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Working Paper

Working from Home in the Netherlands: Looking Inside the Blackbox of Work and Occupations

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Working from Home in the Netherlands: Looking Inside the Blackbox of Work and Occupations

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Working from Home in the Netherlands: Looking Inside the Blackbox of Work and Occupations

Emil Mihaylov*

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The paper provides new evidence on the ability to work from home (WFH) for hundreds of Dutch occupations and examines how WFH is related to various occupation-specific characteristics. This is done by linking several publicly available datasets from Statistics Netherlands, which contain different occupation-specific information (e.g., tasks descriptions, measures of physical and socio-psychological workload, autonomy of work, computer use at work, workplace accidents and injuries, job satisfaction and job turnover, actual WFH, etc.). The paper finds that WFH is possible only in high and mid-skilled occupations such as managers, professionals, technicians and associate professionals, and clerical support workers, while it is nearly impossible in low-skilled professions such as plant and machine operators and elementary occupations. Around 16% of the employed persons in the Netherlands work in occupations that cannot be done from home, 24% work in occupations that can be performed entirely from home, and 54% are employed in occupations with significant possibilities to WFH (i.e., their occupations contain 50% or more teleworkable tasks). Furthermore, the ability to WFH is negatively related to physical work, repetitive work, and dangerous work and positively related to working on screens and independence at work. The potential to WFH is also positively correlated with job satisfaction and negatively correlated with victimisation at work (i.e., intimidation, violence, bullying, unwanted sexual attention), incidence and duration of sick leave, and work-related reasons for sick leave. The analyses in the paper are of a descriptive nature.

JEL Codes: J21, J22, J24, J29, J81

Keywords: working from home, occupations, job tasks, Netherlands, Covid-19

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1 Introduction

In the last 20 years the share of people who regularly work from distance in the Netherlands has increased by more than eight times, to nearly 50% in 2021, while the share of companies that facilitate remote working has almost quadrupled, reaching over 80% in 2021 (Figure 1). A similar positive trend is observed also for the number of people who use a computer and internet at work, both of which have increased to around 80% in 2021. In the light of these developments, as well as the recent growth in homeworking caused by the Coronavirus pandemic, it is important to gain more insight into the type of work that can be done from distance and how it is distributed across occupations, industries, and firms.

Using publicly available data from Statistics Netherlands, the present paper (i) develops a new measure of working from home (WFH) feasibility for hundreds of Dutch occupations and (ii) examines how the ability to WFH is related to various occupation-specific characteristics. To this end, we employ a set of 128 job tasks provided by the Netherlands Standard Classification of Occupations (SBC92, edition 2001), classify them as either WFH feasible or non-feasible, and calculate the share of WFH feasible tasks for each occupation. The resulting WFH feasibility index is then linked to several datasets containing occupation-level measures of physical and socio-psychological workload, autonomy of work, computer use at work, workplace accidents and injuries, working overtime, job satisfaction and job turnover, actual WFH, etcetera²³.

The paper is most closely related to Holgersen, Jia and Svenkerud (2021), who use hundreds of occupational descriptions from the International Standard Classification of Occupations (ISCO08) to evaluate the ability to WFH for ISCO08 occupations, and Arntz, Ben Yahmed and Berlingieri (2020), who utilize a list of tasks descriptions from the German Qualification and Career Survey to estimate the share of teleworkable tasks in German occupations. Our approach is, however, different than that of Dingel and Neiman (2020), who employ a set of work conditions (e.g., frequency of e-mail use, dealing with violent people, performing physical activities) to determine if an occupation can be done from home. As Hatayama, Viollaz and Winkler (2020) point out, one caveat of the latter approach is that it is not clear which work conditions to consider when judging the potential to WFH, and also the more

² The purpose of the merging is thus to better understand how the ability to WFH is related to different occupational variables.

³ Please note that the terms working from home, working from distance, remote working, and teleworking are used interchangeably here, and are meant to indicate the possibility of working from a different location than the official workplace.

conditions are considered, the bigger the chances are that at least one of them will be satisfied for any given occupation. The present paper overcomes this challenge by employing all 128 tasks from the Netherlands Standard Classification of Occupations. A drawback of our approach, however, is that it relies on tasks descriptions from the 2001 edition of SBC92, which means that some of the tasks may have changed between 2001 and now.

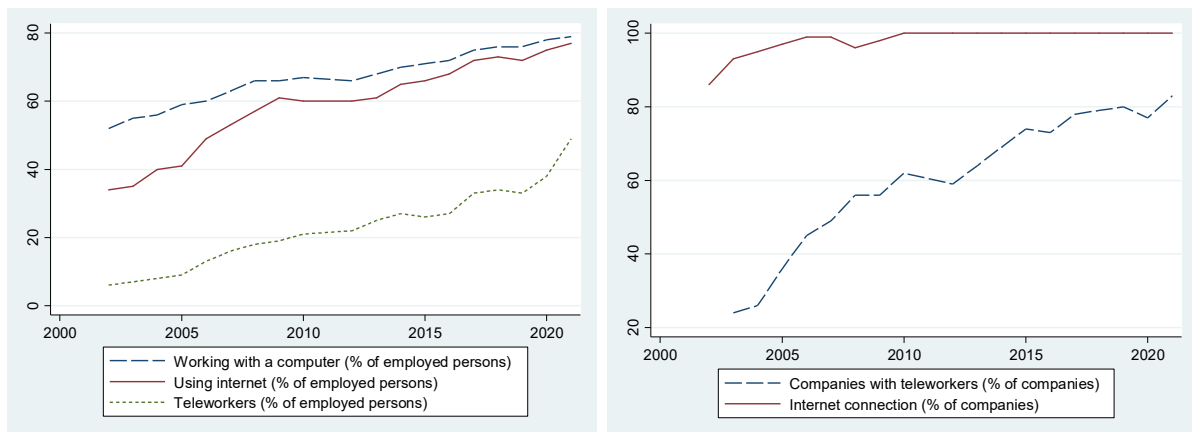


Figure 1. Trends in computer/internet use at work and teleworking; 2002-2021.

Source: Graphs based on StatLine (ICT-gebruik bij bedrijven; kerncijfers)⁴.

The paper finds that the ability to WFH is limited only to high and mid-skilled occupations such as managers, professionals, technicians and associate professionals, and clerical support workers. In these occupations, the share of teleworkable tasks is between 66% and 93%. On the other side, plant and machine operators, assemblers and elementary occupations have the lowest share of teleworkable tasks, which is close to 0%. In the aggregate, around 16% of the workers in the Netherlands are employed in occupations with 0% teleworkable tasks, 24% are employed in occupations with 100% teleworkable tasks, and 54% are employed in occupations with 50% or more teleworkable tasks. Furthermore, the paper shows that the WFH feasibility is strongly negatively correlated with physical work, repetitive work, and dangerous work and positively correlated with working on screens and independence at work. Strikingly, the ability to WFH is also positively related to job satisfaction and negatively related to victimisation at work, incidence and duration of sick leave, and work-related reasons for sick leave. Even though the above relationships are descriptive, they provide useful information about the

⁴ In 2020 the survey was held in the month February, which is before the first lockdown in the Netherlands and, therefore, the numbers in that year should be considered as pre-Covid. We would like to thank Ferry Lapré from Statistics Netherlands for providing valuable information on the timing of the survey in 2020.

differences between those who can and cannot work from home. Finally, the paper finds that our WFH index is highly correlated with actual WFH practises in the Netherlands.

The rest of the paper is organized as follows. Section 2 provides an overview of the recent literature on WFH. Section 3 describes the data and methods used to estimate the WFH potential of occupations. Section 4 presents the WFH index and shows how it is related to various occupation-specific characteristics. Section 5 estimates the number of teleworkable jobs in the Netherlands and examines how the ability to WFH is related to employment growth at the level of occupations. Section 6 examines how the share of teleworkable tasks in occupations (as measured by our index) is related to actual working from home in the Netherlands; it also studies the relationship between teleworkable tasks and critical occupations. Section 7 concludes.

2 Alternative approaches to measure WFH feasibility

This section presents a brief overview of the recent empirical literature on the feasibility of occupations and jobs to be done from distance.

Dingel and Neiman (2020) estimate the feasibility of working from home for more than 900 U.S. occupations. To this end, they utilize a set of 15 work conditions, drawn from two separate O*NET surveys, to determine if an occupation can be done from distance. They assume that occupations cannot be performed remotely if any of the 15 conditions are true – e.g., the average respondent uses email unfrequently/ deals with violent people frequently/ is exposed to diseases or infections frequently, or if performing physical activities/ controlling machines and processes/ operating vehicles or equipment/ repairing and maintaining is very important. The authors estimate that around 37% of U.S. jobs can be performed entirely from home, and that there are large variations in that number across occupations, regions, and industries. They also find that low-income countries have on average lower shares of WFH feasible jobs.

The latter result is confirmed by Gottlieb, Grobovšek, Poschke and Saltiel (2021), Hatayama, Viollaz and Winkler (2020) and Garrote Sanchez et al. (2021). Gottlieb et al. (2021) estimate that around 9% of the workers in the STEP survey (which covers ten low-income countries) can work from home. Their approach is similar to Dingel and Nieman (2020) and excludes the possibility of working from home if a worker's job involves, e.g., repairing, operating equipment, or not using email. Hatayama, Viollaz and Winkler (2020) and Garrote Sanchez et al. (2021) explicitly control for internet access at home, and show that not accounting for internet access can significantly overstate the shares of jobs that can be done

from distance, especially in poor countries⁵. In that respect, Gottlieb, Grobovšek and Poschke (2020) argue that the lower ability to WFH in developing countries is mainly due to the different structure of employment in these countries – namely, high levels of self-employment in combination with concentration of employment in occupations that do not lend themselves easily to remote working.

Several studies estimate the capacity to WFH based on self-assessments of workers. For example, Alipour, Falck and Schüller (2020) and Alipour, Fadinger and Schymik (2021) define a job as WFH feasible when a worker reports working from home or when the same does not rule out the possibility of WFH for her job. They find that around 56% of German jobs can be done (partly or entirely) from home, and that the ability to WFH mainly depends on the task content of workers' jobs. Hensvik, Le Barbanchon and Rathelot (2020) rely on workplace diaries of respondents to the American Time Use Survey and estimate the share of working hours that are performed at home; they find that U.S. workers spend around 15% of their working time at home. And since all three studies use pre-pandemic data, their estimates are unaffected by the lockdowns during the Coronavirus outbreak.

As opposed to that, Adams-Prassl, Boneva, Golin and Rauh (2022) and Zimpelmann, Von Gaudecker, Holler, Janys and Siflinger (2021) use real-time data on teleworking, which they collect at different stages of the pandemic. Adams-Prassl et al. (2022) ask respondents to their survey directly about the fraction of tasks they could do from home and find that around 42% and 39% of job tasks could be potentially done from home in the U.S. and U.K., respectively; however, they also document significant differences in the ability to WFH both across and within occupations and industries, which according to them testifies to the importance of using individual-level measures of WFH capacity when studying the economic consequences of the pandemic. For the Netherlands, Zimpelmann et al. (2021) estimate that around 44% of job tasks could be done from home; they also find that the fraction of actual working hours spent at home has increased from 11% before the pandemic to over 50% in April of 2020. Both studies show, furthermore, that the capacity to work from home is positively related to favourable socioeconomic factors such as higher income and better education.

Finally, the studies of Arntz, Ben Yahmed and Berlingieri (2020) and Holgersen, Jia and Svenkerud (2021) rely on job tasks and occupational descriptions to evaluate the WFH potential of German and Norwegian occupations, respectively. Arntz, Ben Yahmed and

⁵ Based on a sample of 107 countries, and using Dingel and Nieman's (2020) measure, Garrote Sanchez et al. (2021) show that about 23.9% of jobs can be done from home; however, once they account for internet access this number drops to 18.7%.

Berlingieri (2020) classify the 18 tasks in the German Qualification and Career Survey into teleworkable and non-teleworkable and compute the share of teleworkable tasks for each occupation; they find that around 31% of German jobs are fully teleworkable, meaning that they could be performed entirely from home, while another 12% of jobs are partially teleworkable⁶. Holgersen, Jia and Svenkerud (2021) base their assessment on hundreds of detailed occupational descriptions provided by the ISCO08 classification. Using these descriptions, they ask virtual workers on the Amazon Mechanical Turk platform to evaluate whether each of the ISCO08 occupations could be performed from home. Based on the workers' responses, the authors estimate that around 38% of the jobs in Norway could be done from distance, with significant variations across occupation groups (e.g., about two-thirds of the jobs of managers and less than 2% of the elementary occupations jobs could be done remotely).

3 Data and Methods

The paper employs two primary data sources – the Netherlands Standard Classification of Occupations 1992, Edition 2001 (SBC92) and the databank of Statistics Netherlands (StatLine). The first source is used to extract information about the telework potential of occupations and construct a measure of the ability to work from home for 1,211 detailed occupations. StatLine is used to obtain various datasets containing occupation-specific information such as employment per occupation, job turnover, workplace accidents, sick leave, working overtime, actual working from home, computer use at work, physical and psychosocial workload, autonomy of work, etc. A common feature of all StatLine datasets used here, is that they provide information at the level of occupations.

3.1 The Netherlands Standard Classification of Occupations 1992, Edition 2001 (SBC92)

SBC92 is an occupational classification system that classifies jobs into 1,211 occupations, 121 occupation groups, 43 occupation classes, and 5 occupation levels and provides information about the knowledge, skills and work activities associated with these occupations (CBS, 2001). The SBC92 distinguishes, furthermore, between 128 work activities (job tasks) and assigns up to three tasks to each of the 1,211 occupations. The 128 tasks are the key elements for the development of our WFH feasibility index – first, we classify each of the 128 tasks as

⁶ The distinction between fully and partly teleworkable jobs is made on the basis of two indicators: the share of teleworkable tasks in an occupation, and the share of survey respondents who report that teleworking is not possible in their job.

teleworkable or non-teleworkable, and then we calculate the share of teleworkable tasks for each of the 1,211 occupations:

$$\text{WFH}_j = \frac{\text{Number of teleworkable tasks in occupation } j}{\text{Total number of tasks in occupation } j}$$

Where WFH stands for the share of teleworkable tasks in occupation j and ranges between 0 (no teleworkable tasks) and 1 (all tasks teleworkable). Appendix A describes the 128 tasks and shows how they are classified (teleworkable versus non-teleworkable). According to our definition, teleworkable are all tasks that can be performed fully or partly from distance (i.e., a different location than the official work place)⁷.

Crosswalk from SBC92 to ISCO08 and BRC2014

Since 2013 Statistics Netherlands employs the BRC2014 classification system (which is derived from ISCO08) in the collection and reporting of occupational statistics. This means that we first need to convert the WFH index to ISCO08 and BRC2014 occupations before merging it with the StatLine datasets. Appendix B provides further details on the conversion from SBC92 to ISCO08 and BRC2014. In the rest of the paper, we will present only results based on the converted index.

4 Empirical Results⁸

Section 4.1 presents the WFH index. Section 4.2 examines, by means of simple correlations, how the index is related to various occupational characteristics such as physical and socio-psychological workload, working with computers, independence at work, etc.

4.1 WFH feasibility index by occupations

⁷ The SBC92 classification has been previously used by Den Butter and Mihaylov (2013) to develop measures of routine task-intensity. Similar to us, they assign the 128 tasks into five routine categories and calculate the share of each task category for Dutch occupations.

⁸ All Stata DO-files are available upon request. The raw data can be freely downloaded from Statistics Netherlands. Below each table and figure in the paper, we report the original Dutch names of the data files used for the estimations in that table or figure. For example, the results in Figure 1 are based on data file “ICT-gebruik bij bedrijven; kerncijfers” (StatLine) and those in Table 1 are based on data file “Fysieke arbeidsbelasting werknemers; beroep” (StatLine). The interested reader can access these files by copy-pasting their names in StatLine.

Figure 2 depicts the WFH index for 10 major occupation groups (according to ISCO08) and 12 occupation classes (according to BRC2014). The left-side panel clearly shows that the ability to WFH gradually decreases as one moves from left to right in the graph. The WFH index is highest for managers, professionals, technicians and associate professionals, and clerical support workers, and it is lowest for elementary occupations, plant and machine operators and assemblers, and craft and related trades workers. Over 80% of the tasks of managers and professionals are teleworkable, while less than 1% of the tasks of elementary occupations and plant and machine operators and assemblers are teleworkable. This pattern suggests that the ability to WFH is specific only to high and mid-skilled occupations⁹. Turning to the right-side panel, the figure shows that the WFH feasibility is highest for ICT, managers, and pedagogical occupations, and it is lowest for transport and logistics, agricultural, and service occupations. The potential to work remotely is also very high (close to 80%) for business and administrative, creative and linguistic, and commercial professions. All in all, both figures line up well with the existing literature on the ability to work from home.

Table D1 in the Appendix provides the WFH index at the level of 112 BRC2014 occupation groups.

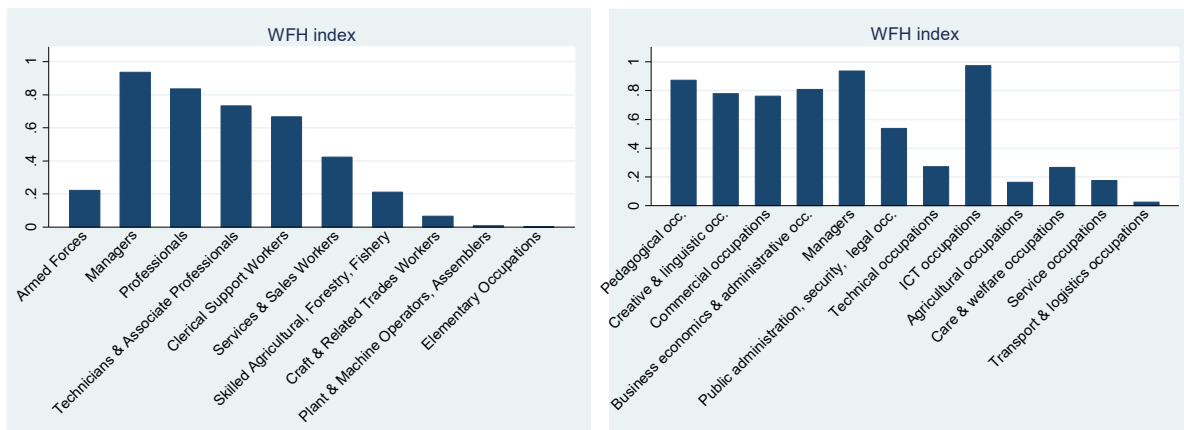


Figure 2. WFH index by ISCO08 major occupation group (left-side panel) and BRC2014 occupation class (right-side panel). The aggregated index is weighted by the number of workers in SBC92 occupations (5-digit) in 2011.

Source: Own calculations based on SBC92 and StatLine (Beroepsbevolking; beroepsklassen 1996-2011).

⁹ As a comparison, Gottlieb, Grobovšek and Poschke (2020) find that over 70% of jobs of managers and professionals and less than 10% of jobs of craft workers, plant and machine operators, skilled agricultural workers, and elementary occupations can be worked from distance. Holgersen, Jia and Svenkerud (2021) show that the share of WFH friendly jobs varies between 65% for managers and 1.7% for elementary occupations. Furthermore, Dingel and Nieman (2020), Adams-Prassl et al. (2022), Irlacher and Koch (2021) and Zimpelmann et al. (2021) demonstrate that the ability to WFH is positively related to income levels.

4.2 Relationship between WFH index and occupation-specific work context measures (StatLine)

As discussed in the literature review, many of the existing telework indices are constructed on the basis of work context and work activity variables, and the ability to work from home is calculated as a function of operating machines and equipment, dealing directly with customers, having a physically demanding job, taking care of people, working with computers and internet, etc. Given that StatLine provides detailed information about many work context and work activity variables at the occupation level, it is informative to examine how our telework index is related to those variables.

Table 1 presents simple bivariate correlations between the WFH index and various occupational characteristics measuring physical workload. The estimated coefficients show that WFH is strongly negatively correlated with variables such as physical force at work, talking loudly, vibrations at work, dangerous work, working in uncomfortable positions, making repetitive movements during work, and highly positively correlated with working on (computer, laptop, smartphone) screens. For all but two of these variables, the correlation coefficient exceeds 0.7 which indicates that the ability to work from home is strongly related to those variables. Worth noting is also that working on screens is the variable with strongest correlation in the table¹⁰. All in all, these results are plausible.

Table 1. Relationship between WFH index and occupational characteristics (physical workload)

		Bivariate correlations
		WFH index
Physical strength	Use a lot of force regularly	-0.7445
Noise and vibrations	Talk loudly regularly	-0.5437
	Deal with vibrations regularly	-0.6245
Dangerous work and hazardous substances	Do dangerous work	-0.7314
	Work with fluid substances	-0.5144
	Get substances on skin	-0.5897
	Inhale substances	-0.5966
	Work with infected people/animals	-0.2721
Working posture	Work in uncomfortable positions	-0.7039
	Make repetitive movements	-0.7638

¹⁰ Similarly, Alipour, Falck and Schüller (2020) find that “working with computers” is the strongest positive predictor of WFH feasibility, while “working standing up” is the strongest negative predictor.

	Work on screens (hours a day)	0.7830
Observations: 72 occupation groups		

Source: own calculations based on WFH index and StatLine (Fysieke arbeidsbelasting werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. StatLine data for 2019.

Table 2 shows bivariate correlations between the WFH index and various psychosocial occupational characteristics. The latter are organized into six categories – workload, independence at work, emotionally demanding work, victimisation at work, and psychological fatigue from work. The estimated coefficients clearly show that the ability to work from distance is most strongly correlated with the variables measuring independence at work. In this category, all but one of the correlation coefficients are greater than 0.6, and three of them are even greater than 0.7. The flexibility to decide on how to do one’s own work, to determine the work order and work pace, to come up with own solutions, and to decide on own worktimes are all positively correlated with our telework index. On the other side, the WFH index is negatively correlated with all variables in the category victimisation at work. This means that occupations with higher working from home potential have a lower incidence of undesired behaviour, intimidation, violence, and bullying.

Table 2. Relationship between WFH index and occupational characteristics (psychosocial workload)

		Bivariate correlations
		WFH index
Workload	Work very fast	0.0377
	Do a lot of work	0.4838
	Work extra hard	0.3631
Independence at work	Decide how to do own work	0.7351
	Determine work order	0.7471
	Determine work pace	0.6373
	Find solutions	0.7043
	Take a leave whenever needed	0.4035
	Determine working hours	0.6610
Emotionally demanding work	Emotionally difficult work situations	-0.0693
	Emotionally demanding work	0.0011
	Emotionally attached to work	0.3955
	Unwanted sexual attention from customers	-0.3565

Victimisation at work	Unwanted sexual attention from supervisors or colleagues	-0.0578
	Intimidation by customers	-0.2073
	Intimidation by supervisors or colleagues	-0.2436
	Physical violence by customers	-0.2910
	Physical violence by supervisors or colleagues	-0.4798
	Bullying by customers	-0.2969
	Bullying by supervisors or colleagues	-0.3840
Psychological fatigue from work	Psychological fatigue from work	0.0634
	Emotionally exhausted from work	0.2349
	Feel empty at the end of working day	0.1790
	Feel tired in the morning	-0.0334
	Takes a lot to work with people	0.2183
	Exhausted from work	-0.3867
Observations: 72 occupation groups		

Source: own calculations based on WFH index and StatLine (Psycho-sociale arbeidsbelasting werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. StatLine data for 2019.

Table 3 presents bivariate correlations between the WFH index and 8 occupational variables measuring sustainable employability. The estimated coefficients show that the ability to work from home is positively correlated with all variables in the table, and the highest correlations are found for the variables satisfaction with work conditions, age until which workers expect to be able to continue working, and meeting physical demands of work.

Table 3. Relationship between WFH index and occupational characteristics (sustainable employability)

		Bivariate correlations
		WFH index
Work satisfaction	Satisfied with working conditions	0.7056
	Satisfied with work	0.5476
Work longer	Until what age want to continue working	0.3442
	Until what age able to continue working	0.6796
Current employability	Meet physical demands of work	0.7507
	Meet psychological demands of work	0.3347
	Could easily get new job with current employer	0.4674

	Could easily get new job with another employer	0.3081
Observations: 72 occupation groups		

Source: own calculations based on WFH index and StatLine (Duurzame inzetbaarheid werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. StatLine data for 2019.

Strikingly, Table 4 shows that the ability to work from home is negatively related to the incidence and duration of sick leave. Occupations with higher WFH scores have on average lower incidences of sick leave, the duration of the sick leave is short, and the reason for the sick leave is not work-related. The WFH index is also negatively correlated with workplace accidents. Occupations with higher flexibility to work from home have a lower share of workers who report injuries, and this holds for both physical and mental injuries.

Table 4. Relationship between WFH index and occupational characteristics (sick leave; workplace accidents)

		Bivariate correlations
		WFH index
Incidence sick leave	Sick leave rate employees	-0.5238
	Share employees who have been absent due to sickness	-0.0622
	Average frequency sick leave (# times)	-0.2886
	Average duration sick leave (# days)	-0.4795
Duration and reason sick leave (most recent case)	1-5 working days	0.5690
	5-20 working days	-0.5332
	20-210 working days	-0.4796
	210 or more working days	-0.3964
	Mainly work-related	-0.6102
	Partly work-related	-0.4621
	Not work-related	0.6891
Unknown	-0.5752	
Work accidents and injuries (% of employees)	Employees reporting work accidents	-0.6868
	Physical injury	-0.6402
	Mental injury	-0.2391
	Injury not distinguishable	-0.5097
	Injury unknown	-0.4492
Observations: 72 occupation groups		

Source: own calculations based on WFH index and StatLine (Ziekteverzuim volgens werknemers; beroep/Arbeidsongevallen werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. StatLine data for 2019.

Table 5 shows that occupations with higher WFH scores have on average also a higher prevalence of working overtime (both regularly and sometimes), and a lower prevalence of regularly working outside office hours. Furthermore, there is a positive correlation between working from home and sometimes working outside office hours.

Table 5. Relationship between WFH index and occupational characteristics (working overtime and working outside office hours)

		Bivariate correlations
		WFH index
% of employees	Regularly working overtime	0.4476
	Sometimes working overtime	0.3527
	Not working overtime	-0.6698
% of employed persons *	Regularly working outside office hours	-0.6707
	Sometimes working outside office hours	0.8369
	Not working outside office hours	0.3830
Observations: 12 occupation classes		

Source: own calculations based on WFH index and StatLine data (Werknemers; mate van overwerken/Werkzame beroepsbevolking; werken buiten kantoor tijden, 2003-2020). The 12 occupation classes are according to BRC2014. BRC2014 contains 13 occupation classes. Shares are calculated by dividing the number of people who (regularly/sometimes/do not) work overtime, or work outside office hours, by the total number of people in an occupation class. * Employed persons include both employees and self-employed. StatLine data for 2019.

Table 6 shows that occupations with higher WFH scores have on average lower shares of workers who change occupations; and for those who change occupations, there is a positive relationship between WFH and the share of people who remain in the same occupation class after the transition. However, all these correlations are rather weak.

Table 6. Relationship between WFH index and occupational characteristics (changing occupations)

	Bivariate correlations
	WFH index
Change occupations (% of employed persons)	-0.1387

Change occupations: same occupation class (% of occ. changers)	0.1099
Change occupations: different occupation class (% of occ. changers)	-0.1099
Observations: 12 occupation classes	

Source: own calculations based on WFH index and StatLine (Werkzame beroepsbevolking; wisseling van beroepsklasse). The 12 occupation classes are according to BRC2014. BRC2014 contains 13 occupation classes. The shares are calculated by dividing the total number of people who change occupations (change occupations but remain in same occupation class/change both occupations and occupation class) by the total number of people in an occupation class (by the total number of people who change occupations). StatLine data for 2019.

Finally, Table 7 presents the relationship between WFH and the percentage of people with disabilities in an occupation and shows that occupations with a higher WFH score have on average lower shares of workers with disabilities. However, this relationship is not very strong as indicated by the correlation coefficient (-0.31).

Table 7. Relationship between WFH index and occupational characteristics (people with disabilities)

	Bivariate correlations
	WFH index
People with disability (% of employed persons)	-0.3175
Observations: 112 occupation groups	

Source: own calculations based on WFH index and StatLine (Werkzame beroepsbevolking; arbeidsgehandicapten, beroep 2015-2017). The 112 occupation groups are according to BRC2014. The shares are calculated by dividing the number of people with disabilities in an occupation group by the total number of employed people in that group. StatLine data for 2017.

Appendix C.2 provides several additional graphs showing trends in working overtime, working outside office hours, and changing occupations over the past 15 years. It also includes a summary table showing the top (bottom) 10 occupations with the highest (lowest) percentage of people with disabilities.

5 How many teleworkable jobs are there in the Netherlands?

Table 8 shows the distribution of employment in the Netherlands across different segments of the working from home index. Looking at the extremes of the index, the table shows that in 2021 about 1.5 million people were employed in occupations with 0% teleworkable tasks, while 2.2 million were employed in occupations with 100% teleworkable tasks. Also about 4 million persons were employed in jobs with up to 50% teleworkable tasks, and another 5

million in jobs with 50% or more teleworkable tasks. If we assume that occupations with a zero WFH score cannot be performed from distance, this would mean that about 16% of the Dutch workers cannot work from home, while 24% can do this entirely. Strikingly, the last column shows that between 2013 and 2021 the occupations with low ability to work from home have decreased in size, while those with high ability to work from home have increased. The largest increase in employment (901,000 persons) is recorded for occupations with 70% or more teleworkable tasks, and the largest drop in employment (139,000 persons) is found for the occupations with up to 30% teleworkable tasks.

Table 8. Teleworkable jobs in the Netherlands in 2021

WFH index	Employed persons 2021 (in 1,000)	Employed persons 2021 (% of total employment)	Change in employment 2013 – 2021 (in 1,000)
0	1,527	16 %	-124
≤ 0.3	3,110	33 %	-139
< 0.5	4,029	43 %	-7
≥ 0.5	5,067	54 %	879
≥ 0.7	4,774	51 %	901
1	2,227	24 %	704
Total employment 2021: 9,257 (in 1,000)			
Total employment 2013: 8,436 (in 1,000)			

Source: own calculations based on WFH index and StatLine (Werkzame beroepsbevolking; beroep). Occupation 551 (Managers without further differentiation) and 1311 (Others) are missing in the crosswalk and are not used for the calculations. In 2021 total employment in both occupations was about 161,000. StatLine employment data by occupation according to BRC2014.

Table 9 examines further the relationship between employment growth and the telework potential of occupations, and presents bivariate correlations between both variables over different periods. Interestingly, the table shows that before 2020 (the start of the pandemic) there was a very weak correlation between employment growth and WFH, whereas after the start of the pandemic the correlation increased by more than three times to about 0.38 over the period 2019-2021. This may suggest that occupations with a high ability to work from home have increased in size on average during the pandemic¹¹.

¹¹ Similarly, Gottlieb, Grobovšek, Poschke and Saltiel (2021) find that the ability to WFH is positively associated with the probability of remaining employed during the first pandemic year (2020) in Peru.

Table 9. Correlation between WFH index and changes in occupational employment

	Bivariate correlations
	WFH index
Change in occ. employment (2019-2021)	0.3859
Change in occ. employment (2020-2021)	0.3706
Change in occ. employment (2019-2020)	0.2212
Change in occ. employment (2015-2019)	0.0691
Change in occ. employment (2013-2015)	0.1021
Change in occ. employment (2013-2019)	0.1142
Observations: 112 occupation groups	

Source: own calculations based on WFH index and StatLine (Werkzame beroepsbevolking; beroep). The 112 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of 2 missing occupations in the crosswalk (551-Managers without further differentiation, 1311-Other) there are fewer observations in the table.

Finally, Table 10 presents the 5 occupations with the largest shifts in employment both before and during the pandemic. Between 2013 and 2019, the 5 occupations with the largest increase (decrease) in employment were: software and application developers, loaders, unloaders and shelf fillers, waiters and bar staff, social workers, group and residential counsellors, specialists personnel and career development (other, carers, managers without further differentiation, cleaners, specialist services managers). During the pandemic, over the period 2019-2021, the 5 occupations with the largest increase (decrease) in employment were: software and application developers, business and organization consultants, marketing, public relations and sales consultants, other, loaders, unloaders and shelf fillers (waiters and bar staff, garbage collectors and newspaper deliverers, general directors, kitchen aids, business service providers).

Table 10. Occupations with largest changes in employment before and during the pandemic

	Increase	Decrease
2013 - 2019	0811 Software and application developers	1311 Other
	1221 Loaders, unloaders and shelf fillers	1051 Carers
	1113 Waiters and bar staff	0551 Managers without further differentiation
	1041 Social workers, group and residential counsellors	1121 Cleaners
	0415 Specialists personnel and career development	0536 Specialist services managers

2019 - 2021	0811 Software and application developers	1113 Waiters and bar staff
	0413 Business and organization consultants	1222 Garbage collectors and newspaper deliverers
	0311 Marketing, public relations and sales consultants	0511 General directors
	1311 Other	1122 Kitchen aids
	1221 Loaders, unloaders and shelf fillers	0422 Business service providers
Observations: 114 occupation groups		

Source: table based on StatLine (Werkzame beroepsbevolking; beroep). Occupations according to BRC2014 classification system.

6 Teleworkable tasks, working from home and critical occupations

Section 6.1 studies how the share of teleworkable tasks in an occupation is related to actual working from home, and Section 6.2 studies the relationship between teleworkable tasks and critical occupations.

6.1 Teleworkable tasks and actual working from home practices

Table 11 examines how the ability to work from distance, as measured by our index, is related to actual working from home in the Netherlands. The latter variable comes from the Dutch Labour Force Survey and measures the percentage of workers in an occupation who report to regularly or occasionally work from home. We choose the year 2019 for the comparison, because this is the last pre-pandemic year and the numbers in that year are unaffected by the lockdowns in 2020 and 2021. Table 11 clearly shows that our WFH index is strongly correlated with the percentage of workers who actually work from home – the correlation coefficient between both exceeds 0.82. As expected, the correlation is much stronger for the share of workers who occasionally work from home than for those who regularly work from home. This is because the number of workers who regularly work from home is smaller than those who do this occasionally (see Figure C1 in the Appendix). This is a logical result given that our index aims to capture the ability to work from home.

Table 11. Relationship between WFH index and actual WFH in the Netherlands (2019)

		Bivariate correlations
		WFH index
% of employed persons	Teleworkers	0.8232
	Teleworkers usually working from home	0.4789
	Teleworkers occasionally working from home	0.8347
Observations: 112 occupation groups		

Source: calculations based on WFH index and CBS data (Thuiswerkers per beroep, 2019)¹². The 112 occupation groups are according to BRC2014.

Figure 3 plots both variables by occupation class¹³. Overall, the graph shows that the share of teleworkable tasks and the share of people who actually work from home are very similar for most occupation classes. The highest degree of similarity between both variables is found for creative and linguistic, public administration, technical, agricultural, and service occupations, while the most significant differences are observed for commercial, business economics and administrative, and ICT occupations. Notably, for most occupation classes the share of teleworkable tasks exceeds the share of workers who work from distance. An exception to this are agricultural, care and welfare, and transport and logistics occupations – for them holds that the share of people who work from home is higher than the share of teleworkable tasks. Finally, the graph shows that working from home is most common in creative and linguistic, managers, ICT, and pedagogical occupations - more than 60% of the people in these occupations work from home.

¹² The actual data about teleworkers per occupation is downloaded from Statistics Netherlands (<https://www.cbs.nl/nl-nl/maatwerk/2020/15/thuiswerkers-per-beroep-2019>) on October 03, 2022. The data originates from the Dutch Labour Force Survey (EBB) in 2019 and can be found in excel file “Thuiswerkers per beroep, 2019”.

¹³ When comparing both variables, please note that they capture different aspects of working from home – the WFH index measures the share of teleworkable tasks in an occupation, while the actual WFH variable measures the share of people who work from home by occupation.

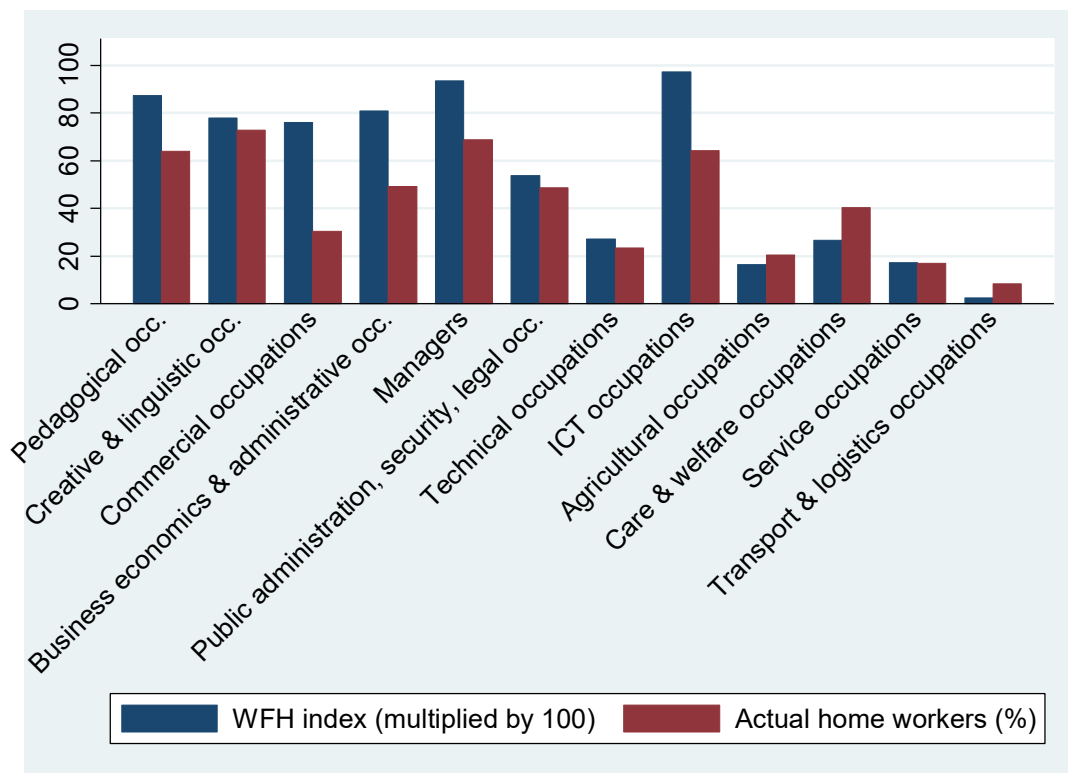


Figure 3. Comparison WFH index and actual WFH by occupation class (BRC2014). Source: graph based on WFH index and CBS data (Thuiswerkers per beroep, 2019). The aggregated data is weighted by the number of workers in SBC92 occupations (5-digit) in 2011.

In sum, the above results indicate that the working from home index is highly correlated with the share of people who work from distance¹⁴.

6.2 Teleworkable tasks and critical occupations

Figure 4 depicts the working from home index and the share of people who work in critical occupations by occupation class. The graph clearly shows that there is a negative correlation between both variables – occupation classes with higher shares of teleworkable tasks have on average lower shares of people who work in crucial occupations. An exception to this are the pedagogical, public administration and security, and service occupations for which there is a positive relationship between both variables. Furthermore, the figure shows that nearly 100% of the workers in agricultural and care and welfare occupations, and more than 60% of the workers in pedagogical and transport and logistics occupations work in critical occupations.

¹⁴ With regard to the similarity of our index to other studies, Figure C2 in the Appendix shows that the index is strongly correlated with the WFH capacity measure of Alipour, Falck and Schüller (2020). The correlation coefficient between both variables is 0.92.

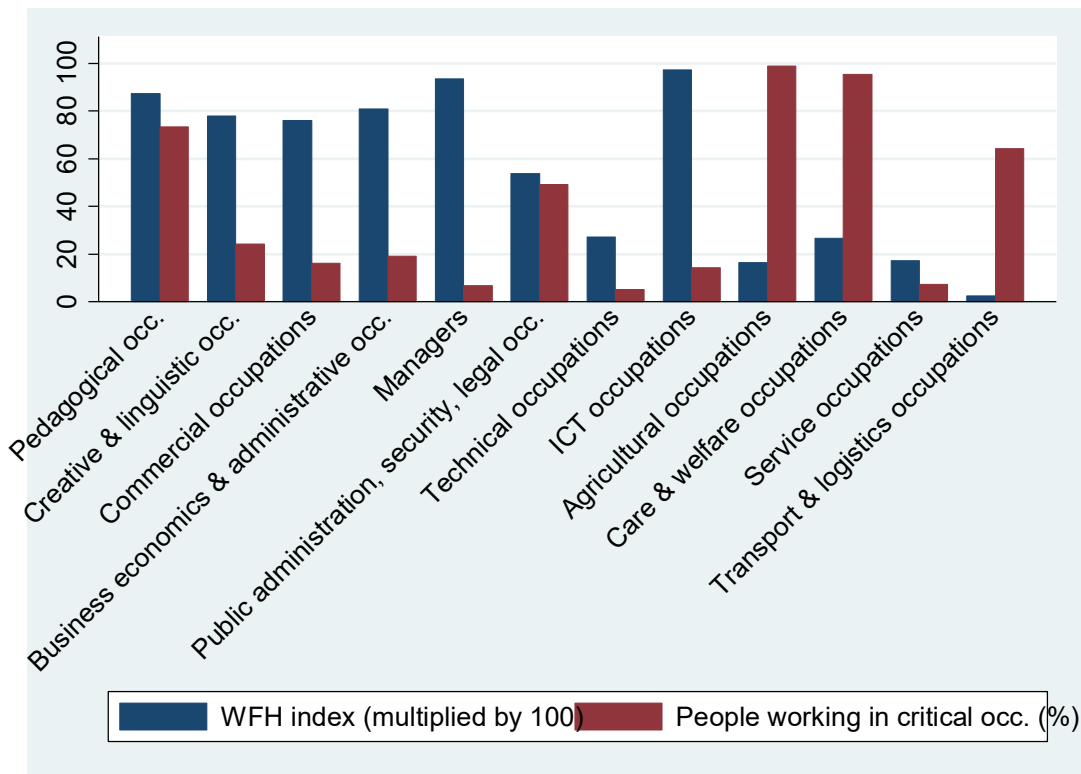


Figure 4. WFH index and percentage of workers in critical occupations by occupation class (BRC2014) Source: graph based on WFH index and CBS data (Revisie cruciale beroepen)¹⁵. The aggregated index is weighted by the number of workers in SBC92 occupations (5-digit) in 2011.

Finally, Figure 5 depicts the share of people who work from distance by economic sector and company size. A first glance at the picture shows that teleworking is most common in ICT, information and communication, financial services, real estate rental and trade, and specialist business services, and is least frequent in hospitality, industry, and trade. The figure shows also that in the majority of sectors the percentage of people who work from distance is higher in larger companies. This, however, does not hold for the sectors trade and information and communication. In the latter sector, for example, the share of teleworkers is highest in small companies and lowest in large companies, although the differences between both groups are negligible.

¹⁵ The data about critical occupations is downloaded from Statistics Netherlands (<https://www.cbs.nl/nl-nl/faq/corona/economie/hoeveel-mensen-werken-er-in-cruciale-beroepen->) on October 06, 2022. The data originates from the Dutch Labour Force Survey (EBB) and can be found in excel file “Revisie cruciale beroepen”.

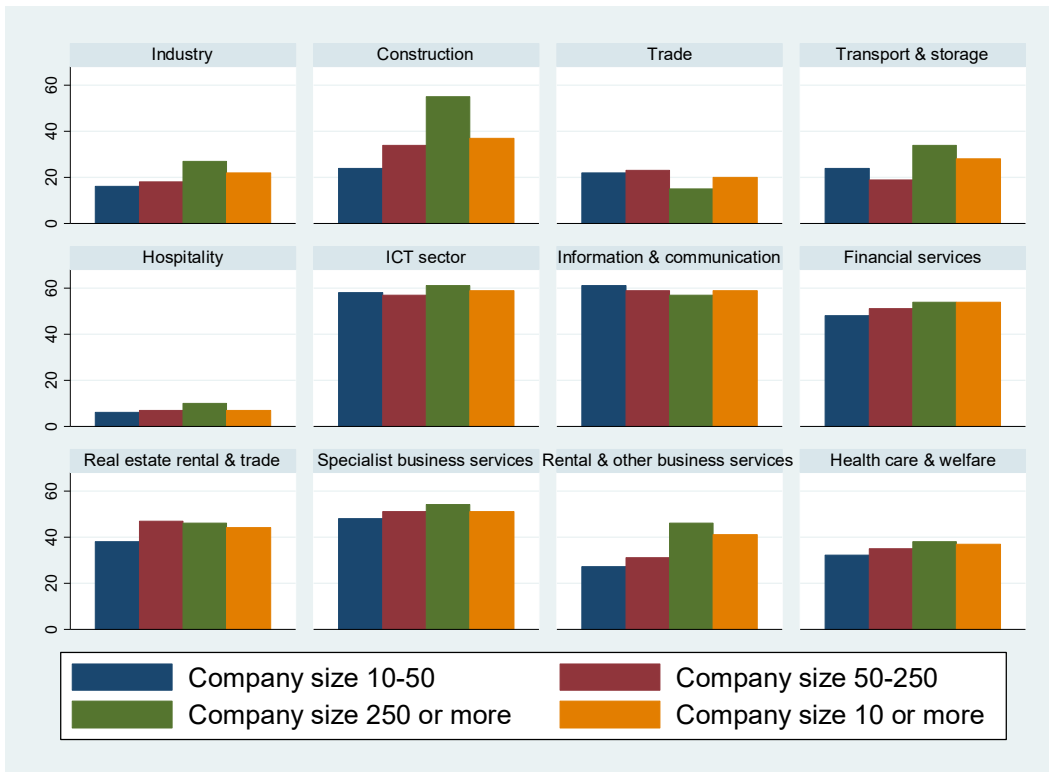


Figure 5. Working from home by economic sector and firm size, 2019 (% of employed persons)
 Source: graph based on StatLine (ICT-gebruik bij bedrijven; bedrijfstak en bedrijfsgrootte, 2019).

7 Conclusions

In the last two decades the share of people who regularly work from distance in the Netherlands has increased eightfold (from 6% in 2002 to 49% in 2021), and the share of companies that facilitate teleworking has more than tripled (from 24% in 2003 to 83% in 2021). Given these developments, the objective of the paper was to look inside the Blackbox of work and occupations and gain more insight into the types of work that can be done from distance and the factors related to the ability to work from home. This was done by linking several datasets from Statistics Netherlands which provide different occupation-specific information. The paper developed a new measure of WFH feasibility for Dutch occupations and found that WFH is possible only in high and mid-skilled occupations such as managers, professionals, technicians and associate professionals, and clerical support workers. In other low-skilled occupations, such as plant and machine operators, assemblers and elementary occupations, WFH was found to be practically impossible because of the very low content of teleworkable tasks in these professions. Furthermore, the paper estimated that in 2021 around 16% of the workers in the Netherlands were employed in occupations that cannot be performed from home, 24% were employed in occupations that can be done entirely from home, and 54% were employed in occupations that are suitable to be done (at least partly) from home. The paper showed that our

WFH index is negatively correlated with occupation-level measures of physical work, repetitive work, dangerous work, victimisation at work, frequency and duration of sick leave, and positively correlated with working on screens, independence at work, and job satisfaction. The ability to WFH was also found to be strongly positively correlated with the share of people who actually WFH in the Netherlands, and negatively correlated with the share of people who work in critical occupations.

Finally, it is worth noting that the paper has a descriptive character and the estimated relationships (between WFH and other occupation-specific variables) are based on simple correlations that do not imply causalities. The main limitation of the paper is that it utilizes the 2001 version of the Netherlands Standard Classification of Occupations 1992 to draw tasks descriptions and construct our WFH feasibility index. The latter classification is no longer in use and has been replaced by the BRC2014 scheme in 2013. In that sense, our analysis may be seen as analogous to studies that use the U.S. DOT occupational database, which is no longer updated and which has been replaced by the O*NET database.

References

- Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2022). Work that can be done from home: Evidence on variation within and across occupations and industries. *Labour Economics*, 74, 102083. <https://doi.org/10.1016/j.labeco.2021.102083>
- Alipour, J. V., Fadinger, H., & Schymik, J. (2021). My home is my castle—The benefits of working from home during a pandemic crisis. *Journal of Public Economics*, 196, 104373. <https://doi.org/10.1016/j.jpubeco.2021.104373>
- Alipour, J. V., Falck, O., and Schüller, S. (2020). Germany's Capacity to Work from Home. CESifo Working Paper No. 8227, Version: November 2021.
- Arntz, M., Ben Yahmed, S. & Berlingieri, F. (2020). Working from Home and COVID-19: The Chances and Risks for Gender Gaps. *Intereconomics* 55(6), 381–386. <https://doi.org/10.1007/s10272-020-0938-5>
- CBS (2001), Standaard Beroepenclassificatie 1992, Editie 2001, Centraal Bureau voor de Statistiek, Voorburg/Heerlen, the Netherlands.
- Den Butter, F., & Mihaylov, E. (2013). Veranderende vaardigheden op de Nederlandse arbeidsmarkt. *Economisch Statistische Berichten*, 98(4670), 618-621.
- Dengler, K., Matthes, B., & Paulus, W. (2014). Occupational tasks in the German labour market. An alternative measurement on the basis of an expert database. FDZ-Methodenreport No. 12/2014 (en), Research Data Centre of the German Federal Employment Agency at the Institute for Employment Research, Nuremberg.
- Dingel, J. I., & Neiman, B. (2020). How many jobs can be done at home?. *Journal of Public Economics*, 189, 104235.
- Garrote Sanchez, D., Gomez Parra, N., Ozden, C., Rijkers, B., Viollaz, M., & Winkler, H. (2021). Who on earth can work from home?. *The World Bank Research Observer*, 36(1), 67-100. doi:10.1093/wbro/lkab002

- Gottlieb, C., Grobovšek, J., & Poschke, M. (2020). Working from home across countries. *Covid Economics* 8, 70-91.
- Gottlieb, C., Grobovšek, J., Poschke, M., & Saltiel, F. (2021). Working from home in developing countries. *European Economic Review*, 133, 103679. <https://doi.org/10.1016/j.euroecorev.2021.103679>
- Hatayama, M., Viollaz, M., and Winkler, H. (2020). Jobs' Amenability to Working from Home: Evidence from Skills Surveys for 53 Countries. *World Bank Policy Research Working Paper* No. 9241, Available at SSRN: <https://ssrn.com/abstract=3599548>
- Hensvik, L., Le Barbanchon, T., & Rathelot, R. (2020). Which Jobs Are Done from Home? Evidence from the American Time Use Survey. IZA Discussion Paper Series No. 13138, IZA – Institute of Labor Economics.
- Holgersen, H., Jia, Z. & Svenkerud, S. (2021). Who and how many can work from home? Evidence from task descriptions. *Journal for Labour Market Research*, 55(1), 1-13, ISSN 2510-5027, Springer, Heidelberg, <http://dx.doi.org/10.1186/s12651-021-00287-z>
- Irlacher, M., & Koch, M. (2021). Working from Home, Wages, and Regional Inequality in the Light of COVID-19. *Jahrbücher für Nationalökonomie und Statistik (Journal of Economics and Statistics)*, 241(3), 373-404. <https://doi.org/10.1515/jbnst-2020-0030>
- ROA-CBS (2014). Beroepenindeling ROA-CBS 2014. Research Centre for Education and the Labour Market (ROA) and Centraal Bureau voor de Statistiek (CBS), Maastricht, Den Haag/Heerlen, December 2014.
- Zimpelmann, C., von Gaudecker, H. M., Holler, R., Janys, L., & Siflinger, B. (2021). Hours and income dynamics during the Covid-19 pandemic: The case of the Netherlands. *Labour Economics*, 73, 102055. <https://doi.org/10.1016/j.labeco.2021.102055>

APPENDICES

A Classification of tasks (SBC92)

Table A1 presents the English translation of the 128 tasks and shows how they are classified. The original task descriptions (in Dutch) can be found in Appendix 2 (page 56) of the Netherlands Standard Classification of Occupations 1992, Edition 2001 (CBS, 2001).

Table A1. Tasks in the Netherlands Standard Classification of Occupations (SBC92)

English translation tasks SBC92	Teleworkable (yes/no)
001 MANAGING EXECUTIVES AND IMPLEMENTING POLICY Managing executives. Conducting strategic and tactical policy of a department, company or institution and making policy decisions.	Yes
002 MANAGING EMPLOYEES AND IMPLEMENTING POLICY Managing employees. Conducting strategic and tactical policy of a department, company or institution and making policy decisions.	Yes
003 MANAGING EMPLOYEES WITHOUT IMPLEMENTING POLICY Managing employees, without conducting strategic and tactical policy and policy decision making.	Yes
004 IMPLEMENTING POLICY WITHOUT MANAGING Conducting strategic and tactical policy of a company or institution and making decisions about it, without managing individuals.	Yes
005 PREPARING POLICY Preparing the policy of a department, company or institution, by providing oral and written advice on the basis of assignment from a policymaker. When preparing the policy, no decision is made about that policy. Implementing government policy is also part of this task.	Yes
006 PREPARING WORK, COORDINATING WORK Carrying out (preparatory) activities of organizational, coordinating nature to ensure smooth progress.	Yes
007 CALCULATE Carrying out (preparatory) activities of a financial nature to ensure smooth progress.	Yes
008 INSPECTION Monitoring compliance with regulations, ordinances and laws. For other types of inspection, see tasks 049 and 027.	Yes
009 ADVISING: LEGAL, TAX In various business, tax and family law matters giving advice and drawing up deeds, providing legal assistance, pleading and representing or chairing parties.	Yes
010 ADVISING: ORGANIZATIONAL	Yes

Providing advice on organizational aspects, such as company strategy and internal (production) organization.	
011 ADVISING: COMMERCIAL, ECONOMIC Providing advice in the economic or commercial field, such as sales strategy, market opportunities and advertising campaigns.	Yes
012 ADVISING: TECHNICAL, TECHNOLOGICAL Providing technological advice, for example, on the use of materials, production methods and environmental aspects.	Yes
013 ADVISING: SOCIAL, SOCIETY Giving advice, providing assistance and leading discussions in the social, cultural, pedagogical, and/or psychological field.	Yes
014 INFORMING Providing information both orally and in writing, in the form of lectures, talks with the press, press releases, brochures and the like. Also the lending in a library is part of this task. For other forms of informing, see task 032.	Yes
015 RESEARCHING: NON NUMERICAL Collecting, recording and editing data, which does not involve much calculation. The outcome is used to solve problems, implement improvements, adjust processes or instruments.	Yes
016 RESEARCHING: NUMERICAL (EXCLUDING ANALYST WORK) Collecting, recording and editing data, which involves a lot of calculation. The outcome is used to solve problems, implement improvements, adjust processes or instruments. Excluded are the tasks performed by analysts in laboratories. See also task 017.	Yes
017 ANALYST WORK Collecting and recording data according to a standardized analytical method, usually performed in a laboratory.	No
018 CONTROLLING, TESTING, SORTING Controlling, testing or sorting of raw materials and products by measurement or sensory assessment.	No
019 WRITING, EDITING, TRANSLATING Writing, editing, correcting and sometimes presenting messages and articles. Making translations orally (interpreters) or in writing. Also 'Artistic' writing is part of this task.	Yes
020 IT DEVELOPMENT, CONSULTING In the field of automation, designing information systems and associated software, compiling manuals and documentation, adjusting processes and/or giving advice with regard to the purchase or modification of computer equipment or software. For the management of automation tools and processing of data, see task 021.	Yes
021 IT MANAGEMENT, PROCESSING Managing computer programs (software) and sometimes computer equipment (hardware), including the control over the use of programs and	Yes

data. Edit and save data using computer programs. For the development of automation tools and advice on their use, see task 020.	
022 DESIGNING, CONSTRUCTING Creating designs and making them concrete through sketches, drawings and prototypes. Taking into account the wishes of clients and technical, aesthetic and economic possibilities. Also the designing of gardens is part of this task.	Yes
023 TECHNICAL DRAWING, CALCULATION, MEASUREMENT Making detailed drawings, calques, charts, material statements, specifications, budgets and models based on a sketch, drawing or model. Transfer the specified dimensions to materials processed by others.	Yes
024 PERFORMING HR ACTIVITIES Selecting, recruiting and firing workers. Mediating between supply and demand in the labor market. Advising and guiding with regard to training, courses and other career activities.	Yes
025 PERFORMING SECRETARIAL WORK Performing, independently and for others, a wide variety of among others administrative tasks, preparing and attending meetings, taking minutes, typing out concepts and also being representative.	Yes
026 ADMINISTER: NUMERICAL Carrying out administrative work that involves a lot of calculations, such as bookkeeping, compiling statistics, processing tax data and the like.	Yes
027 ADMINISTER: REVIEWING RULES Carrying out administrative work that involves checking against given laws, administrative and other arrangements, and performing actions that directly result from this. Also arrangements in the field of insurance are part of this task. For other forms of testing against rules, see tasks 008 and 049.	Yes
028 ADMINISTER: TEXTS Carrying out administrative work that involves a lot of text-work, such as conducting personnel administration, corresponding, composing texts from other texts, drawing up (standard) deeds and the like.	Yes
029 TYPING, TEXT PROCESSING Enter or type text or data supplied (more or less exclusively) by others.	Yes
030 PERFORMING ARCHIVE, LIBRARY WORK Characterize or summarize the content of writings or documents and store them systematically. The lending of these writings and documents is part of task 014. See also task 038 for goods other than writings and documents.	Yes
031 PERFORMING OFFICE SUPPORT ACTIVITIES Perform more or less exclusively relatively simple office work in support of (other) administrative activities, such as taking care of internal mail, copying, answering the phone, making coffee and the like.	No
032 RECEIVING	No

Speaking to and dealing with visitors, customers, clients and the like at companies or agencies using standard procedures. Also travel guiding is part of this task. For other forms of informing, see task 014.	
033 WHOLESALE TRADING Wholesale buying and selling goods, securities, services and other merchandise, or acting as an intermediary in this regard. Acquiring assignments and performing valuations on the basis of experience with prices in an industry.	Yes
034 PURCHASING Purchasing, renting or leasing raw materials, products and services whose price, quality and delivery conditions fit within the production and sales policy. Thereby carrying out a thorough market exploration and tender processing.	Yes
035 SELLING: REPRESENTING Selling, renting or leasing goods or services. For this, visit customers at their homes or work premises. Provide information and give advice about composition, usage and application possibilities.	Yes
036 SELLING (EXCL REPRESENTING) Selling, renting or leasing goods or services. It can be done both over the telephone and directly. Provide information and advice about composition, usage and application possibilities. Also acquisition, making quotations and selling advertisements are part of this task. If only payment is made, it is part of task 037. For other forms of sales, see tasks 033 and 035.	Yes
037 CHECKOUT Pay at the cash register or at the counter, issue admission tickets or savings stamps, exchange or return vouchers. When, in addition to payment, also information and advice is provided about products, this is part of task 036.	No
038 STORING, ISSUEING In a warehouse, storeroom, timber yard and the like, checking incoming goods for quality and quantity, storing, issuing and ensuring administrative processing. The systematic storing of writings and documents is part of task 030.	No
039 LOADING, UNLOADING Using physical force and non-motorized aids, loading and unloading goods from ships, airplanes, trains and (truck) cars. During loading, goods are often checked for quantity. For other forms of moving goods, see tasks 041 and 042.	No
040 DELIVERING Bringing goods or materials to someone. Also the administrative actions necessary for this are part of this task.	No
041 TRANSPORTING, CARRYING	No

Transporting goods or materials using physical force or non-motorized means of transport. Inputs and outputs of production machines are part of task 091. For other forms of moving goods, see tasks 039 and 042.	
042 OPERATING MOBILE MACHINES, CRANES Carrying out work using moving machines or cranes. This often involves acting on the instructions of others. Moving loads with a forklift is also part of this task. Driving rail vehicles is part of task 045.	No
043 STEERING AIRCRAFT Operate a passenger, cargo, helicopter or air-cushion craft for the transport of persons and/or goods. Also the instruction of pilots, testing of pilots or aircrafts and making of a flight plan on board is part of this task.	No
044 STEERING VESSELS Operate a passenger, cargo ship, fishing vessel, tug or push barge by means of rudder control, navigation and pilotage, for the transport of persons and/or goods. Also the operation of a guided ferry is part of this task. The operation of an air-cushion vessel is part of task 043.	No
045 DRIVING RAIL VEHICLE Driving a metro, tram, train or locomotive for the transport of persons and/or goods. Internal transport with a locomotive is also part of this task.	No
046 DRIVING TRUCK Driving a truck, truck combination or truck with trailer for the transport of goods. Loading and unloading or supervising it. Taking care of customs formalities for international transport.	No
047 DRIVING A BUS Driving a bus, trolleybus or coach for the transport of persons.	No
048 DRIVING PASSENGER CAR, VAN Driving a passenger car, taxi, minibus or ambulance for the transport of persons. Driving a delivery van for the transport of goods. The loading and unloading of the delivery van and the payment of delivered goods and materials is usually done by the driver her/himself.	No
049 GUARDING, SECURING, MONITORING Maintain public order and safety, conduct surveillance and security services with regard to persons, goods and objects (installations, buildings, sites, environment and nature). Check seat, entry tickets and identification cards. Check and register cargo papers and the like. For others forms of monitoring, see tasks 008 and 027.	No
050 HOUSEHOLD, OFFICE CLEANING Carrying out cleaning work in the household or at school, office, company or hospital. For other forms of cleaning, see tasks 051 and 104.	No
051 CLEANING, INDUSTRIAL CLEANING Cleaning large objects and installations or removing rust, old paint or weather damage. The cleaning of streets, sewers, chimneys, windows,	No

glass facades, tanks, clothing and textiles is also part of this task. For other forms of cleaning, see tasks 050 and 104.	
052 MELTING, MOLDING, POURING Making metal or plastic liquid by heating or by adding chemicals and during this process adding other metals or substances to improve the properties of the substance. Making molds using molds and dies. Pouring liquid metal or plastic into a mould, filling the hollow mold with metal or plastic. For solid state shaping of metal and plastics, see task 056.	No
053 MACHINING Apply one of the machining techniques in metalworking, such as turning, milling, drilling, reaming, chamfering, planing, grinding, polishing. Manual or computer-assisted setting of the bench. For applying multiple techniques common in metalworking, see task 054.	No
054 BENCHWORKING Apply multiple techniques, tools and machinery common in metalworking. This includes turning, milling, drilling, reaming, chamfering, planing, grinding, polishing. Manual or computer-assisted setting of the benches. For the application of one of these techniques, see task 053.	No
055 TOOL MAKING, FINE BENCHWORKING, INSTRUMENT MAKING Manufacturing workpieces that require a high degree of accuracy (moulds and dies, machine parts, tools, medical instruments, measuring equipment, aircraft instruments). This task uses almost all tools and machines in a metal workshop. This task also includes assembling, repairing or overhauling clocks and building and maintaining products by hand or with hand tools for which manufacturing requires great precision, such as prostheses and musical instruments.	No
056 PLASTIC DESIGN Transforming metal, natural materials or plastic in solid form by means of forging, rolling, pressing, extruding, moulding, turning (for example on a potter's wheel) and the like. For shaping metal and plastic materials in a liquid form, see task 052.	No
057 PLATE WORKS Modeling sheet material mechanically and with hand tools according to drawing or knocking and performing activities such as marking, cutting, sawing, cutting, shaping (machine) or knocking (hand).	No
058 WELDING, CUTTING, SOLDERING Burning products together by means of welding or soldering, or setting products apart by cutting flames.	No
059 ISOLATE Installing insulation material in or on walls, facades, roofs and pipes, including the coating of pipes. This task applies if only insulation material is applied. These work activities can also be found as elements of task 076.	No

<p>060 ASSEMBLING: PIPES (INSTALLATION TECHNIQUE)</p> <p>Bending pipelines according to drawing or sketch, making them ready and attaching them together. Connecting, maintaining and, if necessary, repairing the installations. Connecting pumps and heating boilers and the like is also part of this task.</p>	No
<p>061 ASSEMBLING: CONSTRUCTIONS</p> <p>Setting up, dismantling or assembling construction works, car bodies, airplane fuselages and the like from pre-processed profiles and sheets in a construction workshop or on site according to drawing.</p>	No
<p>062 MOUNTING, ASSEMBLING: MACHINES, DEVICES</p> <p>Building up, erecting, aligning machines, equipment and installations from parts on site according to drawing and putting them into operation. The installation of elevators is also part of this task.</p>	No
<p>063 ASSEMBLING, REPAIRING: MECHANICAL</p> <p>Carrying out mechanical assembly work according to drawing and detecting and repairing faults in installations. Mechanical means things like gears, shafts, taps, valves, rods and the like. When replacing parts, they are often manufactured in-house.</p>	No
<p>064 MAINTENANING, REPAIRING: (MOTOR) VEHICLES</p> <p>Checking the proper functioning of cars, tractors, motorcycles, (moped) bicycles and small two-stroke engines, maintaining them, repairing or overhauling engines. Also the maintenance and repair of vessels is part of this task.</p>	No
<p>065 INSTALLING, REPAIRING: STRONG CURRENT</p> <p>Building, installing, maintaining and repairing electrical light and power installations (greater than or equal to 220 volts) with corresponding motors according to drawing or diagram. The installation and repair of lightning rods and neon signs is also part of this task. For other electrotechnical works, see task 066 and 067.</p>	No
<p>066 INSTALLING, REPAIRING: WEAK CURRENT</p> <p>Building, installing, maintaining and repairing low-voltage installations according to drawing or diagram. Examples of low-voltage installations are telecommunications, control circuits and the electrical installations of cars and aircraft. For other electrotechnical works, see task 065 and 067.</p>	No
<p>067 INSTALLING, REPAIRING: ELECTRONICS</p> <p>Installing, maintaining and repairing electronic equipment according to drawing or diagram. Examples of electronics applications include video, audio, computer and radar equipment. For other electrotechnical works, see task 065 and 066.</p>	No
<p>068 MASONRY, JOINING, BRICKLAYING</p> <p>Carrying out all kinds of masonry according to work drawing or general instructions. Cutting out masonry joints, cleaning and filling with mortar.</p>	No

Covering walls, floors and the like with tiles or flagstones. Stone carving is also part of this task. For related activities, see task 069, 073 and 080.	
069 PLASTERING Provide ceilings, walls and floors with a decorative plasterboard, plasterboard or concrete slab and the like. Pouring decorative concrete and terrazzo works are also part of this task. For related activities, see task 068, 073 and 080.	No
070 PERFORMING CONCRETE, CONCRETE STEEL WORKS Pouring concrete in liquid form into formwork and tamping. Cutting, bending, braiding and adjusting concrete steel. Making formwork for concrete is part of task 071.	No
071 CARPENTRY Carrying out a wide variety of carpentry and adjustment work with hand tools and with the use of woodworking machines. Installation of doors and windows, concrete carpentry, furniture making and installation and adjustment of partition walls is also part of this task.	No
072 MACHINE WOODWORKING Manufacture products or semi-finished products according to drawing or model with woodworking machines.	No
073 FLOOR COVERING, UPHOLSTERY Upholster or install wallpaper on walls. Apply floor covering. Upholster and fill furniture. Measuring, assembling and installing curtains, curtain rails and curtain caps. Sewing curtains is part of task 085.	No
074 PAINTING, COLORING, SPRAYING Provide large surfaces or series of objects with a protective or decorative layer with hand tools or by spraying or painting. Preparatory work, such as removing rust, sanding and filling, is also part of this task.	No
075 GLASS SETTING, GLASS CUTTING Cutting and fitting glass to size. The installation of double glass is also part of this task.	No
076 COVERING ROOFS Covering roofs with reed, slate, tiles, bitumen or roofing sheets. The application of insulation material can also be part of this task. If only insulation material is applied, then task 059 applies.	No
077 MAINTENANCE WORK: CARPENTRY, MASONRY, GLASS SETTING Carrying out general maintenance of buildings and houses, with an emphasis on carpentry, bricklaying and glazing. For related activities, see task 068, 071, 075, 078 and 079.	No
078 MAINTENANCE WORK: ELECTRICAL INSTALLATIONS Carrying out general maintenance of buildings and houses, with an emphasis on the maintenance of electrical installations. For related activities, see task 065, 077 and 079.	No

<p>079 MAINTENANCE WORK: GAS, WATER, HEATING INSTALLATIONS</p> <p>Carrying out general maintenance of buildings and houses, with an emphasis on plumbing such as minor maintenance of gas, water, heating and air-conditioning installations. For related activities, see task 060, 077 and 078.</p>	No
<p>080 STREET MAKING, EARTHWORKS</p> <p>Placing boulders, cobblestones, tiles and the like on roads, paths or sidewalks. Covering dikes and quays with basalt or stone blocks. This task also includes laying factory floors, setting out earthworks and paving, and setting pits and curbstones. For related activities, see task 068, 069 and 073.</p>	No
<p>081 PREPARING TO PRINT: TEXT</p> <p>Setting texts for printing using photo equipment or a computer. Assemble the typeset texts on paper or film into one or more pages. Making the actual printing form. For related activities, see task 082.</p>	No
<p>082 PREPARING TO PRINT: IMAGE</p> <p>Making images on paper or on photographic film for the purpose of printing. Process the photographic images further and assemble them on paper or film into one or more pages. Making the actual printing form. For related activities, see task 081.</p>	No
<p>083 PRINTING</p> <p>Printing material in one or more colours.</p>	No
<p>084 GRAPHIC POST-PROCESSING</p> <p>Manual or machine cutting, punching, gluing, binding and the like of printed materials.</p>	No
<p>085 PERFORMING CONFECTION WORK, MAKING CLOTHES</p> <p>Transferring garment designs to patterned paper, cutting, assembling, stitching, pressing, finishing, embroidery and mending of garments and textile fabrics. Also sewing curtains, sunshades, awnings (including sticking, welding) and the like is part of this task.</p>	No
<p>086 PROCESSING LEATHER</p> <p>Pre-processing, dyeing and processing leather or fur. Shoe making and repairing is also part of this task.</p>	No
<p>087 CUTTING, SLAUGHTERING</p> <p>Slaughtering animals, boning and cutting meat. Gibbing herring, cleaning fish, filleting and cutting into slices. Preserve meat, meat products and fish.</p>	No
<p>088 PREPARING FOOD (NOT READY-TO-USE)</p> <p>Prepare foods that are not supplied ready-to-use using hand tools in a production plant or kitchen. For the preparation of ready-to-use foods, see task 089.</p>	No
<p>089 PREPARING FOOD (READY-TO-USE)</p>	No

Prepare simple foods that are often supplied ready-to-use, such as fish, waffles, French fries and mini pancakes. For the preparation of other foods, see task 088.	
090 SERVING Advise guests in a catering establishment on the choice of their meals, drinks and the like, serve dishes at the table and provide guests with drinks. Serving dishes and drinks in a hospital, retirement residence and the like is also part of this task.	No
091 OPERATING PRODUCTION MACHINERY, EQUIPMENT Manufacture or process large series of products with machines or installations by switching the machines and installations on and off, supply and remove materials and, if necessary, adjust the machines and installations according to applied marking stripes. For related activities, see task 092 and 093.	No
092 SETTING UP, CONVERTING PRODUCTION MACHINES Prepare machines or production lines for production by converting and adjusting them for another process. Lubricate moving parts of a machine after cleaning. For related activities, see task 091.	No
093 MONITORING (PRODUCTION) PROCESSES Start up, adjust, monitor and, if necessary, switch to manual operation or stop of almost fully automated processes. Inform experts if certain limits are exceeded. For related activities, see task 091.	No
094 PUTTING TOGETHER, ASSEMBLING Building (semi-)products together using bolts and nuts or techniques such as soldering, riveting and sticking. This is about line production. If there is no line production, this is part of one of the other tasks.	No
095 PACKING, WRAPPING (MANUAL) Manual packing of goods. The mechanical packing of goods is part of task 091.	No
096 DEMOLISHING Breaking apart objects or structures by force. For related activities, see task 097.	No
097 DISASSEMBLING Dismantling of objects, machines, equipment and the like by carefully disassembling them. For related activities, see task 096.	No
098 CRAFT PRODUCTION, REPAIR Manufacture products by hand or simple tools. This task is usually combined together with another task to indicate what is being produced.	No
099 GIVING LESSONS, TEACHING Transferring knowledge and skills through teaching, instructing and developing teaching materials. Also the development of teaching materials, teaching aids and supervision of toddlers is part of this task. For related activities, see task 100.	Yes

<p>100 PROVIDING TRAINING (PHYSICAL)</p> <p>Through giving lessons, teaching and instructing, teaching people skills to increase physical performance and body control. The development of training methods is also part of this task. For related activities, see task 099.</p>	No
<p>101 HEALING PEOPLE</p> <p>Maintaining the mental or physical health of people as much as possible through examination (inspection), diagnosis and treatment. For related activities, see task 102, 103 and 105.</p>	No
<p>102 MEDICAL ASSISTANCE: TECHNICAL</p> <p>Assisting a physician during work by operating X-ray, ultrasound, radiation, eye-measurement, EEG, ECG, lung function equipment and the like. For related activities, see task 101 and 103.</p>	No
<p>103 MEDICAL ASSISTANCE: NON TECHNICAL</p> <p>Assisting a physician during work by giving instruments and preparing prescriptions. Also the making or compounding of medicines in a pharmacy is part of this task. For related activities, see task 101 and 102.</p>	No
<p>104 STERILIZING</p> <p>Sterilizing and cleaning laboratory and medical instruments and tools. For other forms of cleaning, see task 050 and 051.</p>	No
<p>105 THERAPEUTICAL ASSISTANCE (PHYSICAL)</p> <p>Treating and guiding people with physical disorders (movement, speech, feeding, body parts) in order to eliminate the problems or prevent deterioration. For related activities, see task 101 and 106.</p>	No
<p>106 AGOGICAL, SOCIAL GUIDANCE</p> <p>Guiding people with mental, learning, budget management, relationship, psychosocial or parenting problems on the basis of a treatment plan, and after consultation with experts and colleagues, to solve the problems. For related activities, see task 105.</p>	No
<p>107 NURSING</p> <p>Nursing mentally or physically ill or needy people. Performing prescribed medical procedures, such as connecting, operating and checking medical aid equipment. The care during ambulance transport is also part of this task. For other forms of caring for the needy, see task 108.</p>	No
<p>108 TAKING CARE OF, HELPING PEOPLE</p> <p>Taking care of people in need, at home or in a facility. Maternity care is also part of this task. For nursing people in need, see task 107.</p>	No
<p>109 TAKING CARE OF APPEARANCE</p> <p>Taking care of the appearance of people such as hair, skin, nails, face, hands and feet. Applying make-up is also part of this task.</p>	No
<p>110 HEALING ANIMALS</p> <p>Maintaining animal health through examination (inspection), diagnosis and treatment. A vet usually runs an in-house pharmacy. The inspection of</p>	No

meat at slaughter is also part of this task. For related activities, see task 111.	
<p>111 VETERINARY MEDICINE ASSISTANCE</p> <p>Assisting a veterinary practitioner in the care, treatment and examination of animals, by operating equipment, giving and sterilizing instruments, preparing prescriptions, administering medicines, performing simple bacteriological or medical/physical tests and insemination. For related activities, see task 110 and 112.</p>	No
<p>112 TAKING CARE OF, TRAINING ANIMALS</p> <p>Taking care of the well-being, feeding and appearance of (test) animals. Training or taming animals. Driving horse is also part of this task. For related activities, see task 111.</p>	No
<p>113 HUNTING, PEST CONTROL</p> <p>Maintaining the animal population or combating vermin by shooting, catching, exterminating or disinfecting.</p>	No
<p>114 DOING HORTICULTURE WORK</p> <p>Growing, caring for and harvesting plants, flowers and fruits. To this end, among other things, ensuring good water management and good climate control in greenhouses. Fruit growing is also part of this task.</p>	No
<p>115 DOING GARDENING WORK</p> <p>Building and maintaining gardens, small parks, green areas and parks. Maintaining watercourses, roadsides and, for example, cemeteries. The diagnosis and treatment of tree diseases is also part of this task. For related activities, see task 118.</p>	No
<p>116 PERFORMING AGRICULTURAL WORK (EXCL. LIVESTOCK)</p> <p>Sow or plant on a farm, till the soil, control weeds and harvest crops. To this end, among other things, operate, adjust and maintain agricultural machines and vehicles.</p>	No
<p>117 PERFORMING LIVESTOCK WORK</p> <p>Taking care of, selecting, inseminating, inspecting and fattening of (poultry) livestock on a livestock farm. To this end, among other things, operate, adjust and maintain machines and vehicles. Also manufacturing dairy products.</p>	No
<p>118 PERFORMING FORESTRY WORK</p> <p>Growing seedlings from seed, caring for young plants, controlling weeds and wild growth, tilling the soil, harvesting wood and monitoring the quality of the forest. To this end, among other things, operate, adjust and maintain machines and vehicles. For related activities, see task 115.</p>	No
<p>119 PERFORMING FISHING WORK</p> <p>Catching, cleaning and freezing fish on board a fishing vessel. Also performing maintenance work on the fishing equipment. The growing, harvesting and fishing for crustaceans and freshwater fish is also part of this task.</p>	No

120 OPERATE IMAGE, SOUND, TRANSMISSION, LIGHTING EQUIPMENT Photography and film developing and printing. Making image and sound recordings with film, video and audio equipment. Editing and compiling image and sound recordings. Operate lighting installations and transmission equipment. Artistic photography is part of task 127.	No
121 ACTING, DIRECTING Performing roles for stage, opera/opera, revue, musical, radio, television, or film. Directing stage, theatre, radio, television and film productions.	No
122 EXHIBITING, PRESENTING PROGRAMS Exhibiting art. Presenting and announcing programs on radio, television or in a theatre. Reporting on radio or television and displaying are also part of this task.	No
123 PRESENTING APPEARANCE Presenting one's own appearance for photo reports, fashion shows and the like.	No
124 DANCING Performing dances, alone or in a group, for an audience with the accompaniment of music. Choreography, mime and giving dance lessons (if not in regular education) are also part of this task. Giving dance lessons in regular education is part of task 099.	No
125 SINGING Performing musical pieces publicly, by means of the human voice. Conducting a choir and giving singing lessons (if not in regular education) are also part of this task. Teaching music in regular education is part of task 099.	No
126 MAKING MUSIC, CONDUCTING, COMPOSING Playing a musical instrument. Instructing groups of performing musicians during rehearsals and musically directing the performance. Composing and arranging music. Teaching how to play a musical instrument (if not in regular education) is also part of this task. Teaching music in regular education is part of task 099.	Yes
127 PRACTICING VISUAL ARTS Making works of art. Also drawing, illustrating, art painting, artistic photography, goldsmiths and art blacksmiths, clothing and industrial design, and the restoration of art objects are part of this task.	Yes
128 PLAYING SPORTS Practicing a certain branch of (cognitive) sport for money. To this end, train regularly under the guidance of a sports instructor, trainer or coach.	No

B Crosswalks between SBC92, ISCO08 and BRC2014

Table B1 shows the double crosswalk that is used to link our telework index to various occupation-level datasets provided by StatLine. The crosswalk involves two steps: the first one links (n:m) 1,211 SBC92 occupations to 410 ISCO08 occupations, and the second one connects (n:1) 410 ISCO08 occupations to 112 BRC2014 occupations. Take, for example, BRC2014 occupation 1113 (waiters and bar staff) – the telework score of this occupation is calculated as a weighted average of the scores of SBC92 occupations 11106 (assistant restaurant, cafeteria), 11108 (buffet, bar attendant), 37203 (waiter, waitress), 57206 (headwaiter), 77301 (steward passenger ship, purser merchant ship), 37302 (cafe, bar owner)¹⁶.

Table B1. Crosswalks between SBC92, ISCO08 and BRC2014 (an example)

SBC92 <i>1,211 occupations (5-digit)</i>	ISCO08 <i>410 occupations (4-digit)*</i>	BRC2014 <i>112 occupations**</i>
11106	5131	1113
11108		
37203		
57206		
77301		
11108	5132	
37302		

Notes: * ISCO08 contains 436 occupations, 26 of which are missing in the first crosswalk because they either do not have a corresponding SBC92 occupation (e.g., Water and Firewood Collectors (9624)) or their size is too small.

** BRC2014 contains 114 occupations; two BRC2014 occupations (Managers without further differentiation (551) and Others (1311)) are not merged with SBC92.

Eventually, there are two BRC2014 occupations (Managers without further differentiation (551) and Others (1311)) that are not merged with SBC92. Together they make up for less than 1.8% of total employment in 2021 and, therefore, we choose not to impute scores for them. If we would impute scores, they would be very broad and unprecise. Consider, for example, the occupation Others (1311) – in the second crosswalk Others is linked to 3 major (one-digit), 8 sub-major (two-digit), 1 minor (three-digit), and 7 four-digit ISCO08 occupations, whereas all

¹⁶ Statistics Netherlands provides two alternative crosswalks between SBC92 and ISCO08. The first one links (n:m) 1,211 SBC92 occupations to 410 ISCO08 occupations, and the second one links (1:n) 1,049 SBC92 occupations to 327 ISCO08 occupations. As Table B1 shows, we chose to use the first crosswalk because it includes more occupations. We would like to thank Dr. Sue Westerman from Statistics Netherlands for providing valuable information on the pros and cons of both crosswalks; the final decision on which crosswalk to use is ours.

7 four-digit occupations are missing in the first crosswalk. If we would impute a score for Others, it would thus be based on all four-digit occupations within the 3 major, 8 sub-major and 1 minor groups and would cover more than 240 four-digit ISCO08 occupations (which is about 55% of all four-digit ISCO08 occupations).

The two crosswalks are downloaded from the website of Statistics Netherlands¹⁷.

Employment weights

The WFH measure is converted from SBC92 to ISCO08 and BRC2014 using employment weights. The variable “Beroepsbevolking; beroepsklassen 1996-2011” (StatLine) serves as a weight and provides employment statistics for 121 SBC92 occupations (3-digit level). Unfortunately, we do not have employment data at the level of 1,211 occupations (5-digit). Therefore, we follow the strategy of Dengler, Matthes and Paulus (2014) and distribute the number of employed persons (shortly, workers) in each 3-digit occupation group equally among the 5-digit occupations within the group. For example, occupation group 211 (lower non-specialist occupations) includes 10 occupations (5-digit level) and counts 16,000 workers in 2011. We calculate employment for the 10 occupations in the group as $16,000/10 = 1,600$. The weights are based on employment in 2011.

For consistency, we use the same employment weights (i.e., number of workers by SBC92 occupation in 2011) whenever we aggregate the WFH index. This is thus also the case when we aggregate the already converted index – for example, from 4 to 1-digit ISCO08 level or from 3 to 1-digit BRC2014 level.

The correlations in Table 1-7, 9 and 11 are unweighted because we want to give equal weight to all occupations and, therefore, not to affect the estimated relationship between the ability to work from home and various occupation-specific characteristics by the size of occupations. However, the use of weights does not seem to have much influence on the estimated correlations. See, for example, Table C1 and C2 in Appendix C where we replicate the unweighted results in Table 1 and 2 using two different employment weights – the number of workers by SBC92 occupation in 2011 (“Beroepsbevolking; beroepsklassen 1996-2011”) and the number of workers by BRC2014 occupation in 2019 (Werkzame beroepsbevolking; beroep). We chose the year 2019 for the second weight, because this is the last pre-pandemic year and the employment numbers in that year are unaffected by the Coronavirus-pandemic.

¹⁷ <https://www.cbs.nl/nl-nl/onze-diensten/methoden/classificaties/onderwijs-en-beroepen/beroepenclassificatie--isco-en-sbc-->. File names “Schakelschema n:m SBC92 – ISCO2008” and “Schakelschema ISCO2008 – BRC 2014”, last access on June 30, 2022.

Also, the occupation-specific variables for which the correlations are calculated are from the year 2019.

C Additional results

C.1 Tables and graphs

Table C1. Relationship between WFH score and occupational characteristics (physical workload) – Unweighted versus weighted comparison

		Bivariate correlations		
		WFH score		
		Unweighted	Weighted 2019	Weighted 2011
Physical strength	Use a lot of force regularly	-0.7445	-0.7238	-0.7521
Noise and vibrations	Talk loudly regularly	-0.5437	-0.4726	-0.5427
	Deal with vibrations regularly	-0.6245	-0.5392	-0.6139
Dangerous work and hazardous substances	Do dangerous work	-0.7314	-0.6489	-0.7052
	Work with fluid substances	-0.5144	-0.5515	-0.5613
	Get substances on skin	-0.5897	-0.5767	-0.6016
	Inhale substances	-0.5966	-0.5102	-0.6023
	Work with infected people/animals	-0.2721	-0.2758	-0.3241
Workplace posture	Work in uncomfortable positions	-0.7039	-0.6725	-0.7476
	Make repetitive movements	-0.7638	-0.7456	-0.7415
	Work on screens (hours a day)	0.7830	0.7435	0.7389
Observations: 72 occupation groups				

Source: own calculations based on WFH index and StatLine (Fysieke arbeidsbelasting werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. The weights in 2011 and 2019 measure, respectively, the number of workers by SBC92 occupation in 2011 (“Beroepsbevolking; beroepsklassen 1996-2011”) and the number of workers by BRC2014 occupation in 2019 (Werkzame beroepsbevolking; beroep). StatLine data for 2019.

Table C2. Relationship between WFH score and occupational characteristics (psychosocial workload) – Unweighted versus weighted comparison

		Bivariate correlations		
		WFH score		
		Unweighted	Weighted 2019	Weighted 2011
Workload	Work very fast	0.0377	-0.1019	0.0333
	Do a lot of work	0.4838	0.3690	0.4157
	Work extra hard	0.3631	0.2316	0.3353
	Decide how to do own work	0.7351	0.7121	0.6703

Independence at work	Determine work order	0.7471	0.7146	0.6875
	Determine work pace	0.6373	0.6253	0.5718
	Find solutions	0.7043	0.6942	0.6746
	Take a leave whenever needed	0.4035	0.4303	0.3309
	Determine working hours	0.6610	0.5983	0.5481
Emotionally demanding work	Emotionally difficult work situations	-0.0693	-0.0935	-0.1073
	Emotionally demanding work	0.0011	-0.0542	-0.0428
	Emotionally attached to work	0.3955	0.3224	0.3170
Victimisation at work	Unwanted sexual attention from customers	-0.3565	-0.4375	-0.4401
	Unwanted sexual attention from supervisors or colleagues	-0.0578	-0.1154	-0.0820
	Intimidation by customers	-0.2073	-0.2576	-0.2381
	Intimidation by supervisors or colleagues	-0.2436	-0.1723	-0.2464
	Physical violence by customers	-0.2910	-0.3287	-0.3325
	Physical violence by supervisors or colleagues	-0.4798	-0.5082	-0.5184
	Bullying by customers	-0.2969	-0.3460	-0.2842
	Bullying by supervisors or colleagues	-0.3840	-0.3136	-0.3663
Psychological fatigue from work	Psychological fatigue from work	0.0634	0.0643	0.0427
	Emotionally exhausted from work	0.2349	0.1900	0.1876
	Feel empty at the end of working day	0.1790	0.1845	0.1668
	Feel tired in the morning	-0.0334	0.0143	-0.0510
	Takes a lot to work with people	0.2183	0.1602	0.1503
	Exhausted from work	-0.3867	-0.3872	-0.3498
Observations: 72 occupation groups				

Source: own calculations based on WFH index and StatLine (Psycho-sociale arbeidsbelasting werknemers; beroep). The 72 occupation groups are according to BRC2014. BRC2014 contains 114 occupation groups, but because of missing observations in StatLine there are fewer observations in the table. The weights in 2011 and 2019 measure, respectively, the number of workers by SBC92 occupation in 2011 (“Beroepsbevolking; beroepsklassen 1996-2011”) and the number of workers by BRC2014 occupation in 2019 (Werkzame beroepsbevolking; beroep). StatLine data for 2019.

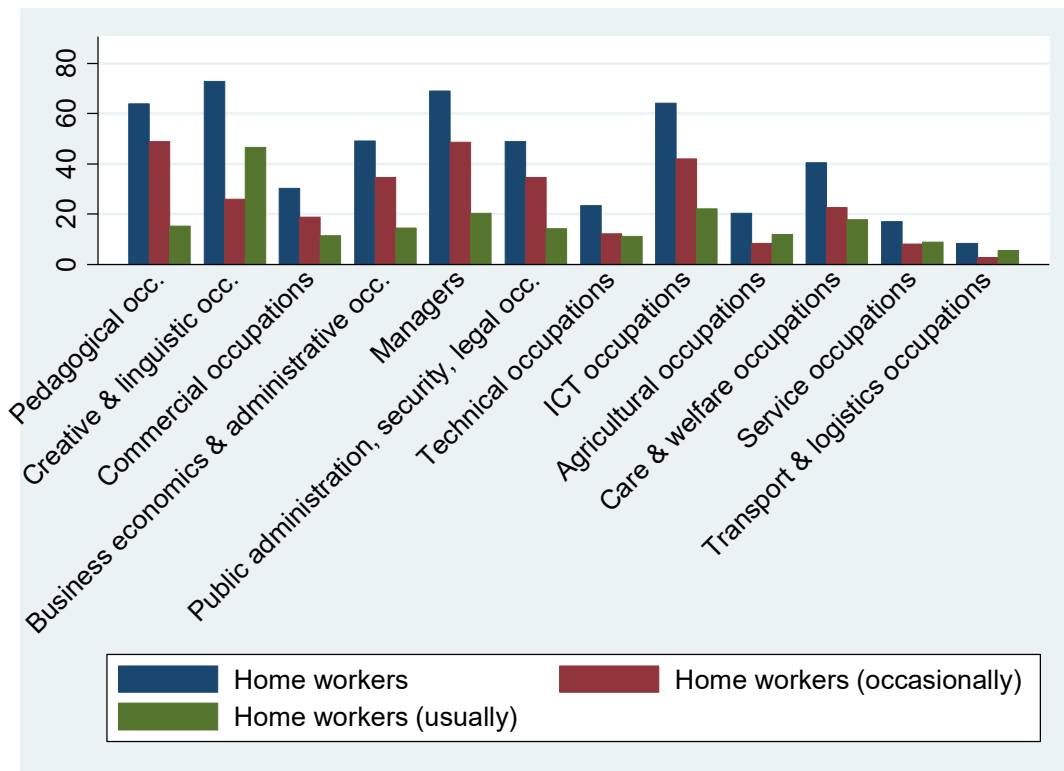


Figure C1. Share of people working from home by occupation class (BRC2014).

Source: graph based on CBS data (Thuiswerkers per beroep, 2019). The aggregated data is weighted by the number of workers in SBC92 occupations (5-digit) in 2011.

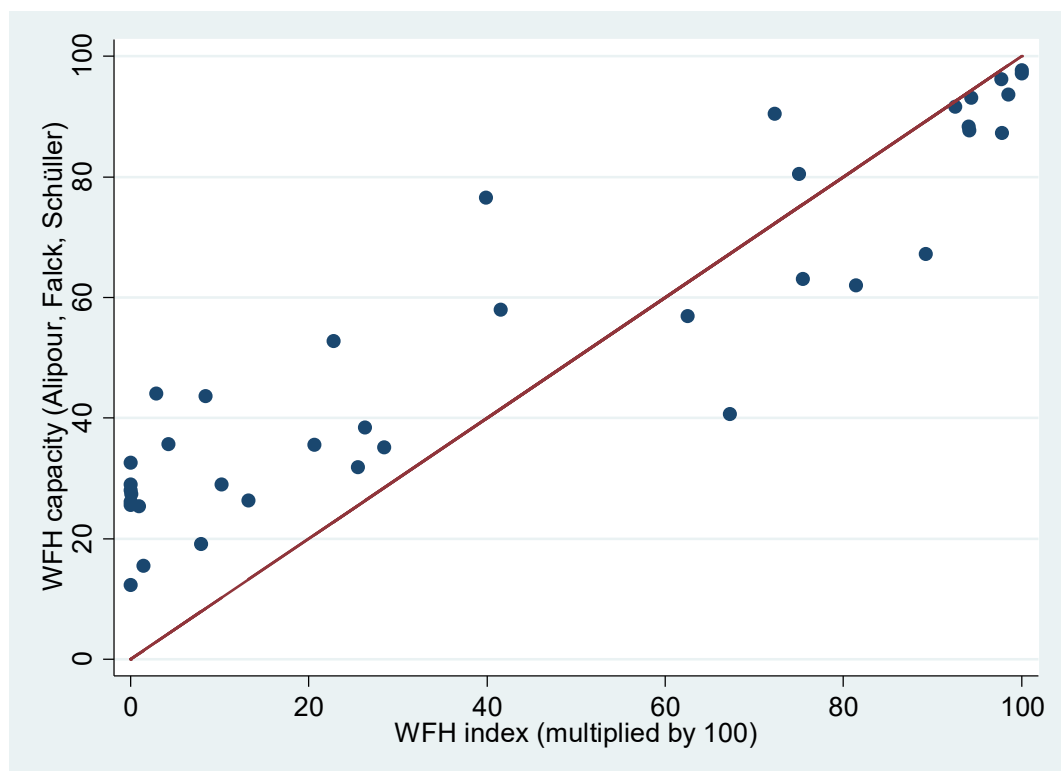


Figure C2. Comparison WFH index and WFH capacity measure of Alipour, Falck and Schüller (2020, Table A3, p.26).

WFH capacity measure of Alipour, Falck and Schüller (2020) refers to the share of WFH feasible jobs in an occupation. Dots represent 2-digit ISCO08 occupations and straight line depicts the 45-degree line. Correlation coefficient between both variables is 0.92.

C.2 Trends in working overtime, working outside office hours, and changing occupations

Figure C3 and C4 depict the development of working overtime and working outside office hours for 12 occupation classes between 2006 and 2020. Figure C3 shows the share of workers who report to regularly or sometimes work overtime (i.e., work more hours than contractually agreed), while Figure C4 presents the share of workers who regularly or sometimes work outside office hours (i.e., work between 7 p.m. - 6 a.m. or in the weekend). Looking at the first graph, a few remarks are in place. First, the groups of managers and pedagogical occupations have the highest shares of workers who regularly work overtime, while the service and agricultural occupations have the lowest shares of overtime workers. Second, for most occupation classes the share of workers who regularly work overtime exhibits a decreasing trend, while the share of workers who sometimes work overtime shows an upward trend. An exception to this are the pedagogical, agricultural, and service occupations, all of which have a stable share of workers who regularly work overtime - this share is about 40% for the pedagogical occupations and about 20% for the other two occupations.

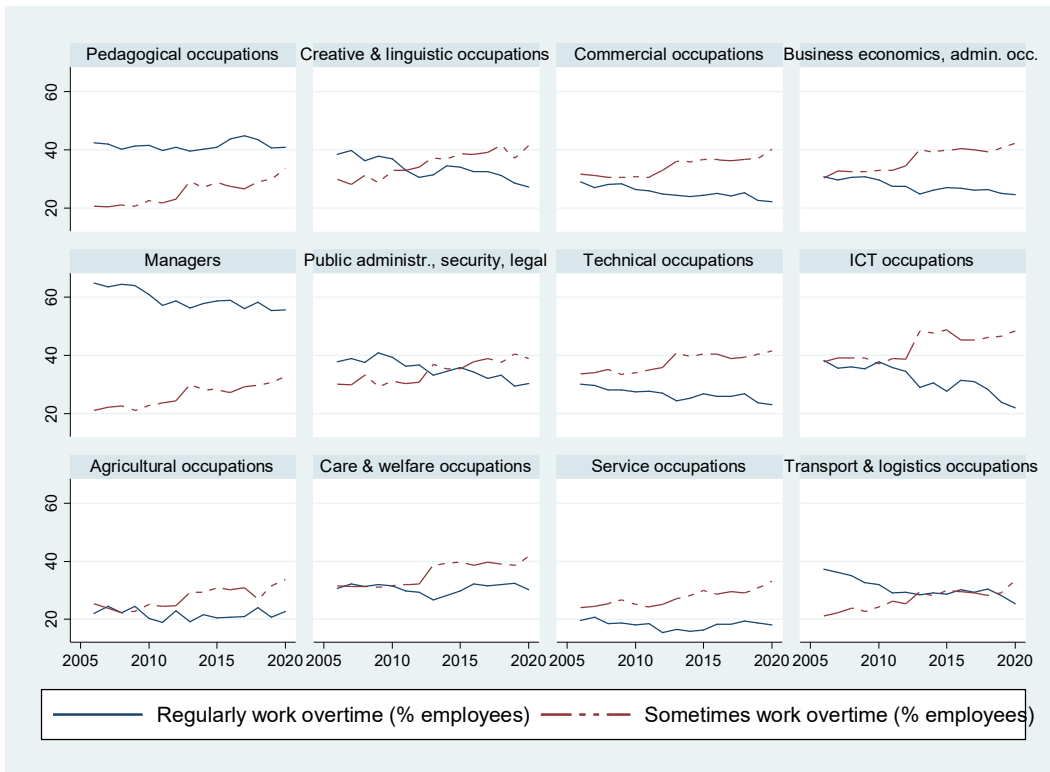


Figure C3. Trends in working overtime by occupation class (BRC2014); 2006-2020.
Source: graph based on StatLine data (Werknemers; mate van overwerken).

Figure C4 depicts the share of workers who regularly or sometimes work outside office hours by occupation class. As the graph shows, more than fifty percent of the workers in commercial, agricultural, care and welfare, service, and transport and logistics occupations work regularly outside office hours (this share is even around 60% for the service, and transport and logistics occupations). On the other side, pedagogical, business economics and administrative, technical, and ICT occupations have the lowest shares of workers who regularly work outside office hours. Both figures clearly show that working outside office hours is a different measure than working overtime, and the occupations that have the highest prevalence of working overtime are different than the ones with the highest shares of working outside office hours.

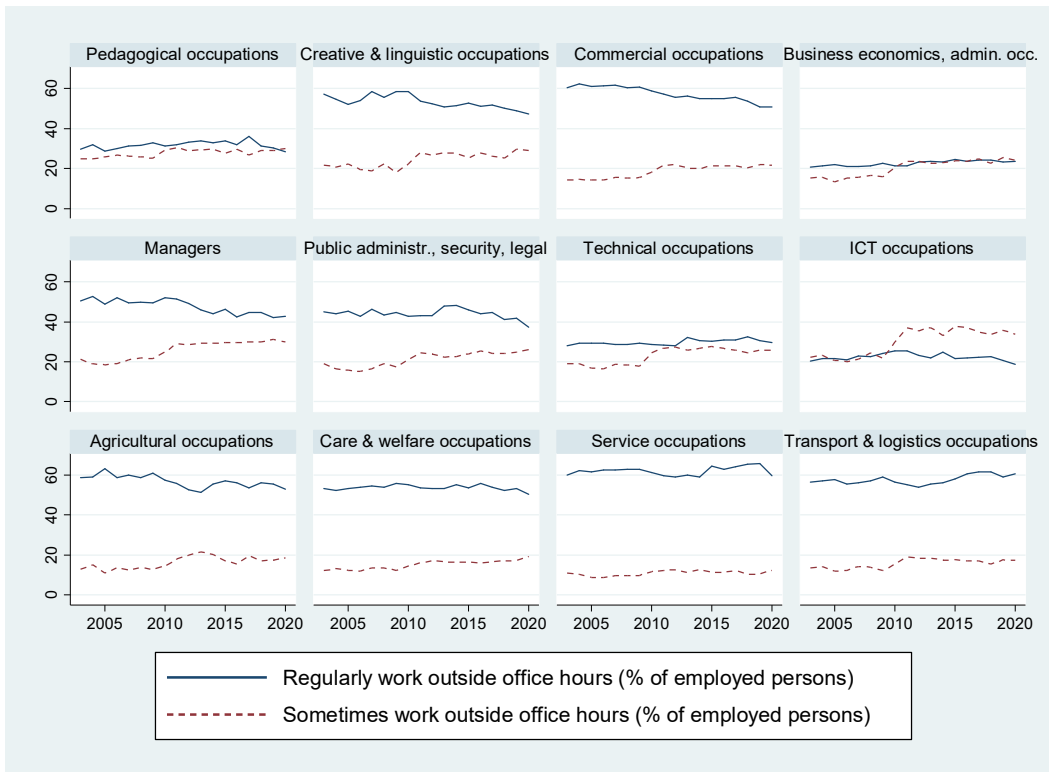


Figure C4. Trends in working outside office hours by occupation class (BRC2014); 2003-2020
 Source: graph based on StatLine data (Werkzame beroepsbevolking; werken buiten kantoor tijden, 2003-2020).

Figure C5 and C6 provide insights into how changing occupations develops over time by occupation class. Figure C5 depicts the percentage of people who changed occupations between 2004 and 2020. As the graph shows, switching occupations is most common in the groups of commercial, service, and transport and logistics occupations where 15% or more of the workers change occupations on a yearly basis. On the other side, care and welfare, public administration, security and legal, and technical occupations are the classes with the lowest percentage of workers who change occupations. The figure also shows that there is a clear upward trend in changing occupations over time for the groups of pedagogical, commercial, service, and transport and logistics occupations. Figure C6 looks further into where workers go after occupational change – whether they remain in the same occupation class or go to a different class. Strikingly, the graph shows that across the board when people switch occupations they most often move to a different occupation class. The percentage of workers who move to a new class after occupational change is highest for creative and linguistic, public administration, agricultural, service, and transport and logistics occupations. On the other side, occupational switchers in technical, care and welfare, and to some extent, business economics

and administrative occupations are nearly equally distributed between those who remain in the same class and those who move to a different one.

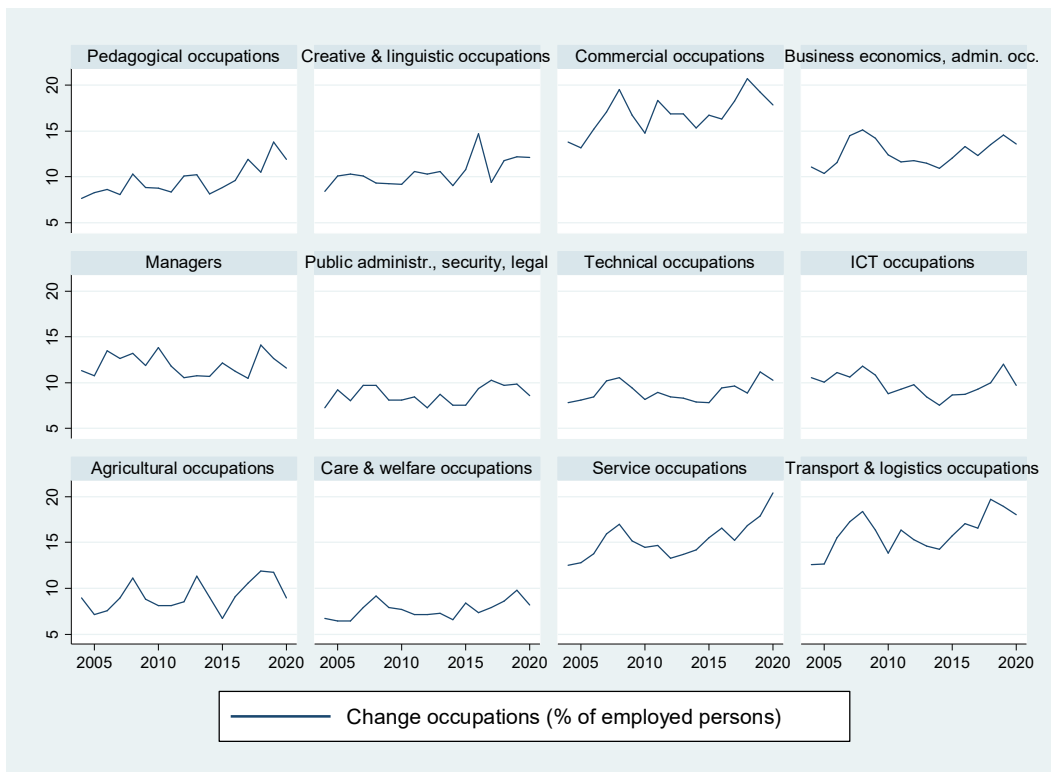


Figure C5. Percentage of workers who change occupations by occupation class (BRC2014); 2004-2020. The shares are calculated by dividing the total number of people who change occupations by the total number of people in an occupation class.

Source: graph based on StatLine (Werkzame beroepsbevolking; wisseling van beroepsklasse).

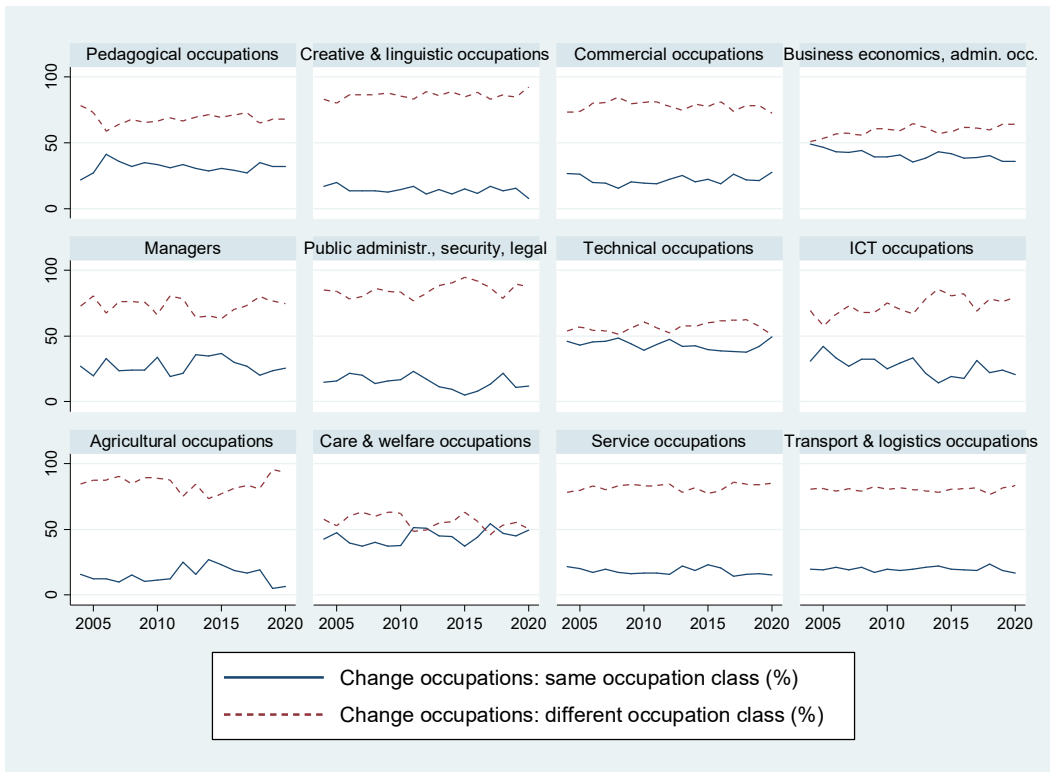


Figure C6. Percentage of workers who change occupations by occupation class and destination (BRC2014); 2004-2020. The shares are calculated by dividing the number of people who change occupations but remain in same occupation class (change both occupations and occupation class) by the total number of people who change occupations.

Source: graph based on StatLine (Werkzame beroepsbevolking; wisseling van beroepsklasse).

Finally, Table C3 displays the top (bottom) 10 occupations with the highest (lowest) shares of workers with disabilities. People with disabilities are most concentrated in professions such as performing artists, butchers, cleaners, construction and industry assistants, printing workers, agricultural assistants, photographers and interior designers, assembly workers, where they make up between 12% and 17% of the workforce in these occupations. On the other side, persons with disabilities constitute about 0% of the people employed in professions such as librarians and curators, electrical engineers, ICT managers and bakers, and about 2-3% of the workers employed as sales and marketing managers, biologists and natural scientists, lawyers, architects, retail and wholesale managers.

Table C3. Occupations with highest/lowest percentage of workers with disabilities in 2017

		Workers with disability (%)
Top 10 occupations	0215 Performing Artists	.12
	0751 Butchers	.125
	1121 Cleaners	.125
	0781 Construction and industry auxiliary workers	.1447368
	0755 Printing and crafts workers	.1481481
	0921 Agricultural auxiliary workers	.1481481
	0222 Photographers and interior designers	.15
	1116 Providers of other personal services	.1538462
	1115 Cleaning janitors and team leaders	.1707317
	0772 Assembly workers	.1724138
Bottom 10 occupations	0211 Librarians and curators	0
	0713 Electrical engineers	0
	0533 Managers ICT	0
	0752 Bakers	0
	0551 Managers without further differentiation	0
	0522 Sales and marketing managers	.0212766
	0711 Biologists and natural scientists	.025641
	0621 Lawyers	.0273973
	0714 Architects	.0277778
0542 Retail and wholesale managers	.0322581	
Observations: 114 occupation groups		

Source: calculations based on StatLine (Werkzame beroepsbevolking; arbeidsgehandicapten, beroep 2015-2017). The 114 occupation groups are according to BRC2014. The shares are calculated by dividing the number of workers with disabilities in an occupation group by the total number of workers in that occupation group. StatLine data for 2017.

D WFH feasibility index by BRC2014 occupation group

Table D1 presents the WFH feasibility index by BRC2014 occupation group (see ROA-CBS, 2014 for more information about BRC2014). The index is available upon request at the level of 1,211 (5-digit) SBC92 occupations and 410 (4-digit) ISCO08 occupations.

Table D1. WFH index by BRC2014 occupation group

BRC2014 occupation group	WFH index	BRC2014 occupation group	WFH index	BRC2014 occupation group	WFH index
111	.9438503	435	.703232	741	0
112	.9833386	511	.9757738	742	0
113	1	521	.9049745	743	0
114	.8762102	522	.9986058	744	0
115	.9234967	531	.9095833	751	.338993
121	.1169967	532	.8784472	752	.3414771
131	.7757584	533	.980949	753	.0749107
211	1	534	.930373	754	.0779892
212	.9476645	535	1	755	.0838918
213	.825417	536	.9756008	761	.0284283
214	1	541	.7939979	771	.0008184
215	.2282095	542	1	772	0
221	1	543	.882507	781	0
222	.8117661	611	.9784497	811	1
311	1	612	1	812	1
321	1	621	1	821	1
331	.9086684	631	.675	822	.1180544
332	.830739	632	.2832447	911	.1747246
333	0	633	.0392809	912	.1988126
334	.7682076	634	.2221959	913	.263459
411	1	711	.9833856	921	0
412	1	712	.9771546	1011	.4203162
413	1	713	.9751655	1012	.3033373
414	1	714	1	1013	.139681
415	1	721	.8250484	1021	.4648535
421	1	722	.9098513	1022	.7975557
422	.9468397	723	.1240107	1031	0
423	1	731	.1634406	1032	.5
431	.6412677	732	.177776	1033	0
432	.8276926	733	0	1034	.3311158
433	.1261875	734	0	1035	.3156446
434	.9570595	735	0	1041	.3120396

1051	0				
1111	.3039158				
1112	.311426				
1113	.0937281				
1114	.1600988				
1115	.3859845				
1116	.1870754				
1121	0				
1122	0				
1211	.2790648				
1212	.0409177				
1213	0				
1214	0				
1215	.0126177				
1221	0				
1222	.0088277				

Notes: own calculations based on SBC92 and StatLine (Beroepsbevolking; beroepsklassen 1996-2011). The aggregated index is weighted by the number of workers in SBC92 occupations (5-digit) in 2011. The names of occupation groups are not reported in the table, due to space considerations; they can be found on page 16 in ROA-CBS (2014) under "Beroepsgroep".