

H T
W M
G A

Hochschule Konstanz
Fakultät Maschinenbau

FUTURE FACTORY MEETS ACADEMICS

A CROSS-UNIVERSITY TESTBED INDUSTRY 4.0

1 PEOPLE



Prof. Dr. Marcus Kurth

Chair for Systems and Control Engineering at the HTWG Constance

Background: Technical Cybernetics

Profound experience in system dynamics, digitization, automation and software development

Co-founder and CEO of Modellfabrik Bodensee GmbH / Varity for industrial VR and AR applications



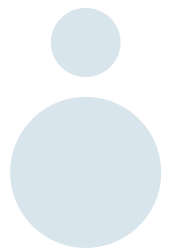
Prof. Dr. Carsten Schleyer

Chair for Value Creation Systems at the HTWG Constance

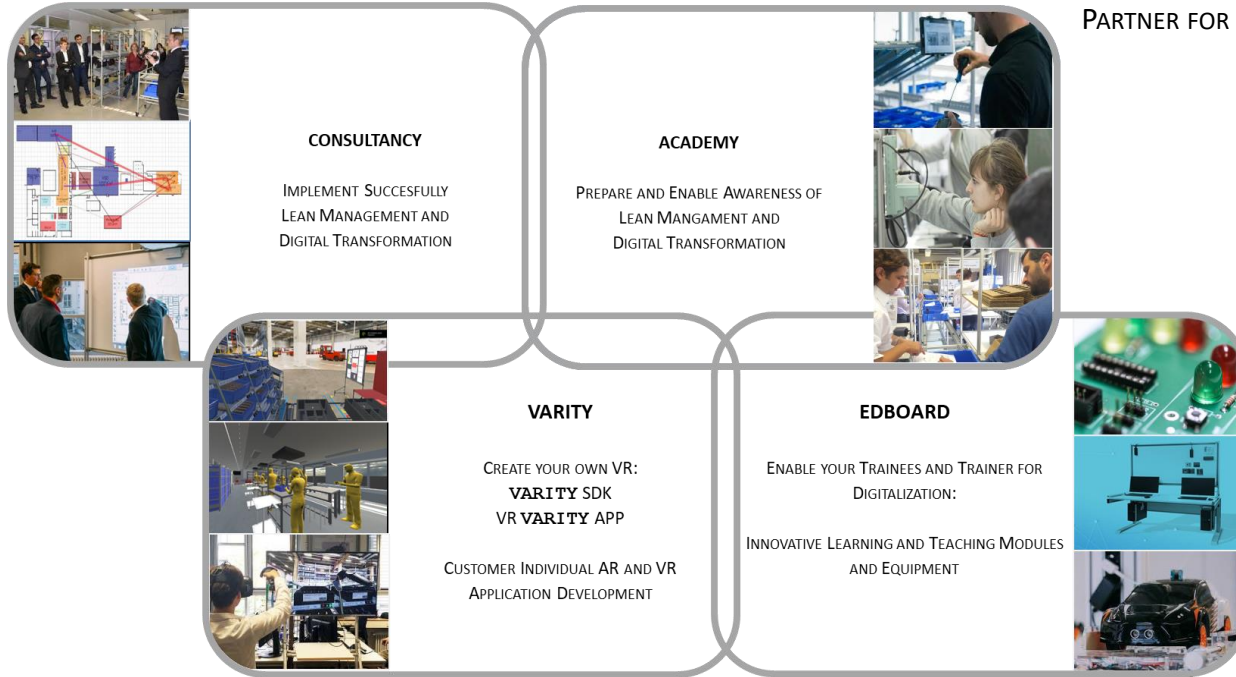
Background: Manufacturing Management

Profound experience in lean management, supply chain, smart manufacturing and industry 4.0

Co-founder and CEO of Modellfabrik Bodensee GmbH / Varity for industrial VR and AR applications

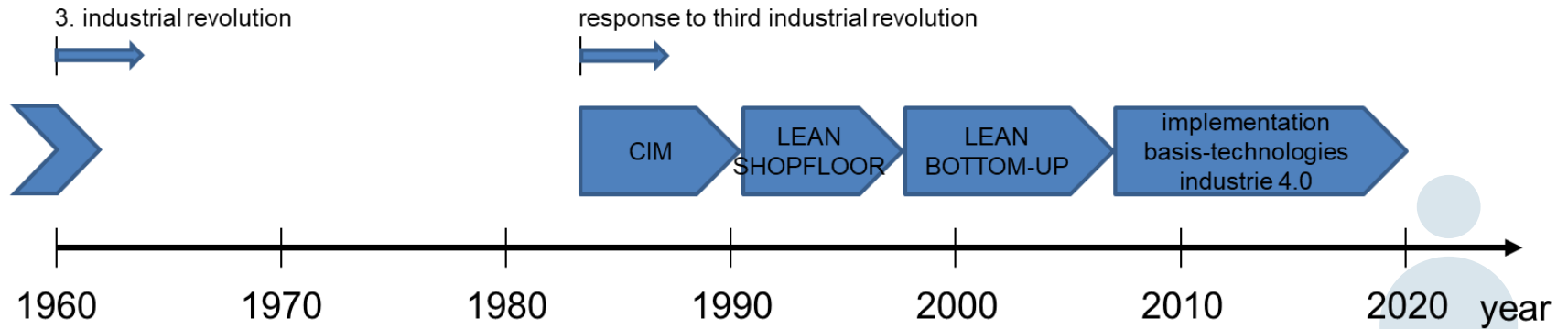


1 WHAT WE DO

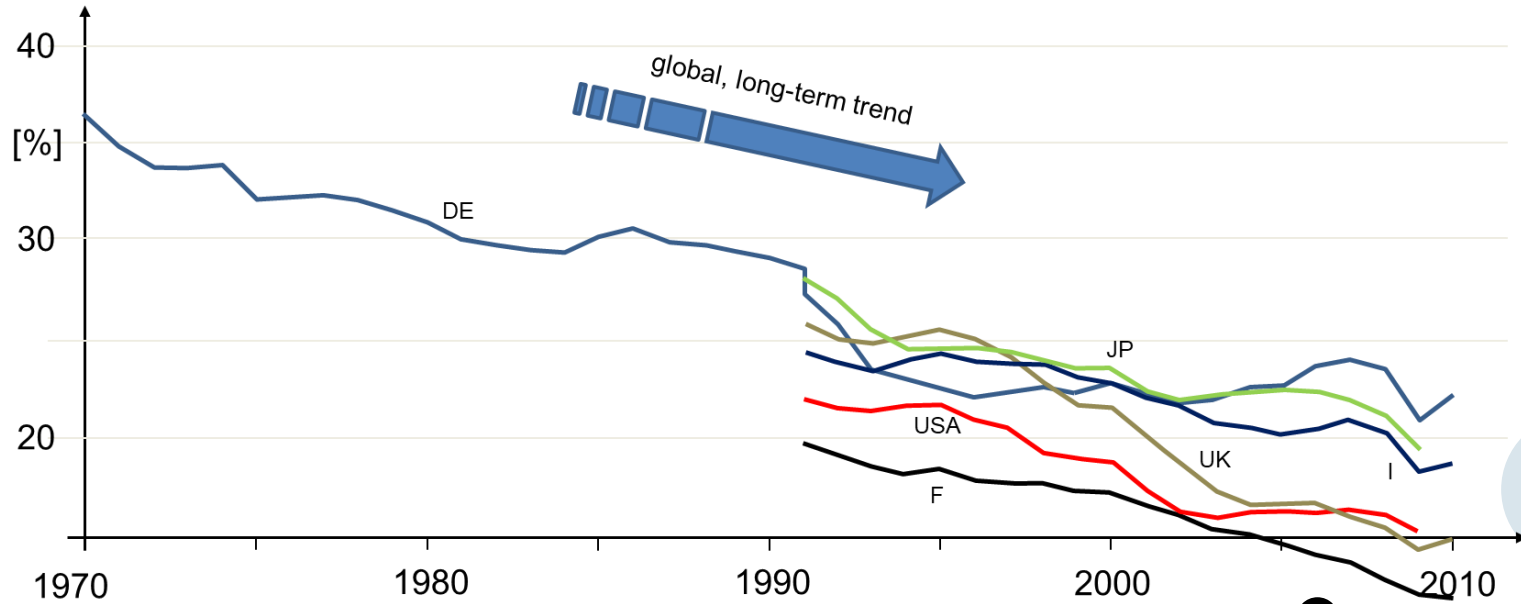


PARTNER FOR SCHOOLS, UNIVERSITIES, AND COMPANIES

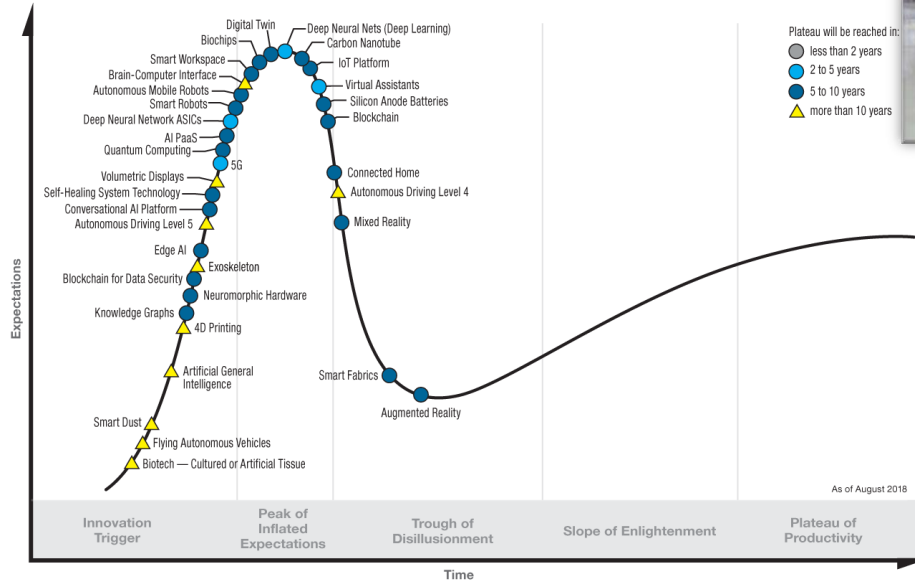
2 APPROACHING THE FOURTH INDUSTRIAL REVOLUTION



2 SHARE OF MANUFACTURING IN TOTAL ECONOMIC GROSS VALUE ADDED



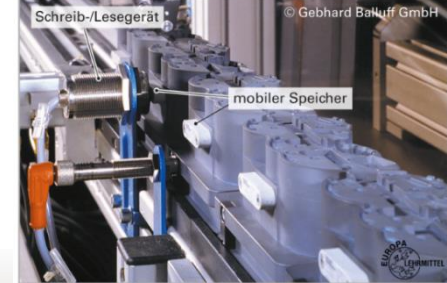
2 UPRISING TECHNOLOGIES



gartner.com/SmarterWithGartner

Source: Gartner (August 2018)
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Hochschule Konstanz



2 DRIVERS OF DIGITALIZATION

E-COMMERCE
CUSTOMIZING
LOT SIZE 1
ADVANCED LEAN OPTIMISATIONS
...



STOCK OPTIMIZATION
COST REDUCTION
QUALITY
PROCESS STABILITY
...



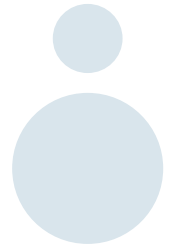
TRACK AND TRACE



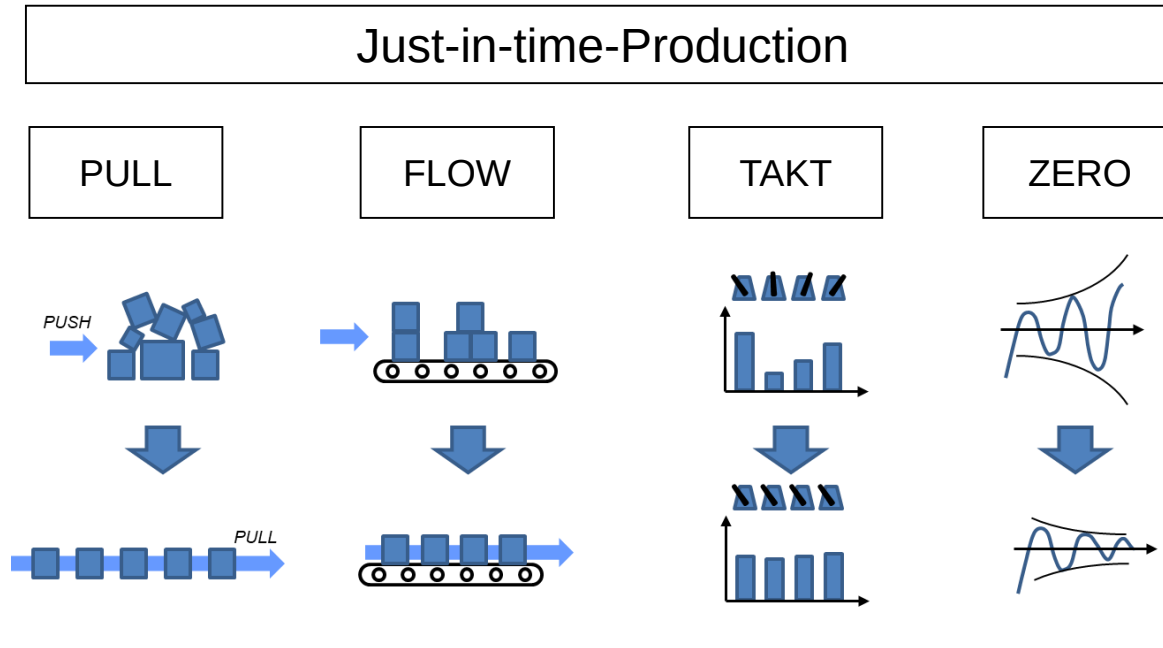
SENSORS



**Factory
Intelligence**
* ANALYTICS

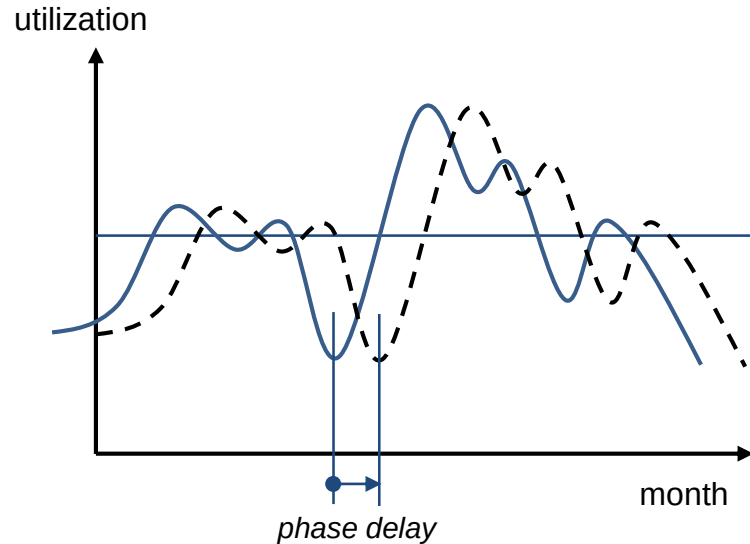


2 SYSTEM DYNAMICS OF LEAN MANAGEMENT

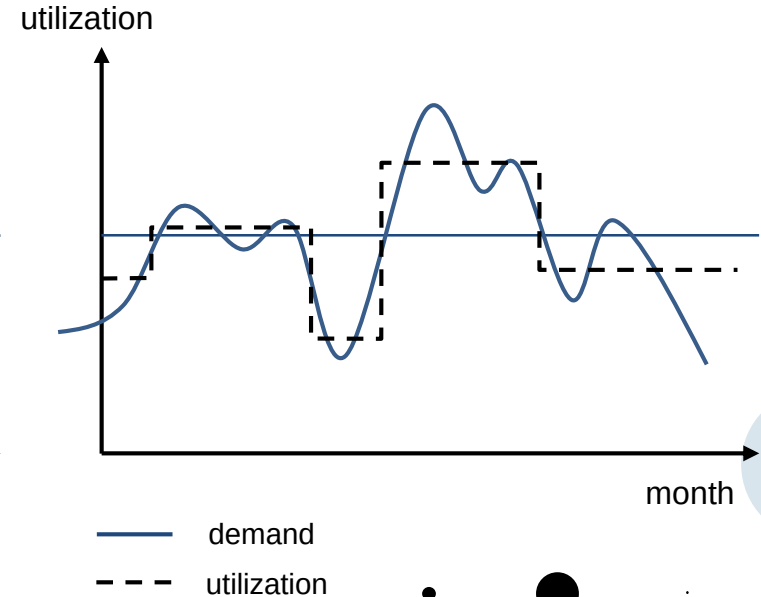


2 SYSTEM DYNAMICS OF MARKET-SYNCHRONOUS PRODUCTION

a) demand driven production

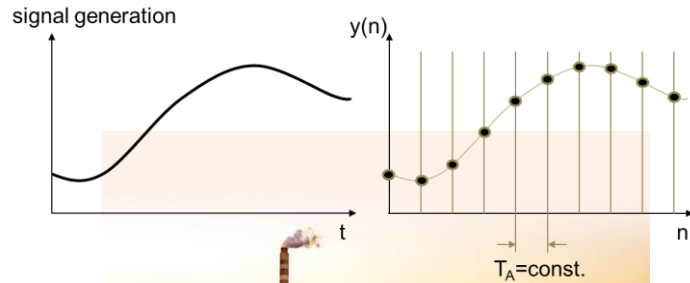


b) markt-synchronous production

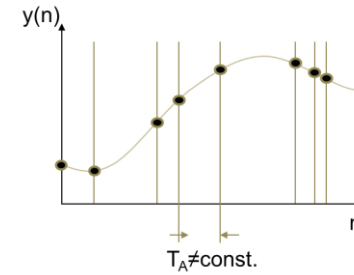


2 SYSTEM DYNAMICS – THE MATH

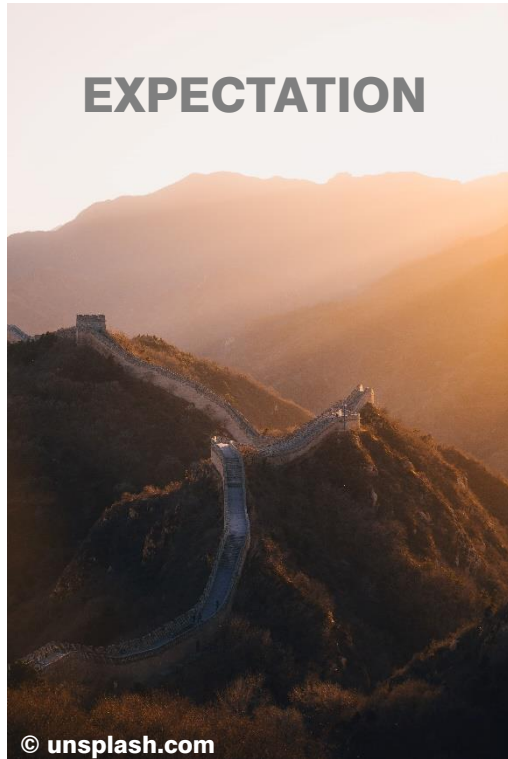
DETERMINISTIC



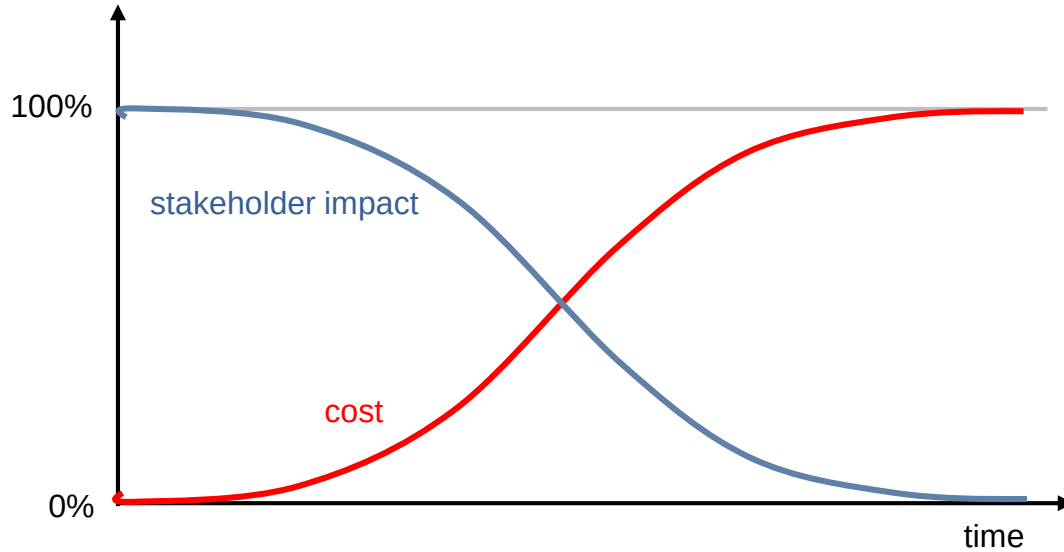
STOCHASTIC



2 DATA LAKE



2 COSTS DURING PRODUCT DEVELOPMENT



3 3-UNIVERSITIES | 3-COUNTRIES | 1-ALLIANCE



UNIVERSITIES

- FH Vorarlberg (AT)
- NTB Buchs (CH)
- HTWG Konstanz (DE)

COOPERATION PARTNER

- RhySearch (CH)

SUPPORTING COMPANIES

- Ingun (DE)
- Virinco (FIN)
- Sybit (DE)
- Thyssen Krupp Presta (LI)
- Sola (AT)

FINANCING



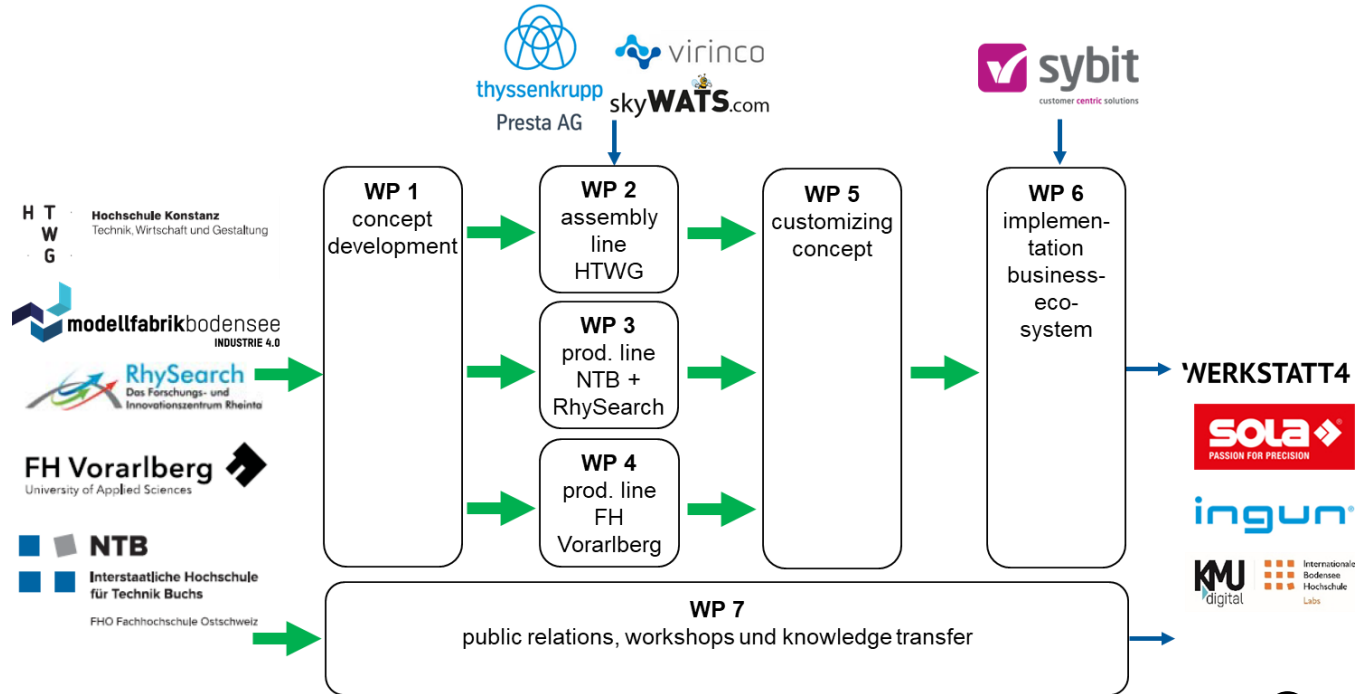
Europäische Union
Europäischer Fonds für
regionale Entwicklung



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



3 FROM RESEARCH TO BUSINESS



3 PARTNER

AIRBUS

AlixPartners
when it really
matters



ACTEMIUM

Baumer
Passion for Sensors



Bundesagentur für Arbeit
Agentur für Arbeit
Konstanz – Ravensburg

chromasens
IMAGING FOR PROFESSIONALS

**Dentsply
Sirona**

edboard

modellfabrikbodensee
INDUSTRIE 4.0

FAULHABER

**Handwerkskammer
Konstanz**

ingun®

**NATIONAL
INSTRUMENTS**

MOTION & CONTROL™
NSK



SFS

SIEMENS

SOLA

**STADTWERKE
KONSTANZ**

thyssenkrupp

thuga
Energie

varity



Volkswagen



VETTER

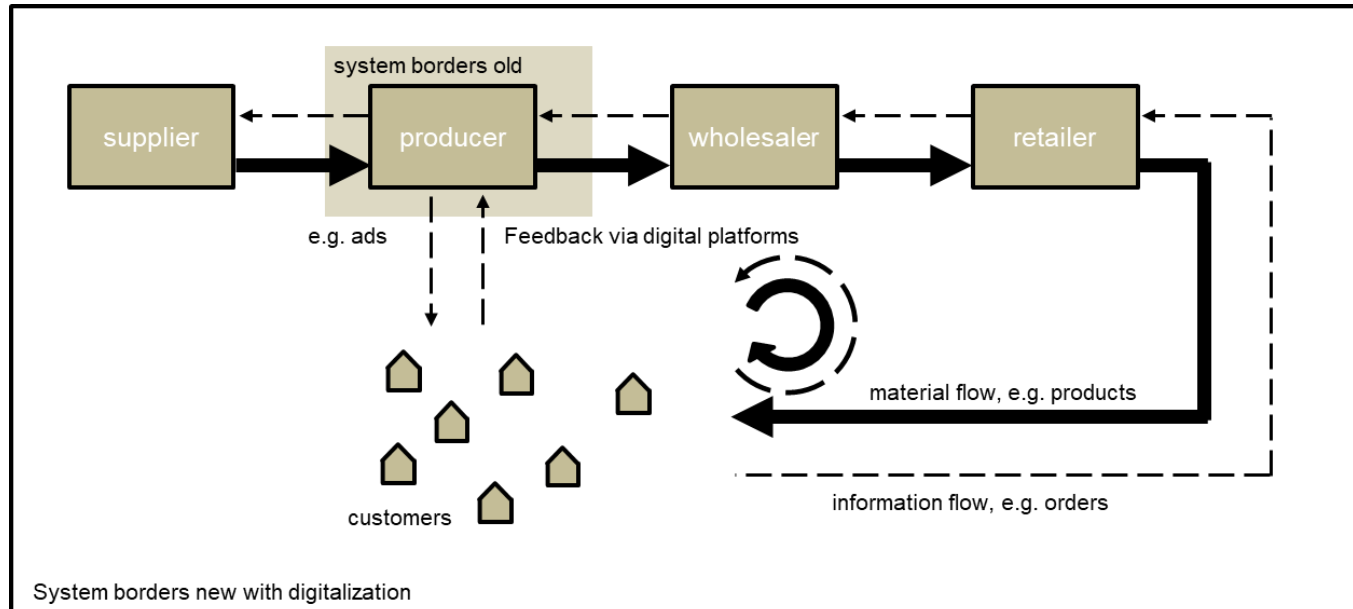
WEBER-HYDRAULIK

WIDOS
Welding. Together.

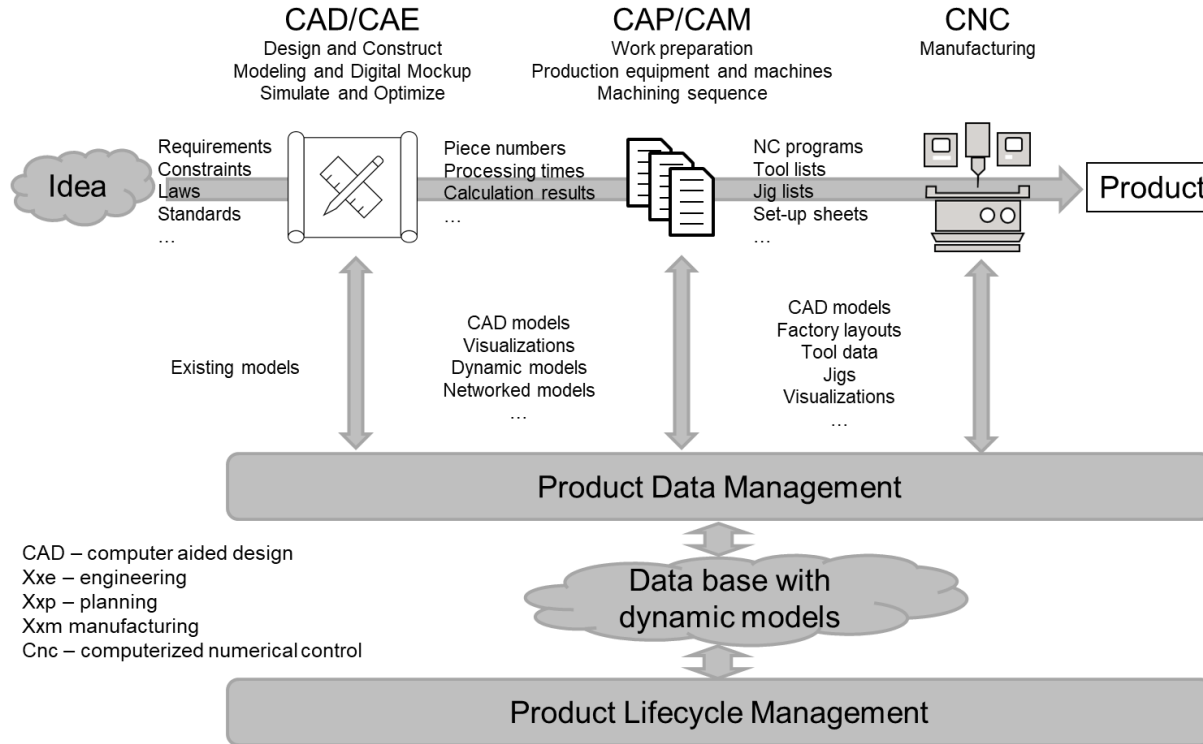
**Zeppelin-Gewerbeschule
Technische Schulen Konstanz**

Hochschule Konstanz

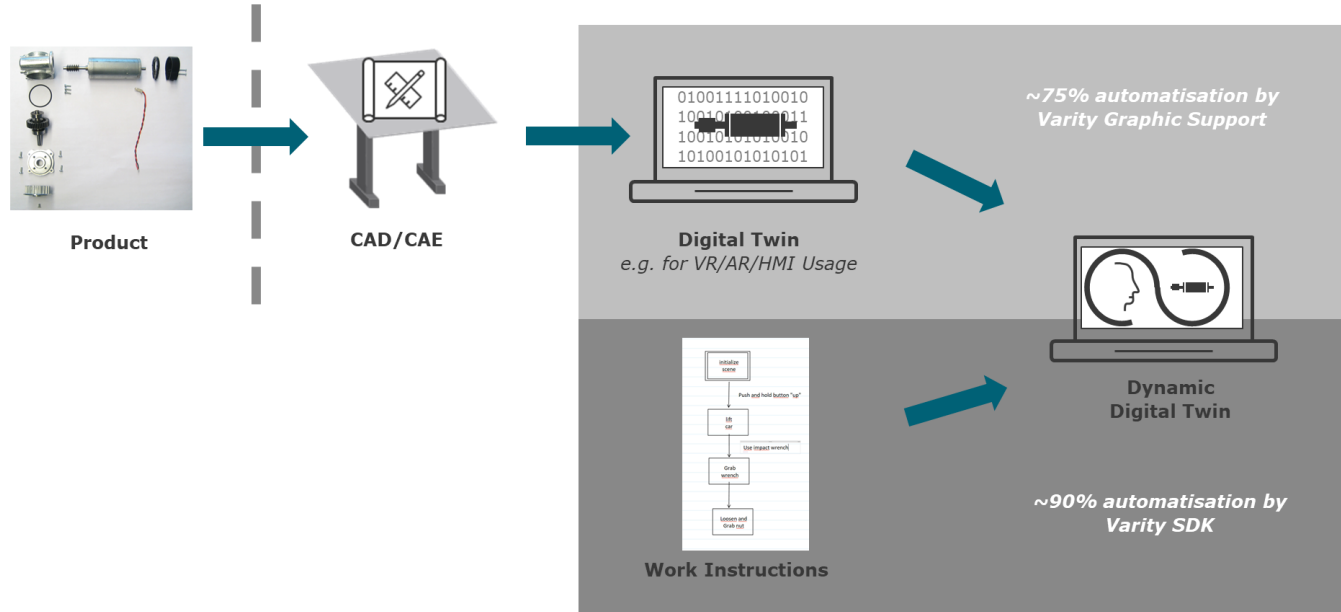
4 IMPROVED SUPPLY CHAIN DYNAMICS by augmented system borders



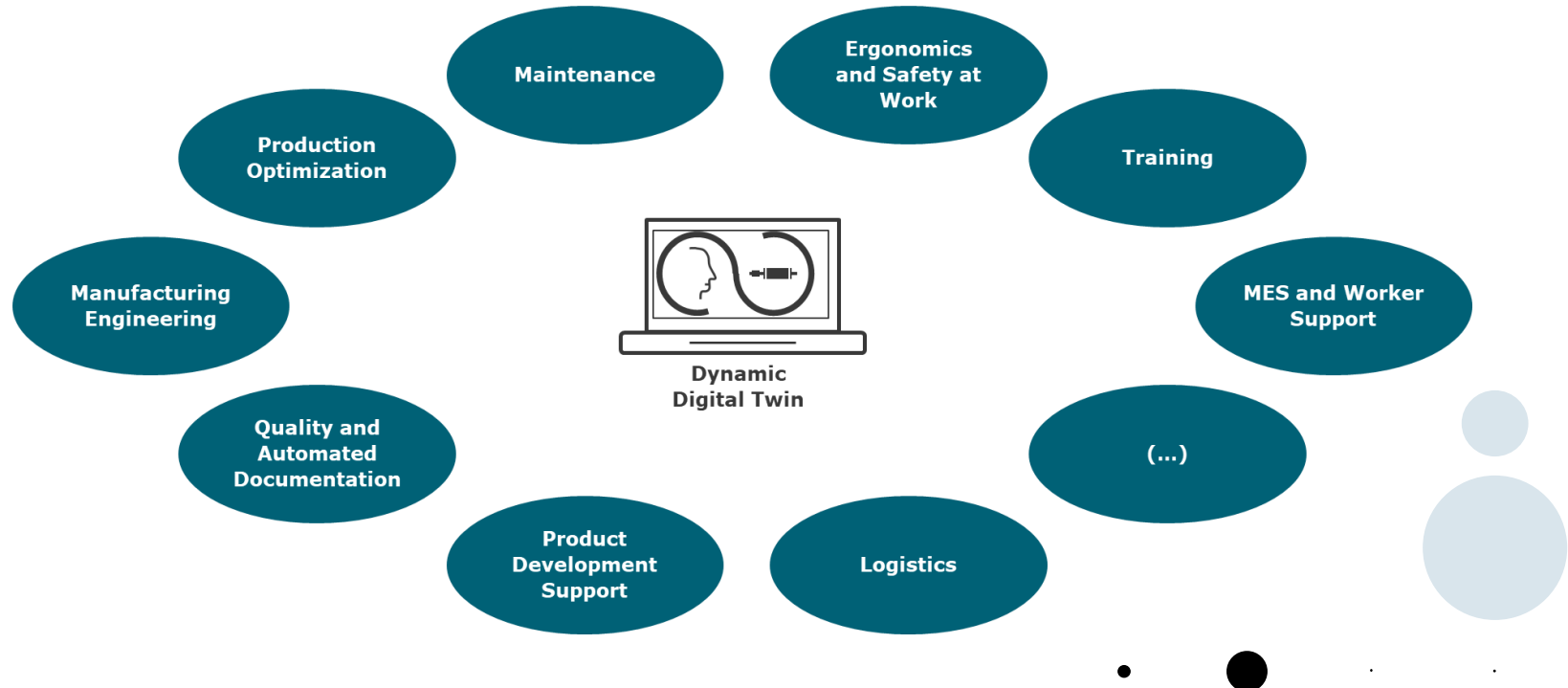
4 THE MATERIAL FLOW AS INFORMATION FLOW



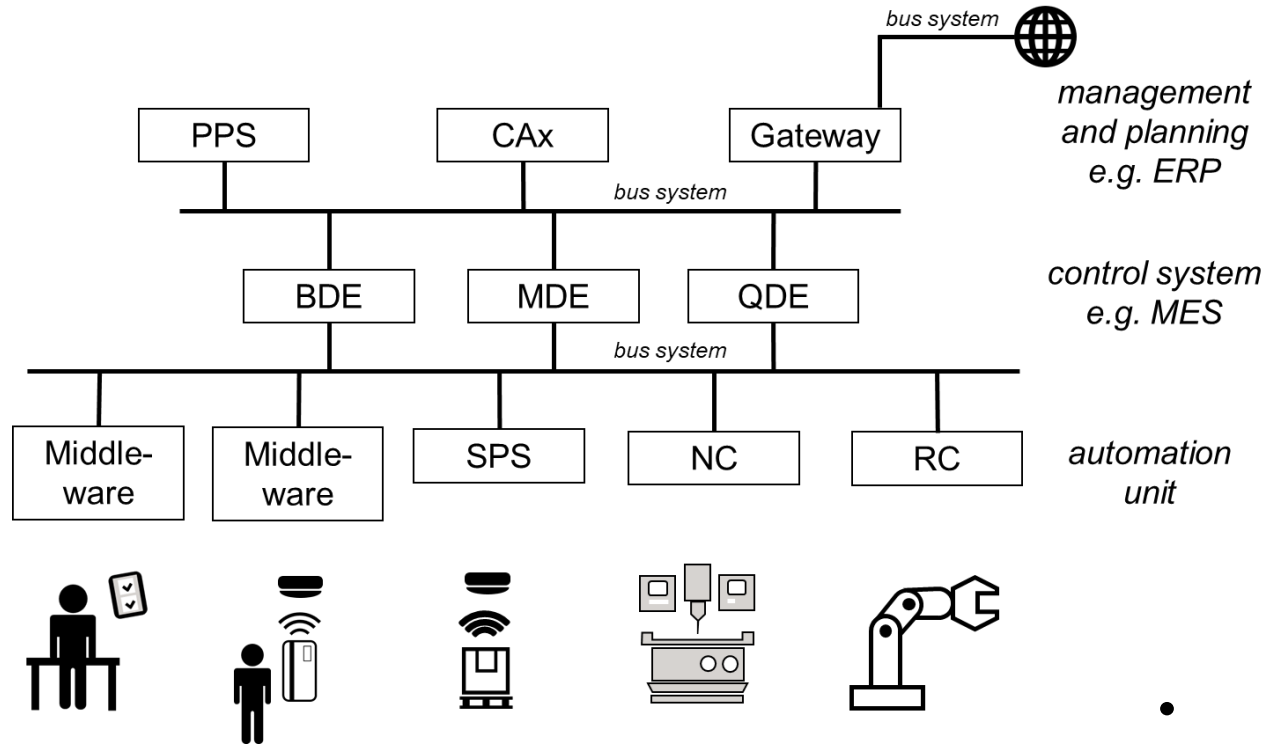
4 WORK FLOW FOR AN INTEGRATED DIGITALISATION



4 HUGE POTENTIAL OF DYNAMIC DIGITAL TWIN

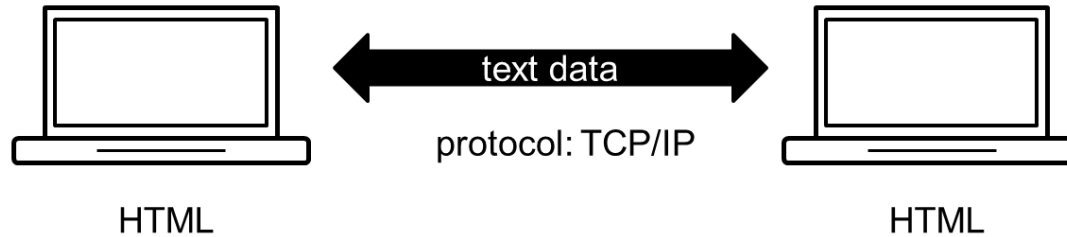


4 HIGHLY STANDARDIZED AUTOMATION SYSTEM

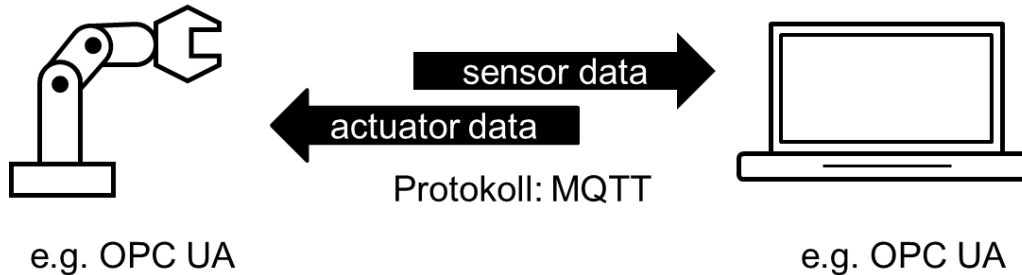


4 PULL INFORMATION – ACCORDING MATERIAL FLOW

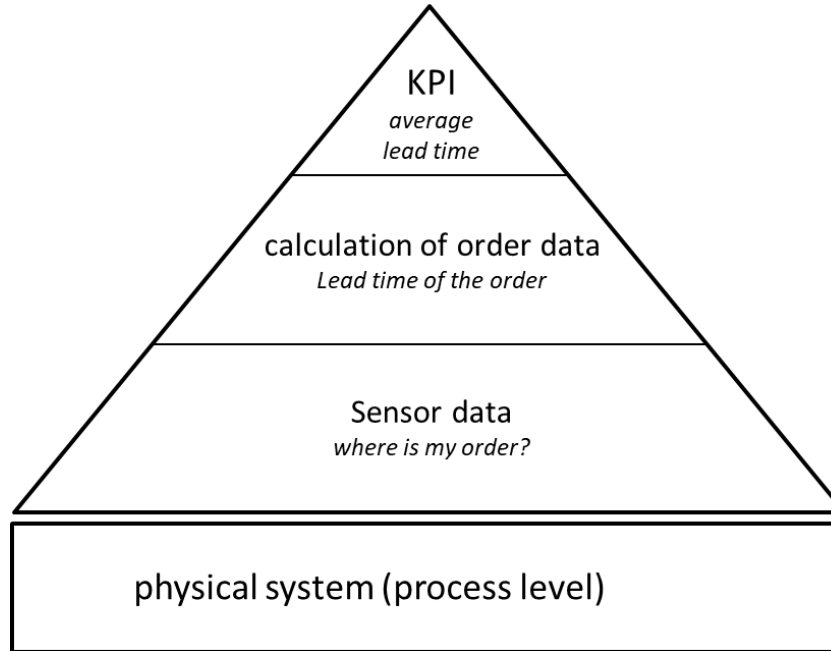
a) data exchange and presentation inbetween computers



b) data exchange and presentation with CPS



4 COSTE EFFICIENT DATA GENERATION



5 TARGETS OF THE TESTBED INDUSTRY 4.0

- IMPLEMENTATION OF AN AGILE DEVELOPMENT PROCESS FOR CUSTOMIZED PRODUCTION
- DEMONSTRATION OF THE POSSIBILITIES OF HIGH AUTOMATION IN A PROCESS LANDSCAPE 4.0
- DEVELOPMENT OF A STORE FLOOR-BASED, CROSS-BORDER BUSINESS ECOSYSTEM
- DEMONSTRATION OF THE IMPLEMENTATION OF DIGITALIZATION IN REGIONAL COMPANIES AND SMES
- TRAINING OF STUDENTS AND PROFESSIONALS



5 LESSONS LEARNT

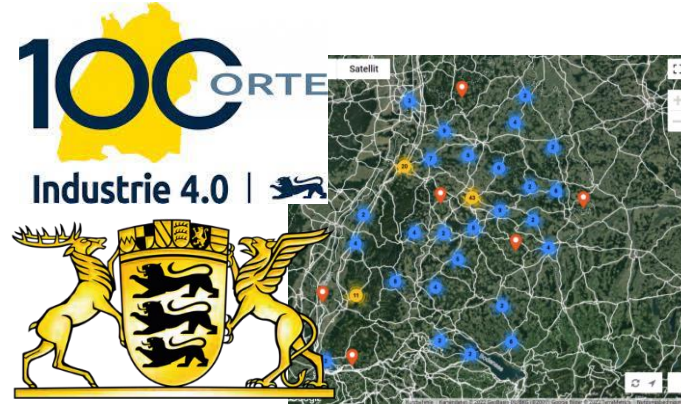
- KEEP THE DATA LAKE CLEAN!
- SINGLE SOURCE OF TRUTH!
- LIMIT COST FOR SENSOR TECHNOLOGY AND FOR DATABASE MAINTENANCE!
- BRING THOUGHTS FROM HUMANS TO MACHINES - NOT VICE VERSA!
- OPEN SYSTEMS TO BIG DATA!



5 DECORATION



AWARD
VDMA Competition



FLAGSHIP PROJECT
Production of the Future

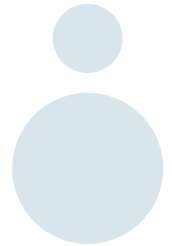
HRK German Rectors' Conference
The Voice of the Universities

AWARD
Good Practice



USE CASE
Potential and Experience
of Industrie 4.0

ZVEI
Die Elektroindustrie
USE CASE
AI in Industrial Automation



Handelsblatt

[illegible]

The image features the SRF news logo in the top left corner, consisting of the letters 'SRF' in white on a red background, with 'news' in white on a smaller red background below it. To the right of the logo is a photograph of a small, dark-colored robot car with orange wheels and a sensor on top, set against a blurred background.

THANK YOU
for your attention