INDUSTRY 4.0 AT BOSCH
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Industry 4.0 at Bosch

Bosch Group

- Mobility Solutions
  - 60% Share of sales
  - One of worlds largest automotive suppliers
  - Leading in drive and control technology

- Industrial Technology
  - Leading in packaging and process technology

- Bosch Group
  - 80 billion € in sales
  - 400,000 associates

- Consumer Goods
  - Leading supplier of household appliances
  - Leading supplier of power tools & accessories

- Energy and Building Technology
  - Global market leader energy-efficient heating products

- Leading supplier of household appliances

Bosch: Invented for life

Bosch Group
80 billion € in sales
400,000 associates

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Internet of things (IoT)
Industry 4.0 at Bosch
Connected Industry: our dual strategy

By 2020
EUR ~ 1bn extra turnover

By 2020
EUR ~ 1bn extra savings

Leading Provider
70+ Solutions

Leading User
270+ Bosch Plants Worldwide

- Sensors
- Drive & Controls
- Software & Data Analytics
- Machinery & Robotics
- Logistics
- Services
Industry 4.0
Features at Bosch

People as key players

- Fast integration and flexible configuration
- Open standards
- Virtual real-time representation
- Digital life-cycle management
- Secure value-creation network
- Distributed intelligence
Industry 4.0 at Bosch

Feature: fast integration and flexible configuration

Value-added network based on comprehensive broadband infrastructure
Guaranteed latency, reliability and quality
Ad hoc connection of people, processes and machines

Flexible integration and (re) configuration of machines
Quick setup of process modules for new tasks
Modules are strung together ad hoc to form a large-scale production line
"Plug and Produce" - modules can be interchanged quickly
Industry 4.0 at Bosch

Feature: distributed intelligence

**Example: autonomous rollers**
Parts transport from the supermarket to the production line
Autonomous navigation of the rollers on the shop floor
Collecting, processing and communicating data
Independent work of logistics tasks through swarm

**Example: flexible manufacturing modules with own controls**
Module knows its technical skills and autonomously organizes its work steps in the process
Module detects different parts and processes them
Industry 4.0 at Bosch
Feature: secure value-creation network

Secure cross-company value-creation networks

Secure infrastructure for people, processes, and data

Protection of the means of production and the company’s IT systems from attacks and disturbances (data security)

Unique tamper-proof digital identity for each intelligent component, machine, and product

Tight and secure collaboration between people and machines (safety)
Industry 4.0 at Bosch
Feature: digital life-cycle management

Engineering on the basis of all relevant information relating to the life cycles of products, machinery, and plant

Seamless integration and processing of all data along the value stream

Automation, acceleration and protection of engineering and business processes

Evaluation and optimization of simulated scenarios (workpiece-quantity, machinery, value-stream scenarios ...)

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**Industry 4.0 at Bosch**

**Feature: virtual real-time representation**

- **Virtual real-time representation of objects and their states**
- Assignment of real objects to their virtual image through unique identification
- Virtual description of manufacturing and assembly processes
- Acquisition of real object properties and real-time updating of the virtual image
- Simulation of processes based on the real-time virtual representation
- Objects with digital memory
Industry 4.0 at Bosch
Feature: open standards

Compatible equipment, machinery, components and services
Easy integration of machines and components from different manufacturers
Harmonized interfaces: e.g. of semantics, protocols, connectors
Platform-independent and universal interfaces
Industry 4.0 at Bosch
Feature: people as key players

People play the decisive role in the connected plant
Decisions based on contextual digital information
Mastering complexity through new ways of visualization and operation

New ways of learning
Individual integration of the employee in the work process
Assistance functions and ability amplifier for people
Health and well-being through adaptive workplace ergonomics
Continuous cooperation with universities and startup
Get learning, or stay analog

Volkmar Denner, CEO, Robert Bosch GmbH
Thank you!