A large, semi-transparent grey circle is positioned on the left side of the page, partially overlapping the text.

Changes in working conditions  
and quality of working life and  
their impact on the health and  
safety of workers in the Czech  
Republic



2023

*The study was prepared within the framework of the project of the Association of Independent Trade Unions "The Future of Collective Bargaining in the Czech Republic and the Impact of Technological Changes Due to Digitisation and Automation on the Requirements for Employee Work Competence", financed from the contribution to the activities under Section 320a(a) of Act No. 262/2006 Sb., the Labour Code, as amended, to support social dialogue.*

## **Authors:**

Aleš Kroupa, Renata Kyzlinková, Jana Váňová, Soňa Veverková



This work is licensed under a Creative Commons Attribution 4.0 International Public License.  
(<http://www.creativecommons.org/licenses/by/4.0>)

Elaborated by:  
Research Institute of Labour and Social Affairs, v. v. i.  
Dělnická 213/12, Prague 7, 170 00

## Table of Contents

<b>1.</b>	<b>Digitisation and the world of work: general and contextual anchoring</b> .....	6
1.1	Introduction.....	6
1.2	Introduction to terminology and basic concepts .....	6
1.3	The impact of digitisation on employment.....	10
1.4	The impact of digitisation on working conditions .....	14
1.5	Demographic development and digitisation as an important parameter in adapting to an ageing workforce.....	15
1.6	Changes to the education system in the light of the growing influence of digitisation in the world of work.....	19
1.7	Summary.....	21
<b>2.</b>	<b>Algorithm management and working conditions</b> .....	24
2.1	What is algorithm management?.....	24
2.2	The impact of algorithmic management on quality of working life .....	28
2.3	Evaluation of the survey among couriers of digital work delivery platforms .....	31
2.4	Structure of the research population according to selected characteristics .....	32
2.5	What are the reasons to work for a digital work delivery platform? .....	35
2.3	Evaluation of working conditions.....	36
2.6	Union membership and the potential for platform workers' union development.....	39
2.7	Main findings .....	42
<b>3.</b>	<b>Impact of digitisation on the quality of work in the Czech Republic and EU-27</b> .....	43
3.1	Introduction.....	43
3.2	Dimensions of quality of work.....	44
3.2.1	Physical working conditions .....	44
3.2.2	Social conditions of work.....	46
3.2.3	The conditions under which staff carry out their work tasks.....	49
3.2.4	Participation in labour-related decision-making processes.....	50
3.2.5	Opportunities to influence working hours.....	52
3.2.6	Job prospects, job security, education, career, and professional development.....	55
3.2.7	Self-realisation and job satisfaction .....	59
3.3	Digitisation of work.....	62
3.3.1	Impact of algorithmic work on individual dimensions .....	65
3.4	Quality of work index .....	67
3.5	Summary.....	71

**Conclusion**..... 73  
**Literature**..... 75

Digitisation is a key phenomenon in today's world, fundamentally affecting almost all aspects of our lives, including the working environment and quality of working life. Rapid technological advances and the widespread use of digital tools are changing the way we work, communicate, and organise our work activities. This study focuses on the impact of digitisation on the quality of working life and seeks to identify the key trends and challenges that this process entails.

Digitisation has many positive aspects that contribute to improving working life. New technologies enable the automation of routine and repetitive tasks, creating space for time and resources for more challenging and creative work. Communication and collaboration are enhanced by online tools that allow easy exchange of information and collaboration on projects between teams in different locations around the world. However, digitisation also brings certain challenges and negative impacts on the quality of working life. For example, the rise of digital communication channels such as emails, chat apps and social networks can lead to increased workloads and lack of downtime. Employees may face pressure for constant availability and the requirement to deal with work tasks outside standard working hours etc. Another of the negatively perceived phenomena is the so-called algorithmization of work activities and the associated control mechanisms of employees. In recent years, we have witnessed the increasing use of algorithms and automation in various areas of working life. Algorithms are becoming an integral part of many business processes and decisions, whether it's employee selection, logistics management or even work scheduling. Access to digital technologies and skills brings with it the issue of inequalities in the labour market and opportunities for career growth.

As can be seen from the above, the issue can be viewed from many perspectives. We have developed three subtopics within this limited scope of the text. The content consists of three closed thematic units. In the first part, "Digitisation and the world of work: general and contextual anchoring", readers are introduced to the basic concepts defining the space where digitisation is reflected in the working life of society and individuals. The risks and opportunities of digitisation, particularly in relation to the labour market, are outlined in general terms. It presents perspectives on the process of job creation and destruction, on the necessary changes in the education system, and finally on the use of digitisation and information technology to address the issue of an ageing workforce. The second part, "Algorithmic Management and Working Conditions", goes into more depth on the issue of algorithmic management of work activities and presents a concrete example of the quality of working life of platform workers (courier and delivery services) through survey data. The third part of the paper presented here, "The Impact of digitisation on the Quality of Work in the Czech Republic and EU-27", offers a view of employees and entrepreneurs on their working conditions and how their working life is affected by information and digital technologies, based on data from the European Working Conditions Survey (EWCS) 2021. The analysis focuses not only on the situation within the Czech Republic, but also provides a comparative perspective with other countries of the European Union (EU).

# 1. Digitisation and the world of work: general and contextual anchoring

Jana Váňová

## 1.1 Introduction

How will digitisation affect workers in different countries and in the Czech Republic? Will inequalities in the labour market and society increase? Can digitisation affect the quality of our working environment and our quality of life? If so, in what sense? Will the professions still exist in a few years or will they disappear, become easier or more demanding? What are the best fields to be trained in and what skills to acquire that will be useful in the future?

These are some of the questions that we try to answer very briefly in the text, although the answer is not easy not only because of the scope of the text, but also because in some respects the predictions diverge. The pace of change is unprecedented and more accurate estimates of developments are therefore risky to say the least.

## 1.2 Introduction to terminology and basic concepts

At the beginning of our reflection on the options and possible impacts of digitisation on working conditions and the quality of working life and possibly also on the health of workers, we consider it appropriate to at least give a basic overview of the terminology that is increasingly appearing not only in professional texts, but also in the media and in workplaces themselves. They are therefore highly likely to resonate in the world of work (and not only in it) with increasing obviousness and with all the contexts that the content of the terms represents. The basic concepts of digitisation and the world of work are summarised in the table below.

Table 1 **Basic concepts**

<b>Augmented reality (AR)</b>	Augmented reality is a term for the visual embedding of a digital object into reality using 3D scans of the surrounding environment. This object, set in the real world, can then be observed using the device's screen.
<b>Automation</b>	The use of self-learning control systems to control technological equipment and processes. From the point of view of industrialisation, this is a step following mechanisation. While mechanisation provides people with equipment to make their work easier, automation reduces the need for a human presence to perform an activity. If the ideal assumption of so-called complex automation is met, it could theoretically lead to the elimination of humans from the relevant production process. In practice, this option does not yet appear to be feasible. The modern concept of factory automation puts humans and automation technology

	in the role of partners: automation technology helps people keep technological processes efficient and safe. <i>(Source: Wikipedia)</i>
--	---

continuation of the table

<b>Fourth Industrial Revolution (4IR)</b>	Development of digital technologies in industry, logistics and other sectors. It heralds the societal development and integration of digital, physical, and biological technologies. Although this revolution is described as an industrial revolution, its anticipated impacts cannot be limited to the industrial sector. The expected changes will have an impact on the way products and services are produced, distributed, and consumed, on the mobilisation and replacement of labour, on education and social systems, and on new types of literacy. Anticipation of changes in the forms of work with the expectations of workers associated with the processes of digitisation and computerization in organizations (Kebzová, 2018); in the Czech environment, the term Industry 4.0 is also used as a synonym for the fourth industrial revolution, which copies the German term Industrie 4.0. The term Work 4.0 is used to emphasise the impact of this revolution on the world of work; given its complexity, the revolution is sometimes described as Society 4.0.
<b>Data mining</b>	Extracting or mining knowledge from databases. It is understood as a process of finding patterns in data. A pattern means a specific valid relationship on a specific data set expressed in an understandable form. The form includes some forms of data models, e.g., decision trees, association rules, cluster analysis, etc. Data mining is used to identify new insights and hypotheses as opposed to traditional statistical analysis, which aims to confirm or refute them. This is due to the large amount of different types of data that most organisations handle, which may contain interesting findings that were previously unknown. <i>(Source: Wikisofia)</i>
<b>Digitization</b>	The term is used in the context of accelerated automation and labour substitution. It is the use of digital data, its processing in the form of analyses, graphs, and models.
<b>Robotization</b>	<p>A summary of the process of introduction of industrial and more recently non-industrial robots and its social and technological implications. The robot is an integration of mechanical, electrical, and electronic elements based on information technology. There are many definitions of robotization. One frequently used definition characterizes a robot as a computer equipped with a specific peripheral device.</p> <p>Given the basic function of a robot - to replace human labour - there is an obvious link to employment levels (1 robot replaces 2.5 workers on average). In the future, we can expect not only an increase in the number of robots, but also new applications, including in small-scale economy, services, leisure, and home. <i>(Source: Sociologická encyklopedie)</i></p> <p>The introduction of robotics should result in increased productivity and competitiveness, both in industry and in other sectors. <i>(Source: MPO, Iniciativa Průmysl 4.0, s. 56)</i></p>
<b>Machine learning</b>	A subfield of artificial intelligence dealing with algorithms that allow a computer system to "learn". In this context, by "learning" we mean a change in the internal state of a system that makes it more effective in adapting to changes in the environment. Machine learning is highly intertwined with the fields of statistics and data mining and has a wide range of applications. Its techniques are used, for example, in biomedical informatics (so-called decision support systems), distinguishing illegal use of credit cards, speech and text recognition, and many others. <i>(Source: Wikipedia)</i>
<b>Artificial intelligence (AI)</b>	A branch of computer science concerned with the creation of learning systems that solve complex tasks in areas such as logistics, robotics, natural language processing, and big data processing.

	Most research in artificial intelligence is focused on solving specific problems, developing particular approaches, and finding further applications of already developed techniques. Contrary to popular belief, the pursuit of a "truly intelligent machine" is a fringe issue and most of the focus is elsewhere. (Source: Wikipedia)
<b>Virtual reality (VR)</b>	Virtual reality is a technology that allows the user to experience a simulated environment.

Digitisation is the automation and digitisation of processes. These are processes that until now have been handled mechanically, manually and by trained personnel. At the same time, these are processes that can be ensured through information technology and practically without human involvement. The worker, often also the work space, can thus be used for other work tasks. Digitisation therefore significantly reduces the need to physically visit (most often) offices when dealing with various administrative tasks and moves these processes online. Digitisation includes, for example, the operation of data boxes, the possibility of submitting and filling in online applications and forms on the Internet, or online access to data that originally required a personal visit to the institution.

#### **Example of digitisation**

##### Agenda of the Labour Office

Ideally, it should be a functional application, for example for registering jobseekers. The citizen enters directly into the authenticated data repository what it requires, the system verifies it and confirms the requested action. The existence of such an action is then entered into the relevant registers automatically, and the citizen will see the change directly in its portal.

One of the most important benefits of digitisation is the significant savings in time, human resources, energy, fuel, environmental friendliness and savings in hardware and software that would be controlled by humans in a non-digitized process. For the ordinary citizen, an internet connection should then be sufficient to complete this task.

It is therefore not a process by which the job centre worker works with a computer to enter (transcribe or fill in) client data instead of a paper form.

In the Czech Republic, it is currently possible to work with the application, which is on the website <https://www.mpsv.cz/-/zadost-o-zarazeni-do-evidence-zajemcu-o-zamestnani>. The application can be submitted via "Citizen Identity", Bank Identity, eCitizen, NIA ID1 or eGovernment Mobile Key. It is also possible to use a data repository.

The Industrial Revolution 4.0 represents the next phase of digitisation, which is being significantly driven by disruptive trends, including the rise of data and connectivity, analytics, human-machine interaction, and improved robotics. As the designation "4" or 4.0 suggests, this is the fourth stage of industrial development, where, in very simplified terms, the first three stages of industrial

---

<sup>1</sup> Národní identitní autorita pro elektronickou identifikaci; <https://info.identitaobcana.cz/ups/>



production were characterised by a focus on mechanics and the driving of machines by steam (Industry 1.0), electricity (Industry 2.0) and finally information technology and partial automation (Industry 3.0). Industry 4.0 is characterised by the interconnection of processes, the introduction of automation and advanced cyber technologies into production with the possibility of creating augmented reality. The wave of digitisation and automation in industry began (according to the maturity of individual countries) in 2010 and holds clear potential for setting future organisational and production structures. The dynamic emergence of the industrial revolution is also evidenced by the fact that, according to McKinsey and its 2019 survey<sup>2</sup>, the term "Industry 4.0" was virtually absent from Google searches before 2014, but in 2019, 68% of survey respondents considered the term strategic.

Industry 4.0 uses four basic types of disruptive technologies that can be applied across the entire value chain:

- *Connectivity, data, and computing power*: cloud technologies, internet, blockchain, sensors.
- *analytics and intelligence*: advanced analytics, machine learning, artificial intelligence.
- *Human-machine interaction*: virtual reality and augmented/augmented reality, robotics and automation, self-driving vehicles.
- *Advanced engineering*: additive manufacturing (e.g., 3D printing), renewable energy, nanoparticles.<sup>3</sup>

Within this framework, Industry 4.0 is the intelligent networking of machines and processes for industry using information and communication technologies, and specific ways to use smart networks include:

- *Flexible production*: many companies are involved in product development. With digital networking, these steps can be better coordinated and the load on the production capacity can be better planned.
- *Convertible factory*: future production lines can be designed in modules and quickly assembled for specific tasks according to the current needs. This increases productivity and efficiency; individualised products can be produced in small quantities and still at affordable prices.
- *Customer solutions*: consumers and manufacturers will converge. Customers themselves can design products according to their own wishes - for example, sneakers designed and tailored to fit. At the same time, smart products that are already delivered and in use can send data to the manufacturer. With this usage data, the manufacturer can improve its products and offer new services to customers.

---

<sup>2</sup> Zdroj: <https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/capturing-value-at-scale-in-discrete-manufacturing-with-industry-4-0>

<sup>3</sup> Zdroj: <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir>

- Optimised logistics: algorithms can calculate ideal transport routes, for example, machines independently report when they need new material - the intelligent network enables an optimal flow of goods.
- Use of data: Data on the production process and product status will be combined and analysed. Data analysis provides guidance on how to produce a product more efficiently. More importantly, it is the basis for entirely new business models and services. For example, lift manufacturers can offer their customers "predictive maintenance": lifts equipped with sensors that continuously send data on their condition. Product wear and tear would be detected and repaired before the lift system failed.
- Resource-efficient circular economy: with the support of data, the entire life cycle of a product can be considered. The design phase would already be able to determine which materials can be recycled.

The above-mentioned possibilities of using new technologies, such as newly introduced systems, the use of ever new and updated applications, the very likely changes in forms of work and changes in job descriptions, but also, for example, in the organisation of work, will have a very significant impact on the demands on the quality of education of the population and on the changed demands on the required qualifications of individuals. Qualifications as we know them today, both in terms of content and form, are very likely to change. Certainly, a different range of skills will be required from those seen as essential today, with even more emphasis on flexibility, creativity, and a willingness to learn new things.

Although information technology and its use in production are mentioned from different angles in relation to Industry 4.0, it is important to mention that they are only part of the success of Industry 4.0. To thrive in the fourth industrial revolution, companies need to ensure that their workforces are adequately equipped to adopt and use information technologies, preferably through the upgrading and updating of new skills and qualifications. The buzzword has thus become "reskilling", which is a real challenge: workers are retrained with new skills that enable them to fill different jobs.

"It's not just about making our company better and being ready for the future; it's about making sure that all our employees are ready for that future, that they feel interested and engaged, that they retrain and that they are excited about what the future holds." (*Western Digital CEO David Goekeler*)

### 1.3 The impact of digitisation on employment

Employment is an area where opinions differ on whether digitisation will lead to more or fewer jobs. Differences are also marked in the estimation of the speed of change or whether digitisation can lead to more unemployment.

Broadly speaking, it can be argued that digitisation, automation, and robotics will change jobs in three basic ways, which will always be reflected in the demand and supply of knowledge, and which will impact on the employees themselves:

- New technologies will have an impact on the transformation of individual jobs. Some work tasks will be automated, in some cases the technology will supplement employees in completing and achieving their work tasks. Overall, the tasks provided within each job will change, and the demand for job skills will change. Those employees who will be most affected are those who will have to adapt a substantial part of their job competences and skills.
- New technologies will make some jobs redundant. In some occupations, most tasks may be automated and their stay in the labour market will only be temporary. Employees in these occupations are likely to have to change their occupational focus if they want to stay in the labour market. This will require changes in their knowledge and skills. Although the assessment of the threat of automation varies, as do the specific numbers, a strategy must be in place to prepare employees for the possibility of this risk and for a possible change in professional qualifications.
- New technologies will create new job opportunities and new ways to acquire the skills you need. New jobs will be created directly as a result of the introduction of new technologies (e.g., big data specialist). Preferences in leisure are likely to change, leading to the expansion of other occupations (e.g., sports coaches). New forms of work will emerge, such as digital work platforms, from which people and companies will have to learn to benefit.

To make the most of the digital transformation, it must be ensured that employees have or achieve the knowledge and skills to adapt to changes within their job, while also being able to navigate the offer and requirements between jobs. In other words, people need skills that enable them to be flexible and mobile (OECD, Skills Outlook 2019, p. 38).

When quantifying based on occupations, it is important to note that occupations identified as highly vulnerable to digitisation may contain a number of work tasks that cannot be replaced by automation. Most professions will not disappear completely, but the way work tasks are performed will change. A number of studies are rather sceptical and estimate that 40-50% of jobs will disappear in the next 15 years (e.g., Frey, Osborne, 2013). According to Chmelař et al. (2015, p. 3) the ratio of jobs lost to jobs created will be 5:2. On the other hand, there are also estimates that digitisation will enable labour productivity to grow by up to 30% (Korbel, 2015); this will create the conditions for further sales growth, increase company turnover and recruitment of new employees. In the first phase of digitisation, some places will disappear, but afterwards new ones will be created. Up to 2.5 new jobs should be created per job lost (MIT, 2016, p. 19). Qualified estimates therefore range from pessimistic to optimistic visions. It is therefore necessary to approach them with a very reserved attitude (Kohout, Palíšková, 2017).

Table 2 also illustrates the variety of estimates included in each report.

Table 2 Overview of the impact of digitisation on jobs

Source	Claims
Deloitte (2018). Automation of work in the Czech Republic, Why (not) be afraid of robots.	In the economy as a whole, 51% of jobs will be at high risk of automation, 21% at medium risk and 28% at low risk of automation.
MannpowerGroup (2019). The Future of Manufacturing.	Of the 41% that will automate some activities over the next two years, 24% will create new jobs.
Office of the Government of the Czech Republic, Research on the potential of artificial intelligence development in the Czech Republic Analysis of expected socio-economic impacts of AI development in the Czech Republic.	<p>Within 5 years, 50% of the skills required for the occupation will be replaced in 11% of occupations.</p> <p>Within 15 years, technology will replace 50% of skills in almost 70% of occupations.</p> <p>In 30 years, technology replaces more than 50% of skills in almost all occupations.</p> <p>The ratio of jobs lost to jobs created will be 5:2.</p>
Iniciativa Průmysl 4.0, MPO.	For every job lost, up to 2.5 new jobs should be created.
OECD (2019). Skills Outlook.	<p>Over the next 20 years, 10% of jobs will be at high risk of automation and another 35% of jobs will undergo substantial change. In absolute terms, this means that around 408,000 jobs will be at risk and around 1.4 million jobs will be substantially changed.</p> <p>This is one of the more optimistic forecasts, but it may still place a greater burden on social systems, which will have to provide for a larger percentage of the unemployed population before the educational structure of the population adapts to new demands and new industries stabilise.</p>
OECD (2019). Employment Outlook.	Middle-skilled jobs are increasingly exposed to substantial transformation. It is estimated that up to 14% of existing jobs could disappear in the next 15-20 years as a result of automation. A further 32% of jobs could change radically as a result of automation of individual activities.

Source: own processing

However, it is fairly certain that most of the new jobs created (but very likely also the "old" jobs) will require new skills and a significant proportion of the workforce will need to be retrained or re-skilled to be able to use digital technologies correctly in their work to meet job requirements.

For most professions, digital technologies will be an integral part of work, and the intensity of their use again does not provide a clear answer to, for example, the time allocation per work task.

New jobs will be created at both poles of the profession, but especially at the higher level. In doing so, the "new generation" of jobs will be created more slowly, while the loss of "old generation" jobs will be faster - at least in the initial phases of building the Industry 4.0 platform. The process whereby middle-skill and middle-income jobs are lost due to the automation of work activities is referred to as employment polarisation (Frey and Osborne, 2013). This process carries certain risks; it may cause a downshift of some workers from medium-skilled jobs to lower-skilled jobs and thus lower earnings, or a shift of workers from the industrial sector to the service sector, where even if

the skill level of jobs is maintained, a reduction in earnings can be expected. Employment polarisation is therefore associated with rising income differentiation. However, it should be noted that income inequality is growing much more slowly in the Czech Republic than in Western European countries. (Kohout, Palíšková, Praha 2017)

It can be assumed that the transformation of work due to automation will have an impact on the social organization of society similar to that of previous eras of technological change. However, the pace of change and the nature of change will be faster this time around, and the introduction of AI in its various forms will accelerate the increase in uncertainty, with AI replacing jobs entirely or substantially taking them over in some cases.

It can also be expected that the introduction of new technologies into the labour market will be increasingly associated with a decline in traditional full-time jobs. On the other hand, alternative employment, in some cases with the worker in a self-employed position, will be more typical.

In its latest Future of Jobs Report, the World Economic Forum said that AI will be the fastest growing job sector between 2023 and 2027. The prognosis is based on an extensive survey of 803 HR managers and directors of companies worldwide, which collectively employ more than 11 million people. Of the 673 million jobs surveyed, respondents expect growth of 69 million, or 2% of current employment.

The report directly lists the expected fastest growing jobs.

Table 3 **Jobs with the fastest growth** (relative to employment growth 2023-2027 in %)

Increment	Job
+ 39 %	Specialists in artificial intelligence and machine learning <i>They help computers "learn" and perform intelligent tasks such as image recognition or voice control.</i>
+ 33 %	Sustainability experts <i>They are responsible for the development of strategies and practical steps in environmental and social sustainability, such as image recognition and voice control.</i>
+ 32 %	Business Intelligence Analysts <i>They examine and analyse enterprise data, providing information and suggestions for strategic decision making and improving organizational performance.</i>
+ 31 %	Information Security Analysts <i>They monitor and secure information systems and networks of companies and institutions against cyber threats.</i>

continuation of the table

Increment	Job
+ 31 %	Fintech developers <i>They focus on the development and deployment of technologies for the financial industry, such as mobile payments, and other innovations.</i>
+ 31 %	Data analysts and researchers <i>Examine and analyse different types of data to detect patterns, identify problems and suggest improvements</i>
+ 30 %	Robotics Engineers <i>They develop and design robots and automated systems to increase efficiency and productivity in industrial and other sectors.</i>
+ 30 %	Big data experts <i>They are engaged in analysing and interpreting vast amounts of data to uncover trends and information for better decision making.</i>
+ 30 %	Agricultural equipment operators <i>They operate and maintain technical equipment in agriculture, such as modern tractors and combines.</i>
+ 30 %	Digital Transformation Specialists <i>They help organisations transition to digital technologies and processes.</i>

Source: HN, *Deset dřobů budoucnosti. Which industries will boom in the coming years and how the Czech Republic is prepared for them*; 12. 6. 2023

## 1.4 The impact of digitisation on working conditions

Technological change and the introduction of automation and digitisation into the workplace can ultimately provide support to offset everyday work risks and reduce their impact on the long-term health of workers. The impact of the introduction of automation and digitisation in the workplace on the long-term work capability of older workers is also explored in an EU-level investigation to identify relevant factors for improving the long-term work capability of older workers that can be addressed by new AI-based solutions such as the Internet of Things, virtual reality, or interactive virtual coaches (Jimenez et al., 2022).

Information and communication technology, digitisation and automation has become a topic that has permeated virtually all areas of modern society, its leisure and working life, and is emerging in relation to stress, health, and psychological well-being. One of the sectors where AI is penetrating much faster is industry (Furman, Seamans, 2019), as in recent decades, the industrial sector has been at the forefront of the development and advanced use of AI technologies, thanks to a combination of intelligent manufacturing technologies, cyber-physical infrastructure, and data management.

The project "Benefits and stressors - Perceived effects of ICT use on employee health and work stress. An exploratory study from Austria and Hong Kong, focusing specifically on advertising, public relations, and journalism. The project sought to analyse how employees can use technology for their work, but also how technology can create additional pressure on employees. Twenty-five individual semi-structured interviews were conducted as part of the project - 13 participants were from Hong Kong and 12 from Austria. One of the outcomes of the interviews was that all participants confirmed the additional workload they felt they had to be available and responsive at all times and at short notice. They confirmed the blurring of the boundaries between work and private life and at the same time a certain acceptance of this state. Another common conclusion was the confirmation of higher workload due to the use of information and communication technologies (ICT). Here, the respondents referred in particular to the fact of using social networks in connection with work duties. On the other hand, almost all respondents confirmed the increase in work efficiency due to ICT. The research therefore shows that new technologies and their use can have both positive and negative impacts on the working and personal lives of workers.

Many studies have shown that new technologies, automation, robotics and, ultimately, artificial intelligence have enormous potential to change the way work is organised. Artificial intelligence has been influencing the way we work for some time, and even helping to assess the efficiency of job performance, which is being used, for example, towards the platform economy. According to the New York Times (NY Wall Street Journal, Eastern edition; 2023), in the last year, and especially in the last six months, generative artificial intelligence has greatly increased the potential of new technologies to help, hinder, or redirect the way we work. Specific examples of technologies with enormous potential include visual tools such as DALL-E 2 and Midjourney, which fundamentally change the graphical possibilities, or text generation technologies based on large language files such as ChatGPT.

At its best, artificial intelligence will promote better collaboration and productivity and enable safer working in challenging or risky environments, encouraging the inclusion of people with certain health limitations or older people in the workforce.

However, human judgement should always be the key to harnessing the power of AI. Generative AI "makes up" false facts and employees who blindly follow its output risk failure. Employers must therefore equip their employees with the skills and capabilities needed to successfully use AI. Employees must also learn to proofread AI-generated text, confirming quoted facts. Corporate management should ensure that AI-produced content always involves a human.

## **1.5 Demographic development and digitisation as an important parameter in adapting to an ageing workforce.**

The Czech Statistical Office estimates that the Czech Republic will have a total population of 10.53 million in 2101, with almost 30% of them being seniors aged 65 and over. The average age of the population will increase from the current 42.2 to 47.4 years. The number of deaths will regularly

exceed the number of live births, and the proportion of people of economically active age and in the 0-19 and 65+ categories will be almost equal.

*"We project that by the end of the 2020s we will have a population of approximately 10.8 million, the highest in this century. The period of the 1960s and 1970s, on the other hand, should be characterised by the greatest numerical declines. In the early 1980s, the size of the Czech population drops to 10.4 million people. By the end of the century, the population should reach approximately 10.5 million people,"* says Jaroslav Sixta, vice-chairman of the Czech Statistical Office.

According to the results of the latest demographic projection from February 2019, the largest reduction in the population of the Czech Republic aged 15-64 is expected to occur in the late 1930s and early 1940s. By the end of 2050, 56% of the Czech population should be in this age category. A halt to the decline is expected to occur in the late 1950s. The population aged 15-64 will fall to 6.2 million by 2045 and 6.1 million by mid-century. The lowest-ever population is expected to be 5.9 million at the end of the 1950s. Meanwhile, the age structure of the population will undergo significant changes throughout the period.

The focal point of the population of economically active age, represented by the strong birth cohorts born in the 1970s, will gradually shift to older ages as each generation ages, thus naturally changing the age composition of the population. From 2022 onwards, the 45-49 age group will be the focal point, and from 2027 onwards the 50-54 age group, etc. In 2037, 60-64-year-olds, i.e., those of pre-retirement age, are expected to take over the position of the numerically strongest five-year age group and maintain this position until mid-century.

The evolution of demographics is an important variable in relation to the introduction of new technologies.

According to OSHA-EU (2017), the workforce, or working-age population, will decline by 0.4% each year in the European Union until 2040, a decline that began in 2010. For most EU countries, this represents a rethink of (pension) policy and a gradual increase in the official retirement age, while limiting early retirement options. This means extending the working life of individuals, while at the same time exposing them to all the factors present in working life, including technological developments and potential occupational hazards that may pose a much higher possibility of accidents or occupational diseases for the older generation (with likely physical limitations).

However, the focus on processes and the intensity of the digitisation process very often causes the human factor itself to be neglected. Yet the demographic development of society has an undeniable impact on the workforce, its size, structure, physical capabilities, etc. Currently, more than 45% of workers in the European Union are over 45 years old (Buzzelli, 2021).

Along with an ageing population, the phenomenon of an ageing workforce is becoming more and more pronounced. In view of this fact, it is and will be necessary to seek (and find) new solutions to enable the ageing workforce to participate in the labour market, while maintaining adequate and



desirable labour productivity and maintaining a reasonable balance between work participation and quality of life in old age.

In the context of an ageing population and to maintain the employability of this older segment of the population, the European Commission has initiated a three-year project under the HORIZON 2020 programme called Ageing@work: <https://ageingatwork-project.eu/>. Working conditions will have to be adapted to avoid the risk of early retirement and possible incapacity to work, given the older workforce and the anticipated health problems. In addition to the ageing factor, there is also the factor of the rapid development of technology and the related rapid development of whole fields where new technologies are introduced. For older workers and employers, this does not "only" present the challenge of mastering new technologies and processes in the workplace and their use, but also the use of technology to set up a more friendly working environment for older workers and to grasp new technologies so that work tasks are optimized to the maximum extent possible, for example, in terms of the need to use the physical potential of workers.

The aim of the above-mentioned three-year Ageing@Work project is to develop a range of highly adaptable, personalised ICT tools for use in both the work environment and in personal life to enhance their active participation in working life and quality of personal life.

The Ageing@Work project focuses on developing solutions that support:

- Better workplace design, with an emphasis on ergonomics, process organisation, task assignment and planning;
- Increase productivity with an emphasis on the older generation;
- Knowledge sharing and cooperation;
- Creating a motivational environment involving the work and personal life of older workers, for example through a personalised virtual assistant.

The consequences of an ageing workforce are not only felt at the policy-making level, but also at the enterprise level. Some industries are increasingly dependent on the knowledge, skills, and experience of older workers (Schinner et al., 2022), and in the Czech Republic the energy sector is often mentioned in this regard. This puts businesses in a situation where they are looking for ways to keep older workers in employment for longer and looking for ways to cope with all the challenges and opportunities that these situations bring.

There are a number of studies that show which health problems are typical or more prevalent at certain older ages. Li, Lindenberger (2002) confirms that aging has a significant impact on sensorimotor and cognitive abilities, which tend to deteriorate, changes occur in the psyche, but also in the social sphere of the aging person. As age increases, physical work capacity also declines, cardiorespiratory capacity decreases, and muscle strength tends to decrease by 1-2% per year.

On the other hand, there is evidence that retention in work can be associated with positive health outcomes. In other words, work can have a positive impact on the physical and mental health and

psychological well-being of all workers if working conditions are appropriately adapted (EU-OSHA, 2017).

If working conditions are not properly adapted and do not respond sufficiently to the changing new requirements of the work organisation, the average employee can often face difficulties in the workplace. There will be an increasing need for "age-friendliness" in the workplace, for flexible working conditions.

It is in the context of the above-mentioned Ageing@Work project that a holistic approach to supporting ageing employees by linking work and personal life, using intelligent personalised ICT tools that, among other things, help to prevent workplace accidents and support the work engagement and wellbeing of older workers in the workplace was introduced. With the appropriate integration of modern technology, older workers can therefore remain active and productive in their working lives for longer.

In the Ageing@Work project, several technical solutions have been proposed to adjust the working conditions for older workers when integrating new digital technologies in order to create satisfactory working conditions that also stimulate engagement in the work process and a positive perception and outlook on work. With this goal in mind, modern technologies such as AR and VR will be involved in the creation of working conditions, as well as a personified Avatar. The proposed technical solutions emphasize a highly individualized approach to promote adaptation to the workplace and enhance productivity.

In practice, participation in education decreases with age (Warr, Fay, 2001). It is also significant that those who want to acquire new knowledge or update existing skills at an older age have different requirements for training, its objectives and the content and format of the training itself than those at a younger age. This is partly due to acquired professional and life experience, but also to age-related changes in physical fitness (e.g., decline in physical fitness). Another factor that influences training requirements is the length of the training break. The longer the break, the more difficult it is to start and stay in education. It should also be taken into account that senior staff often have a wealth of experience gained during their working life, for example through international, managerial and/or project experience in different professional fields and activities. All this must be taken into account when designing the training, as well as the personality of each participant. Older employees are more motivated to learn if the learning is practical.

When training senior employees, it is advisable to use engaging teaching methods (e.g., discussions, case studies, group, and project work), and to conduct training in small teams, together with colleagues, friends, or partners. (Koller, Gruber, 2001)

## 1.6 Changes to the education system in the light of the growing influence of digitisation in the world of work

As mentioned in the introductory section, the possibilities of using modern technologies, which will very likely also result in the introduction of new systems and the use of ever new and updated applications, will have a major impact on the demands on the quality of education of the population. It is evident that the impacts of the introduction of automation into manufacturing are, and will continue to be, complex in nature, with education being one of the main "impact zones" and one (perhaps the only area) through which we can respond effectively and positively to the automation process. The field of education has a very specific position in the case of the impact of Industry 4.0 processes - the digitisation process intervenes in education both as a tool and source of new forms of learning and as one of the objectives of the education processes, which should ideally be a crucial area influencing further developments in the field of the introduction of automation, robotics, and digitisation into practice.

According to Kohout, Palíšková (2017), the following changes in the field of education will be needed to change the emphasis on key competences:

- Digital literacy as part of everyone's basic education. In particular, the ability to use technology to solve problems effectively and the ability to work effectively with information. This entails the ability to continuously learn new trends in technology and continuously develop your IT knowledge and skills.
- Narrow specialization in one field will recede and T-shaped professional knowledge, i.e., both deep and broad knowledge, will be required. Depth of Expertise, i.e., deep professional knowledge in one field, and at the same time Breadth of Knowledge, i.e. broad knowledge across many disciplines, but also the ability to communicate, think critically, etc. This ability to think interdisciplinarily is a prerequisite for innovation. Given the interconnectedness of technologies, production processes and the entire value (or value) chain, it will be necessary to navigate the entire system.
- In addition to hard skills (professional, technical, linguistic, etc.), soft skills (in particular communication skills, conceptual thinking, team leadership and collaboration, stress resistance, ability to react and make decisions quickly, ability to share information, ability to tolerate, self-management, etc.) will continue to grow in importance. Soft skills are a prerequisite for effective work in teams and virtual teams, within collaborative platforms, etc.

The authors of WEF, 2023 think along similar lines, stating that employers estimate that 44% of workers will need to upskill in the next five years. According to the report, six out of ten workers will need training by 2027, but only half of workers today have access to adequate training opportunities. The highest priority for skills training in 2023-2027 is analytical thinking, which is expected to account for an average of 10% of training initiatives. The second priority for workforce development is the promotion of creative thinking, which will be the focus of 8% of training initiatives. Training employees to use artificial intelligence and big data ranks third among corporate

skills training priorities over the next five years and will be addressed by 42% of companies surveyed. Employers also plan to focus on developing workers' skills in leadership and social influence (40% of companies), resilience, flexibility, and agility (32%) and curiosity and lifelong learning (30%). Two-thirds of companies expect to see a return on their investment in skills training within one year of making the investment, whether in the form of increased mobility across roles, increased employee satisfaction or increased productivity.

Cognitive skills are growing fastest in importance according to the WEF report (2023), reflecting the growing importance of complex problem solving in the workplace. This is also confirmed by Kohout and Palíšková (2017), who state that it can already be deduced from today's labour market trends that individuals who have more complex knowledge and skills, are able to think and make decisions in a broader context and are willing to continuously learn will be more successful on the labour market. From the perspective of companies, there is a clear trend towards the growing importance of creative thinking at the expense of analytical thinking. Technological literacy is the third fastest growing key skill. Skills related to self-efficacy ranked above skills related to working with others in the rate of increase in the importance of skills reported by businesses. The social-emotional attitudes that businesses say are growing fastest in importance are curiosity and lifelong learning, resilience, flexibility and agility, and motivation and self-awareness. While respondents did not rate any skills as net declining, a significant minority of companies rated reading, writing and math, global citizenship, sensory processing skills, and manual dexterity, persistence, and accuracy as declining in importance for their workforce.

The skills that companies believe are growing fastest in importance are not always reflected in corporate upskilling strategies. In addition to the top-ranked cognitive skills, there are two skills that companies prioritize much more than their current importance to employees would suggest: artificial intelligence and big data, as well as leadership and social influence. Companies rank AI and big data 12 places higher in their skills strategies than in their core skills rankings and report that they will invest an estimated 9% of their reskilling efforts in it, a higher proportion than in the creative thinking ranked above, suggesting that although AI and big data is part of fewer strategies, it tends to be a more important element when included. Leadership and social influence ranked five places higher than their current importance suggests and are the highest ranked approach. Other skills on which businesses are placing strategic emphasis are design and user experience (up nine places), environmental care (up ten places), marketing and media (up six places), and networks and cyber security (up five places).

Respondents express confidence in developing their existing workforce, but are less optimistic about the outlook for talent availability over the next five years. Accordingly, organisations identify a lack of qualified workers and an inability to attract talent as major barriers to industry transformation. In response, 48% of companies cite improving talent progression and promotion processes as a key business practice that can increase the availability of talent for their organisation, ahead of offering higher salaries (36%) and offering effective retraining and upskilling (34%).

Surveyed companies report that investments in-house education and training and process automation are the most common workforce strategies that will be adopted to achieve their

organizations' business goals. Four out of five respondents expect to implement these strategies in the next five years. Workforce development is most often seen as the responsibility of workers and managers, with 27% of training expected to be provided by in-house training and coaching, ahead of 23% by in-house training departments and 16% by employer-sponsored apprenticeships. Respondents expect to reject outsourced training solutions in favour of company-led initiatives to address skills shortages.

Most companies will prioritise women (79%), young people under 25 (68%) and people with disabilities (51%) in their diversity, equality, and inclusion (DEI) programmes. Minorities will favour those from disadvantaged religious, ethnic or racial backgrounds (39%), workers aged 55+ (36%), those who identify as LGBTQI+ (35%) and those from low-income backgrounds (33%).

Forty-five per cent of businesses consider training funding to be an effective intervention available to governments in their efforts to connect talent to employment. Financing skills training ranked ahead of flexibility in hiring and firing (33%), tax and other incentives for businesses to increase wages (33%), improving school systems (31%) and changes to immigration laws on foreign talent (28%).

## 1.7 Summary

Technological developments will significantly influence labour market changes in 2023. A key moment is the increasing emergence of artificial intelligence, which is being reinforced by economic, geopolitical, and socio-economic developments, all taking place in an environment of increasing environmental pressures.

In some sectors, the impact of demographic change is more pronounced, particularly in the information and technology sector, where companies will need to secure employees with high intellectual potential. In other fields, it will be "sufficient" to maintain and further develop the potential and skills of employees. However, the requirement to continually update and develop the skills of employees goes against the natural cycle of human life, where older people have a natural tendency to reduce their workload.

However, the demands on performance, physical fitness and daily emotional stress may not match the actual physical and mental abilities of employees. Therefore, one of the main objectives of the management of individual companies should be to maintain the competences of all employees, with an emphasis on older employees and to strive to develop their potential in order to prevent their early retirement. In order to maintain the innovative capacity of enterprises, it will be necessary, even in the context of demographic developments, to promote and improve intergenerational cooperation, where the younger generation can gain experience from the older one and the older one can help to maintain labour productivity.

National economies will be forced to respond more quickly and efficiently to changing technologies and entire markets. And this will only be possible with the right motivation and training of the workforce.

German researchers have conducted research where they have tried to build the assumption that age need not be considered the only significant factor that affects quality of life, innovation ability and IT skills. Therefore, Dill, Keupp (2015) in 2011 conducted a study on the relationship between age and innovation capabilities. Surprisingly, according to the survey results, the innovative capacity of older workers was estimated to be higher than that of younger workers, both from the perspective of the oldest workers (51-65 years) and their younger colleagues (18-31 years). Among all respondents, young employees scored high on communication skills, teamwork, and willingness to learn. The weaknesses of the younger ones, as assessed by the whole sample, lie in the area of experience and expertise. The self-assessment of younger employees is consistent with the results of the whole sample. Senior employees, on average among all respondents, are particularly strong in experience and expertise in the innovation-related characteristics assessed. In addition, teamwork and communication skills are among the strengths of all respondents. The weaknesses of the older employees, according to the overall sample, lie in the area of readiness to learn and in the area of showing creativity. However, older employees scored better on communication skills and teamwork than their younger counterparts. Other surveys of HR managers have found that older people attribute higher innovation skills to younger employees than to themselves.

The 4.0 initiative confirms that the traditional organisation of work will be transformed under the influence of new processes that will be more interconnected and continuous into strictly separate divisions between professions and activities into a structure that will be significantly flat with decentralised decision-making. In addition to normal work activities, the work will require independent decision-making supported by the application of automated, monitoring and optimisation systems, and will also involve coordination, control, and follow-up activities. This will bring a completely new workplace layout and a new rhythm of work.

The work teams will have a more amorphous structure, with ad hoc teams being formed to accomplish a specific task or solve a specific problem. With the use of communication technologies, it will often be teams based on virtual links, where experts not only within one company or its regional branches, but also experts from other companies or independent specialists can communicate and cooperate with each other. Not only the ability to work in a team and project thinking, but also the ability to manage language and cultural barriers will become a very important part of the qualification.

Teleworking opportunities will expand considerably and become common in some professions. According to the conclusions of Kotíková et al. (2019), it will open up employment opportunities for people who would otherwise have difficulty commuting to work, whether because of living in more remote locations, health conditions or caring for family members. More use will be made of other flexible forms of work (flexible working hours, irregular working hours, part-time work, etc.). The combination of these flexible forms of work can help to address the problems of the 'sandwich

generation', who are at the peak of their working lives but have the burden of caring for young adults and elderly parents.

In addition, self-employment will become an increasingly common employment option, which will become easier with the use of IT technologies and will be used by workers in a growing range of occupations. The worker will be able to offer their skills to more employers, which will give them a greater opportunity to make their work more efficient, increase their income and, last but not least, gain a greater range of experience.

New technologies will bring about the elimination of physically strenuous work, routine work and work that is health or life threatening. They will also bring the possibility of qualitative enrichment of work, its performance in a more interesting working environment, greater autonomy and more opportunities for professional development and space for innovative thinking.

New technologies will also have the effect of facilitating direct communication between producers and customers and increasing market access for new/small firms. This will bring the opportunity to work and do business regardless of location.

There will be individualisation of demand and pressure to produce smaller batches and to introduce specialised production according to customer requirements (MIT, 2017).

On the other hand, according to Hejduk, Smejkalová and Špidla (2017), the possibility to adapt the time and performance of work to specific needs can generally contribute to an increase in the quality of life, but it can also lead to blurring of the boundary between working hours and private life, the emergence of unpaid overtime, non-compliance with rest periods, and subsequent impacts on people's mental and physical health. The change in the nature of the workplace, or the transition to platform work, is also a challenge for trade union organisation.

However, at present it is very difficult to determine exactly how individual occupations will change, or whether they will disappear, or completely new ones will emerge, and what specific knowledge and skills will be associated with them; only certain general trends can be identified. It is safe to say, however, that the knowledge and skills acquired will become obsolete much faster than they do now, and special support will be needed for the older generation of workers who are likely to find the use of new technologies more challenging. For this reason, lifelong learning, including corporate learning, will become increasingly important.

## 2. Algorithm management and working conditions

Renata Kyzlinková, Soňa Veverková

We often hear about algorithms and algorithm management in connection with digitisation and automation. However, in the context of work and working conditions, many people still cannot imagine what an algorithm and algorithm management are for. In short, algorithm management significantly speeds, streamlines, and simplifies the production process, but it can be a source of physical and psychological difficulties for workers. Algorithm management is most often associated with digital work platforms (ILO, 2022), and indeed the business of some types of digital work platforms is based on algorithm management. However, as we will show in this chapter, algorithm management is used not only by digital work platforms but also by "traditional" companies.

In the first part, this chapter briefly but clearly introduces the basic concepts of algorithmic management and gives examples of how this form of management can affect working conditions and the physical and mental health of employees. The second part of this chapter presents the results of a unique survey conducted among platform workers - couriers of digital work delivery platforms. In February this year, they protested in Prague against the new algorithm introduced by the digital delivery platform Wolt (see Table 5). As a result of this protest, the first trade union representing courier delivery work platforms was formed: Platform Workers Union. Some of the members and supporters of this initiative answered survey questions, providing an interesting insight into the working life of algorithm-driven couriers.

### 2.1 What is algorithm management?

An algorithm can be defined as a predefined procedure that solves certain tasks or problems. In any case, this is nothing we have not encountered before, we use algorithms every day, e.g., in cooking (a recipe is also an algorithm), solving mathematical equations, assembling furniture, etc.

The term "*algorithm* management" was first used by Lee et al. (2015). Algorithm management, or algorithmic management, is management that uses an algorithm to manage people, replacing a manager. Not necessarily at all levels and in all processes: most often it replaces lower management and activities that fall under the responsibility of lower management. Algorithm management has been able to develop mainly thanks to information technologies: tools capable of analysing "big data",<sup>4</sup> machine learning, artificial intelligence, geolocation, etc. The combination of these information

---

<sup>4</sup> Neboli velká data, či takové datové sety, které běžný software nezvládne analyzovat, protože přicházejí ve velkých objemech, z různých zdrojů a rychle se hromadí. K jejich analýze je využívána umělá inteligence.



technology has made it possible to automate some of the functions and processes previously performed by the manager (ILO, 2022).

According to ILO (2022), algorithm management is most prevalent on digital work platforms<sup>5</sup>. According to the ILO (2021), these include digital work platforms operating in *microtasks*<sup>6</sup> and digital work platforms in delivery services<sup>7</sup>.

Although some digital work platforms and their algorithmic management are the most frequent source of criticism (ILO, 2021), it should be mentioned that algorithmic management is not only a matter of digital work platforms. Algorithm management is common today (at least at lower management levels), e.g., in transport, logistics, wholesale and retail, but also in the hospitality industry, or wherever work performance can be easily measured. The following box illustrates the algorithm management and its shortcomings in one of the largest e-shops in the world, Amazon.

Table 4 **Algorithm management**

#### Algorithm management in a "classic" company- the example of Amazon

Amazon.com is an online store founded in 1994. It is owned by the US-based Amazon.com, Inc. but has gradually expanded its operations worldwide and is now one of the largest online stores in the world. It started out selling books, CDs and DVDs, but now it sells almost everything. To distribute goods worldwide, it naturally needs distribution warehouses, and not only in the country of origin (the USA). This has led to the establishment of further distribution centres in Europe, e.g. in the United Kingdom, Italy, France, Poland, Romania, Spain and the Czech Republic.

Amazon's work is algorithm-driven and highly efficient. Amazon has several applications, each for a specific group of workers (warehouse workers, drivers). However, algorithm management has negative effects on working conditions and employee health. This is why in many countries workers are protesting against working conditions.

#### Amazon in the USA<sup>8</sup>

Stephen Normandin (63) worked for Amazon, or Amazon Flex, for four years as a self-employed driver. Amazon Flex is a delivery company founded by Amazon in 2015. Here, self-employed drivers deliver goods from Amazon to customers. Stephen Normandin was delivering goods in the Phoenix (Arizona) area. In 2021, he received an email where the algorithm assessed that he was not doing his job well, and Stephen Normandin was fired. Without any explanation. "My livelihood depends on this job," Normandin says, "I always deliver everything. I've never left anyone out. I've always delivered on time. It doesn't make any sense to me at all." According to Soper (2021), such behavior by Amazon is not at all unusual. The algorithm monitors everything: whether the driver delivered the goods on time, whether he left them at the place where the customer requested, including the exact location (on the porch behind the flowerpot...), etc. The algorithm rates the driver's performance in four categories: 'excellent', 'good',

---

<sup>5</sup> Digitální pracovní platformy jsou digitální služby, které zprostředkovávají práci, resp. spojují poptávku po práci s nabídkou práce (ILO, 2021).

<sup>6</sup> Neboli „klikací“ digitální pracovní platformy, založené na jednoduchých úkolech typu hledání citlivého obsahu na sociálních sítích, zvyšování přístupů na weby zákazníků, doplňování klíčových slov atd. (De Groen et al., 2021).

<sup>7</sup> Digitální pracovní platformy zaměřené na doručovací služby, zejména dovoz jídla z restaurací, ale nově i zboží z obchodů. (De Groen et al., 2021).

<sup>8</sup> Podle Soper, 2021 a Medwell, 2022.

continuation of the table

"satisfactory" and "risky". The algorithm then assigns work according to the rating. Those that the algorithm evaluates as "great" get more work than others, and therefore earn more. The problem is that drivers don't know exactly what the algorithm is evaluating and how much weight different factors have in the evaluation. They often have no idea why they got the ratings they got. If they are evaluated as "at risk" by the algorithm, they are deactivated, which means that they do not get to place orders, make deliveries, and therefore do not get to earn money. They have 10 days to appeal, but the appeal at this stage is again evaluated by the algorithm, not the manager. During these 10 days, the driver is also deactivated, i.e. not working. Moreover, according to Soper (2021), according to the testimonies of former managers, the algorithm is far from being able to evaluate all the real situations that a driver may encounter during a delivery. However, Amazon says the benefits of the algorithm outweigh the negatives and considers drivers who have been "dismissed" or deactivated without knowing the reason to be isolated cases.

### Amazon UK<sup>9</sup>

Garfield Hilton and Darren Westwood work as warehouse operatives at an Amazon distribution warehouse in Coventry. They are employees. In January 2023, the union (GMB's trade union headquarters<sup>10</sup>), which operates at Amazon, organized a strike there. In addition to low wages, they also protested against undignified working conditions. These include continuous monitoring of employees. Every employee must be logged into an app that literally monitors their every move. Even going to the toilet, which is especially humiliating for Garfield Hilton because as a diabetic he needs to go to the toilet more often. Every time the algorithm assesses that he has been in the toilet for too long, it has to give an explanation. Even a one-minute delay in returning from a break will result in a "black spot". Moreover, wages are low compared to similar professions, so many employees are working overtime, which Garfield Hilton and Darren Westwood say means that many tired workers are moving around the warehouse in a kind of "zombie mode". Garfield Hilton states that "the way you have to look at it is that if the box of goods is not moving and standing still, you are not making them money".

But according to Amazon, the application only monitors employees in the workplace, not on breaks, in the restroom, etc. In addition, the system, which evaluates the work of employees, is said to help employees improve their performance - they learn where they have reserves and where they should improve.

### Amazon in the Czech Republic<sup>11</sup>

In August 2020, Amazon terminated the employment contract with its employee Michaela Máková. The reason was the employee's loss of medical capacity. Michaela Máková lives in Most, where there is a general lack of jobs. She is a single mother and in insolvency. That is why, in 2017, she took advantage of Amazon's offer to work in a distribution warehouse in Prague.

She was tempted by the pay, the free shipping and working only four days a week. Gradually, however, Michaela Máková began to suffer from pain and tingling in her hands, which, in her opinion, was the result of the repetitive movements when packing the parcels: she had to pack 2,000 of them during a ten-hour shift.

In 2021, Michaela Máková underwent carpal tunnel surgery on her right arm. According to the Regional Hygiene Station of the Central Bohemian Region, Amazon is responsible for these health problems and Michaela Máková is entitled to claim compensation.<sup>12</sup>

"If the manager doesn't like you, he'll send you to a position where it's not in your power to do what the algorithm requires. You get three warnings and then you're automatically out...", says Ivo Mayer, President of the Basic Trade Union of the Amazon Store Employees.

<sup>9</sup> Podle Dearbail a Conway (2023).

<sup>10</sup> Odborová centrála GMB (General, Municipal, Boilermakers and Allied Trade Union) má cca 500 000 členů napříč různými odvětvími, od průmyslových odvětví po služby. Webové stránky viz <https://www.gmb.org.uk/>

<sup>11</sup> Podle Votavová (2021a, 2021b).

<sup>12</sup> V době psaní tohoto textu nebylo o dalším vývoji kauzy bohužel nic známo.

continuation of the table

Not surprisingly, Amazon has been the target of criticism from both trade unions and human rights organisations (Delfanti et al., 2021). UNI Global, the global trade union headquarters<sup>13</sup>, based on its experience of working conditions at Amazon, has formulated four recommendations on how to regulate algorithmic management (UNI Global, 2021):

- 1) Trade unions should be involved in setting the algorithms that drive the work. Unions should also agree on the scope and use of the data the employer collects on its workers.
- 2) In workplaces where there is no union and no collective bargaining, monitoring (in any form, whether it is video recording or simply logging in/logging out of an application) should be prohibited.
- 3) Occupational health and safety authorities and institutions should assess and advise on the risks associated with algorithm management.
- 4) The decision to dismiss or punish a worker should always be made by the manager, not the algorithm.

According to Kellogg et al. (2020), currently, algorithmic management, whether it is used by a digital work platform or a "classic" company, is directed towards three areas:

- a) **Process management**, i.e. what the worker has to do, in what sequence and in what timeframe.

*In practice, one can imagine an algorithm management of taxi drivers: the algorithm receives an order from a customer and calculates which driver in the customer's location will be able to do the job at the highest speed, taking into account the current traffic situation.*

- b) **Evaluation of the worker** in order to detect those workers who do not perform their work as expected by the manager (or algorithm). Thanks to the applications that the worker uses in connection with the performance of his work, the algorithm obtains a lot of data, e.g. how long it takes the worker to perform a specific task, how often he logs out of the application (and therefore does not perform work), how his work is evaluated by customers, if the application allows this evaluation, etc. The problem of algorithmic evaluation of a worker is that the evaluation algorithm is not transparent, it is not clear which data enter it and with what weight.

*Thus, a particular taxi driver can be evaluated on the basis of the speed with which he responds to an order, on the ratio of accepted/rejected orders, on the basis of time preferences (whether is e.g. active during times of the day of increased customer demand) and of course on the basis of customer ratings. The algorithm then uses this data to create a rating for a particular worker. Of course, the chase for a positive review can be very stressful: a negative customer review can often be caused by a misunderstanding, but the taxi driver often has no opportunity to defend the negative review or give his version of the "story". The negative rating given by the customer can be compensated by the taxi driver, e.g. by increased activity during the day when more customers demand taxis. However, the time of increased demand is also changing in relation to how many other taxi drivers currently providing their services the algorithm records. Thus, the algorithm can fundamentally affect the working hours of the taxi driver, including any overtime.*

<sup>13</sup> Webové stránky organizace viz <https://uniglobalunion.org/>

- c) **Work Disciplines.** After the evaluation, the algorithm then "directs" the worker, either by reward or "punishment". A frequent "punishment" for a negative evaluation is temporary or permanent restriction of access to work, i.e. the employee is usually prevented or restricted from accessing the application where customers present their requests. In fact, research shows that digital work platforms and their algorithms in particular sustain more workers than are in demand, so they don't mind some downtime (Brick, 2023). Bonuses are usually monetary rewards.

## 2.2 The impact of algorithmic management on quality of working life

How can algorithm management affect working conditions? Todolí-Signes (2021) lists the following areas:

### Continuous monitoring of workers

In workplaces where algorithm management is used, workers are under constant supervision. Work performance is usually tied to the worker logging into the application - at the start of working hours, the worker logs in and logs out only during breaks and then at the end of working hours. The application allows you to monitor the employee's performance and compare it with others. In addition, the algorithm can also interfere with the performance of the work, e.g., in call centres, the algorithm can recommend the worker to speak more slowly or more clearly based on voice analysis. For workers who are in direct contact with the customer, the algorithm can evaluate how the worker looks when interacting with the customer and make recommendations in this direction. Thanks to the constant monitoring, the employer obtains a huge amount of data about its employees, so the question arises whether this monitoring is in compliance with Regulation (EU) 2016/679 of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (GDPR for short)<sup>14</sup>.

### Higher work intensity

Algorithm management can increase work intensity. This means that the volume of tasks that a worker must perform during working hours is increasing. The algorithm can use the data to evaluate how much time specific tasks require on average, and then demand this time from the worker. Moreover, if a worker performs above average, the algorithm may increase the performance

---

<sup>14</sup> Někteří autoři (např. Abraha, 2023) se domnívají, že právě legislativa týkající se GDPR by mohla v oblasti zneužívání algoritického managementu prozatím nahradit chybějící pracovněprávní legislativu. In other words, employment legislation currently has limited tools in most EU countries to combat the adverse effects of algorithmic management, but in the event of a dispute between employer and employee, data protection legislation could be used.

requirements without the worker's knowledge. This, of course, increases the demands on the performance of the workforce.

### **Lack of autonomy**

In algorithm management, there is no room for self-initiative and decision-making, or self-scheduling. The algorithm is very good at evaluating how to optimize the production process based on the acquired data, i.e., how the individual tasks should be followed in order to achieve the most efficient result. On the one hand, the algorithm can help in this respect in the sense that it eliminates the "trial and error" process. On the other hand, there is a danger that a worker who is not forced to think about their work will come to rely on the algorithm in such a way that they are unable to detect flaws in the event of an error. In other words, the worker stops using their brain and relies entirely on the algorithm.

### **Prejudice and discrimination caused by algorithm management**

Of course, the algorithm has no bias, but the data it evaluates may already be a source of discrimination. Based on the data at its disposal, the algorithm can evaluate which person is best suited for a particular job (not only education, experience, but also physiognomy, etc.). Moreover, as far as any minorities in the labour market are concerned, there are generally fewer workers belonging to these minorities than "majority" workers. Thus, the algorithm will not have enough data to evaluate the "performance" of these workers, so it will avoid them in the hiring process, or it will ask them to demonstrate their qualifications in much more detail than workers in the majority population.

### **Complexity and lack of information**

Algorithm management workers often complain about the lack of information and the complexity of the algorithm. While in many professions workers are rather overloaded by the amount of information, the opposite is true for algorithm-driven workers. They have no idea how the algorithm is set up, what exactly it tracks and evaluates, how it calculates the amount of the reward. For many workers, not knowing how to set up the algorithm is a source of stress.

### **Failure and functional fails**

The algorithm learns from the data. The more data it has, the better results it can achieve in a given area. However, at the moment we are still at the beginning and the algorithms still do not have enough data to be able to evaluate any situation that may arise at a specific workplace or during a specific work task. Uber drivers<sup>15</sup> complained that while they used to solve problems that arose

---

<sup>15</sup> Uber Technologies Inc. (zkráceně Uber) je firma, která vznikla v USA v roce 2009. Působí v oblasti dopravy a přepravy. Nyní působí prakticky po celém světě. In the past, it has come into the limelight mainly through the provision of taxi

during their work with a manager, today they are dependent on an automated machine that cannot handle every situation they encounter during their work.

---

services, which in many countries "crushed" local taxi services. Uber was one of the first digital work platforms to spark interest in the platform economy and platform workers.

Table 5 Algorithm management of the digital work platform

**Algorithm management of a digital work platform- the example of Wolt<sup>16</sup>**

Wolt is a Finnish digital work delivery platform that was founded in 2014. It is currently active in a number of European and non-European countries.

In early 2023, demonstrations and strikes by couriers took place in a number of EU countries (Czech Republic, Lithuania, Slovenia, Greece, etc.) and non-EU countries (Azerbaijan, Serbia, Georgia). This was due to a major change in the algorithm that calculates the courier's remuneration. In some countries, Wolt has launched dynamic *pricing*, a new algorithm that calculates courier rewards based on many inputs. However, this makes it completely opaque to the couriers; in other words, they do not know how the algorithm calculates the total amount of remuneration. The new terms and conditions state that the remuneration is calculated, for example, on the basis of the distance the courier has to travel, weather conditions, the size of the shipment, the time of day, etc. However, the specific conditions are not known and it can be assumed that other parameters, such as the courier's history in terms of his activity level and acceptance or rejection of orders, also enter into the calculation of the remuneration. It is also stated in the terms and conditions that the courier will not be informed about specific parameters entering the algorithm and about their changes.

Wolt has not changed its tactics yet<sup>17</sup>. Since 2022, Wolt has been publishing the Algorithmic transparency report (Wolt 2022 and 2023), where, according to Wolt representatives, the algorithm is sufficiently described. This initiative is certainly a step in a good direction, but some authors point out (Van Doorn, 2022) that the report is only a promotional material that does not provide specific amounts or weights for the parameters that go into the algorithms. Anyone who reads these reports must give the critics the benefit of the doubt...

## 2.3 Evaluation of the survey among couriers of digital work delivery platforms

This text was written in cooperation between the Research Institute of Labour and Social Affairs, v. v. i. and the Trade Union of Platform Workers (OOPP). The aim was to gather data on platform workers of digital labour platforms operating in the delivery and taxi services sector (Wolt, Bolt, Dámejidlo, Uber, etc.) and at the same time to enable the newly formed trade union to know its 'target group' and their preferences regarding the activities that a trade union focused on platform workers should develop in the interest of platform workers.

The Platform Workers' Union currently mainly represents the interests of platform workers working on digital labour platforms in the delivery sector. According to a number of studies, this group of platform workers is considered to be one of the most vulnerable in terms of precarious working conditions. Therefore, it is logical that the first trade union representing the interests of platform workers is recruited from the ranks of couriers and drivers of digital work platforms focused on delivery.

<sup>16</sup> Podle BNE (2023) a Cihla (2023).

<sup>17</sup> V době psaní tohoto textu nebylo o vývoji dynamického oceňování nic známo.

## **2.4 Structure of the research population according to selected characteristics (age, type of digital work platform, employment status, level of time, etc.) and survey methodology**

The data was collected through an online survey. Given the time available to respondents, we consider the number of responses (223) a success. Respondents work as couriers in delivery services managed by a digital work platform. Respondents were contacted primarily through social media and direct email contacts in the Platform Workers Union database. This is not a representative sample of respondents. Since the questionnaire was in Czech, it can be argued that workers of non-Czech nationality are underestimated. Furthermore, it can be assumed that they are over-represented by the couriers at the digital labour platform Wolt, who have already protested several times against the platform's wage and working conditions and who are in contact with the Platform Workers' Union initiative.

However, the results of the survey serve as a useful insight into the reality of working life, including the motives and barriers that accompany this form of work activity. Although this is only a survey data collection, it is possible to highlight its uniqueness in terms of mapping the opinions of a very hard-to-reach group of workers who are dislocated due to the nature of their work, i.e., they are not located at one workplace with one "employer".

A total of 223 questionnaires were completed.

Of the 223 respondents, significantly more men (83%) than women answered the questionnaire. This gender distribution already suggests that the delivery service profession is dominated by men. The vast majority are self-employed or self-employed (80% of respondents). Almost 12% of respondents work on agreements outside the employment relationship (work performance agreement, work activity agreement). And less than 2% (4 respondents) said they work without any contract. 4.4% of respondents said they have a traditional employment contract.



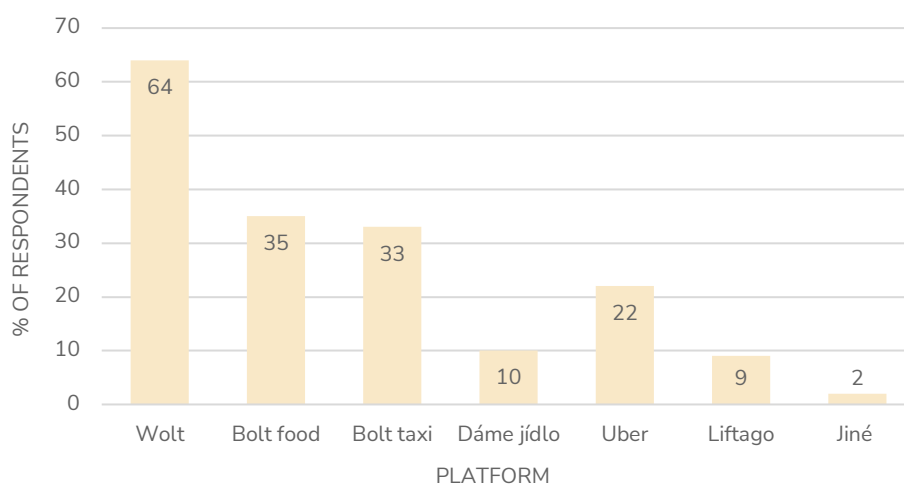
Table 6 Worker status by contractual relationship

Work status	%
I am a full-time employee (40 hours per week).	1,3
I'm a part-time employee.	3,1
I'm working on a work performance agreement.	9,9
I'm working on a work activity agreement. <sup>18</sup>	1,8
SELF-EMPLOYED	80,3
I don't have a contract.	1,8
I don't know	1,8

Source: OOPP survey

In terms of respondents' platform affiliation, respondents performing courier work for the Wolt digital work platform are most represented (64%). However, it should be noted that couriers do not usually work for just one platform. 44% of respondents worked exclusively for one digital work platform, 41% worked for two platforms, and 14% split their time between three platforms.

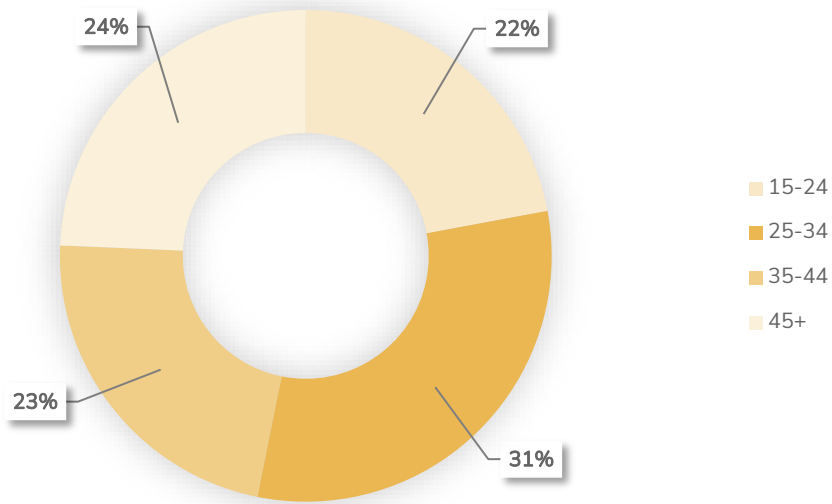
Chart 1 Percentage of respondents who work for one of the listed platforms at the time of the survey (multiple platforms available)



<sup>18</sup> V anketě byla nabídnuta možnost odlišit dohodu o provedení práce a dohodu o pracovní činnosti (viz třetí část zákona č. 262/2006 Sb., zákoník práce). Odpovědi „Pracuji na dohodu o pracovní činnosti“ je však potřeba brát s rezervou. Podle Veverková et al. (2023) je naprostá většina platformových pracovníků sebezaměstnaných, v méně než 10 % případů se jedná o pracovníky pracující na základě dohod o provedení práce. Využití dohod o pracovní činnosti, jejíž ustanovení se blíží pracovní smlouvě, nedává u platformové práce ekonomický smysl, tzn. je nevýhodná pro obě strany: jak pro digitální pracovní platformu (administrativní náklady a náklady na sociální a zdravotní pojištění hrazené zaměstnavatelem), tak pro pracovníka (nižší výdělek ve srovnání se sebezaměstnanými pracovníky a zaměstnanci pracujícími na základě dohod o provedení práce. Podle Veverková et al. (2023) navíc platformoví pracovníci obecně mají nízké ponětí o svých právech a povinnostech na trhu práce, takže jejich schopnost rozlišit dohodu o provedení práce a dohodu o pracovní činnosti může být omezená. Jinak řečeno, ti respondenti, kteří označili, že pracují na základě dohody o pracovní činnosti, mohou ve skutečnosti pracovat na základě dohody o provedení práce.

Source: OOPP survey

Chart 2 Age composition of respondents



Source: OOPP survey

Figure 2 shows that the age composition of respondents is very balanced in the research population.

For the respondents who answered the survey, this type of work is the main source of income for 48% of them. About one-third of these are earnings in addition to another job or business. The rest are students, pensioners, or parents on parental leave.

Of course, these figures do not reflect the actual proportion of couriers who have working via a digital work platform as their main work activity. Other research suggests that this proportion is likely to be lower. It can be assumed that the survey was filled out mainly by those couriers who have this job as their main work activity, as they are naturally more interested in their working conditions.

Table 7 Work for the platform as main and secondary activity

Earnings/Extra income	%
Main source of earnings	48,0

Only extra income to studying, parental leave, pension, etc.	17,9
Only extra income to another job	23,8
Only extra income to other business activities	10,3

Source: OOPP survey

18% of respondents work for a digital work platform via the<sup>19</sup> fleet. Fleet-bound couriers usually have different contract terms than couriers who work directly for a digital work platform. Workers who use the fleet's services are more often employed on a work contract (or work contract), almost never as self-employed (self-employed). Respondents who said they were working without a contract or did not know what kind of contract they had were also more likely to have had work arranged through the fleet. The most important reasons why respondents work for digital work delivery platforms via fleet are age (the respondent is under the age of majority and therefore cannot establish a trade license), reluctance or unwillingness to establish a trade license, working for fleet does not require this and this method is less administratively demanding for the worker. The fact that the respondent does not own a car was mentioned only sporadically. Several times, foreclosures imposed on the worker were mentioned as a reason for using the platform.

All respondents with an employment contract (i.e., employees) are comfortable with the level of their hours. For the self-employed, 81% of the respondents are satisfied with this status, i.e., self-employed status, 10% said they would prefer to have a work contract and 8% of the respondents are not interested in their work status.

Regarding the number of hours worked, three quarters of the respondents are satisfied with their working hours as set. For others, underemployment rather than overload of "extra" hours prevails. 17% of the respondents would like to work more hours, but unfortunately the digital work platform, or the amount of work available, does not allow this. This is also probably why many couriers work for more than one digital delivery work platform. Only 7% of respondents indicated a desire to work fewer hours.

## 2.5 What are the reasons to work for a digital work delivery platform?

The survey also asked about the reasons why respondents work for the digital work delivery platform<sup>20</sup>. The most frequently cited reason was the flexibility of the job, which combines well with other activities. The reason for the relatively high representation was that it is a good earner. This

<sup>19</sup> „Flotilami“ jsou nazývány firmy, které zajišťují pro doručovací digitální pracovní platformy kurýry. Kurýrovi mohou zapůjčit i auto nebo jiný dopravní prostředek, nicméně v takovém případě je kurýr zpravidla nucen odpracovat za den určitý počet hodin. Flotila si za své služby strhává provizi z kurýrovy odměny.

<sup>20</sup> Respondenti mohli vybrat i více variant.

reason was mentioned more often by young people under 25. Around 40% of respondents enjoy this type of work, regardless of their age or status, or whether it is full-time or part-time, or a main or secondary job.

**Table 8 Main reasons why respondents work through platforms in the delivery services sector**

The reason why the respondent chose to work for the platform	% of affirmative responses
For lack of other job opportunities (in my field, in my region, etc.).	13,9
It is a good extra income (on top of a current job, studies, parental leave, etc.).	37,7
The work is flexible and combines well with my other activities (family, leisure, studies, etc.).	75,3
It is a good start for my future employment (career).	6,7
I like it.	39,9

Source: OOPP survey

Only 14% of respondents said they chose this type of work due to a lack of other job opportunities. At the same time, however, only 7% of respondents rate working for a digital work delivery platform as an opportunity for an easier career start.<sup>21</sup> Expert studies generally talk about platform work (Eurofound, 2018; Ilsøe et al., 2021) as a possible ticket to more stable jobs. However, it can be assumed, and this can also be inferred from our survey data, that this interpretation does not apply to platforms in the delivery services sector.

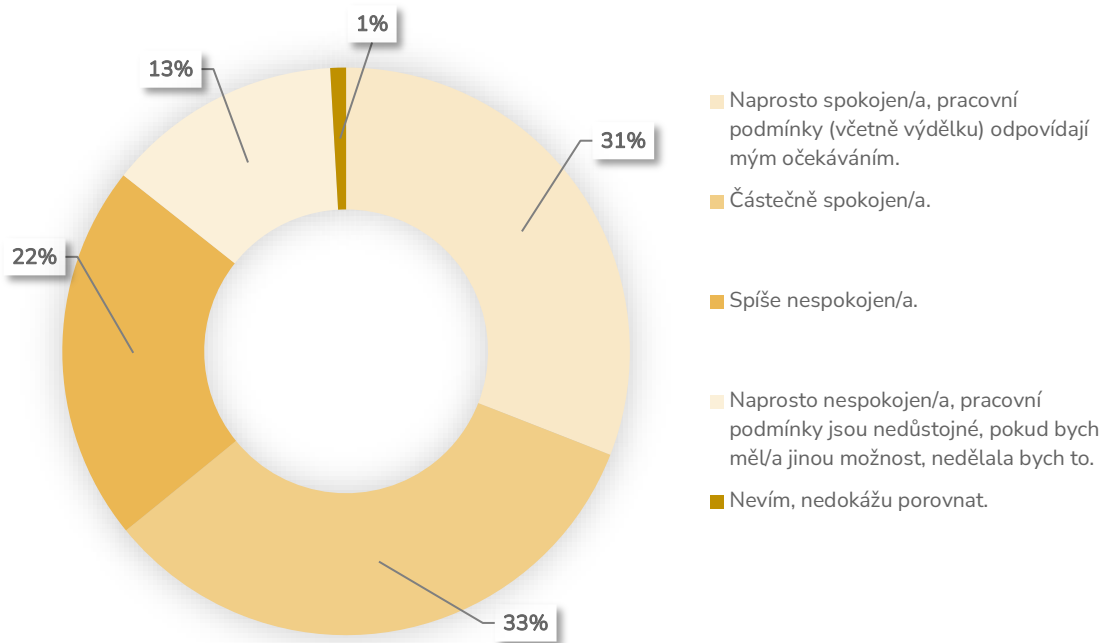
## 2.3 Evaluation of working conditions

Couriers and digital work platform delivery drivers are more satisfied than dissatisfied with their jobs and working conditions. 31% of respondents expressed complete satisfaction with working conditions, including earnings that meet the worker's expectations. Another third (33%) were partially satisfied. Approximately 13% of couriers and drivers are very dissatisfied. They responded that if they had another option then they would not do the job (see Figure 3). The level of satisfaction with working conditions is not differentiated by age, type of employment contract/status, or whether the work is done indirectly through the fleet or directly.

<sup>21</sup> Eurofound (2018): Platform work. Prospects and career development. Available at: <https://www.eurofound.europa.eu/hu/data/platform-economy/dossiers/prospects-and-career-development>.

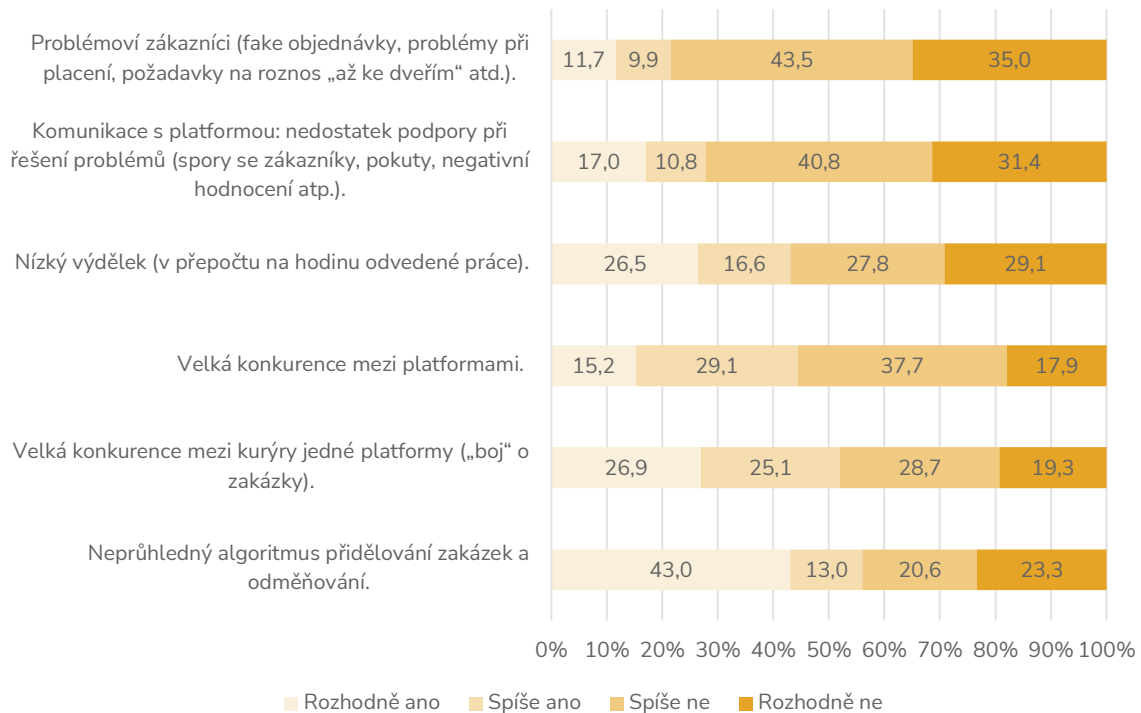
Ilsøe, A., Larsen T.P., Bach, E.S. (2021): Multiple Jobholding in the digital platform economy: signs of segmentation. Transfer: European Review of Labour and Research, 27(2). <https://doi.org/10.1177/1024258921992>

Chart 3 Satisfaction of couriers and drivers of platform-managed delivery services with working conditions



Source: OOPP survey

Chart 4 What are the challenges of working across platforms?



Source: OOPP survey

Couriers and drivers feel that one of the biggest problems is the lack of transparency in the algorithm that assigns them jobs and calculates their remuneration. A full 43% of respondents definitely consider this problematic. More than half of the respondents also admitted that they face a lot of competition among couriers/drivers of a single delivery digital work platform, i.e., they have to fight for contracts. Strong competition among digital workplace delivery platforms is cited by 44% of respondents.

When it comes to assessing the level of earnings, respondents are roughly divided into two similarly sized camps. Earnings per hour of work were rated as low by approximately 43% of respondents. More often than not, it was mainly those who work as couriers and drivers as a supplement to other non-remunerative activities, i.e., students, disabled/elderly pensioners, carers, etc. Women were also more likely than men to be less satisfied with their earnings.

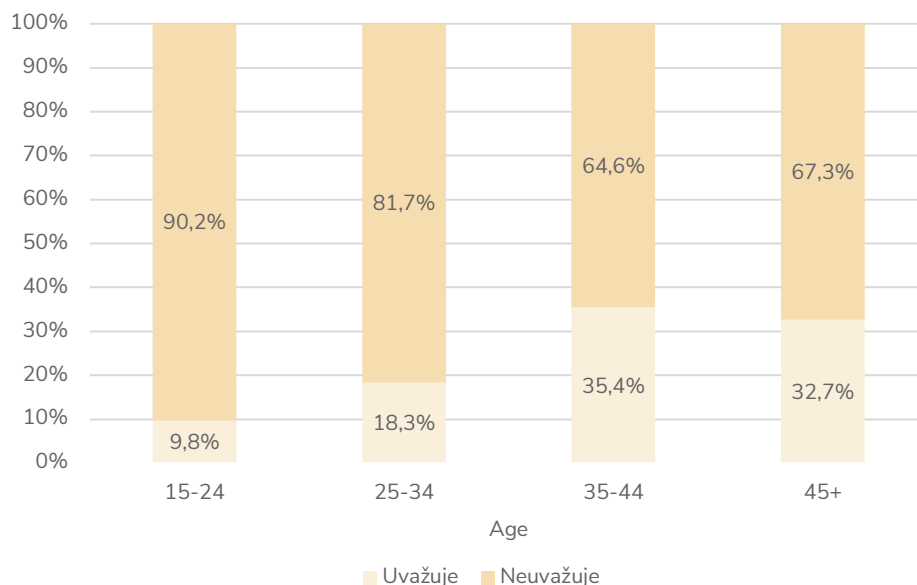
Drivers and couriers perceive the relationship and communication with the digital work platform and customer behaviour as the least problematic.

## 2.6 Union membership and the potential for platform workers' union development

Among the respondents, only 4 respondents were unionized. On the other hand, 20 of them (9%) said they did not know what a trade union was. The real potential for membership can be found in the 20% of delivery service platform workers who said they were considering union membership. However, the majority (68%) are not considering joining a union.

Workers over 35 are relatively more likely to consider joining a union. On the other hand, young people under 25 are the least likely to do so. This trend does not differ much from the majority population and from the attitudes of employees, whose motivation to join a union is generally higher than that of the self-employed. Similarly, the potential to join a union is more likely to be found among couriers/drivers who do this work as their main activity (33% of them consider union membership) than among couriers/drivers for whom platform work is more of a side job (6% consider union membership). Furthermore, men are more likely than women to consider joining unions. Fleet affiliation has no bearing on the willingness to unionise.

Chart 5 Willingness to join a trade union by age



Source: OOPP survey

Couriers/drivers who do not consider union membership most often cite the belief that they can take care of themselves as the reason they find membership unnecessary; (35%). The second most frequently cited reason is unwillingness to pay membership fees (26%). Trade unions are seen as

an outdated institution that does not know the working conditions of couriers by 24% of respondents who declare their reluctance to organise. Only 13% of respondents who are not interested in union organisation report that they have no information about union membership opportunities. On the other hand, it can be argued that there is little disdain for unions and their ability and competence to negotiate with the platform.

Table 9 **Why do not respondents consider joining a trade union to represent their interests?**

Reasons why couriers/drivers do not consider union membership	%
Unions are useless, I'll take care of myself.	35,4
I don't want to pay membership fees.	26,0
The union is an outdated institution that has no idea about the working conditions of couriers.	23,8
I don't know how the union could help me.	21,1
I don't have any information about union membership options at my work.	13,5
I don't believe the union knows and understands my platform/flotilla issues.	13,5
I don't believe that the union will actually represent my interests; the officials will certainly want to accommodate the platform or the interests of other entities.	13,0
The platform I work for will not take unions seriously.	10,8
Don't know/not found out	5,4

Source: OOPP survey

In terms of services and support to the union, **respondents** would most **welcome an intervention towards ensuring greater transparency of working conditions, particularly in terms of work allocation algorithms and remuneration**. Another task for unions, as traditionally in other sectors and for workers, should be to negotiate pay. Specific to the sector is the workers' demand that unions advocate for media coverage and highlighting the problems associated with working for digital labour platforms. They should spread awareness of the possible precariousness of working conditions of platform workers and secondarily influence legislation leading to better working conditions at both national and European level.



Table 10 **Why do respondents not consider joining a trade union to represent their interests?**  
(Multiple answers can be checked)

	Absolutely yes	Rather yes	Rather not	Absolutely not
It should seek to negotiate more transparent working conditions with platforms, especially regarding work allocation algorithms and remuneration	92,2	5,9	0,0	2,0
It should deal in particular with the increase in remuneration	71,2	25,0	3,8	0,0
It should raise awareness of the working conditions of platform workers in the media and among the general public, including customers	71,2	19,2	7,7	1,9
It should influence legislation on platform workers and their working conditions at national level	66,0	23,4	10,6	0,0
It should also be active at European level and work with unions supporting platform workers in other EU countries to put pressure on platforms at transnational level	66,0	21,3	10,6	2,1
It should deal with individual problems of platform workers in relation to the platform, e.g., unfair customer complaints, unfair remuneration, etc.	52,9	31,4	7,8	7,8
It should provide legal advice on the working conditions of platform workers	50,0	42,3	5,8	1,9

Source: OOPP survey

Interestingly, traditional services such as assistance in resolving various individual disputes or problems or providing legal advice are the least urgently demanded.

Regarding the preferred level of union fees, approximately 60% of current and potential members would prefer fees up to a maximum of CZK 200.

The question of the best possible communication channel remained largely unanswered. Therefore, the results are not complete and must be interpreted with great caution. However, websites with updated information and possibly a regular newsletter were most often mentioned as the most appropriate communication channel, followed by private closed groups on social networks (Facebook and WhatsApp). Podcasts and text messaging were not preferred by almost no one.

## 2.7 Main findings

- The issue of collective interest representation is mainly of interest to platform workers who carry out this work as their main job activity. These workers are likely to be over-represented in the research population.
- Platform workers perceive that the most problematic aspect of their work performance is that the algorithms for allocating work and subsequently calculating remuneration are not transparent. The high competition among couriers and the competition for work seems to be very problematic.
- The survey confirms the experience that platform workers are overwhelmingly self-employed (80%), and to a much lesser extent work under a work contract.
- Couriers often combine work for several digital delivery platforms at the same time. Eight out of 10 self-employed persons (i.e., self-employed) stated that this form of contractual arrangement suited them. Satisfaction with the length of working hours/time off prevails as well. Only 17% of respondents would like to work more.
- Two-thirds of workers reported overall satisfaction with their work.
- The most frequently cited reason for choosing this type of work is the flexibility and the advantage of combining work with other activities such as family, leisure, studies, etc. The proportion of couriers/drivers who said they enjoy their work (40%) is also not negligible.
- More than two-thirds of respondents do not consider union membership, consider it an unnecessary institution, are convinced that they can take care of themselves and do not want to bear the costs of paying membership fees.
- However, if unions were active in this sector, then their agenda should focus in particular on more transparent working conditions, in the case of algorithmic allocation of work and remuneration. In addition, unions should spread awareness of the working conditions of platform workers in the media and among the general public, including customers, and last but not least, collectively bargain for remuneration.

## 3. Impact of digitisation on the quality of work in the Czech Republic and EU-27

Aleš Kroupa

### 3.1 Introduction

In recent years, there have been serious impacts of digitisation on working conditions and work organization, accelerated by the COVID-19 pandemic. These changes, for better or worse, affect both the physical and psychological performance of paid work itself in a number of ways, and at the same time have significantly helped to manage the constraints associated with the pandemic, while allowing workers to cope better with the demands of work in the long term, including the so-called reconciliation of work and family life.

As we will see below, the changes affect not only employees, but also a number of self-employed persons, including those who often work in a regime on the borderline between entrepreneurial activity and employment, i.e., in a so-called quasi-employment relationship, exhibiting a significant number of features of dependent work as defined by Act No. 262/2006 Sb., the Labour Code. This practice is widespread in both highly skilled professions (IT specialists and other creative professions) and less skilled ones (couriers, construction professions). In some sectors, this practice is even prevalent. For example, the study *Work Instability and Insecurity of Artists in Audiovisual Production* (Kyzlinková, Kroupa, 2022) shows that professionals in the audiovisual sector work mainly as self-employed persons, i.e., on the basis of commercial contracts, copyright contracts or other contracts concluded under the Civil Code. Another segment where quasi-employee relationships are prevalent is the platform economy, employing various delivery drivers, education professionals, social workers, and many others. More information on the scope of platform work, the professional composition of platform workers, their motives, and reasons for working for platforms is contained in the study of the *Czech Digital Work Platform* (Váňová, Veverková, Kroupa, 2023).

The quality of work is viewed as a multidimensional model, where the individual dimensions, or characteristics related to the performance of work, represent both certain demands on the person of the worker, and, at the same time, bring certain positives to the worker, such as a sense of satisfaction and self-realization from work. The publication *Working conditions in the time of COVID-19 served as inspiration: Implications for the future* (Eurofound, 2022), whose authors, based on the 2017 OECD Guideline on Measuring the Quality of the Working Environment, selected the European Working Conditions Survey questionnaire for the purpose of operationalising the individual dimensions of work

The Telephone Survey<sup>22</sup>, organised in 2021 by the European Commission agency EUROFOUND, sets 42 questions forming the basis of six dimensions to assess the quality of work. These are 1) physical and social conditions of work, 2) conditions of performance of work tasks, 3) opportunity to participate in work processes, 4) working hours, 5) job security and prospects and career development, 6) job satisfaction.

From these dimensions, an index was also created to show the position and interrelationships of European countries in terms of quality of work. At the same time, the degree of digitisation of work was monitored by respondents' answers to the question to what extent the computer system influences what they do at work.

## 3.2 Dimensions of quality of work

### 3.2.1 Physical working conditions

Physical working conditions are one of the basic conditions affecting both work safety and the well-being of employees, as well as their health. The description of physical and social working conditions is therefore based on the monitoring of three indicators characterising contact with physical risk factors such as chemical and biological substances and excessive noise, as well as four indicators measuring the physical strain on workers. This includes carrying or moving heavy loads, lifting, or moving people, repetitive hand or arm movements and working in painful or strenuous positions.

27% of economically active workers in the Czech Republic (EU-27 26%) report contact with hazardous physical agents in the form of chemicals. The most frequent is in the health sector, where 59% of workers in the Czech Republic come into contact with chemicals, compared to 46% in the EU-27, and in industry, where 34% (EU-27 30%) of workers come into contact with chemicals. In the Czech Republic, 14% of workers come into contact with infectious substances (EU-27 18%), most often in the healthcare sector, where 64% of workers report being in contact with infectious substances (EU-27 59%). Women in the Czech Republic and the EU are twice as likely as men to be exposed to infectious materials, 20% (EU-27 21%). 34% of Czech and 34% of EU-27 workers are exposed to excessive noise, especially in education 57% (EU-27 53%) and industry 42% (EU-27 45%).

---

<sup>22</sup> European Working Conditions Telephone Survey 2021 – EWCTS 2021 je průzkum pracovních podmínek realizovaný každých pět let od roku 1991 za použití dotazníku s minimální obměnou otázek. V roce 2021 uskutečnila nadace Eurofound nové kolo průzkumu pracovních podmínek v Evropě (EWCS). Respondenti byli v 36 evropských zemích poprvé osloveni formou telefonických rozhovorů za pomoci počítače tzv. metoda CATI (*Computer Assisted Telephone Interview*). Vedle zemí EU byli dotazováni respondenti ze Spojeného království, Norska, Švýcarska, Albánie, Bosny a Hercegoviny, Kosova, Černé Hory, Severní Makedonie a Srbska. Cílovou populací byli všichni obyvatelé výše uvedených zemí ve věku 16 let nebo starší, kteří byli v době průzkumu zaměstnaní, tj. ekonomicky aktivní (zaměstnanci a podnikatelé). K vytvoření národních reprezentativních vzorků pro každou zemi byl použit náhodný pravděpodobnostní výběr. Konečný počet rozhovorů dosažených po kontrole kvality ve všech 36 zemích byl 71 758.

The physical burden of carrying or moving heavy loads is characteristic of 34% of workers in the Czech Republic (EU-27 35%). Workers carrying or moving heavy loads are significantly more likely to be found in the Czech Republic in construction 56% (EU-27 56%) and in industry 43% (EU-27 38%). Lifting or moving people was reported by 10% of Czech and 12% of European respondents. Logically, a significantly higher prevalence was recorded in the Czech Republic in the health sector at 57% (EU-27 51%) and in education at 21% (EU-27 16%). 30% of Czech and 50% of European economically active workers work in painful or strenuous positions, more often in healthcare 51% (EU-27 64%) and industry 38% (EU-27 47%). Repetitive hand or arm movements at work were reported by 74% of Czech workers (EU-27 71%). From a sectoral perspective, no significant differences were observed between economically active workers and those whose work involves carrying or moving loads. In the case of physical load, differences between men and women were observed only in the case of carrying heavy loads, to the disadvantage of men, logically due to physiognomic differences and EU-wide legislation limiting the weight of the loads carried by women.

Table 11 Exposure to work-related physical agents in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
		<b>How often are you exposed at work to the following:</b>											
Physical factors	1. Handling or skin contact with chemicals or products.	25,6	30,0	26,2	22,4	25,3	22,8	27,2	26,9	27,2	24,6	16,7	23,3
	2. Handling or direct contact with substances that may be infectious, e.g., waste, body fluids, laboratory material, etc.	18,3	15,5	17,9	16,0	14,2	15,8	15,1	8,2	14,0	12,5	8,2	11,8
	3. To such loudness that you have to raise your voice when talking to other people	35,1	29,9	34,4	32,8	26,7	32,0	34,4	28,5	33,6	28,2	18,1	26,5
		<b>How often does your main paid job require...?</b>											
Physical stress	4. Carrying or moving heavy loads	34,3	41,4	35,3	28,8	36,5	29,8	32,2	43,9	34,1	27,8	28,8	27,9
	5. Lifting or moving persons	12,2	8,8	11,7	10,5	7,6	10,1	10,0	7,9	9,6	6,2	5,2	6,0
	6. Work in painful or strenuous positions.	48,8	57,2	50,0	44,7	54,7	46,0	28,3	42,0	30,3	24,1	28,0	24,7
	7. Repetitive hand or arm movements	70,1	75,3	70,8	71,0	72,8	71,2	73,3	75,7	73,6	76,2	70,6	75,3

Note: 1 employee, 2 entrepreneur, 3 total. On a five-point scale of 1 (never), 2 (rarely), 3 (sometimes) 4 (often), 5 (always), the respondent indicated the subjectively perceived level of exposure to the relevant factor. Answers in the table in %: always + often + sometimes (questions 1-7). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: EWCTS 2021

### 3.2.2 Social conditions of work

The social conditions of work are among other aspects of work that affect the quality of work and, indirectly, the performance of the worker. The description of the social conditions of work is based on the monitoring of three indicators characterising the degree of possible social support from fellow employees, an indicator measuring subjectively perceived discrimination and three questions on unacceptable behaviour (verbal assault, sexual harassment, and bullying) at work by colleagues or managers.

Support from co-workers was reported by 39% of Czech respondents and 47% of economically active respondents from EU-27 countries. If we look at collegial support from the self-employed, it is clear that their options for turning to colleagues for help are much more limited. Only 24% of entrepreneurs in the Czech Republic and 37% in the EU-27 reported experience with support from colleagues or professional colleagues. 42% of employees in the Czech Republic and 41% in the EU-27 receive support from their supervisor.

Support from colleagues varies by age in both Czech and European corporate settings, with the level of reported support tending to fall in the older age groups from 47% in the 16-24 age group to 34% in the 56+ group in the Czech Republic and from 59% to 43% in the European 27 respondents. In the Czech Republic, there was also higher support from colleagues in the case of women. In terms of sectors, there was a higher incidence of support from colleagues in sectors such as trade and hospitality (Czech Republic 49%/EU-27 52%) and a lower incidence in transport (Czech Republic 24%/EU-27 42%). Support from managers was recorded to a greater extent in the Czech Republic in financial services (54%) and in trade and hospitality (46%). Whereas in industry, respondents reported a significantly lower frequency of support (37%) from managers. The situation varied across the 27 countries, with higher support from managers reported by workers in agriculture (52%) and in trade and hospitality (45%). In contrast, the health sector registered significantly lower support (35%). No other significant differences by education, for example, were observed.

Table 12 **Social factors affecting work performance in %**

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Support for co-workers	1. Your colleagues help and support you	46,8	42,6	46,8	47,5	35,9	47,5	38,7	48,9	38,7	37,2	46,7	37,4
	2. Your co-workers or professional colleagues help and support you.	0,0	36,9	36,9	0,0	41,1	41,1	0,0	24,2	24,2	0,0	25,1	25,1
	3. Your manager helps and supports you	41,0	0,0	41,0	40,8	0,0	40,8	41,8	0,0	41,8	34,2	0,0	34,2
Discrimination	4. Have you been discriminated against at work in the last 12 months?	11,5	10,4	11,3	11,9	11,0	11,8	12,3	12,4	12,3	12,0	14,8	12,5



continuation of the table

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Unacceptable behaviour	Have you been exposed to any of the following at work in the last month?												
	5. Verbal assault or threats	9,5	8,1	9,3	9,9	8,0	9,6	7,6	14,2	8,5	6,6	10,4	7,2
	6. Unwanted sexual attention	1,7	2,2	1,8	1,7	2,1	1,7	1,4	4,1	1,8	0,2	1,6	0,5
	7. Bullying, harassment, violence	6,1	4,5	5,9	6,3	4,7	6,1	3,1	3,2	3,1	1,6	4,5	2,1

Note: 1 employee, 2 entrepreneur, 3 total. The extent of support, discrimination and unacceptable behaviour was recorded by the respondent on a five-point scale of 1 (never), 2 (rarely), 3 (sometimes), 4 (often), 5 (always). Answers in the table in %: "Always" (questions 1, 2, 3) and "Yes" (questions 4, 5, 6, 7). Question 2 was asked only of entrepreneurs. The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: EWCTS 2021

The fact that the respondent had been the object of discrimination, defined as inadequate treatment because of religion, race, demographic or other personal characteristics, was reported by 12% of respondents in the Czech Republic and 11% in the EU 24. As far as discrimination in the workplace is concerned, it is more often registered in the Czech Republic among the younger age groups (16-24years) and then in the middle age group, i.e., 45-55years. In the first case, 18% and 14% of respondents said they had been discriminated against for various reasons. At the same time, women are more likely to complain about discrimination in the Czech Republic, with 15% of women, as opposed to 10% of men, saying they had been discriminated against at work in the last 12 months. In the EU-27, 13% of female complainants were registered compared to 10% of male complainants. From a sectoral perspective, discrimination at European level was recorded more frequently in health (15% of respondents) and transport (14% of respondents).

Exposure to unacceptable workplace behaviour consisting mainly of verbal assault, sexual harassment or bullying was experienced by 9% (verbal assault), 2% (sexual harassment) and 3% (bullying) of economically active persons in the Czech Republic. The frequencies of the responses of the 27 respondents are similar, with the exception of bullying, harassment and violence, where the incidence was roughly twice as high as in the Czech Republic.

From a sectoral perspective, the incidence of unacceptable behaviour in the Czech Republic was more frequently recorded in the health sector, where 14% of respondents reported having been the victim of verbal assault or threats (EU-27 17%). At the same time, 5% of respondents (11% in the EU-27) said they had been bullied in healthcare. The second sector characterised by a higher incidence of negative behaviour is transport, where 13% (EU-27 12%) of respondents reported verbal assault, followed by the industrial sector, where bullying is more common, reported by 4% (EU-27 5%) of respondents. Unacceptable behaviour by colleagues is more frequently registered in the youngest (16-27years) and middle age groups (35-44years), where 7% (EU-27 5%) and 3% (EU-27 2%) of respondents received unwanted sexual attention in the former and the latter respectively. On the other hand, bullying was more frequently recorded in the Czech Republic in



the two youngest age groups, i.e., 16-24(8%) and 25-34(5%). Unlike men (Czech Republic 2%, EU-27 5%), women are more likely to be bullied (Czech Republic 4%, EU-27 7%), as is the case with unwanted sexual attention (Czech Republic 3%, EU-27 3%).

### 3.2.3 The conditions under which staff carry out their work tasks

The conditions under which individual work tasks are carried out vary considerably from company to company depending on the organisation of work and have an unquestionable impact on the working climate and, in many cases, on the health of the workers themselves. This dimension therefore looks at indicators measuring autonomy at work, i.e., the ability to change or choose work methods, the order of tasks or the speed of work. The dimension also includes indicators measuring the intensity of work performance in terms of the speed of tasks performed and the pressure of deadlines. Indicators measuring work intensity included work in emotionally demanding situations.

Workers in the Czech Republic can change or choose their work methods (41%), order of tasks (50%) and speed (55%). Compared to the European average, the proportion of workers with the ability to influence the organisation of work in terms of methods and choice of order of tasks is lower. Conversely, the pace of work may change slightly more in the Czech Republic.

The intensity of work, expressed in terms of high work speed, pressure of deadlines and emotional demands on the worker, is more frequently reported among workers in the Czech Republic compared to the EU-27 data, as shown in Table 13 below.

Table 13 Working conditions in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
		<b>Can you choose or change .... ?</b>											
Autonomy of work	1. Methods of your work	47,7	60,1	49,4	49,8	61,0	51,3	38,9	53,2	41,1	41,6	50,0	43,0
	2. Order of your tasks	52,7	64,7	54,4	57,3	64,5	58,2	48,3	58,8	50,1	55,6	52,1	55,0
	3. Speed or pace of your work	49,5	60,9	51,1	49,9	61,7	51,5	52,7	63,9	54,6	57,9	68,1	59,7
		<b>How often does your main paid job or business require .... ?</b>											
Intensity of work	4. Presence in situations that are emotionally challenging for you	18,4	19,4	18,5	19,7	21,3	19,9	27,3	23,6	26,7	28,9	25,5	28,4
	5. High speed of work	49,3	48,5	49,1	54,2	55,3	54,4	52,0	52,4	52,1	55,0	57,7	55,5
	6. Working under pressure of deadlines	47,2	51,2	47,7	53,6	58,9	54,3	48,4	54,8	49,4	52,8	55,4	53,2

*Note: 1 employee, 2 entrepreneur, 3 total. Autonomy and work intensity are assessed by the workers themselves on a five-point scale of 1 (never), 2 (rarely), 3 (sometimes), 4 (often), 5 (always). Answers in the table in %: always + often (questions 1-6). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.*

*Source: EWCTS 2021*

In the Czech Republic, men (46%) and workers with tertiary education, i.e., with higher vocational and university education (47%) are more likely to change their working methods. At the same time, workers with more autonomy in their working methods are more likely to be found in education (60%) and public administration (32%). The occurrence of a higher level of the possibility to change working methods was not registered in the education system by chance, it corresponds to the situation in the education system in 2021, when the survey was conducted and when online teaching was still in many cases in its infancy. Employees with the ability to change the order of tasks are more often recruited from banking (82%) and services (60%). The agricultural sector is typical for changes in the speed of work, with 76% of workers reporting this option. Women (31%) and workers with tertiary education (31%) are more likely to report increased emotional strain. These are most often workers in sectors such as education (39%), health (62%) and public administration (37%). High speed of work is characteristic of the healthcare (64%) and construction (63%) sectors. Working under deadline pressure is more likely to be reported by men (53%), workers with tertiary education (56%) and construction workers (65%).

As far as the EU-27 is concerned, the situation is similar in many respects. The ability to vary work methods, task order and speed is reported more frequently among workers with tertiary education. The ability to change working methods is characteristic of the education sector (64%), the order of tasks for the financial sector (70%) and speed also for the financial sector (60%). High emotional strain is more common among women (22%) and, by sector, in health (41%) and education (26%). In the EU-27, high labour velocity is characteristic of the healthcare (55%) and trade and hospitality (54%) sectors. Working under deadline pressure is reported mainly in the financial sector (54%) and construction (52%) in the EU-27.

#### **3.2.4 Participation in labour-related decision-making processes**

With the shift from hierarchically to participatively managed organisations, employee representatives or employees themselves are playing an increasing role in the management of organisations. This is a trend related to the type of production, i.e., the sector, the organisational set-up, and the legal status of the organisation. Workers' participation in decision-making processes enhances their motivation and improves their performance. This dimension therefore includes indicators measuring the influence of workers on important work-related decisions or goal setting, as well as the opportunity to participate in changes to work processes. In the case of entrepreneurs, the indicators used were questions mapping the ability of the entrepreneur to make important decisions related to their business and the extent to which the respondent entrepreneur can hire and fire employees, which may not be, as it may seem at first glance, a straightforward practice. Many entrepreneurs working in so-called quasi-employee relationships or operating franchise businesses do not always have this option. The fact that they cannot make decisions about the running of their business, or about hiring and firing employees, was reported by 7% and 50% of employees in the Czech Republic, respectively, while 6% and 30% of entrepreneurs in the EU-27 do not have these competences. The large difference in the case of hiring and firing of employees

in the Czech Republic may be related to the relatively large share of so-called disguised employment relationships (the so-called *schwarz* system). Classically, these are the trade and hospitality sectors, which is finally confirmed in the following text, where the lack of autonomy to decide on the running of one's own business was observed significantly more often in these sectors. The same applies to the banking sector, where there are many self-employed bank advisors working for various financial institutions.

The difference between the level of reported participation in the Czech Republic and the EU-27, especially in the case of consultations on work objectives, is significant in favour of the Czech Republic (57% in the EU-27 vs. 69% in the Czech Republic). The other two indicators, on the other hand, are several percentage points lower in the Czech Republic compared to the EU-27. Logically, higher values were recorded among entrepreneurs whose work is inherently more autonomous.

Table 14 Participation in decision-making processes in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Participation	1. You can influence decisions that are important to your work.	55,8	85,0	59,9	58,0	85,2	61,6	53,6	83,0	58,2	60,5	78,5	63,5
	2. You are consulted in advance when setting your work goals.	56,6	0,0	56,6	57,7	0,0	57,7	68,8	0,0	68,8	72,6	0,0	72,6
	3. You are involved in improving work organisation or work processes in your department or organisation	57,5	0,0	57,5	60,9	0,0	60,9	51,4	0,0	51,4	57,4	0,0	57,4
Business autonomy	4. I make the most important decisions about running my business.	0,0	5,6	5,6	0,0	5,5	5,5	0,0	6,5	6,5	0,0	9,5	9,5
	5. Do you have the authority to hire or fire employees?	0,0	29,9	29,9	0,0	29,4	29,4	0,0	50,1	50,1	0,0	55,7	55,7

Note: 1 employee, 2 entrepreneur, 3 total. The extent of participation was recorded by the workers themselves on a five-point scale of 1 (never), 2 (rarely), 3 (sometimes), 4 (often), 5 (always). Answers in the table in %: always + often (questions 1, 2, 3), rather + definitely disagree (question 4) and no (question 5). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: EWCTS 2021

The ability to influence important work-related decisions was more common in the Czech Republic among workers in the 25-34age group (61%), while in the EU-27 it was only in the oldest group, i.e., 56 years and above (63%). In terms of education, among workers with tertiary education (61%

in the Czech Republic and 66% in the EU-27). Men are more likely to be involved in decision-making, both in the Czech Republic (64%) and in European countries (63%). From a sectoral perspective, the possibility of having some influence on important decisions is more frequently reported in the construction sector (76% in the Czech Republic and 67% in the EU-27), services (65% in the Czech Republic and 65% in the EU-27), in the financial sector (68% in the Czech Republic) and in the agricultural sector (69% in the EU-27), where the higher incidence is related to the high share of family farms.

Consultation of set work goals is more common among workers in the highest age group 56+ (75%) and with tertiary education (74% in the Czech Republic and 61% in the EU-27). From a sectoral perspective, work targets are more frequently discussed in the construction sector (Czech Republic 83% and EU-27 62%). In the Czech Republic, it is in education (77%) and agriculture (76%).

The opportunity to contribute to improving work organisation and work processes is most frequently reported by workers in the 25-34 age group (57%) and in the EU-27 in the 35-44 age group (60%) with tertiary education (57% in the Czech Republic and 62% in the EU-27) and in the health (63%) and service (62%) sectors.

The significant lack of autonomy in entrepreneurship, especially in terms of decision-making on its development and operation, including hiring and firing employees, in the Czech Republic, as in European countries, applies more often to the lowest age group of entrepreneurs, i.e. 16-24 years (Czech Republic 25% and EU-27 15%) and, in the case of the possibility to hire and fire employees, also to the 25-34 age group (Czech Republic 70% and EU-27 37%). In terms of sectors, a significant reduction in the autonomy of business development in the Czech Republic was observed in the trade and hospitality sector (15%) and then in the banking sector (12%). In the personnel area, Czech entrepreneurs report limited decision-making in the education (61%) and healthcare (92%) sectors.

#### **3.2.5 Opportunities to influence working hours.**

Working hours and their organisation are one of the most important working conditions. According to the study by Kroupa et al. (2020), the Czech Republic, with a working week longer than 40 hours, ranks among the EU countries with the longest "normal working hours". This is mainly due to the fact that the Czech Republic has the highest proportion of employees among EU countries (25%) who report that their usual working hours are between 41 and 48 hours per week. On the other hand, working more than 40 hours a week is the least common for employees in Finland, Germany, and Belgium. If we look at the proportion of employees who usually work longer than the European maximum working week (i.e., more than 48 hours per week), it is clear that Greece and, in the past, the UK are the worst performers among the current EU countries. The high number of hours worked per worker per year in the Czech Republic is largely due to the low share of part-time jobs and the relatively high proportion of self-employed persons in the working population. According to Lehmann (2016), the most important predictor of working time in European countries is the sector, which is also confirmed by the Czech Republic, where there is a relatively high representation of

workers in sectors such as manufacturing, construction, transport, craft and repair work, and machine and plant operators.

This dimension therefore includes indicators measuring the number of hours worked at night, in leisure time or overtime. This dimension also includes an indicator measuring the frequency of on-call work.

The findings from the EWCTS 2021 data analysis are consistent with the above findings from the Working Time Reduction study. The different sectoral composition of the Czech economy in contrast to most of the EU-27 countries also results in a higher percentage of workers in the Czech Republic reporting more frequent night work and, at the same time, the aforementioned higher number of hours worked per week, including overtime above the legal limit of 48 hours. On the contrary, workers in the Czech Republic are less likely to work in their free time (14% in the Czech Republic and 16% in the EU-27), and at the same time show less flexibility in working hours in terms of being able to "take an hour or two off during normal working hours to take care of personal or family matters" (very + fairly easy in the Czech Republic 62% and 76% in the EU-27).

Table 15 Working time, distribution, and duration in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Asocial forms of work	1. How often do you work at night, at least 2 hours between 10pm and 5am?	19,9	30,0	21,3	21,3	34,8	23,1	24,6	29,3	25,3	24,0	34,1	25,7
	2. In the last 12 months, how often have you been asked to come to work immediately/urgently?	11,9	25,7	13,6	11,5	27,0	13,4	9,0	22,2	11,3	11,1	12,2	11,3
	3. During the past 12 months, how often have you worked in your spare time to meet your work commitments?	13,5	34,6	16,4	15,5	38,9	18,6	11,2	28,0	13,7	9,7	28,8	12,9
	4. High number of hours worked per week - 48 or more	12,6	43,3	16,7	12,4	46,2	16,7	19,7	40,7	22,9	17,6	41,8	21,5
Flexibility of working hours	5. Would you say that taking an hour or two off during normal working hours to take care of personal or family matters is...	75,1	78,1	76,1	75,1	78,3	75,5	59,2	78,0	62,2	59,5	85,1	63,8

Note: 1 employee, 2 entrepreneur, 3 total. Answers always + often + sometimes (question 1), daily + several times a week + several times a month (question 2), daily + several times a week (question 3), 48 hours or more (question 4), very + fairly easy (question 5). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: EWCTS 2021

Night work was registered more often (34%) in the youngest age group in the Czech Republic, i.e., workers aged 14-24, or those aged 18 and above, as the age limit is regulated by Czech labour law. On the other hand, workers aged 56 and older are less likely to work at night (19%). Men are also more likely to work at night (29%). From a sectoral perspective, night work is more common in health care (Czech Republic 39%, EU-27 28%), industry (Czech Republic 31%) and transport (Czech Republic 47%, EU-27 42%). Occupations that are more likely to work at night include machine and plant operators and assemblers (43%).

In the EU-27, night work is more common among workers aged 25-34 (24%) and among men (25%). In terms of socio-economic status, businessmen are more often represented among night workers (30%). The sectors where night work is more common at European level differ from those in the Czech Republic. While in the Czech Republic, industry is among the selected sectors, in the EU-27, agriculture is among the sectors with a high incidence of night work (28%). Occupations characterised by an increased prevalence of night work at EU level as in the Czech Republic include machine and plant operators and assemblers (42%), followed by qualified workers in agriculture, forestry, and fishing (33%) and workers in the armed forces (53%).

On-call work is again characteristic of the youngest age group of workers in the Czech Republic, aged between 16 and 24 (18% in the Czech Republic and 21% in the EU-27). From a sectoral perspective, on-call workers are more likely to be found in agriculture (20% in the Czech Republic, 28% in the EU-27) and also in healthcare (22% in the EU-27). Occupations characterised by a higher incidence of on-call work in the Czech Republic include mainly qualified workers in agriculture, forestry, and fishing (34%), followed by workers in the armed forces (Czech Republic 22%, EU-27 33%). Logically, higher representation was also registered among craftsmen and repairers (Czech Republic 18%, EU-27 32%) and among entrepreneurs (Czech Republic 22%, EU-27 26%). In terms of education, on-call work is most common in European countries for people with primary education (23%).

Working in leisure time (daily + several times a week) was more often reported by respondents aged 56 and over (17%) and those with tertiary education (18% in the Czech Republic, 22% in the EU-27). In the Czech Republic, leisure time is significantly more likely to be spent catching up with work responsibilities in education (Czech Republic 26%, EU-27 36%) and agriculture (Czech Republic 29%, EU-27 31%). In terms of occupation, qualified workers in agriculture, forestry and fishing are more likely to work in their spare time (Czech Republic 40%, EU-27 36%) and various specialists (Czech Republic 19%, EU-27 25%). In contrast to the Czech Republic, managers and legislators are also more likely to work in their free time in European countries (29%). Logically, entrepreneurs in both the Czech Republic (28%) and the EU-27 (35%) are more likely to work in their spare time.

As mentioned above, the Czech Republic is one of the European countries with the highest number of hours worked per week. Those who spend more than 48 hours a week at work are more likely to be men (Czech Republic 30%, EU-27 21%), entrepreneurs (Czech Republic 41%, EU-27 43%), workers in agriculture (Czech Republic 40%, EU-27 46%), construction (Czech Republic 36%, EU-27 23%) and transport (Czech Republic 47%, EU-27 26%). In terms of occupation, these include

legislators and managers (42% Czech Republic, 35% EU-27), qualified workers in agriculture, forestry, and fishing (48% Czech Republic, 51% EU-27) and machine and plant operators, including assemblers (35% Czech Republic, 24% EU-27). Thus, a very similar trend has been observed in the EU-27 regarding the socio-demographic and sectoral position of workers,

In the Czech Republic, a certain flexibility of working time, which can be used to take care of personal or family matters, is more characteristic of younger workers, while the possibility of using working time in this way is less frequent at the age of 45 and above. Flexibility is more likely to be used by men (69%) than women (54%) and logically, they are more autonomous entrepreneurs (78%). From a sectoral perspective, this "benefit" is more likely to be used by workers in the Czech Republic in agriculture (92%), construction (79%), finance (81%) and services (76%). This option was more frequently mentioned by respondents working as managers and legislators (74%), qualified workers in agriculture, forestry, and fishing (88%) and logically, craftsmen and repairers (70%).

In European countries, the observed "benefit" was registered more frequently among the oldest group of workers, i.e., respondents over 56 years of age (79%). As in the Czech Republic, men (80%) are more likely than women (70%) to be able to arrange their personal belongings. The gap between employees and entrepreneurs was not significant at European level. From a sectoral perspective, flexibility was registered more often in agriculture (82%), financial sector (84%), services (83%) and, unlike in the Czech Republic, in industry (82%). As in the Czech Republic, the possibility of taking care of personal or family matters during working hours was consistently reported by managers and legislators (83%), qualified workers in agriculture, forestry, and fishing (80%), craftsmen and repairers (80%) and, in addition, civil servants (82%).

#### **3.2.6 Job prospects, job security, education, career, and professional development**

Job prospects, job security and the opportunity for career and personal development are essential motivational factors that also contribute to the stability of employees in the organisation. Investing in employee stabilisation and career development usually leads to a loyal and satisfied team of employees and, secondarily, to increased work performance and stronger work morale. Another aspect of stabilising employees is to reduce the cost of recruitment and subsequent training of new employees. The indicators used measure job security based on the expectation of negative changes in both the organisation of work and the reduction in the number of workers and, in the case of entrepreneurs, their attachment to only one client. Another indicator measures the level of career development, as well as training and the opportunity to learn new things in the course of one's employment.

Labour market insecurity measured on a five-point scale shows a slightly higher level (17%) of negative expectations among Czech workers about losing their jobs than was recorded at the European level (15%). In contrast, Czech workers, unlike European workers, share fewer concerns

(Czech Republic 18%, EU-27 22%) about intra-company organisational changes. Relying on only one client for business activities was reported by 11% of European and 9% of Czech entrepreneurs.

About 50% of European and Czech workers consider their career prospects to be good. Continuing education, whether paid or provided by the employer or training from co-workers or managers using the "learning by doing" method, is inseparably linked to career development and is significantly more common in Czech companies. Completion of employer-paid training in the last 12 months was reported by 58% of respondents in the Czech Republic and 46% in the EU-27. The second type of training was completed by 55% of employees in the Czech Republic and 46% in the EU-27 countries. Learning new things at work was reported by 69% of workers in the Czech Republic, compared to only 62% in the EU-27.



Table 16 Job security, career and professional development and training in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Job insecurity	1. I could lose my job in the next 6 months	14,4	16,9	14,8	14,2	18,5	14,8	15,5	23,6	16,8	15,8	22,4	16,8
	2. I expect an unwelcome change in my work situation	21,6	23,1	21,8	21,7	25,3	22,2	17,7	20,3	18,1	19,1	25,0	20,1
	3. Generally speaking, you have more than one client or customer	0,0	11,2	11,2	0,0	8,5	8,5	0,0	9,4	9,4	0,0	14,5	14,5
Career development	4. I have good career prospects in my job	50,1	57,6	51,0	52,1	61,5	53,3	47,4	67,4	50,3	46,7	66,8	49,8
Opportunity to train and learn	5. Training paid for or provided by your employer	45,5	0,0	45,5	50,0	0,0	50,0	57,9	0,0	57,9	60,5	0,0	60,5
	6. Training during work (from co-workers, supervisors)	48,5	33,7	46,4	52,4	39,1	50,6	56,4	46,4	54,9	54,2	44,1	52,6
	7. Does your job require you to learn new things?	60,5	70,8	62,0	66,9	78,6	68,4	67,0	79,1	68,9	74,2	79,8	75,1

Note: 1 employee, 2 entrepreneur, 3 total. Answers strongly + rather agree (question 1, 2, 4), no (question 3), yes (question 5, 6), often + always (question 7). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: EWCTS 2021

In the Czech Republic, the youngest group of workers aged 16-24 (25%) and workers with primary education (29%) are significantly more likely to feel threatened by job loss. On the other hand, the 25-34 age group feels significantly less threatened (13%). In terms of sector, workers in transport (24%) feel threatened, while workers in state and local government (90%) and education (82%) report high job security. In terms of occupation, service, and sales workers (22%), support and non-qualified workers (22%) and craftsmen and repairers (21%) report increased job insecurity. In contrast, 100% job security is logically reported by workers in the armed forces and qualified workers in agriculture, forestry, and fishing (96%). Logically, given their position, entrepreneurs expect to lose their jobs more often, both in the Czech Republic (24%) and in European countries (17%). At European level, workers aged 16-34 are among the age groups at risk. The youngest age group, 16-24 years old, is worried about losing their job, with 20% and 16% of the second group, 25-34 years old. In contrast, the oldest age group, i.e., workers over 56 years of age, shows significantly lower concerns. 81% disagree with the statement that they could lose their jobs in the next 6 months. As in the Czech Republic, people with primary education (22%) are more likely to feel threatened. In contrast, respondents with tertiary education show significantly lower concern (80%). Job insecurity in European countries is felt by workers in the retail and hospitality sector (19%) and in transport (18%). In terms of occupation, the most common occupations expecting redundancies are support and non-qualified workers (22%), machine and plant operators,

assemblers (20%) and service and sales workers (19%). On the other hand, workers in the armed forces (94%), specialists (82%) and qualified workers in agriculture, forestry, and fishing (85%) consider their jobs to be stable. In concluding this paragraph, it is important to note that the results of the survey conducted in 2021, when the COVID-19 pandemic was still ongoing, may be tainted by this fact.

In the Czech Republic, concerns about in-house changes were characteristic of the youngest age group 16-24 years (31%). In terms of sector, changes were expected most often in state and local government (24%), while low levels of concern about changes were reported by workers in the education and health (77%) and agriculture (75%) sectors. The occupational group most likely to expect organisational change is the armed forces (55%).

Intra-company organisational changes are more highly (31%) expected by workers in European agriculture. This is matched by increased fear of change among qualified workers in agriculture, forestry, and fishing (31%).

The uncertainty associated with business relying on only one client is characteristic of lower to middle-aged workers in the Czech Republic (13-15%) and tends to decrease for workers over 45 years of age. Only about 5-6% of entrepreneurs over 45 years of age report dependence on a single client. Typical sectors where businesses have only one client are transport (15%), agriculture (15%) and banking (13%). The results are not surprising, since in delivery services, for example, drivers, or importers, work for one "employer" as self-employed. The same is true in banking, where there are many bank advisors and intermediaries working in a self-employed role for a single financial institution. In terms of occupational classes, these include ancillary and non-qualified workers (36%) and miscellaneous technical and professional workers (14%). In the EU-27, business insecurity based on a single-client relationship is characteristic of the youngest age group 16-24 (15%) and of workers with primary education (19%). From a sectoral perspective, single-client businesses are more common in sectors such as agriculture (28%), public administration (23%) and transport (16%). In terms of occupational classes, these include ancillary and non-qualified workers (26%), qualified workers in agriculture, forestry, and fishing (27%) and, surprisingly, workers in the armed forces (50%).

Good prospects for career development in employment are more often rated by younger respondents aged 16-24 (Czech Republic 60% and EU-27 60%) and 25-34 (Czech Republic 64% and EU-27 60%), both in the Czech Republic and at the EU level. Respondents from higher age groups, especially those over 56 years of age, are significantly less likely to rate their career prospects positively (37% in the Czech Republic and 41% in the EU-27). In the Czech Republic, optimism about career development is more often shared by workers with tertiary education, i.e., with higher vocational and university education (57%) and more often by men (55% in the Czech Republic and 55% in the EU-27) than by women (45% in the Czech Republic and 46% in the EU-27). From a sectoral perspective, career prospects are more often rated as good in agriculture (61%), banking (59%) and services (58%). In European countries, the sectors are banking (61%) and construction (58%). By contrast, in sectors such as education (39%) and transport (47%), workers are significantly less optimistic about their prospects. Positive assessments of career development

opportunities are more common among entrepreneurs (67% in the Czech Republic and 58% in the EU-27) than among employees (47% in the Czech Republic and 50% in the EU-27), as well as among armed forces personnel (100% in the Czech Republic and 77% in the EU-27), legislators and managers (60% in the Czech Republic and 64% in the EU-27), various professionals (60% in the Czech Republic and 55% in the EU-27) and craftsmen and repairers (56% in the Czech Republic and 56% in the EU-27).

Employer-provided training was registered more often among respondents with tertiary education (65%) and then in sectors such as public administration (77%), construction (73%), transport (67%), agriculture (66%) and banking (64%). In a number of sectors, this included mandatory occupational health and safety training and training related to the introduction of technological change. Employer-organised training was more frequently reported by workers in the following professions: armed forces (100%), legislators and managers (68%), civil servants (66%), specialists (64%).

Training provided to workers by co-workers or supervisors is more common in both the Czech Republic and EU countries among the younger age groups 16-24 years (Czech Republic 70% and EU-27 56%) and 25-34 years (Czech Republic 59% and EU-27 53%), while training by colleagues or supervisors using the "learning by doing" method is significantly less common in older age groups, especially 56 years and above (Czech Republic 48% and EU-27 40%). The described method of transferring experience and knowledge is significantly less common for workers with primary education (21%). Men (58%) are more often trained in this way than women (51%). According to the workers themselves, this approach to training is more common in the Czech Republic in agriculture (70%), while it is less common in EU countries in agriculture (30%) and is also more common in banking (63% in the Czech Republic and 57% in the EU-27).

Learning new things on the job is also a matter for more educated workers with tertiary education in the Czech Republic and the EU-27 (79% in the Czech Republic and 71% in the EU-27) in sectors such as banking (82% in the Czech Republic and 71% in the EU-27), education (78% in the Czech Republic and 71% in the EU-27) and, in addition, in the construction sector (76% in the Czech Republic).

#### **3.2.7 Self-realisation and job satisfaction**

Self-fulfilment at work depends mainly on the possibilities to use individual skills of the worker and then on finding the meaning and value of the work. For the purpose of this module, the questions of the questionnaire will be used to measure the appreciation of co-workers and management, the feeling of usefulness of the work performed, the degree of use of acquired knowledge and skills, and finally the evaluation of whether the appropriate remuneration for the work corresponds to the work effort.

In terms of individual indicators of self-fulfilment and job satisfaction, the values between the Czech Republic and the average for the EU countries do not differ much, except for satisfaction with the salary remuneration related to the efforts made and the results achieved. Compared to European

workers, Czech workers are significantly more satisfied with the level of remuneration relative to the work done. In the EU-27, 59% of respondents rate their salary as adequate, while 66% of respondents in the Czech Republic do. Sense of self-realisation assessed by the question "Do you feel you are doing useful work?" and the question "Does your job give you a feeling of a job well done?" is slightly stronger in the European average, i.e., there is a higher level of job satisfaction than among workers in the Czech Republic. 88% of European and 86% of Czech workers answered the first question. Similarly, the second question on the usefulness of work was answered positively by 86% of EU-27 workers and 83% of Czech workers. There was no difference between the Czech Republic and the European average in the use of acquired knowledge and skills.

Table 17 Self-realisation and job satisfaction indicators in %

		EU-27			EU-27 comp			CZECH REPUBLIC			CZ comp		
		1	2	3	1	2	3	1	2	3	1	2	3
Inner reward	1. I'm getting the credit I deserve for my work	71,4	77,1	72,2	70,1	74,9	70,8	72,0	78,8	73,1	71,7	81,4	73,3
	2. Considering all my efforts and achievements on the job, I feel that I get a reasonable salary.	58,8	58,6	58,8	58,3	60,4	58,5	65,1	68,9	65,6	66,3	66,7	66,4
Opportunity for self-realisation	3. You feel like you're doing useful work.	87,7	91,8	88,3	87,6	93,0	88,3	86,2	85,9	86,2	84,2	76,5	82,9
	4. Your job gives you the feeling of a job well done.	85,2	92,3	86,2	84,2	91,5	85,2	81,9	89,7	83,1	81,8	82,1	81,8
	5. I have ample opportunity to use my knowledge and skills in my current job.	47,2	55,2	48,3	45,0	53,3	46,1	46,7	60,8	48,9	46,2	57,7	48,1

Note: 1 employee, 2 entrepreneur, 3 total. Answers strongly + rather agree (question 1, 2), always + often (question 3, 4), strongly agree (question 5). The columns EU-27 comp, and CZ comp stand for work under the influence of computer systems.

Source: European Working Conditions Telephone Survey 2021

The feeling that they receive adequate recognition for their work was more often recorded among the highest age group of workers in the Czech Republic aged 56 and over. 81% of them agreed with the statement. Respondents with primary education are the most likely to say that they receive adequate recognition for their work (85%). In terms of sector, these are those working in agriculture (83%), construction (81%) and public administration (81%). In terms of professional recognition, recognition is more frequently reported by workers in the armed forces (100% in the Czech Republic and 77% in the EU-27). In both the Czech and European environments, entrepreneurs (79% in the

Czech Republic and 77% in the EU-27) are more likely to receive the recognition they deserve than employees (72% in the Czech Republic and 71% in the EU-27).

100% of Czech workers with a basic education believe that their salary is appropriate for the effort they put in. From a sectoral perspective, satisfaction with salary adequacy is higher in the banking sector (72%), healthcare (72%) and construction (71%). On the contrary, frequent dissatisfaction was registered in the trade and hospitality (34%) and transport (34%) sectors. Higher-educated professions, i.e., legislators and managers (74%), specialists (71%), and armed forces personnel (80%) show high satisfaction with their salary in relation to their work. At European level, a gender gap has been noted. Men (62%) are more likely to consider their salary to be reasonable, in contrast to women, where only 55% consider their salary to be reasonable in relation to their efforts and results. From a sectoral perspective, salary satisfaction is higher in the EU countries in the banking (64%) and construction (64%) sectors. At the same time, higher dissatisfaction was registered in the health sector, where 42% of respondents considered their salary to be inadequate for the effort, they put in. High levels of satisfaction with pay in European countries are reported by armed forces personnel (67%) and legislators and executives (66%).

Conviction about the usefulness of work prevails among the oldest age group 56 years and older, where 91% of respondents in the Czech Republic and 93% at EU level are convinced of the usefulness of work. From a sectoral perspective, Czech and European workers in education (Czech Republic 96% and EU-27 94%) and healthcare (Czech Republic 98% and EU-27 94%) are more likely to believe that their own work is useful. From an occupational perspective, the feeling of usefulness of the work performed was more frequently registered among craftsmen and repairers (91%).

The feeling of a job well done is characteristic of the oldest age group of workers 56+ (89% in the Czech Republic and 91% in the EU-27) to an increased extent both at Czech and European level. The feeling of a job well done is more often shared by entrepreneurs 90% in the Czech Republic and 92% in the EU-27. In the Czech Republic, it is more common to find workers who are satisfied with their work in the agriculture and construction sectors (93%), followed by finance, healthcare, and transport, where 88% of respondents said the same.

The use of knowledge is again characteristic of the 56+ age group to an increased extent both in the Czech Republic and in the EU-27. In both cases, 54% of respondents said they had the opportunity to use their knowledge and skills at work. Again, this opinion is more often held by entrepreneurs (61% in the Czech Republic and 55% in the EU-27). In the Czech Republic, workers in agriculture (56%), construction (61%), education (56%) and healthcare (60%) make increased use of their knowledge and skills at work.

### **3.3 Digitisation of work**

The impact of advancing digitisation on the quality of work will be monitored by looking at the extent to which the quality of work changes under the influence of computer systems. The scope of the work tasks that are generated by the software was operationalized in the survey by the question: "To what extent does the computer system affect what you do at work?" where respondents answered on a five-point scale of 1 (to a great extent), 2 (to some extent), 3 (almost not), 4 (not at all) and 5 (not applicable to my work situation). The results for each country are shown in Table 18 below.

Table 18 Extent of work performed under the influence of a computer system in %

	Employee largely + to some extent	Entrepreneur largely + to some extent	Total largely + to some extent
Finland	75,1	65,0	73,8
Lithuania	74,1	67,3	73,0
Slovakia	72,6	50,0	68,3
Belgium	68,8	62,1	68,1
Denmark	69,3	46,9	67,9
Spain	67,7	69,0	67,9
Ireland	68,2	62,7	67,6
Poland	69,9	56,1	66,9
Portugal	69,2	48,6	65,4
Croatia	64,7	71,8	65,4
France	63,9	65,7	64,1
Sweden	65,0	55,3	63,9
Bulgaria	65,5	50,3	63,3
Austria	63,3	59,7	62,9
Romania	61,6	65,6	62,3
Estonia	61,8	61,2	61,8
Latvia	62,1	50,3	60,8
<b>Czech Republic</b>	61,0	60,0	60,8
Luxembourg	60,2	53,4	59,8
Malta	60,7	47,5	59,1
<b>EU-27</b>	58,2	55,1	57,7
Hungary	57,6	52,5	56,9
Slovenia	55,3	51,8	54,9
Italy	52,7	63,9	54,9
Cyprus	55,1	37,9	52,8
Netherlands	54,1	29,0	51,1
Greece	49,9	38,6	46,5
Germany	41,6	27,2	40,5

Note: The estimated extent of work under the influence of the computer system was expressed by the respondent by answering on a scale of 1 (to a great extent), 2 (to some extent), 3 (almost not), 4 (not at all) 5 (not applicable to my work situation).

Source: EWCTS 2021

According to the results of the EWCTS 2021 survey, a software algorithm affects the work of about 58% of workers in the EU-27 countries (38.2% to a great extent and 19.4% to some extent) and almost 61% of workers in the Czech Republic (39.9% to a great extent and 20.9% to some extent). Working under the influence of algorithms was most frequently registered in Finland (74%) and

Lithuania (73%), while the lowest influence was reported in Germany (41%) and Greece (47%). In a number of countries, almost no significant difference was registered between employees and entrepreneurs in terms of the extent of work under the influence of algorithms (Czech Republic, Estonia, France, Spain). In many countries, however, employees are among those more often affected by algorithmic work (Denmark, the Netherlands, Germany, Finland, etc.). On the contrary, there are countries where the trend is the opposite, i.e., where algorithmic work is more frequent among entrepreneurs (Italy, Croatia, France, Romania)

In the Czech Republic, the impact of algorithmic work was significantly lower in the 16-24 (48%) and 25-34 (55%) age groups. In terms of gender and work status (employed versus self-employed), no differences were observed in the prevalence of work under the influence of the algorithms. Those with tertiary education, i.e., higher vocational and university education, are more likely to work under the influence of algorithms in the Czech Republic as in the EU as a whole (70%). From a sectoral perspective, algorithmic work is significantly more prevalent in the financial sector (92%) and public administration (68%). On the contrary, it is significantly less common to work under the influence of algorithms in sectors where manual labour predominates, i.e., agriculture (35%) and construction (55%), and, unlike in the EU, education (50%) and transport (54%).

The impact of algorithmic work at EU-27 level was also significantly lower in the 16-24 age group (48%) compared to the economically active population. In terms of gender and employment status (employee versus self-employed), no differences were observed in the extension of work under the influence of the algorithms. Algorithms are also more common in the EU-27 among those with tertiary education, i.e., higher vocational and university education (70%), and less common among those with primary (24%) and secondary education (49%). From a sectoral perspective, algorithmic work is significantly more prevalent in the public administration (69%) and financial sector (79%). On the other hand, it is significantly less frequent in sectors with a predominance of manual work, i.e., agriculture (41%) and construction (43%).

All the above findings concerning the extent of algorithmic work in the educational and occupational groups and sectors of the national economy also correspond to its extent in the different occupational groups according to the ISCO classification, as shown in Table 19.



Table 19 Percentage of workers whose work is largely and to some extent influenced by a computer system in each ISCO group in %

Employees (employees and entrepreneurs)	EU-27	CZECH REPUBLIC
Officials	76,9	84,5
Technical and professional staff	69,8	72,0
Specialists	70,4	71,3
Legislators and executives	71,1	70,8
Qualified workers in agriculture, forestry, and fishing	39,1	60,8
Employees in the armed forces	68,3	55,4
Machine and plant operators, assemblers	47,8	49,6
Service and sales workers	46,5	49,3
Craftsmen and repairers	40,3	47,2
Auxiliary and non-qualified workers	27,8	34,9
<b>Total</b>	<b>57,7</b>	<b>60,8</b>

*Note: The estimated extent of work under the influence of the computer system was expressed by the respondent by answering on a scale of 1 (to a great extent), 2 (to some extent), 3 (almost not), 4 (not at all) 5 (not applicable to my work situation).*

*Source: EWCTS 2021*

Computer-influenced work was less common in the Czech Republic among workers in the armed forces, in contrast to the EU-27 average. A significantly higher prevalence was recorded among officials, qualified agricultural workers, craftsmen, and non-qualified auxiliary workers in the Czech Republic.

### 3.3.1 Impact of algorithmic work on individual dimensions

The following section attempts to identify how work performed under the influence of a computer system, or algorithms, affects the various dimensions of work quality described above. Given the prevalence of computerised work in the population (61% in the Czech Republic and 58% in the EU-27), as mentioned above, it is surprising how little it affects the quality of work.

Although work in many jobs is performed under the influence of algorithms, no significant effect has been observed in the case of physical working conditions where "algorithmic work" has somehow influenced the physical working conditions mentioned. Thus, there is no increase or decrease in the number of workers who work in contact with hazardous substances, are exposed to noise pollution, carry, or lift heavy loads or persons, perform work using repetitive hand movements or work in positions unsuitable for the body.

In terms of the social conditions of work, a more significant effect was observed at the level of the Czech Republic in that the group of workers whose work is affected by the computer system

reported lower interest and support from their superiors. In the case of unacceptable behaviour, a trend towards lower incidence of verbal assault, unwanted sexual attention or bullying associated with harassment or violence was observed in the Czech Republic under the influence of algorithmic work.

Work under the influence of algorithms tends to contribute to increased autonomy of work, both in the Czech Republic and in European countries, i.e., where it is possible to influence the order and speed of work tasks. In the Czech Republic, 55% of workers working under the influence of algorithms can adjust the order of tasks and 60% the speed of work. In the EU-27, this group of workers is only more likely to change the order of tasks, as 58% of respondents said. At the same time, both at the level of the Czech Republic and in the EU-27 countries, a trend has been observed where computerisation of work increases its intensity, both its speed and the frequency of tasks performed under pressure of deadlines. This was confirmed by 56% (speed of work) and 53% (frequency of tasks under deadline pressure) of respondents in the Czech Republic and 54% of respondents in the EU-27.

Working under the influence of algorithms also seems to affect the extent to which workers in the Czech Republic can participate in influencing decisions important to the performance of their work. This was reported by 64% of respondents who are more likely to influence decisions that are important to them and 58% of Czech respondents who are more likely to be involved in improving work organisation and processes.

Paradoxically, working under the influence of algorithms does not have a significant impact on the length and distribution of working time in the Czech Republic or in the EU-27. The exception is for those who have to work in their spare time to fulfil their work obligations. These workers are more likely to be found among those whose work is performed under the influence of algorithms, both in the Czech Republic (36%) and in the EU-27 (37%).

Working under the influence of algorithms is also significantly more often related to the fact that this work requires further education or learning new things, as reported by 75% of Czech and 68% of European respondents. At the same time, these workers are more likely to receive training, both from their employer (61% in the Czech Republic and 50% in the EU-27) and from their co-workers or supervisors (51% in the EU-27).

Working under the influence of algorithms has almost no positive impact on self-fulfilment and job satisfaction. On the contrary, a certain trend can be registered in the case of those respondents who do not work in the Czech Republic under the influence of algorithms, that they feel the increased usefulness of their own work (91%), but at the same time they more often disagree (31%) that they receive a reasonable salary in relation to their work performance.

### 3.4 Quality of work index

From the items listed in Tables 11 to 19 in Chapter 3, an index was created that comprehensively measures job quality based on both the demands and positives associated with the job. The demands and benefits of the work in each dimension operationalized by the questions in the questionnaire are summarized in Table 20 below.

To create the index, Eurofound researchers calculated the difference between exposure to the demands of work on the one hand and the benefits of work on the other. The work of the respondent in question was considered burdensome if the demands of the job outweighed its positives. Otherwise, when the demands were lower than the benefits, the work was considered beneficial, enriching. The grading of the level of job demands and benefits of each individual respondent and their position on the scale, expressed by the strength of the index, was done on the basis of the aforementioned difference in demands and benefits. If the demands of the work exceeded 50%, it was an **extreme burden**, if the difference was between 25% and 50% in favour of the demands, it was a **high burden**, and if it was below 25%, it was a **moderate burden**. Similarly, if the difference between benefits and claims was greater than 50%, it was a **large benefit** or enrichment of work, if the difference was between 50% and 25%, it was a **moderate benefit**, and if the difference was less than 25%, it was a **weak benefit**.

Table 20 Demands and benefits associated with working in each dimension

Dimensions of quality of work	Job demands on the worker	Benefits of work for the worker
1. Physical and social conditions of work.	Physical risk factors at work Physical workload Unacceptable behaviour and discrimination	Support from co-workers
2. The conditions under which workers perform their work tasks.	Intensity of work	Appropriateness of tasks and autonomy of work.
3. Opportunity to participate in labour-related decision-making processes	Dependency (applies only to the self-employed)	Participation in decision-making and change, exercising the voice of employees.
4. Opportunities to influence working hours	Work during non-social hours	Flexible working hours
5. Job prospects, job security, employment, career development	Job insecurity	Opportunity for training and education Career growth
6. Job satisfaction		Inner reward Opportunity for self-realisation

Source: Eurofound, 2022

According to the table below, the results of the evaluation of work in terms of its demands or benefits tend to concentrate in the middle of the scale, i.e., in the categories "moderate burden" and "weak benefit", with about 1/3 of respondents in both the Czech Republic and the EU-27 evaluating work as burdensome to varying degrees. In the Czech Republic, the figure is 36%, which is slightly

more than this third and also more than the European average of 30%. Two-thirds of the workers then consider their work more or less rewarding.

Table 21 **Quality of work index, representation of workers in the EU-27 and the Czech Republic in %**

	EU-27	EU-27 (impact of computer system)	CZECH REPUBLIC	CZ (influence of computer system)
extreme load	3,6	3,2	4,5	4,7
high load	7,7	7,3	8,8	7,6
moderate load	18,9	18,9	23,0	19,9
weak benefit	26,2	26,2	28,3	28,8
moderate benefit	22,7	23,1	18,6	17,8
high benefit	20,8	21,3	16,7	21,3
<b>Total</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>

Source: EWCTS 2021

Among the workers whose work is extremely and highly demanding, those with secondary education are more often found in the Czech Republic. As the workload decreases and the benefits of the job for the worker increase, we more often register respondents with tertiary education, but also with primary education. Strenuous work is more common in the Czech Republic in health care, transport, and industry. On the other hand, workers in banking, education, agriculture and public administration and local government are more likely to find their work rewarding. Service and sales workers, machine and equipment operators, assemblers and auxiliary and non-qualified workers are more likely to perceive their work as burdensome. On the other hand, legislators, and managers, as well as various specialists and officials, consider their work to be beneficial.

At European level, workers with high workloads are more likely to be those with secondary education. As the workload decreases and the benefits of the job for the worker increase, we more often register respondents with tertiary education. Strenuous work is more common in European countries in the health, transport, and agricultural sectors. On the other hand, workers in the banking, services and government and local government sectors are more likely to consider their work to be beneficial. In particular, professions such as service and sales workers, qualified workers in agriculture, forestry and fishing, machine and equipment operators, assemblers, auxiliary and non-qualified workers are more likely to perceive their work as strenuous, while legislators and managers, various specialists and civil servants see their work as rewarding.

The above differences between the Czech Republic and the European average are due to the different composition of the national economy, i.e., the number of employees in industry is higher compared to the EU average, while the number of workers in services is low in the Czech economy compared to the EU average.

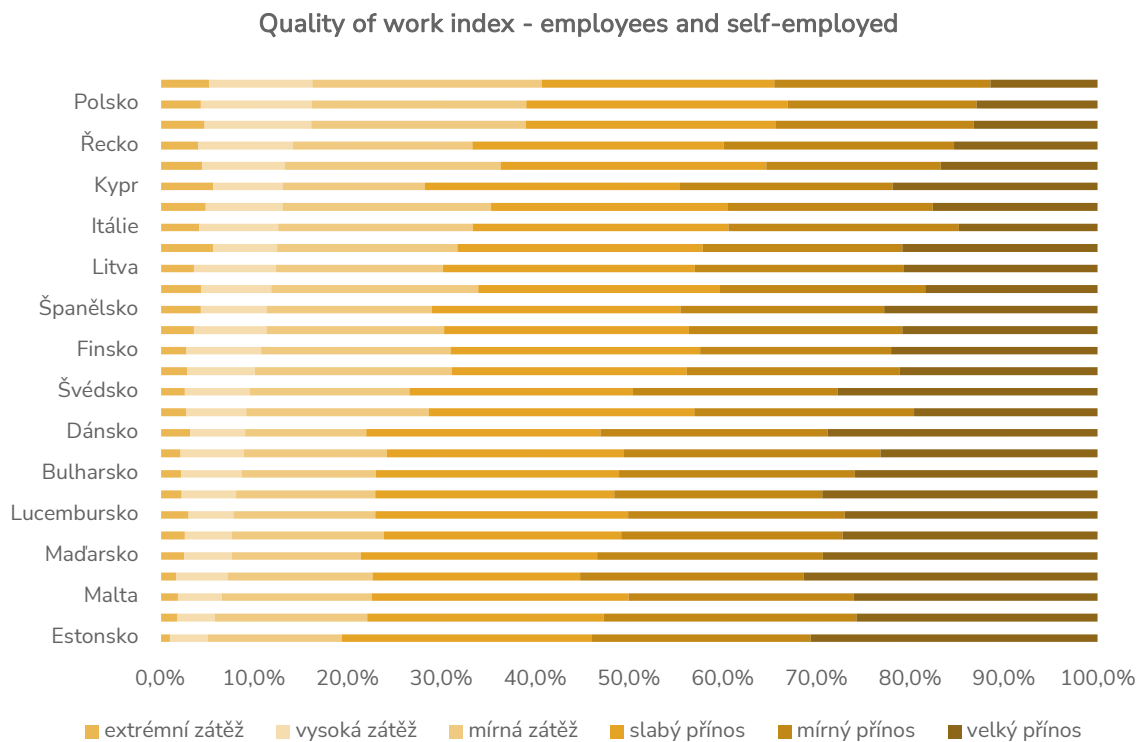
Regarding the work under the influence of algorithms, we can see from the table above that the work under the influence of the computer system seems to reduce the workload and simultaneously strengthen the respondents' evaluation towards more contribution or enrichment of the work. This trend is significantly stronger in the Czech Republic compared to the EU-27. In the Czech Republic,

the number of those whose work is rated as burdensome is decreasing by 4 percentage points, while at the same time the number of respondents in the group that considers their work highly rewarding is increasing the most.

If we look at the composition of the index across countries for the entire economically active population and then at the distribution of the index for respondents working under the influence of computing, we see how the ranking of countries has changed with respect to the composition of the index.

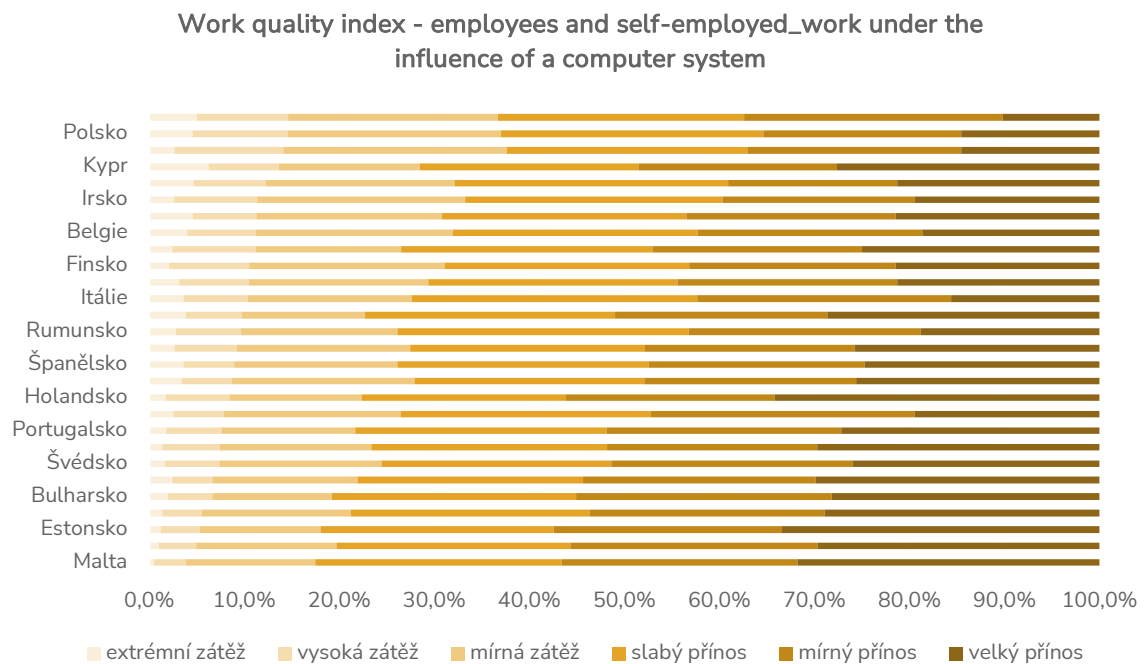
In terms of individual countries, the chart shows that in eight countries 1/3 of workers find their work burdensome (extreme, high, and moderate burdens). Specifically, Slovakia, Poland, France, the Czech Republic, Ireland, Belgium, Italy, and Greece. If we focus on countries above the EU-27 average, we would have to add Croatia, Latvia, and Finland. If we consider only extreme and high burdens, then the countries above the EU-27 average include Spain, Lithuania, and Cyprus.

**Chart 6 Distribution of the quality of work index in the EU-27 among the economically active population in %**



Source: EWCTS 2021

Chart 7 Distribution of the EU-27 quality of work index among the economically active population working under the influence of computer systems in %



Source: EWCTS 2021

As far as working under the influence of algorithms is concerned, in many countries it is evaluated as less burdensome and, on the contrary, more beneficial and enriching. The chart shows that only in four countries, including Ireland, Slovakia, Poland, and France, do 1/3 of workers find their work burdensome. If we focus on countries above the EU-27 average, we would have to add the Czech Republic, Belgium, Finland and Croatia. In addition, if we consider only extreme and high burdens, Cyprus and Lithuania are among the countries above the EU-27 average. In the case of algorithm-driven work, the number of countries with high workload scores was therefore reduced from 14 to 10. The southern EU countries have dropped out of the list of countries on the high workload ladder due to computerisation: Spain, Greece, Italy, and Latvia.

### 3.5 Summary

The impact of computer systems on the quality of work is not as extensive as one might expect. Despite the fact that computerised work is relatively widespread in the population (61% in the Czech Republic and 58% in the EU-27), it is surprising how little it affects the quality of work.

In terms of individual job attributes, the impact was noted in the case of limited interest and support from supervisors. Similarly, in the case of unacceptable behaviour, there was a trend towards a lower incidence of verbal assault, unwanted sexual attention or bullying associated with harassment or violence under the influence of algorithmic work. In the first case, in many respects, the "system" takes the initiative in assigning tasks and controlling them, and thus the need for the supervisor to assign and explain, and ultimately control, tasks is eliminated. In the latter case, due to limited social contacts, there are not as many opportunities for unacceptable behaviour in the workplace.

Those working under the influence of algorithms were more likely to report the ability to adjust both the order and speed of work tasks. At the same time, however, according to respondents' statements, there is an increase in the intensity of work, both in terms of its speed and in terms of the number of tasks with deadlines carried out under great pressure.

Working under the influence of algorithms also seems to have the effect of allowing workers to be more involved in influencing decisions that are important to their work performance, while at the same time being more involved in improving work organisation and work processes.

Working under the influence of algorithms is significantly more often related to the fact that this work requires further education and learning new things. These workers receive more training, both from their employer and from their co-workers or supervisors.

Paradoxically, working under the influence of algorithms does not have a significant impact on the length and distribution of working time in the Czech Republic or in the EU-27. The exception is those who work in their spare time. Similarly, working under the influence of algorithms does not significantly change the physical working conditions, such as working in an environment where there is a risk of noise, chemical and biological agents, or where it is necessary to work at high speed, in unfavourable body positions, etc. Similarly, working under the influence of algorithms has almost no positive impact on self-realisation and job satisfaction.

The overall view of the index measuring the quality of work suggests that work under the influence of algorithms or computer systems seems to be less taxing on workers and at the same time becomes more rewarding for workers. This conclusion may also be related to the gradual change in the composition and importance of the individual sectors of the national economy, where, albeit with different fluctuations, the labour force is shifting from the secondary to the tertiary sector of the national economy and at the same time the share of the tertiary sector in GDP is increasing.

From the perspective of individual EU-27 countries, we can see that when working under the influence of a computer system, in many countries there is a decline in the proportion of those who consider their work to be burdensome and, on the contrary, more often evaluate it as beneficial and enriching. In the case of work under the influence of algorithms, the number of countries with high workload scores was reduced from 14 to 10.



## Conclusion

According to the results of various foreign and domestic analyses, as shown in the first, introductory part of the study, it is currently very difficult to determine exactly what the impact of digitisation will be on individual sectors and professions. Whether they will change, disappear, or create completely new ones, and also what specific knowledge and skills will be associated with these changes. It is certain that the knowledge and skills acquired will become obsolete much faster than at present, and the older generation of workers will need special support. This will increase the importance of lifelong and corporate learning.

Increasingly, some form of self-employment will be a more common employment option, made easier by the use of IT technology, and will be used by workers in an increasing range of occupations.

In terms of management, these will often be teams based on virtual links, where experts not only within one company or its regional branches, but also experts from other companies or independent specialists will communicate and cooperate with each other. At the same time, many tasks will be generated and then evaluated by an algorithm.

As discussed in Chapter 2, "Algorithm Management and Working Conditions", algorithms can significantly affect working conditions in terms of work intensity, lack of autonomy at work, or discrimination, etc. Through a case study monitoring the workers of the digital work platform Wolt, insight was gained into the working conditions that prevail in the platform economy in the delivery sector. Despite the fact that the main motive for working for digital work platforms is to earn extra income and at the same time the work is considered temporary by many respondents, over half of the respondents are satisfied with their work despite the lack of any legal protection. Any dissatisfaction is often initiated by the lack of transparency in the algorithm that allocates work to couriers and calculates the amount of remuneration for the work. The solution to this situation is limited by the high competition among couriers, both within delivery companies and between individual companies. Union organisation in these companies is currently minimal and change is not expected to be much, at least according to the results of the survey, although about a third of the respondents were considering membership at the time of the survey, when respondents had vivid memories of the recent courier strikes.

The third part of the study "The impact of digitisation on the quality of work in the Czech Republic and the EU-27" showed the impact of algorithmic work on workers at the Czech and EU level, based on the responses of more than 70,000 workers from 36 European countries. Despite the fact that around 60% of respondents reported working under the influence of a computer system, the influence of computer systems on the quality of work is not as great as one might expect, both in the Czech Republic and in EU countries.

There has been an increased incidence of complaints about increasing work intensity among workers in algorithm-driven environments. In terms of social contacts, a certain loosening of the

relationship between superior and subordinate was observed, as the algorithm takes the initiative in many respects in the allocation of tasks and in their control. Paradoxically, working under the influence of algorithms does not have a significant impact on the length and distribution of working time, both in the Czech Republic and in the EU-27.

Algorithmic work can also have positive aspects and can provide workers with the opportunity to participate in matters relating to the assignment and conditions of work tasks, as well as the organisation of work. For the time being, however, this possibility is not fully exploited. Algorithm-driven work is very often related to the need for further education in the form of training or at least learning from the closest colleagues or from a supervisor using the so-called "Learning by doing" method.

## Literature

### CHAPTER 1 DIGITISATION AND THE WORLD OF WORK

BAECKER, Dirk (2011). Zukunftsfähigkeit: 16 Thesen zur nächsten Gesellschaft, *Revue für postheroisches Management* 9: S. 8-9

BUZZELLI, Gregorio. (2021). *Class structure and technological replaceability of the European workforce*. Master thesis. Dostupné z: [https://www.researchgate.net/publication/356187792\\_Class\\_structure\\_and\\_technological\\_replaceability\\_of\\_the\\_European\\_workforce](https://www.researchgate.net/publication/356187792_Class_structure_and_technological_replaceability_of_the_European_workforce)

CAPTAIN, Seán (2023). How AI Will Change the Workplace; We asked some top thinkers from different fields to weigh in on what's ahead, as the AI explosion compels businesses to rethink, well, almost everything. *Wall Street Journal*, 14. 5. 2023.

ČSÚ (2018). Věková projekce. Dostupné z <https://www.czso.cz/csu/czso/vekova-skladba-obyvatele-ceska-se-vyrazne-promeni>

Deloitte (2018). Automatizace práce v ČR. Proč se (ne)bát robotů. Dostupné z: <https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/strategy-operations/Automatizace-prace-v-CR.pdf>

DILL, Helga, KEUPP, Heiner (2015). *Der Alterskraftunternehmer Ambivalenzen und Potenziale eines neuen Altersbildes in der flexiblen Arbeitswelt*. Wetzlar: Majuskel Medienproduktion GmbH., ISBN 978-3-8376-2993-4.

FREY, Carl, Benedikt, OSBORNE (2013). The Future of Employment: How susceptible are jobs to computerisation?, *Technological Forecasting and Social Change*, vol. 114(C), s. 254–280.

FURMAN, Jason, SEAMANS, Robert (2019). AI and the economy. *Innovation Policy and the Economy*. Volume 19. Dostupné z <https://doi.org/10.1086/699936>

GARM, Florian, JANSEN, Christian, SCHMITZ, Christoph, HALLERSTEDDE, Stefan, TSCHIESNER, Andreas (2019). *Capturing value at scale in discrete manufacturing with Industry 4.0*. McKinsey. Dostupné z: <https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/capturing-value-at-scale-in-discrete-manufacturing-with-industry-4-0>

GERR, Olga (2023). Some aspects of the implementation of the concept of sustainable work for older workers in the conditions of digitalization. *Journal AIP Conference Proceedings* 2757, 100005 (2023). Dostupné z <https://doi.org/10.1063/5.0136185>

HEJDUK, Radim, SMEJKALOVÁ, Kateřina, ŠPIDLA, Vladimír (2017). *Budoucnost práce*. Praha: Masarykova demokratická akademie, z. s. ISBN 978-80-87348-29-1. Dostupné z: [https://masarykovaakademie.cz/wp-content/uploads/mda\\_budoucnost\\_prace\\_e\\_170329.pdf](https://masarykovaakademie.cz/wp-content/uploads/mda_budoucnost_prace_e_170329.pdf)

JIMENEZ Abril, Patricia et al. (2022). Design of Human-Centered Adaptive Support Tools to Improve Workability in Older Workers. A Field of Research of Human-Centered AI. In: ANTONA, M., STEPHANIDIS, C. (eds). *Universal Access in Human-Computer Interaction. Novel Design Approaches and Technologies*. HCII 2022. Lecture Notes in Computer Science, vol 13308. Springer, Cham. Dostupné z: [https://doi.org/10.1007/978-3-031-05028-2\\_11](https://doi.org/10.1007/978-3-031-05028-2_11)

KOHOUT, Pavel, PALÍŠKOVÁ, Marcela (2017). *Dopady digitalizace na zaměstnanost a sociální zabezpečení zaměstnanců*. Dostupné z: [https://ipodpora.odbory.info/soubory/dms/wysiwyg\\_uploads/bba5a5c7366cdf3/uploads/Studie\\_Dopady\\_digitalizace.docx](https://ipodpora.odbory.info/soubory/dms/wysiwyg_uploads/bba5a5c7366cdf3/uploads/Studie_Dopady_digitalizace.docx)

KOLLER, Barbara, GRUBER, Hannelore (2001). Mitteilungen aus der Arbeitsmarkt- und Berufsforschung, Forum der Arbeitsmarkt- und Berufsforschung, Institut für Arbeitsmarkt- und Berufsforschung (IAB), Nürnberg. Dostupné z: [https://ams-forschungsnetzwerk.at/downloadpub/2001\\_4\\_mittab\\_koller\\_gruber.pdf](https://ams-forschungsnetzwerk.at/downloadpub/2001_4_mittab_koller_gruber.pdf)

KOTÍKOVÁ, Jaromíra, KRAUS, Arno, MODRÁ, Jarmila, ŠŤASTNOVÁ, Pavlína, VÁŇOVÁ, Jana, VÍŠEK, Petr (2019a). *Dopady digitalizace, automatizace a robotizace na trh práce, do oblasti vzdělávání a oblasti sociálních systémů, rešerše dokumentů*. Praha: VÚPSV, v. v. i. Dostupné z: [https://katalog.vupsv.cz/fulltext/vv\\_008.pdf](https://katalog.vupsv.cz/fulltext/vv_008.pdf)

KOTÍKOVÁ, Jaromíra, KRAUS, Arno, MODRÁ, Jarmila, ŠŤASTNOVÁ, Pavlína, VÁŇOVÁ, Jana, VÍŠEK, Petr (2019b). *Dopady digitalizace, automatizace a robotizace na trh práce, do oblasti vzdělávání a oblasti sociálních systémů, rešerše dokumentů*. Praha: VÚPSV, v. v. i. Dostupné z: [https://katalog.vupsv.cz/fulltext/vv\\_009.pdf](https://katalog.vupsv.cz/fulltext/vv_009.pdf)

LI, Karen, LINDENBERGER, Ulman (2002). Relations between aging sensory/sensorimotor and cognitive functions. *Neurosci Biobehav Rev.* Nov;26(7):777-83. DOI: 10.1016/s0149-7634(02)00073-8.

MannpowerGroup (2019). The Future of Manufacturing. Dostupné z: <https://www.manpowergroup.cz/tovarna-budoucnosti/>

MPO (2015). Iniciativa Průmysl 4.0 Ministerstvo průmyslu České republiky. Dostupné z: <https://www.mpo.cz/assets/dokumenty/53723/64358/658713/priloha001.pdf>

NINAUS, Katharina, DIEHL, Sandra, TERLUTTER, Ralf, CHAN, Kara, HUANG, Angi (2015). Benefits and stressors – Perceived effects of ICT use on employee health and work stress: An exploratory study from Austria and Hong Kong. *International Journal of Qualitative Studies on Health and Well-being*, 10:1. Dostupné z: DOI: 10.3402/qhw.v10.28838

OECD (2019). Skills Outlook 2019. Thriving in a Digital World. Dostupné z: [https://read.oecd-ilibrary.org/education/oecd-skills-outlook-2019\\_df80bc12-en#page1](https://read.oecd-ilibrary.org/education/oecd-skills-outlook-2019_df80bc12-en#page1)

OSHA-EU (2017). Healthy workplaces for all ages – Promoting a sustainable working life: campaign guide. European Agency for Safety and Health at Work Publications Office. Dostupné z: <https://data.europa.eu/doi/10.2802/94682>

SCHINNER, Matthias et al. (2017). Industrie 4.0' and an Aging Workforce – A Discussion from a Psychological and a Managerial Perspective. In: ZHOU, J., SALVENDY, G. (eds) Human Aspects of IT for the Aged Population. Applications, Services and Contexts. ITAP 2017. Lecture Notes in Computer Science, vol 10298. Springer, Cham. [https://doi.org/10.1007/978-3-319-58536-9\\_43](https://doi.org/10.1007/978-3-319-58536-9_43)

Úřad vlády ČR (2018). Výzkum potenciálu rozvoje umělé inteligence v České republice Analýza očekávaných socioekonomických dopadů rozvoje AI v ČR. Dostupné z: <https://www.vlada.cz/assets/evropske-zalezitosti/aktualne/AI-souhrnna-zprava-2018.pdf>

WARR, Peter, FAY, Doris (2001). Age and personal initiative at work. *European Journal of Work and Organizational Psychology*. 10(3), 343-353 (11). Dostupné z: <https://doi.org/10.1080/13594320143000717>

WEF (2023). *Future of Jobs report 2023*. World Economic Forum.

## CHAPTER 2 ALGORITHM MANAGEMENT AND WORKING CONDITIONS

ABRAHA, Halefom (2023). Regulating algorithmic employment decisions through data protection law. *European Labour Law Journal*, 14(2), 172–191. <https://doi.org/10.1177/20319525231167317>

BNE (2023). #ReWolt: Why are Wolt strikes spreading across Europe?. Brave new Europe, 7. 4. 2023. Dostupné z: <https://braveneweuropa.com/rewolt-why-are-wolt-strikes-spreading-across-europe>

CIHLA, Radek (2023). Kurýři rozvážkové společnosti Wolt opět protestovali v centru Prahy. Denik.cz, 14. 2. 2023. Dostupné z: [https://prazsky.denik.cz/zpravy\\_region/praha-wolt-kuryri-protest-vaclavske-namesti.html](https://prazsky.denik.cz/zpravy_region/praha-wolt-kuryri-protest-vaclavske-namesti.html)

DEARBAIL, Jordan, CONWAY, Zoe (2023). Amazon strikes: Workers claim their toilet breaks are timed. BBC, 25. 1. 2023. Dostupné z: <https://www.bbc.com/news/business-64384287>

DELFANTI, Alessandro, RADOVAC, Lilian, WALKER, Taylor (2021). *The Amazon Panopticon*. UniGlobal, červen 2021. Dostupné z: [https://uniglobalunion.org/news\\_media/uploads/2021/07/amazon\\_panopticon\\_en\\_v3.pdf](https://uniglobalunion.org/news_media/uploads/2021/07/amazon_panopticon_en_v3.pdf)

Eurofound (2019). Mapping the contours of the platform economy, available at: <https://www.eurofound.europa.eu/sites/default/files/wpef19060.pdf>

ILO + EC (2022). The Algorithmic Management of work and its implications in different contexts. ILO + EC, Background paper n°9, June 2022. Dostupné z: [https://www.ilo.org/wcmsp5/groups/public/---ed\\_emp/documents/publication/wcms\\_849220.pdf](https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_849220.pdf)

LEE, Min Kyung, KUSBIT, Daniel, METSKY, Evan, DABBISH, Laura. (2015). *Working with Machines: The Impact of Algorithmic and Data-Driven Management on Human Workers*. Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, 2015: 1603–1612. Dostupné z: <https://doi.org/10.1145/2702123.270254810.1145/2702123.2702548>.

KELLOGG, Katherina, VALENTINE, Melissa A., CHRISTIN, Angéle (2020). Algorithms at Work: the New contested Terrain. *Academy of Management Annals*, Vol. 14, No. 1, 366–410. Dostupné z: <https://doi.org/10.5465/annals.2018.0174>

MEDWELL, Jamie (2022). When the Algorithm Is Your Boss. *Tribune*, 30. 1. 2022. Dostupné z: <https://tribunemag.co.uk/2022/01/amazon-algorithm-human-resource-management-tech-worker-surveillance>

SOPER, Spencer (2021). Fired by Bot at Amazon: 'It's You Against the Machine. *Bloomberg.com*, 28. 6. 2021. Dostupné z: <https://www.bloomberg.com/news/features/2021-06-28/fired-by-bot-amazon-turns-to-machine-managers-and-workers-are-losing-out>

TODOLÍ-SIGNES, Adrian (2021). Making Algorithms Safe for Workers: Occupational Risks Associated With Work Managed by Artificial Intelligence. *European Review of Labour and Research*, 2021. Dostupné z: [https://papers.ssrn.com/sol3/Delivery.cfm/SSRN\\_ID3915718\\_code2489716.pdf?abstractid=3915718&mirid=1](https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3915718_code2489716.pdf?abstractid=3915718&mirid=1)

UNI Global (2021). Amazon: four steps for policymakers to deal with abusive worker surveillance. UNI Global, 12. 7. 2021. Dostupné z: <https://uniglobalunion.org/news/amazon-four-steps-for-policymakers-to-deal-with-abusive-worker-surveillance/>

VAN DOORN, Niels (2022). On the inadequacy of Wolt's Algorithmic Transparency Report and the limits of "algorithmic management" discourse. *Platformlabor.com*, 24. 10. 2022. Dostupné z: <https://platformlabor.net/blog/on-the-inadequacy-of-wolts-algorithmic-transparency-report-and-the-limits-of-algorithmic-management-discourse>

VOTAVOVÁ, Klára (2021b). Amazon workers in Poland & Czechia raise alarms that 'algorithmic management' has led to unfair dismissals, impacts on health & working conditions; incl. company response. *Business & Human Rights Resource Centre*, 15. 10. 2021. Dostupné z: <https://www.business-humanrights.org/en/latest-news/amazon-workers-in-poland-czechia-raise-alarms-that-algorithmic-management-has-led-to-unfair-dismissals-impacts-on-health-working-conditions-incl-company-response/>

VOTAVOVÁ, Klára (2021a). Algoritmy ve středoevropském Amazonu: Rychlé a neférové? *BalkanInsight*, 13. 9. 2021. Dostupné z: <https://balkaninsight.com/cs/2021/09/13/in-central-europe-concern-over-toll-fairness-of-amazon-algorithms/>

Wolt (2022). Wolt's Algorithmic Transparency Report 2022. Únor, 2022. Dostupné z: [https://assets.ctfassets.net/23u853certza/5G5O7KFnwzDGWzE1JFwCN/b4f9307af92b4ad9dc8a32ae09d7a9e0/Wolt\\_Algorithmic\\_Transparency\\_Report\\_2022.pdf](https://assets.ctfassets.net/23u853certza/5G5O7KFnwzDGWzE1JFwCN/b4f9307af92b4ad9dc8a32ae09d7a9e0/Wolt_Algorithmic_Transparency_Report_2022.pdf)

Wolt (2023). Wolt's Algorithmic Transparency Report 2023. Únor, 2023. Dostupné z: [https://downloads.ctfassets.net/23u853certza/6zSHjiE1XtTrD5TzMtvh1/cef4f51b2670b56df900e626c6d43015/Wolt\\_Algorithmic\\_Transparency\\_Report\\_2023.pdf](https://downloads.ctfassets.net/23u853certza/6zSHjiE1XtTrD5TzMtvh1/cef4f51b2670b56df900e626c6d43015/Wolt_Algorithmic_Transparency_Report_2023.pdf)

### CHAPTER 3 IMPACTS OF DIGITISATION ON THE QUALITY OF WORK IN THE CZECH REPUBLIC AND EU-27

Eurofound (2022). *Working conditions in the time of COVID-19: Implications for the future*, European Working Conditions Telephone Survey 2021, Publication Office of the European Union, Luxembourg. Dostupné z: [https://www.eurofound.europa.eu/sites/default/files/ef\\_publication/field\\_ef\\_document/ef22012en.pdf](https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef22012en.pdf)

KROUPA, Aleš, KYZLINKOVÁ, RenPetrata, LEHMANN, Štěpánka, VEVERKOVÁ, Soňa, ŠPAČEK, Ondřej, SEDLÁR, Jan (2020). *Zkracování pracovní doby*. Praha: VÚPSV, v. v. i. Dostupné z: [https://katalog.vupsv.cz/Fulltext/vz\\_481.pdf](https://katalog.vupsv.cz/Fulltext/vz_481.pdf)

KYZLINKOVÁ, Renata, KROUPA, Aleš (2022). *Pracovní nestabilita a nejistota umělců v audiovizuální tvorbě*. Praha: VÚPSV, v. v. i.

KYZLINKOVÁ, Renata, POJER, Petr, VEVERKOVÁ, Soňa (2019). *Nové formy zaměstnávání v České republice*. Praha: VÚPSV, v. v. i. Dostupné z: [https://katalog.vupsv.cz/fulltext/vz\\_450.pdf](https://katalog.vupsv.cz/fulltext/vz_450.pdf)

LEHMANN, Štěpánka (2016). *Více času nebo více peněz? Prediktory délky pracovní doby v Evropské unii*. Disertační práce, Praha: Univerzita Karlova.

PIASNA, Agnieszka, ZWYSEN, Wouter, DRAHOKOUPIL, Jan (2022). *The Platform Economy in Europe. Results from the Second ETUI Internet and Platform Work Survey*. Brussels: ETUI. DOI: <https://doi.org/10.574/08>.

OECD (2017). *Guideline on Measuring the Quality of the Working Environment*. Dostupné z: <https://www.oecd-ilibrary.org/docserver/9789264278240-en.pdf?expires=1684419968&id=id&accname=guest&checksum=65594E7CD66C2E700C83CE9018AC1DD4>

VÁŇOVÁ, Jana, VEVERKOVÁ, Soňa, KROUPA, Aleš (2023). *České digitální pracovní platformy*. Praha: VÚPSV, v. v. i. (v oponentním řízení)

Zákon č. 262/2006 Sb., zákoník práce. Dostupné z: <https://www.zakonyprolidi.cz/cs/2006-262>

Zákon č. 435/2004 Sb., o zaměstnanosti. Dostupné z: <https://www.zakonyprolidi.cz/cs/2004-435>