



## Work-oriented design of innovations and digital change

Wolfgang Anlauff, January 2019, Zagreb

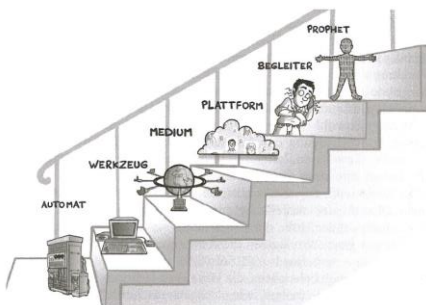
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Potenziale entfalten –  
Veränderungen gemeinsam gestalten.



## The digital staircase at a glance (1)



Source: In line with "The Digital Staircase", by Lothar Schröder 2016

**Automation:** Computer-aided automation  
Central topics: Employment security

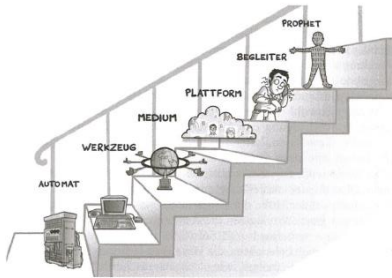
**Tool:** mass use of workstation computers  
Central topics: *physical and psychological stress*

**Medium:** networked medium enables "de-location"  
of work

Central topics: Increasingly blurred boundaries  
between work and leisure time (working time &  
place of work)



## The digital staircase at a glance (2)



Source: In line with "The Digital Staircase", by Lothar Schröder 2016

**Platform:** powerful Internet enables platform economy (crowdsourcing, crowdworking, shared services etc.)

Central topics: *Revitalisation of competitive relations on the basis of wage dumping and reduction of social and labour standards*

**Accompanying aspects:** Miniaturisation (sensor technology, performance) leads to significantly increased spatial and temporal flexibility

Central topics: *Performance, control, mental health, separation of work and private life*

**Prophecy:** Big Data for predicting and controlling processes all the way through to complex behaviour patterns.

Central topic: *Protecting personal rights* (citizens and employees)

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## The 3 levels of change of Work 4.0

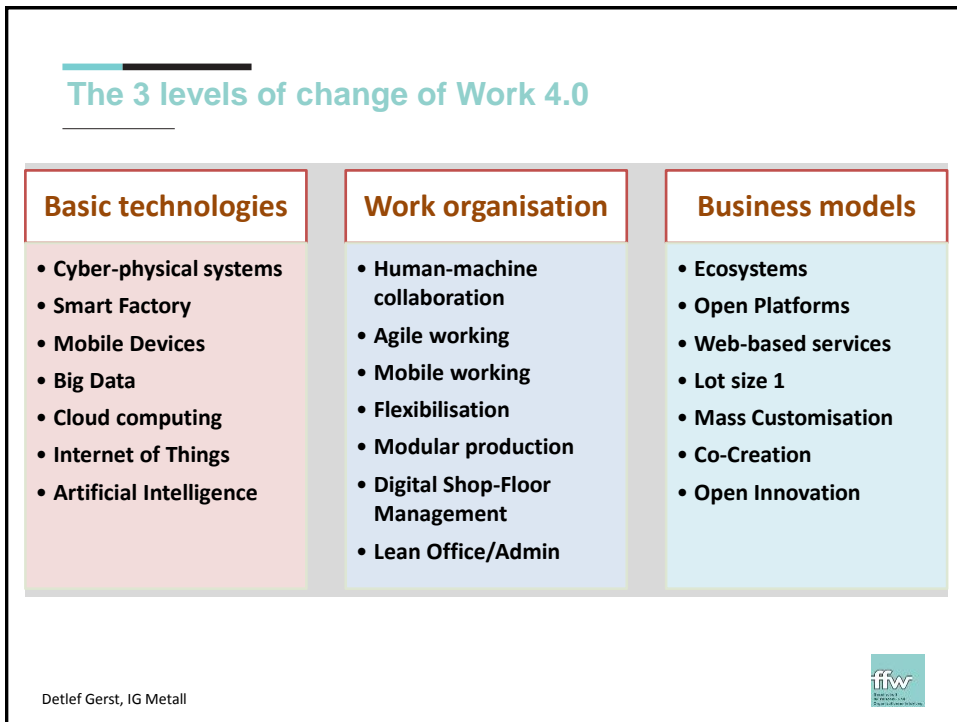


**Prerequisites**

- Sensor technology and EDP technology exponentially faster and cheaper
- Network infrastructure substantially more efficient (speed, coverage, addressability)

In line with Detlef Gerst, IG Metall






## Competence development and digitisation (1)

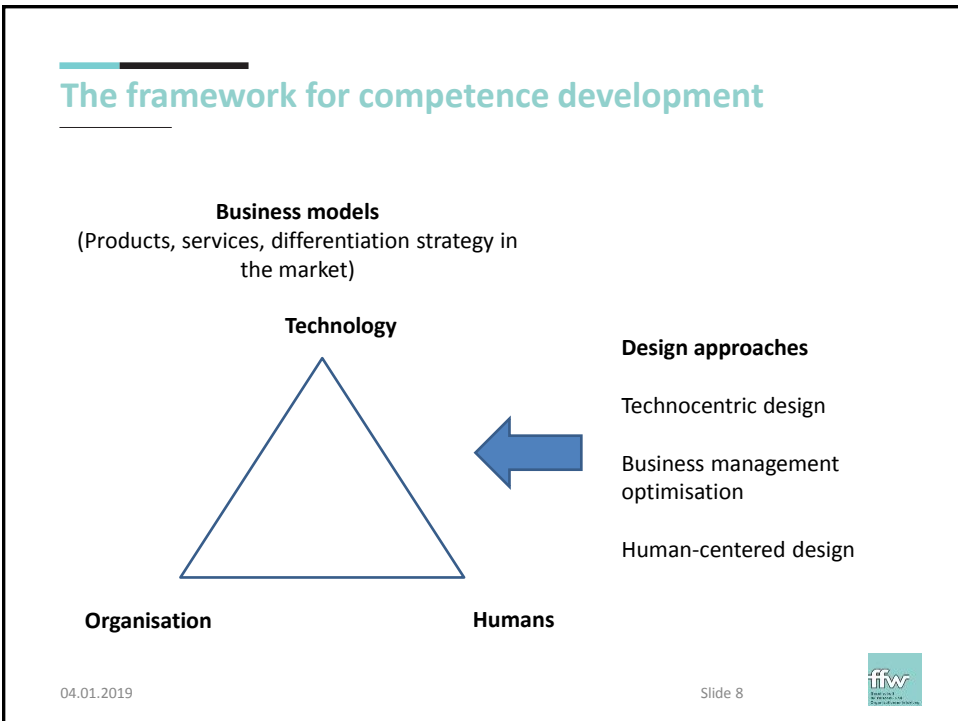
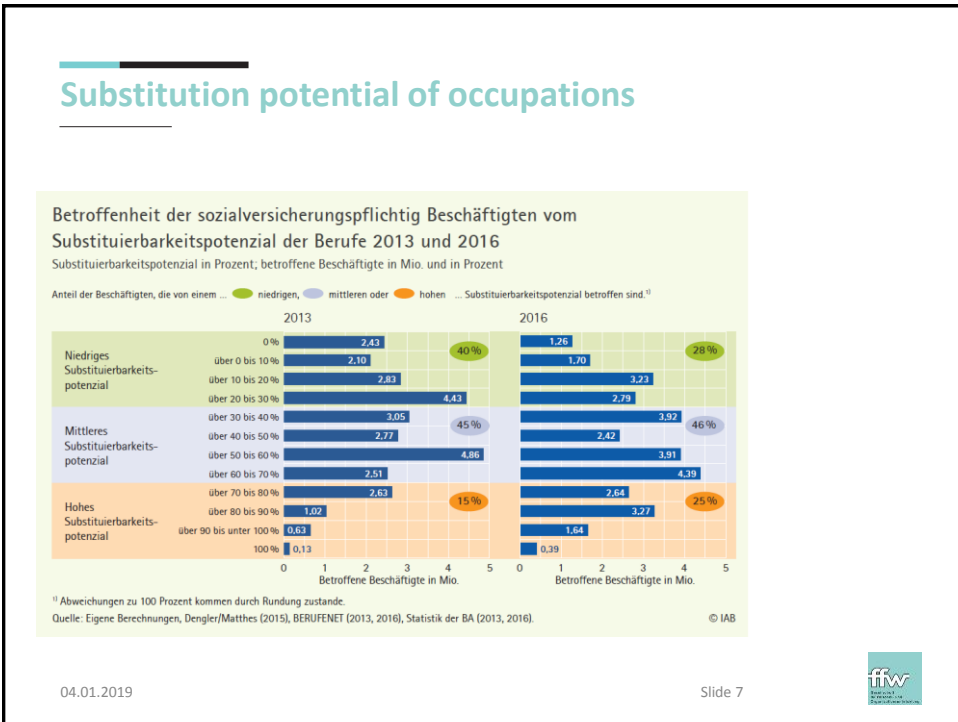
### Digitisation/ Work 4.0

- Changes in business models, technologies, processes, value chains

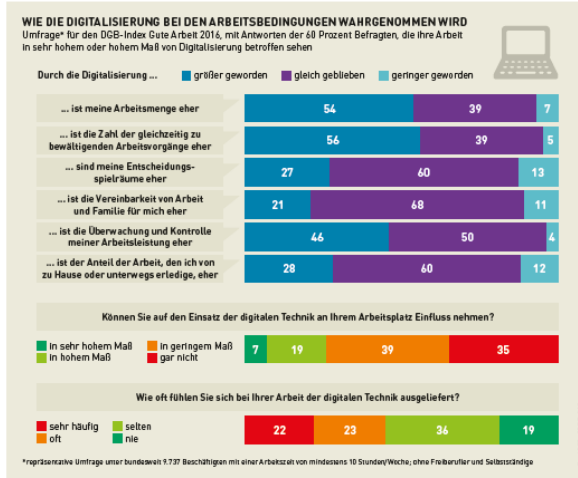
Brief description of scenarios	Impacts on
<p><b>Scenario 1: Automation</b> Activities cease to exist</p>	<ul style="list-style-type: none"> <li>• volume of employment</li> <li>• Assigned activities</li> <li>• Remuneration</li> <li>• Working time &amp; place of work</li> <li>• Ergonomics</li> <li>• Performance &amp; control</li> </ul> <p><b>Dependent on</b></p> <ul style="list-style-type: none"> <li>• Operational design</li> <li>• Technology - Business Administration - Ergonomics</li> </ul>
<p><b>Scenario 2: Polarisation</b> Qualified experts with a high scope for action and, at the same time, simple tasks.</p>	
<p><b>Scenario 3: Upgrading of qualifications</b> Qualified personnel with high scope for action</p>	
<p><b>Scenario 4: new simple activities in the digital world</b> Humans as an extended arm of digital technologies (e.g. pick by light, logistics activities, etc.)</p>	

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## Survey: Digitisation and working conditions



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## Assistance systems and their effects on work

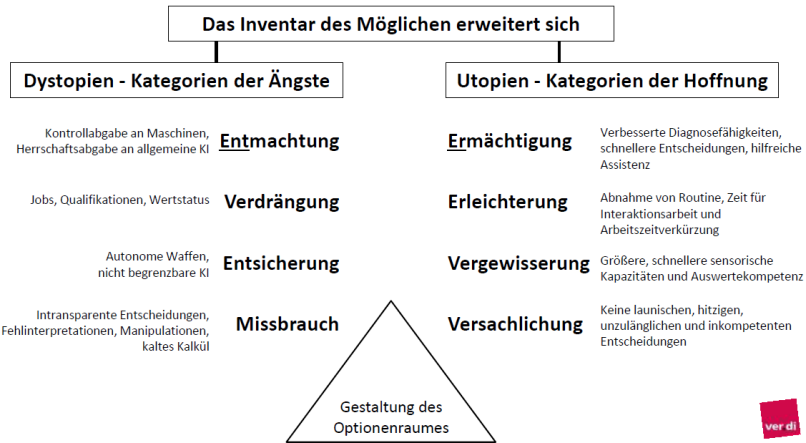
Topic	Positive effects	Negative effects
<b>Ergonomics</b>	Less physical strain (forced postures, lifting and carrying)	New strains (data glasses), one-sided strains due to standardisation, accident hazards
<b>Activities</b>	Support for more complex activities , more room for manoeuvre, improved communication with specialist departments, higher remuneration	Standardisation, humans as executives arms of machinery, reduced work content, lower remuneration
<b>Working time &amp; place of work</b>	Potential for improved reconciliation of work and private life, higher time sovereignty	Potential for relocations increases, potential for precarious employment (crowdworking / crowdsourcing) increases, blurred boundaries between work and leisure time)
<b>Performance &amp; control</b>	Quality assurance and short-term feedback on work results	Evaluation of performance data (direct control), indirect control (machine commands), anonymised power (meta data), acceleration, performance and deadline pressure increases

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## Impact assessment of the use of artificial intelligence



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## Central questions

### Securing employment

- rising / constant / falling
- Are there likely to be shifts in the volume of employment between departments, locations and countries?
- Precarious forms of employment increasing: Crowdsourcing, crowdsourcing, temporary workers

### Work content

- Upgrading of activities: More complex, more varied, more interesting, more valuable, machinery/IT as an aid, opportunities for positive development of remuneration
- Downgrading of activities: Monotony, less scope for action, humans subservient to the commands of "machinery" (assistance, Big Data, etc.), danger of lower remuneration and substitutability

### Working conditions

- Increased physical and/or psychological stress, increasingly blurred boundaries between work and leisure time, intensification of performance, stronger control through direct and indirect surveillance as workers and citizens
- More autonomy and time sovereignty, relieving aids (physical and psychological)

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## Central questions for the design of work

### Development and safeguarding of employment

- Company, collective bargaining and social initiatives
- **Volume:** Product innovation - reduction of working hours
- **Change:** Co-determination & participation - qualification (adaptation, transformation, innovation)

### Designing work

- Labour policy model for the design of "good work" (healthy and competent ageing in employment)
- Protecting personal rights in the company and in society
- Regulating and shaping new forms of employment: crowdworking, crowdsourcing, solo self-employment

### Co-determination

- What extended co-determination rights do we need?
- How can co-determination and participation function well together?

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Vielen Dank für Ihre Aufmerksamkeit

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