International Conference on Sustainable Manufacturing

Industry 4.0: philosophy, components and use cases in German industry

Markus Kunze, Bosch Rexroth AG
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Megatrend: Connected Things

6.6 billion connected things in 2015
0.062 billion connected vehicles
0.019 billion connected telemedical devices
0.070 billion connected security systems
0.120 billion connected electric meters
0.260 billion smart TVs
0.625 billion tablets
3.000 billion smartphones
1.498 billion laptops
0.895 billion desktop PCs
0.044 billion servers

Driver
Higher processing capacity
Higher bandwidth
Higher speed
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Every industry has specific needs

- Reflect specific needs and requirements of markets and industries
- Bundle relevant technologies, application expertise and services
- Global presence combined with local know-how
- Proximity to customer

We have deep industry knowledge
Locations in China

Sales, distribution and service network throughout

40 cities

5 sales branches
support china market for sales & service

4 manufacturing locations
High quality product manufacturing in 3 cities

- Beijing
- Dalian
- Wujin
- Shanghai
- Xi’an
- Chengdu
- Guangzhou

Manufacturing Location
Sales Branch
Sales & Distribution Point
Service Point
Connected Industry: The Next Industrial Revolution

The transformation of Industry 3.0 to Industry 4.0 (connected industry) occurs gradually.
Fusion of the physical world of production with the virtual world of information technology and the internet.

Humans, machines, objects and systems are connected via ICT and the internet and communicate in a dynamic, with real time optimization and in a self-organized way.

In these intelligent production systems, all instances of the added value chain from the supplier over logistics to the customer are connected across the company.

The industrial production can implement customized customer requests with high quality, while reaching higher flexibility and robustness as well as optimal resource allocation.
Connected Industry: Criteria and Chances

- Decentralized Intelligence
- Rapid Connection
- Open Standards
- Real Time Context Integration
- Autonomous Behaviour

New added value networks
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Bosch Perspectives

LEAD PROVIDER
System manufacturer view / production resource view

LEAD OPERATOR
Product manufacturer view / product view

- Big Data
- Business processes
- Production models
- Connection

Added value networks

Decentralized intelligence
Machine models
Software

Technology and solution supplier for OEMs and end users

First in the realization of integrated concepts with equipment providers
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Example Demonstrator from Hannover Trade Show
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Connected Industry: Homburg Plant Example

Supplier

BOSCH

Automotive manufacturer

+10 % Productivity

-30 % Stock reduction

LEAD OPERATOR

Product manufacturer view / product view
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Connected Industry: Bosch Rexroth Example

**LEAD PROVIDER**
System manufacturer view / production resource view

**CENTRAL INTELLIGENCE**
No network
High mechanical content

**1969**
AC servo motors
Multi-axis control
Intelligent drives

**1979**

**1992**
PC-based control units
MTC 200, typ 3 osa
Sercos
Electric hydraulics

**2002**
Real time ethernet
Sercos III
Motion-Logic-Systems
Intelligent electric-mechanical and electric hydraulics

**2012ff.**
Connected Industry (Industrie 4.0)
Connection to CPS

**DECENTRALIZED INTELLIGENCE**
The bridge between automation and IT

Open Core Engineering

- Enhanced access to controls core, even real-time applications
- Open for high level languages C/C++ etc.
- Open for operating systems of smart devices like Apple iOS and Google Android for native Apps
- Realization of individual functions is possible
- Seamless connection to IT world
Systematic approach for energy efficiency

Rexroth for Energy Efficiency

- 4 levers
- Energy System Design: Systemic overall view, design, simulation, consulting
- Efficient Components: Products and systems with optimized efficiency
- Energy Recovery: Recovery and storage of excess energy
- Energy on Demand: Energy usage on demand, stand-by mode
Collaboration for solutions adapted to Chinese needs

智能工厂自动化
Smart Factory Automation

Bosch Rexroth in China

AMTC
Summary

Connected Industry (Industrie 4.0): The future topic in the industry with high relevance and big effect on the entire added value chain

Bosch is in an excellent starting position; big opportunities from the point of view as lead provider as well as lead operator

Success requires fast, exploratory action; creativity and synergies realized by intensive cooperation of all involved parties