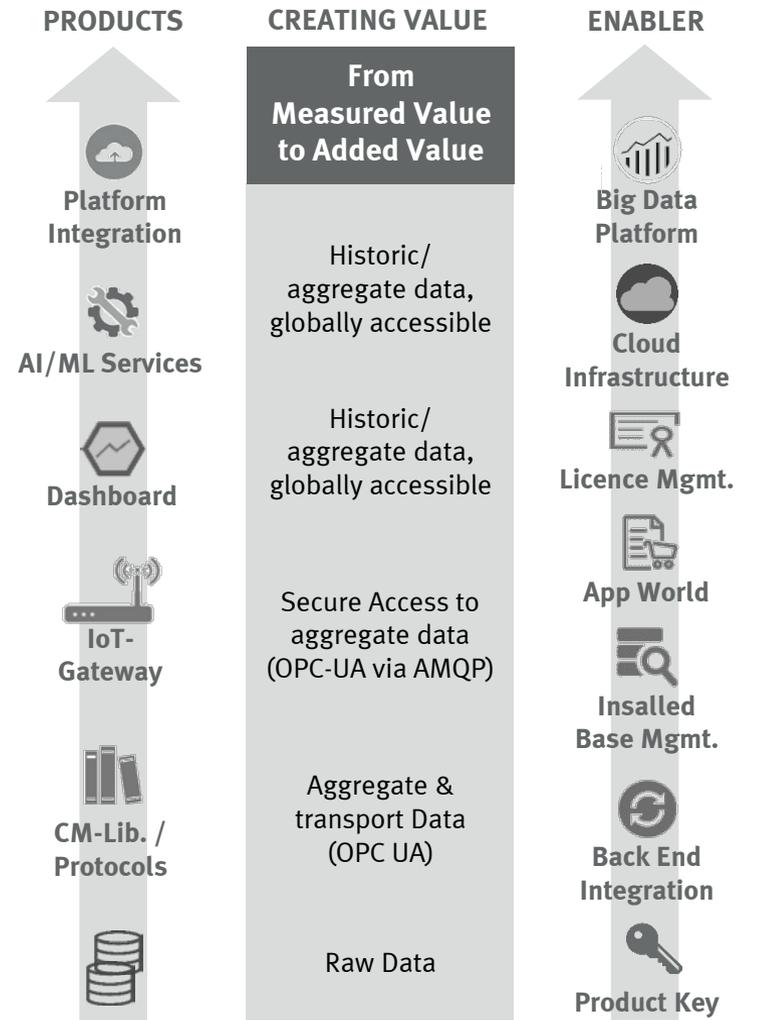
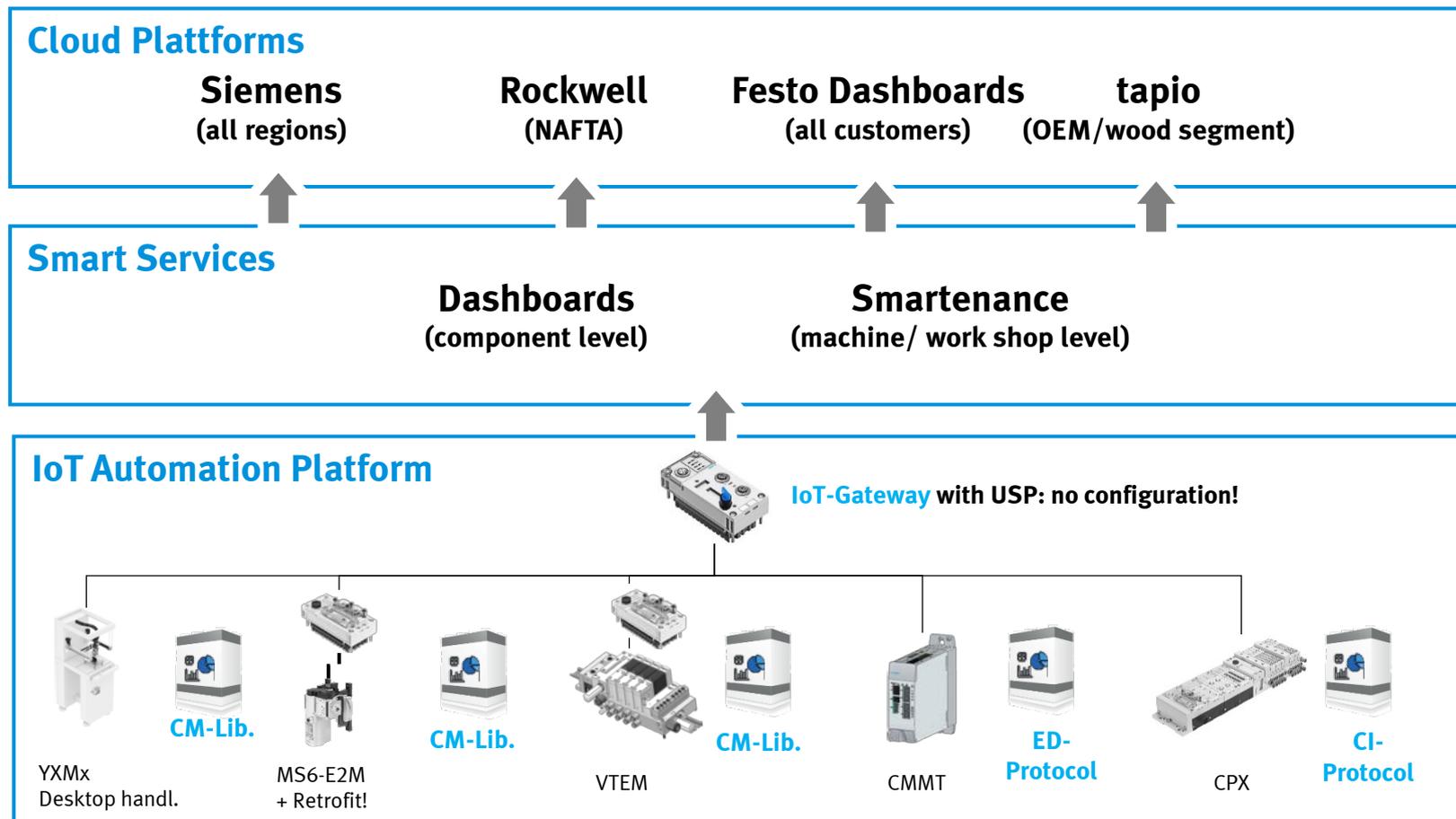
UTILIZING AND LIVING DIGITIZATION WITHIN THE COMPANY

# Definition of Digital Products



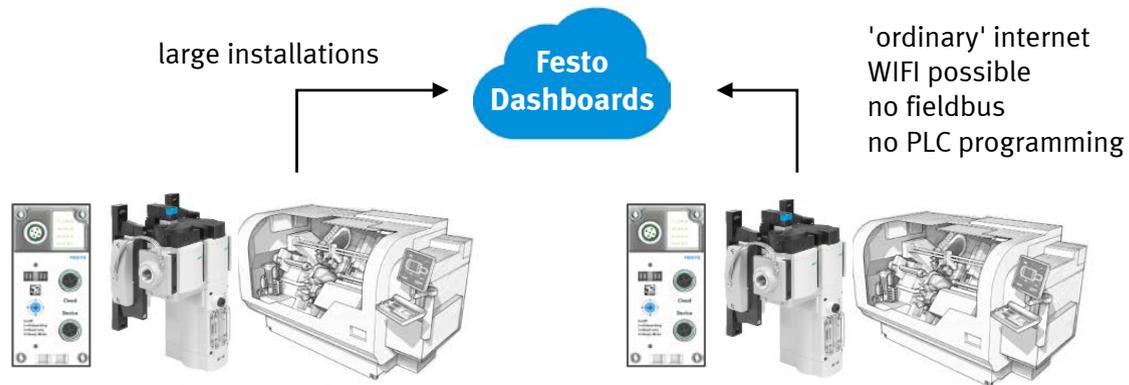
<sup>1</sup> changes to existing business model might apply

# Festo provides pre-configured solutions for Internet of Things



# Applications | 2 of many

## Retrofit existing shopfloors



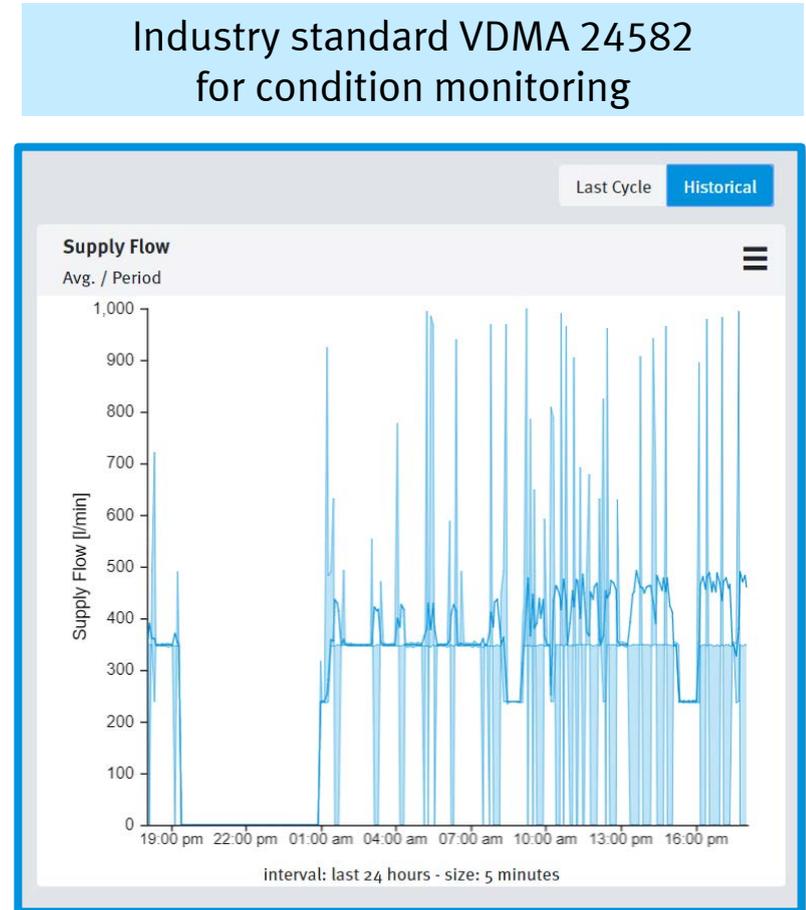
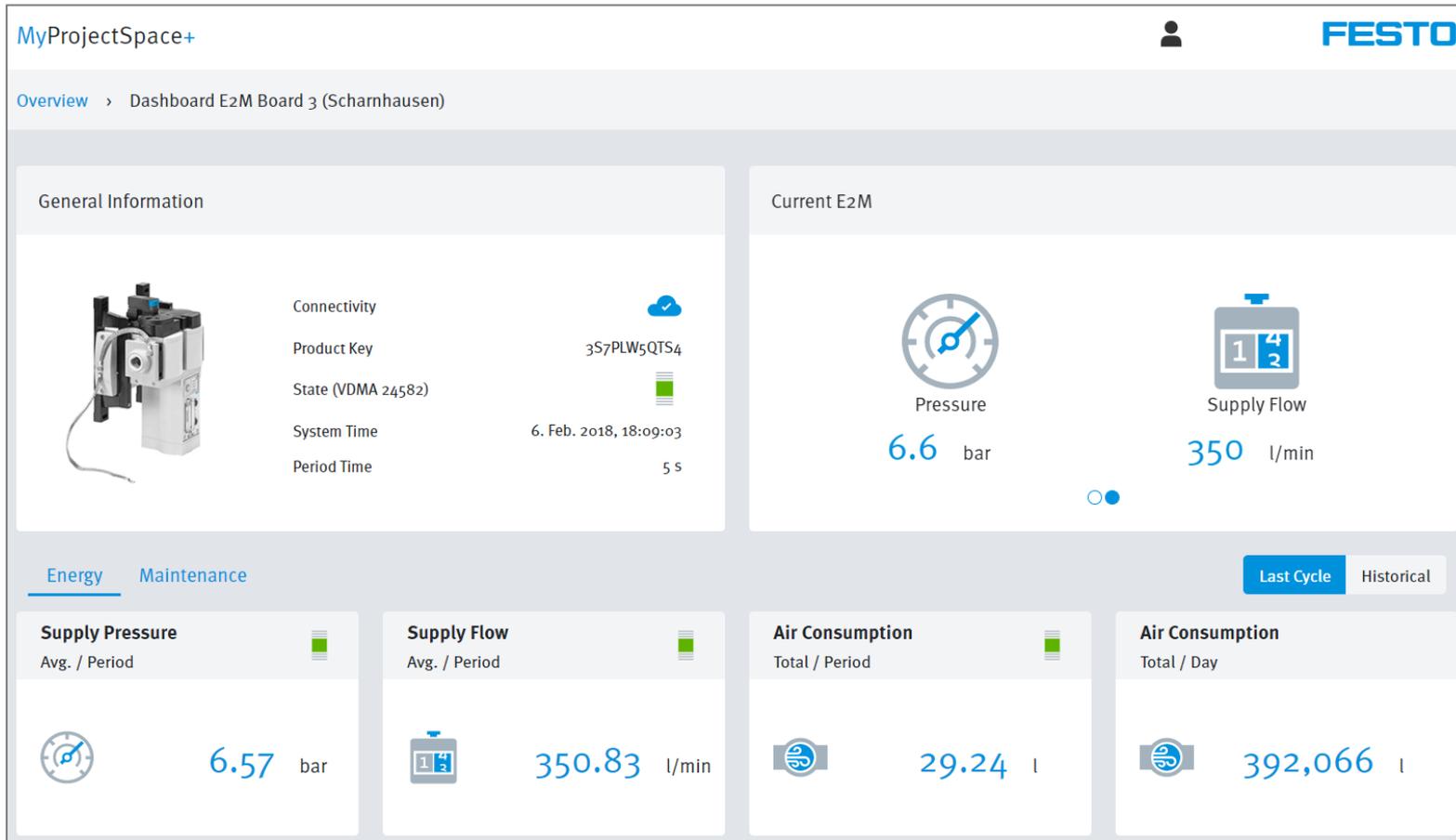
- Retrofit existing shop floor, e.g. machine tools
- 10, 20, 30, .. machines
- multiple halls, different sites, ..
- monitor energy consumption, check for leakage trends
- collect data for certificates (CO2) and reports
- analyse unusual events, usage, occupation
- 99 users, 1 year of data retention

## IoTize conventional assembly machine

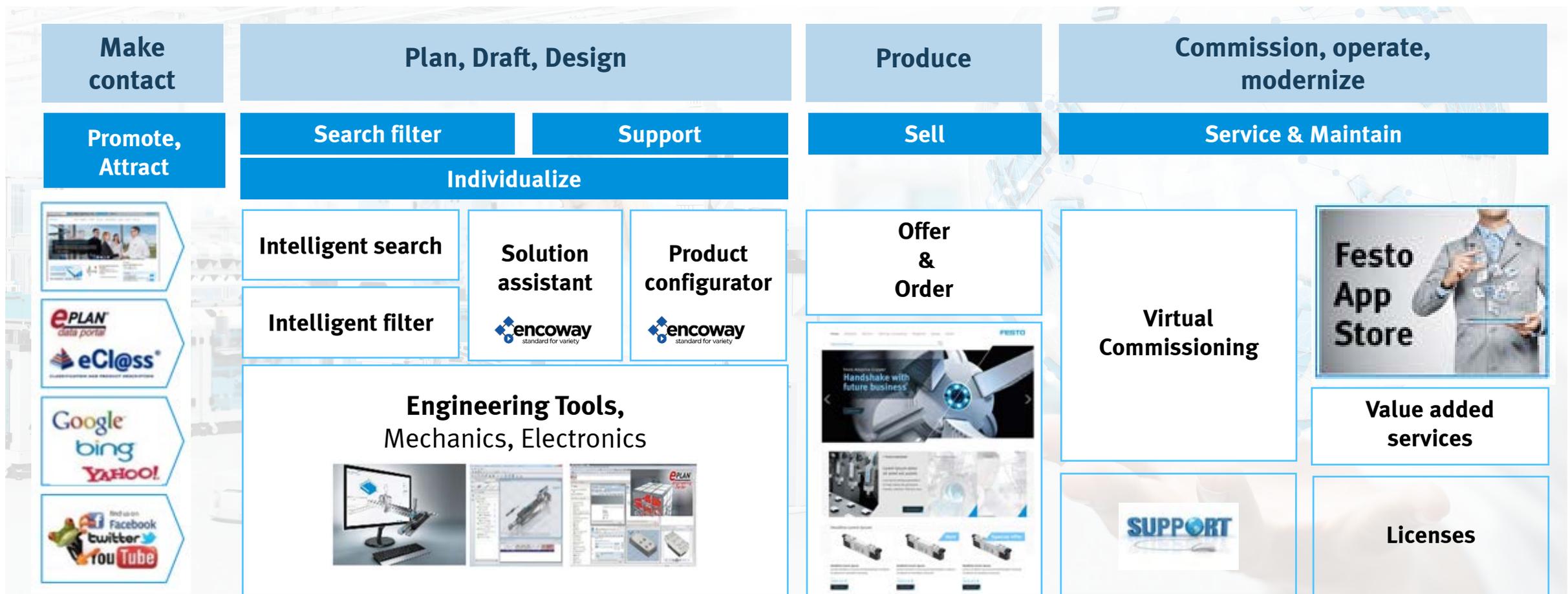


- compatible with existing ethernet fieldbuses (PN, EIP, ..)
- compatible with existing controls, no programming!
- monitor condition counters -> maintain w/o production break
- error diagnosis of CPX with clear-text messages
- error-log possible
- monitor field bus status, shifts per day, ..
- OEE, productivity up to 1 year

# Festo Dashboards - Pre-configured turn key solutions for our customers' Top 3 daily use cases



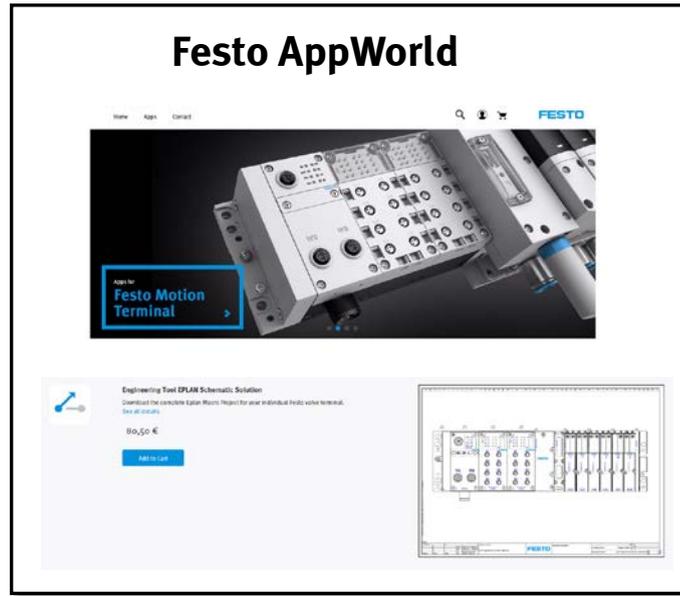
# Digital Customer Journey - Intuitive digital support of customers for all customer touchpoints



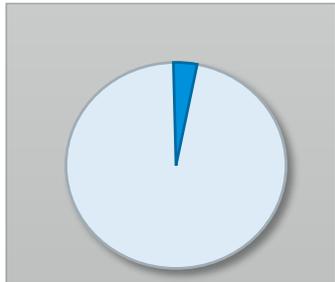
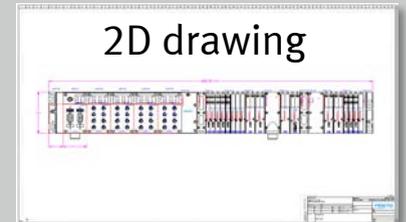
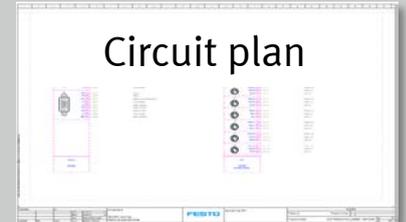
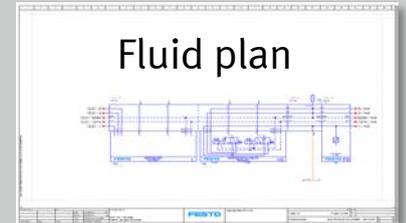
# Automatic generation of electric and fluidic schematics via Festo App World

- High saving potential by automated plan generation

IC1: 50E-F06GCQPERERERER-D+HBABE  
 IC2: 32P-SGL-R-MAHAHBHLBHIIIUPEBHAH  
 -5J3LJLHS5JL+6TJ



ZW1 & PDF File



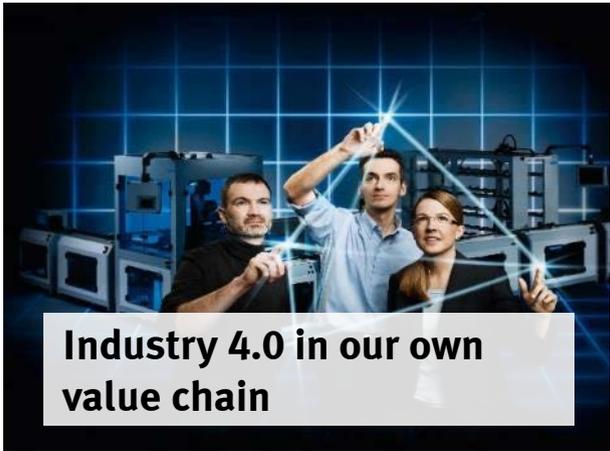
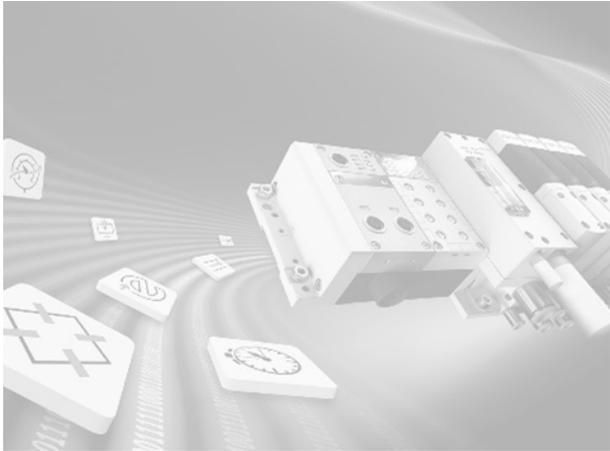
**No manual steps for Festo components**

- ➔ Just a few **minutes** runtime
- ➔ Improved fail safety





## Digitization Program - Internal



**Industry 4.0 in our own value chain**



**Working environment and Qualification**



**Culture and Mindset**

# Digitalisation needs new **skills, competences and culture** within the organisation

Cooperation and alignment are essential to interlink „Digitization“ within the company

## Operations

Digitization and Industry 4.0 in the value chain



## Human Resources

New working areas, methods and environment



## IT department



### Cloud Readiness— hybrid & scalable

- Build up suitable infrastructure and processes
- IT Security
- Big Data & Analytics platform
- Installed Base Management
- License management
- Backend Service Integration

## Skills Development

Qualification 4.0



## Festo Technology Plant: Smart Factory 4.0



**Automatizzato e flessibile**

**Flusso produttivo flessibile**

**Ottimizzazione energetica**

**Learning “taken for granted!”**



Riduzione costi, lotto adeguato alla domanda



Flusso di info e materiali continuamente ottimizzato

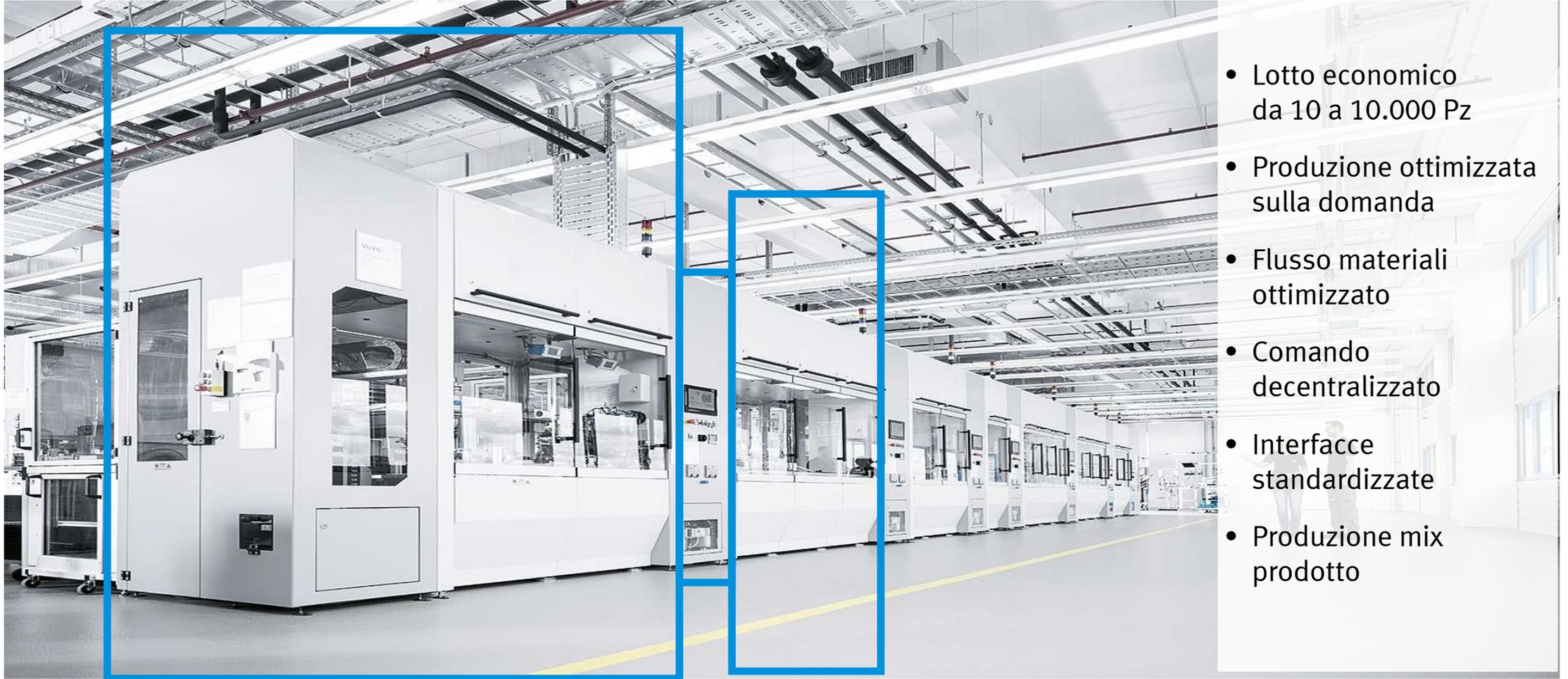


Edifici in Energy Network e efficienza in produzione



Continuo training on the job e Learning centre in loco

## Modular Assembly Line: Decentralized intelligence



- Lotto economico da 10 a 10.000 Pz
- Produzione ottimizzata sulla domanda
- Flusso materiali ottimizzato
- Comando decentralizzato
- Interfacce standardizzate
- Produzione mix prodotto

## Modular Assembly Line: Decentralized intelligence

- Lotsizes 200-2000, Lotsize 1 possible, 1.2 million products /a
- SAP/ RFID controlled recipe management
- 400 IP addresses in machine network
- Data science and analytics:  
cycle time **13**  **11 sec**,  
**+15% productivity**



# Energy Transparency Machines – Retrofitting

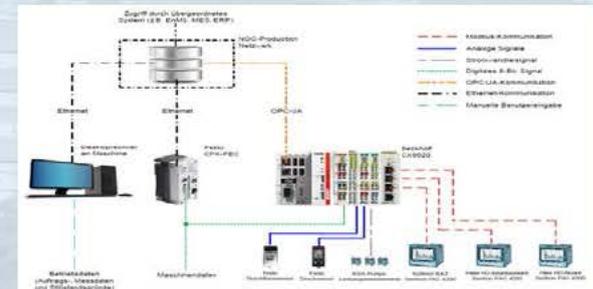
## Energy-Transparent-Machine

CHARACTERIZATION

- **Metering** of the machine group or one machine only
- **Web-based analysis** and visualization of energy data
- Metering through **OPC-UA**

ADVANTAGES

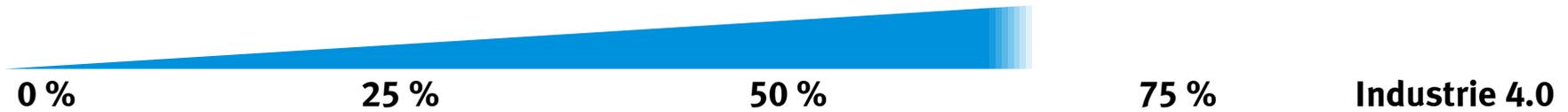
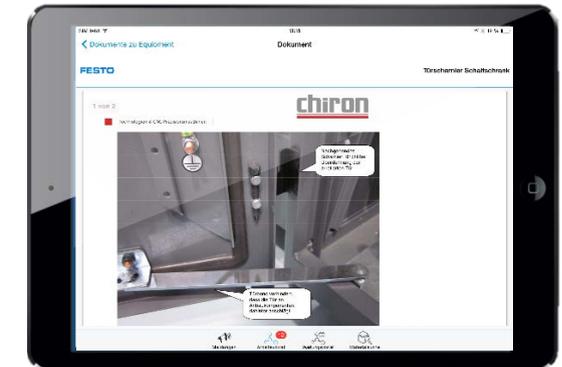
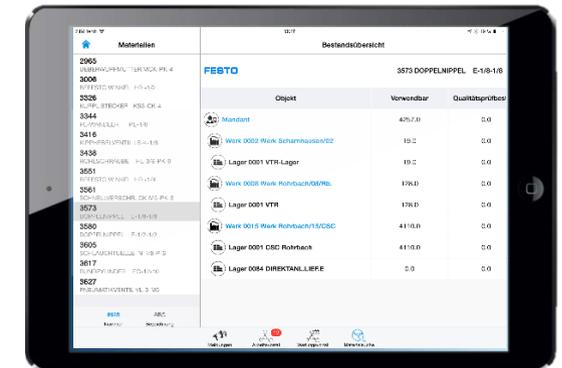
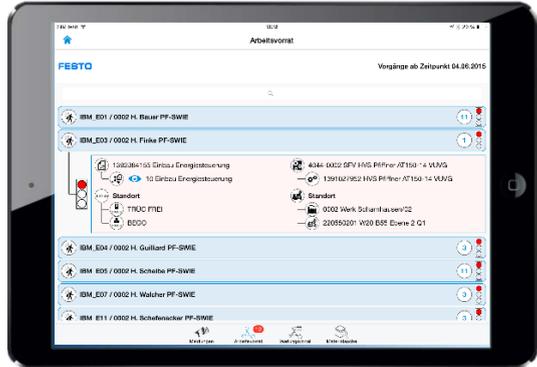
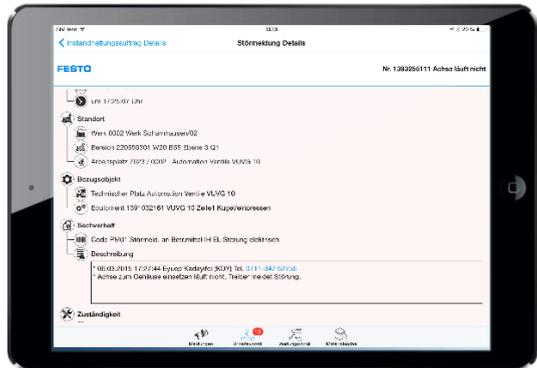
- **Sustainable and energy efficient** manufacturing
- Transparency on the whole shop floor:  
**Awareness and continuously optimization**



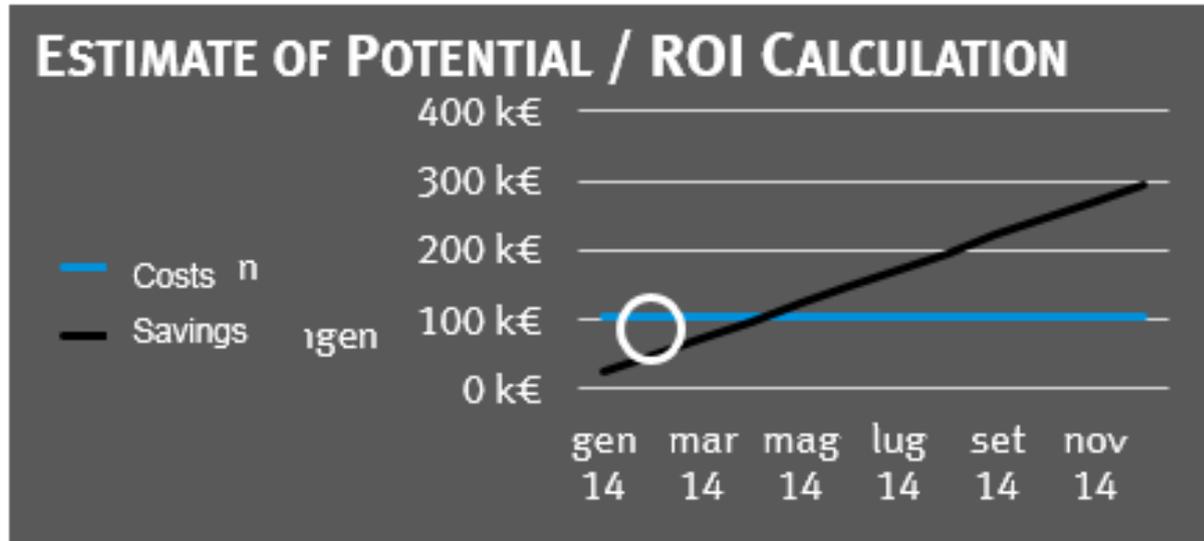
Status: Pilot

Industry 4.0 share

# Mobile Maintenance – higher OEE and higher profitability



# Mobile Maintenance



### SUMMARY

- ROI of 4,3 months
- about 190.000 € saving in Scharnhausen and Rohrbach in the first year
- High worker's acceptance of the solution
- Further positive effect: Machine linkage leads to higher availability of production

## BUSINESS CASE

- 10 Mins Time saving per notification resp. maintenance
- Year 2014: about 19.000 incidents, 2.000 maintenances
- Leads to time saving of about 3.500 hours for person (two man years) & machine
- According to labor costs & machine hour rates this results in a saving of
- iPads: 46 devices, total 23.400 €
- Cases: 3.500 €
- Licenses: 79.000 €
- Total Invest:

**+ 295.000 € \***

**+ ca. 190.000 € p. a.**

**- 105.900 €**

\* Without positive effects of machine linkage

## Benefits of comparing machine KPIs and Energy KPIs



### 1. Bottle-neck optimized work flow

(a chain is only as strong as its weakest part)

- reduce machine performance according to bottle neck situation (1<sup>st</sup> step: SAP)
- Avoid buffer stocks, one-piece-flow
- Reduce waste of energy

### 2. Energy Peak management

- Transparency or real (basic) load
- Team targets e.g. -2% p.a. or per part
- Avoid peaks, start the machines different
- reduces energy bill (2-3 GWh, ROI <3 years)

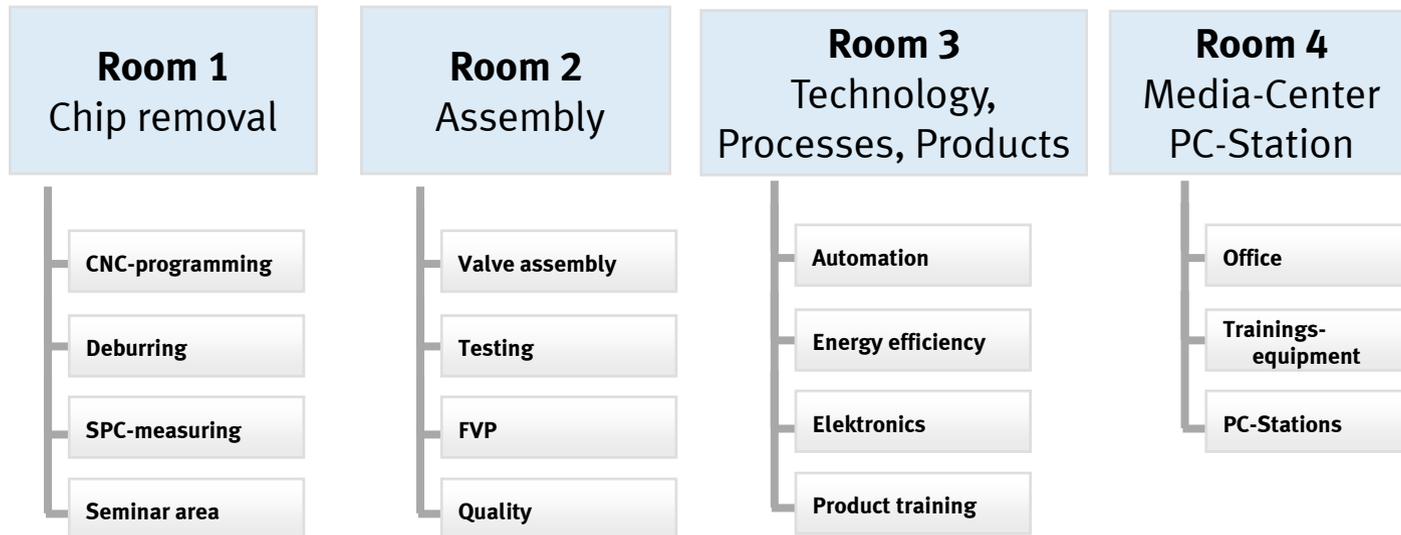
### 3. Utilise available energy sources better

- pre-heat galvanic baths are by “waste” energy of other machines and compressors

# Learning Factory



220 m<sup>2</sup>



Attività operative selezionate



Training Package dedicati

# Cyber Physical Factory for training and Education

