

Road2CPS Roadmapping Workshop

Industrie 4.0

Presentation



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Industrie 4.0 - introduction

- After mechanisation, electrification, informatisation I4.0 promotes the application of IoT technologies, respectively Cyber Physical Systems in the industry, to enable
 - individualization – batch size of 1, personalization of production
 - horizontal integration in value networks
 - highly flexible, highly productive manufacturing using fewer resources
 - dynamic business and engineering processes
 - improved work life balance through worker-centric business models
 - smart systems supporting an ageing work force

Enabling technologies

- The #1 enabling technology are Cyber Physical Systems in any form as the technological foundation for I4.0
 - Smart Objects: sensors/actors, mobile devices, wearables and new kinds of HMI
- Communication technology (wireless & broadband)
- Cloud technology, to provide platforms and big data technology

Recommendations for research priorities

- Standardisation and reference architecture
- Managing complex systems
- Communication technologies, broadband infrastructure
- Security, safety and reliability
- Work organisation, training and education/professional development
- Regulatory frameworks
- Ressource efficiency

Main barriers identified

- Lack of interoperability, standards and a reference architecture
- Security, safety and privacy: current systems are often only adapted to be connected to the internet, but have not been designed and built with cyber security in mind
- Missing business model development: currently most research is technology driven, risk aversion
- Cross domain and interdisciplinary projects are a rarity, which inhibits CPS development
- Technology cost is too high to be adapted broadly by SMEs

Recommendations for CPS implementation

- Interoperability /standardisation/reference architecture
- Security, safety, privacy, reliability
- Demonstrators, platforms and tools
- Business Model development
- Training and education (also to raise acceptance and trust)

Strategic recommendations

- Open platforms, reference architectures & tools
- Fund demonstration, cross-domain/interdisciplinary research
- Facilitate funding to SMEs
- Fund CSAs / task forces on business models, standardisation
- Raise awareness & education, de-fragmentation & cross-fertilisation

Unique findings in your roadmap and under-represented gaps

- Besides the technical topics social and cultural differences are something which is specific for Industrie 4.0 respectively the German industry:
 - German companies have very high innovation potential but a strong aversion to risks.
- Business Model development is greatly underrepresented. What can a company do with a specific part of technology to turn it into profit?
- Personal favourite: smart objects, sensors and CPS.

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