

# LOGISTICS 4.0 AND THE INTERNET OF THINGS

Workshop “Platforms for connected Factories of the Future”

Thorsten Hülsmann · 5<sup>th</sup> of October 2015



# Fraunhofer IML and EffizienzCluster



## Fraunhofer Institute for Material Flow and Logistics

- Founded in 1981 in Dortmund
- More than 200 Scientists and 250 Student Assistants
- Turnover of 25 Million € (2014)
- There of 40% from Industry, Trade and Services



## EffizienzCluster LogistikRuhr

- Founded in 2010
- 120 Companies (Including Volkswagen, Daimler, Bosch, Würth) and 12 Research Institutes, 37 Projects, Programme Volume of 100 Mill. €
- Goal: to Increase Efficiency by 25% through **Autonomization of Logistic Processes** in Manufacturing, Production, Retail and Logistics Services, Safeguard the Leading Role of Europe in Logistics Performance

# Industrie 4.0: Developments towards Smart Factory

## Intelligent Transport Items



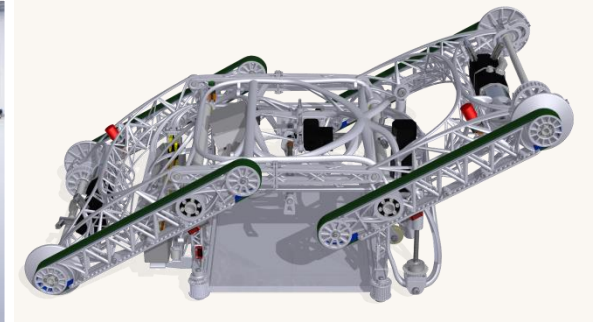
- Sensor Intelligence
- Communicating
- Energy Harvesting

## Cellular Transport Systems

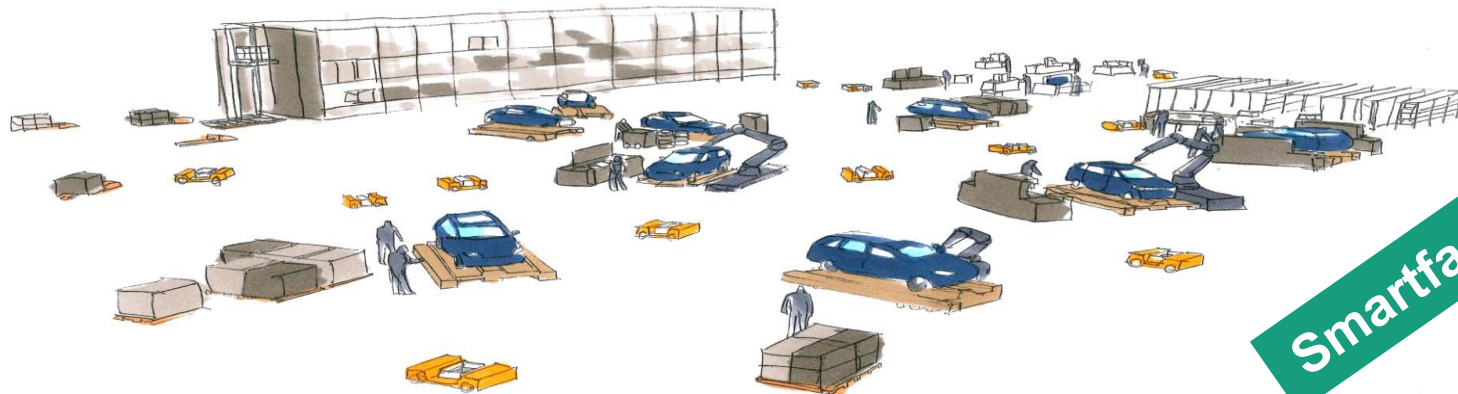


- Autonomous Driving
- Self-controlled Behaviour
- Swarm Intelligence

## Rack Racer

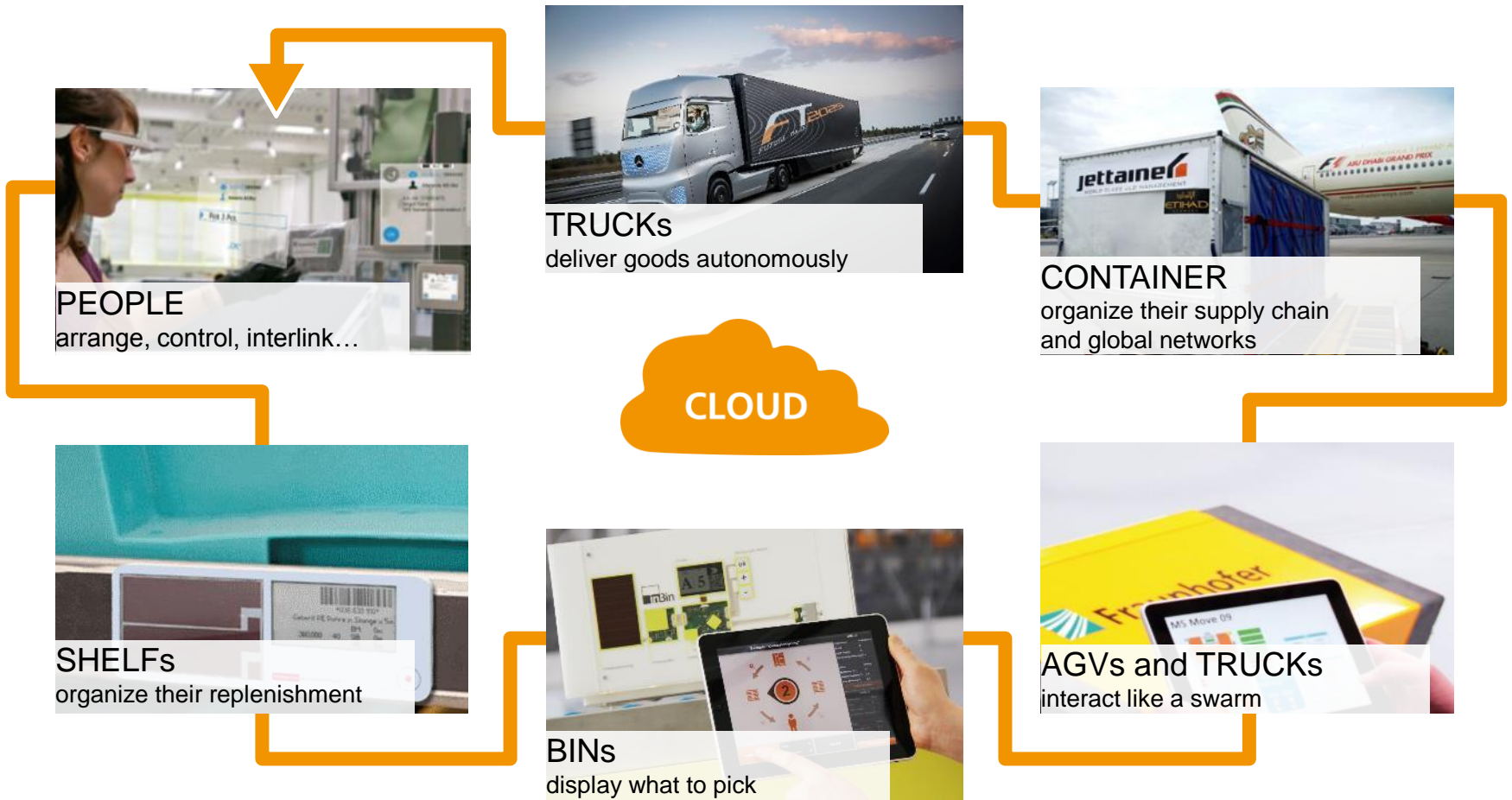


- Autonomous Vehicle
- Diagonal Movements in the Shelf
- Bionic Shape

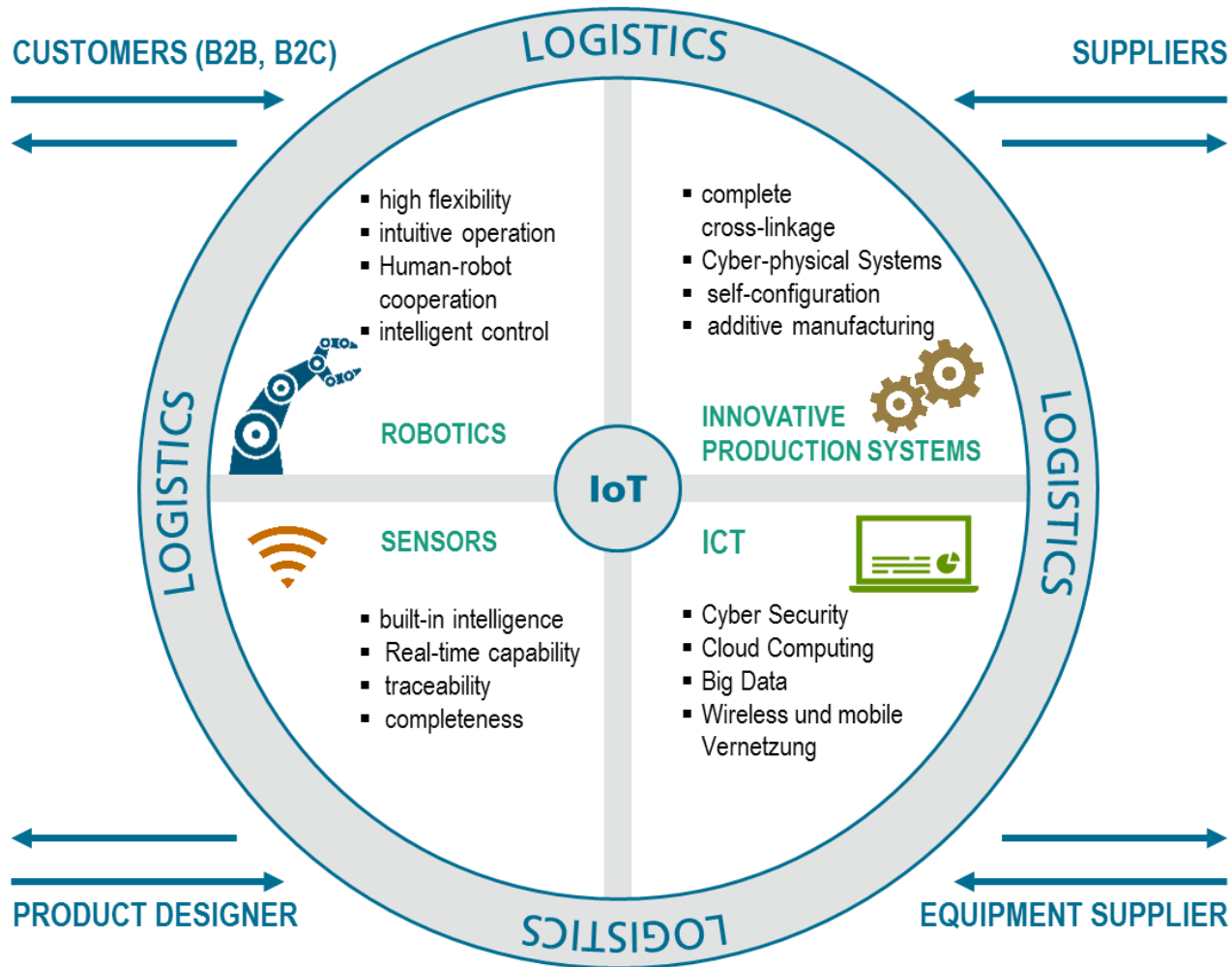


Smartface

# Logistics 4.0 · Internet of Things · Everything is autonomous!

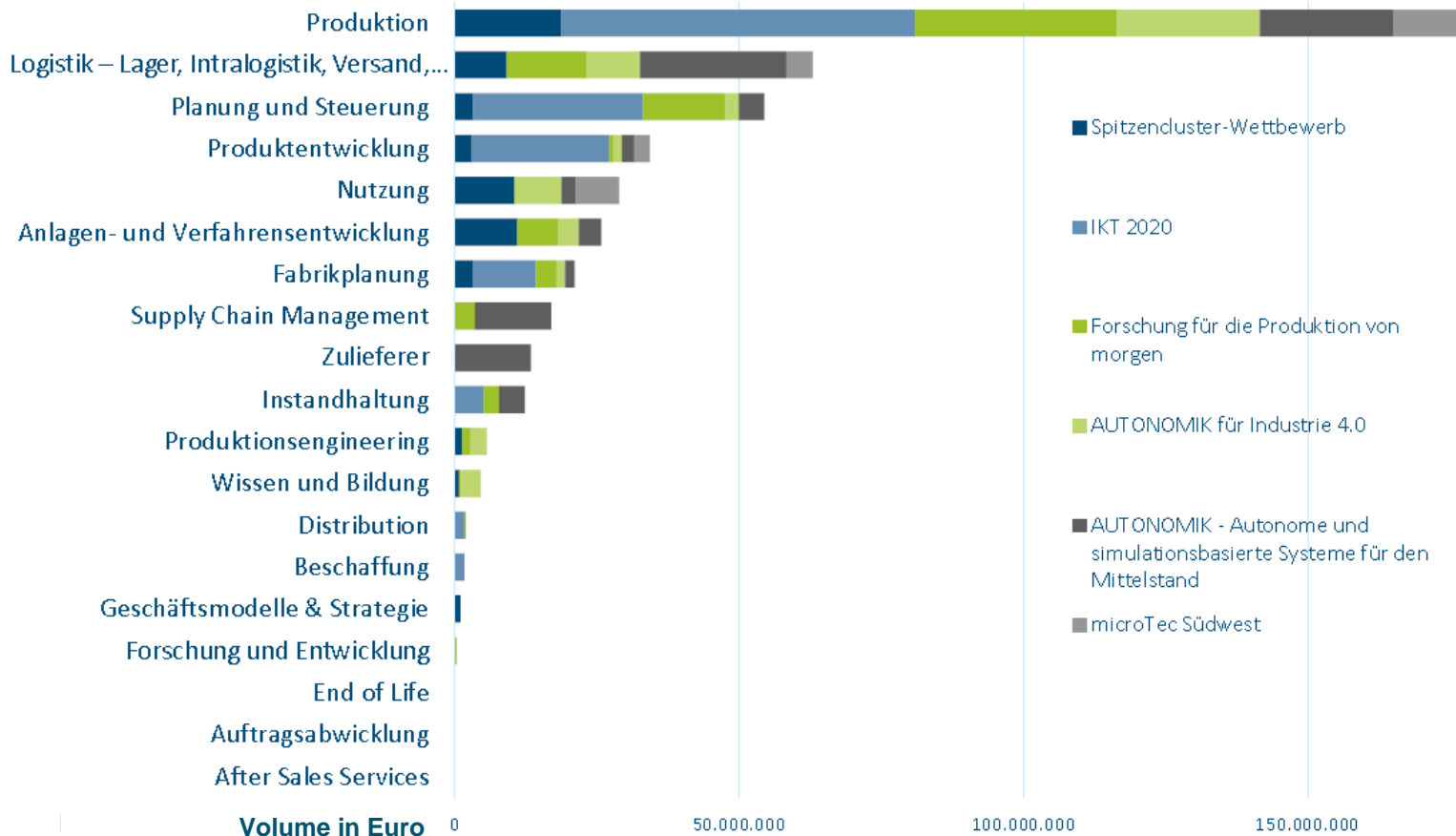


# Significant future areas for the implementation of industry 4.0

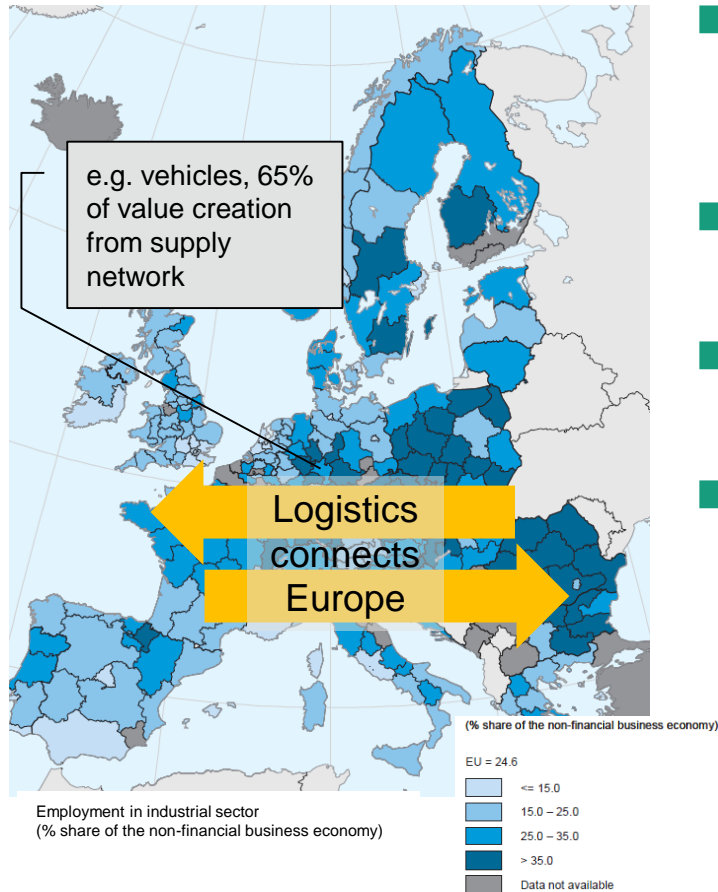


# BMWi Study – Industrie 4.0 Technology- and Research Areas

## Six leading German Research and Innovation Programmes of the Federal



# Logistics and SCM for European Competitiveness in Manufacturing and Services

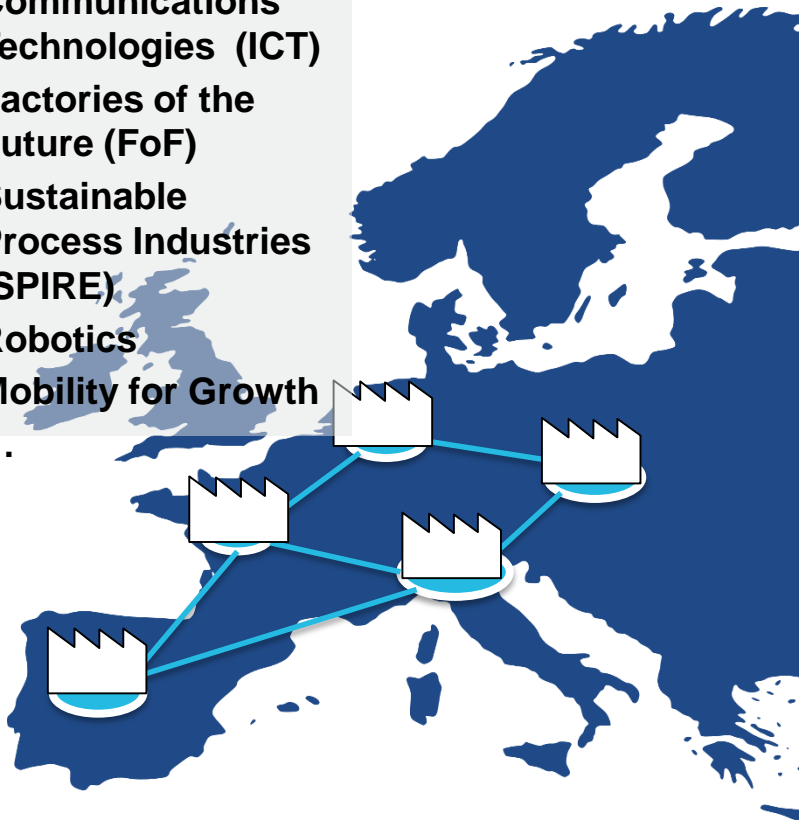


- Increase Share from Industrial Manufacturing of European Union GDP from about 16 Percent to above 20 Percent.<sup>[1]</sup>
- **Logistics Connects Europe's Manufacturing Networks**
- Coordination of Value-adding Networks in Manufacturing, Trade, Retail and Service
- Innovation in **Logistics Technologies, Enterprise-IT and Management** are Required

[1]: European Commission (2012): A stronger European industry for growth and economic recovery, COM (2012) 582

# Research and Innovation to Promote Industrial Value Creation

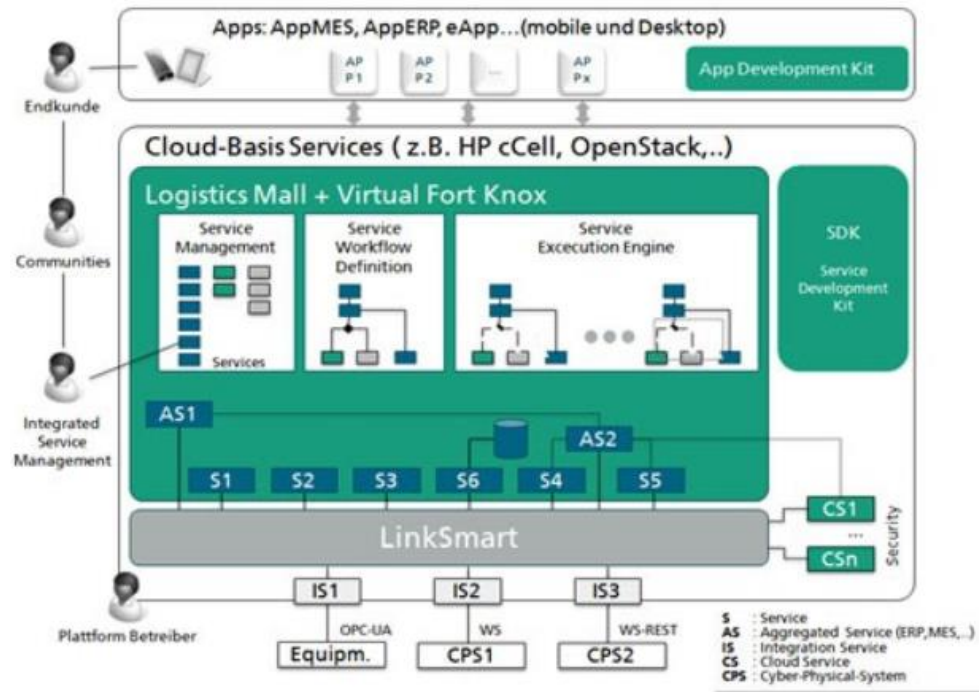
- Information and Communications Technologies (ICT)
- Factories of the Future (FoF)
- Sustainable Process Industries (SPIRE)
- Robotics
- Mobility for Growth
- ...



- Smart Industrial Creation of Value Is more than Manufacturing and Transport
- Adaptable Value-added Company Networks Based on the Factories and their Systems are Required to Realize the Full Potential of CPS and Smart Factories
- Smart Supply Chains and Services Will Link Customers and Markets to Smart Design and Smart Operations Being already Part of the FoF Roadmap

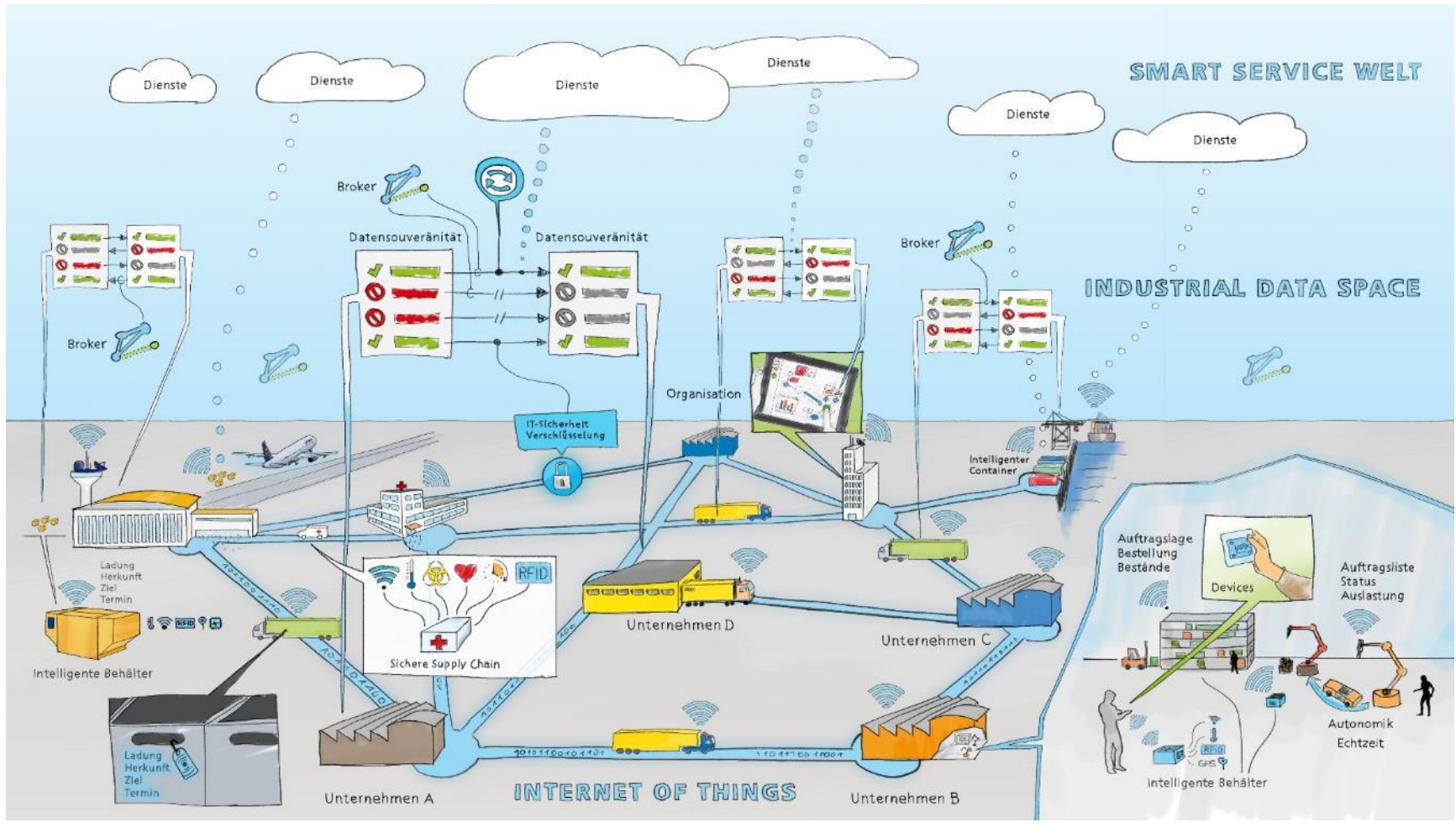


# E<sup>3</sup> - Fraunhofer Internal Project „Energy- and Ressource-Efficient Production“



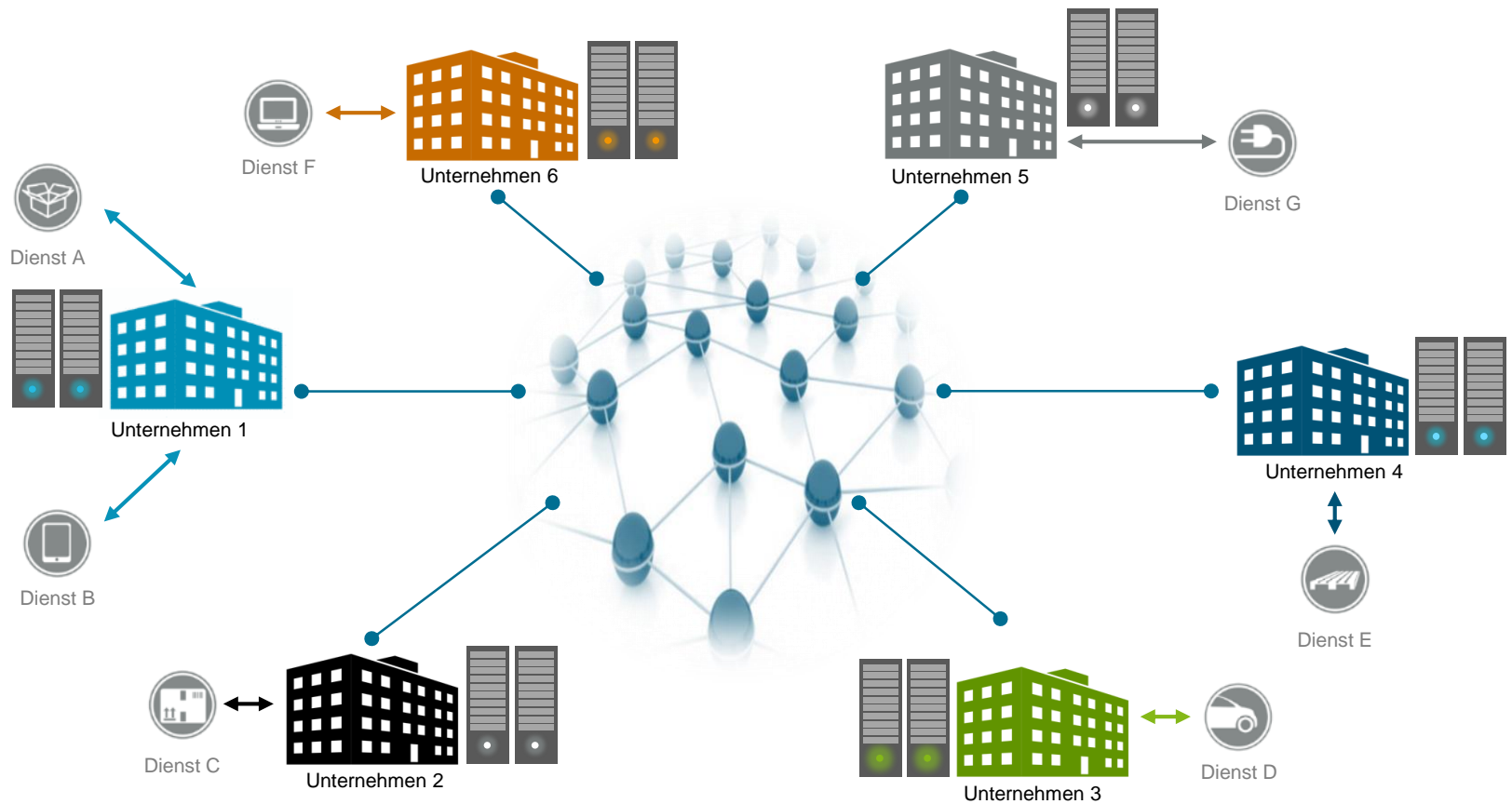
- Sub-Project “Cloud Services” has the goal to realize the integration of different cloud-based service and operations platform
- Based on:
  - Virtual Fort Knox for Manufacturing Services
  - Logistics Mall for Logistics and SCM Services

# INDUSTRIAL DATA SPACE

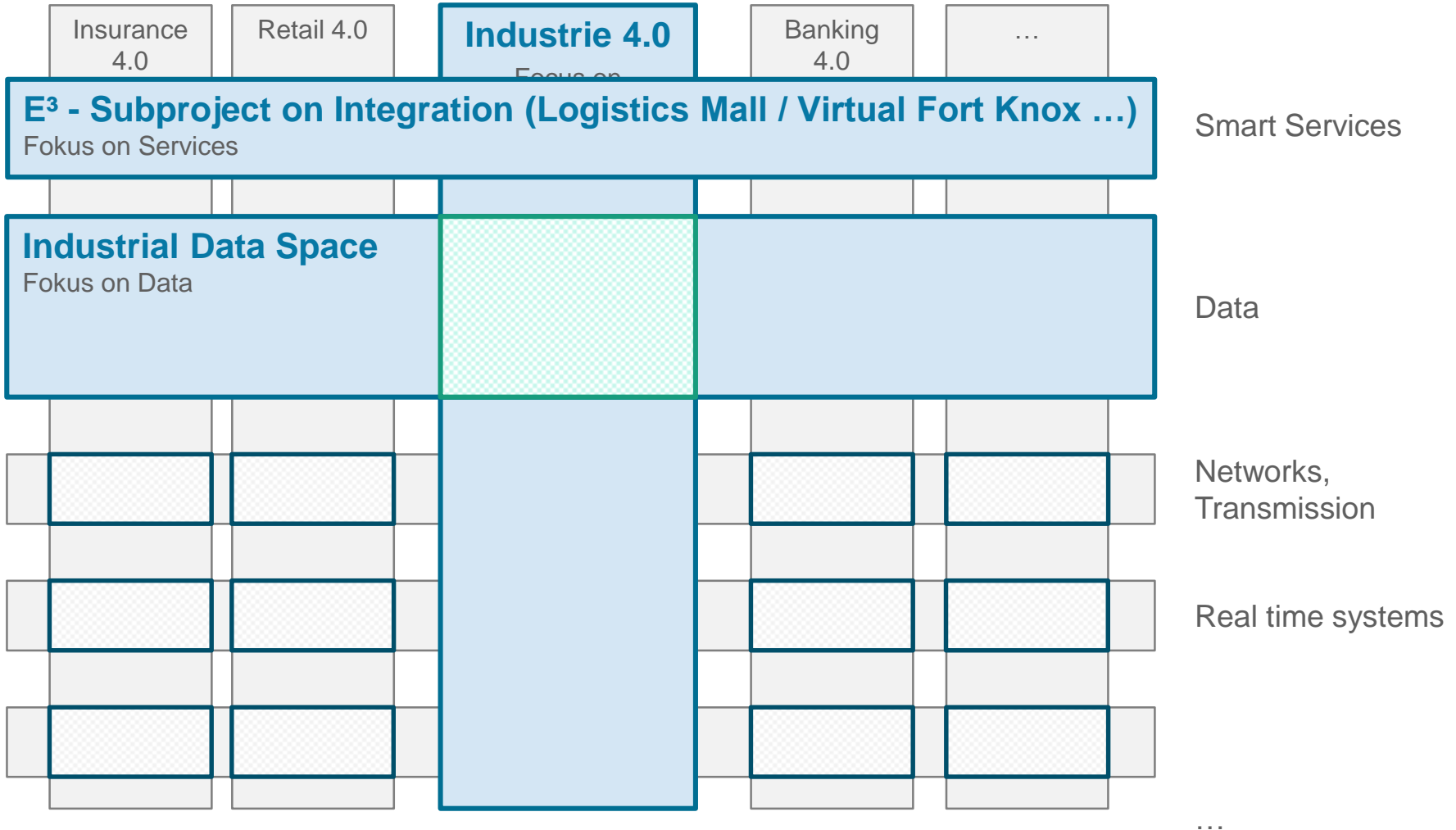


# Industrial Data Space: on demand networking

All data are protected and under Control of their owners. No central platform.  
Data and services are linked and shared on demand.

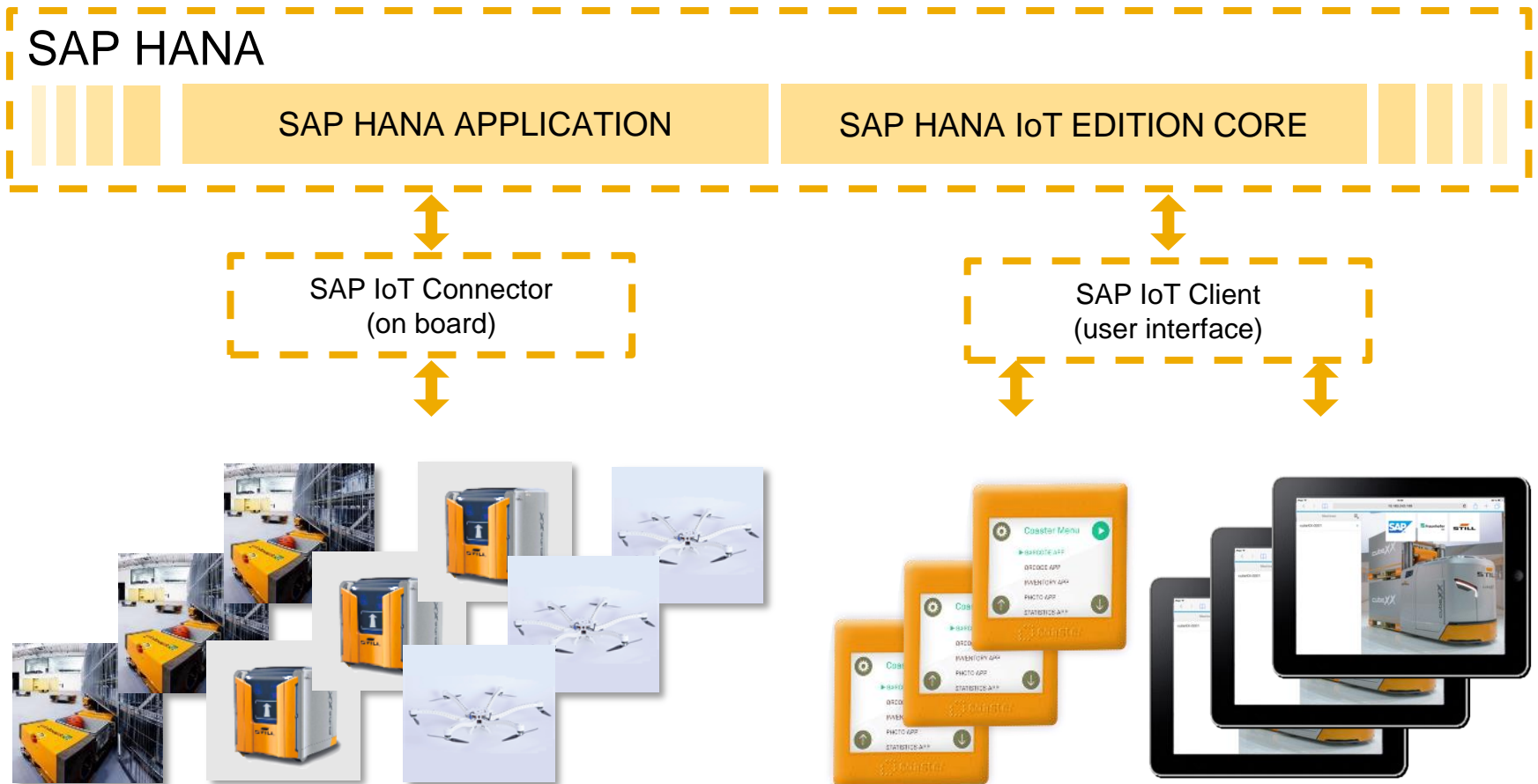


# Coherence of Plattform Industrie 4.0 and related Platform Initiatives



# Social Manufacturing and Logistics

## Humans and Machines in joint Social Networks



# LOGISTICS 4.0 AND THE INTERNET OF THINGS

Workshop “Platforms for connected Factories of the Future”

Thorsten Hülsmann · 5<sup>th</sup> of October 2015

