

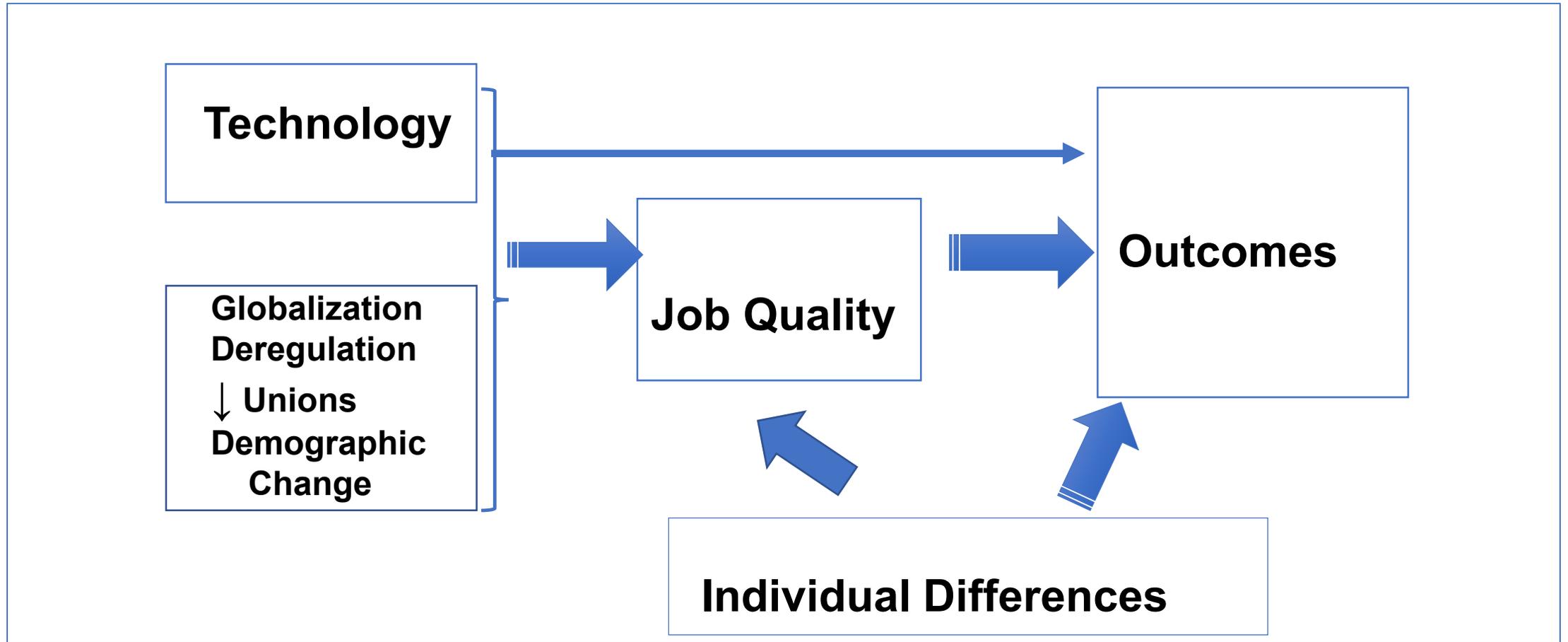
TECHNOLOGICAL CHANGE AND JOB QUALITY

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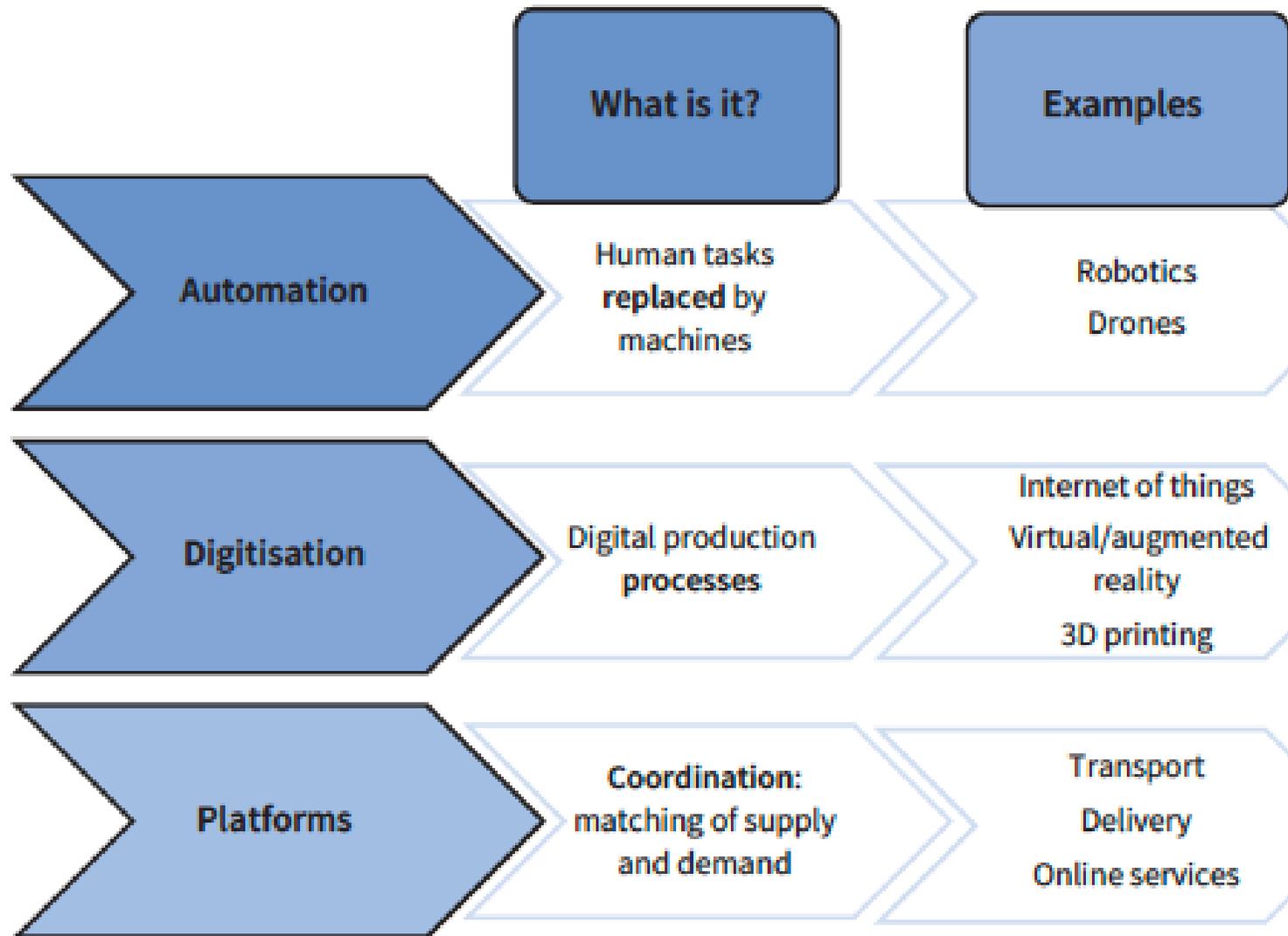
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2022 SOEP User's Conference
June 30, 2022

Technology and Job Quality

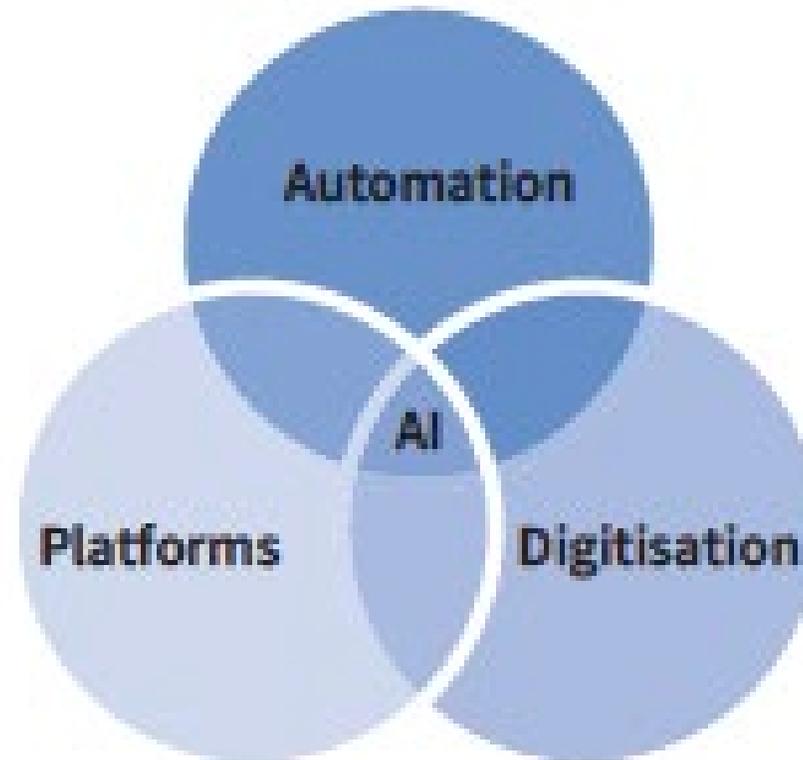


3 Types of Digitalization



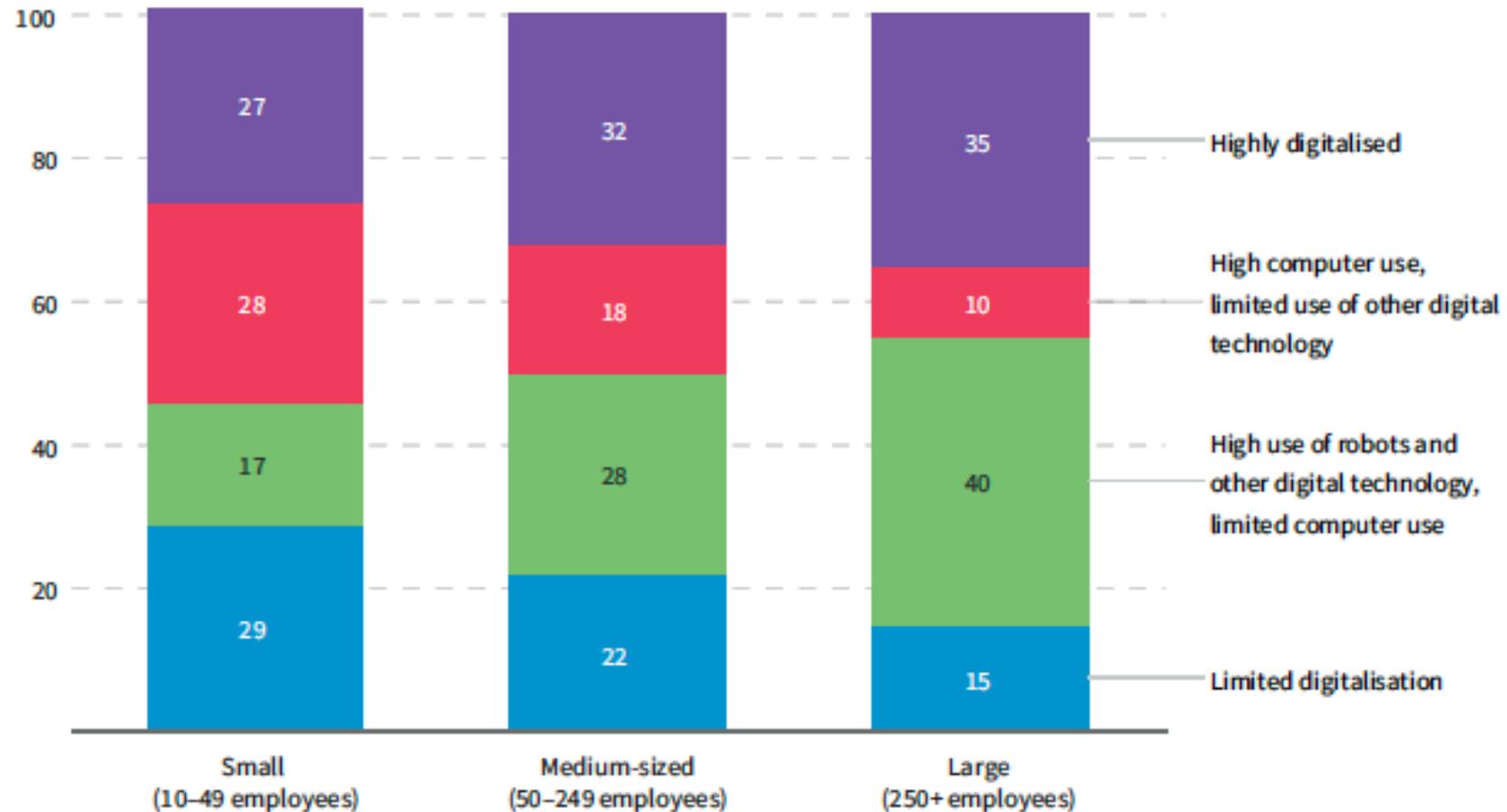
Source: Irene Mandl, Eurofound (2021), *The digital age: implications of automation, digitization and automation for work and employment*

Types of Digitalization Are Used in Combination



Source: Irene Mandl, Eurofound (2021), *The digital age: implications of automation, digitization and automation for work and employment*

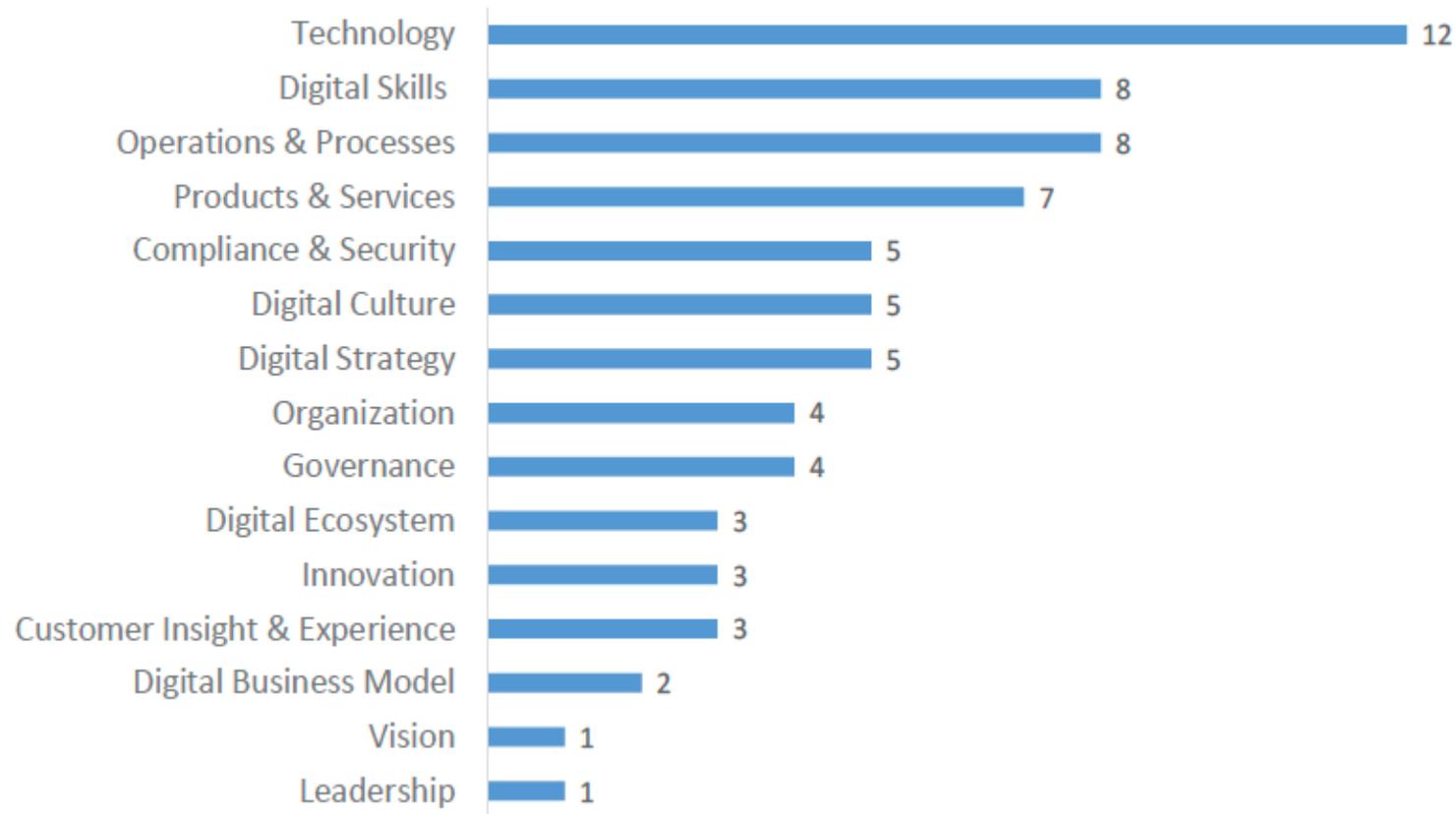
Digitalization Intensity (%) by establishment size, EU27 and UK (2019)



Note: Due to rounding, the values in the bars do not in all cases sum to 100%.
Source: ECS 2019 management questionnaire

Organizational Digital Maturity Models

Frequency of maturity areas addressed in domain specific digital maturity models



Source: Roman Teichert, “Digital Transformation Maturity: A Systematic Review of the Literature”

Automation, Tasks, and Skills

➤ **Substitute** for human skills

- **Self-service scanners in supermarkets**

- **Robots assembling parts of cars**

➤ **Complement** human skills

- **Continuous imaging during medical operations**

- **Remote ordering at restaurants**

Job Quality

- JQ is a **Multidimensional** Concept
 - Skills
 - Autonomy/control over activities
 - Economic
 - Earnings
 - Opportunities for growth in Earnings
 - Benefits (HI, Pension)
 - Control and Flexibility over scheduling
 - Control over Termination of job
- Overall Measure of JQ?

Digitalization → Job Quality

- Flexibility (in working time arrangements, telework, etc.)
- Reduce burden of physical labor, improve safety
- “Technostress”: Stress from work intensification and acceleration, inadequate skills
- Uncertainty about whether job will be eliminated
- Wages and benefits

Measuring Digitalization: I

- **Substitution potential:** Ratio of potentially automatable tasks associated with the occupation/all tasks in occupational profile)
- Based on independent judgments from 3 experts
- Assume that occupations with higher substitution potential have been more likely to have undergone processes of digitalization

- Kortmann et al., “Digitalisation and Employees’ Subjective Job Quality in the Second Half Of Working Life in Germany.” *Social Indicators Research*, 2021

Table 1 Digitalisation and job quality, models 1–3. *Source* DEAS 2014. N= 1541

Job satisfaction		Index		...with work as a whole		...with earnings		...with the kind of work		...with working hours		...with career development or promotion		...with further training		...with the working atmosphere	
		b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Pure model	Digitalisation	0.009	0.068	0.092	0.077	-0.034	0.103	-0.004	0.085	0.429	0.099	–	–	-0.362	0.127	-0.020	0.093
Composition model	Digitalisation	0.172	0.073	0.181	0.085	0.253	0.109	0.069	0.094	0.465	0.104	0.249	0.124	-0.109	0.144	0.103	0.104
Job insecurity model	Digitalisation	0.188	0.072	0.198	0.084	0.266	0.108	0.081	0.093	0.473	0.104	0.274	0.122	-0.081	0.142	0.116	0.103
	Subj. job insecurity	-0.165	0.024	-0.180	0.028	-0.130	0.036	-0.124	0.031	-0.073	0.035	-0.248	0.040	-0.285	0.048	-0.128	0.034

All models include the control variables gender, residency, age. From the composition model onwards it is controlled for: education, sector, company size, SRH, wage, working hours. The job insecurity model additionally controls for subjective job insecurity (1=low-5=high). Significant estimates ($p < 0.05$) in bold; estimates with $p < 0.1$ in italics; “–”: model is not significant. Rounded to three decimal places. Coefficients are unstandardised partial regression slopes

Source: Adapted from Kortmann et al., “Digitalisation and Employees’ Subjective Job Quality in the Second Half Of Working Life in Germany.” *Social Indicators Research*, 2021.

Data: German Ageing Survey, 2014; N=1541 employees 40-65 years old

Measuring Digitalization: II

- Broadest and longest trend indicator on the use of advanced technology in jobs is a question that asks people: “Does your own job involve use of computerized or automated equipment?” This was asked in the Social Change and Economic Life survey of 1986, the Employment in Britain Survey of 1992 and the Skills Survey of 2001
- *Gallie, Felstad and Green (2003)*: growth in use of advanced technology, which is linked to higher skill requirements of jobs, but not to task discretion (due more to managerial design)

Measuring Digitalization in the SOEP - I

Table 1: Summary of item pool on innovation module “digitalization of the world of labor” in SOEP-IS and SOEP-Core.

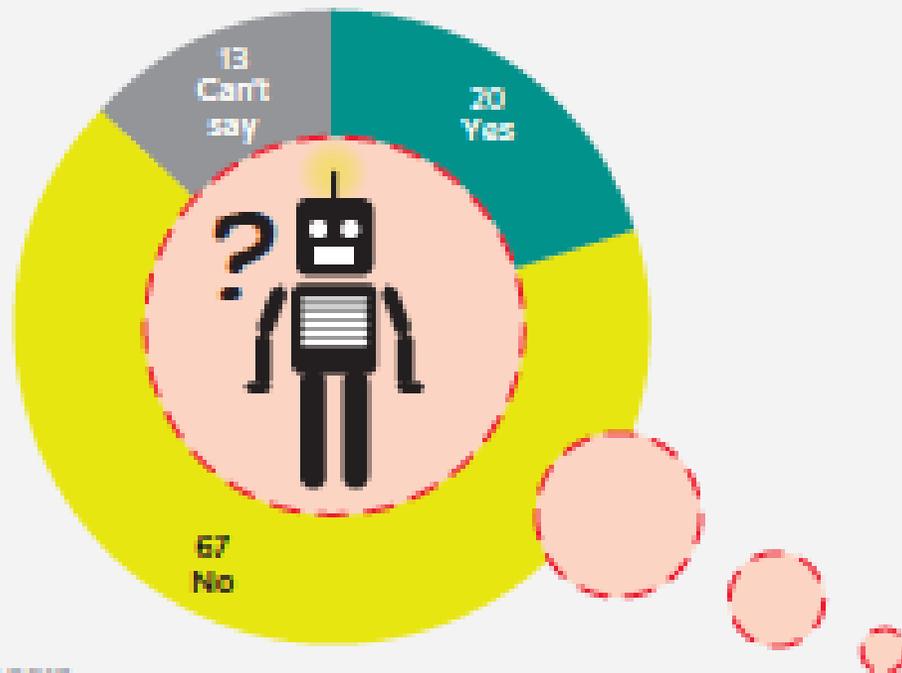
	SOEP-IS	SOEP-Core
AI exposure		
<i>Four items, potential exposure AI specific tasks</i>	Q533	N/A
Four items, exposure AI specific tasks	Q534	Q93
<i>One item, exposure AI (yes/no)</i>	Q535	N/A
Platform work		
Four items each on platform work (a) selling goods, (b) rent out property, and (c) selling services [<i>Six items, platform work overall, not asked separately for (a), (b), (c) in SOEP-IS</i>]	Q536–Q541	Q105–Q116
Digitalized work place		
Digital tools		
Eight items, list of digital tools, frequency [<i>One additional item on digital cash register systems in SOEP-IS</i>]	Q542	Q92
<i>One item, potentially missing digital tools (open response format)</i>	Q543– Q544	N/A
Use of digital technologies		
<i>Four items, use of digital technologies: automatic instructions, feedback, control, and support</i>	Q545–Q548	N/A
Tasks		
Twelve items, list of tasks, frequency	Q549	Q91
Consequences		
Five items, autonomy at work	Q553–Q557	Q94
Three items, work-life conflicts	Q550–Q552	Q94
Three items, worries about technological change, job qualification, and work–life conflict	Q558	Q168
<i>One item, perceived organizational fairness</i>	Q352	N/A

Source: Fedorets et al. (*Journal of Economics and Statistics*, 2021)

Measuring Digitalization in the SOEP - II

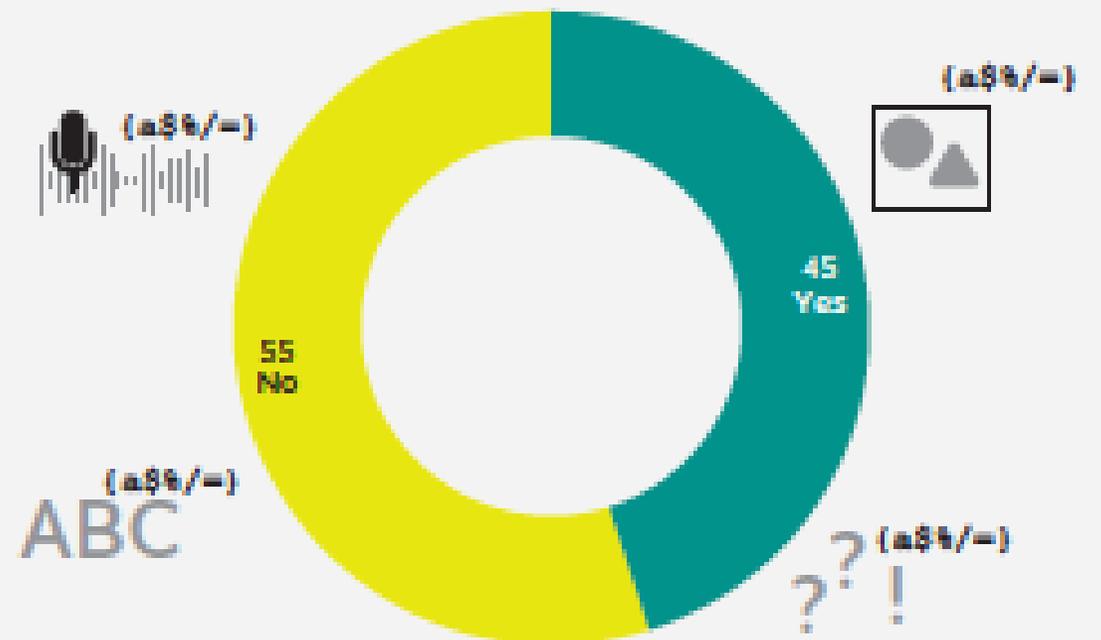
The power of futuristic Ideas: many employees do not know they already work with AI-based systems

Direct measurement:
"Do you use AI at your workplace?"



Source: SOEP-IS 2019.

Indirect measurement:
"Do you use digital systems for speech, text, or image recognition or for answering specialized questions?"



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Source: Oliver Giering et al. (2021): "Artificial Intelligence in Germany"

Studying Digitalization and Job Quality with the SOEP

