Manufacturing Challenges & Opportunities

Road2CPS - Strategic action for future CPS through roadmaps, impact multiplication and constituency building

Based on Yoram Koren: The Global Manufacturing Revolution; Sources: Ford, beetleworld.net, bmw.de, dw.de
Enabling Technologies

The 4th Industrial Revolution

1st Industrial Revolution
Introduction of mechanical production plants which are powered by water and steam power
- End of 18th century

2nd Industrial Revolution
Introduction of specialized mass production based on electrical power
- Beginning of the 20th century

3rd Industrial Revolution
Introduction of electronics and ICT to further increase production automation
- Beginning of the 70's in the 20th century

4th Industrial Revolution
Based on Cyber-Physical Systems
- Today

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Industry & Cyber-Physical Systems

Examples of functions: communicating, negotiating, interpreting and configuring, visualising and simulating, aligning capacities.

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Source: Living in a networked world – Broy/Geisberger/acatech 2015
Manufacturing

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Source: Smart Service Welt Abschlussbericht 2015 (Siemens 2014)
Manufacturing

- Information silos alongside the digital and physical value chains
- Production operators provide information and manage partners manually
- Services are provided reactively and triggered by disturbances
- Operative data in production used insufficiently
- Low transparency about service providers, services and needed/provided production capacities

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Smart Manufacturing

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Source: Smart Service Welt Abschlussbericht 2015 (Siemens 2014)
Smart Manufacturing

- Information silos alongside the value chains are broken up
- Connections between production operators and services providers are handled via marketplaces
- Collaboration and knowledge exchange between production operators and services providers on service platforms more efficient and effective
- Access to information alongside the whole value chain allows innovative services
- Horizontal integration allows optimization alongside the whole value chain
- Smart, data-based predictive and proactive services enable increased productivity
- Intermediaries enable benchmarking services (best in class) for SMEs

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