



Industry 4.0

An initiative of the German government

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Industrial Revolution

1. Industrial Revolution / End of 18th century

Follows introduction of water- and steam powered mechanical manufacturing facilities

2. Industrial Revolution / Start of 20th century

Follows introduction of electrically-powered mass production based on the division of labor

3. Industrial Revolution / Start of 1970s

Uses electronics and IT to achieve further automation of manufacturing

4. Industrial Revolution / Now

Based on Cyber-Physical Systems



Two converging technology trends drive innovation

Internet of Things

Physical objects and devices get enhanced with sensors, actuators and microcomputers, gain the possibility of communicating and become Cyber-Physical Systems

Internet of Services and Big Data

Big Data, Cloud Computing and Smart Devices lead to one person having more than one computer in contrast to past, where many persons used one (mainframe) computer



High-Tech Strategy of Germany's Government

Defined in 2006

Climate/Energy, Health/Food, Mobility, Security and *Communication*

Communication results two strategic initiatives

1. Internet based services for businesses

Deployment of secure cloud infrastructures and the provision of new service platforms will pave the way for the Internet economy in Germany

2. Industry 4.0

ICT-enabled convergence of technological and business processes will usher in a new era for German industry.



Platform Industry 4.0

Provides a platform for development of strategy and vision for Industry 4.0 by industry and research institutes

Opened by Dr. Philipp Rösler, Federal Minister of Economics and Technology

Supported by

BITKOM (Bundesverband Informationswirtschaft, Telekommunikation und neue Medien)

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Industry 4.0

As part of a smart, networked world

As a key component of Industry 4.0, the smart factory brings the Internet of Things and Services to the manufacturing environment

In smart factories, humans, machines and resources communicate with each other as naturally as in a social network

Its interfaces with smart logistics and smart grids will make it a key component of future smart infrastructures



Vision for Industry 4.0

- **Individualisation** (batch sizes of 1) at mass production prices will become a reality
- Manufacturing will be **highly flexible**, extremely productive (up to +50%), will use fewer resources (up to -50%) and will be sustainable in an urban environment
- **Dynamic design** of business and engineering processes
- **Work-life balance** taking account of availability of individual workers
- Older employees supported by **smart assistance systems**
- Existing infrastructure can be **upgraded gradually**
- A high-wage economy that is still **competitive**



Example

Today

Today's automotive industry is characterised by static production lines (with predefined sequences) which are hard to reconfigure to make new product variants

Tomorrow

Industry 4.0 results in the emergence of dynamic production lines. Vehicles become smart products that move autonomously through the assembly shop from one CPS-enabled processing module to another

Requires „onboarding“ of the full Supply Chain, in contrast to „only“ Tier-



Thank you

