

Ulrich Zierahn-Weilage (Utrecht University)

The Future of Work: Automation Risks and the Role of Education

Stakeholder Workshop

5 June 2025



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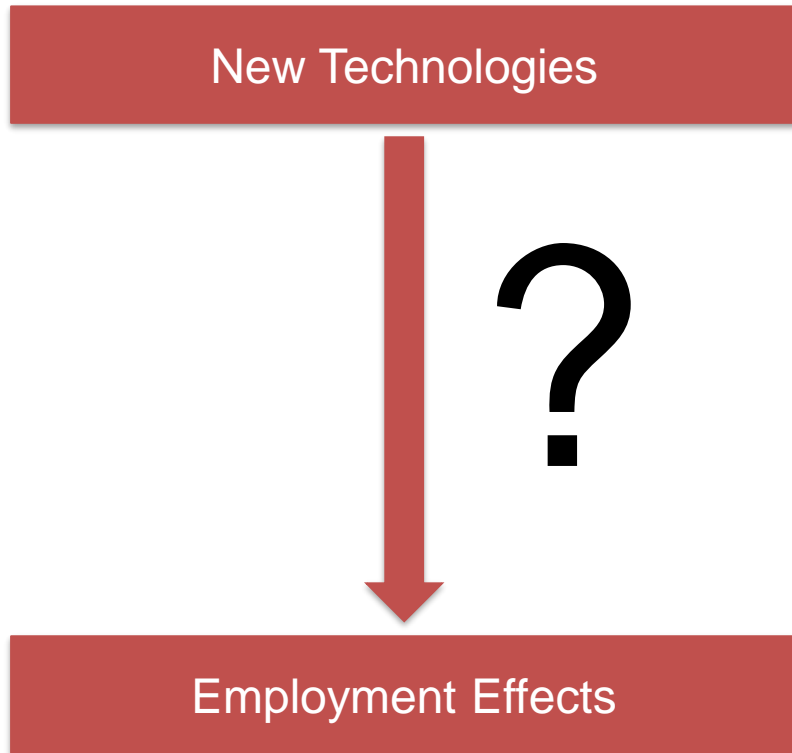
“The experts are divided in two camps. Some claim that the flood is rising rapidly and destroys 80 percent of jobs in 20 years. The others think that this result will only be achieved later.”

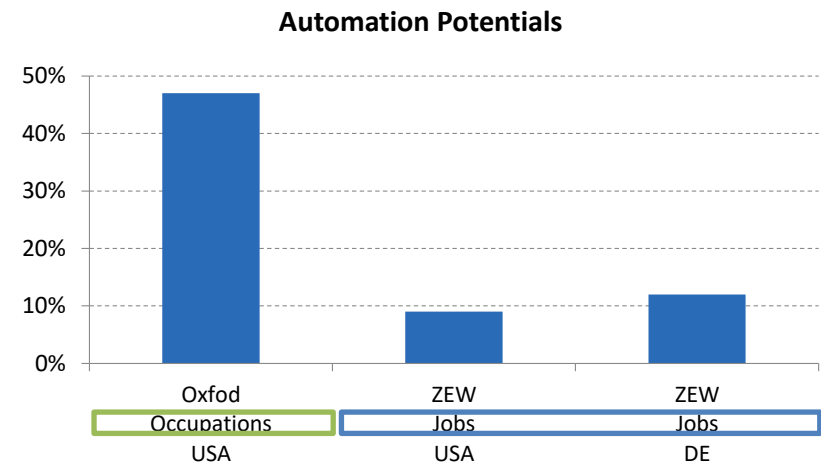
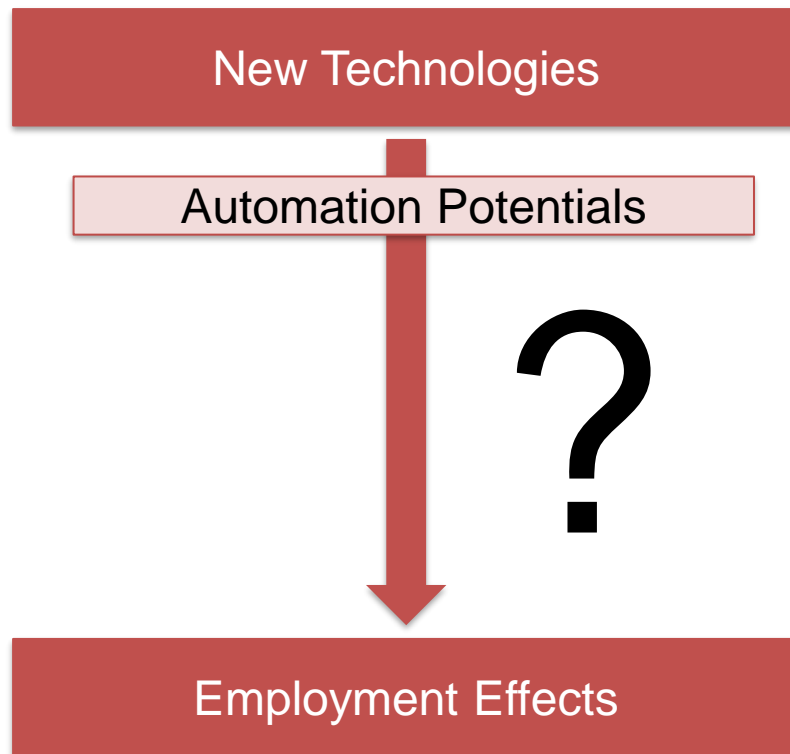
Der Spiegel, 17.4.1979



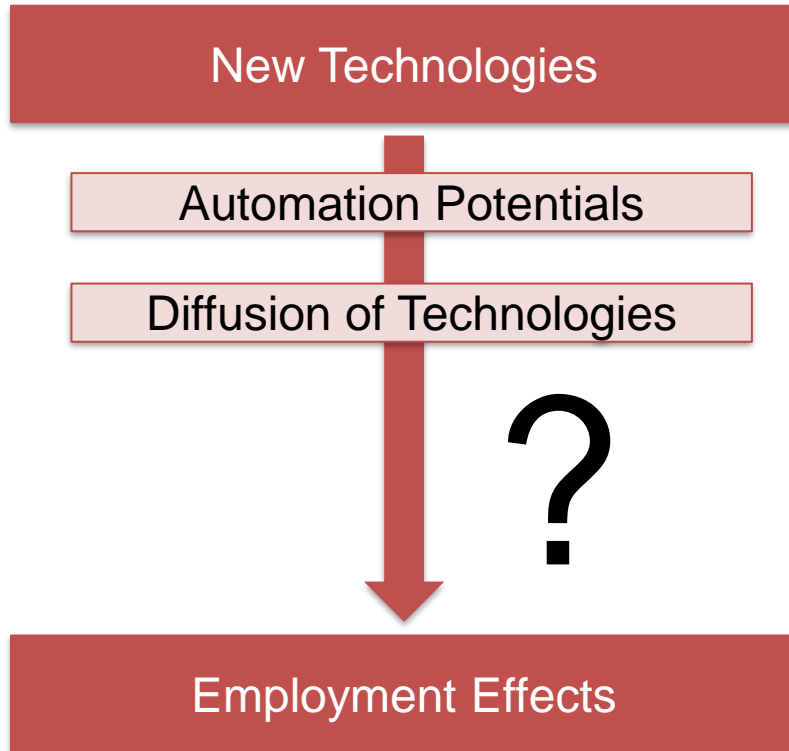
“According to this report, 47% of all employees in the USA work in occupations that likely can be automated within the next 10 to 20 years.”

Der Spiegel, 3.9.2016

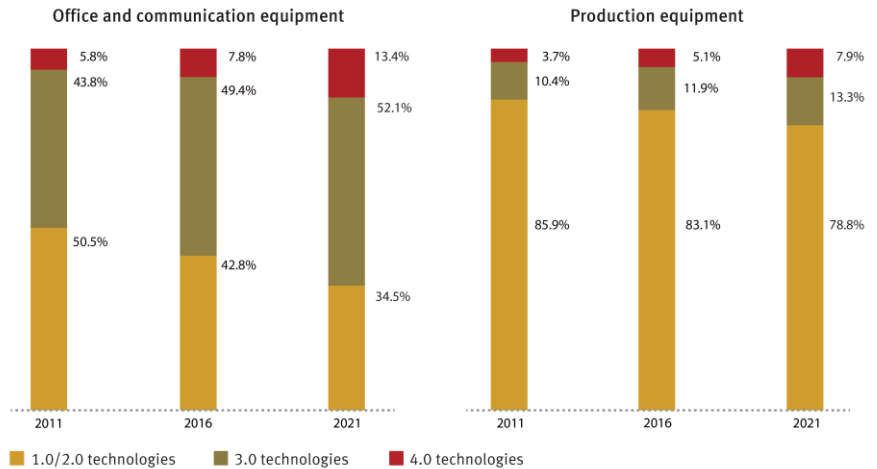




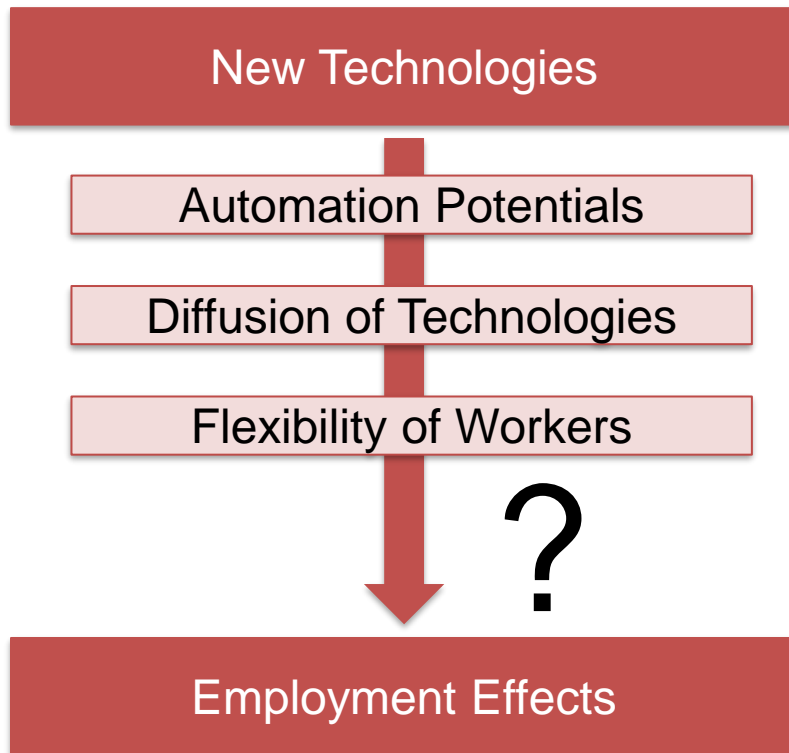
Source: Arntz/Gregory/Zierahn (2017)



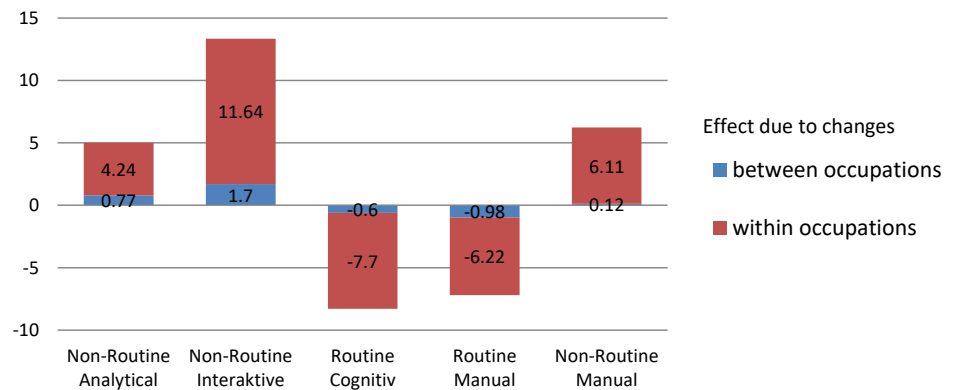
Technological Endowment in German Firms



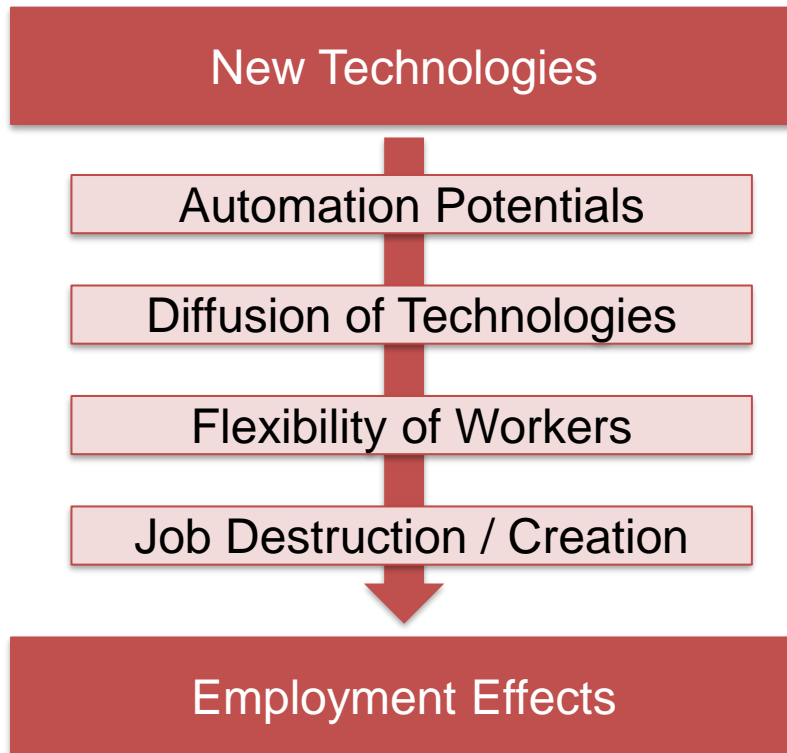
Source: Arntz/Genz/Gregory/Janser/Lehmer/Matthes/Zierahn (2018), Technology and Jobs in the Fourth Industrial Revolution - Firm-Level Evidence, unpublished manuscript.



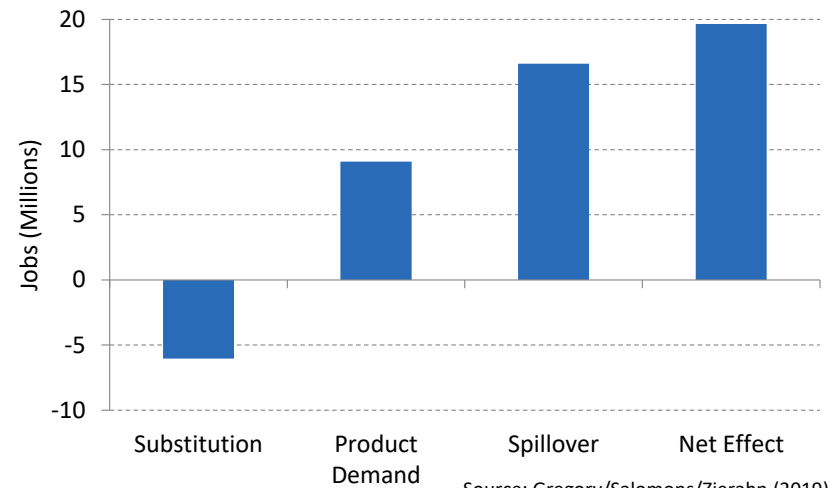
Changing Tasks in Germany, 1979-1999



Source: Spitz-Oener (2006)



Employment Effects in the EU, 1999-2010



Source: Gregory/Salomons/Zierahn (2019)

- **Key question is not how many jobs, but which jobs we will have**
- **Are workers able to fill these jobs?**
 - Rising inequality
 - Rising demand for **interactive and analytic tasks**
 - Declining demand for **routine tasks**
 - Rising importance of (further) training

The Future of Work: We should worry less about the number of jobs, but more about how to manage the transition.

How can we ensure that workers possess the right skills?

Expertise at Work

New Technologies, New Skills, and Worker Impacts

Joint with Căcilia Lipowski and Anna Salomons

[Link to Paper](#)

Setting: German Vocational Training

Research Questions:

1. Are training curricula for occupations exposed to digital innovations more likely to be updated?
2. What skill changes are embodied in these curriculum updates?
3. Do skill updates impact workers' labor market outcomes?

- **German vocational training**
 - Full-time educational program after high-school, typical duration 3 years
 - Majority of trainees receive 'dual' training: classroom education + apprenticeship
 - Certified training firms provide apprenticeships

- **1969 Vocational Training Act:** Apprenticeship component codified in state-approved and nationally standardized, binding training curricula
 - Curricula regularly revised through institutionalized process
 - Updates initiated by employer associations/firms, labor unions, or Federal Institute for Vocational Education and Training (BIBB)

- Text of all vocational training curricula covered by Vocational Training Act coverage , 1971–2021 (obtained from Federal Law Gazette)

linked to (via Natural Language Processing)

- Technology data: Text of US digital breakthrough patents, 1950–2001

Linked to

- Social Security Records (workers' training and careers)

- **Advancing technology spurs updates in German vocational training curricula over 1971–2021**
 - Technology-exposed curricula are more likely to be updated; and are updated more rapidly

education adapts to technological change

- **Skill content of curricula is evolving**
 - Toward tasks which cannot be automated (non-routine tasks); and toward use of digital technologies and team-work
 - Driven to an important extent by newly added expertise

education includes the relevant skills when updating

- **Skill updates impact labor market outcomes**
 - Higher wages and occupational retention for workers with new skills, driven by tech-exposed occupations
 - Skill obsolescence among occupational incumbents
 - Firms increase capital investments

educational updates support workers in coping with new technologies

SKILLS FOR LABOUR MARKETS IN THE DIGITAL AND GREEN TRANSITION

SkiLMeeT is a research project carried out by eight research institutions, exploring how the digital and green transformation of European economies are changing the demand for skills. We analyse the scope of skills shortages and mismatches, identify their drivers and propose innovative ways to reduce skills gaps.

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