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How the fourth industrial (r)evolution may effect the laundry business?

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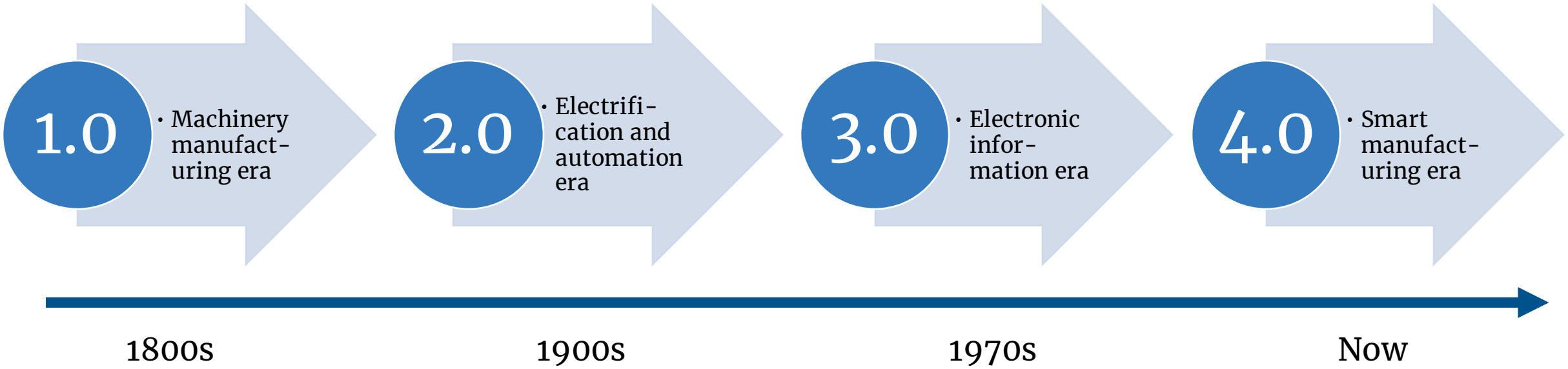
Outline

- Background on Digital Transformation process
- Short overview: US-EU market situation for laundry business
- Most important factors for digitalization of laundry industry
- Opportunities and challenges during the transformation phase
- Economic, ecological and socio-technological view on the digital transformation

Industrial (r)evolution



Qian, F.; Zhong, W.; Du, W. Fundamental Theories and Key Technologies for Smart and Optimal Manufacturing in the Process Industry **2017**, *Engineering*, *3*,154–160.

Digital transformation

- „A disruptive or incremental change process. It starts with adoption and use of digital technologies, then evolving into implicit holistic transformation of an organization, or deliberate to pursue value creation“ → goal: smart industrial laundries

  Hinriette, E.; Feki. M; Boughzala, I. Digital Transformation Challenges **2016**, *MCIS 2016Proceesings*, *33*, 1-8.

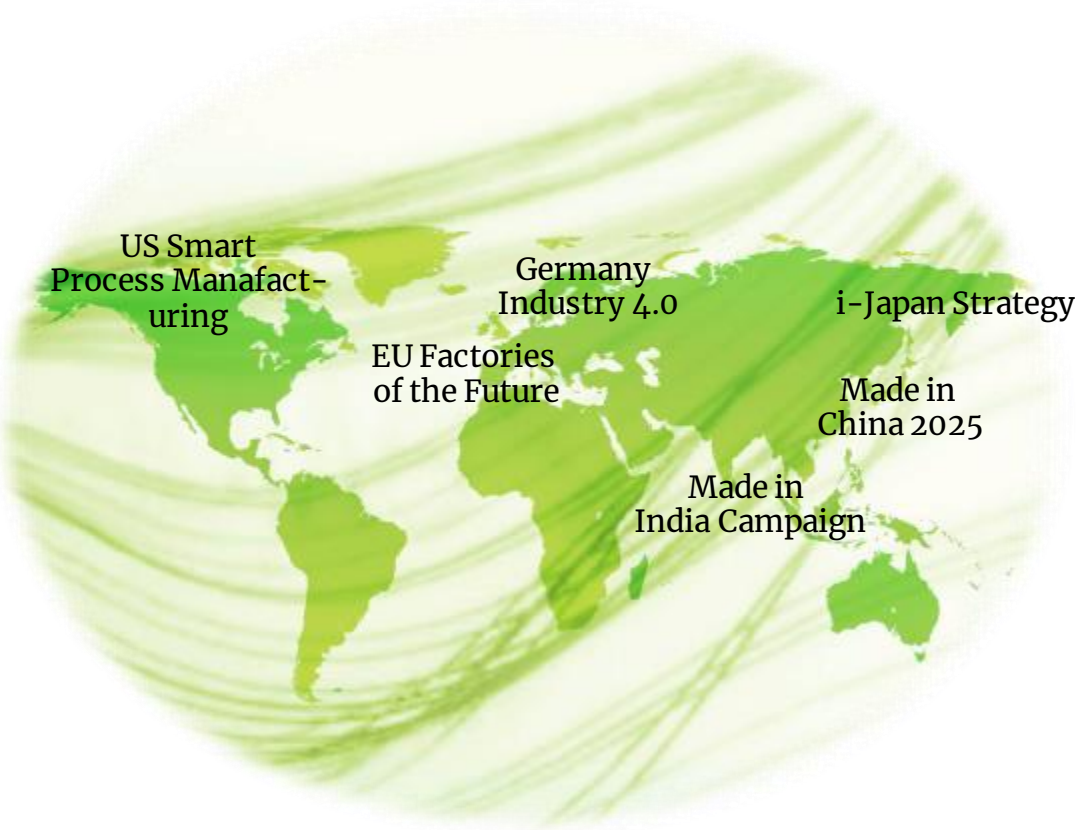
- The transformational phase will stretching over the next 10-20 years

  → evolution or revolution?

- Digitally-enabled automation (i.e. smart laundries), artificial intelligence (AI) and further technologies (e.g. virtual reality) may accelerate the growth of digital-front runner countries

  → GDP increase: 550 billion € or 1.2 % per year in 2016-2030

  McKinsey & Company, Digitally-enabled automation and artificial intelligence: Shaping the future of work in Europe's digital front-runners, **2017**.



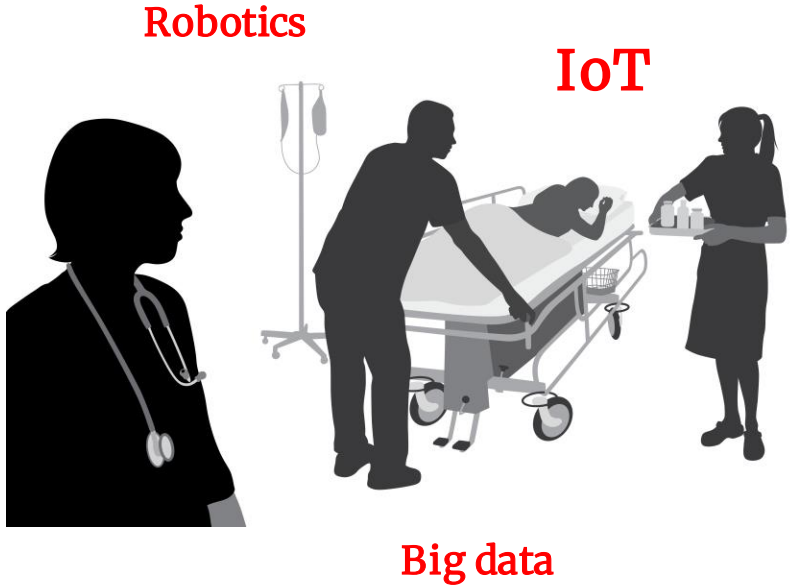
Qian, F.; Zhong, W.; Du, W. Fundamental Theories and Key Technologies for Smart and Optimal Manufacturing in the Process Industry **2017**, *Engineering*, *3*,154–160.

Can we avoid this transformation?

- Amount of data grows exponentially with 40 % per year
- Searching for strategies to optimize processes and enable sustainable growth of the companies/national economies

  → But: 11.000 management books (7934 Lean and Total-Quality-Management books), US survey, Industry Week, **2009** → 74% didn't see significant progress through applying of Lean
- Trends/customer demands: „internet of data and services“ e.g. cloud computing e.g. Amazon, Google & Co. and „internet of things based on cyber-physical systems e.g. laundry truck tracking via GPS/RFID
- „Lack of urgency“ → MIT survey: only 38 % of respondents said that the digital transformation was a permanent fixture on their CEO's agenda

Fitzgerald *et al.* Embracing digital technology: A new strategic imperative **2013**, *MIT Sloan Management review*, 1-16.



Important factors that influence the process of establishing smart industrial laundries

Higher productivity & revenue growth

- Optimization of quality of laundry services
- Low-level faults e.g. decrease in rewash rate
- More efficient processes e.g. logistics in laundries

Cost reduction

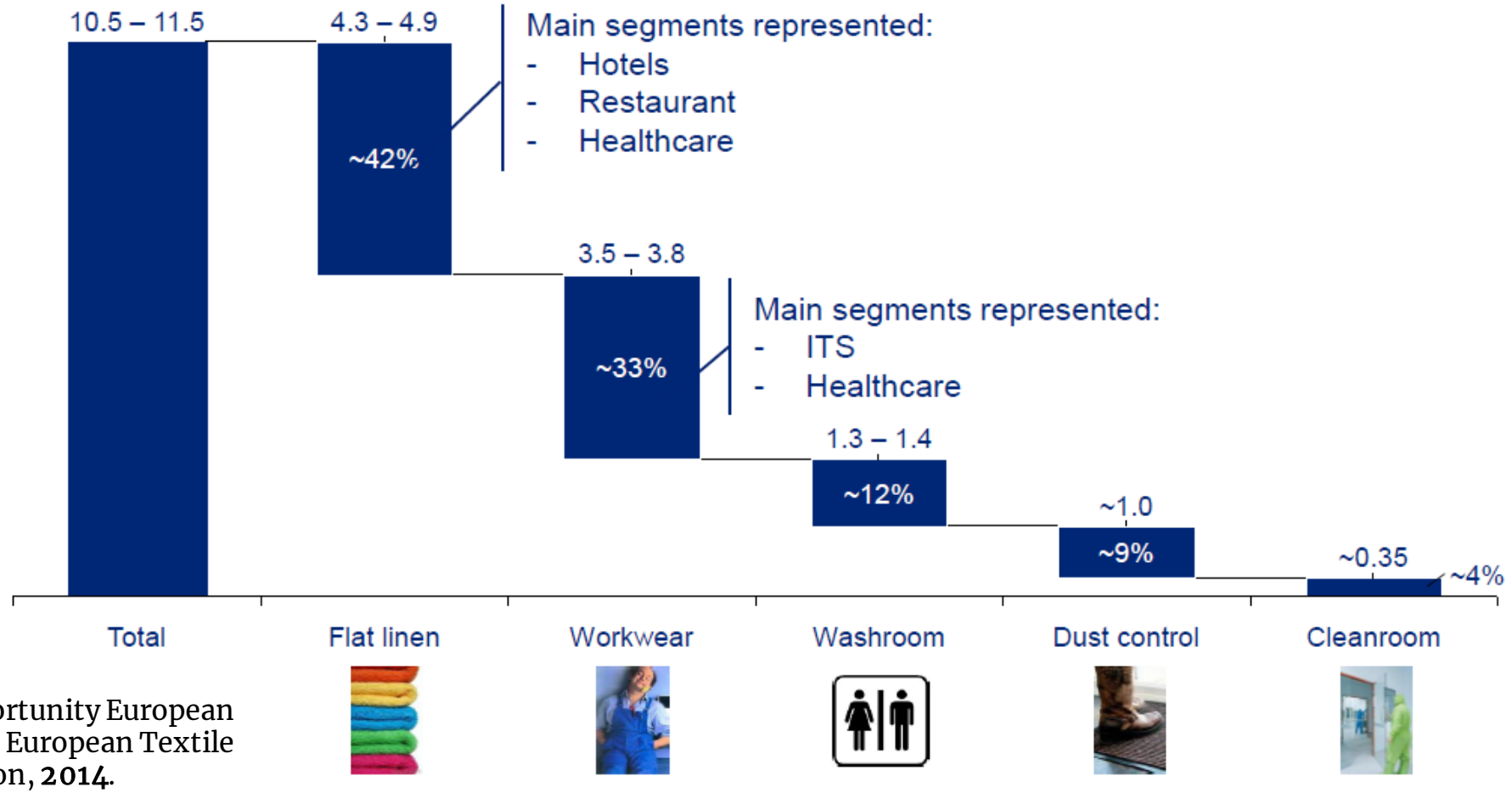
- Resource efficiency (e.g. reuse of resources)
- Reduction in staff

External factors

- Skills shortage (i.e. external service supplier control laundry processes)
- Further external factors e.g. customer requirements

Current situation in laundry business - EU

European textile rental market by product *(30 countries)*
(€ bn; 2012)

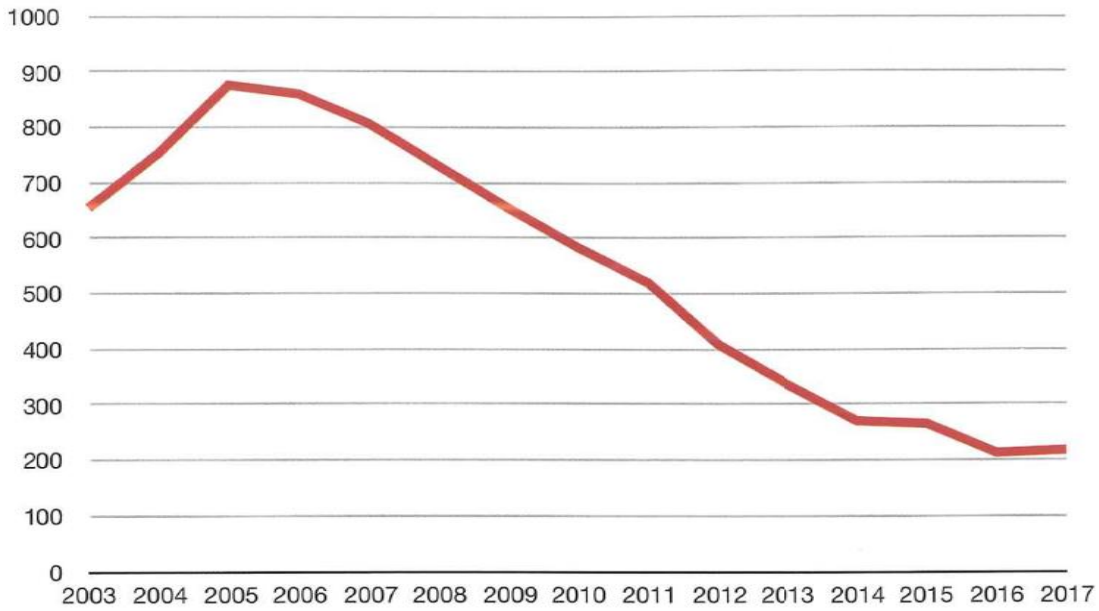


ETSA, Quantifying the opportunity European Market Sizing Study for the European Textile Services Association, **2014**.

Current situation in laundry business - EU

- Lack of (skilled) employees
- Price dumping and consolidation of the market
- Textile rental market: 11 billion € total revenue; potential growth to approx. 26 billion € (conservative scenario with increase of outsourcing rate to 60-65 %)
  ETSA, Quantifying the opportunity European Market Sizing Study for the European Textile Services Association, **2014**.
- European textile rental market increased from 2016 to 2017 by 0.8 % and the German market by 3.2 % respectively

Number of trainees in laundry care industry

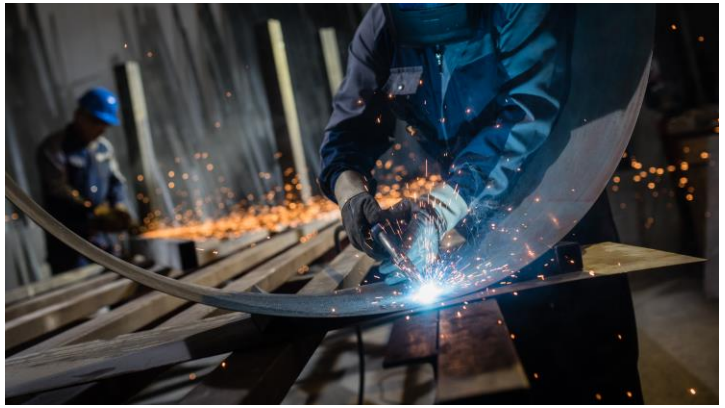


Böttger, G. *WRP, 1*, **2019** (in German)

Current situation in laundry business - US?

- Total revenue in 2019: 16 billion $, annual growth of 1.5 % in 2014-2019 (Ibis World report, **2019**)
- More stable business in comparison to Europe: "Currently U.S. unemployment sits near 4.4% while the EU sits at 7.6%. GDP growth in the U.S. is ~3.3% while the EU is less than 1%." JWC Research report, **2019**
- Automation of industrial processes may boost the growth of uniform business
- Rental uniform business is highly linked to blue-color workers in industries with high employee turnover

  → probability of increase in unemployment rate
- Consolidation of the market (also consolidation processes in health care and hotel sectors)



Examples of challenges

- „Lack of urgency“ → transformation process is to slow
- Lack of concepts and guidelines
- Occupational training and education need to keep pace with the speed of technological development
- Technological skills required are basic skills e.g. programming → e.g. improve qualification of 5 % of employees in laundry
- Sharing the vision → internal communication (important for large companies i.e. several laundry facilities)
- Huge investments → difficult in laundry business!?

Examples of opportunities

- Green manufacturing (i.e. energy efficiency, minimum of emission of waste)
- Planning and decision-making of agile supply chain
- Increase in competiveness (i.e. innovative high quality products/ services) and productivity by flexible and efficient working models and higher employee satisfaction

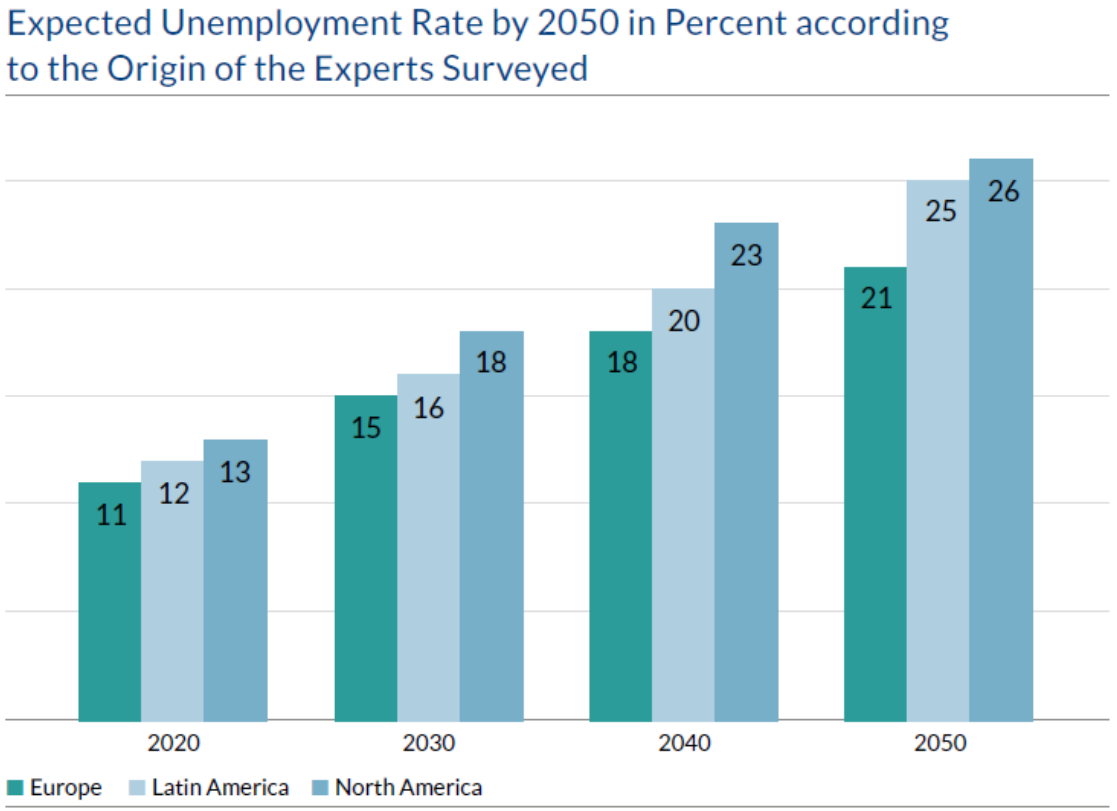
→ e.g. long-life learning driven by digital technologies such as virtual reality and artificial intelligence

Jacobs, J.C.; Kagermann, H.; Spath, D. The Future of Work in the Digital Transformation Agility, Lifelong Learning and the Role of Employers and Works Councils in Changing Times, *A paper by the acatech and Jacobs Foundation Human Resources Working Group – Forum for HR Directors on the Future of Work*, **2014**.

Kogut, I., POLISH - GERMAN SUSTAINABILITY RESEARCH ("STAIR"): acronym "REWARD" (02WU1391), **2019**

Economic and socio-technological view on establishing smart industrial laundries

- Global unemployment rate could rise to 24 % in the year 2050 → widen of social gap? How industrial laundries may use this trend for a sustainable growth?
- Who control the data flow and process optimization?
- Application of effective, neutral and transparent benchmark studies and investment models → supply chain analysis



Wintermann, O.; Daheim, C., *2050: The Future of Work. Findings of an International Delphi-Study of The Millennium Project*, **March 2016**

Sustainability & digitalization

- Not only productivity and revenue growth, but also sustainability will be the main growth factor of laundry business → e.g. life cycle analysis

Examples of research projects of Hohenstein:

- Haap, J. *et al.* Microplastic Fibers Released by Textile Laundry: A New Analytical Approach for the Determination of Fibers in Effluents **2019**, *Water*, *11*, 2088.
- Kogut, I. *et al.* German-Polish project HyprSTEP: Development of hybrid wastewater treatment plants for removing trace organic compounds e.g. antibiotics from wastewater, **2019-2023**

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