

UNIVERSITÄT HOHENHEIM



Robotics and Industry 4.0 - discourse, development and consequences

2nd European TA conference
The Next Horizon of Technology
Assessment

26. February 2015, Berlin

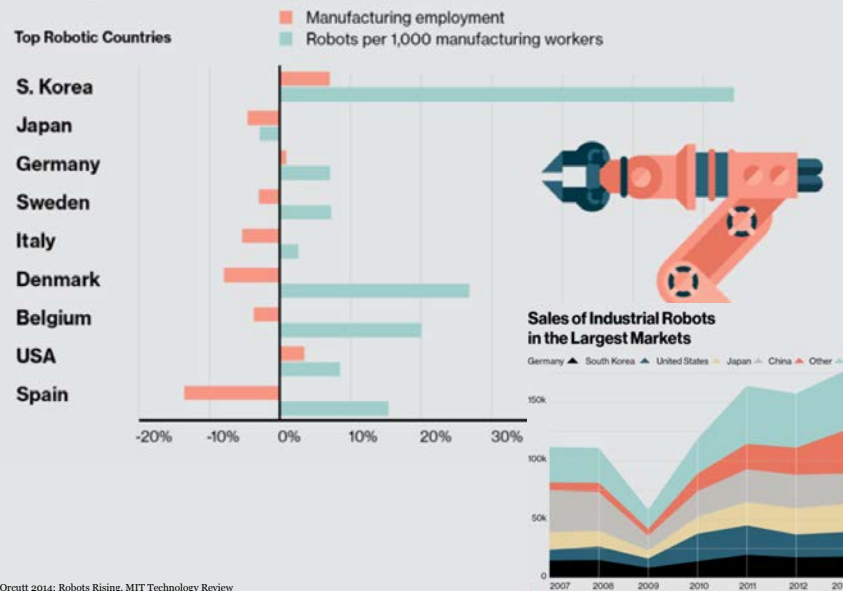
Prof. Dr. Sabine Pfeiffer



18.000

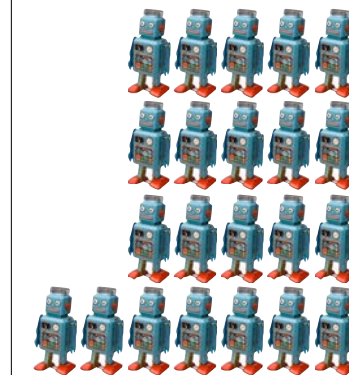


Change in Human Workers and Robots Since 2009

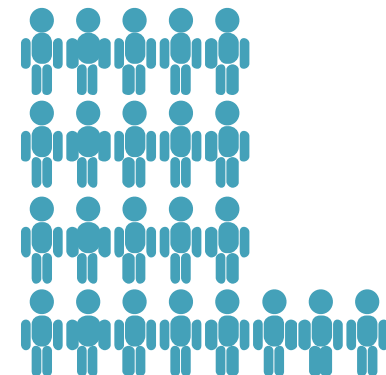


One highly automated production Germany 2015

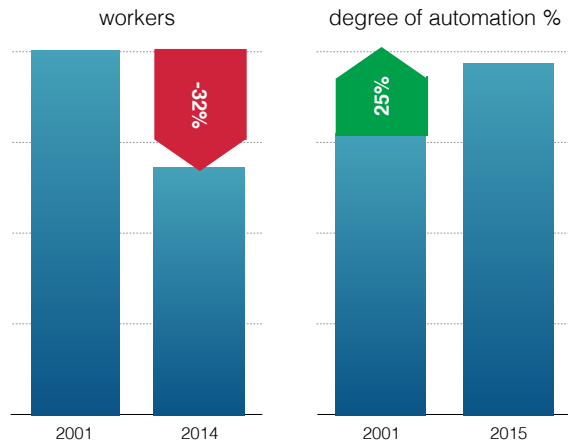
Robots * 1.000



Humans * 1.000

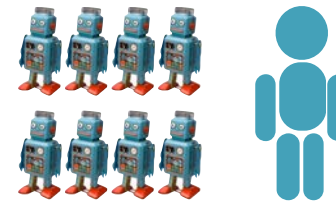


Development from 2001 to 2015



5

division of labour and limits of automatisisation



Human experience is still central but mostly unseen.

20 to 30 times per shift worker intervenes. Not because of technical incidents but to prevent them.

Plant availability is around 90%, more automatisisation infects availability.

6

Robots run 35.000h with overall costs from 100.000 to 200.000 EUR (maintenance included).
With thus costs of 5 EUR per hour repetitive routine work could be substituted and the German demographic problem somewhat solved.

Interview with Director of
Human Ressources
Volkswagen



„**Blended workforce:** A labour force involving close collaboration between humans and intelligent machines in the form of augmentation. Examples include humans collaborating with robots on factory floors or augmented reality applications to assist technicians in complex repair tasks.”

„Shift towards an **integrated digital and human workforce**”



„Digital information and computerized manufacturing technology allows for easy, **exact replication** of manufacturing processes. With the explosion of digitization, literally everything can be identical. Manufacturing facilities can be relocated to emerging or developed nations as needed, allowing manufacturers to **disaggregate supply chains**.“

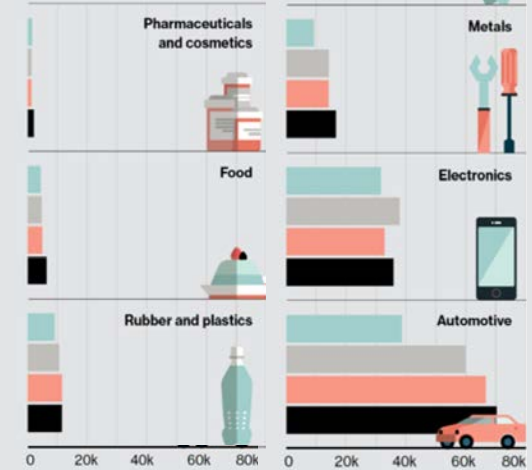


WEF 2012

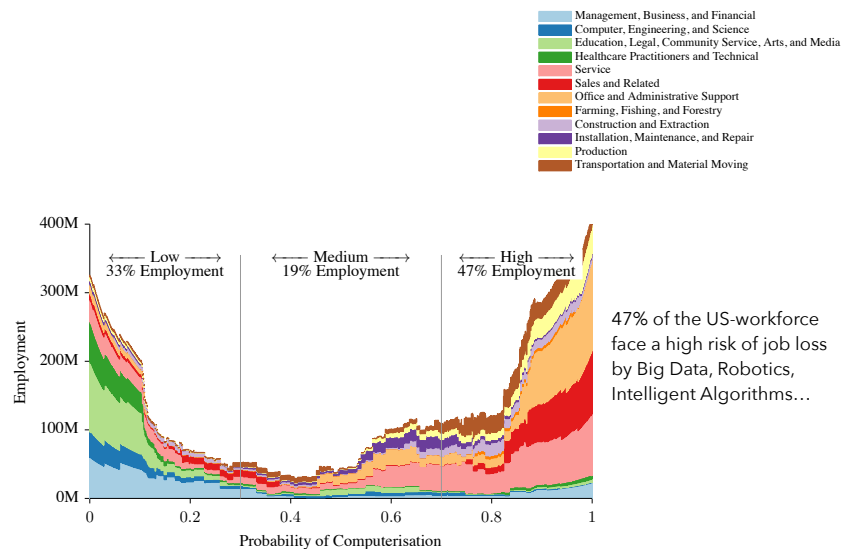
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Worldwide Sales of Industrial Robots by Sector

2010 2011 2012 2013



Qrcutt 2014: Robots Rising, MIT Technology Review



Frey/Osborne 2013: 37

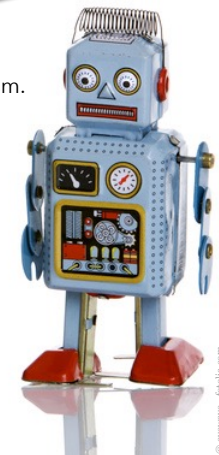
limits

Automation always aims to substitute human labour

But it is always a societal decision not technical determinism.

After 50 years of robotics limits still are:

- Coping with imponderabilities.
- Flexibility and ability to adapt.
- Variability of behaviour.
- Tacit skills and body intelligence.



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This is where humans come in



core competencies

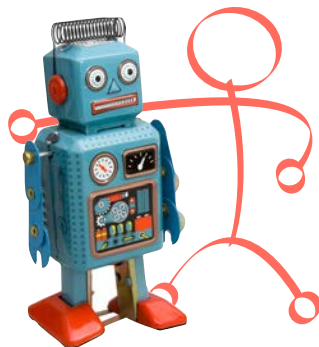


routine tasks



creativity
experience intuition

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Quantitative
Exchange value of human labour
Commodity

labour power

production

dialectical

Qualitative
Use value of human labour
No commodity

labouring capacity

=Arbeitsvermögen
(Pfeiffer 2004)

Pfeiffer (2014)

Thank you!

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