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**8|2020** How digitalized is work in large German workplaces,  
and how is digitalized work perceived by workers?

A new employer-employee survey instrument

Mareike Reimann, Anja-Kristin Abendroth, Martin Diewald

How digitalized is work in large German workplaces, and how is digitalized work perceived by workers?

A new employer-employee survey instrument

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## Abstract

Digitalization of work has been made responsible for an increase in labor market inequalities, not only with respect to job loss, but also concerning an increased polarization of the remaining jobs due to processes of devaluation and upgrading of jobs and occupations. However, the discussion about possible consequences is quite polarized and not very sophisticated regarding different technologies and different implementations of the same technology. To understand changes due to digitalization processes, we suggest measuring the implementation of digitalized work both at the individual employee and at the workplace level, because decisions about how digital assistance systems are implemented are made by the latter. Existing representative surveys in Germany so far miss to provide such a comprehensive overview of digitalized work in different occupations and workplaces, as well as their implications for workers. The aim of this paper is to present a newly developed multi-dimensional measurement of digitalized work implemented in a representative linked employer-employee study design. The instrument aims at measuring the prevalence of various dimensions of digitalized work (the use of digital communication, digital information, digital regulation and control, working with robots) and how those are perceived by workers.

## Zusammenfassung

Die Digitalisierung von Arbeit wird für die Zunahme von Arbeitsmarktungleichheiten (mit)verantwortlich gemacht, nicht nur bezüglich Arbeitsplatzverlust, sondern auch bezogen auf die Polarisierung bestehender Jobs durch einen Prozess der Abwertung und Aufwertung von Berufen und Tätigkeiten. Die Diskussion über mögliche Konsequenzen ist jedoch wenig differenziert in Bezug auf verschiedene Technologien oder unterschiedliche Implementationen der gleichen Technologie. Um Veränderungen durch Digitalisierungsprozesse zu verstehen, ist eine Messung digitalisierter Arbeit auf Beschäftigten- wie auch auf Betriebsebene sinnvoll, da Entscheidungen über den Einsatz digitaler Unterstützungssysteme in Betrieben getroffen werden. In repräsentativen Erhebungen in Deutschland fehlt bislang ein solch umfassender Überblick über digitalisierte Arbeit und ihre Konsequenzen in verschiedenen Berufen und Arbeitsplätzen. Ziel des vorliegenden Beitrags ist es, ein neu entwickeltes, multi-dimensionales Instrument zur Messung digitalisierter Arbeit im Rahmen eines Linked Employer-Employee Studiendesigns vorzustellen. Das Instrument zielt auf eine Bestandsaufnahme der Digitalisierung in Arbeitsorganisationen entlang verschiedener Dimensionen digitalisierter Arbeit (die Nutzung digitaler Kommunikation, digitaler Information, digitaler Regulierung und Kontrolle und der Arbeit mit Robotern) und ihrer Wahrnehmung durch Beschäftigte ab.

## Keywords

Digitalization, Digitalized work, Employer-employee, Inequality, Polarization

# 1 Introduction

Digitalization of work is a key topic on the political agenda and highly debated in current research. The discussion about possible consequences is quite polarized and not very nuanced when it comes to different technologies and different implementations of the same technology. On the one hand, there is utopian optimism for efficiency, productivity, and well-being. On the other hand, major concerns are voiced that fundamental changes in work will threaten employment opportunities and gratifications, ultimately leading to more inequality and polarization in the labor market and the society as a whole. The term digitalization is often used broadly to describe new technological developments based on computer-readable information and the transformation of work. However, digitalization is only a generic term for a broad range of very different, quickly developing applications, ranging from using digital communication and information tools over artificial intelligence to robotics, which shape work in very different degrees. Therefore, it seems unlikely that uniform consequences of “the digitalization” exist. Rather, it is necessary to look at specific forms of digitalized workplaces in different work environments.

Existing representative surveys in Germany so far miss to provide such comprehensive overview of digitalized work in different occupations and workplaces as well as its implications for workers. At the **employee level**, existing surveys mainly monitor the implementation and use of computers and the internet, or information on job tasks is used to deconstruct the share of tasks which are likely to be automatized by digital technologies for existing occupations. At the **employer level**, either very unspecific measurements of whatever can be understood by the term “digitalization” or subjective perceptions not being linked to measurements of tangible working conditions are used. In the following, we present and discuss a newly developed concept for surveying the digitalization of work based on an employee-employer instrument.

Our goal was not to measure the extent of the use of specific digital technologies in specific occupations or workplaces, but rather to capture different, more abstract dimensions of digitalized work on which individual jobs can be compared. Because digital technologies, as in the form of personal computers, have been introduced in workplaces for a long time, simple instruments are not able to capture the revolutionary change in the more recent development based on AI and real-time networks between humans and machines. Therefore, we realized a measurement of different dimensions of digitalized work which distinguishes digitalized communication with supervisors and co-workers, digitalized information processing, digitalized regulation and control of work processes, and working with robots. We integrated this measurement in a quantitative Linked Employer–Employee Panel Survey (LEEP-B3), which consists of a representative sample of large German work organizations (i.e., organizations with more than 500 employees), and about 6,000 randomly selected employees in different occupations and jobs within these work organizations (Diebold et al., 2014). The developed instrument to measure digitalized work is part of the third wave (2018/2019) of this longitudinal survey (two waves completed before: 2012/2013, 2014/2015).

This design has major advantages as it enables to (1) capture the variety of digitalization processes in various industries by differentiating various purposes of their use; (2) embed digitalization in service and production work, in different industries, organizational structures and production processes, and workplace settings; and (3) address the fact that the implementation of the same or

similar digital technologies and the implications for workers are negotiated within workplaces, with different inequality regimes indicating different implications of digitalization for different groups of workers, e.g. in dependence of their qualification level.

This article first describes the rationales of the survey instrument and its design (chapter 2 and 3). Second, insights in the diffusion of digitalization for different groups of workers, different sectors and workplaces are provided (chapter 4). Third and last, emphasis will be laid on demonstrating how the diffusion of digital technologies at work shapes social inequalities.

## 2 Rationale of the survey instrument

Rather than measuring substitution potentials of technologies for occupations or job tasks (e.g. Frey and Osborne, 2013; for Germany: Bonin, Gregory, and Zierahn, 2015; Dengler and Matthes, 2015; Dengler and Matthes, 2018), we designed a survey instrument which captures how the quality of existing jobs changes due to the implementation of digital technologies and in dependence of individual, job and workplace characteristics. Though there are many attempts to develop adequate measurement instruments of technological progress in the past few years, the implementation in large-scale, representative surveys is comparably scarce and has necessarily to cope with constraints of parsimony. On the one hand, most surveys still use very broad measures such as computer and internet usage (i.e. in the German sub-study of the European Social Survey, 2017; or SOEP, 2017; BIBB-BAuA, 2012/2018). These broad measurements have significant drawbacks. Above all, they hardly relate to current discourses on digitalization since they hardly allow for disentangling more recent developments from those in earlier phases of computerization. On the other hand, small case studies focus primarily on very specific occupations or industries (for example: the job-related level of digitalization in an accounting firm; Müller, Hummert, Traum, Görs, and Nerdinger, 2018), making the generalization for diverse occupational groups, industries or workplace settings difficult.

Our goal was to distinguish at least to some extent between older and more recent digital technologies as well as between different purposes of work-related use of digital technologies and their evaluation by different groups of workers in different workplaces. We distinguish the use of digitalized communication with supervisors and co-workers, digitalized information processing, digitalized regulation and control of work processes, and working with robots as different dimensions of digitalized work. In addition, we differentiate how these forms of digitalized work are perceived with respect to different dimensions of job quality, e.g. work autonomy, work flexibility and devaluation of skills. With this we contribute to two salient discourses on digitalization and the consequences for the job quality of different groups of workers. First, we refer to public debates and research highlighting an increasing blurring of boundaries between work and personal life due to the use of digital technologies (Kossek, 2016), especially the use of information and communication technologies and telecommuting (e.g. Allen, Golden, and Shockley, 2015; Chesley, 2005; Nam, 2014; Pfeiffer, 2012; Wajcman, Bittman, and Brown, 2008).

Second, we pick up the discourse on the upgrading or downgrading of jobs based on the so called ‘fourth revolution’, sometimes also labeled as the second phase of digitalization, or the second



machine age (Brynjolfsson and McAfee, 2014; Hirsch-Kreinsen, 2016). Three scenarios have been highlighted (for a review see Hirsch-Kreinsen, Ittermann, and Niehaus, 2018): An optimistic scenario describes an upgrading of job tasks and qualifications due to substitution of low qualified routine tasks and the development of new non-routine work tasks which require higher cognitive skills. This is due to the complex cross-linkage of work processes across workplaces, between humans and machines as well as producer and clients through dense digital information, and the required capacity to operate with mixed human-machine decision-making. The pessimistic scenario describes the segmentation and regulation of work tasks via cyber-physical systems as devaluating the work of humans who lose their self-determination and get alienated. The polarization scenario instead implies a polarization between either low or high qualified jobs, whereas medium qualification jobs are devaluated due to the replacement of job tasks by algorithms that have to be designed and operated by fewer high qualified job holders whose status is upgraded, more than predicted in the optimistic scenario. Moreover, the proposed survey instrument allows to contribute to research on the skill biased technology hypothesis, which suggests wage rewards for skills not only in computer use but also in general cognitive skills to perform non-routine tasks at work which complements tasks performed by the computer (Card and DiNardo, 2002; Dengler and Matthes, 2018; King, Reichelt, and Huffman, 2017; Morris and Western, 1999; Spitz-Oener, 2006; 2008) as well as to research on the class biased technology hypothesis which suggests that the implementation of technologies increases imbalances in power relations and therefore fosters social inequalities in the workplace (Kristal, 2013).

Processes of digitalization can be studied at various levels, with pros and cons for each of them. Occupations structure the division of labor in the system of employment, and the access of individuals to different workplaces. Studying processes of digitalization at this level seems most common in existing research. This approach allows for learning how deeply digitalization has already shaped the structured division of labor and related advantages and disadvantages linked to what employees have acquired to reach specific occupations. However, technical change, especially if sudden, usually affects specific jobs first, and then retroacts to the design of occupations. As especially resourceful workplaces seem to start with investing in a technology which affects the jobs of their employees (King et al., 2017), the spectrum does not necessarily mirror single, distinguishable occupations. Moreover, what makes occupations work in reality, and where they are situated in organizational hierarchies, is considerably heterogeneous across work organizations (Avent-Holt, Hällsten, and Cort, 2019). Therefore, investigating specific jobs, with additional information about the occupational attainment of the job holder, seems crucial and superior to occupational information alone.

Second, at the context level, the alternative is between work organizations and value-added chains transcending organizational boundaries. There are good arguments to choose the latter, since otherwise important interdependencies between jobs in different work organizations or outside work organizations, as in the case of crowdwork and other contract work, will be overlooked. However, there are also strong arguments for choosing work organizations. They have a decisive force in shaping work environments, not least the shape of occupations, and contribute significantly, through several mechanisms, to how the social inequalities are structured in a society (Tomaskovic-Devey and Avent-Holt, 2019). Moreover, despite some selectivity regarding gainful em-

ployment outside work organizations, they are methodologically much more suited for representative multi-level studies of the whole occupational structure than of value-added chains, which are more suited for case studies.

## 3 Implementation of the instrument to measure digitalized work

The discussion on the fourth industrial revolution focuses on the cross-linkage of human workers, human clients, machines in the production and machines as products already delivered to the clients, connected by complex and comprehensive operating systems, via in-house networks and the internet. Following this perspective we developed a new multi-dimensional measurement of digitalization at the workplace, capturing the sheer existence of such systems, the specific characteristics of the interface between humans and smart technologies or objects, as well as the implications for qualification, job security, and job autonomy. Following the discussion we mentioned above, but also in the light of the state-of-the-art as a whole (e.g. Diewald, Andernach, and Kunze, 2017), we laid emphasis on employees' experience of digital regulation and control versus self-determination, autonomy, and flexibility options. We opted for an inventory of workplace digitalization based on more general, overarching working conditions and abstained from differentiating between specific implementations of specific digital systems. However, we at least formulated extra questions for the work with robots to adequately include the sector of manufacturing.

### 3.1 The LEEP-B3 Survey

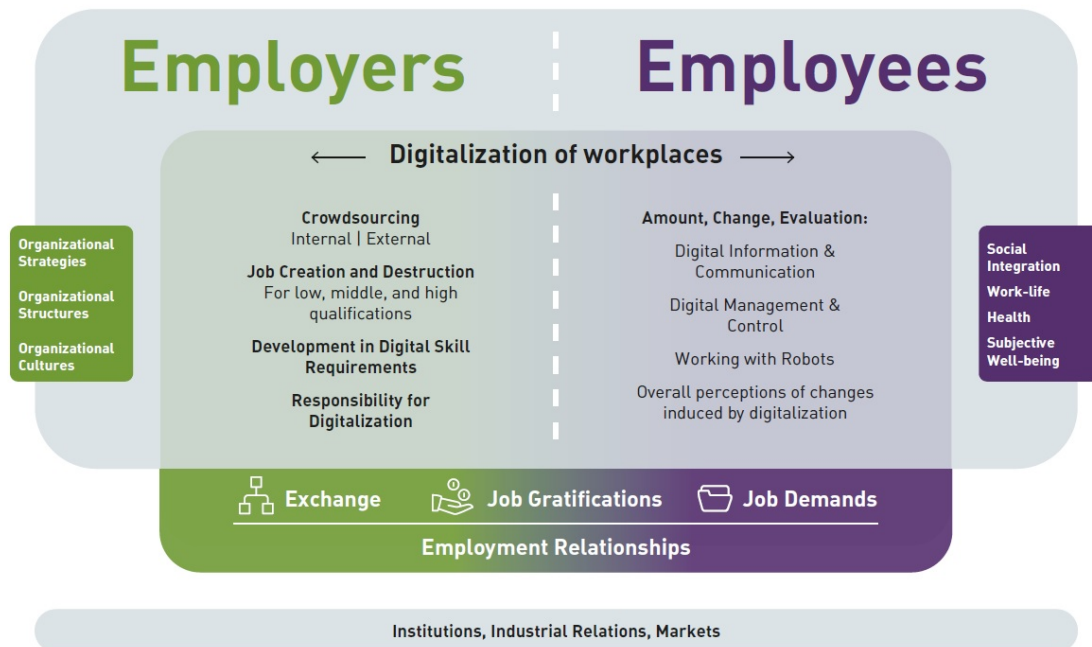
The quantitative Linked Employer–Employee Panel Survey (LEEP-B3) is collected as part of the study “Interactions between Capabilities in Work and Family Life” (LEEP-B3; for further information see Diewald et al., 2014). The study is composed of an employer survey with work organizations<sup>1</sup> from various segments of the economy, an employee survey with employees from these organizations, and an additional partner survey. Moreover, survey data on all levels of the study design are complemented by administrative data in cooperation with the IAB. Areas covered by the employer survey include employee structure, employment policy measures, equal opportunity, work–life balance, and health. Areas covered by the employee survey include occupation, personal life, work–life balance, health, preferences, and satisfaction. The employees who participated in the survey are representative of the employees of large establishments in Germany with more than 500 employees in all industries, including the public sector. Interviews were conducted using computer assisted telephone interviews (CATI). To date, three waves of data collection have been completed (T1: April 2012 to July 2013; T2: February 2014 to April 2015; T3: April 2018 to July 2019). T1 comprised 100 organizations and 6,454 employees with a response rate of 29 percent, calculated based on AAPOR (The American Association for Public Opinion Research, 2015). Of these, 4,000 employees also participated in the second wave (T2) (response rate for panel respondents = 73.3 percent). T3 included the newly developed instrument to measure digitalization. It was

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<sup>1</sup> Within the scope of the LEEP-B3 survey, the term work organizations refers to establishments.

used for the panel respondents as well as for the refreshment sample within the employee survey, and for all subsamples of the employer survey. Figure 1 shows how the newly developed instrument is embedded in the overall structure of the LEEP-B3 survey.

Figure 1: Digitalization within LEEP-B3



Source: LEEP-B3; own illustration.

## 3.2 Description of the instrument

### 3.2.1 Employee Survey

The central dimensions in the employee survey are digitalized communication with supervisors and co-workers, digitalized information processing, digitalized regulation and control of work processes, as well as working with robots (see also Figure 1). For each of these dimensions, the questionnaire is composed of three steps: First, to identify the extent of the prevalence of these specific dimensions of digitalized work, respondents were asked to rate on a 5-point scale (“daily” to “never”) to what extent the different dimensions play a role in their individual job. Second, respondents were asked to rate to what extent the use of the specific digitalized work has increased within the last three years on a 5-point scale (“applies completely” to “does not apply at all”). And third, employees’ subjective perceptions and evaluations of the use of the different dimensions of digitalized work are assessed, again on a 5-point scale (“applies completely” to “does not apply at all”). The complete employee instrument questionnaire is available, in German and in English translation, in the Appendix (see Appendix C-1 and C-3).

### **Digital communication and information processing**

“Digital communication“ measures the frequency of the use of new digital information and communication platforms in comparison with “traditional“ information and communication technologies (telephone, e-mail) as well as face-to-face contact with supervisors and co-workers in the daily work routine. “Digital information processing“ covers the frequency of the use of digital information that is either retrieved from internal or external information systems or process-produced by machines, operating systems, or application programs and apps. Regarding the subjective perceptions, respondents were asked to what extent the use of digital information and communication technologies increases their flexibility regarding place of work and working time, whether it makes communication more efficient, whether it increases the need for constant availability, and whether it replaces personal communication. Moreover, employees were asked to state to what extent they feel overwhelmed by the mass of information and communication.

### **Digital regulation and control**

“Digital control“ identifies to what extent employees digitally control working devices or machines (i.e., by using input displays or remote control), whether they have to intervene in automated workflows, and to what extent they are controlled by automated work instructions given by machines, computer programs or apps. Regarding subjective perceptions of the use of digital control, respondents were asked to what extent automated work instructions are connected to less control over work, to less autonomy in designing tasks, to less personal contact, to more justice in task distribution, to more efficiency, and whether it makes reconciliation with personal responsibilities more difficult.

### **Automated recording**

The dimension “automated recording“ covers to what extent information and data about the employee’s work is stored automatically and digitally by machines, computer programs or apps. Regarding subjective perceptions of the use of automated recording, respondents were asked to rate whether these data are used for performance evaluation, whether they perceive them as helpful in making task distribution more efficient, whether they feel permanently monitored, and whether they feel their privacy to be violated by automated recording.

### **Working with robots**

Finally, the dimension “working with robots“ differentiates between working with stationary robots or with mobile robots, thus capturing one of the most salient developments of the fourth revolution. Respondents were asked whether working with robots has increased within the last three years. Regarding the subjective perception of working with robots, respondents were asked the rate whether robots reduce their workload, whether robots reduce their autonomy in work tasks and their control over work, whether they have to get further qualifications for working with robots, and whether their job will be threatened by robots in the future.

### **Perceptions about the past and future digitalization of own workspace**

Finally, respondents were asked to estimate some consequences of digitalization for the own workspace: whether (yes/no) jobs are cut or newly generated, whether organizational restructuring takes place, whether occupational knowledge gains importance, and whether they need new qual-

ifications and/or additional skills. Those overall questions were first directed to what has happened within the last three years and then directed to what will happen within the following three years.

### 3.2.2 Employer survey

The relevant topic of the employer survey was external and internal flexibilization in the context of digitalization (the complete employer instrument questionnaire is available in Appendices C-2 and C-4, in German and in English translation). Experts, mostly HRM managers, were asked on the one hand how many new jobs have been created – in total and specifically to meet demands imposed by digitalization processes over the last 5 years. On the other hand, again for the last 5 years, experts were asked to indicate the number of job cuts in total and due to the automation of jobs in particular. For both job cuts and new jobs in the context of digitalization, jobs were differentiated into unskilled, skilled, and highly skilled jobs. Moreover, employers were asked to which degree they make use of crowdsourcing via digital platforms. Questions differentiated between internal crowdsourcing (that is using an in-house platform to cross-functionally distribute work tasks across employees within the own organization), and external crowdsourcing (that is using external platforms to distribute work tasks to workers that are not employed within the organization).

Coping with new skill requirements was addressed with two possibilities of recruitment and training. First, to which degree did the relevance of digital skills in job advertisements increase within the last 5 years, and second, to what extent employees were given further training promoting their digital skills. To capture organizational agency to cope with challenges of digitalization, employers were asked whether the organization has established an expert or a department for expertise on digitalization.

### 3.2.3 Construction of additive indices

To handle the extensive information of the instrument we decided to compress information into four additive indices, two on the employee and employer level each.

On the employee level we computed the additive indices (1) “Involvement in digitalized work” and (2) “Digitalization: pace of change”. The index **involvement in digitalized work** is based on the frequency of the use of digitalized work along the dimensions digital communication and information processing as well as digital regulation and control (13 items). As the use of robots is very seldom and mostly concentrated on the manufacturing sector, the items belonging to the working with robots dimension are excluded from the index in order to create an index that is comparable across industries, occupations and jobs. All items were recoded to 0 to 4 so that 0 is equal to never/no use. Moreover, we calculated the share of digital communication of the overall communication by dividing the sum of digital communication (e-mail, digital platforms with supervisors and colleagues) by the total communication (the sum of all 8 communication items), ranging from 0 to 1. To consider all dimensions of digitalization equally, the remaining 6 variables were standardized to a value range from 0 to 1, and then added up to an index ranging from 0 to 6.

For the index **digitalization: pace of change** we used the 8 items on the perceptions about the past and future digitalization of the own workspace (0=no; 1=yes). All items were added up to an index ranging from 0 to 8.

On the employer level we computed two indices as well: (3) “Digitalization of work organizations” and (4) “Use of crowdsourcing”. All 5-point scale variables were recoded to 0 to 4 so that 0 is equal to never/no use; the 6-point scale of importance of digitalization was recoded to 0 to 5. The question on whether an expert or a department for expertise on digitalization was established was coded to 0 for “no expert”, 1 for “a single person” and 2 “a team or department”. To consider all aspects equally, the items were standardized to a value range of 0 to 1, and then added up to the index **digitalization of work organizations**. The additive index on the **use of crowdsourcing** was computed by summing up the use of internal as well as external crowdsourcing (range from 0 to 8).

Finally, each of the indices was divided by the number of used items, resulting in a range between 0 and 1, and then multiplied by 100 to get a value range between 0 and 100, whereas higher values indicate a higher degree of digitalization. By this procedure, all indices are standardized to the same value range to make comparisons more plausible; and missing values are not interpreted as 0.

The indices on the employer and the employee level are only marginally correlated (Pearson correlations 0.071, 0.069;  $p < 0.05$ ) or even not correlated at all when it comes to the use of crowdsourcing on the employer level. The correlation between the two indices on the employer level (digitalization of work organizations and use of crowdsourcing) is about 0.177 ( $p < 0.05$ ) which is also comparably low. Only the two indices on the employee level (involvement in digitalized work and pace of change) are notably correlated by 0.335 ( $p < 0.05$ ). Overall, the low correlations indicate that the four indices measure different aspects of digitalization. This conclusion is also supported by a principal factor analysis we conducted. It revealed two underlying factors, the first one made up of the two employee level indices, the second one made up of the two employer level indices, however, the factor loadings and eigenvalues are not convincing. Factor 1 has an eigenvalue of 0.476 and factor 2 of 0.199; especially the factor loadings for the second factor are low (0.289 for digitalization of work organizations and 0.320 for use of crowdsourcing).

## 4 Digitalized work in large work organizations

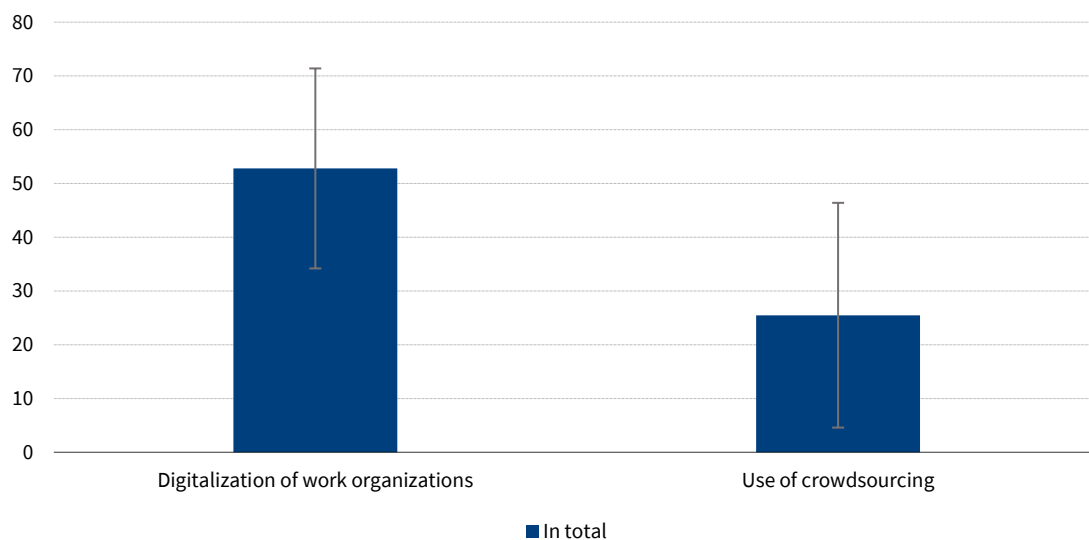
### 4.1 Digitalization of work organizations

According to the additive index on the digitalization of workplaces, the degree of digitalization of large work organizations is on average 52.8, ranging between 8.3 and 86.7 (see Figure 2, see also Table B1 in Appendix).

So far, internal and external crowdsourcing is used comparably seldom by large work organizations. On average, the crowdsourcing index is 25.5, however, with a large standard deviation of 20.9 points indicating that there are some workplaces who use this new method of work organization quite frequently whereas others do not use it at all. This is also supported by the fact that the complete possible range from 0 to 100 exists empirically (see Figure 2, see also Table B1 in Appendix).

Digitalization of work organizations is highest in the economic sector “Financial and insurance activities, economical services” (see Figure 3). The pattern is similar for the use of crowdsourcing, though it is used similarly often in the sectors “manufacturing industries, energy, water supply”. Both digitalization indices on the organizational level are lowest in the sector “Social, private and public services”. Digitalization of work organizations is slightly higher in the public sector compared to the private sector; however, the use of crowdsourcing is higher in the private sector (see Figure 4). A possible explanation might be that the assignment of service contracts (“Werkaufträge”) for full-time employees is highly restricted in the public sector in favor of dependent employment contracts (see § 631 BGB and § 611 Abs. 1 BGB). Digitalization of work organizations tends to be higher, the less the organization is affected by pressure from competition (see Figure 5). In comparison, work organizations have the highest average value on the digitalization of work organizations index if it is unlikely that the organization’s future is in danger (53.8) and lowest if the likeliness is high (44.3). In contrast, crowdsourcing is used most often in those work organizations who experience a high pressure from competition. All mean differences are statistically significant (t-test,  $p < 0.05$ ), except for the economic sector “Trade, hospitality industry and transportation”.

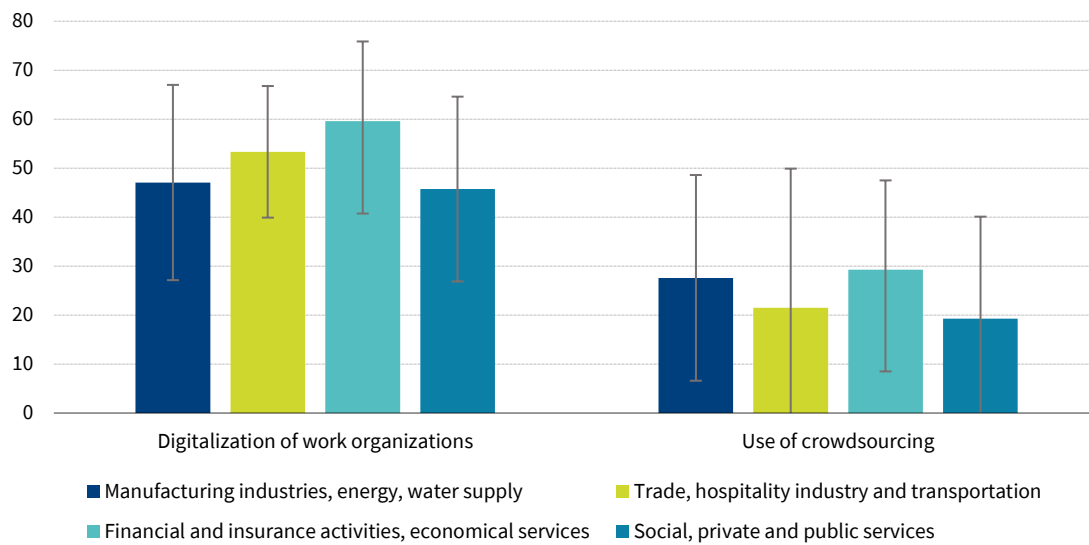
**Figure 2: Digitalization of work organizations and use of crowdsourcing**



Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.

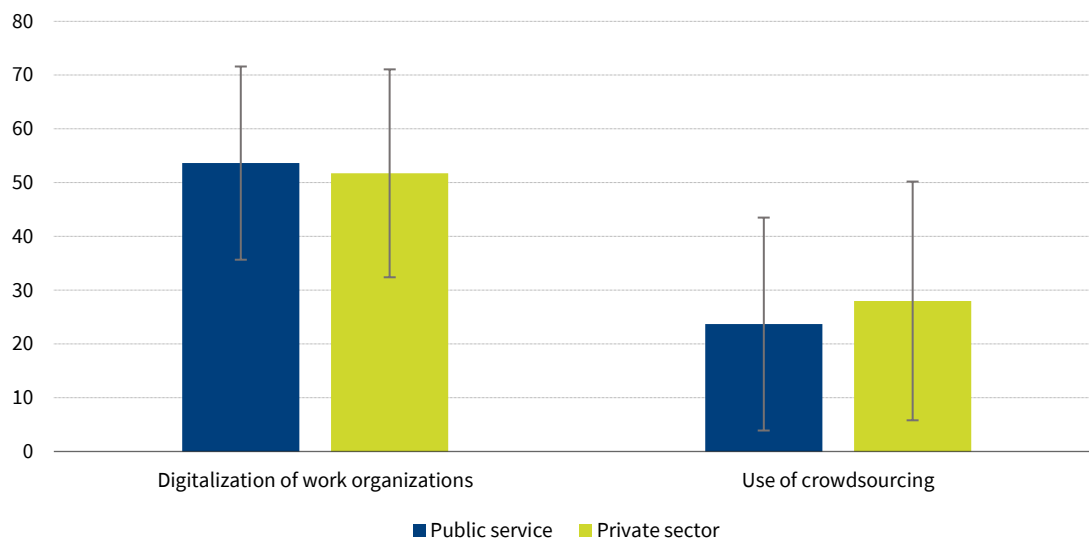
**Figure 3: Digitalization of work organizations and use of crowdsourcing: economic sectors**



Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.

**Figure 4: Digitalization of work organizations and use of crowdsourcing: public vs. private sector**

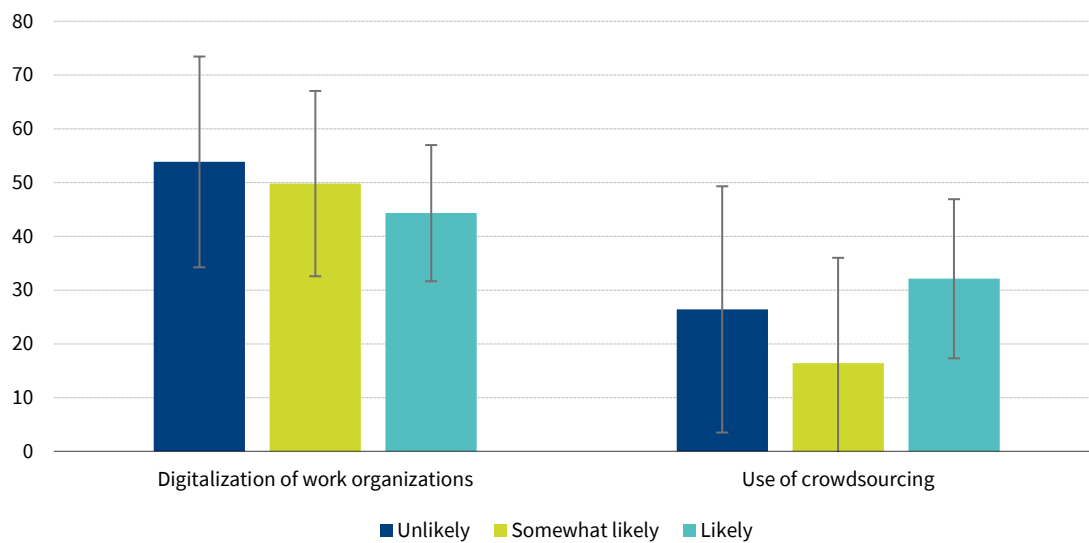


Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.



**Figure 5: Digitalization of work organizations and use of crowdsourcing: pressure from competition**



Standard deviation displayed as grey lines.

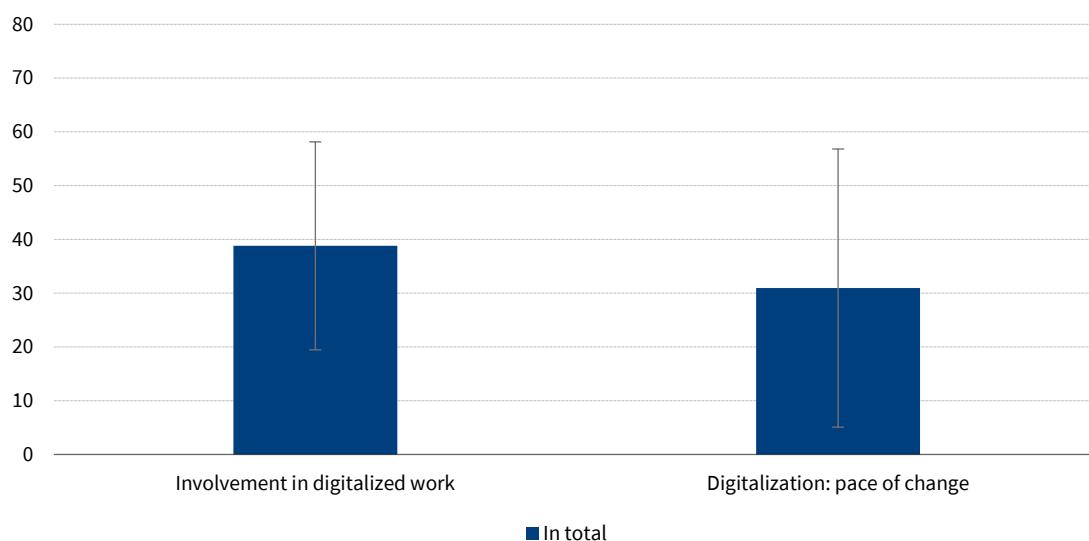
Source: LEEP-B3; own calculations.

## 4.2 Involvement of employees in digitalized work

The mean of the additive index on employees' involvement in digitalized work is 38.8 (see Figure 6, see also Table A1 in Appendix). Similarly, the mean for the additive index of perceived pace of change (30.95) indicates that more than half of the workers has not yet experienced major changes of their work environment due to digitalization referring to job cuts, restructuring of work and changes in the required qualifications and professional expertise for their work. Nevertheless, the range shows a large variation indicating that a few workers (1.65 percent) are not at all involved in digitalized work and a few almost reach the highest values on the index (0.25 percent of workers with values above 90 for index involvement in digitalized work). Moreover, around a quarter of the workers perceive no major changes in their work environment and in their work requirements due to digitalization (25.48 percent with value 0 on index pace of change) and a few workers already experience very strong changes due to digitalization (1.54 percent with maximum value of 100 for index pace of change). Clear variation is also found between occupational groups, economic sectors and between the public and private sector as shown in Figure 7, Figure 8 and Figure 9 (see also Table A1 in Appendix). Figure 7 shows that the average involvement in digitalized work ranges between 37.0 for social services and 40.0 for manufacturing, however, only the mean difference of social services is statistically significant ( $p < 0.01$ ). These quite small occupational differences can also be found for the index pace of change (mean difference of administrative services not statistically significant  $p > 0.05$ ). Figure 8 displays that the average involvement in digitalized work ranges between 34.4 for the "Social, private and public services" sector and 42.2 for the sector "Manufacturing industries, energy, and water supply" (sectors "Trade, hospitality industry and transportation" and "Financial and insurance activities, economical services" not statistically significant,  $p > 0.05$ ). Differences in mean values between sectors are similar for the index pace of change but slightly smaller with 24.2 for the "Social, private and public services" and "Manufacturing, energy,

and water supply” sector (all mean differences are statistically significant,  $p < 0.05$ , exception: sector “Trade, hospitality industry and transportation”). Distinguishing between the public and private sector Figure 9 shows that involvement in digitalized work is more spread in the private sector (Mean value of 39.8) than in the public sector (Mean value of 35.1). The same is true for the pace of change as the mean value of this index is 27.6 for the public sector and 33.1 for the private sector. Looking separately at the specific items on the use of digitalized work (see Table A6, Table A7, Table A8, Table A14, Table A18 and Table A22 in Appendix) shows that especially the use of data or information retrieved by in-house or external information systems is most common followed by the use of automatically stored digital information or data during the work process by machines, computer programs or apps. The least pronounced is the work with automatically generated work instructions received from machines, computer programs or apps. In comparison, working with robots hardly exists: Only 10 percent of workers are involved in working with robots at all. Investigating the question on whether these different forms of digitalized work have increased over the last years reveals a similar picture. It indicates that the use of information and communication technologies has largely increased whereas automatically created work instructions, automatic storage of work performance, and the work with robots instead seem only to increase slightly (see Table A26 in Appendix). The investigation of the single indicators being part of the index pace of change (see Table A28 and Table A29 in Appendix) illustrates that in the last 3 years and in the following 3 years additional qualifications are and will be more and more required due to digitalization. Moreover, workers perceive that digitalization has the consequence that work is increasingly restructuring and will further be restructured in the future. This is especially interesting as the scientific and public debate often addresses job loss and a devaluation of occupation specific knowledge which at least is not largely shared in the perceptions of digitalization of the survey employees.

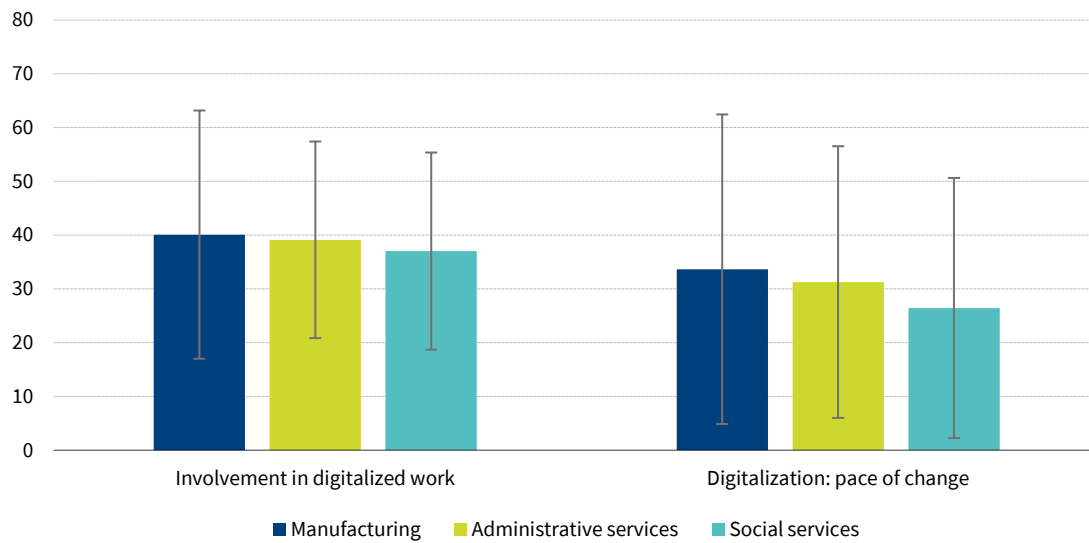
**Figure 6: Involvement in digitalized work of employees and perceived pace of change**



Standard deviation displayed as grey lines.

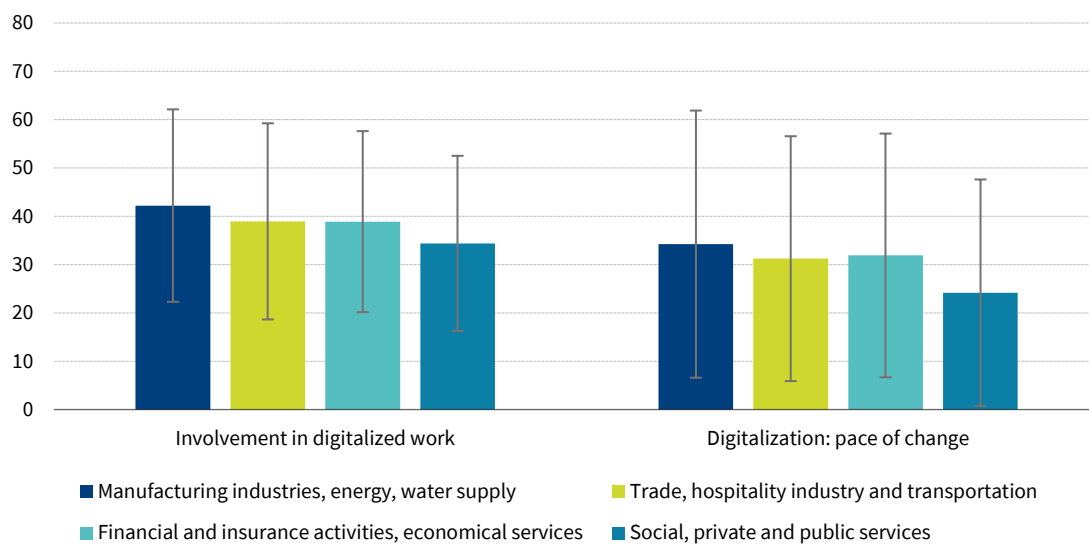
Source: LEEP-B3; own calculations.

**Figure 7: Involvement in digitalized work of employees and perceived pace of change: occupational groups**



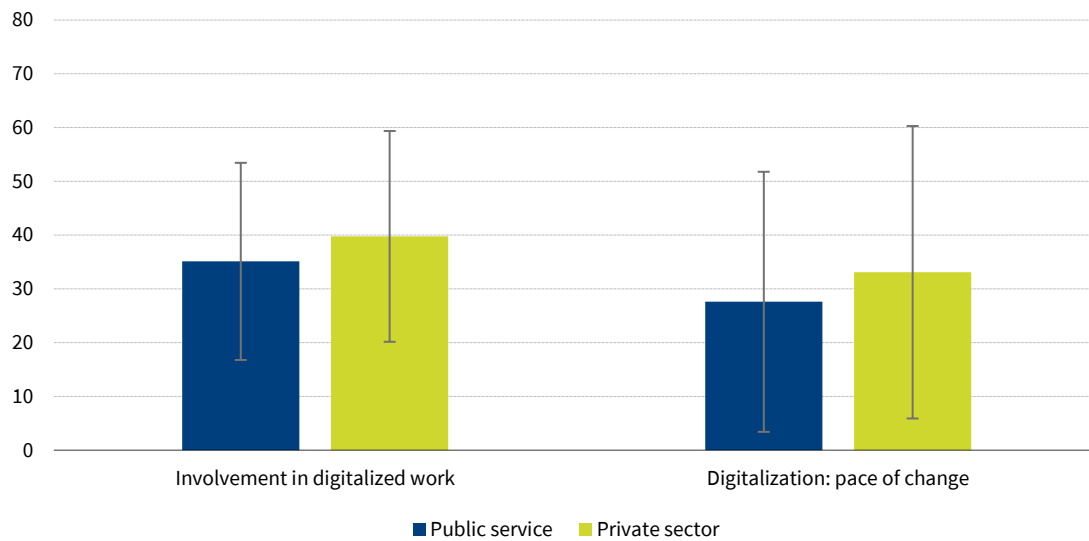
Standard deviation displayed as grey lines.  
Source: LEEP-B3; own calculations.

**Figure 8: Involvement in digitalized work of employees and perceived pace of change: economic sectors**



Standard deviation displayed as grey lines.  
Source: LEEP-B3; own calculations.

**Figure 9: Involvement in digitalized work of employees and perceived pace of change: public vs. private sector**



Standard deviation displayed as grey line.

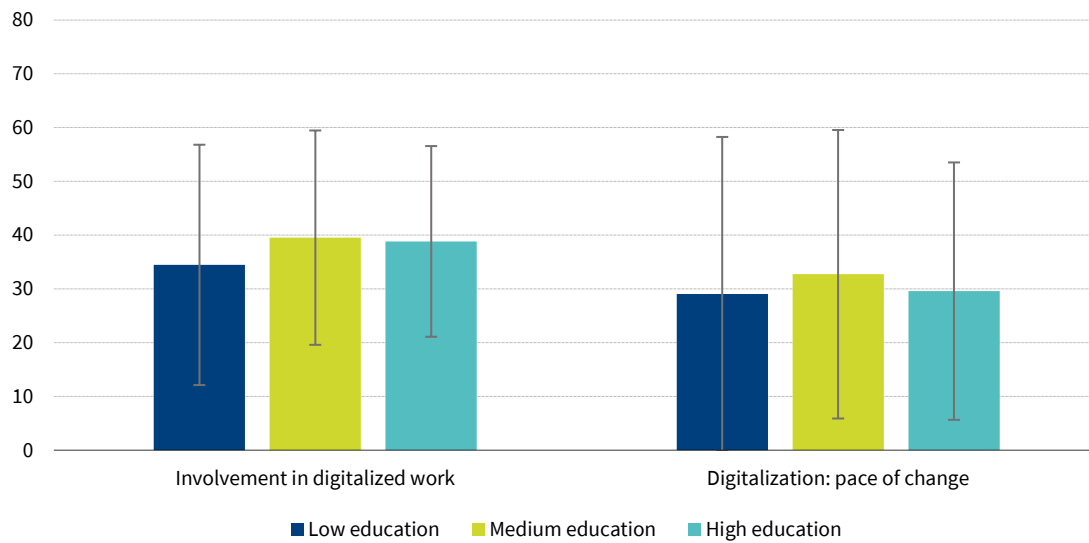
Source: LEEP-B3; own calculations.

### 4.3 Digitalization across the hierarchy of employers and employees

The question of which groups of the workforce will be most advantaged or disadvantaged by the implementation of digital systems is among the most pressing topics in research and public debates. As a first step we look at how deeply different levels in the hierarchy of jobs are involved with digitalized work. For this purpose we have a look at three indicators: qualification level, job autonomy, and a position with a supervisory responsibility. At the employer level, we consider the establishments' competitive position in comparison with the main competitor with respect to productivity, job security and profit. Whether different degrees of involvement in digital systems lead to job upgrading or downgrading is, however, a different subsequent question.

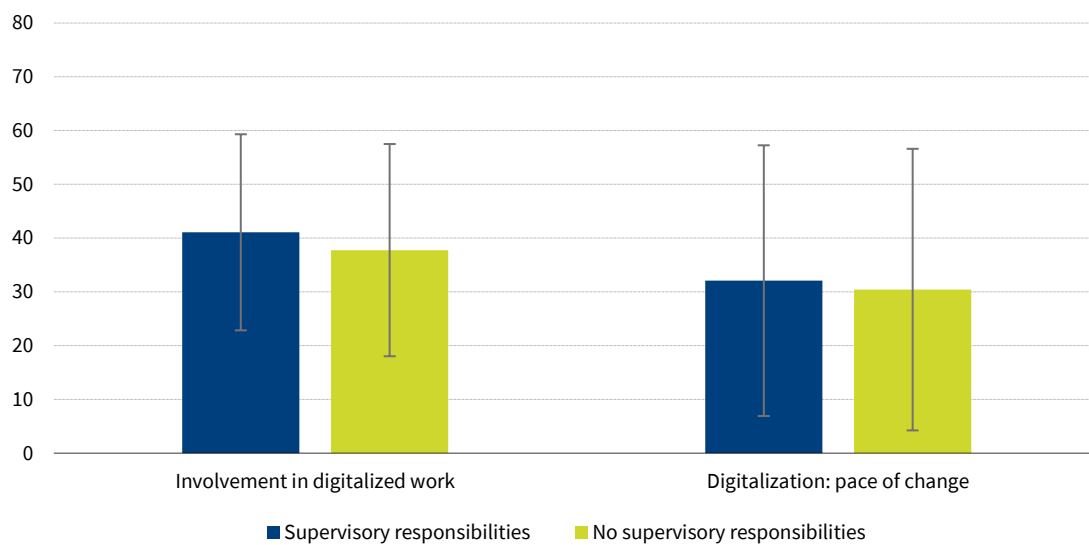
Figures 10 to 12 show the degree to which involvement in digitalized work and pace of change are distributed across educational levels, job autonomy, and supervisory responsibility. For involvement in digitalized work, there are no pronounced differences across the different groups, and even no consistent tendency in the direction downward or upward the hierarchy levels. There is a slight tendency that those in the lower ranges of the job hierarchy are somewhat less involved. However, as a whole, there is no pattern that the middle or one of the extremes is much more involved than the others. Looking at the single components of involvement in digitalized work reveals that this picture is valid throughout. However, looking at perceptions of digitalized work, this is not true for the perceptions of more flexibility through digitalization. Here we find a clear advantage for those with better jobs in terms of all three indicators (see Table A13). In other words, digitalization provides only for better educated employees and for those in jobs with more autonomy or supervisory responsibility gains in job flexibility, but not for the others – a specific digital divide which is masked in general indices summing up several dimensions of involvement in digitalized work.

**Figure 10: Involvement in digitalized work and pace of change with digitalization: level of education and training**



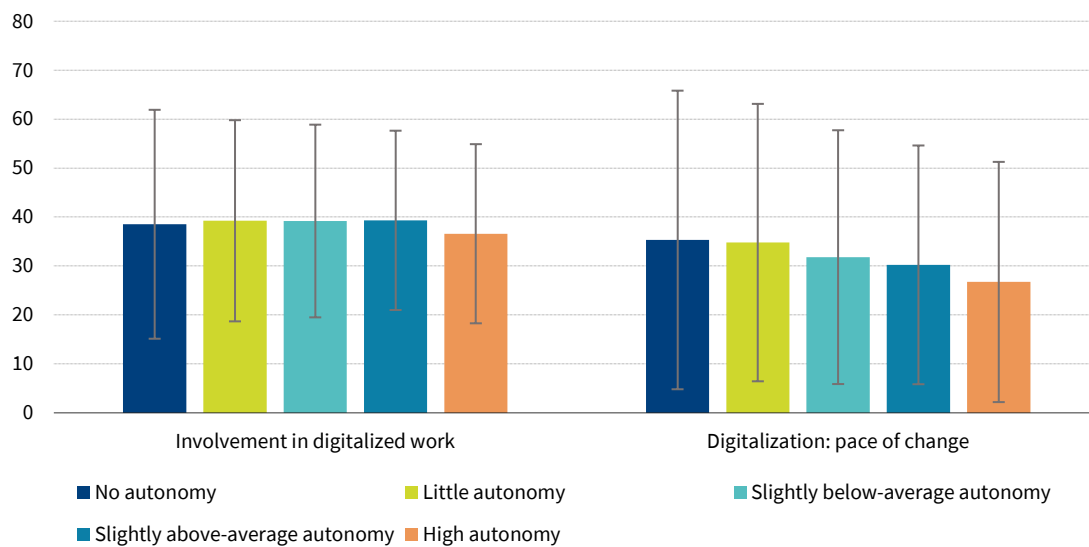
Standard deviation displayed as grey lines.  
Source: LEEP-B3; own calculations.

**Figure 11: Involvement in digitalized work and pace of change with digitalization: supervisory responsibilities**



Standard deviation displayed as grey lines.  
Source: LEEP-B3; own calculations.

**Figure 12: Involvement in digitalized work and pace of change with digitalization: job autonomy**



Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.

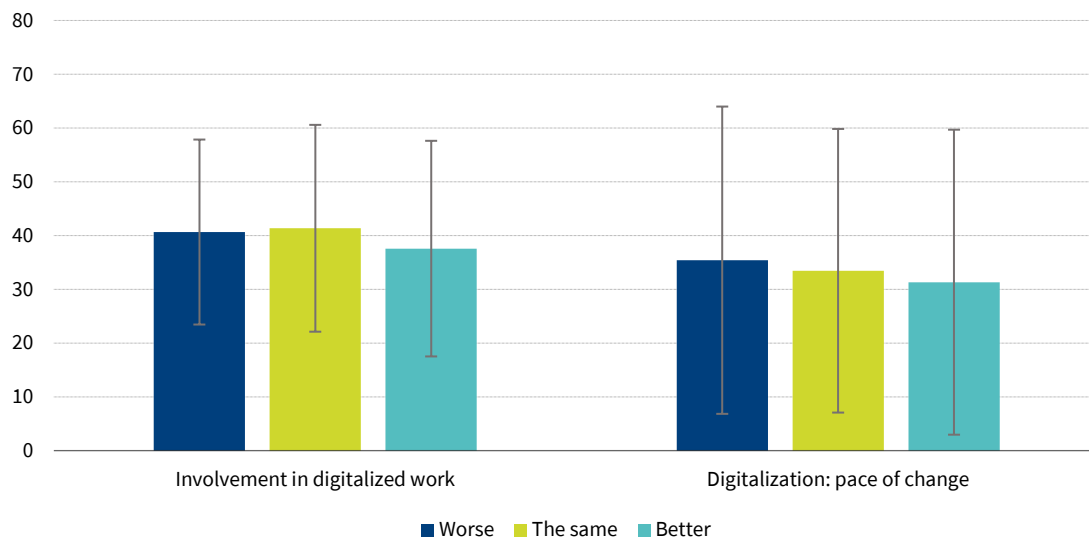
This picture changes a bit when looking at the perceived pace of change, and here for different levels of job autonomy. It is evident that especially in the groups with comparably low job autonomy the pace of change is faster than in the middle and the top autonomy jobs. A more detailed view on specific developments reveals that this difference is mainly driven by one dimension, namely the increase in automatically stored information, and in second instance also by an increase in automatically created work instructions, which may lead to the perception of being controlled (see Appendix Table A27, Table A 30, Table A31). In other words, whereas employees in jobs with higher levels of autonomy profit from digitalization in the form of more flexibility, those having lower job autonomy are increasingly faced with digital systems that monitor and guide them, thus presumably lowering their job autonomy even more than it was already the case before.

These results are, however, much less visible in the results for education and training. Generally, those with lower education and training are generally less involved in digitalized work, but nevertheless do not experience a higher pace of change, whereas those with low job autonomy do. Obviously, there are divergent developments in more specific groups of the workforce that are not sufficiently captured by the broad lines of demarcation we employ for our first overview here.

The comparison with the main competitor does not reveal strong demarcations between employees' involvement in highly versus hardly digitalized work as well (see Figure 13-Figure 15). The expectation is that labor productivity as well as profit go hand in hand with high levels of involvement and pace of change. However, this expectation is not confirmed. Better productivity is linked to somewhat lower involvement, and pace of change is slower. Yet, differences are not pronounced for the composite measures we constructed for a first overview. For profit, the expectation is confirmed. Employees in more profitable work organizations have slightly higher degrees of digitalized work, and they experience also a significantly higher pace of change. Looking at the experience of job security in different work organizations, this first look is more consistent with fears rather than hopes about consequences of digitalized work: We find a higher involvement as well

as a higher pace of change in work organizations with low job security, and this difference is among the strongest differences we found in our overview at all.

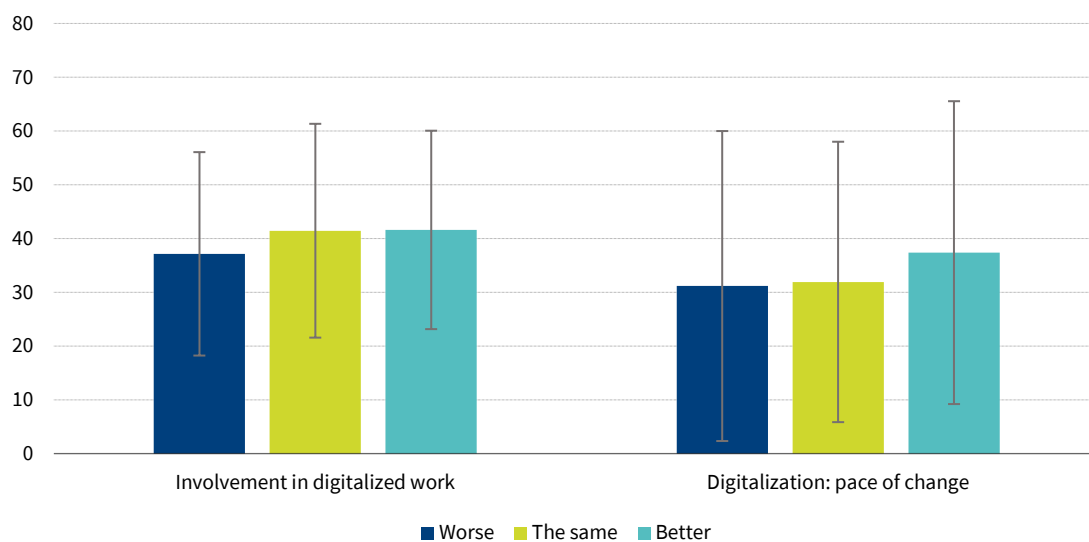
**Figure 13: Involvement in digitalized work and pace of change with digitalization: Comparison with main competitor - labor productivity**



Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.

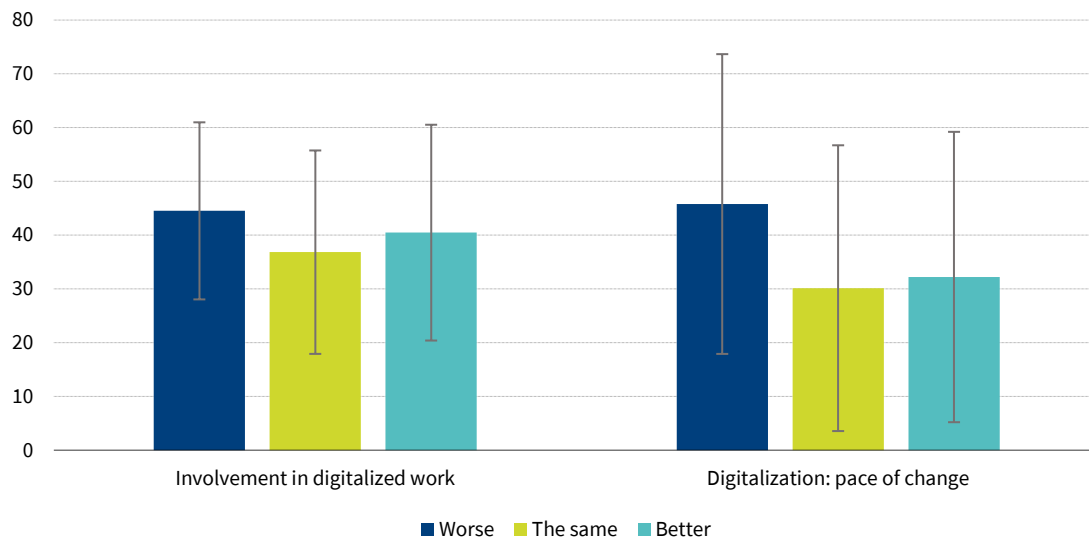
**Figure 14: Involvement in digitalized work and pace of change with digitalization: Comparison with main competitor - profit**



Standard deviation displayed as grey lines.

Source: LEEP-B3; own calculations.

**Figure 15: Involvement in digitalized work and pace of change with digitalization: Comparison with main competitor - job security**



Standard deviation displayed as grey line.  
Source: LEEP-B3; own calculations.

## 5 Discussion

The main purpose of this paper is the presentation of a newly developed instrument to collect information on the digitalization of workplaces at both the employee and employer levels. Though not as fine-grained as the identification of specific tools would be, our instrument allows for distinguishing several dimensions of actual use as well as perceptions and evaluations of digital assistance systems in the office and in the factory. In general, the low to modest correlations between the different dimensions make evident that there is no one-dimensional “digitalization” but diverging patterns of which digital systems are implemented, and how they fit to employers’ and employees’ needs. Unidimensional, undifferentiated, but also composite measures, like the two we used for this overview, bear the danger that important lines of differentiation may be overlooked, if they refer to only one or two of the dimensions collapsed in these indices.

The descriptive results are not meant to provide scientific analyses of research questions. Nevertheless, the mere illustration of the diversity that exists under the umbrella of the term “digital workplaces” allows for some predications. First, there is no uniform “digitalization process”, but highly specific implementations and developments. Therefore, undifferentiated measurements like those we constructed as indices for involvement in digitalized work and pace of change, may not capture the huge differences in the ongoing processes of implementing different systems in different ways. Second, we see in the indicators of change within workplaces that digitalization does not only lead to job destruction and creation, but that it also leads to an ongoing and far-reaching restructuring of many workplaces. Third, the implementation of digital assistance systems is not so much concentrated in specific economic sectors and occupational fields, but the high standard deviations point to a remarkable variance within them. Fourth, the restructuring



through digitalization does not harass employees so thoroughly as sometimes assumed. However, and fifth, the question of devaluations of workplaces shows up most prominently along the dimension of flexibility versus control. Whereas flexibility gains through digital assistance systems are mostly experienced by those in the upper segments of the occupational structure, those in the lower segments do not but face instead more control of work through such systems. In these important respects there is indeed an accentuation of preexisting labor market inequality.

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# Appendix

## A. Tables Employees

**Table A1: Indices Employees (Distribution)**

	Involvement in digitalized work					Digitalization: pace of change				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	38.8	19.3	0	93.9	5,646	31.0	25.9	0	100	5,381
<b>Occupational groups</b>										
Manufacturing	40.1	23.1	0	90.2	958	33.7	28.8	0	100	897
Administrative services	39.1	18.3	0	93.9	3,399	31.3	25.3	0	100	3,267
Social services	37.0	18.3	0	87.8	743	26.5	24.2	0	100	708
<b>Economic sectors</b>										
Manufacturing industries, energy, water supply	42.2	19.9	0	91.7	1,523	34.2	27.7	0	100	1,422
Trade, hospitality industry and transportation	39.0	20.3	0	93.9	348	31.2	25.3	0	100	337
Financial and insurance activities, economical services	38.9	18.7	0	92.6	2,199	31.9	25.2	0	100	2,123
Social, private and public services	34.4	18.1	0	87.8	1,013	24.2	23.5	0	100	973
<b>Public vs. private sector</b>										
Public service	35.1	18.3	0	91.7	1,642	27.6	24.2	0	100	1,591
Private sector	39.8	19.6	0	92.6	1,147	33.1	27.2	0	100	1,083
<b>Pressure from competition/Position in competition</b>										
<b>Pressure from competition: organization's future is in danger</b>										
Unlikely	37.7	19.4	0	92.6	1,490	30.9	26.3	0	100	1,441
Somewhat likely	37.1	17.9	0	76.9	299	31.0	26.3	0	100	274
Likely	43.6	16.7	6.3	85.9	93	32.5	28.2	0	100	87
<b>Comparison with main competitor: Labor productivity</b>										
Worse	40.7	17.2	0	79.2	90	35.4	28.6	0	100	84
The same	41.4	19.2	0	92.6	583	33.5	26.4	0	100	561
Better	37.6	20.1	0	91.3	351	31.3	28.4	0	100	326
<b>Comparison with main competitor: Job security</b>										
Worse	44.5	16.5	8.3	86.7	97	45.8	27.9	0	100	92
The same	36.8	18.9	0	89.2	387	30.1	26.6	0	100	367
Better	40.5	20.1	0	92.6	601	32.2	27.0	0	100	568
<b>Comparison with main competitor: Profit</b>										
Worse	37.2	18.9	0	75.0	149	31.2	28.8	0	100	140
The same	41.5	19.9	0	92.6	466	31.9	26.1	0	100	446
Better	41.6	18.5	0	89.2	317	37.4	28.2	0	100	296

Source: LEEP-B3, own calculations.

**Table A2: Indices Employees (Inequality)**

	Involvement in digitalized work					Digitalization: pace of change				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	38.8	19.3	0	93.9	5,646	31.0	25.9	0	100	5,381
<b>Education</b>										
Low education	34.5	22.4	0	89.8	530	29.1	29.2	0	100	487
Medium education	39.5	19.9	0	92.9	2,652	32.7	26.8	0	100	2,498
High education	38.8	17.7	0	93.9	2,248	29.6	23.9	0	100	2,187
<b>Supervisory responsibilities</b>										
Supervisory responsibilities	41.1	18.2	0	92.9	1,759	32.1	25.2	0	100	1,700
No supervisory responsibilities	37.8	19.7	0	93.9	3,877	30.4	26.2	0	100	3,673
<b>Autonomy</b>										
No autonomy	38.5	23.4	0	91.7	385	35.3	30.5	0	100	360
Little autonomy	39.2	20.6	0	92.9	797	34.8	28.3	0	100	763
Slightly below-average autonomy	39.2	19.7	0	93.9	1,119	31.8	25.9	0	100	1,051
Slightly above-average autonomy	39.3	18.3	0	91.7	2,469	30.2	24.4	0	100	2,351
High autonomy	36.6	18.3	0	91.7	863	26.7	24.5	0	100	841

Source: LEEP-B3, own calculations.

**Table A3: Correlations of indices**

	1	2	3
(1) Involvement in digitalized work	1		
(2) Digitalization: pace of change	0.335*	1	
(3) Digitalization of work organizations	0.071*	0.069*	1
(4) Use of crowdsourcing	-0.030	0.014	0.177*

Source: LEEP-B3, own calculations.

**Table A4: Correlations of items used for index "Involvement in digitalized work"**

	1	2	3	4	5
(1) Percentage of digital communication	1				
(2) Use of information retrieved by information systems	0.325*	1			
(3) Use of automatically stored digital information during the process	0.160*	0.445*	1		
(4) Controlling or programming machines or implements digitally	0.008	0.086*	0.242*	1	
(5) Intervening digitally in the automated work processes of machines or implements	-0.007	0.046*	0.226*	0.643*	1
(6) Getting automatic work instructions	0.067*	0.1*	0.257*	0.298*	0.403*

Source: LEEP-B3, own calculations.

**Table A5: Correlations of items used for index "Digitalization: pace of change"**

	1	2	3	4	5	6	7
(1) Last 3 years: elimination of jobs in course of digitalization	1						
(2) Next 3 years: elimination of jobs in course of digitalization	0.667*	1					
(3) Last 3 years: restructuring of work in course of digitalization	0.305*	0.279*	1				
(4) Next 3 years: restructuring of work in course of digitalization	0.296*	0.413*	0.651*	1			
(5) Last 3 years: professional expertise less important in course of digitalization	0.202*	0.206*	0.193*	0.164*	1		
(6) Next 3 years: professional expertise less important in course of digitalization	0.214*	0.276*	0.175*	0.227*	0.687*	1	
(7) Last 3 years: additional qualifications required in course of digitalization	0.184*	0.171*	0.316*	0.283*	0.050*	0.053*	1
(8) Next 3 years: additional qualifications required in course of digitalization	0.184*	0.229*	0.287*	0.365*	0.071*	0.104*	0.708*

Source: LEEP-B3, own calculations.

Table A6: Digital communication and information: Use (Distribution)

	Communication with supervisor: face to face					Communication with supervisor: phone					Communication with supervisor: e-mail					Communication with supervisor: digital platforms/apps				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.5	1.1	0	4	5,811	1.4	1.2	0	4	5,811	1.6	1.3	0	4	5,811	0.5	0.9	0	4	5,808
<b>Occupational groups</b>																				
Manufacturing	2.6	1.1	0	4	980	1.4	1.3	0	4	980	1.0	1.2	0	4	980	0.5	1.0	0	4	978
Administrative services	2.4	1.0	0	4	3,501	1.4	1.2	0	4	3,502	2.0	1.2	0	4	3,501	0.5	1.0	0	4	3,500
Social services	2.5	1.0	0	4	759	1.4	1.3	0	4	759	1.2	1.2	0	4	759	0.4	0.8	0	4	759
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	2.6	1.1	0	4	1,549	1.5	1.3	0	4	1,549	1.6	1.3	0	4	1,549	0.5	0.9	0	4	1,546
Trade, hospitality industry and transportation	2.2	1.1	0	4	354	1.5	1.2	0	4	354	1.4	1.3	0	4	354	0.7	1.1	0	4	354
Financial and insurance activities, economical services	2.4	1.0	0	4	2,276	1.4	1.2	0	4	2,277	1.9	1.2	0	4	2,276	0.5	1.0	0	4	2,276
Social, private and public services	2.4	1.0	0	4	1,043	1.3	1.2	0	4	1,043	1.2	1.2	0	4	1,043	0.4	0.7	0	4	1,043
<b>Public vs. private sector</b>																				
Public service	2.4	1.0	0	4	1,695	1.3	1.2	0	4	1,695	1.6	1.2	0	4	1,695	0.4	0.8	0	4	1,695
Private sector	2.4	1.1	0	4	1,183	1.5	1.3	0	4	1,182	1.6	1.3	0	4	1,182	0.5	0.9	0	4	1,181
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	2.4	1.1	0	4	1,546	1.4	1.2	0	4	1,545	1.6	1.3	0	4	1,545	0.5	0.9	0	4	1,544
Somewhat likely	2.4	1.0	0	4	308	1.5	1.2	0	4	308	1.6	1.2	0	4	308	0.5	0.9	0	4	308
Likely	2.6	1.1	1	4	94	1.6	1.4	0	4	94	1.6	1.4	0	4	94	0.4	0.9	0	4	94
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	2.6	1.1	0	4	91	1.3	1.3	0	4	91	1.6	1.3	0	4	91	0.7	1.1	0	4	90
The same	2.4	1.0	0	4	603	1.5	1.2	0	4	602	1.8	1.3	0	4	602	0.5	1.0	0	4	603
Better	2.5	1.1	0	4	363	1.4	1.3	0	4	363	1.3	1.4	0	4	363	0.5	0.9	0	4	362
<b>Comparison with main competitor: Job security</b>																				
Worse	2.6	1.1	0	4	100	1.3	1.4	0	4	100	1.3	1.2	0	4	100	0.4	0.8	0	3	100
The same	2.5	1.0	0	4	399	1.6	1.3	0	4	398	1.8	1.2	0	4	398	0.4	0.9	0	4	399
Better	2.4	1.1	0	4	621	1.4	1.2	0	4	621	1.6	1.4	0	4	621	0.6	1.0	0	4	619
<b>Comparison with main competitor: Profit</b>																				
Worse	2.3	1.1	0	4	152	1.2	1.2	0	4	152	1.6	1.3	0	4	152	0.5	1.0	0	4	151
The same	2.5	1.1	0	4	483	1.5	1.3	0	4	482	1.8	1.3	0	4	482	0.6	1.0	0	4	483
Better	2.5	1.1	0	4	326	1.5	1.3	0	4	326	1.5	1.3	0	4	326	0.4	0.8	0	4	325

Source: LEEP-B3, own calculations.

Table A7: Digital communication and information: Use (Distribution)

	Communication with colleagues: face to face					Communication with colleagues: phone					Communication with colleagues: e-mail					Communication with colleagues: digital platforms/apps				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	3.4	0.8	0	4	5,819	2.1	1.5	0	4	5,815	1.9	1.5	0	4	5,816	0.9	1.2	0	4	5,811
<b>Occupational groups</b>																				
Manufacturing	3.4	0.9	0	4	980	1.5	1.5	0	4	980	0.9	1.3	0	4	979	0.8	1.2	0	4	979
Administrative services	3.4	0.8	0	4	3,506	2.3	1.4	0	4	3,504	2.4	1.4	0	4	3,505	0.9	1.3	0	4	3,503
Social services	3.4	0.9	0	4	760	1.8	1.4	0	4	760	1.2	1.4	0	4	760	0.8	1.1	0	4	760
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	3.5	0.8	0	4	1,550	2.1	1.5	0	4	1,550	1.8	1.6	0	4	1,548	0.8	1.2	0	4	1,549
Trade, hospitality industry and transportation	3.4	0.8	1	4	354	2.0	1.5	0	4	353	1.6	1.6	0	4	354	1.1	1.3	0	4	353
Financial and insurance activities, economical services	3.4	0.9	0	4	2,281	2.2	1.4	0	4	2,280	2.3	1.4	0	4	2,281	0.9	1.3	0	4	2,279
Social, private and public services	3.4	0.8	0	4	1,043	1.8	1.4	0	4	1,043	1.3	1.4	0	4	1,043	0.8	1.1	0	4	1,043
<b>Public vs. private sector</b>																				
Public service	3.4	0.8	0	4	1,697	2.0	1.4	0	4	1,697	1.8	1.5	0	4	1,697	0.8	1.1	0	4	1,697
Private sector	3.4	0.8	0	4	1,185	2.1	1.5	0	4	1,183	1.8	1.6	0	4	1,184	0.9	1.3	0	4	1,182
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	3.4	0.8	0	4	1,548	2.1	1.5	0	4	1,547	1.9	1.5	0	4	1,547	0.8	1.2	0	4	1,545
Somewhat likely	3.3	0.9	0	4	308	2.0	1.4	0	4	307	1.9	1.6	0	4	308	0.9	1.2	0	4	308
Likely	3.3	0.9	0	4	95	2.1	1.4	0	4	95	1.6	1.6	0	4	95	0.7	1.1	0	4	95
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	3.4	0.8	0	4	91	1.8	1.6	0	4	91	1.6	1.7	0	4	91	1.1	1.3	0	4	91
The same	3.4	0.9	0	4	605	2.3	1.4	0	4	604	2.1	1.5	0	4	605	0.9	1.3	0	4	604
Better	3.4	0.9	0	4	363	2.0	1.6	0	4	362	1.5	1.6	0	4	362	0.9	1.3	0	4	361
<b>Comparison with main competitor: Job security</b>																				
Worse	3.4	0.9	0	4	100	2.1	1.6	0	4	100	1.7	1.6	0	4	100	0.6	1.0	0	4	100
The same	3.4	0.9	0	4	400	2.2	1.4	0	4	399	2.0	1.5	0	4	400	0.8	1.2	0	4	400
Better	3.4	0.8	0	4	622	2.1	1.5	0	4	621	1.8	1.6	0	4	621	1.0	1.3	0	4	619
<b>Comparison with main competitor: Profit</b>																				
Worse	3.3	0.8	1	4	153	2.0	1.4	0	4	153	1.8	1.6	0	4	153	1.0	1.3	0	4	153
The same	3.4	0.9	0	4	483	2.2	1.5	0	4	481	2.0	1.6	0	4	482	0.9	1.3	0	4	482
Better	3.5	0.8	0	4	327	2.2	1.5	0	4	327	1.7	1.6	0	4	327	0.9	1.2	0	4	325

Source: LEEP-B3, own calculations.

**Table A8: Digital communication and information: Use (Distribution)**

	Use of information retrieved by information systems					Use of automatically stored digital information during the process				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.8	1.3	0	4	5,805	2.3	1.5	0	4	5,734
<b>Occupational groups</b>										
Manufacturing	2.2	1.5	0	4	977	2.2	1.6	0	4	970
Administrative services	3.0	1.1	0	4	3,496	2.4	1.5	0	4	3,452
Social services	2.6	1.3	0	4	760	2.2	1.5	0	4	749
<b>Economic sectors</b>										
Manufacturing industries, energy, water supply	2.7	1.3	0	4	1,547	2.5	1.4	0	4	1,537
Trade, hospitality industry and transportation	2.7	1.3	0	4	355	2.4	1.5	0	4	353
Financial and insurance activities, economical services	3.0	1.2	0	4	2,271	2.3	1.5	0	4	2,237
Social, private and public services	2.6	1.3	0	4	1,042	2.0	1.5	0	4	1,026
<b>Public vs. private sector</b>										
Public service	2.8	1.3	0	4	1,693	2.0	1.5	0	4	1,667
Private sector	2.7	1.3	0	4	1,180	2.4	1.5	0	4	1,170
<b>Pressure from competition: organization's future is in danger</b>										
Unlikely	2.8	1.3	0	4	1,543	2.2	1.5	0	4	1,521
Somewhat likely	2.6	1.3	0	4	308	2.1	1.5	0	4	301
Likely	2.7	1.4	0	4	95	2.7	1.3	0	4	95
<b>Comparison with main competitor: Labor productivity</b>										
Worse	2.4	1.5	0	4	91	2.5	1.4	0	4	91
The same	2.9	1.2	0	4	604	2.5	1.4	0	4	596
Better	2.5	1.4	0	4	360	2.3	1.6	0	4	358
<b>Comparison with main competitor: Job security</b>										
Worse	2.9	1.3	0	4	99	2.9	1.3	0	4	99
The same	2.7	1.3	0	4	400	2.2	1.5	0	4	393
Better	2.7	1.4	0	4	619	2.4	1.5	0	4	615
<b>Comparison with main competitor: Profit</b>										
Worse	2.4	1.5	0	4	154	2.1	1.5	0	4	152
The same	2.8	1.3	0	4	481	2.4	1.4	0	4	475
Better	2.9	1.2	0	4	324	2.6	1.4	0	4	325

Source: LEEP-B3, own calculations.



Table A9: Digital communication and information: Perceptions (Distribution)

	Use of ICT: higher flexibility					Use of ICT: higher efficiency					Use of ICT: be constantly available					Use of ICT: replacement of personal interaction					Use of ICT: feeling overwhelmed				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.1	1.5	0	4	5,352	2.3	1.2	0	4	5,358	1.3	1.3	0	4	5,358	1.4	1.2	0	4	5,361	1.4	1.2	0	4	5,362
<b>Occupational groups</b>																									
Manufacturing	1.6	1.4	0	4	771	2.3	1.2	0	4	774	1.2	1.3	0	4	774	1.4	1.3	0	4	774	1.3	1.2	0	4	774
Administrative services	2.3	1.5	0	4	3,380	2.3	1.1	0	4	3,381	1.3	1.3	0	4	3,381	1.5	1.2	0	4	3,385	1.5	1.2	0	4	3,386
Social services	1.6	1.5	0	4	690	2.2	1.2	0	4	692	1.4	1.4	0	4	692	1.3	1.3	0	4	692	1.4	1.2	0	4	692
<b>Economic sectors</b>																									
Manufacturing industries, energy, water supply	2.1	1.4	0	4	1,390	2.3	1.1	0	4	1,394	1.3	1.3	0	4	1,393	1.5	1.2	0	4	1,394	1.4	1.2	0	4	1,394
Trade, hospitality industry, transportation	1.9	1.5	0	4	320	2.4	1.2	0	4	319	1.4	1.4	0	4	319	1.6	1.4	0	4	320	1.4	1.2	0	4	320
Financial and insurance activities, economical serv.	2.2	1.5	0	4	2,168	2.4	1.1	0	4	2,170	1.2	1.3	0	4	2,173	1.5	1.2	0	4	2,173	1.5	1.2	0	4	2,173
Social, private and public services	1.7	1.5	0	4	947	2.1	1.2	0	4	948	1.3	1.4	0	4	946	1.3	1.3	0	4	949	1.3	1.2	0	4	949
<b>Public vs. private sector</b>																									
Public service	1.9	1.5	0	4	1,569	2.2	1.2	0	4	1,569	1.3	1.4	0	4	1,571	1.4	1.3	0	4	1,572	1.4	1.2	0	4	1,571
Private sector	2.1	1.5	0	4	1,072	2.4	1.2	0	4	1,073	1.3	1.3	0	4	1,073	1.5	1.2	0	4	1,075	1.4	1.2	0	4	1,074
<b>Pressure from competition: organization's future is in danger</b>																									
Unlikely	2.1	1.5	0	4	1,437	2.4	1.2	0	4	1,439	1.3	1.3	0	4	1,439	1.5	1.3	0	4	1,442	1.4	1.2	0	4	1,441
Somewhat likely	2.2	1.5	0	4	265	2.3	1.2	0	4	266	1.5	1.4	0	4	265	1.5	1.2	0	4	266	1.4	1.2	0	4	266
Likely	1.8	1.4	0	4	90	2.1	1.2	0	4	91	1.5	1.4	0	4	91	1.6	1.2	0	4	91	1.5	1.1	0	4	91
<b>Comparison with main competitor: Labor productivity</b>																									
Worse	2.0	1.4	0	4	78	2.2	1.1	0	4	79	1.5	1.3	0	4	79	1.6	1.3	0	4	79	1.4	1.1	0	4	79
The same	2.3	1.4	0	4	574	2.4	1.1	0	4	573	1.3	1.3	0	4	573	1.5	1.2	0	4	575	1.5	1.2	0	4	575
Better	1.9	1.5	0	4	309	2.2	1.2	0	4	309	1.1	1.3	0	4	309	1.4	1.2	0	4	309	1.2	1.2	0	4	308
<b>Comparison with main competitor: Job security</b>																									
Worse	1.8	1.4	0	4	94	2.3	1.1	0	4	94	1.3	1.4	0	4	94	1.4	1.2	0	4	94	1.6	1.1	0	4	94
The same	2.1	1.4	0	4	363	2.4	1.2	0	4	363	1.3	1.3	0	4	363	1.5	1.2	0	4	365	1.4	1.2	0	4	364
Better	2.2	1.5	0	4	557	2.3	1.1	0	4	557	1.3	1.3	0	4	557	1.5	1.3	0	4	557	1.4	1.2	0	4	557
<b>Comparison with main competitor: Profit</b>																									
Worse	2.1	1.4	0	4	137	2.3	1.2	0	4	136	1.2	1.3	0	4	137	1.5	1.2	0	4	137	1.4	1.1	0	4	136
The same	2.2	1.5	0	4	437	2.4	1.2	0	4	439	1.3	1.3	0	4	439	1.5	1.3	0	4	439	1.4	1.2	0	4	439
Better	2.0	1.4	0	4	303	2.4	1.1	0	4	303	1.3	1.3	0	4	303	1.4	1.2	0	4	303	1.4	1.1	0	4	303

Source: LEEP-B3, own calculations.

Table A10: Digital communication and information: Use (Inequality)

	Communication with supervisor: face to face					Communication with supervisor: phone					Communication with supervisor: e-mail					Communication with supervisor: digi- tal platforms or apps				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.5	1.1	0	4	5,811	1.4	1.2	0	4	5,811	1.6	1.3	0	4	5,811	0.5	0.9	0	4	5,808
<b>Education</b>																				
Low education	2.5	1.2	0	4	544	1.3	1.3	0	4	543	0.9	1.3	0	4	543	0.4	0.8	0	4	542
Medium education	2.5	1.1	0	4	2,721	1.4	1.3	0	4	2,721	1.4	1.3	0	4	2,721	0.5	0.9	0	4	2,720
High education	2.4	1.0	0	4	2,322	1.5	1.2	0	4	2,323	2.1	1.1	0	4	2,323	0.5	1.0	0	4	2,322
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	2.5	1.0	0	4	1,791	1.8	1.2	0	4	1,791	2.0	1.3	0	4	1,791	0.6	1.0	0	4	1,789
No supervisory responsibilities	2.4	1.1	0	4	4,009	1.3	1.2	0	4	4,009	1.5	1.3	0	4	4,009	0.4	0.9	0	4	4,008
<b>Autonomy</b>																				
No autonomy	2.3	1.2	0	4	396	1.0	1.2	0	4	396	0.7	1.1	0	4	396	0.4	0.8	0	4	396
Little autonomy	2.5	1.1	0	4	829	1.3	1.3	0	4	829	1.2	1.2	0	4	828	0.5	0.9	0	4	828
Slightly below-average autonomy	2.5	1.0	0	4	1,153	1.5	1.2	0	4	1,153	1.7	1.3	0	4	1,153	0.5	0.9	0	4	1,153
Slightly above-average autonomy	2.5	1.0	0	4	2,529	1.5	1.2	0	4	2,531	1.9	1.2	0	4	2,531	0.5	1.0	0	4	2,529
High autonomy	2.4	1.1	0	4	886	1.4	1.2	0	4	885	1.8	1.3	0	4	886	0.5	1.0	0	4	885

Source: LEEP-B3, own calculations.

Table A11: Digital communication and information: Use (Inequality)

	Communication with colleagues: face to face					Communication with colleagues: phone					Communication with colleagues: e-mail					Communication with colleagues: digital platforms or apps				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	3.4	0.8	0	4	5,819	2.1	1.5	0	4	5,815	1.9	1.5	0	4	5,816	0.9	1.2	0	4	5,811
<b>Education</b>																				
Low education	3.3	1.0	0	4	544	1.3	1.5	0	4	543	0.8	1.3	0	4	543	0.6	1.0	0	4	544
Medium education	3.4	0.8	0	4	2,721	1.9	1.5	0	4	2,718	1.5	1.5	0	4	2,719	0.8	1.2	0	4	2,716
High education	3.4	0.8	0	4	2,329	2.4	1.4	0	4	2,329	2.6	1.3	0	4	2,329	1.0	1.3	0	4	2,327
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	3.5	0.7	0	4	1,797	2.4	1.4	0	4	1,797	2.2	1.5	0	4	1,797	1.0	1.3	0	4	1,793
No supervisory responsibilities	3.4	0.9	0	4	4,011	1.9	1.5	0	4	4,007	1.8	1.5	0	4	4,008	0.8	1.2	0	4	4,007
<b>Autonomy</b>																				
No autonomy	3.4	0.9	0	4	396	1.1	1.3	0	4	396	0.6	1.1	0	4	396	0.6	1.1	0	4	396
Little autonomy	3.5	0.8	0	4	829	1.9	1.5	0	4	829	1.4	1.5	0	4	828	0.8	1.1	0	4	829
Slightly below-average autonomy	3.4	0.8	0	4	1,153	2.1	1.4	0	4	1,152	1.9	1.5	0	4	1,152	0.9	1.2	0	4	1,149
Slightly above-average autonomy	3.4	0.8	0	4	2,531	2.2	1.4	0	4	2,529	2.2	1.5	0	4	2,532	0.9	1.3	0	4	2,529
High autonomy	3.4	0.9	0	4	893	2.2	1.5	0	4	892	2.1	1.5	0	4	891	0.9	1.3	0	4	891

Source: LEEP-B3, own calculations.

Table A12: Digital communication and information: Use (Inequality)

	Use of information retrieved by information systems					Use of automatically stored digital information during the process				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.8	1.3	0	4	5,805	2.3	1.5	0	4	5,734
<b>Education</b>										
Low education	1.9	1.6	0	4	542	1.9	1.6	0	4	538
Medium education	2.7	1.3	0	4	2,713	2.4	1.5	0	4	2,694
High education	3.1	1.1	0	4	2,325	2.3	1.5	0	4	2,281
<b>Supervisory responsibilities</b>										
Supervisory responsibilities	3.0	1.1	0	4	1,798	2.4	1.4	0	4	1,780
No supervisory responsibilities	2.7	1.3	0	4	3,996	2.2	1.5	0	4	3,944
<b>Autonomy</b>										
No autonomy	2.3	1.5	0	4	394	2.2	1.6	0	4	391
Little autonomy	2.6	1.4	0	4	827	2.3	1.6	0	4	813
Slightly below-average autonomy	2.8	1.3	0	4	1,150	2.3	1.5	0	4	1,132
Slightly above-average autonomy	2.9	1.2	0	4	2,527	2.3	1.5	0	4	2,500
High autonomy	2.8	1.2	0	4	891	2.2	1.5	0	4	884

Source: LEEP-B3, own calculations.

**Table A13: Digital communication and information: Perceptions (Inequality)**

	Use of ICT: higher flexibility					Use of ICT: higher efficiency					Use of ICT: be constantly available					Use of ICT: replacement of personal interaction					Use of ICT: feeling overwhelmed				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.1	1.5	0	4	5,352	2.3	1.2	0	4	5,358	1.3	1.3	0	4	5,358	1.4	1.2	0	4	5,361	1.4	1.2	0	4	5,362
<b>Education</b>																									
Low education	1.8	1.4	0	4	398	2.2	1.2	0	4	402	1.2	1.4	0	4	402	1.4	1.3	0	4	402	1.3	1.3	0	4	402
Medium education	1.8	1.5	0	4	2,474	2.3	1.2	0	4	2,478	1.2	1.3	0	4	2,477	1.5	1.3	0	4	2,478	1.4	1.2	0	4	2,479
High education	2.3	1.5	0	4	2,268	2.3	1.1	0	4	2,266	1.3	1.3	0	4	2,267	1.4	1.2	0	4	2,270	1.4	1.1	0	4	2,269
<b>Supervisory responsibilities</b>																									
Supervisory responsibilities	2.3	1.4	0	4	1,724	2.3	1.1	0	4	1,726	1.5	1.3	0	4	1,727	1.4	1.2	0	4	1,727	1.5	1.2	0	4	1,727
No supervisory responsibilities	1.9	1.5	0	4	3,619	2.3	1.2	0	4	3,623	1.2	1.3	0	4	3,622	1.5	1.3	0	4	3,625	1.4	1.2	0	4	3,626
<b>Autonomy</b>																									
No autonomy	0.8	1.2	0	4	317	2.0	1.3	0	4	320	1.1	1.4	0	4	319	1.5	1.4	0	4	320	1.4	1.3	0	4	319
Little autonomy	1.4	1.4	0	4	737	2.1	1.2	0	4	735	1.3	1.4	0	4	735	1.5	1.3	0	4	737	1.5	1.3	0	4	738
Slightly below-average autonomy	1.9	1.4	0	4	1,061	2.2	1.1	0	4	1,064	1.3	1.3	0	4	1,064	1.5	1.3	0	4	1,064	1.5	1.2	0	4	1,064
Slightly above-average autonomy	2.3	1.4	0	4	2,392	2.4	1.1	0	4	2,394	1.3	1.3	0	4	2,397	1.4	1.2	0	4	2,395	1.4	1.1	0	4	2,396
High autonomy	2.6	1.4	0	4	831	2.5	1.2	0	4	831	1.3	1.3	0	4	829	1.4	1.3	0	4	831	1.2	1.2	0	4	831

Source: LEEP-B3, own calculations.

Table A14: Digital regulation and control: Use (Distribution)

	Controlling or programming machines or implements digitally					Intervening digitally in the automated work processes of machines or implements					Getting automatic work instructions				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.4	1.6	0	4	5,806	0.9	1.3	0	4	5,810	0.7	1.1	0	4	5,807
<b>Occupational groups</b>															
Manufacturing	1.8	1.7	0	4	977	1.6	1.6	0	4	978	0.9	1.3	0	4	976
Administrative services	1.2	1.6	0	4	3,499	0.7	1.2	0	4	3,502	0.7	1.2	0	4	3,502
Social services	1.5	1.7	0	4	759	0.9	1.2	0	4	758	0.6	1.1	0	4	757
<b>Economic sectors</b>															
Manufacturing industries, energy, water supply	1.6	1.7	0	4	1,549	1.3	1.5	0	4	1,547	0.9	1.2	0	4	1,546
Trade, hospitality industry, transportation	1.3	1.6	0	4	355	0.9	1.3	0	4	355	0.9	1.2	0	4	353
Financial and insurance activities, economical services	1.2	1.6	0	4	2,273	0.7	1.2	0	4	2,276	0.7	1.1	0	4	2,278
Social, private and public services	1.3	1.6	0	4	1,039	0.8	1.1	0	4	1,041	0.5	1.0	0	4	1,040
<b>Public vs. private sector</b>															
Public service	1.2	1.6	0	4	1,691	0.7	1.1	0	4	1,695	0.5	1.0	0	4	1,696
Private sector	1.5	1.7	0	4	1,184	1.0	1.4	0	4	1,182	0.8	1.2	0	4	1,181
<b>Pressure from competition: organization's future is in danger</b>															
Unlikely	1.3	1.6	0	4	1,545	0.8	1.2	0	4	1,545	0.7	1.1	0	4	1,545
Somewhat likely	1.4	1.6	0	4	307	1.0	1.3	0	4	307	0.6	1.0	0	4	306
Likely	1.7	1.6	0	4	95	1.2	1.3	0	4	94	1.2	1.4	0	4	95
<b>Comparison with main competitor: Labor productivity</b>															
Worse	1.6	1.6	0	4	91	1.2	1.4	0	4	91	0.9	1.2	0	4	91
The same	1.4	1.7	0	4	605	1.0	1.3	0	4	604	0.8	1.2	0	4	602
Better	1.5	1.7	0	4	363	1.0	1.3	0	4	362	0.8	1.2	0	4	363
<b>Comparison with main competitor: Job security</b>															
Worse	1.7	1.7	0	4	100	1.0	1.3	0	4	99	1.1	1.2	0	4	100
The same	1.3	1.6	0	4	399	0.9	1.3	0	4	399	0.6	1.1	0	4	397
Better	1.5	1.7	0	4	622	1.0	1.3	0	4	621	0.9	1.2	0	4	621
<b>Comparison with main competitor: Profit</b>															
Worse	1.4	1.6	0	4	154	1.0	1.3	0	4	154	0.8	1.1	0	4	154
The same	1.5	1.7	0	4	483	1.1	1.4	0	4	483	0.8	1.2	0	4	481
Better	1.5	1.7	0	4	327	0.9	1.3	0	4	325	0.9	1.3	0	4	327

Source: LEEP-B3, own calculations.

Table A15: Digital regulation and control: Perceptions (Distribution)

	Automatic work instructions: less control					Automatic work instructions: less autonomy					Automatic work instructions: neglected personal contact				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.2	0	4	1,113	1.7	1.3	0	4	1,114	1.7	1.4	0	4	1,114
<b>Occupational groups</b>															
Manufacturing	1.7	1.1	0	4	251	1.9	1.3	0	4	251	2.0	1.4	0	4	252
Administrative services	1.5	1.2	0	4	647	1.6	1.2	0	4	647	1.7	1.3	0	4	646
Social services	1.4	1.3	0	4	117	1.6	1.3	0	4	118	1.4	1.4	0	4	118
<b>Economic sectors</b>															
Manufacturing industries, energy, water supply	1.6	1.1	0	4	375	1.8	1.2	0	4	376	2.0	1.3	0	4	376
Trade, hospitality industry and transportation	1.8	1.2	0	4	86	1.8	1.3	0	4	85	2.0	1.4	0	4	86
Financial and insurance activities, economical services	1.5	1.2	0	4	416	1.6	1.2	0	4	416	1.6	1.3	0	4	415
Social, private and public services	1.3	1.3	0	4	135	1.4	1.3	0	4	136	1.4	1.3	0	4	136
<b>Public vs. private sector</b>															
Public service	1.4	1.2	0	4	219	1.6	1.2	0	4	218	1.6	1.3	0	4	219
Private sector	1.6	1.1	0	4	280	1.6	1.2	0	4	280	1.8	1.4	0	4	280
<b>Pressure from competition: organization's future is in danger</b>															
Unlikely	1.5	1.1	0	4	287	1.6	1.2	0	4	287	1.8	1.3	0	4	287
Somewhat likely	1.4	1.1	0	4	43	1.6	1.3	0	4	43	1.8	1.5	0	4	43
Likely	1.3	1.2	0	4	31	1.7	1.3	0	4	31	2.0	1.4	0	4	31
<b>Comparison with main competitor: Labor productivity</b>															
Worse	1.6	1.1	0	4	23	1.7	1.4	0	4	23	2.1	1.3	0	4	23
The same	1.6	1.1	0	4	146	1.6	1.2	0	4	146	1.8	1.4	0	4	146
Better	1.4	1.0	0	4	86	1.5	1.1	0	4	86	1.7	1.3	0	4	86
<b>Comparison with main competitor: Job security</b>															
Worse	1.6	1.2	0	4	31	1.9	1.2	0	4	31	2.0	1.4	0	4	31
The same	1.6	1.2	0	4	71	1.5	1.3	0	4	71	1.9	1.4	0	4	71
Better	1.5	1.1	0	4	160	1.6	1.2	0	4	160	1.7	1.3	0	4	160
<b>Comparison with main competitor: Profit</b>															
Worse	1.5	1.2	0	4	33	1.5	1.4	0	4	33	2.2	1.4	0	4	33
The same	1.4	1.1	0	4	118	1.5	1.2	0	4	118	1.6	1.4	0	4	118
Better	1.6	1.1	0	4	91	1.7	1.1	0	4	91	1.9	1.3	0	4	91

Source: LEEP-B3, own calculations.

Table A15: Digital regulation and control: Perceptions (Distribution) (continuation)

	Automatic work instructions: fairer work distribution					Automatic work instructions: more efficient work distribution					Automatic work instructions: difficulties responding to private commitments				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.1	0	4	1,086	2.1	1.2	0	4	1,107	1.4	1.3	0	4	1,108
<b>Occupational groups</b>															
Manufacturing	1.7	1.1	0	4	249	2.3	1.1	0	4	251	1.8	1.4	0	4	249
Administrative services	1.5	1.1	0	4	627	2.0	1.2	0	4	642	1.3	1.2	0	4	643
Social services	1.3	1.2	0	4	113	1.8	1.2	0	4	116	1.4	1.4	0	4	118
<b>Economic sectors</b>															
Manufacturing industries, energy, water supply	1.6	1.1	0	4	369	2.2	1.1	0	4	376	1.6	1.3	0	4	375
Trade, hospitality industry and transportation	1.5	1.1	0	4	84	2.2	1.2	0	4	85	1.7	1.4	0	4	83
Financial and insurance activities, economical services	1.5	1.2	0	4	401	2.0	1.2	0	4	411	1.2	1.1	0	4	413
Social, private and public services	1.3	1.2	0	4	132	1.8	1.2	0	4	134	1.3	1.3	0	4	136
<b>Public vs. private sector</b>															
Public service	1.4	1.2	0	4	209	1.9	1.2	0	4	214	1.2	1.2	0	4	215
Private sector	1.5	1.1	0	4	274	2.1	1.2	0	4	280	1.5	1.3	0	4	278
<b>Pressure from competition: organization's future is in danger</b>															
Unlikely	1.5	1.2	0	4	280	2.1	1.2	0	4	286	1.4	1.3	0	4	284
Somewhat likely	1.5	1.1	0	4	42	2.1	1.2	0	4	43	1.4	1.3	0	4	43
Likely	1.2	1.1	0	4	30	1.9	1.2	0	4	31	1.7	1.5	0	4	31
<b>Comparison with main competitor: Labor productivity</b>															
Worse	1.3	1.2	0	3	23	1.8	1.2	0	4	23	1.6	1.3	0	4	23
The same	1.5	1.1	0	4	143	2.1	1.2	0	4	146	1.3	1.3	0	4	144
Better	1.6	1.2	0	4	83	2.2	1.1	0	4	86	1.5	1.3	0	4	86
<b>Comparison with main competitor: Job security</b>															
Worse	1.5	1.1	0	4	30	1.8	1.1	0	4	31	1.6	1.3	0	4	30
The same	1.5	1.2	0	4	70	2.2	1.2	0	4	71	1.3	1.3	0	4	70
Better	1.5	1.1	0	4	156	2.1	1.2	0	4	160	1.4	1.3	0	4	160
<b>Comparison with main competitor: Profit</b>															
Worse	1.3	1.2	0	4	32	1.6	1.2	0	4	33	1.3	1.4	0	4	32
The same	1.5	1.1	0	4	117	2.2	1.2	0	4	118	1.2	1.2	0	4	118
Better	1.5	1.1	0	4	87	2.1	1.1	0	4	91	1.7	1.3	0	4	90

Source: LEEP-B3, own calculations.



Table A16: Digital regulation and control: Use (Inequality)

	Controlling or programming machines or implements digitally					Intervening digitally in the automated work processes of machines or implements					Getting automatic work instructions				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.4	1.6	0	4	5,806	0.9	1.3	0	4	5,810	0.7	1.1	0	4	5,807
<b>Education</b>															
Low education	1.5	1.7	0	4	545	1.2	1.5	0	4	543	0.9	1.3	0	4	543
Medium education	1.5	1.7	0	4	2,712	1.1	1.4	0	4	2,718	0.8	1.2	0	4	2,712
High education	1.2	1.6	0	4	2,325	0.7	1.1	0	4	2,325	0.6	1.0	0	4	2,330
<b>Supervisory responsibilities</b>															
Supervisory responsibilities	1.4	1.6	0	4	1,794	1.0	1.3	0	4	1,793	0.7	1.1	0	4	1,795
No supervisory responsibilities	1.3	1.7	0	4	4,001	0.9	1.3	0	4	4,006	0.7	1.1	0	4	4,001
<b>Autonomy</b>															
No autonomy	1.7	1.7	0	4	395	1.4	1.6	0	4	393	0.9	1.4	0	4	393
Little autonomy	1.5	1.7	0	4	822	1.1	1.4	0	4	826	0.8	1.2	0	4	826
Slightly below-average autonomy	1.4	1.7	0	4	1,149	0.9	1.3	0	4	1,152	0.8	1.2	0	4	1,153
Slightly above-average autonomy	1.3	1.6	0	4	2,529	0.8	1.2	0	4	2,529	0.7	1.1	0	4	2,529
High autonomy	1.2	1.6	0	4	894	0.8	1.2	0	4	893	0.5	0.9	0	4	890

Source: LEEP-B3, own calculations.

Table A17: Digital regulation and control: Perceptions (Inequality)

	Automatic work instructions: less control					Automatic work instructions: less autonomy					Automatic work instructions: neglected personal contact				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.2	0	4	1,113	1.7	1.3	0	4	1,114	1.7	1.4	0	4	1,114
<b>Education</b>															
Low education	1.6	1.1	0	4	128	1.8	1.2	0	4	128	2.1	1.4	0	4	128
Medium education	1.7	1.2	0	4	568	1.9	1.3	0	4	570	1.8	1.4	0	4	569
High education	1.3	1.1	0	4	384	1.5	1.2	0	4	383	1.5	1.3	0	4	384
<b>Supervisory responsibilities</b>															
Supervisory responsibilities	1.4	1.2	0	4	335	1.5	1.2	0	4	336	1.6	1.4	0	4	336
No supervisory responsibilities	1.6	1.2	0	4	777	1.8	1.3	0	4	777	1.8	1.4	0	4	777
<b>Autonomy</b>															
No autonomy	2.0	1.3	0	4	100	2.4	1.4	0	4	99	2.2	1.4	0	4	100
Little autonomy	1.9	1.2	0	4	181	2.1	1.3	0	4	182	2.1	1.3	0	4	182
Slightly below-average autonomy	1.4	1.1	0	4	257	1.7	1.1	0	4	258	1.7	1.3	0	4	258
Slightly above-average autonomy	1.4	1.1	0	4	461	1.5	1.2	0	4	461	1.6	1.3	0	4	461
High autonomy	1.2	1.2	0	4	111	1.1	1.2	0	4	111	1.5	1.5	0	4	110

Source: LEEP-B3, own calculations.

Table A17: Digital regulation and control: Perceptions (Inequality) (continuation)

	Automatic work instructions: fairer work distribution					Automatic work instructions: more efficient work distribution					Automatic work instructions: difficulties responding to private commitments				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.1	0	4	1,086	2.1	1.2	0	4	1,107	1.4	1.3	0	4	1,108
<b>Education</b>															
Low education	1.8	1.1	0	4	126	2.3	1.2	0	4	128	1.7	1.4	0	4	127
Medium education	1.6	1.1	0	4	558	2.1	1.2	0	4	567	1.5	1.3	0	4	568
High education	1.3	1.1	0	4	372	2.0	1.2	0	4	380	1.1	1.2	0	4	380
<b>Supervisory responsibilities</b>															
Supervisory responsibilities	1.4	1.1	0	4	322	2.1	1.2	0	4	333	1.4	1.3	0	4	333
No supervisory responsibilities	1.6	1.1	0	4	763	2.1	1.2	0	4	773	1.4	1.3	0	4	774
<b>Autonomy</b>															
No autonomy	1.6	1.2	0	4	99	2.2	1.2	0	4	99	1.9	1.6	0	4	98
Little autonomy	1.5	1.1	0	4	181	2.1	1.2	0	4	180	1.8	1.4	0	4	182
Slightly below-average autonomy	1.4	1.1	0	4	251	1.9	1.1	0	4	257	1.3	1.2	0	4	257
Slightly above-average autonomy	1.6	1.1	0	4	443	2.1	1.1	0	4	458	1.3	1.2	0	4	458
High autonomy	1.6	1.4	0	4	110	2.2	1.3	0	4	110	1.1	1.2	0	4	111

Source: LEEP-B3, own calculations.

**Table A18: Automated recording: Use (Distribution)**

	Automatic storage of information about my operations				
	Mean	SD	Min	Max	Obs
<b>In total</b>	1.9	1.6	0	4	5,716
<b>Occupational groups</b>					
Manufacturing	2.1	1.6	0	4	965
Administrative services	1.8	1.6	0	4	3,444
Social services	1.8	1.7	0	4	750
<b>Economic sectors</b>					
Manufacturing industries, energy, water supply	2.0	1.6	0	4	1,533
Trade, hospitality industry and transportation	2.2	1.7	0	4	348
Financial and insurance activities, economical services	1.9	1.6	0	4	2,235
Social, private and public services	1.7	1.7	0	4	1,025
<b>Public vs. private sector</b>					
Public service	1.7	1.6	0	4	1,664
Private sector	2.0	1.6	0	4	1,171
<b>Pressure from competition: organization's future is in danger</b>					
Unlikely	1.9	1.6	0	4	1,518
Somewhat likely	1.7	1.7	0	4	305
Likely	1.8	1.6	0	4	94
<b>Comparison with main competitor: Labor productivity</b>					
Worse	2.2	1.5	0	4	91
The same	2.1	1.6	0	4	594
Better	2.1	1.7	0	4	361
<b>Comparison with main competitor: Job security</b>					
Worse	2.7	1.4	0	4	99
The same	1.9	1.7	0	4	394
Better	2.0	1.6	0	4	615
<b>Comparison with main competitor: Profit</b>					
Worse	1.9	1.6	0	4	152
The same	2.1	1.6	0	4	479
Better	2.3	1.6	0	4	322

Source: LEEP-B3, own calculations.

Table A19: Automated recording: Perceptions (Distribution)

	Automatically stored information: for performance evaluation					Automatically stored information: more efficient					Automatically stored information: constant monitoring					Automatically stored information: privacy is not protected				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.5	0	4	3,019	1.7	1.2	0	4	3,084	1.9	1.5	0	4	3,080	0.9	1.2	0	4	3,084
<b>Occupational groups</b>																				
Manufacturing	1.9	1.5	0	4	549	1.8	1.2	0	4	574	2.3	1.5	0	4	574	1.0	1.3	0	4	573
Administrative services	1.4	1.5	0	4	1,804	1.6	1.2	0	4	1,829	1.8	1.4	0	4	1,824	0.8	1.1	0	4	1,826
Social services	1.4	1.4	0	4	379	1.6	1.3	0	4	391	1.9	1.5	0	4	390	0.7	1.1	0	4	393
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	1.5	1.4	0	4	856	1.8	1.2	0	4	880	1.9	1.5	0	4	880	0.9	1.2	0	4	878
Trade, hospitality industry and transportation	1.8	1.5	0	4	202	1.6	1.3	0	4	208	2.4	1.5	0	4	209	1.0	1.3	0	4	208
Financial and insurance activities, economical services	1.5	1.5	0	4	1,188	1.6	1.3	0	4	1,205	1.8	1.5	0	4	1,199	0.9	1.2	0	4	1,204
Social, private and public services	1.2	1.4	0	4	472	1.5	1.3	0	4	488	1.8	1.5	0	4	486	0.7	1.1	0	4	488
<b>Public vs. private sector</b>																				
Public service	1.3	1.4	0	4	790	1.6	1.3	0	4	811	1.8	1.5	0	4	809	0.8	1.1	0	4	814
Private sector	1.7	1.5	0	4	670	1.7	1.2	0	4	683	2.1	1.4	0	4	680	1.0	1.2	0	4	683
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	1.6	1.5	0	4	812	1.7	1.3	0	4	832	2.0	1.5	0	4	832	0.9	1.2	0	4	834
Somewhat likely	1.5	1.5	0	4	143	1.5	1.2	0	4	145	1.9	1.5	0	4	141	0.9	1.2	0	4	144
Likely	1.3	1.4	0	4	48	1.5	1.3	0	4	49	1.7	1.4	0	4	48	0.9	1.3	0	4	48
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	1.6	1.4	0	4	56	1.6	1.2	0	4	57	2.1	1.5	0	4	57	1.1	1.3	0	4	57
The same	1.7	1.6	0	4	346	1.7	1.2	0	4	350	2.1	1.5	0	4	349	1.0	1.2	0	4	350
Better	1.6	1.6	0	4	209	1.7	1.2	0	4	215	2.1	1.4	0	4	214	0.9	1.2	0	4	215
<b>Comparison with main competitor: Job security</b>																				
Worse	1.5	1.4	0	4	75	1.5	1.1	0	4	79	1.9	1.4	0	4	78	0.9	1.2	0	4	79
The same	1.7	1.5	0	4	211	1.8	1.2	0	4	211	2.1	1.4	0	4	210	1.0	1.2	0	4	212
Better	1.7	1.6	0	4	346	1.7	1.3	0	4	354	2.1	1.5	0	4	353	1.0	1.2	0	4	353
<b>Comparison with main competitor: Profit</b>																				
Worse	1.5	1.4	0	4	82	1.5	1.2	0	4	83	2.0	1.4	0	4	83	1.0	1.2	0	4	83
The same	1.6	1.6	0	4	283	1.7	1.2	0	4	286	2.1	1.5	0	4	283	1.0	1.2	0	4	286
Better	1.8	1.5	0	4	207	1.8	1.3	0	4	214	2.1	1.4	0	4	213	0.9	1.2	0	4	213

Source: LEEP-B3, own calculations.

Table A20: Automated recording: Use (Inequality)

	Automatic storage of information about my operations				
	Mean	SD	Min	Max	Obs
<b>In total</b>	1.9	1.6	0	4	5,716
<b>Education</b>					
Low education	1.9	1.7	0	4	534
Medium education	2.1	1.6	0	4	2,675
High education	1.7	1.6	0	4	2,286
<b>Supervisory responsibilities</b>					
Supervisory responsibilities	1.8	1.6	0	4	1,762
No supervisory responsibilities	1.9	1.6	0	4	3,944
<b>Autonomy</b>					
No autonomy	2.5	1.7	0	4	386
Little autonomy	2.2	1.7	0	4	808
Slightly below-average autonomy	2.0	1.6	0	4	1,135
Slightly above-average autonomy	1.8	1.6	0	4	2,487
High autonomy	1.6	1.6	0	4	883

Source: LEEP-B3, own calculations.

Table A21: Automated recording: Perceptions (Inequality)

	Automatically stored information: for performance evaluation					Automatically stored information: more efficient					Automatically stored information: constant monitoring					Automatically stored information: privacy is not protected				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.5	0	4	3,019	1.7	1.2	0	4	3,084	1.9	1.5	0	4	3,080	0.9	1.2	0	4	3,084
<b>Education</b>																				
Low education	1.8	1.5	0	4	282	1.7	1.2	0	4	289	2.1	1.5	0	4	285	1.0	1.4	0	4	289
Medium education	1.6	1.5	0	4	1,543	1.7	1.3	0	4	1,591	2.1	1.5	0	4	1,591	0.9	1.2	0	4	1,590
High education	1.2	1.3	0	4	1,090	1.6	1.2	0	4	1,099	1.6	1.4	0	4	1,098	0.8	1.1	0	4	1,099
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	1.4	1.4	0	4	882	1.8	1.2	0	4	891	1.8	1.5	0	4	892	0.8	1.1	0	4	893
No supervisory responsibilities	1.5	1.5	0	4	2,131	1.6	1.2	0	4	2,187	2.0	1.5	0	4	2,183	0.9	1.2	0	4	2,185
<b>Autonomy</b>																				
No autonomy	2.0	1.6	0	4	263	1.5	1.3	0	4	270	2.7	1.4	0	4	271	1.0	1.3	0	4	269
Little autonomy	1.8	1.6	0	4	485	1.6	1.2	0	4	499	2.3	1.5	0	4	500	1.0	1.2	0	4	503
Slightly below-average autonomy	1.5	1.4	0	4	624	1.7	1.2	0	4	638	1.9	1.4	0	4	634	0.9	1.2	0	4	638
Slightly above-average autonomy	1.3	1.4	0	4	1,247	1.7	1.2	0	4	1,270	1.6	1.4	0	4	1,266	0.8	1.1	0	4	1,264
High autonomy	1.2	1.4	0	4	392	1.8	1.4	0	4	396	1.5	1.6	0	4	398	0.7	1.2	0	4	400

Source: LEEP-B3, own calculations.

Table A22: Working with robots: Use (Distribution)

	Working with stationary robots					Working with mobile robots				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.8	0	4	5,808	0.1	0.5	0	4	5,802
<b>Occupational groups</b>										
Manufacturing	0.7	1.3	0	4	976	0.3	0.8	0	4	976
Administrative services	0.1	0.6	0	4	3,502	0.1	0.4	0	4	3,498
Social services	0.1	0.6	0	4	759	0.1	0.3	0	4	758
<b>Economic sectors</b>										
Manufacturing industries, energy, water supply	0.6	1.2	0	4	1,546	0.3	0.8	0	4	1,545
Trade, hospitality industry and transportation	0.1	0.4	0	4	355	0.1	0.4	0	4	355
Financial and insurance activities, economical services	0.1	0.5	0	4	2,275	0.0	0.3	0	4	2,272
Social, private and public services	0.1	0.6	0	4	1,042	0.0	0.3	0	4	1,041
<b>Public vs. private sector</b>										
Public service	0.1	0.4	0	4	1,694	0.0	0.3	0	4	1,692
Private sector	0.3	0.8	0	4	1,180	0.1	0.5	0	4	1,181
<b>Pressure from competition: organization's future is in danger</b>										
Unlikely	0.1	0.6	0	4	1,543	0.1	0.4	0	4	1,543
Somewhat likely	0.3	0.9	0	4	308	0.2	0.7	0	4	308
Likely	0.4	1.0	0	4	94	0.1	0.6	0	4	95
<b>Comparison with main competitor: Labor productivity</b>										
Worse	0.4	1.0	0	4	91	0.2	0.8	0	4	91
The same	0.2	0.7	0	4	603	0.1	0.5	0	4	604
Better	0.3	0.9	0	4	362	0.1	0.5	0	4	362
<b>Comparison with main competitor: Job security</b>										
Worse	0.3	0.9	0	4	99	0.1	0.6	0	4	99
The same	0.2	0.8	0	4	399	0.1	0.6	0	4	399
Better	0.2	0.7	0	4	620	0.1	0.4	0	4	621
<b>Comparison with main competitor: Profit</b>										
Worse	0.3	0.8	0	4	154	0.1	0.5	0	4	154
The same	0.2	0.7	0	4	483	0.1	0.4	0	4	483
Better	0.2	0.7	0	4	324	0.1	0.4	0	4	325

Source: LEEP-B3, own calculations.



Table A23: Working with robots: Perceptions (Distribution)

	Working with robots: relieves workload					Working with robots: less autonomy					Working with robots: less control					Working with robots: further qualificat. necessary					Working with robots: job is threatened				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.0	1.4	0	4	385	1.6	1.4	0	4	383	1.3	1.4	0	4	386	2.8	1.4	0	4	387	0.8	1.3	0	4	388
<b>Occupational groups</b>																									
Manufacturing	2.1	1.4	0	4	207	1.9	1.4	0	4	204	1.5	1.4	0	4	206	2.9	1.4	0	4	207	1.0	1.3	0	4	207
Administrative services	2.0	1.4	0	4	118	1.4	1.3	0	4	119	1.1	1.2	0	4	119	2.6	1.4	0	4	119	0.7	1.2	0	4	120
Social services	2.1	1.6	0	4	30	1.5	1.3	0	4	30	1.1	1.2	0	4	31	3.1	1.1	0	4	31	0.6	1.2	0	4	31
<b>Economic sectors</b>																									
Manufacturing industries, energy, water supply	2.1	1.4	0	4	257	1.7	1.4	0	4	255	1.4	1.3	0	4	257	2.9	1.3	0	4	257	0.9	1.3	0	4	257
Trade, hospitality industry, transportation	1.8	1.7	0	4	8	1.6	1.2	0	3	9	1.4	1.6	0	4	9	3.1	1.4	0	4	9	1.1	1.7	0	4	9
Financial and insurance activities, economical services	1.9	1.5	0	4	56	1.6	1.4	0	4	55	1.1	1.3	0	4	55	2.4	1.5	0	4	56	0.8	1.3	0	4	57
Social, private and public services	2.0	1.5	0	4	33	1.6	1.4	0	4	33	1.1	1.3	0	4	34	2.9	1.2	0	4	34	0.5	1.1	0	4	34
<b>Public vs. private sector</b>																									
Public service	1.9	1.5	0	4	40	1.5	1.4	0	4	41	1.3	1.5	0	4	41	2.7	1.5	0	4	41	0.9	1.5	0	4	41
Private sector	2.0	1.3	0	4	96	1.8	1.3	0	4	94	1.4	1.3	0	4	96	2.9	1.2	0	4	96	1.1	1.4	0	4	97
<b>Pressure from competition: organization's future is in danger</b>																									
Unlikely	1.8	1.4	0	4	64	1.7	1.3	0	4	63	1.5	1.4	0	4	65	2.7	1.4	0	4	65	1.1	1.4	0	4	65
Somewhat likely	2.1	1.3	0	4	32	2.0	1.4	0	4	32	1.3	1.3	0	4	32	3.1	1.1	0	4	32	1.2	1.6	0	4	33
Likely	2.4	0.7	1	3	9	2.1	1.6	0	4	9	2.1	1.7	0	4	9	3.0	1.2	1	4	9	1.9	1.8	0	4	9
<b>Comparison with main competitor: Labor productivity</b>																									
Worse	2.6	0.5	2	3	10	2.7	1.3	0	4	10	2.4	1.4	0	4	10	3.3	0.9	1	4	10	1.9	1.4	0	4	10
The same	2.1	1.1	0	4	29	1.7	1.2	0	4	29	1.4	1.4	0	4	29	2.8	1.3	0	4	29	1.2	1.6	0	4	29
Better	1.7	1.6	0	4	33	1.8	1.3	0	4	32	1.2	1.1	0	4	33	2.8	1.2	0	4	33	0.9	1.3	0	4	34
<b>Comparison with main competitor: Job security</b>																									
Worse	1.8	1.2	0	3	9	2.0	1.4	0	4	8	1.8	1.6	0	4	9	3.1	1.1	1	4	9	1.7	1.6	0	4	9
The same	2.2	1	0	4	28	2.0	1.2	0	4	28	1.8	1.3	0	4	28	3.0	1.2	0	4	28	1.7	1.6	0	4	29
Better	1.8	1.5	0	4	40	1.6	1.3	0	4	40	1.1	1.1	0	4	40	2.7	1.3	0	4	40	0.7	1.0	0	4	40
<b>Comparison with main competitor: Profit</b>																									
Worse	2.4	0.8	1	4	10	2.1	1.3	0	4	10	2.2	1.3	0	4	10	3.0	1.2	1	4	10	2.1	1.5	0	4	11
The same	2.0	1.4	0	4	29	1.8	1.4	0	4	29	1.3	1.1	0	3	29	2.9	1.3	0	4	29	0.8	1.1	0	3	29
Better	1.8	1.4	0	4	20	1.8	1.3	0	4	19	1.2	1.2	0	4	20	2.8	1.2	0	4	20	0.8	1.2	0	4	20

Source: LEEP-B3, own calculations.

Table A24: Working with robots: Use (Inequality)

	Working with stationary robots					Working with mobile robots				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.8	0	4	5,808	0.1	0.5	0	4	5,802
<b>Education</b>										
Low education	0.5	1.1	0	4	545	0.3	0.8	0	4	545
Medium education	0.3	0.9	0	4	2,714	0.1	0.5	0	4	2,710
High education	0.1	0.5	0	4	2,325	0.1	0.4	0	4	2,324
<b>Supervisory responsibilities</b>										
Supervisory responsibilities	0.3	0.8	0	4	1,795	0.1	0.5	0	4	1,792
No supervisory responsibilities	0.2	0.8	0	4	4,002	0.1	0.5	0	4	3,999
<b>Autonomy</b>										
No autonomy	0.6	1.3	0	4	395	0.2	0.7	0	4	395
Little autonomy	0.3	0.9	0	4	829	0.1	0.6	0	4	828
Slightly below-average autonomy	0.2	0.8	0	4	1,149	0.1	0.5	0	4	1,147
Slightly above-average autonomy	0.2	0.7	0	4	2,525	0.1	0.4	0	4	2,522
High autonomy	0.2	0.6	0	4	894	0.1	0.5	0	4	894

Source: LEEP-B3, own calculations.

Table A25: Working with robots: Perceptions (Inequality)

	Working with robots: relieves workload					Working with robots: less autonomy					Working with robots: less control					Working with robots: further qualification necessary					Working with robots: job is threatened				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	2.0	1.4	0	4	385	1.6	1.4	0	4	383	1.3	1.4	0	4	386	2.8	1.4	0	4	387	0.8	1.3	0	4	388
<b>Education</b>																									
Low education	2.2	1.4	0	4	88	1.8	1.5	0	4	88	1.6	1.4	0	4	88	2.6	1.4	0	4	88	1.0	1.4	0	4	88
Medium education	2.1	1.5	0	4	214	1.8	1.3	0	4	212	1.3	1.3	0	4	214	2.9	1.3	0	4	215	0.8	1.2	0	4	216
High education	1.7	1.4	0	4	70	1.1	1.3	0	4	70	0.8	1.1	0	4	71	2.6	1.5	0	4	71	0.6	1.1	0	4	71
<b>Supervisory responsibilities</b>																									
Supervisory responsibilities	2.0	1.4	0	4	140	1.7	1.4	0	4	141	1.2	1.3	0	4	141	3.1	1.2	0	4	141	0.7	1.2	0	4	142
No supervisory responsibilities	2.1	1.5	0	4	245	1.6	1.4	0	4	242	1.4	1.4	0	4	245	2.6	1.4	0	4	246	0.9	1.3	0	4	246
<b>Autonomy</b>																									
No autonomy	2.0	1.5	0	4	70	2.0	1.5	0	4	66	1.9	1.6	0	4	69	2.8	1.4	0	4	70	1.3	1.6	0	4	70
Little autonomy	2.1	1.4	0	4	75	2.1	1.4	0	4	75	1.6	1.4	0	4	75	2.7	1.3	0	4	75	1.0	1.3	0	4	75
Slightly below-average autonomy	1.9	1.4	0	4	70	1.3	1.3	0	4	70	1.0	1.1	0	3	70	2.8	1.3	0	4	70	0.6	1.1	0	4	71
Slightly above-average autonomy	2.0	1.4	0	4	126	1.4	1.2	0	4	127	1.1	1.2	0	4	127	2.7	1.4	0	4	127	0.6	1.1	0	4	127
High autonomy	2.2	1.6	0	4	44	1.5	1.5	0	4	45	1.0	1.3	0	4	45	3.1	1.2	0	4	45	0.8	1.4	0	4	45

Source: LEEP-B3, own calculations.

Table A26: Perceptions about the increase in digitalization (Distribution)

	Last 3 years: increase in use of ICT					Last 3 years: increase in automati- cally created work instructions					Last 3 years: increase in automatic storage of information					Last 3 years: increase in working with robots				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	3.0	1.3	0	4	5,789	1.3	1.4	0	4	5,476	1.7	1.6	0	4	5,596	1.0	1.5	0	4	5,280
<b>Occupational groups</b>																				
Manufacturing	2.7	1.4	0	4	967	1.5	1.5	0	4	944	1.9	1.6	0	4	953	1.5	1.6	0	4	921
Administrative services	3.0	1.2	0	4	3,499	1.3	1.4	0	4	3,282	1.6	1.5	0	4	3,370	1.0	1.5	0	4	3,157
Social services	3.0	1.2	0	4	755	1.2	1.4	0	4	711	1.8	1.6	0	4	732	0.7	1.3	0	4	683
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	2.9	1.2	0	4	1,542	1.5	1.5	0	4	1,476	1.8	1.5	0	4	1,511	1.5	1.6	0	4	1,458
Trade, hospitality industry and transportation	3.1	1.2	0	4	354	1.5	1.5	0	4	344	2.0	1.6	0	4	348	0.9	1.5	0	4	320
Financial and insurance activities, economical services	3.0	1.2	0	4	2,272	1.3	1.4	0	4	2,129	1.6	1.5	0	4	2,175	0.9	1.4	0	4	2,021
Social, private and public services	2.9	1.3	0	4	1,034	1.1	1.4	0	4	972	1.6	1.6	0	4	1,003	0.7	1.3	0	4	949
<b>Public vs. private sector</b>																				
Public service	2.9	1.3	0	4	1,685	1.1	1.4	0	4	1,575	1.5	1.6	0	4	1,621	0.7	1.3	0	4	1,512
Private sector	3.0	1.2	0	4	1,177	1.4	1.5	0	4	1,117	1.8	1.6	0	4	1,148	1.2	1.6	0	4	1,077
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	3.0	1.2	0	4	1,540	1.3	1.5	0	4	1,448	1.7	1.6	0	4	1,488	1.0	1.5	0	4	1,390
Somewhat likely	2.9	1.3	0	4	304	1.2	1.4	0	4	284	1.5	1.6	0	4	297	1.1	1.5	0	4	281
Likely	3.1	1.1	0	4	95	1.4	1.4	0	4	88	1.8	1.5	0	4	93	1.2	1.6	0	4	89
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	3.1	1.2	0	4	91	1.8	1.5	0	4	85	1.9	1.4	0	4	89	1.5	1.6	0	4	83
The same	3.1	1.2	0	4	602	1.5	1.5	0	4	568	1.9	1.5	0	4	584	1.2	1.6	0	4	546
Better	2.8	1.3	0	4	360	1.3	1.5	0	4	346	1.8	1.6	0	4	356	1.1	1.5	0	4	332
<b>Comparison with main competitor: Job security</b>																				
Worse	3.4	1.0	0	4	100	1.7	1.4	0	4	96	2.5	1.5	0	4	99	1.2	1.6	0	4	94
The same	3.0	1.2	0	4	394	1.3	1.5	0	4	368	1.7	1.6	0	4	384	1.1	1.6	0	4	361
Better	2.9	1.3	0	4	620	1.5	1.5	0	4	592	1.8	1.6	0	4	604	1.2	1.5	0	4	561
<b>Comparison with main competitor: Profit</b>																				
Worse	3.0	1.2	0	4	153	1.4	1.5	0	4	145	1.7	1.5	0	4	149	1.3	1.6	0	4	141
The same	3.0	1.3	0	4	479	1.5	1.5	0	4	453	1.8	1.6	0	4	471	1.1	1.5	0	4	438
Better	3.1	1.2	0	4	327	1.5	1.5	0	4	311	2.2	1.6	0	4	316	1.2	1.6	0	4	292

Source: LEEP-B3, own calculations.

Table A27: Perceptions about the increase in digitalization (Inequality)

	Last 3 years: increase in use of ICT					Last 3 years: increase in automati- cally created work instructions					Last 3 years: increase in automatic storage of information about my op- erations					Last 3 years: increase in working with robots				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	3.0	1.3	0	4	5,789	1.3	1.4	0	4	5,476	1.7	1.6	0	4	5,596	1.0	1.5	0	4	5,280
<b>Education</b>																				
Low education	2.6	1.4	0	4	539	1.4	1.5	0	4	521	1.7	1.6	0	4	524	1.4	1.6	0	4	514
Medium education	3.0	1.2	0	4	2,701	1.4	1.5	0	4	2,563	1.9	1.6	0	4	2,624	1.0	1.5	0	4	2,457
High education	3.0	1.2	0	4	2,327	1.2	1.4	0	4	2,187	1.5	1.5	0	4	2,236	1.0	1.5	0	4	2,106
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	3.2	1.1	0	4	1,789	1.3	1.5	0	4	1,702	1.7	1.6	0	4	1,746	1.2	1.6	0	4	1,650
No supervisory responsibilities	2.9	1.3	0	4	3,989	1.3	1.4	0	4	3,764	1.7	1.6	0	4	3,840	1.0	1.5	0	4	3,620
<b>Autonomy</b>																				
No autonomy	2.7	1.4	0	4	389	1.4	1.5	0	4	379	2.1	1.6	0	4	382	1.2	1.6	0	4	371
Little autonomy	2.9	1.3	0	4	823	1.4	1.5	0	4	781	1.9	1.6	0	4	796	1.0	1.5	0	4	754
Slightly below-average autonomy	2.9	1.2	0	4	1,148	1.3	1.4	0	4	1,075	1.7	1.6	0	4	1,106	1.0	1.4	0	4	1,021
Slightly above-average autonomy	3.0	1.2	0	4	2,521	1.3	1.4	0	4	2,390	1.6	1.5	0	4	2,431	1.0	1.5	0	4	2,303
High autonomy	3.0	1.3	0	4	891	1.1	1.4	0	4	834	1.4	1.6	0	4	864	1.1	1.5	0	4	815

Source: LEEP-B3, own calculations.

Table A28: Perceptions about the past and future digitalization of own workspace: Use (Distribution)

	Last 3 years: elimination of jobs					Last 3 years: restructuring of work					Last 3 years: professional expertise less important					Last 3 years: additional qualifications required				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.4	0	1	5,798	0.4	0.5	0	1	5,798	0.1	0.3	0	1	5,796	0.5	0.5	0	1	5,802
<b>Occupational groups</b>																				
Manufacturing	0.2	0.4	0	1	971	0.4	0.5	0	1	977	0.1	0.3	0	1	973	0.5	0.5	0	1	975
Administrative services	0.2	0.4	0	1	3,500	0.4	0.5	0	1	3,496	0.1	0.3	0	1	3,500	0.5	0.5	0	1	3,499
Social services	0.1	0.3	0	1	756	0.4	0.5	0	1	753	0.1	0.2	0	1	755	0.5	0.5	0	1	757
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	0.2	0.4	0	1	1,543	0.4	0.5	0	1	1,546	0.1	0.3	0	1	1,539	0.5	0.5	0	1	1,542
Trade, hospitality industry and transportation	0.2	0.4	0	1	352	0.4	0.5	0	1	353	0.1	0.3	0	1	354	0.5	0.5	0	1	354
Financial and insurance activities, economical services	0.2	0.4	0	1	2,274	0.4	0.5	0	1	2,269	0.1	0.3	0	1	2,277	0.5	0.5	0	1	2,275
Social, private and public services	0.1	0.3	0	1	1,039	0.3	0.5	0	1	1,039	0.1	0.2	0	1	1,039	0.5	0.5	0	1	1,041
<b>Public vs. private sector</b>																				
Public service	0.1	0.3	0	1	1,689	0.3	0.5	0	1	1,691	0.1	0.2	0	1	1,692	0.5	0.5	0	1	1,692
Private sector	0.2	0.4	0	1	1,180	0.4	0.5	0	1	1,184	0.1	0.3	0	1	1,181	0.5	0.5	0	1	1,182
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	0.1	0.3	0	1	1,543	0.4	0.5	0	1	1,546	0.1	0.3	0	1	1,544	0.5	0.5	0	1	1,544
Somewhat likely	0.2	0.4	0	1	304	0.4	0.5	0	1	306	0.1	0.3	0	1	304	0.6	0.5	0	1	306
Likely	0.2	0.4	0	1	95	0.4	0.5	0	1	95	0.2	0.4	0	1	95	0.5	0.5	0	1	95
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	0.2	0.4	0	1	91	0.4	0.5	0	1	91	0.2	0.4	0	1	91	0.5	0.5	0	1	91
The same	0.2	0.4	0	1	604	0.4	0.5	0	1	605	0.1	0.3	0	1	601	0.5	0.5	0	1	603
Better	0.2	0.4	0	1	362	0.4	0.5	0	1	363	0.1	0.3	0	1	363	0.4	0.5	0	1	362
<b>Comparison with main competitor: Job security</b>																				
Worse	0.4	0.5	0	1	100	0.4	0.5	0	1	100	0.2	0.4	0	1	100	0.7	0.5	0	1	100
The same	0.2	0.4	0	1	396	0.4	0.5	0	1	398	0.1	0.3	0	1	397	0.5	0.5	0	1	398
Better	0.1	0.3	0	1	622	0.4	0.5	0	1	623	0.1	0.3	0	1	621	0.5	0.5	0	1	621
<b>Comparison with main competitor: Profit</b>																				
Worse	0.2	0.4	0	1	153	0.4	0.5	0	1	153	0.1	0.4	0	1	154	0.4	0.5	0	1	154
The same	0.2	0.4	0	1	482	0.4	0.5	0	1	482	0.1	0.3	0	1	480	0.5	0.5	0	1	481
Better	0.2	0.4	0	1	327	0.4	0.5	0	1	327	0.1	0.3	0	1	326	0.5	0.5	0	1	325

Source: LEEP-B3, own calculations.

Table A29: Perceptions about the past and future digitalization of own workspace: Use (Distribution)

	Next 3 years: elimination of jobs					Next 3 years: restructuring of work					Next 3 years: professional expertise less important					Next 3 years: additional qualifications required				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.4	0	1	5,694	0.4	0.5	0	1	5,640	0.1	0.3	0	1	5,728	0.6	0.5	0	1	5,662
<b>Occupational groups</b>																				
Manufacturing	0.3	0.4	0	1	953	0.4	0.5	0	1	942	0.1	0.4	0	1	955	0.6	0.5	0	1	950
Administrative services	0.2	0.4	0	1	3,436	0.4	0.5	0	1	3,409	0.1	0.3	0	1	3,461	0.6	0.5	0	1	3,428
Social services	0.1	0.3	0	1	749	0.4	0.5	0	1	737	0.1	0.3	0	1	756	0.6	0.5	0	1	741
<b>Economic sectors</b>																				
Manufacturing industries, energy, water supply	0.3	0.4	0	1	1,516	0.4	0.5	0	1	1,490	0.1	0.3	0	1	1,518	0.6	0.5	0	1	1,500
Trade, hospitality industry and transportation	0.2	0.4	0	1	351	0.4	0.5	0	1	348	0.1	0.3	0	1	351	0.6	0.5	0	1	349
Financial and insurance activities, economical services	0.2	0.4	0	1	2,228	0.4	0.5	0	1	2,218	0.1	0.3	0	1	2,249	0.7	0.5	0	1	2,236
Social, private and public services	0.1	0.3	0	1	1,025	0.3	0.5	0	1	1,014	0.1	0.3	0	1	1,035	0.5	0.5	0	1	1,016
<b>Public vs. private sector</b>																				
Public service	0.1	0.4	0	1	1,668	0.4	0.5	0	1	1,657	0.1	0.3	0	1	1,678	0.6	0.5	0	1	1,661
Private sector	0.3	0.4	0	1	1,157	0.5	0.5	0	1	1,141	0.1	0.3	0	1	1,162	0.6	0.5	0	1	1,151
<b>Pressure from competition: organization's future is in danger</b>																				
Unlikely	0.2	0.4	0	1	1,515	0.4	0.5	0	1	1,505	0.1	0.3	0	1	1,526	0.6	0.5	0	1	1,514
Somewhat likely	0.2	0.4	0	1	302	0.3	0.5	0	1	291	0.1	0.3	0	1	301	0.6	0.5	0	1	294
Likely	0.2	0.4	0	1	92	0.4	0.5	0	1	93	0.1	0.3	0	1	94	0.6	0.5	0	1	91
<b>Comparison with main competitor: Labor productivity</b>																				
Worse	0.3	0.5	0	1	89	0.5	0.5	0	1	86	0.1	0.4	0	1	89	0.6	0.5	0	1	88
The same	0.3	0.4	0	1	594	0.5	0.5	0	1	590	0.1	0.3	0	1	597	0.7	0.5	0	1	590
Better	0.3	0.4	0	1	352	0.5	0.5	0	1	345	0.1	0.4	0	1	355	0.5	0.5	0	1	352
<b>Comparison with main competitor: Job security</b>																				
Worse	0.5	0.5	0	1	97	0.6	0.5	0	1	97	0.1	0.3	0	1	99	0.8	0.4	0	1	96
The same	0.3	0.4	0	1	394	0.4	0.5	0	1	388	0.1	0.3	0	1	393	0.6	0.5	0	1	388
Better	0.2	0.4	0	1	607	0.5	0.5	0	1	597	0.1	0.4	0	1	610	0.6	0.5	0	1	606
<b>Comparison with main competitor: Profit</b>																				
Worse	0.3	0.4	0	1	149	0.5	0.5	0	1	150	0.1	0.3	0	1	151	0.5	0.5	0	1	150
The same	0.2	0.4	0	1	472	0.4	0.5	0	1	462	0.1	0.3	0	1	474	0.6	0.5	0	1	471
Better	0.3	0.5	0	1	318	0.6	0.5	0	1	316	0.1	0.4	0	1	320	0.6	0.5	0	1	316

Source: LEEP-B3, own calculations.

Table A30: Perceptions about the past and future digitalization of own workspace (Inequality)

	Last 3 years: elimination of jobs in course of digitalization					Last 3 years: restructuring of work in course of digitalization					Last 3 years: professional expertise less important in course of digitalization					Last 3 years: additional qualifications required in course of digitalization				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.4	0	1	5,798	0.4	0.5	0	1	5,798	0.1	0.3	0	1	5,796	0.5	0.5	0	1	5,802
<b>Education</b>																				
Low education	0.2	0.4	0	1	539	0.4	0.5	0	1	540	0.1	0.3	0	1	536	0.4	0.5	0	1	538
Medium education	0.2	0.4	0	1	2,709	0.4	0.5	0	1	2,712	0.1	0.3	0	1	2,713	0.5	0.5	0	1	2,715
High education	0.1	0.3	0	1	2,327	0.3	0.5	0	1	2,324	0.1	0.2	0	1	2,325	0.5	0.5	0	1	2,326
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	0.2	0.4	0	1	1,793	0.4	0.5	0	1	1,792	0.1	0.2	0	1	1,792	0.6	0.5	0	1	1,795
No supervisory responsibilities	0.1	0.4	0	1	3,994	0.4	0.5	0	1	3,995	0.1	0.3	0	1	3,995	0.5	0.5	0	1	3,996
<b>Autonomy</b>																				
No autonomy	0.2	0.4	0	1	394	0.5	0.5	0	1	394	0.2	0.4	0	1	392	0.5	0.5	0	1	393
Little autonomy	0.2	0.4	0	1	827	0.4	0.5	0	1	823	0.1	0.3	0	1	823	0.5	0.5	0	1	827
Slightly below-average autonomy	0.2	0.4	0	1	1,150	0.4	0.5	0	1	1,150	0.1	0.3	0	1	1,148	0.5	0.5	0	1	1,148
Slightly above-average autonomy	0.1	0.3	0	1	2,519	0.4	0.5	0	1	2,521	0.1	0.2	0	1	2,523	0.5	0.5	0	1	2,524
High autonomy	0.1	0.3	0	1	891	0.3	0.5	0	1	892	0.0	0.2	0	1	892	0.5	0.5	0	1	892

Source: LEEP-B3, own calculations.



Table A31: Perceptions about the past and future digitalization of own workspace (Inequality)

	Next 3 years: elimination of jobs in course of digitalization					Next 3 years: restructuring of work in course of digitalization					Next 3 years: professional expertise less important in course of digitalization					Next 3 years: additional qualifications required in course of digitalization				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	0.2	0.4	0	1	5,694	0.4	0.5	0	1	5,640	0.1	0.3	0	1	5,728	0.6	0.5	0	1	5,662
<b>Education</b>																				
Low education	0.2	0.4	0	1	526	0.4	0.5	0	1	517	0.2	0.4	0	1	530	0.5	0.5	0	1	527
Medium education	0.2	0.4	0	1	2,650	0.4	0.5	0	1	2,628	0.1	0.3	0	1	2,676	0.6	0.5	0	1	2,635
High education	0.2	0.4	0	1	2,296	0.4	0.5	0	1	2,277	0.1	0.3	0	1	2,301	0.6	0.5	0	1	2,280
<b>Supervisory responsibilities</b>																				
Supervisory responsibilities	0.2	0.4	0	1	1,776	0.4	0.5	0	1	1,760	0.1	0.3	0	1	1,776	0.7	0.5	0	1	1,756
No supervisory responsibilities	0.2	0.4	0	1	3,907	0.4	0.5	0	1	3,870	0.1	0.3	0	1	3,942	0.6	0.5	0	1	3,895
<b>Autonomy</b>																				
No autonomy	0.3	0.4	0	1	380	0.5	0.5	0	1	377	0.2	0.4	0	1	383	0.5	0.5	0	1	381
Little autonomy	0.3	0.4	0	1	813	0.5	0.5	0	1	802	0.2	0.4	0	1	811	0.6	0.5	0	1	801
Slightly below-average autonomy	0.2	0.4	0	1	1,123	0.4	0.5	0	1	1,117	0.1	0.3	0	1	1,127	0.6	0.5	0	1	1,124
Slightly above-average autonomy	0.2	0.4	0	1	2,482	0.4	0.5	0	1	2,452	0.1	0.3	0	1	2,500	0.6	0.5	0	1	2,465
High autonomy	0.2	0.4	0	1	879	0.4	0.5	0	1	877	0.1	0.2	0	1	890	0.6	0.5	0	1	874

Source: LEEP-B3, own calculations.

## B. Tables Employers

**Table B1: Indices Employers (Distribution)**

	Digitalization of work organizations					Use of crowdsourcing				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	52.8	18.6	8.3	86.7	2,617	25.5	20.9	0	100	3,044
<b>Economic sectors</b>										
Manufacturing industries, energy, water supply	47.1	19.9	21.7	83.3	460	27.6	21	0	100	538
Trade, hospitality industry, transportation	53.3	13.4	33.3	86.7	225	21.5	28.4	0	75	225
Financial and insurance activities, economic services	59.6	16.3	23.3	86.7	1,122	29.3	18.2	0	62.5	1,299
Social, private and public services	45.7	18.9	8.3	73.3	690	19.3	20.8	0	75	842
<b>Public vs. private sector</b>										
Public service	53.6	18.0	8.3	86.7	1,461	23.7	19.8	0	62.5	1,803
Private sector	51.7	19.3	21.7	83.3	1,156	28.0	22.2	0	100	1,241
<b>Pressure from competition: organization's future is in danger</b>										
Unlikely	53.8	19.6	8.3	83.3	1,501	26.4	22.9	0	100	1,630
Somewhat likely	49.8	17.2	23.3	73.3	265	16.4	19.6	0	50	324
Likely	44.3	12.7	23.3	56.7	105	32.1	14.8	25	62.5	105
<b>Comparison with main competitor: Labor productivity</b>										
Worse	44.3	17.2	23.3	65	92	45.4	19.8	12.5	62.5	92
The same	56.4	17.4	23.3	80	637	26.8	20.2	0	62.5	637
Better	50.4	20.1	21.7	83.3	338	27.1	26.3	0	100	384
<b>Comparison with main competitor: Job security</b>										
Worse	48.8	28.3	23.3	80	107	36.6	13.7	25	62.5	107
The same	56.9	18.8	23.3	80	407	30.6	23.6	0	100	417
Better	50.0	16.7	21.7	83.3	616	24.5	22.7	0	75	652
<b>Comparison with main competitor: Profit</b>										
Worse	55.9	22.9	23.3	80	150	27.9	25.7	0	100	160
The same	54.9	18.4	21.7	83.3	458	28.6	21.9	0	62.5	494
Better	53.6	19.4	23.3	80	348	24.1	21.0	0	75	348

Source: LEEP-B3, own calculations.

**Table B2: Correlations of items used for indices "Digitalization of work organizations" and "Use of crowdsourcing"**

	1	2	3	4
(1) Expert for digitalization	1			
(2) Increase in the importance of digital literacy for posting of jobs and recruitment over the last 5 years	-0.002	1		
(3) Employees trained to meet new challenges and possibilities due to digitalization	-0.034	-0.109*	1	
(4) Use of internal crowdsourcing	0.121*	0.093*	0.044*	1
(5) Use of external crowdsourcing	0.070*	0.109*	0.053*	0.214*

Source: LEEP-B3, own calculations.

**Table B3: Expert for digitalization (Distribution)**

	Expert for digitalization				
	Mean	SD	Min	Max	Obs
<b>In total</b>	0.7	0.5	0	1	3,044
<b>Economic sectors</b>					
Manufacturing industries, energy, water supply	0.5	0.5	0	1	538
Trade, hospitality industry and transportation	0.7	0.5	0	1	225
Financial and insurance activities, economical services	0.8	0.4	0	1	1,299
Social, private and public services	0.7	0.5	0	1	842
<b>Public vs. private sector</b>					
Public service	0.8	0.4	0	1	1,803
Private sector	0.6	0.5	0	1	1,241
<b>Pressure from competition: organization's future is in danger</b>					
Unlikely	0.7	0.5	0	1	1,630
Somewhat likely	0.8	0.4	0	1	324
Likely	0.4	0.5	0	1	105
<b>Comparison with main competitor: Labor productivity</b>					
Worse	0.4	0.5	0	1	92
The same	0.7	0.5	0	1	637
Better	0.6	0.5	0	1	384
<b>Comparison with main competitor: Job security</b>					
Worse	0.4	0.5	0	1	107
The same	0.9	0.4	0	1	417
Better	0.5	0.5	0	1	652
<b>Comparison with main competitor: Profit</b>					
Worse	0.7	0.4	0	1	160
The same	0.5	0.5	0	1	494
Better	0.6	0.5	0	1	348

Source: LEEP-B3, own calculations.

**Table B4: Increase in the importance of digital literacy for posting of jobs and recruitment over the last 5 years (Distribution)**

	Increase in the importance of digital literacy for posting of jobs and recruitment over the last 5 years				
	Mean	SD	Min	Max	Obs
<b>In total</b>	2.6	1.0	0	4	3,044
<b>Economic sectors</b>					
Manufacturing industries, energy, water supply	2.7	1.0	0	4	538
Trade, hospitality industry and transportation	2.3	1.3	0	4	225
Financial and insurance activities, economical services	2.9	0.9	0	4	1,299
Social, private and public services	2.3	0.9	1	4	842
<b>Public vs. private sector</b>					
Public service	2.6	1.0	0	4	1,803
Private sector	2.7	1.0	0	4	1,241
<b>Pressure from competition: organization's future is in danger</b>					
Unlikely	2.4	1.1	0	4	1,630
Somewhat likely	2.5	0.7	1	4	324
Likely	2.7	1.0	2	4	105
<b>Comparison with main competitor: Labor productivity</b>					
Worse	2.8	0.4	2	3	92
The same	2.9	1.0	1	4	637
Better	2.3	0.9	1	4	384
<b>Comparison with main competitor: Job security</b>					
Worse	2.9	1.0	2	4	107
The same	2.5	1.0	1	4	417
Better	2.7	0.9	0	4	652
<b>Comparison with main competitor: Profit</b>					
Worse	3.2	0.9	1	4	160
The same	2.8	0.7	1	4	494
Better	2.7	1.0	1	4	348

Source: LEEP-B3, own calculations.

Table B5: Employees trained to meet new challenges and possibilities due to digitalization (Distribution)

	Employees trained to meet new challenges and possibilities due to digitalization				
	Mean	SD	Min	Max	Obs
<b>In total</b>	1.6	1.0	0	5	2,617
<b>Economic sectors</b>					
Manufacturing industries, energy, water supply	1.3	0.8	0	5	460
Trade, hospitality industry and transportation	2.0	1.4	1	5	225
Financial and insurance activities, economical services	1.8	1.1	0	5	1,122
Social, private and public services	1.3	0.8	0	4	690
<b>Public vs. private sector</b>					
Public service	1.6	1.1	0	5	1,461
Private sector	1.5	1.0	0	5	1,156
<b>Pressure from competition: organization's future is in danger</b>					
Unlikely	1.8	1.2	0	5	1,501
Somewhat likely	1.0	0.3	0	4	265
Likely	1.0	0.0	1	1	105
<b>Comparison with main competitor: Labor productivity</b>					
Worse	1.3	0.7	1	3	92
The same	1.7	0.9	1	4	637
Better	1.6	1.1	0	5	338
<b>Comparison with main competitor: Job security</b>					
Worse	1.4	0.5	1	2	107
The same	1.4	0.6	1	4	407
Better	1.8	1.2	0	5	616
<b>Comparison with main competitor: Profit</b>					
Worse	1.3	0.5	1	2	150
The same	1.8	1.2	1	5	458
Better	1.8	0.9	1	4	348

Source: LEEP-B3, own calculations.

Table B6: Use of crowdsourcing (Distribution)

	Use of internal crowdsourcing					Use of external crowdsourcing				
	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs
<b>In total</b>	1.5	1.3	0	4	3,044	0.5	0.8	0	4	3,044
<b>Economic sectors</b>										
Manufacturing industries, energy, water supply	1.5	1.3	0	4	538	0.7	0.8	0	4	538
Trade, hospitality industry and transportation	1.1	1.5	0	4	225	0.6	0.9	0	3	225
Financial and insurance activities, economical services	1.8	1.2	0	4	1,299	0.5	0.8	0	3	1,299
Social, private and public services	1.1	1.4	0	4	842	0.5	0.7	0	2	842
<b>Public vs. private sector</b>										
Public service	1.4	1.4	0	4	1,803	0.5	0.7	0	3	1,803
Private sector	1.6	1.3	0	4	1,241	0.7	0.8	0	4	1,241
<b>Pressure from competition: organization's future is in danger</b>										
Unlikely	1.6	1.4	0	4	1,630	0.5	0.8	0	4	1,630
Somewhat likely	0.9	1.0	0	3	324	0.4	0.7	0	2	324
Likely	1.4	0.8	1	3	105	1.2	0.4	1	2	105
<b>Comparison with main competitor: Labor productivity</b>										
Worse	1.9	1.2	0	3	92	1.8	0.4	1	2	92
The same	1.5	1.1	0	3	637	0.7	0.7	0	2	637
Better	1.6	1.7	0	4	384	0.6	0.9	0	4	384
<b>Comparison with main competitor: Job security</b>										
Worse	2.6	0.5	2	3	107	0.4	0.8	0	2	107
The same	1.7	1.2	0	4	417	0.8	0.9	0	4	417
Better	1.3	1.4	0	4	652	0.7	0.7	0	2	652
<b>Comparison with main competitor: Profit</b>										
Worse	1.1	1.2	0	4	160	1.1	0.9	0	4	160
The same	1.7	1.4	0	4	494	0.5	0.8	0	2	494
Better	1.3	1.3	0	4	348	0.6	0.7	0	2	348

Source: LEEP-B3, own calculations.

## C. Questionnaires

### C-1 Employee Questionnaire English

Note: Translated Questionnaire

<b>D100: Now, here are a few questions about your everyday work. How often do you use the following information and communication technology?</b>		Several times per day	Daily	Weekly	Rarely	Never
<b>D100A:</b>	How often do you communicate/interact face to face with your supervisor about your work?	1	2	3	4	5
<b>D100B:</b>	How often do you communicate with your supervisor about your work via phone?	1	2	3	4	5
<b>D100C:</b>	How often do you communicate with your supervisor about your work via e-mail?	1	2	3	4	5
<b>D100D:</b>	How often do you communicate with your supervisor about your work via digital communication platforms or apps?	1	2	3	4	5
<b>D100E:</b>	How often do you communicate face to face with your colleagues about your work?	1	2	3	4	5
<b>D100F:</b>	How often do you communicate about your work with colleagues via phone?	1	2	3	4	5
<b>D100G:</b>	How often do you communicate about your work with colleagues via e-mail?	1	2	3	4	5
<b>D100H:</b>	How often do you communicate about your work with colleagues via digital communication platforms or apps?	1	2	3	4	5
<b>D100I:</b>	How often do you use digital information or data for your work that you retrieve, e.g. by in-house or external information systems?	1	2	3	4	5
<b>D100J:</b>	How often do you use digital information or data for your work that have been stored automatically during the process, e.g. by machines, computer programs or apps?	1	2	3	4	5

**D101:** We proceed with questions about information and communication technology. Please answer according to a scale from 1 to 5 to what extent each of the following statements apply to you. 1 means that the statement “applies completely” and 5 means that it “does not apply at all”. Choose the numbers in between to rate your statement.

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D101A:</b>	The use of digital information and communication technology has increased over the last three years.					

*Filter: Ask D102A to D102E only, if D100C, D100D, D100G, D100H, D100I, D100J are at least once no 4 or 5 (=never).*

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D102A:</b>	By using digital information and communication technology, I am more flexible in terms of work place and time.					
<b>D102B:</b>	The use of digital information and communication technology makes communication more efficient.					
<b>D102C:</b>	By using digital information and communication technology, I have to be constantly available.					
<b>D102D:</b>	The use of digital information and communication technology will replace personal interaction.					
<b>D102E:</b>	When using digital information and communication technology, I feel overwhelmed by the amount of information and communication.					

**D200:** And how often do you deal with the following activities in your everyday work?

		Several times per day	Daily	Weekly	Rarely	Never
<b>D200A:</b>	How often do you control or program machines or implements digitally, e.g. via computer or input displays?	1	2	3	4	5
<b>D200B:</b>	How often do you have to intervene digitally in the automated work processes of machines or implements in case of disturbances?	1	2	3	4	5
<b>D200C:</b>	How often do you get work instructions that are not personal but automatic, e.g. from machines, computer programs, or apps?	1	2	3	4	5



**D201:** We proceed with questions about automatically created work instructions. Please answer according to a scale from 1 to 5, to what extent each of the following statements apply to you. 1 means that the statement “applies completely” and 5 means that it “does not apply at all”. Choose the numbers in between to rate your statement.

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D201A:</b>	Work instructions that are not created by people, but by machines, computer programs or apps have increased in the last 3 years.					

*Filter: Ask D202A to D202F only, if D200C is unequal 4 or 5.*

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D202A:</b>	Automatically generated work instructions give me less control over my own work.					
<b>D202B:</b>	Automatically generated work instructions give me less autonomy at my job.					
<b>D202C:</b>	By automatically created work instructions, personal contact is neglected.					
<b>D202D:</b>	Automatically created work instructions make work distribution fairer.					
<b>D202E:</b>	Automatically created work instructions make the work distribution more efficient.					
<b>D202F:</b>	Automatically created work instructions make it more difficult to respond to private commitments at short notice.					

**D300:** Now there are following a few questions about the automatic storage of information or data about your work steps. Please answer according to a scale from 1 to 5, to what extent each of the following statements applies to you. 1 means that the statement “applies completely” and 5 means that it “does not apply at all”. Choose the numbers in between to rate your statement.

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D300A:</b>	Information or data about my operations are automatically stored e.g. via an app, machines or a computer program.					
<b>D301A:</b>	The automatic storage of information or data about my work steps has increased within the last 3 years.					

*Filter: Ask D302A to D302D only, if D300A is unequal 4 or 5.*

		Applies completely			Does not apply at all	
		1	2	3	4	5
<b>D302A:</b>	The automatically stored information or data about my work are used for my performance evaluation.					
<b>D302B:</b>	Through automatically stored information or data about my work, I can make my work even more efficient.					

<b>D302C:</b>	Through automatically stored information or data about my work, I am constantly monitored.	1	2	3	4	5
<b>D302D:</b>	Through automatically stored information or data about my work, my privacy is not protected.	1	2	3	4	5

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**D400:** The following questions are about working with robots.

		Several times per day	Daily	Weekly	Rarely	Never
<b>D400A:</b>	How often does your work involve handling stationary robots?	1	2	3	4	5
<b>D400B:</b>	How often does your work involve dealing with autonomous mobile robots?	1	2	3	4	5

---

**D401:** We will continue with the work with robots. Please answer according to a scale from 1 to 5, to what extent each of the following statements apply to you. 1 means that the statement “applies completely” and 5 means that it “does not apply at all”. Choose the numbers in between to rate your statement.

		Applies completely			Does not apply at all
<b>D401A:</b>	Working with robots has increased over the last 3 years.	1	2	3	4 5

*Filter: Ask D402A to D402E only, if at least once D400A or D400B are not 4 or 5 (=never).*

		Applies completely			Does not apply at all
<b>D402A:</b>	Working with robots relieves my workload.	1	2	3	4 5
<b>D402B:</b>	By working with robots, I have less autonomy at my job.	1	2	3	4 5
<b>D402C:</b>	By working with robots, I have less control over my job.	1	2	3	4 5
<b>D402D:</b>	Working with robots means I have to complete further qualifications/ qualify further.	1	2	3	4 5
<b>D402E:</b>	My job is threatened in the future because robots are taking over or will take over my work.	1	2	3	4 5

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<b>D500:</b>	<b>Thus far, we asked about changes in the workplace, which are often referred to as digitalization. Do you agree with the following statements about digitalization in your workplace or not?</b>		
		<b>Yes</b>	<b>No</b>
<b>D500A:</b>	In the last three years, jobs in my field of work have been eliminated in course of digitalization.	1	2
<b>D500B:</b>	Over the next three years, jobs in my field of work will disappear in course of digitalization.	1	2
<b>D501A:</b>	In the last three years, my work has been restructured in course of digitalization.	1	2
<b>D501B:</b>	Over the next three years, my work will be restructured in course of digitalization.	1	2
<b>D502A:</b>	In the last three years, my professional expertise has become less important in course of digitalization.	1	2
<b>D502B:</b>	Over the next three years, my professional expertise will become less important in course of digitalization.	1	2
<b>D503A:</b>	In the last three years, additional qualifications were required because of changes in my work in course of digitalization.	1	2
<b>D503B:</b>	Over the next three years, additional qualifications will be required because of changes in my work in course of digitalization.	1	2

## C-2 Employer Questionnaire English

Note: Translated Questionnaire

**Q30:** The next two statements are about outsourcing tasks to a number of people via the internet or an internet platform. This includes external outsourcing as well as the intern work organization.

		To a large extent				Not at all
Q30A	To what extent are corporate tasks outsourced <u>externally</u> by assigning jobs to a number of people via the internet or an internet platform?	1	2	3	4	5
Q30B	To what extent are corporate tasks assigned cross-functional and inter-divisional via an <u>internal</u> platform?	1	2	3	4	5

**Note:** Meant here is "Crowdsourcing". Confirm this if interviewee asks about it

**Q31:** To what extent did the importance of digital literacy increase for the posting of jobs and recruitment over the last 5 years?

To a large extent					Not at all
1	2	3	4	5	

**Q32:** How many new jobs were created in your establishment in the fiscal year 2017?

	Number or Proportion
a) How many of those jobs were created in order to meet new challenges and possibilities due to digitalization?	
b) How many of those were qualified jobs requiring a university or college degree ("Universität"/"Fachhochschule")?	
c) How many of those were qualified jobs requiring completed vocational training?	
d) How many of those were jobs requiring neither a degree nor a completed training?	

**Q21:** What percentage of employees participated in internal or external advanced training activities during the second half of 2017?

**Percentage:** percent

**Q35:** To what extent did you train your employees in order to meet new challenges and possibilities due to digitalization? Please state how many percent of your employees have been trained.

None	1 percent-20 percent	21 percent-40 percent	41 percent-60 percent	61 percent-80 percent	81 percent-100 percent
1	2	3	4	5	6

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**Q33:** Does your establishment/ your department employ an expert specifically for digitalization?  
One person  
A team/ a department  
None

**Note:** Multiple answers are possible!

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**Q34A:** How many jobs were cut in this establishment in the fiscal year 2017?

**Number:**

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**Q34B:**

**Number or Pro-  
portion**

- a) How many of those jobs were cut due to automation and digitalization of activities?
- b) How many of those were qualified jobs requiring a university or college degree ("Universität"/"Fachhochschule")?
- c) How many of those were qualified jobs requiring completed vocational training?
- d) How many of those were mundane jobs requiring neither a degree nor a completed training?

## C-3 Employee Questionnaire German

Note: Original Questionnaire

**D100:** Nun folgen einige Fragen zu Ihrem Arbeitsalltag. Wie häufig nutzen Sie folgende Kommunikations- und Informationstechnologien?

		Mehr mals Tägli ch	Tägli ch	Wöc hent- lich	Sel- tener	Nie
<b>D100A:</b>	Wie häufig tauschen Sie sich von Angesicht zu Angesicht mit <u>Ihrem Vorgesetzten</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100B:</b>	Wie häufig tauschen Sie sich per Telefon mit <u>Ihrem Vorgesetzten</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100C:</b>	Wie häufig tauschen Sie sich per E-Mail mit <u>Ihrem Vorgesetzten</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100D:</b>	Wie häufig tauschen Sie sich über digitale Kommunikations-Plattformen bzw. Apps mit <u>Ihrem Vorgesetzten</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100E:</b>	Wie häufig tauschen Sie sich von Angesicht zu Angesicht mit <u>Ihren Kollegen</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100F:</b>	Wie häufig tauschen Sie sich per Telefon mit <u>Ihren Kollegen</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100G:</b>	Wie häufig tauschen Sie sich per E-Mail mit <u>Ihren Kollegen</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100H:</b>	Wie häufig tauschen Sie sich über digitale Kommunikations-Plattformen bzw. Apps mit <u>Ihren Kollegen</u> über Ihre Arbeit aus?	1	2	3	4	5
<b>D100I:</b>	Wie häufig verwenden Sie für Ihre Arbeit digitale Informationen oder Daten, die Sie z.B. über betriebsinterne oder -externe Informationssysteme abrufen?	1	2	3	4	5
<b>D100J:</b>	Wie häufig verwenden Sie für Ihre Arbeit digitale Informationen oder Daten, die automatisch prozessbegleitend erstellt wurden z.B. durch Maschinen, Computerprogramme oder Apps?	1	2	3	4	5

**D101:** Es geht weiter um Kommunikations- und Informationstechnologien. Bitte nennen Sie mir auf einer Skala von 1 bis 5, wie sehr die folgenden Aussagen zutreffen. Die 1 bedeutet dabei, dass die Aussage "voll und ganz zutrifft", die 5 bedeutet, dass die Aussage "überhaupt nicht zutrifft". Mit den Werten dazwischen können Sie Ihre Einschätzung abstimmen.

		Trifft vollund ganz z			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D101A:</b>	Die Verwendung von digitalen Kommunikations- und Informationstechnologien hat in den letzten 3 Jahren zugenommen.					

*Filter: D102A bis D102E nur dann stellen, wenn von D100C, D100D, D100G, D100H, D100I, D100J mindestens einmal keine 4 oder 5 (=nie).*

		Trifft vollund ganz z			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D102A:</b>	Durch die Verwendung von digitalen Kommunikations- und Informationstechnologien bin ich flexibler was Arbeitsort und -zeit betrifft.					
<b>D102B:</b>	Durch die Verwendung von digitalen Kommunikations- und Informationstechnologien ist die Kommunikation effizienter.					
<b>D102C:</b>	Durch die Verwendung von digitalen Kommunikations- und Informationstechnologien muss ich ständig in Bereitschaft sein.					
<b>D102D:</b>	Durch die Verwendung von digitalen Kommunikations- und Informationstechnologien wird der persönliche Kontakt ersetzt.					
<b>D102E:</b>	Durch die Verwendung von digitalen Kommunikations- und Informationstechnologien fühle ich mich durch die Masse an Kommunikation und Informationen überfordert.					

**D200:** Und wie häufig haben Sie in Ihrem Arbeitsalltag mit folgenden Tätigkeiten zu tun?

		Mehr mals Täg- lich	Tägli- ch	Wö- chent- lich	Sel- tener	Nie
		1	2	3	4	5
<b>D200A:</b>	Wie häufig steuern oder programmieren Sie Maschinen oder Arbeitsgeräte digital z.B. über Computer oder Eingabedispays?					
<b>D200B:</b>	Wie häufig müssen Sie digital in automatische Arbeitsabläufe von Maschinen oder Arbeitsgeräten eingreifen, wenn Störungen auftreten?					
<b>D200C:</b>	Wie häufig bekommen Sie Arbeitsanweisungen, die nicht von Personen sondern automatisch z.B. von Maschinen, Computerprogrammen, oder Apps erstellt werden?					

**D201:** Es geht weiter um automatisch erstellte Arbeitsanweisungen. Bitte nennen Sie mir auf einer Skala von 1 bis 5, wie sehr die folgenden Aussagen zutreffen. Die 1 bedeutet dabei, dass die Aussage "voll und ganz zutrifft", die 5 bedeutet, dass die Aussage "überhaupt nicht zutrifft".

		Trifft voll und ganz zu			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D201A:</b>	Arbeitsanweisungen, die nicht von Personen sondern automatisch z.B. von Maschinen, Computerprogrammen, oder Apps erstellt werden, haben in den letzten 3 Jahren zugenommen.					

*Filter: D202A bis D202F nur dann stellen, D200C nicht gleich 4 oder 5.*

		Trifft voll und ganz zu			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D202A:</b>	Durch automatisch erstellte Arbeitsanweisungen habe ich selbst weniger die Kontrolle über meine Arbeit.					
<b>D202B:</b>	Durch automatisch erstellte Arbeitsanweisungen habe ich weniger Gestaltungsmöglichkeiten bei der Arbeit.					
<b>D202C:</b>	Durch automatisch erstellte Arbeitsanweisungen kommt der persönliche Kontakt zu kurz.					
<b>D202D:</b>	Durch automatisch erstellte Arbeitsanweisungen ist die Arbeitsverteilung gerechter.					
<b>D202E:</b>	Durch automatisch erstellte Arbeitsanweisungen ist die Arbeitsverteilung effizienter.					
<b>D202F:</b>	Durch automatisch erstellte Arbeitsanweisungen ist es schwieriger, kurzfristig auf private Verpflichtungen zu reagieren.					



**D300:** Nun geht es um die automatische Speicherung von Informationen oder Daten über Ihre Arbeitsschritte. Bitte nennen Sie mir auf einer Skala von 1 bis 5, wie sehr die folgenden Aussagen zutreffen. Die 1 bedeutet dabei, dass die Aussage "voll und ganz zutrifft", die 5 bedeutet, dass die Aussage "überhaupt nicht zutrifft".

		Trifft voll und ganz zu			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D300A:</b>	Informationen oder Daten über meine Arbeitsschritte werden automatisch gespeichert z.B. über eine App, Maschinen oder ein Computerprogramm	1	2	3	4	5
<b>D301A:</b>	Die automatische Speicherung von Informationen oder Daten über meine Arbeitsschritte hat in den letzten 3 Jahren zugenommen.	1	2	3	4	5

*Filter: D302A bis D302D nur dann stellen, wenn D300A nicht gleich 4 oder 5.*

		Trifft voll und ganz zu			Trifft überhaupt nicht zu	
		1	2	3	4	5
<b>D302A:</b>	Durch die automatische Speicherung von Informationen oder Daten über meine Arbeitsschritte werden die dabei gesammelten Informationen für meine Leistungsbewertung verwendet.	1	2	3	4	5
<b>D302B:</b>	Durch die automatische Speicherung von Informationen oder Daten über meine Arbeitsschritte kann ich meine Arbeit noch effizienter gestalten.	1	2	3	4	5
<b>D302C:</b>	Durch die automatische Speicherung von Informationen oder Daten werde ich ständig überwacht.	1	2	3	4	5
<b>D302D:</b>	Durch die automatische Speicherung von Informationen oder Daten wird meine Privatsphäre nicht gewahrt.	1	2	3	4	5

**D400:** Es folgen einige Fragen zu der Arbeit mit Robotern.

		Mehr mals Täg- lich	Täg- lich	Wöc- hent- lich	Sel- tener	Nie
<b>D400A:</b>	Wie häufig beinhaltet Ihre Arbeit den Umgang mit stationären Robotern?	1	2	3	4	5
<b>D400B:</b>	Wie häufig beinhaltet Ihre Arbeit den Umgang mit autonom mobilen Robotern?	1	2	3	4	5

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**D401:** Es geht weiter um die Arbeit mit Robotern. Bitte nennen Sie mir auf einer Skala von 1 bis 5, wie sehr die folgenden Aussagen zutreffen. Die 1 bedeutet dabei, dass die Aussage "voll und ganz zutrifft", die 5 bedeutet, dass die Aussage "überhaupt nicht zutrifft".

		Trifft voll und ganz zu				Trifft überhaupt nicht zu
<b>D401A:</b>	Die Arbeit mit Robotern hat in den letzten 3 Jahren zugenommen	1	2	3	4	5

*Filter: D402A bis D402E nur dann stellen, wenn mindestens eine der Fragen D400A der D400B nicht gleich 4 oder 5.*

		Trifft voll und ganz zu				Trifft überhaupt nicht zu
<b>D402A:</b>	Die Arbeit mit Robotern entlastet mich in meiner Arbeit.	1	2	3	4	5
<b>D402B:</b>	Die Arbeit mit Robotern lässt mir wenig Gestaltungsmöglichkeiten bei der Arbeit.	1	2	3	4	5
<b>D402C:</b>	Durch die Arbeit mit Robotern habe ich immer weniger selbst die Kontrolle über meine Arbeit.	1	2	3	4	5
<b>D402D:</b>	Durch die Arbeit mit Robotern muss ich mich weiterqualifizieren.	1	2	3	4	5
<b>D402E:</b>	Mein Arbeitsplatz ist in Zukunft bedroht, weil Roboter meine Arbeit übernehmen.	1	2	3	4	5

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**D500:** Bisher ging es um Veränderungen am Arbeitsplatz, die häufig unter dem Stichwort Digitalisierung thematisiert werden. Treffen folgende Aussagen über Digitalisierung in Ihrem Arbeitsbereich zu oder nicht?

		Ja	Nein
<b>D500A:</b>	In den letzten drei Jahren sind Arbeitsplätze in meinem Arbeitsbereich durch die Digitalisierung weggefallen.	1	2
<b>D500B:</b>	In den nächsten drei Jahren werden Arbeitsplätze in meinem Arbeitsbereich durch die Digitalisierung weggefallen.	1	2
<b>D501A:</b>	In den letzten drei Jahren wurde mein Arbeitsbereich durch die Digitalisierung umstrukturiert.	1	2
<b>D501B:</b>	In den nächsten drei Jahren wird mein Arbeitsbereich durch die Digitalisierung umstrukturiert.	1	2
<b>D502A:</b>	In den letzten drei Jahren ist mein berufliches Fachwissen durch die Digitalisierung weniger wichtig geworden.	1	2
<b>D502B:</b>	In den nächsten drei Jahren wird mein berufliches Fachwissen durch die Digitalisierung weniger wichtig werden.	1	2
<b>D503A:</b>	In den letzten drei Jahren waren Zusatzqualifikationen aufgrund von Veränderungen meiner Arbeit durch Digitalisierung erforderlich.	1	2
<b>D503B:</b>	In den nächsten drei Jahren werden Zusatzqualifikationen aufgrund von Veränderungen meiner Arbeit durch Digitalisierung erforderlich sein.	1	2

## C-4 Employer Questionnaire German

Note: Original Questionnaire

**Q30:** Folgend geht es um die Möglichkeit, Arbeitsaufgaben an eine Vielzahl von Menschen über das Internet bzw. über eine Internetplattform auszulagern. Dies beschränkt sich nicht auf die externe Auslagerung, sondern bezieht auch die interne Arbeitsorganisation mit ein.

		Sehr stark				Gar nicht
Q30A	Inwiefern werden Unternehmensaufgaben <u>extern</u> ausgelagert, indem Arbeitsaufträge an eine Vielzahl von Menschen über das Internet bzw. eine Internetplattform vergeben werden?	1	2	3	4	5
Q30B	Inwiefern werden Unternehmensaufgaben <u>intern</u> funktions- und abteilungsübergreifend über interne Plattformen vergeben?	1	2	3	4	5

**Hinweis:** Hier geht es um sogenanntes Crowdsourcing. Ggfls. bestätigen, wenn der Interviewte danach fragt.

**Q31:** Inwiefern hat die Bedeutung digitaler Kompetenzen bei der Ausschreibung von Stellen und bei Einstellungen in den letzten 5 Jahren zugenommen?

Sehr stark					Gar nicht
1	2	3	4		5

**Q32:** Wie viele Stellen sind in Ihrem Betrieb insgesamt im Geschäftsjahr 2017 neu geschaffen worden?

**Anzahl:**

**Anzahl  
oder Anteil**

- Q32A Wie viele Stellen davon sind geschaffen worden, um neuen Anforderungen und Möglichkeiten durch die Digitalisierung gerecht zu werden?
- Q32B Wie viele davon waren Stellen für qualifizierte Tätigkeiten, die einen Hochschul- oder Fachhochschulabschluss erfordern?
- Q32C Wie viele davon waren Stellen für qualifizierte Tätigkeiten, die eine abgeschlossene Lehre oder vergleichbare Berufsausbildung erfordern?
- Q32D Wie viele davon waren Stellen für einfache Tätigkeiten, die keinen Hochschul- oder Fachhochschulabschluss und keine abgeschlossene Lehre oder vergleichbare Berufsausbildung erfordern?

**Q21:** Wie groß war der Anteil Beschäftigter in inner- oder außerbetrieblichen Weiterbildungsmaßnahmen im letzten Halbjahr 2017?

**Anteil:** percent

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<b>Q35:</b>	In welchem Umfang haben Sie Mitarbeiter weitergebildet, um neuen Anforderungen und Möglichkeiten durch die Digitalisierung gerecht zu werden? Bitte geben Sie an, wie viel Prozent Ihrer Mitarbeiter Sie weitergebildet haben.					
	<b>Keine</b>	<b>1 percent-20 percent</b>	<b>21 percent-40 percent</b>	<b>41 percent-60 percent</b>	<b>61 percent-80 percent</b>	<b>81 percent-100 percent</b>
	1	2	3	4	5	6

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**Q33:**      Gibt es in Ihrem Betrieb/Ihrer Dienststelle einen Experten speziell für Digitalisierung?

eine Person

Ein Team oder Abteilung

Keine

# Imprint

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