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Industrie 4.0 @ WITTENSTEIN

Basics / Usecases / Lessons Learned

Thomas Bayer
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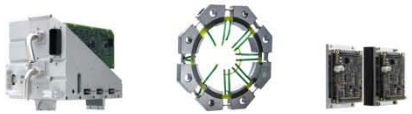
Mechanical & Mechatronic Drive Solutions

WITTENSTEIN alpha

WITTENSTEIN intens

WITTENSTEIN electronics



WITTENSTEIN bastian

WITTENSTEIN motion control

WITTENSTEIN aerospace & simulation

WITTENSTEIN cyber motor

attocube systems

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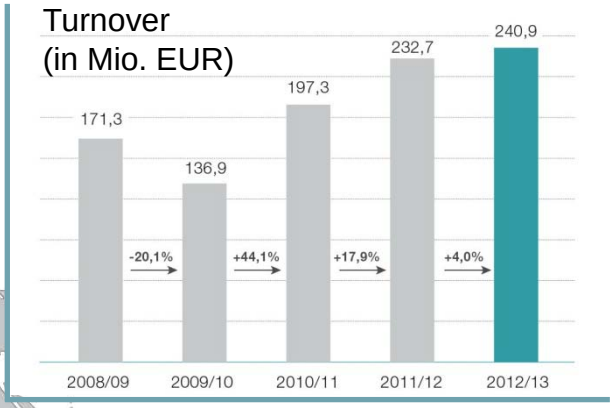
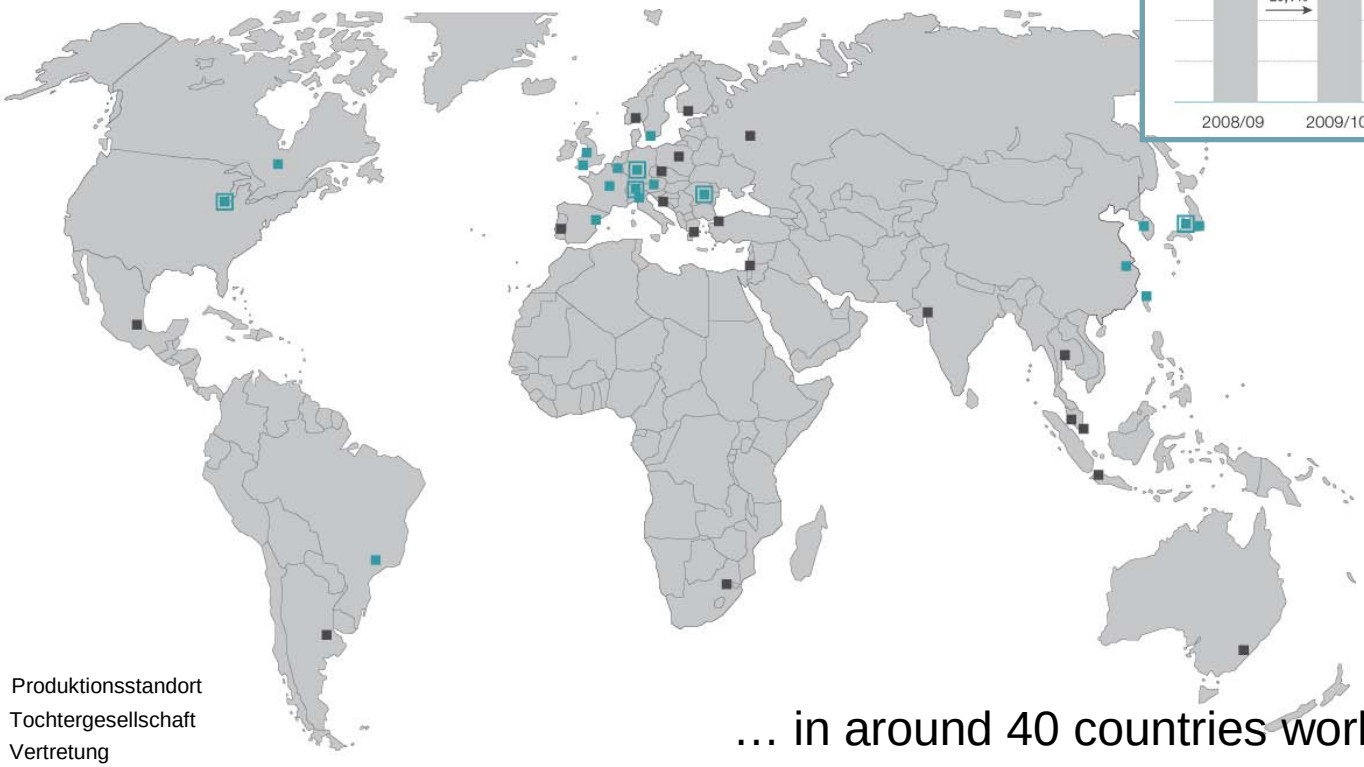
WITTENSTEIN International





… in around 40 countries world wide.

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Innovative Solutions – from Subsea to Space

Foto: Trumpf

Foto: airbus

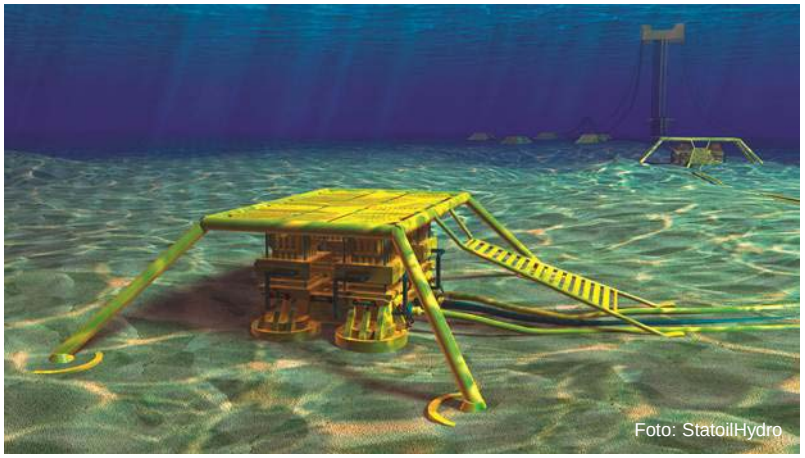
Foto: StatoilHydro

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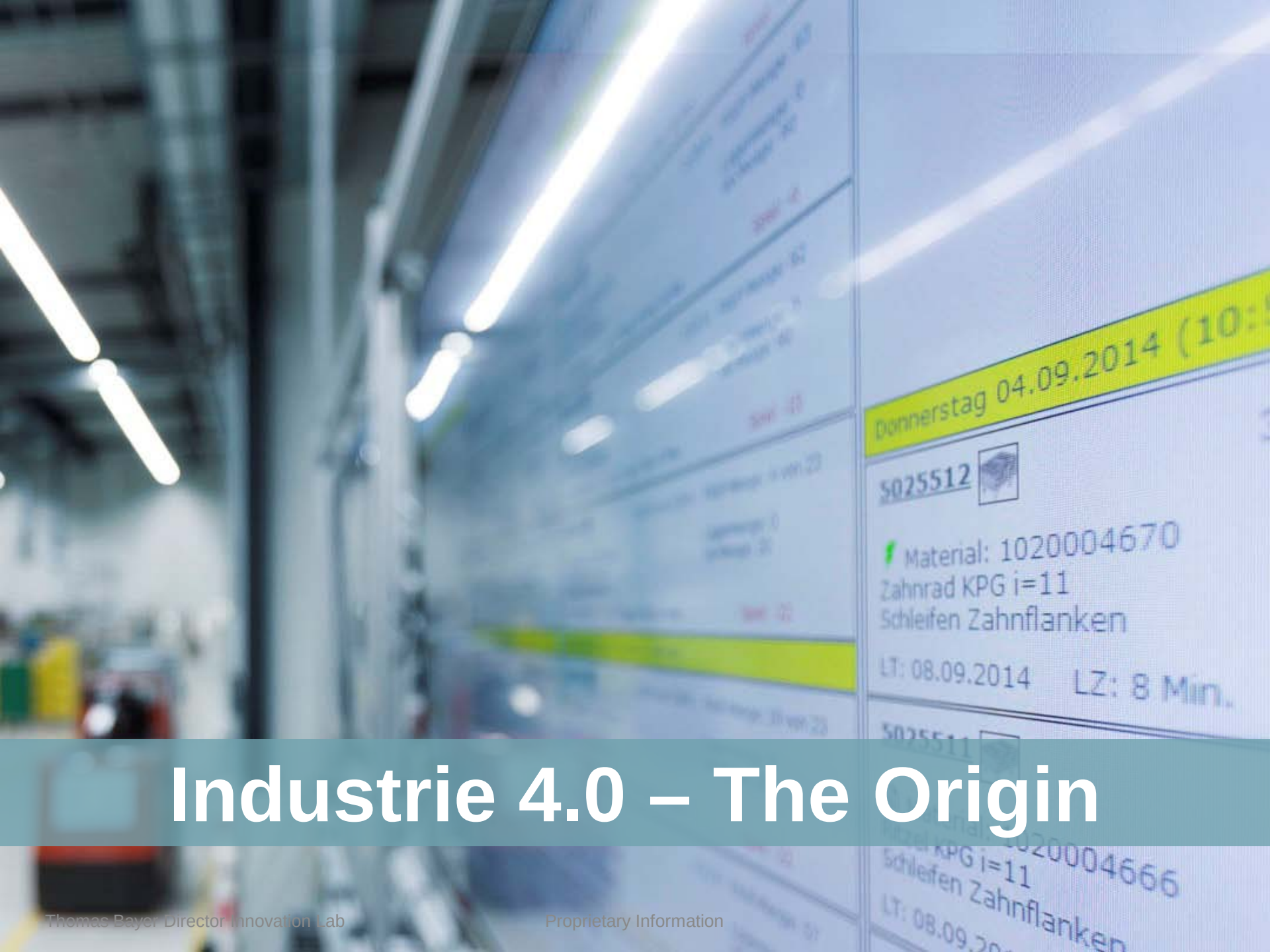

Industrie 4.0 – The Origin

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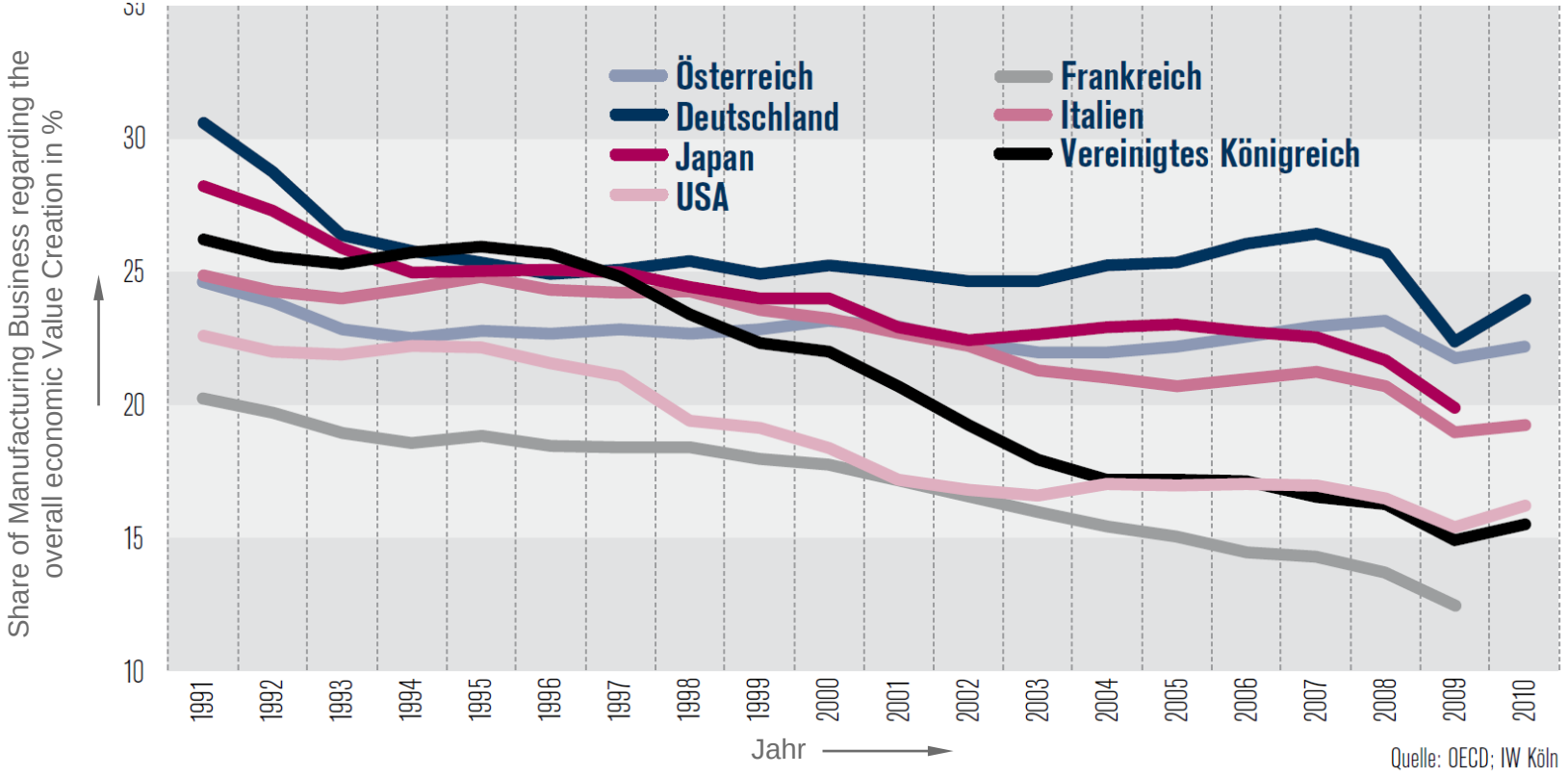
Need for Action – Industry Share in Comparison



Source: Forschungsunion: Umsetzungsempfehlungen für das Zukunftsprojekt Industrie 4.0 (2012)

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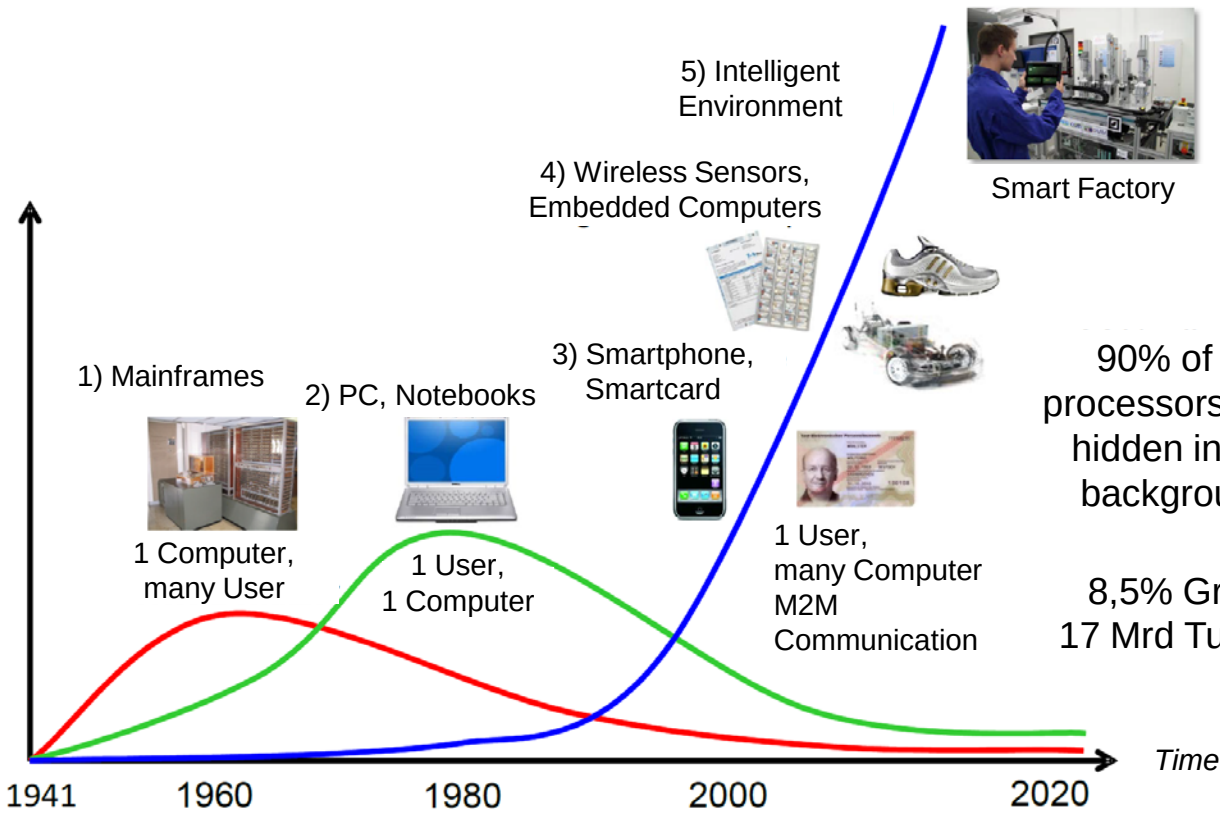
Mega Trend to intelligent Environments



90% of all processors work hidden in the background

8,5% Growth
17 Mrd Turnover

Quelle: Prof. Wahlster, DFKI GmbH

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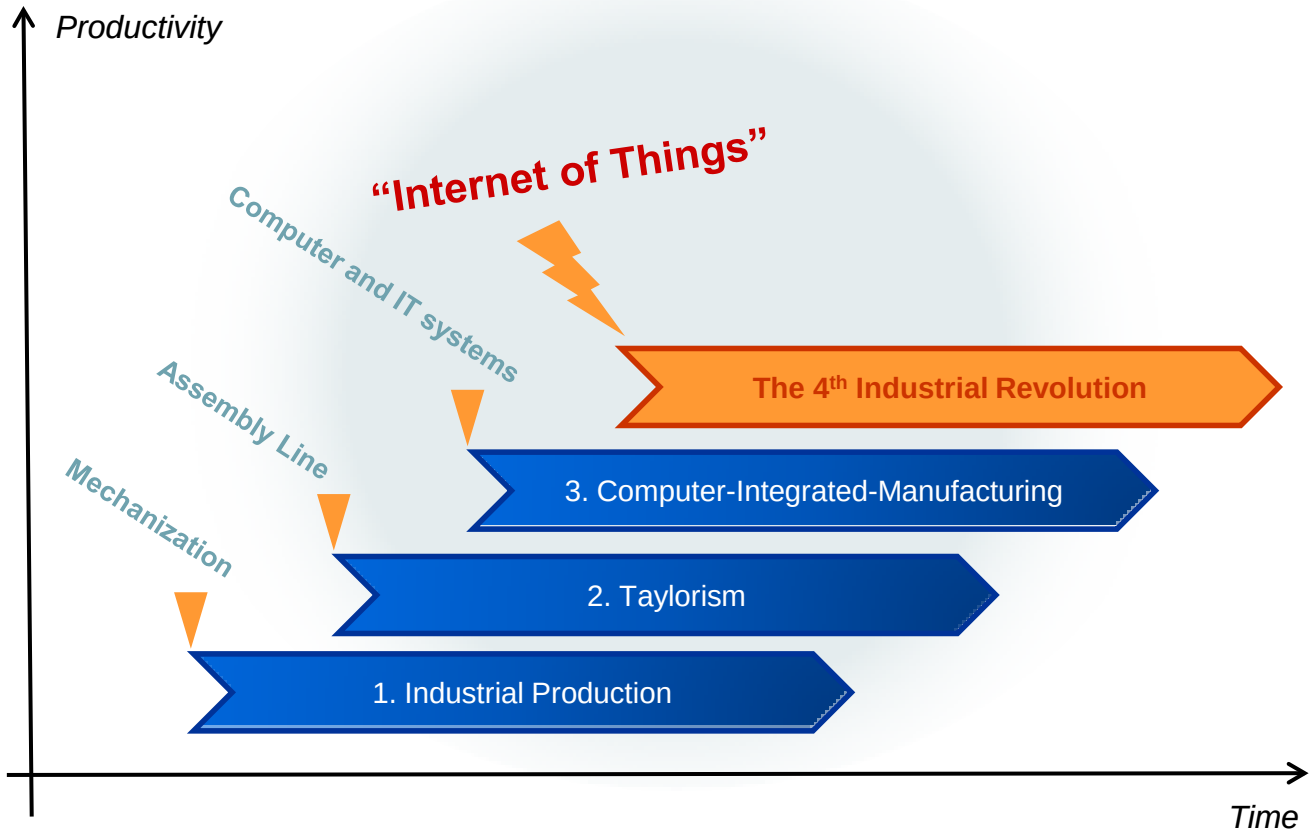
Industrial Revolution



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Paradigm of the Internet of Things

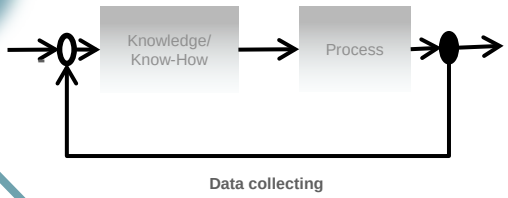
Ubiquitous Computing
- „Digitalization“ of daily objects

Collection of data in „high resolution“

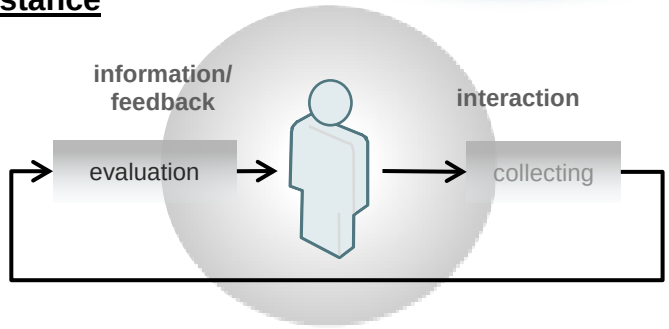
Selecting/
filtering/
interpreting/

Ambient Intelligence:
- **Proactive autonomous Control**

Effective information access and efficient interpretation with internet technologies



Ambient Assistance



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Views on Industrie 4.0

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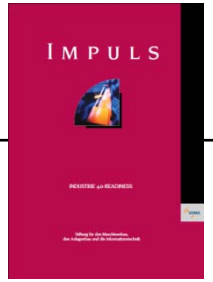

For what Stands “Industrie 4.0”?

	Physical	Virtual	
Operations	**Smart Factory** The equipment of assets with sensors allows to build up networks to increase transparency and planning capability	**Smart Operations** The Smart Factory enables flexible production planning and scheduling as well as processes without media breaks	**Operational Excellence** - Increased efficiency through further automation - Customized products for the price of mass products
Product	**Smart Products** The Product is able to think and stays in contact with the manufacturer over its complete life cycle	**Data-driven Services** The network of product, manufacturer and customer opens new markets for services	**Expansion of the products performance** - Sales increase through digital value-added products - Open up new markets

Digitalization

Business Targets

Referring to: Lichtblau, K. et al.: Industrie 4.0 Readiness. Impuls Stiftung, Aachen, Köln, Oktober 2015. http://www.impuls-stiftung.de/studien, last access Oct. 20, 2015

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Views on Industry 4.0

Disruptive Approach

- Industrie 4.0 offers completely new business opportunities

Progressive Approach

- Industrie 4.0 solves problems from today with technologies from tomorrow

Destructive Approach

- Industrie 4.0 is not new and does not contain innovative aspects

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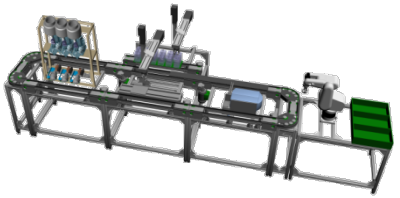
The Human as informed Decider in the Loop

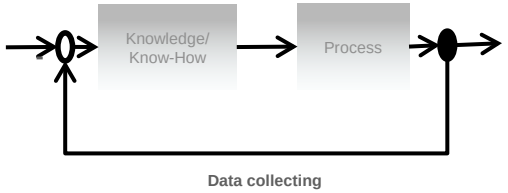
Actual and extensive Information



e.g.

- **Optimized production processes**
- **Adherence of quality standards**
- **Effective ramp-up of complex production processes**

Interpretation and Presentation



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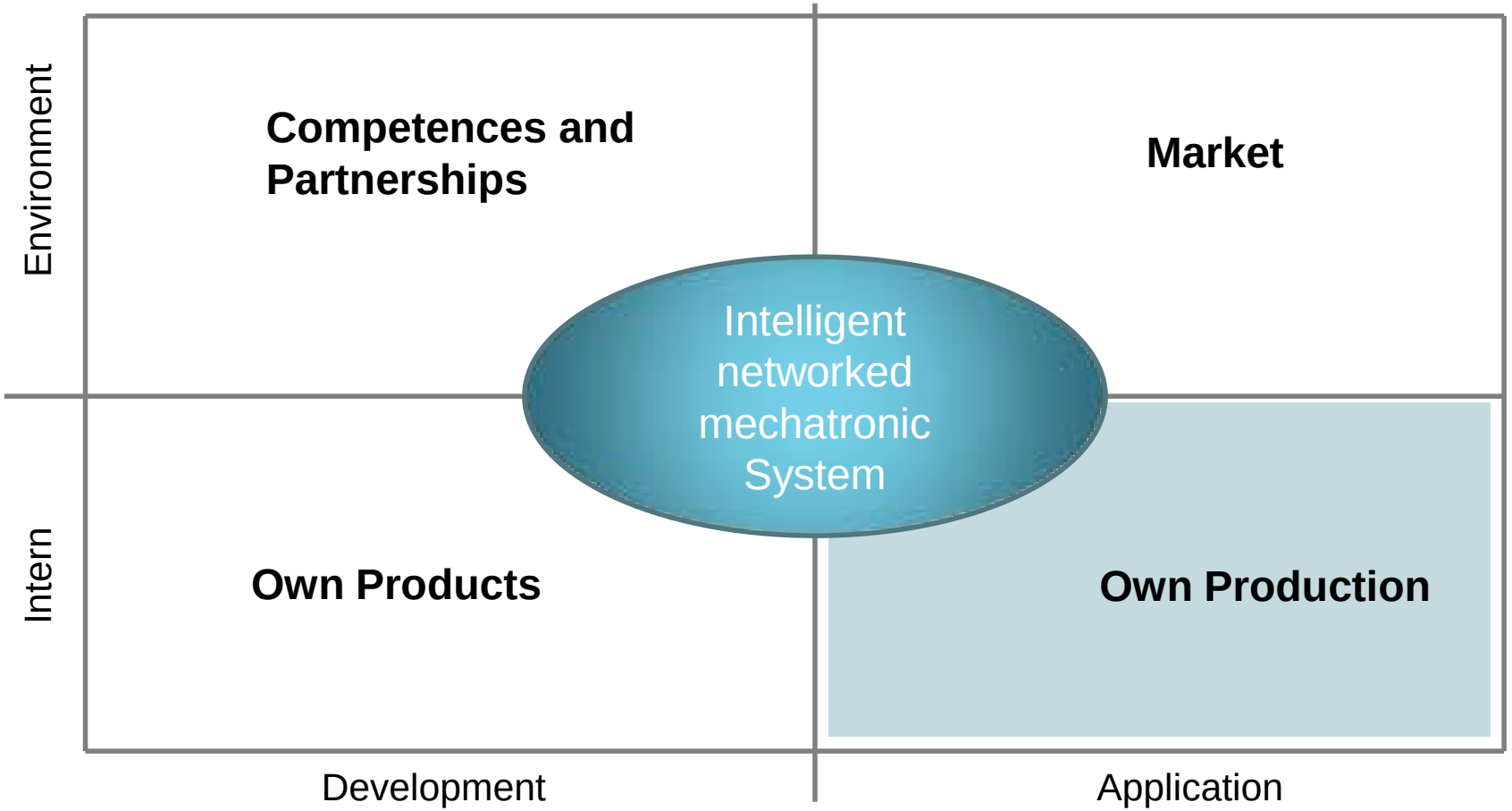
The R&D field of Cyber Physical Systems



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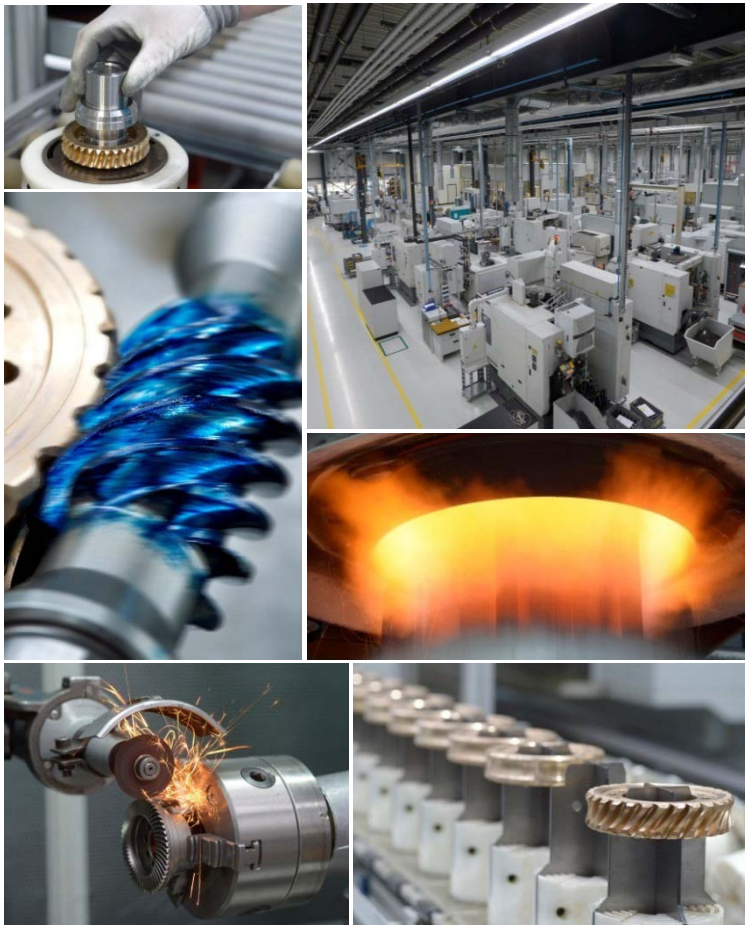
WITTENSTEIN bastian GmbH – Product und service Portfolio

- High performance tooth works
- Tooth works of high accuracy and precision
- Prototyping customized gear systems
- Serial production
- Non-standard tooth works and gearing



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WITTENSTEIN bastian GmbH – Key Challenges

Multi-variant product portfolio with special solutions, small batch sizes down to batch size one

Order specific process chains, dynamic bottlenecks in order processing

High training effort necessary to get workers skilled

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Public Funded R&D Project CyProS – Goals

CyProS
Vernetzte Intelligenz in der Produktion

Development of a representative spectrum of cyber physical system modules for production and logistic systems.

Provision of universal procedures, measures and platforms to introduce CPS.

Creation of a technical and methodolical basis for an economically feasible application of cyber physical systems in real production.

Bundesministerium für Bildung und Forschung
PTKA Projektträger Karlsruhe
Karlsruher Institut für Technologie

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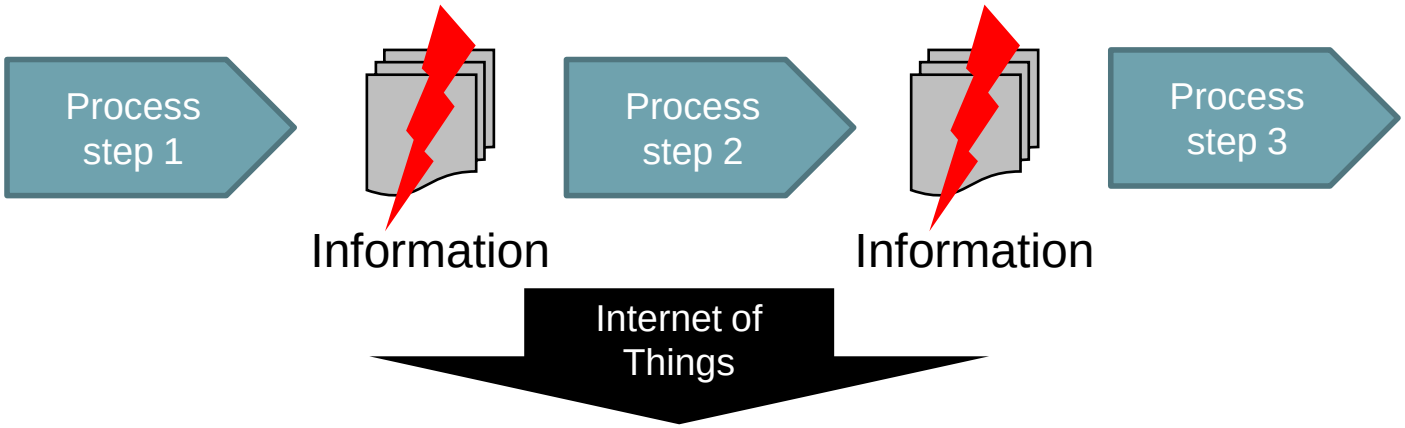
The Progressive Approach - Optimization of Shop Floor Processes by closing Media Breaks



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Industrie 4.0 Use Cases in Fellbach Factory

CYPOS
VERNETZTE INTELLIGENZ IN DER PRODUKTION

Flexible Intralogistics by introducing
the Internet of Things

Mobile Access to
Production Planning System

Internet Service Platform, Predictive Maintenance,
Process Information and Documentation

Auto-ID based
Management of changeover Parts

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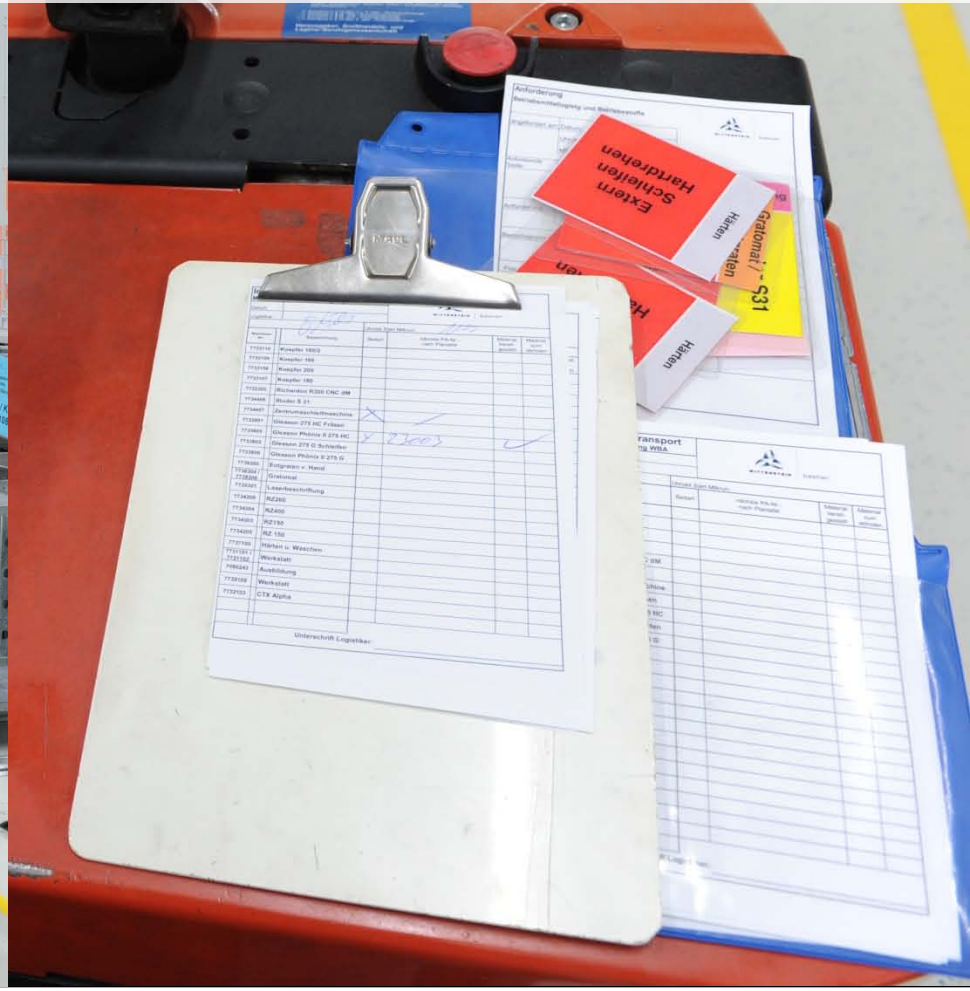
Usecase: Intralogistics



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Usecase: Intralogistics

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Usecase: Mobile Access to PPS

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Usecase: Mobile Access to PPS

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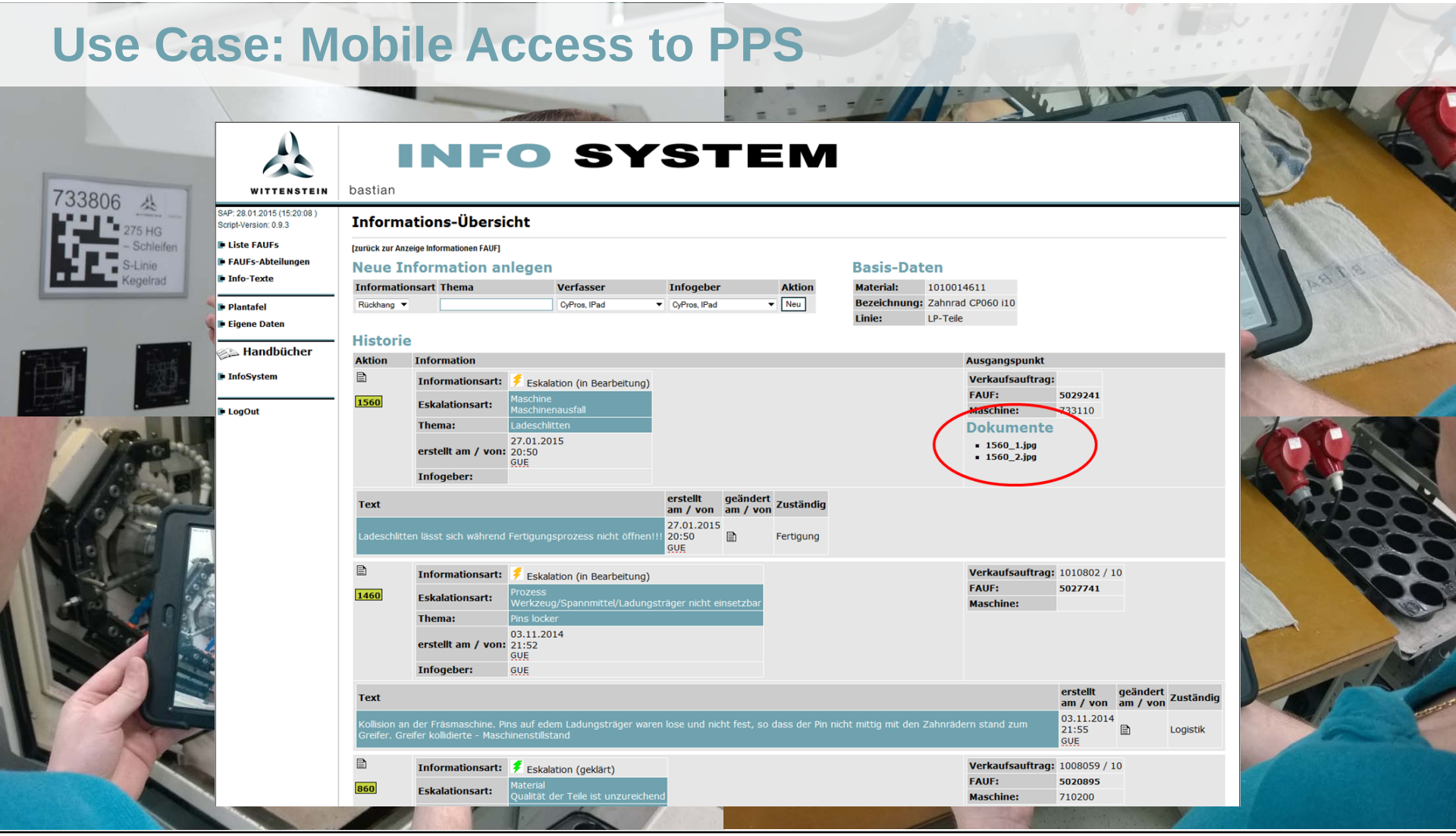
Use Case: Mobile Access to PPS



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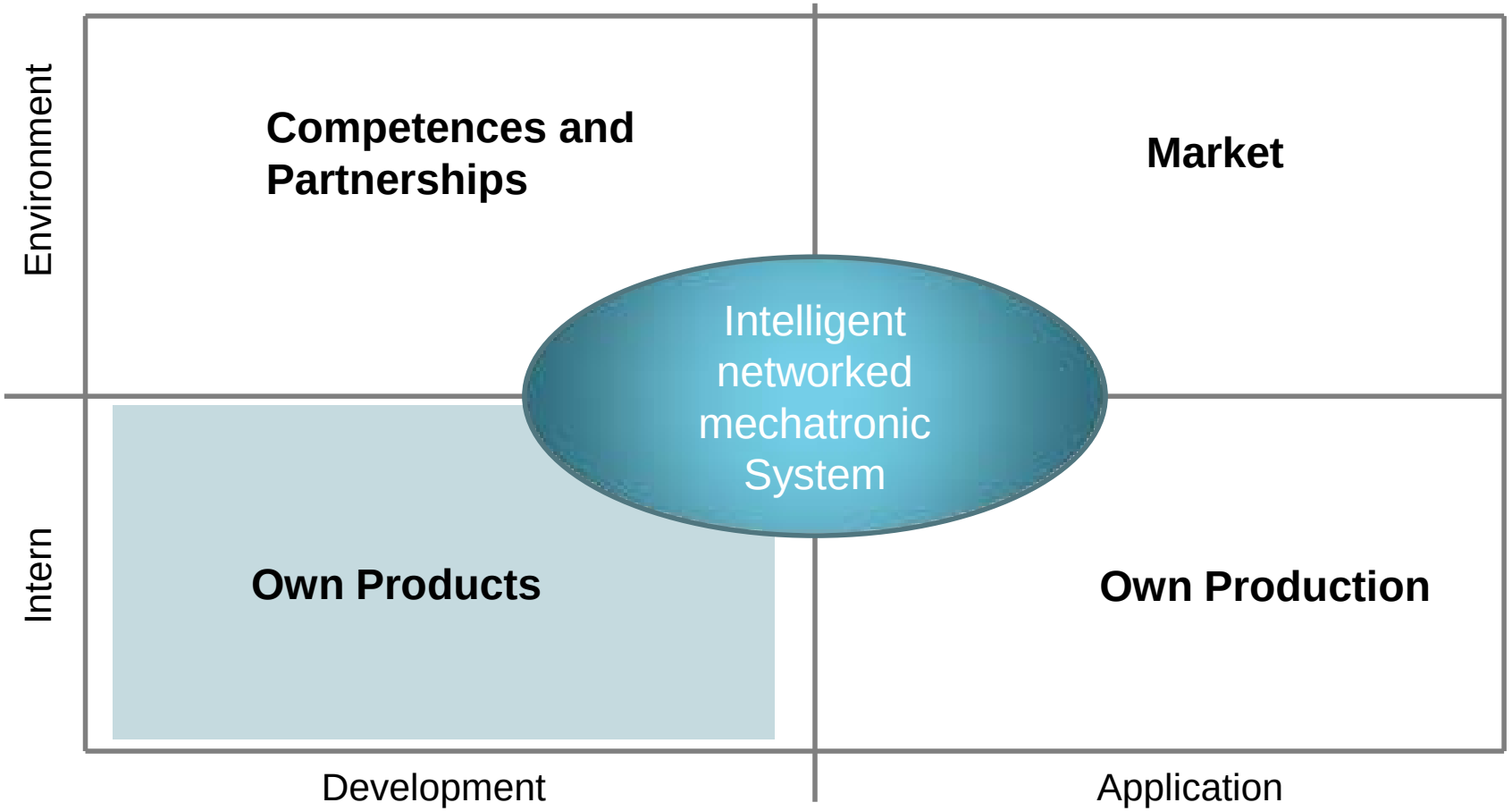
The R&D field of Cyber Physical Systems



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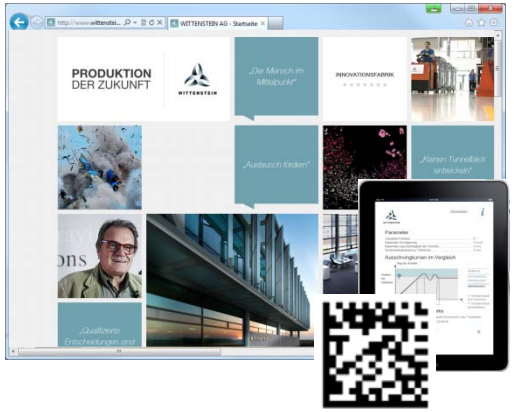
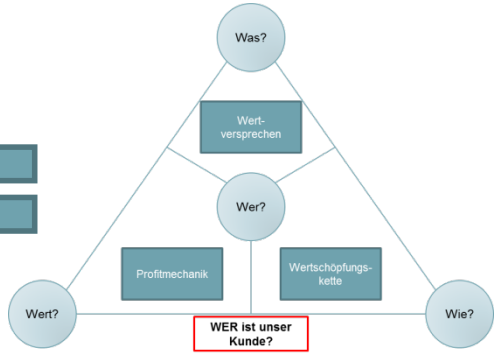
Disruptive Approach – Software-based Services as Foundation for new Business Models

Typical mechanical Products



IoT, IoS, CPS



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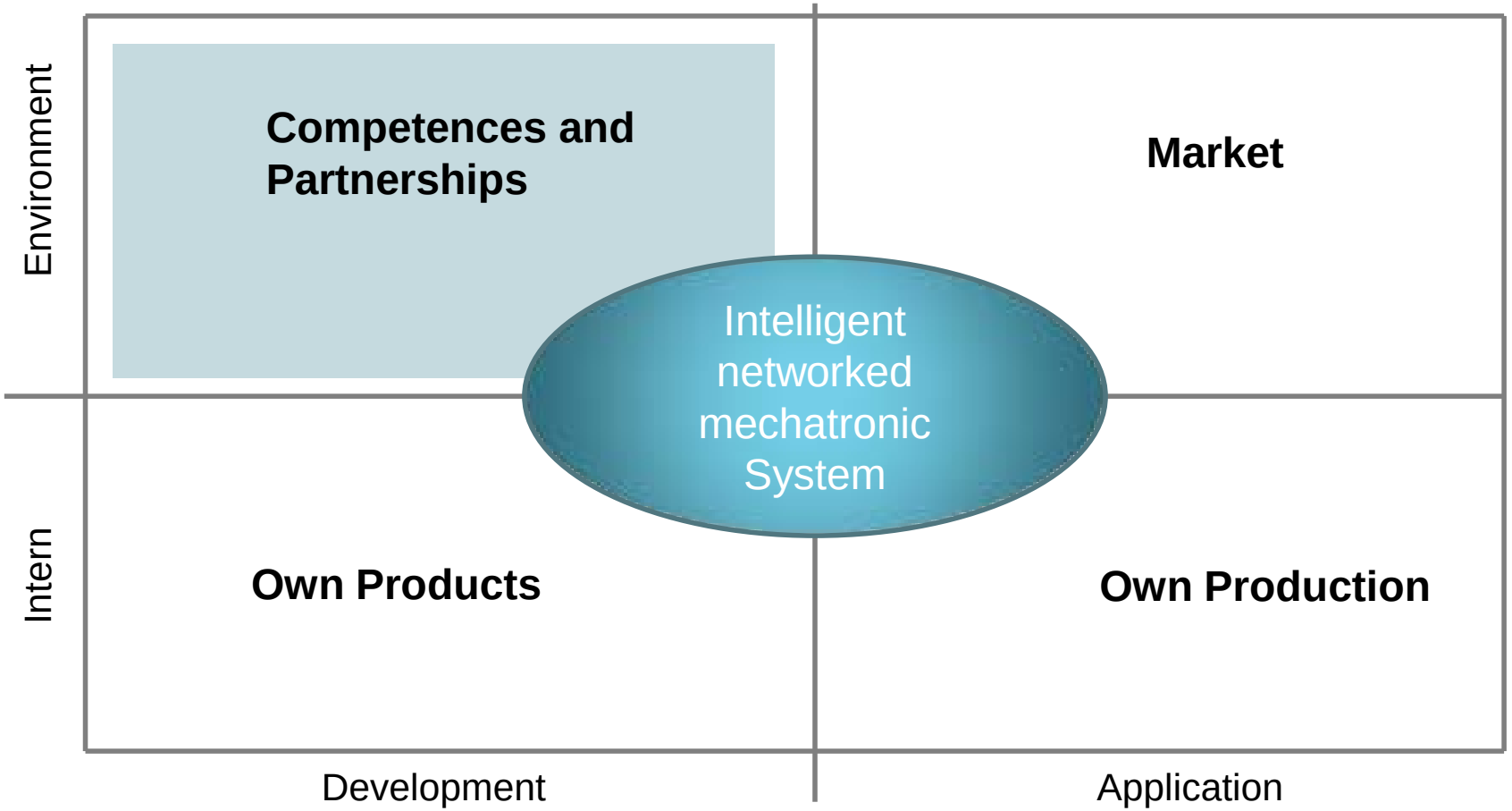
The R&D field of Cyber Physical Systems



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Development of Networked mechatronic Drive Systems

Steuern Sie unser System nach den Prinzipien der Industrie 4.0 mit Ihrem Smartphone

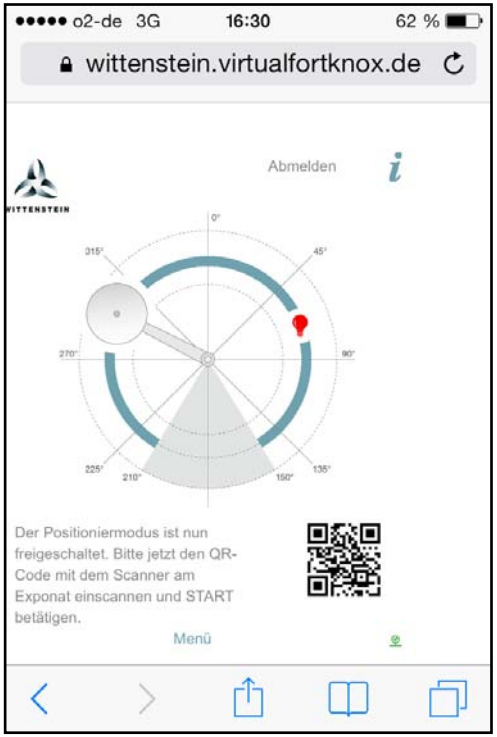
In Zusammenarbeit mit

m2m-soft

hp

Fraunhofer IPA

VIRTUAL FORT KNOX



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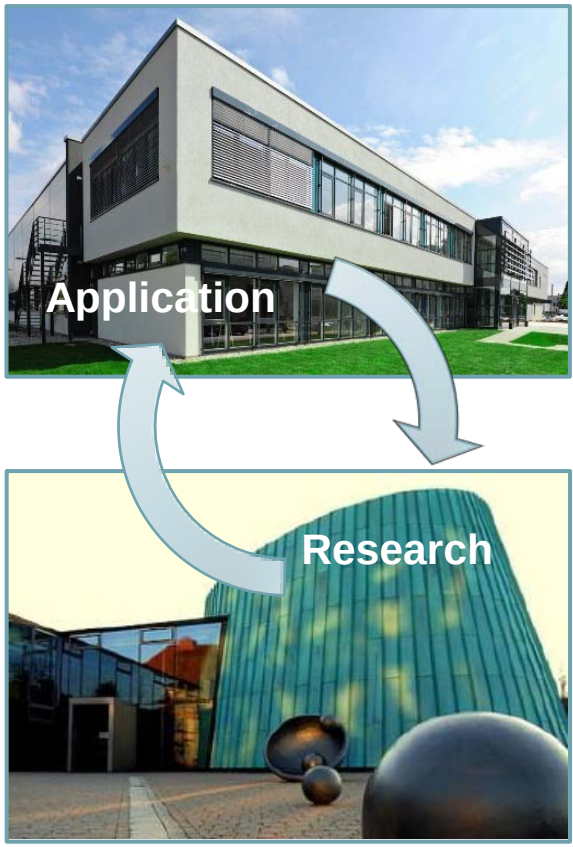
WITTENSTEIN Industry Campus – the next Step

Vision

- Leading institute for implementation of Industrie 4.0 in concrete products, processes and business models
- Closing the gap between technological invention and its economic implementation as innovation

Mission

- Making Industrie 4.0 and its benefits tangible by implementing concrete usecases
- Interdisciplinary education of junior employees between typical engineering sciences and ICT



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Role of the Human

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How Will Working Environment Change?

Human as Informed Decision Maker in the Center

- In Industrie 4.0 human workers will be able to make optimal decisons based on comprehensive realtime information from the shop floor

Increased Focus on Core Competencies and Core Tasks

- By the reduction of inefficent times for information retrieval and routine tasks, core competences of human workes are stepping into the centre

Security for Persolal Data as Solvable Issue

- Privacy requirements for securing personal data of human workers can be solved on the level of practical applications

Inclusion of Shop Floor Workforce Right from the Beginning as Key

- Human workers to be meant to use Indiustrie 4.0 applications in their daily work need to be involeved already in the design phase of systems

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Lessons Learned

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Lessons Learned

Stop Talking, start Implementing

- System understanding will grow by implemnetation efforts taken, support the human in the loop

Application first, Technology second

- Technology is not the problem, ist the integration in organizational processes that‘s tricky

ICT is moving in the Center of Value Creation

- ICT will create teh opportunity for new business models

Development within Partner Networks as promising approach

- A tight network of partners with complementary cometences is the key for success

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WITTENSTEIN – one with the future!

Innovation with passion

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