The Future of Work: Experiences from Germany

Conference
„On Digital Economy and its Implications for Employment“

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Presentation by
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Source: Sibylle Scheibner, PTW, TU Darmstadt

Overview

1. Introduction: IG Metall, its Goals and Activities
2. Digital Economy in Germany
   - Origins of the term “Industrie 4.0”
   - Examples in Industry and Service Sector
3. Effects on Employment
4. Industrial Policy: Regional Initiatives
5. Work in the Digital Economy
   - Social Dialogue and Effects at the Workplace
6. Designing Digital Work
7. Scenarios for the Digital Economy

Introduction: IG Metall

- German **multi-sector** union: Metalworking & electronics, automotive, textile, wood, information technology, …

IG Metall: Figures & Structure

over	**2,200,000**	members
over	**135,000**	active officers
over	**18,000**	work sites in over 30 sectors
over	**150**	local offices
over	**2,000**	regular employees

Source: CC0 Public Domain

Goals and Activities of IG Metall

- Improve working and living conditions
- Democratization of the economy and co-determination
- Striving for peace, disarmament, international understanding and conservation of the environment

<u>Current Focal Topics & Activities (small selection)</u>

- Working hours: Create possibility to adapt working hours to various stages in workers' lives + regulate mobile work
- Increase number of plants with a collective agreement
- Secure standard of living for elderly: increase pensions

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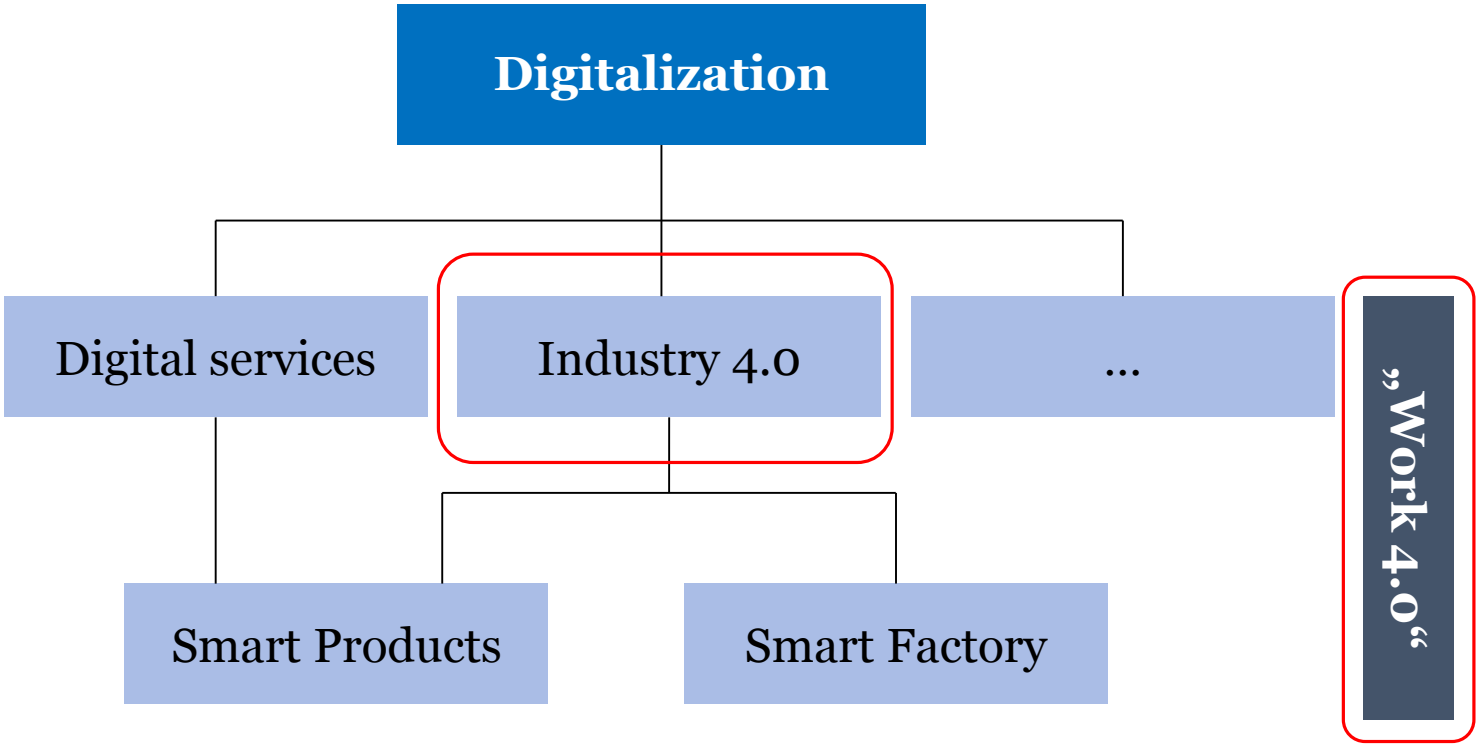
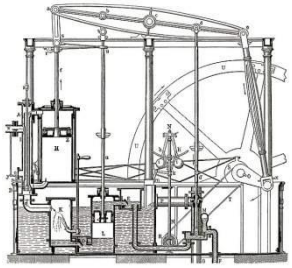
Different Terms

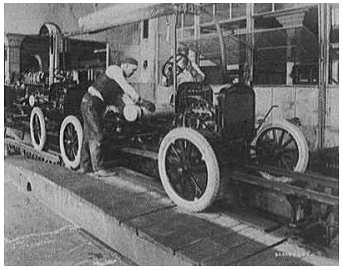


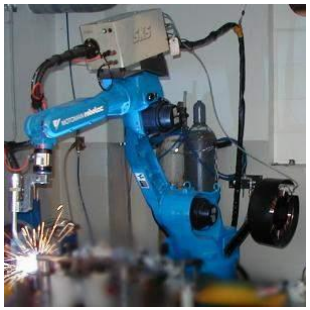
- Industry 4.0 / “Industrie 4.0“ (German term) = Integration, networking
- Internet of Things (internationally used term) =
  Products and machines are online and communicate autonomously

Steps Towards a Digital Industry

- **Industry 4.0 = networked economy, digitalization of production**
  - All real processes are reproduced digitally, i.e. cyber-physical systems (CPS)
- **Why the fourth industrial revolution?**







1. Industrial Revolution
by implementation of mechanical production facilities with steam and water energy

2. Industrial Revolution
by division of labor and mass production with the means of electricity

3. Industrial Revolution
by implementation of information technology for further automization

4. Industrial Revolution
by implementation of cyber-physical systems

Industry 1.0

Industry 2.0

Industry 3.0

Industry 4.0

Degree of complexity →

around 1790 **around 1910** **around 1970** **today**

Source: Prof. Bauer, Fraunhofer IAO & IAT, Univ. Stuttgart

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Paradigms of Industrie 4.0

- Wearables →

- Predictive Maintenance:

„Shift-Doodle“:

Source: zapp2photo/Fotolia, Wearables?, Fraunhofer IAO

Crowdwork as One Trend of Digitalization in the Service Sector

- Definition: Outsourcing of tasks via online platforms to a large pool of freelancers, the crowdworkers
- Lukas Biewald, founder and CEO of CrowdFlower:
  - “Before the times of internet it would have been really hard to find someone, who is willing to perform tasks for 10 minutes, and to fire him afterwards. But with this new technology it is possible to find people, which you pay a tiny wage, and to get rid of them, as soon as you don’t need them anymore.“
    translated from Cohen (2014, p. 303 in Benner: “Crowdwork”)
- Problems: Social security, standards & applicable laws?
- Advantages for workers: Flexible, easy access to labor

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Effects on Employment: Introductory Thoughts

- John M. Keynes: Technological unemployment
  - “This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour.” (Keynes, 1931, p. 361; quoted by Möller, 2015)
- Technological progress is rationalizing, but also opens up new markets (Appelbaum & Schettkat, 1995). That means…
  - Competetive advantages for cheaper / better products. But:
  - “Those countries are suffering relatively which are not in the vanguard of progress.“ (Keynes, 1931, p. 362; quoted by Möller, 2015)
- Blind spot in the debate: Ecological impact of econ. growth

Quantitative Effects on Employment

- World Economic Forum's survey (Jan. 2016) resulted in: "Robots, automation, and AI will replace 5 million jobs"
  - 371 large companies in 15 major economies, incl. Indonesia

- Frey & Osborne (2013): 47 % of jobs in the US have >70 % likelihood to be replaced by automation

Source: WEF (2016)

- German scenario study (Wolter et al. 2016)
  - Higher demand for digital technologies
  - Companies will invest more in training

→ 1.540.000 jobs will be lost until 2025
→ 1.510.000 jobs will be created

} 7 % of 43 million jobs in total

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Regional Initiatives: Example of NRW

Federal State of North Rhine-Westphalia

IG Metall in the Ruhr Valley

- Steps towards “4.0” necessary
- Local IG Metall as initiator of a network:
  - + Employers
  - + Science
  - + Office for Employment

→promoting regional industrial policy

Project “Work 2020”

- Evaluating the state of digitalization in plants: employees participate
- Educate works councils

→ Signed Agreement with management how digitalization is implemented

BESSER ARBEIT 2020 BEZIRK NRW

→ Save qualified jobs

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Work in the Digital Economy

- Common point of view in Germany:
  - There is a global trend towards a digital economy, in all sectors.
  - “We” can be the vanguard of this process – or lose revenue & jobs
- Alliance between government & business associations

  → “Plattform Industrie 4.0”
  - IG Metall actively engaged in subgroup for work & qualification

- Over the last years, common sense has developed:
  - Companies and the educational system need to (re-)qualify employees for the digital economy

Work in the Digital Economy

- Social dialogue about the future of work
  → “White Paper”
- The German system of co-determination and collective bargaining is (at least verbally) highly valued by all stakeholders to create acceptance for the changes that employees will face

Digitalization: Effects at the Workplace

46 %

… of all employees say: their **workload has increased** due to digitalization.

IG Metall graphics, source:
DGB-Index Gute Arbeit 2016

The survey is representative for all German employees

74 %

… of those employees whose job is affected by digitalization say: they have **little or no influence**, how digital technology is used at their workplace.

Other effects of digitalization

(defined as: complex work, interdependency, high information load, pressure to work faster and adapt towards technology)

➔ + 15 %
burnout & emotional stress

➔ + 18 %
work-family conflicts

Diminishes, if employees have flexible working time & place !

Böhm et al. (2016), online survey for Barmer GEK

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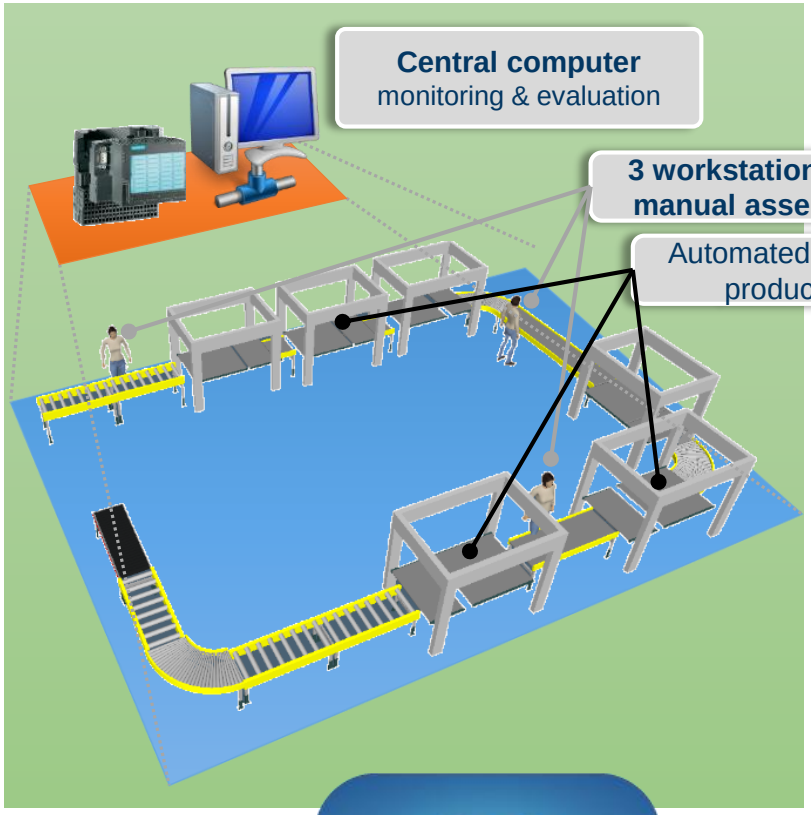
An Example of Designing Digital Work

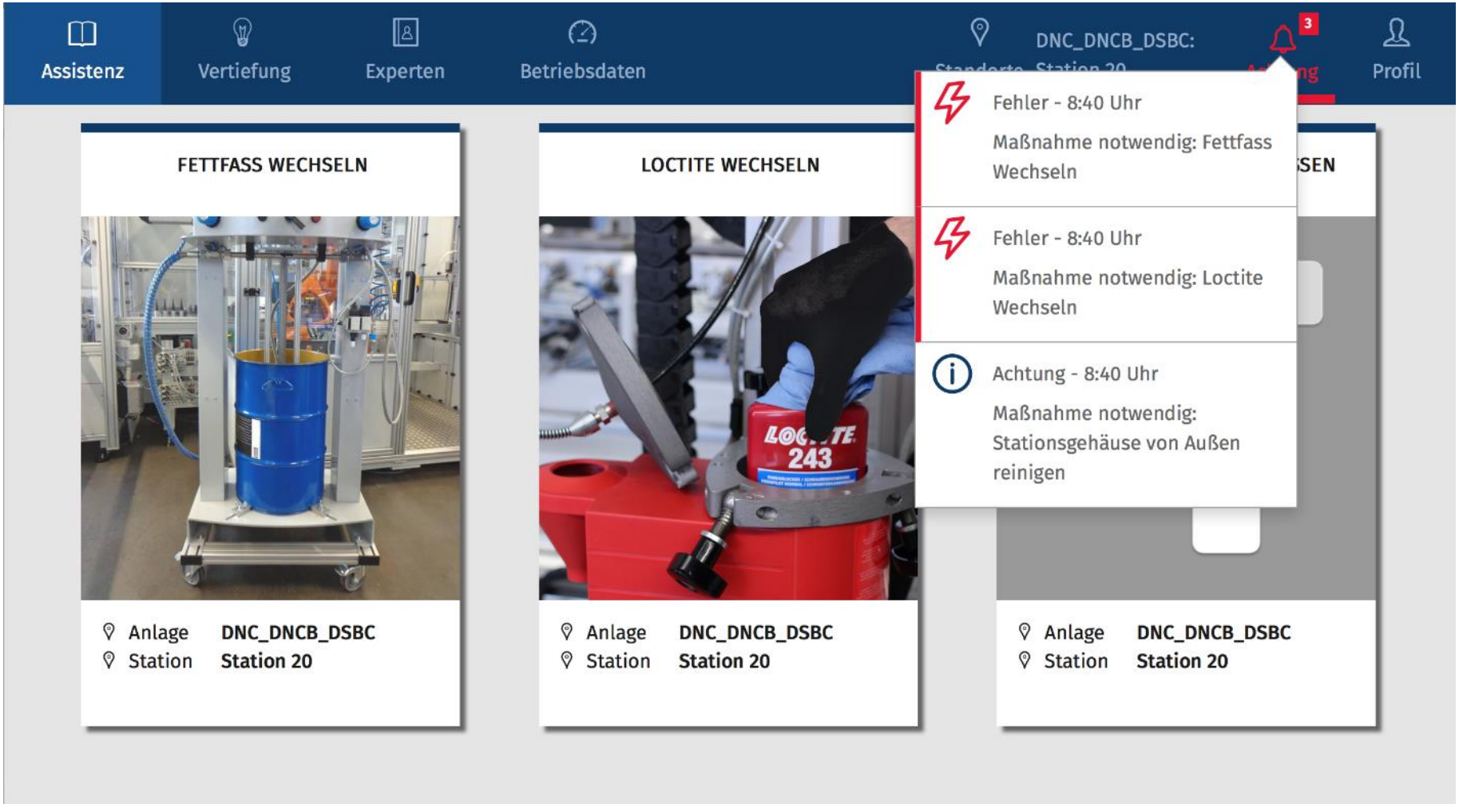


- Research Project **APPsist**: Intelligent assistance and knowledge system in production
- Funded by Ministry of Economics

Source: Projekt APPsist / DFKI (also for next slide)

An Example of Designing Digital Work

- Actual participation of workers in system development
- Not only step by step instructions, but knowledge acquisition



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Designing Digital Work: 2 Scenarios

	Humans Use Systems	Systems Steer Humans
Content of Work	Upgrading of jobs: Influence for employees how work & tasks are arranged	Downgrading of jobs: Narrow definition of tasks; high standardization
Organization of Work		
Technology		
Qualification / Competencies		
Data		

Designing Digital Work: 2 Scenarios

	Humans Use Systems	Systems Steer Humans
Content of Work	Upgrading of jobs: Influence for employees how work & tasks are arranged	Downgrading of jobs: Narrow definition of tasks; high standardization
Organization of Work	Cooperation and participation between groups of employees	High responsibility; low scope for action
Technology	Substitution of highly demanding and unattractive tasks, e.g. by lightweight robots	Goal of full automation; number of employees as small as possible
Qualification / Competencies	Comprehensive training (on and off the job); better chances for upward mobility	Only training on the job
Data	Access to information and knowledge for problem solving; personal data protection	Use of personal data to control employees and to increase performance

Summary & Take-Home Messages

- Changes towards a digital economy or “Work 4.0” are underway – no matter how we call them
- Digitalization also means rationalization
  - Quantitative effects on employment are hard to estimate
- This change is not determined, but can be designed
  - Goal of good working and living conditions
- Unions can shape the process
  - At best, together with government and employers’ associations
- Employees need degrees of freedom and qualification to make the digital economy a successful one

Thank You for Your Attention!

Source: Thomas Range