TECHNISCHE UNIVERSITÄT WIEN
Vienna | Austria

---Technology for People---

Human Centered Cyber Physical Assembly

Sebastian Schlund

Univ. Prof. Dr.-Ing.

Human Centered Cyber Physical Production and Assembly Systems
(BMVIT Endowed Chair for Industrie 4.0)

Budapest

September 20, 2017

Background

-51% German jobs

(Bowles, 2014)

„47%

…of US jobs at high risk of being substituted by mobile robotics and artificial intelligence.“ (Frey, Osborne, 2013)

Up to 350.000 new jobs in Germany until 2015 (BCG, 2015)

18 million German workplaces at risk

(ING DIBA, 2015)

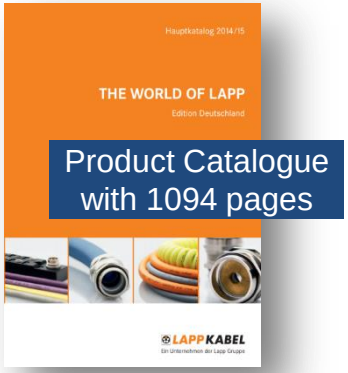
Worldwide loss of 5 million jobs until 2020 due to Industry 4.0 (WEF, 2016)

9% of todays US jobs under risk – 12% of German jobs (ZEW, 2015)

Net loss of 60.000 jobs until 2015 (IAB, 2015)

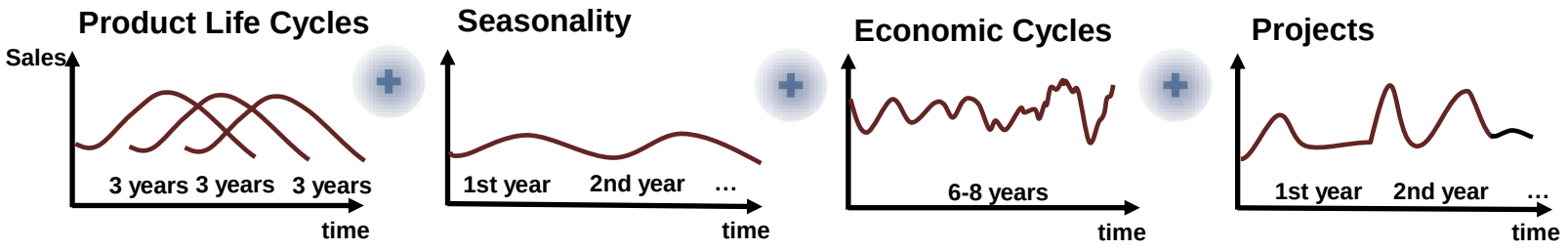
Reasons to consider Human Centered Cyber Physical Systems

#1 Even if automation is becoming feasible for very small lot sizes; they tend to decrease further on...



Pictures: Lapp Kabel, Rittal

#2 …as the volatility of customer demands increases.



Reasons to consider Human Centered Cyber Physical Systems

#3 Not every process and every job can be automated.



Pictures: Bosch, Liebherr, Infineon

#4 Cooperation and complementary solutions (man + machine) offer a significant productivity potential.

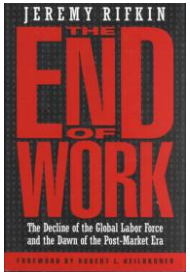

Pictures: itizzimo, BMW, Fraunhofer IAO

Reasons to consider Human Centered Cyber Physical Systems

#5 Presence in assembly is lean (not yet 4.0 nor deserted) and the transition period will last years, perhaps decades.

Pictures: Fraunhofer IAO

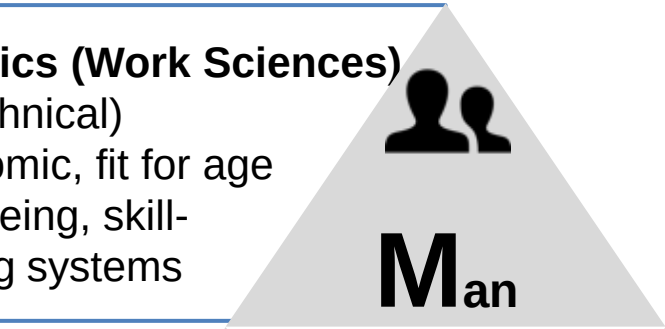
#6 Effects on society of complete automation and possible its consequences are not yet taken into account.



?

Pictures: Jeremy Rifkin, http://smallbizeconomist.com/andrew-laurents-robot-tax/

What are Human Centered Cyber Physical Assembly Systems?



Ergonomics (Work Sciences)
(socio-technical)
→ ergonomic, fit for age and ageing, skill-building systems

+ **Implementation** (agile, experimental)
+ **Participation** (user-centered, user-integrated)

HCPS

Technology

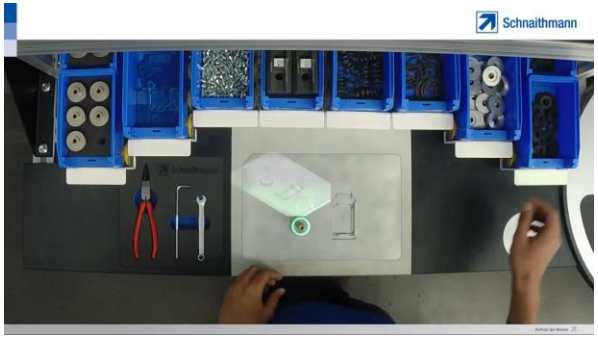
Organization

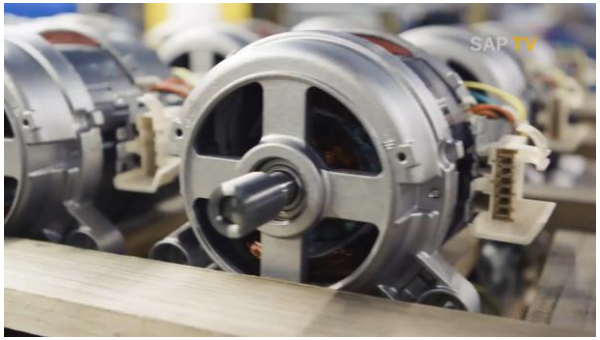
Technology Management
(Automation, Digitalization)
→ innovative, scalable systems

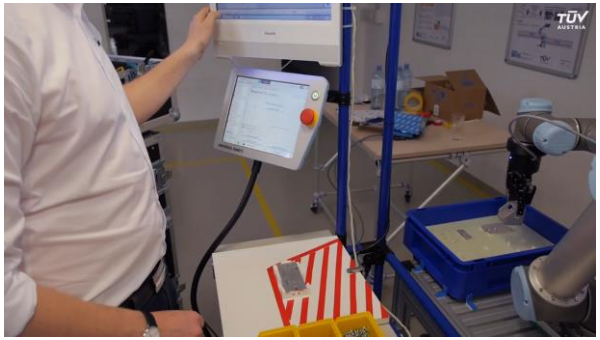
Production Management
→ international competitiveness
(productive, flexible, lean)

Human Centered Cyber Physical Assembly Systems follow a socio-technical process of designing, implementing and using technologically upgraded assembly systems in an integrated approach of its relevant disciplines.

What are Human Centered Cyber Physical Assembly Systems?







Films: Fraunhofer IAO/Zumtobel, Schnaithmann, SAP, Workaround GmbH, Fraunhofer Austria, itittimo

What next? Some open questions…

1. How does an integrated development of reasonable assistance systems by three parties (Process Experts + Digitalization Experts + User Experts) look like?
2. What role will context adaptable, individualized and intuitive to use assistance systems play in manufacturing in the future?
3. Will there be a significant market for scalable assistance systems that account for differences in industries, business size and degrees of lean maturity.
4. Do we need guidelines and standards for user centric design, acceptancy and feedback.
5. How do we treat privacy issues and big data desires?

… tbc

Contact

Univ. Prof. Dr.-Ing.

Sebastian Schlund

Head of Department

Human Centered Cyber Physical Production and Assembly Systems

(BMVIT Endowed Professorship)

Technische Universität Wien

Institut für Managementwissenschaften

Theresianumgasse 27, A-1040 Wien

Telefon: +43 (1) 58801-33054

sebastian.schlund@tuwien.ac.at