

Digit Working Paper No. 1  
February 2022

# digital futures at work research centre

---

## Measuring the size, characteristics and consequences of digital work

Rachel Verdin and Jacqueline O'Reilly

University of Sussex Business School

The **Digit Working Papers** series is an open access resource of peer-reviewed papers from the Digital Futures at Work Research Centre (Digit). This series presents concept papers, findings and theoretical investigations around the digital futures of work that are the result of, and contribute to, Digit research. The working papers are intended to meet our core objectives of:

- a. generating new knowledge, ideas and methods
- b. engaging policymakers and practitioners through communications, knowledge exchange and impact
- c. strong career development for researchers, and
- d. ensuring long-term sustainability of the produced knowledge and the Centre.

---

Suggested citation for this report:

Verdin, R. and O'Reilly, J. (2022) 'Measuring the size of the digital workforce', *Digit Working Papers No. 1*, University of Sussex, Falmer.

<https://dx.doi.org/10.20919/WHFQ8202>

---

© Copyright is held by the authors

DOI: 10.20919/WHFQ8202

ISSN 2755 – 1350

Publisher: Digital Futures at Work Research Centre (Digit)

Address: University of Sussex, Falmer, BN1 9SL

Editors:

Prof Jacqueline O'Reilly, University of Sussex

Prof Mark Stuart, University of Leeds

Views expressed in this working paper are those of the authors and not those of Digit.

### About the authors

**Rachel Verdin** is a post-doctoral researcher at the University of Sussex Business School, working on the EU Horizon 2020 project EUROSHIP.

**Jacqueline O'Reilly** is Professor of Comparative Human Resource Management at the University of Sussex Business School and Co-Director of Digit.

### Acknowledgements:

This report has received funding from the ESRC Digital Futures at Work Research Centre (Digit) (grant number ES/S012532/1) and the EU Horizon 2020 project EUROSHIP – Closing gaps in social citizenship ([euroship-research.eu](http://euroship-research.eu)). New tools to foster social resilience in Europe, funded from the programme H2020-SC6-GOVERNANCE-04-2019 – Enhancing social rights and EU citizenship under grant agreement No 870698.

This is an updated version of an earlier publication: O'Reilly, J, Verdin, R (2021) The digital transformation of work and associated risks. EUROSHIP Working Paper No. 9. Oslo: Oslo Metropolitan University. DOI: 10.6084/m9.figshare.17158064. Available at: <https://euroship-research.eu/publications>.

The authors appreciate their discussions of this paper with: Rune Halvorsen, Mi Ah Schoyen, Marge Unt, Christopher Grages, Birgit Pfau-Effinger, Zyab Ibáñez, Margarita León, Caterina Arciprete, Matteo Jessoula, and András Gábos.

## Abstract

This working paper provides a summary assessment of the existing literature and data on digital forms of employment internationally. It illustrates the variability in how it is defined, how it is growing and what kind of risks are associated with these developments.

Evaluation of these types of jobs is divided. On one hand, optimists point to the attractions and relative ease in finding employment on digital platforms; on the other hand, more critical perspectives argue that these employment contracts can result in exclusion from social protection systems.

The evidence indicates that while overall a relatively small proportion of all employment digital work is growing, both on platforms as well as adoption amongst more traditional companies.

The characteristics of digital workers can vary by region and occupation. Overall, they tend to be predominantly younger and more likely male, with a growing number of women albeit in particular occupations. Skills and earnings levels vary but the key issues of disputes are around pay, conditions and employment status.

The consequences of this form of work for those with lower skilled digital employment can undermine their social citizenship: they lack comparable employment rights, or when unemployed entitlement to adequate social protection. The potential polarisation effects of digital exclusion and deficits will severely hamper the wider benefits of transparency offered by these technologies. During the pandemic these trends have become more apparent.

The imbalance of bargaining power and regulatory governance to bridge gaps in citizenship entitlements undermines the collective potential of policy makers and trade unions to address these challenges. Nevertheless, there is emerging evidence of innovative challenges and contestation of these gaps by both union organisations and national regulators attempts to adapt social protection.

**Key words:**

Digital platforms; international comparisons; intersectional inequalities

## Key Points

1. The size of digital workforce is growing.
2. The characteristics of digital workers vary by region and occupation.
3. Skills and earnings levels vary but the key issues of disputes are around pay, conditions and employment status.
4. Lower skilled digital employment undermines social citizenship on employment rights and social protection.
5. The potential polarisation effects of digital exclusion and deficits will severely hamper the wider benefits of transparency offered by these technologies.
6. The imbalance of bargaining power and regulatory governance to bridge gaps in citizenship entitlements undermines the collective potential of policy makers and trade unions to address these challenges. Nevertheless, there is emerging evidence of innovative challenges and contestation of these gaps by both union organisations and national regulators' attempts to adapt social protection.

# Table of Contents

<b>Abstract .....</b>	<b>3</b>
<b>Key Points .....</b>	<b>4</b>
<b>Table of Contents .....</b>	<b>5</b>
<b>Abbreviations.....</b>	<b>6</b>
<b>Introduction .....</b>	<b>7</b>
<b>1. Employment trends in the digital labour market .....</b>	<b>8</b>
<b>What does digital employment mean? .....</b>	<b>8</b>
Figure 1: Platform work typology.....	9
<b>Size and location of the digital labour market .....</b>	<b>10</b>
<b>Growth trajectory of platform employment.....</b>	<b>11</b>
Figure 2: The growth of active digital labour platforms globally (selected categories 1999-2021).....	12
Figure 3a: The global spread (%) of online labour 2017.....	14
Figure 3b: The global spread (%) of online labour 2021 .....	14
Figure 4a: Online occupations by country 2017.....	15
Figure 4b: Online occupations by country 2021 .....	15
<b>2. Platform Worker Profiles .....</b>	<b>16</b>
<b>3. Policy challenges arising from platform employment in Europe .....</b>	<b>17</b>
<b>Regulatory gaps .....</b>	<b>17</b>
<b>Working conditions.....</b>	<b>17</b>
<b>Unionisation .....</b>	<b>19</b>
<b>The impact of the Covid Pandemic on Platform workers .....</b>	<b>21</b>
<b>Conclusion.....</b>	<b>22</b>
<b>References.....</b>	<b>22</b>

## Abbreviations

COLLEEM Collaborative Economy and Employment Survey

EU European Union

GMB General and Municipal Boilermakers Union (UK trade union)

ILO International Labour Organisation

OLI Online Labour Index

WEF World Economic Forum

## Introduction

There is a burgeoning literature seeking to understand the size, shape and growth of digital labour markets. The pandemic has amplified and further exposed existing regulatory gaps highlighting the challenges for social citizenship associated with emergent digital labour markets. This paper examines the risks of disenfranchising workers, exacerbating inequalities and undermining the opportunities they have for full and effective social citizenship.

The evidence available indicates that there is a considerable variability in the forms and extent of employment through digital and online platforms including both for online jobs and on-location work mediated by these platforms.

The motivations for those undertaking digital employment are outlined alongside the difficulties workers experience in relation to their uncertain employment relationship. While the improved flexibility that these emergent business models can offer may be appealing, the evidence shows how this often presents as a double-edged sword with some benefits and many other disadvantages.

The need for fair working standards, access to social protection systems and collective support before the pandemic have been amplified by periods of lockdown and the erratic effects on the labour market. Undertaking digital employment directly affects how individuals participate in public and social life. The evidence has shown the risks workers face 'and the exclusionary consequences for disadvantaged citizens' (Schou and Svejgaard Pors, 2019: 464).

While digital employment may be relatively marginal, it is growing in a contested and poorly regulated space with significant risks for those engaged in these emergent labour markets (Neufeind et al. 2018; Schoukens, 2020; Spencer et al. 2021). These developments not only highlight the previously existing imbalance of bargaining power, but the need for clear regulatory standards. These developments present considerable challenges for national and multi-national governments and regulators in terms of reforms covering employment protection, minimum wages, working hours, health and environmental safety, as well as workers voice and influence in implementing these changes.

The spill over effects of new forms of digital employment is also generating new problems extending to digital forms of management within standard employment relationships, demonstrating its potential to reach far beyond those engaged in platform labour (Schoukens, 2020).

The patterns that are emerging and the gaps that are present highlight risks in terms of inequality and social exclusion. The irrepressible wave of technological transformations in work is overwhelming considerations of equality, fairness and inclusion in the wake of this drive for digitalisation at work. This working paper provides the initial phase of examining these issues within the [Digit](#) and [EUROSHIP](#) projects; the aim of which is to continue and facilitate a mutually beneficial dialogue between EU and UK funded projects in this field.

# 1. Employment trends in the digital labour market

Since the 2000s, new forms of employment mediated by digital labour platforms have emerged across Europe and the globe (Mandl et al. 2015; Neufiend et al. 2018; ILO, 2021; Spencer et al. 2021). However, efforts to ascertain the size and shape of the digital labour market have been complex and challenging. A variety of new methodologies are being developed to capture this dynamic alongside more conventional statistical measures aimed to monitor these developments. Here we outline some of the most recent research attempting to define and quantify the size, shape and growth of platform labour.

This data can begin to identify the proportion of populations engaged in such work, with reference to variable aspects such as the frequency and volume of hours worked. Nevertheless, some of this knowledge is in its relative infancy while new innovative measures are being experimented with in attempts to capture this more accurately and consistently across countries. Based on a review of existing empirical evidence around the challenges it presents, this working paper concludes by outlining some of the major risks associated with employment rights, benefits and working conditions linked with work mediated by digital labour platforms.

## What does digital employment mean?

The concept of digital employment or platform labour does not have a universal definition and remains contested in the literature. Much of this initial debate has focused on platform work, although these practices are increasingly being adopted by mainstream conventional firms who are having to adapt to competitive pressures created by these digital competitors.

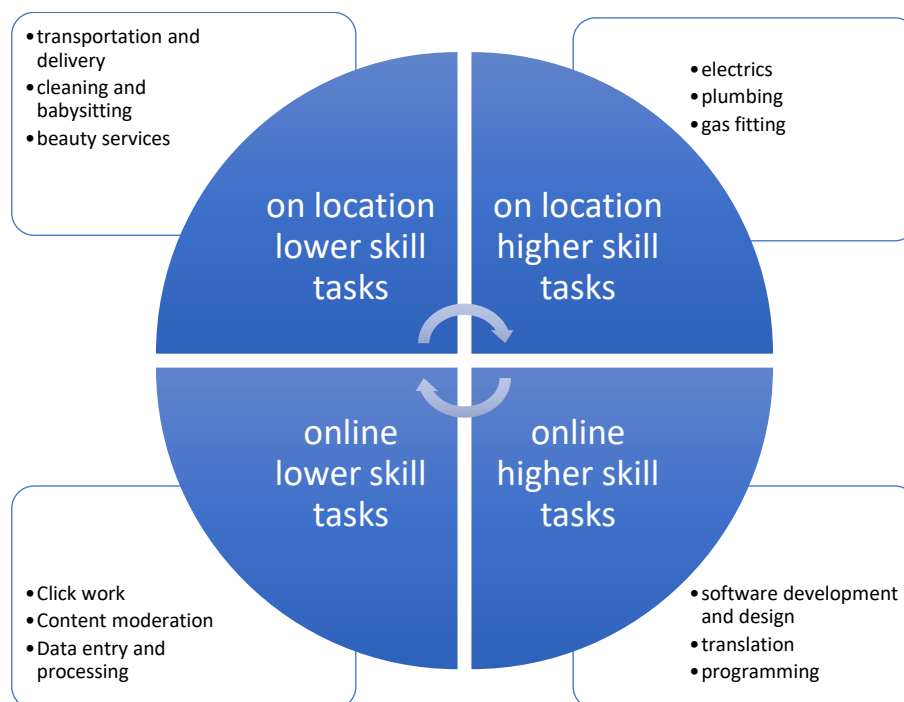
Here we focus on definitions of digital employment mediated by these platforms. Hauben et al (2020: 13) define this as:

'all paid labour provided through, on, or mediated by an online platform in a wide range of sectors, where work can be of varied forms.'

The platform provider acts as an intermediary between organisations and individuals seeking labour and workers looking for paid work. One of the most contentious legal issues around these relationships has been the extent to which the platform is purely a facilitator of labour exchange, or an employer in their own right.

The implications of this contestation lies with responsibility for social protection for these workers, which is discussed in more detail later in this working paper. For present purposes, with the aim of monitoring and measuring the different forms of employment facilitated by these platforms, we can distinguish between work that is entirely on-line, or is carried out on-location (see figure 1).



**Figure 1: Platform work typology**

Source: Adapted from Hauben et al. (2020)

Figure 1 subdivides types of employment according to where they are performed.

On-location refers to work that is carried out in person at a specific location. The platform acts as a mediator between the consumer requiring the service and the worker who performs the task, i.e. driving or delivery work, cleaning and personal care work.

Online work is entirely web based, and independent of location from the organisation requesting these tasks and the workers performing them. The platform mediates between these parties. The work is matched, carried out and paid digitally, for example, data entry and translation services. There is a further subdivision within each of these categories, recognising the low and high skill entry requirements as illustrated in Fig. 1.

Platform work offers solutions for both economic demand from both individual consumers and/or businesses and labour supply looking for paid work (i.e. platform workers). The advantages for both demand and supply are as follows. For businesses using platform workers they are: able to access a large pool of potentially international labour; benefit from quick completion of work; and reduced costs of labour. For individual consumers they have easy access to a local pool of labour services. For those seeking paid work: there are less barriers to entry; those from poorer countries may access higher wages, particularly for those in higher skilled roles (Lehdonvirta, 2021)<sup>1</sup>; there is flexibility and autonomy to manage work around other commitments;

<sup>1</sup> <https://digit-research.org/events/digit-events/digit-debates-16-june-2021/>

and they have the potential to earn a secondary or additional income (Broughton et al., 2018).

The reality behind worker motivations is complex and varied. Dependant on the level of skill the job requires, workers typically exercise variable degrees of control over their work. The issue of control has been one of the major contentions in legal cases questioning the extent to which these jobs are genuinely independent. Flexibility is often at the behest of expectations arising from the platform, particularly for those in the lower skill segment of the labour market.

Within this complex, and at times contested, definition of what constitutes platform labour there is further complexity in attempting to measure the size of the digital labour market. These challenges include identifying: the number of hours worked; the potential for individuals to be engaged in work across numerous platforms; and the variability in the reference period used to ascertain regularity of work.

Additionally, labour market statistics and measures may not capture workers that are using platform work as a secondary income. Establishing this information from company data may also be misleading as work may fall below tax reporting purposes, accounts may be used by more than one person, and there is variability in whether and how companies report this pay data (Tubaro et al., 2020).

## Size and location of the digital labour market

Studies have used a variety of methods to examine the extent of digital forms of employment and capture the 'elusive phenomenon'. The lack of comparability between research results reflects the inconsistency in country studies and the variable methodologies they use.

The most cited study, according to Hauben et al. (2020), uses the COLLEEM (Collaborative Economy and Employment) survey and covers fourteen EU Member States to assess the shape and growth of the platform labour market (Pesole et al., 2018; Urzi Brancati et al., 2020).<sup>2</sup> Their research shows that there has been a steady growth in those undertaking platform work across EU Member States as secondary, marginal and sporadic employment. The exception to this finding of ongoing growth are those they categorise as 'main' platform workers (Urzi Brancati et al., 2020: 17).<sup>3</sup> The COLLEEM survey findings suggest 1.4% of the working age population are engaged in platform work as their main form of employment. This corresponds with other research which indicates that platform work is often used in conjunction with other forms of employment as a strategy to 'piece together an income' (Huws, 2017: 10; Hauben et al., 2020: 19).

---

<sup>2</sup> The COLLEEM research project was launched in January 2017 by the European Commission's Joint Research Centre and Directorate General for Employment and Social Affairs to investigate the collaborative economy and employment. COLLEEM is an online panel survey of internet users aged between 16 and 74 from Croatia, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, the Netherlands, Portugal, Spain, Sweden, Slovakia, Romania, and the United Kingdom. The survey was carried out in 2017 and then again in 2018. <https://ec.europa.eu/jrc/en/colleem>

<sup>3</sup> 'Main' platform workers are defined as those receiving 50% or more of their income from platform work and/ or those working more than 20 hours a week and receiving 25-50% of their income from platform work. This finding relates to data from the 2017 and 2018 COLLEEM survey results.

Interestingly research carried out prior to the March 2020 onset of the covid pandemic in Europe showed that the volume of online platform workers exceeded the numbers performing on-location platform work in all countries (Huws et al., 2019: 24-25). Within this broad trend there is significant national variation in the overall uptake of platform work (Berg et al., 2018; Huws et al., 2017; Pesole et al., 2018; Howcroft and Bergvall-Kåreborn, 2019; Albert et al., 2021; Halvorsen et al., 2021; Ibáñez et al., 2021; Unt et al., 2021; Grages et al., 2021; Arciprete et al., 2021; Verdin and O'Reilly, 2021).

An overview of the literature identifies the variable extent of participation in platform work between countries. Huws et al. (2019: 3) find that participation levels in the UK, Germany and Hungary are at the lower end, while Italy, Spain, and Estonia have amongst the highest levels in Europe. With reference to this data, they conclude suggesting that countries with lower average wages have higher instances of platform workers. They go on to suggest that the most likely explanation for these higher instances of platform work in Central Eastern and Southern Europe is poverty (Huws et al., 2019). This accords with the relatively low level of platform workers and stagnant growth of digital employment reported in Norway (Dølvik and Jesnes, 2018: 13).

However, the COLLEEM survey research from Pesole (2018: 3) is at odds with these findings. While the countries studied are not all the same, they suggest the UK has the highest incidence of platform work, accompanied by Germany, Spain, and Italy. Conversely Hungary and Slovakia have low instances of platform work, contrary to the findings of Huws et al (2019). Poverty as a catalyst to work on these platforms is also contested by the recent work from Lehdonvirta (2021) suggesting that some platform workers have very high levels of income and skills.

Clearly the various attempts to measure the forms, size and location of digitally mediated and platform work illustrate its variegated nature. The disparity between research results and their lack of systematic comparability demonstrates, according to Makó et al. (2020), the 'diverging terminology of digital labour, different survey methods [and] sampling problems' (Makó et al., 2020: 169). These different findings highlight the significant heterogeneity in the way platform work is measured, its take up, the volume of hours typically worked and how this varies between countries. This diversity presents significant challenges for those trying to regulate these relationships with regard to social right risks both within and across European jurisdictions.

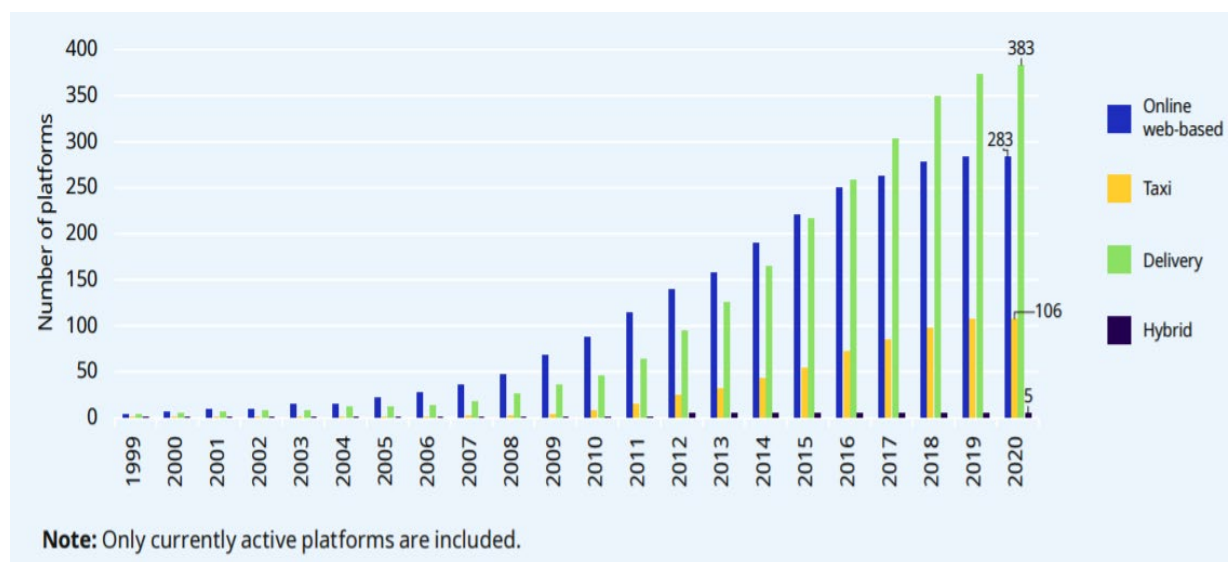
## Growth trajectory of platform employment

Despite the lack of consensus over defining and measuring the extent of digital employment with consistent data, it can be used to broadly indicate the number of workers finding employment on these digital platforms. Nevertheless, there are suggestions of 'exponential growth' of platform employment (Howcroft and Bergvall-Kåreborn, 2019). UK based analysis has found that the level of platform workers was around 5 million in 2016 (Howcroft and Bergvall-Kåreborn, 2019) and between 2016-2019, for those working at least once a week, this doubled in size to 9.6% of the adult population (SSCU and HBS, 2019). While the majority of those were using digital employment to top up their income, 48% defined themselves as full-time platform workers (SSCU and HBS, 2019).

In terms of quantifying the size of the labour market with precision, Kässi and Lehdonvirta (2018) have attempted to resolve the insufficiency of existing labour market statistics and indicators. The Online Labour Index (OLI) was created to address these inconsistencies (<http://ilabour.oii.ox.ac.uk/online-labour-index/>). The OLI provides a global measure of the demand for and use of fully digital platforms, where the entire transaction occurs online (i.e. Amazon Mechanical Turk). To create the Index a census of all platform companies of 'non-trivial size' was combined with information relating to the number of active user profiles, job vacancies posted and tasks completed. The resultant data set enables the global tracking of supply and demand of platform work by country and occupation type in near real time. The Index also evidences the global spread, regional trends and commonalities in the type of platform work. The analysis shows that software development and technology are the most sought-after skills (accounting for one third of all platform jobs), followed by creative and clerical work (Kässi and Lehdonvirta, 2018: 247).

The OLI evidences that online freelancing work has grown by 11% each year for the last five years. Online global workers are now estimated at 19 million, with 5 million of those working full-time (Kässi et al., 2021). Figure 2 charts this growth, alongside that of taxi and delivery services, through their identification and analysis of 777 active platforms up to January 2021.

**Figure 2: The growth of active digital labour platforms globally (selected categories 1999-2021)**



Source: (ILO, 2021): 47.

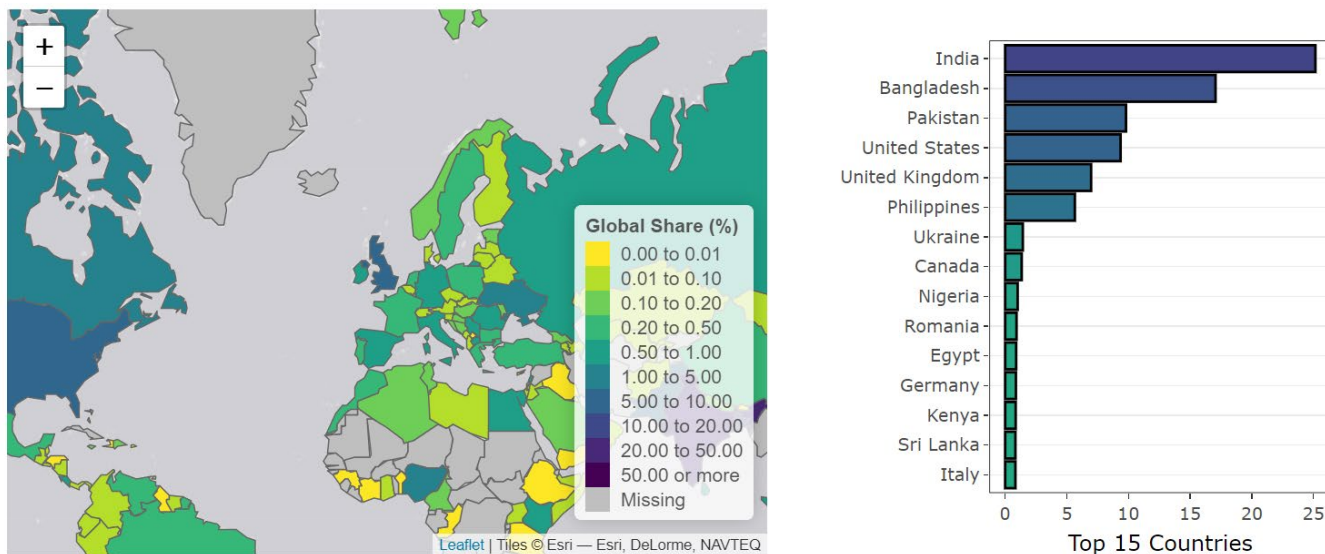
affected by the increase in remote working in standard employment relationships. In addition, more conventional firms are also beginning to adopt the practices of these platform firms. This is a response to competitive challenges to innovate with new forms of service delivery and different employment conditions (Rolf, O'Reilly and Meryon 2021; Hunt and O'Reilly, 2021).

The online labour observatory of the OLI provides a useful data visualisation tool to show the spread of both supply and demand of online work, and how this has changed globally since 2017. With reference to labour supply, figures 3a and 3b illustrate the changing global spread of where online labour has been performed. This indicator suggests that European labour markets tend to have relatively lower levels of penetration in comparison to Asia and Anglo-Saxon countries. On one hand this could mean that it is less easy for workers in Continental Europe to access work through these platforms. But, on the other hand the inequalities resulting from this type of labour may also be less extensive than in countries where this work is more common.

The labour force share of platform workers has increased since 2017 in India, Pakistan and Russia alongside the relative decline for countries such as the US and Canada. Concern over these differences for European workers revolve around issues of social dumping, where these workers are employed on inferior terms and conditions for example to those in the EU. Businesses offering jobs for online labour are largely based in the US (41%), followed by the UK (8%) and India (6%) (Stephany et al., 2020). The implication for European workers are either that it is less easy for them to access these potential jobs, or if they do, the terms and conditions of employment might be quite different to those within their own jurisdictions; an issue which is currently highly litigious.

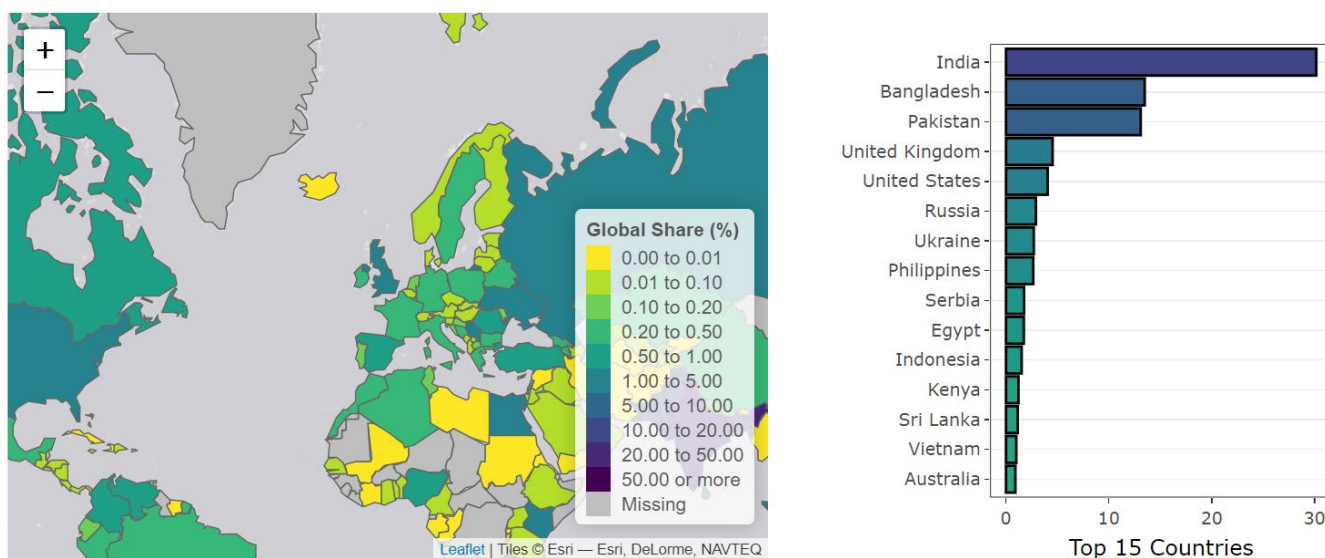


**Figure 3a: The global spread (%) of online labour 2017**



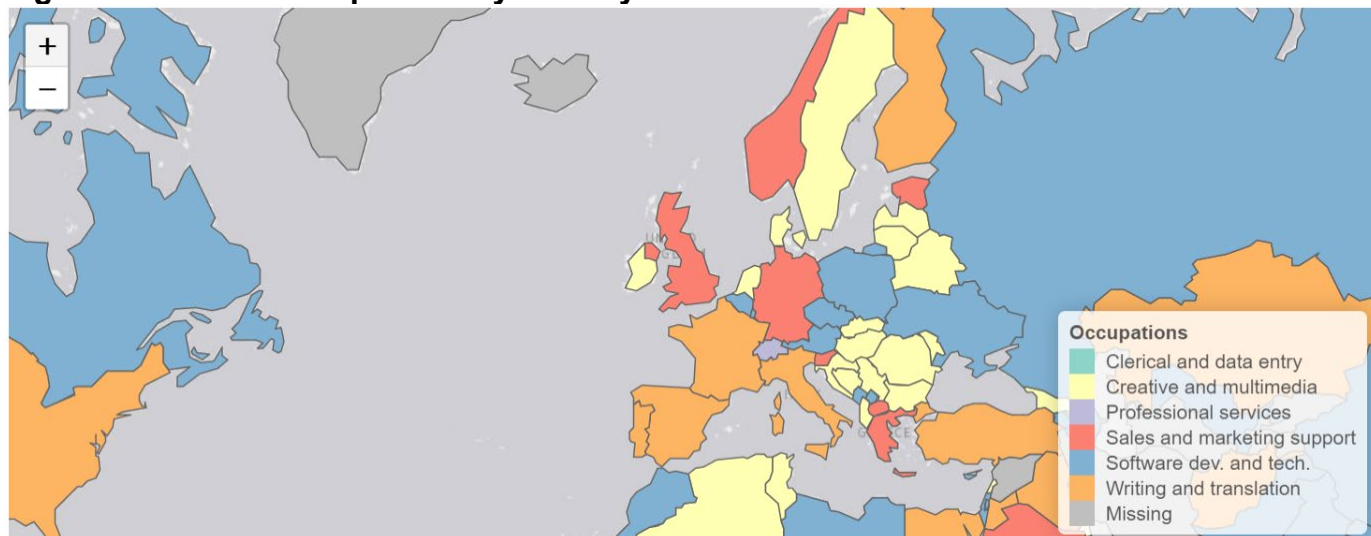
Source: <https://onlinelabourobservatory.org/oli-supply/>

**Figure 3b: The global spread (%) of online labour 2021**

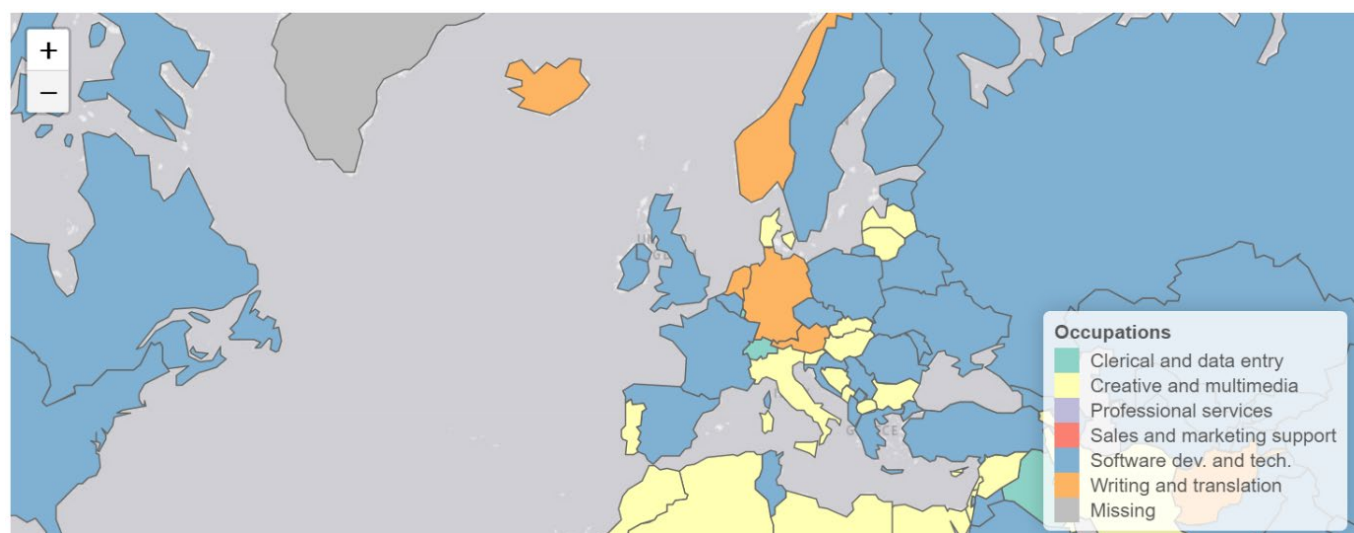


Source: <https://onlinelabourobservatory.org/oli-supply/>

The OLI also enables cross-national comparison of the type of work carried out and how this too is changing over time. Figures 4a and 4b demonstrate how the type of work has shifted between 2017 and 2021 in Europe.

**Figure 4a: Online occupations by country 2017**

Source: <https://onlinelabourobservatory.org>



Source: <https://onlinelabourobservatory.org>

The existing quantitative evidence illustrates the overall trajectory of growth of platform work within and outside Europe, alongside divergent patterns of development between countries and occupations. Despite this growing body of evidence there still remains a need to understand the consequences of this type of work for those engaged in it, in terms of social protection and working conditions. We examine the characteristics of platform workers in section 2 before assessing how regulatory and collective

frameworks are attempting to address these challenges nationally and internationally in section 3.

## 2. Platform Worker Profiles

Available evidence of the characteristics of platform workers indicates some common broad trends between countries related to age and education. According to the International Labour Organisation (ILO, 2021), the average age of platform workers internationally is thirty-three years. This corresponds with findings from Europe (Pesole et al., 2018; Urzi Brancati et al., 2020; Berg et al., 2018; Bonin, 2017; Lepanjuuri et al., 2018: 14; SSCU and HBS, 2019).

Online platform workers are more likely to be highly educated, particularly those from developing countries (ILO, 2021; Berg, 2018; Hauben et al., 2020: 20; Lepanjuuri et al., 2018: 14). Low skilled on-location workers are more likely to come from marginalised and vulnerable groups. The proportion of non-nationals working on these platforms varies across Europe (Urzi Brancati et al., 2020: 4). The evolution of intersectional inequalities across socio-economic, gendered and ethnic lines within these emerging labour markets is concerning with regard to issues of social citizenship and the variation in national responses to these developments (Renan Barzilay, 2019; Dubal, 2021; Albert et al. 2021; Halvorsen et al. 2021; Ibáñez et al. 2021; Unt et al. 2021; Grages et al. 2021; Arciprete et al. 2021; Verdin and O'Reilly 2021).

A gender analysis of platform workers shows that men are most likely to undertake this kind of work. This gender division is more marked in developing countries (Berg et al., 2018; Behrendt et al., 2019; ILO, 2021; Pesole et al., 2018; Rani and Furrer, 2019). The trajectory of platform worker growth shows that women's engagement is rising at a faster rate than men's and so the overall participation gap is closing, albeit slowly (Urzi Brancati et al., 2020).

However, participation rates are highly segregated by occupational groups and activities. For example, according to the COLLEEM survey, men are prominent in transportation (on-location) and software development (online) while women dominate in housekeeping and beauty services (on-location) and translation (online) (Pesole et al., 2018: 4).

Even where there is no difference in tasks or occupations the gender pay gap on these platforms remains significant. Adams-Prassel (2021) suggests that this may in large part be attributable to the interruptions female workers face in the context of working from home and managing domestic demands on their time that interrupt their work flow and productivity.

The take up of platform work by gender demonstrates significant variability between selected European countries. While men form the majority of weekly platform workers in Germany (60.6%), Estonia (72.1%) and Spain (60.5%), in Italy women are in the majority (52.8%) (Huws, 2017; SSCU and HBS, 2019). Within the UK, analysis shows that the gender balance of platform workers has shifted. In 2016 women occupied 52.7% of platform roles, but by 2019 men were in the majority (55.8%) (Huws et al., 2019: 2).



There is very little data that allows us to distinguish between the ethnic origin or disability status of platform workers within or between European countries limiting our analysis of the intersectional effects of these types of employment largely to gender differences, and to a limited extent where these are migrant workers (Piasna and Drahokoupil, 2019; Holtum et al., 2021). There is an emerging literature, largely from the US that is beginning to explore ethnic differences in pay rates on these platforms (Dubal 2021); however, there is, as of yet, no substantial comparative European evidence.

These gaps in our knowledge make it more difficult for policy makers to have a more fine-grained analysis of the differential impact of platform mediated employment. Nevertheless, the growth of this phenomena has raised a number of universal concerns related to regulatory gaps, working conditions and employee representation that are discussed in section 3.

### 3. Policy challenges arising from platform employment in Europe

#### Regulatory gaps

The labour market status associated with digital forms of employment is relatively high on the policy agenda of many governments (Hauben et al., 2020; Spencer et al. 2021). A dependant employment relationship provides the standard reference point for most labour and social security legal and policy frameworks (Schoukens, 2020). Protections associated with the traditional employment relationship, such as pay rates, sick pay and holiday entitlement, and responsibility for regulations surrounding health and safety at work, are often uncertain or being contested for platform workers (Trappmann et al. 2020). Operating outside of the scope of existing social protection systems, arrangements for workers are variable. This limits access to social protection systems, resulting in largely unregulated working conditions and in some jurisdictions contested litigation or negotiation on the status of these workers (Neufeind et al. 2018; Deakin 2020; Rolf et al. 2022). These gaps between standard and digital workers constitute a double challenge for the future of work with some commentators suggesting that 'economic and social progress are at stake' (Behrendt et al., 2019: 19) or that we need a new 'Digital Social Contract' (Spencer et al. 2021). Understanding the risks of poverty and social exclusion these gaps present is critical to protection of social standards and living conditions during these transformations.

#### Working conditions

The work mediated by platforms is to a large extent not new and could be seen as a form of 'putting out'.<sup>4</sup> However, the way that it is accessed, mediated, managed and

---

<sup>4</sup> For example, spot labour markets, day contracting and 'putting out' have been evident from the earliest days of industrialisation to more recent practices in the Italian garment sector (Lazerson 1995).

regulated is new and is more global and presents risks for workers in terms of wages, benefits and working conditions.

Platform work can offer the ability to earn a secondary income with the promise of good wages, increased access to work beyond cultural and national barriers, and improved flexibility for carers, students and those with health needs (Broughton et al., 2018).

However, the lived reality of these opportunities is often contradictory. Research by Berg (2018) found that only 7% of workers earned the wage advertised by the platform or more. Additionally, assessment of four platforms in Europe found that median earnings for platform workers in the UK were around 50% lower than the minimum wage, 29% lower in Germany and 9% lower in Spain (Rani and Furrer, 2019: 569). The risks of 'substituting a traditional sweat shop for a digital one' mean that with increased autonomy comes precarity, a lack of social protection coverage and lower job quality (OECD, 2017: 272).

The continued growth of digital labour platforms places increasing numbers of the workforce beyond the scope of social protection systems (Urzi Brancati et al., 2019: 4). Berg (2018) found that only three in ten workers on crowd work platforms were covered by some form of social insurance. Their research also suggested that only 35% of workers had a pension or retirement plan. Survey data showed that one third of those had employment outside of the platform economy and that was where their social protection coverage arose (Berg et al., 2018: xviii). This demonstrates how digital employment is increasing the risks of poverty and social exclusion and creating new forms of inequities for those engaged in it.

The need for international standards to ensure 'decent work' for platform workers has been well documented. The ILO (2021) has produced a comprehensive analysis of international working conditions detailing workers' motivations, barriers and challenges. They flagged key issues concerning precarity, low pay, non-payment and the digital evaluation and reward of work.

This builds on previous analyses of working conditions on micro-task platforms (Berg et al., 2018). Reports have considered various aspects of working conditions such as: pay rates, work availability, work intensity, rejects and non-payment, worker communication with clients and platform operators, social protection coverage and the types of work performed. Workers are typically not offered any training or development, and career progression opportunities are scarce (Hauben et al., 2020: 36; Broughton et al., 2018: 9).

Research has demonstrated how a variety of workers internationally experience the pros and cons of the work on these platforms, suggesting how working conditions could be improved (Berg et al., 2018; Spencer et al., 2021). The World Economic Forum (WEF, 2020) identified the key issues workers face, formulating the improvements that are needed as a 'Charter for Platform Companies'. Their Charter, alongside a similar approach adopted by Fairwork (2020), sets out a roadmap for action with goals including: diversity and inclusion, safety and wellbeing, flexibility and fair conditions, reasonable pay and fees, social protection, learning and development, voice and participation and data management (WEF, 2020; Fairwork, 2020).

There have been various degrees of recognition of these issues by governments within Europe but, as yet, there has been no coordinated response (Taylor, 2017; HM Government, 2018; Hauben et al., 2020; ILO, 2021). While the regulatory response is 'in flux' (ILO, 2021: 211) the urgent need for action is further compounded by the expansion of digital forms of management, impacting beyond digital labour platforms (Allen QC and Masters, 2021; Gilbert et al., 2021). The increasing use of technologies and Artificial Intelligence more broadly in the workplace is similarly developing without regulatory constraint. Dølvik and Jesnes (2018: 16) suggest that

'we might in a few years no longer talk about a distinct platform or sharing economy but see growing integration of platform methodology in ordinary companies, such as on-demand work, digitally intermediated work and increased digitalization of traditional jobs.'

This accords with findings from Huws et al. (2019: 30) who conclude that given the difficulties with isolating digital platform workers as distinct groups, the broader issue of the spread of digital management practices needs addressing in its entirety; in particular as established firms attempt to compete with platform operations that benefit from lower labour costs.

## Unionisation

The limited regulatory response to the emergent challenges of digital employment has prompted soft law initiatives and codes of conduct to be implemented by local jurisdictions and non-state actors (ILO, 2020: 246-7; Rolf et al. 2022).<sup>5</sup> Within this context the limitations on union organising are concerning. One of the fundamental principles of fair work includes freedom of association and effective recognition of the right to collectively bargain. The capacity of digital employment to undermine existing frameworks is accompanied by a lack of bargaining power for workers. The potential for collectivism amongst platform workers is undermined by the uncertain employment relationship associated with digital employment and barriers to unionisation resulting from the way work is organised. The isolated nature of work and the way it is allocated and managed presents risks for those seeking solidarity in union membership and wishing to engage in collective action. Howcroft and Bergvall-Kåreborn (2019: 32) suggest that union activity and action carries the risk of platform deactivation, loss of income and may be considered futile.

That said, despite the individualised nature of the work, collective action and unionisation has provided some opportunity for workers to challenge poor working practices (Tassinari and Maccarrone, 2020). Collective action is being coordinated by both established mainstream unions and informal groups of workers or start up unions (Staton, 2020; ILO, 2021: 212). Confirming ILO findings, indicators from the [Leeds Index of Platform Labour Protest](#), provides an international measure of worker protest, showing that pay has been the most significant issue of unrest, apart from in the US where contested employment status was more frequent (Trappmann et al. 2020).

---

<sup>5</sup> For instance, the Charter of fundamental rights of digital labour was introduced in the municipality of Bologna; Cabify, Deliveroo, Grab, MBO Partners, Postmates and Uber Technologies voluntarily signed the WEF Charter at the WEF 2020 annual meeting in Davos.

Legal challenges and strike action have been important forms of opposition in western Europe and the global south respectively (Joyce et al., 2020).

The importance of strengthening the role of workers' organisations has been evidenced by the outcomes in a number of examples of collective successes including: the Uber case in the UK concerning worker status and the subsequent recognition of GMB union;<sup>6</sup> union recognition at an online cleaning platform in Denmark, which has allowed workers to transition to employee status (ILO, 2021: 26); and the successful union lobbying in Germany at IG Metall resulting in the inclusion of self-employed workers into the firms' statutory pension scheme (Behrendt et al., 2019). In Norway after a five-week strike by Foodora food delivery cyclists in 2019 the employer eventually agreed a collective agreement on pay with The United Federation of Trade Unions (Fellesforbundet).<sup>7</sup>

The extensive debates with the unions in Norway illustrate some common concerns across the EU. LO, the largest confederation of trade unions in Norway, referred to the 'sharing economy' 'as something that challenges the welfare state and the organized labour market' (LO, 2018: 62). In the Programme of Action for 2017-2021, LO has articulated a concern for the expansion of the digital economy if it is left to grow without a review of current legal framework in relation to employment and working conditions, competition rules, and taxation of commercial activities. According to LO (2017: 16):

'An increasing number of workers choose or are forced into self-employment. In some cases, this may afford better control over their own working conditions but in other it is an illegal circumvention of the regulations on permanent employment contracts that deprives workers of their lawful rights in the labour market, without the benefit of increased freedom or self-determination. In the commercial sharing economy, we see clear trends towards employers trying to organize themselves out of their responsibilities as employers and operating at the fringes of Norwegian legislation. [...]

This development will, if allowed to continue, lead to day labour becoming the norm and undermine job security and co-determination, and put a downward pressure on wages. This will be particularly hard on those who already are in a vulnerable position in the labour market, and favour serious economic crime and tax evasion. LO will therefore further develop our strong commitment against labour market crime, social dumping and precarious work, and defend permanent employment at real employers.'

Despite protests from labour movements in many countries, new regulatory measures from national governments have been erratic and varied (Neufeind et al. 2018). The capacity of union campaigns depends on the strength of unions within the respective country and the flexibility of the bargaining agreements in place. Despite some successful cases from both established and start up unions, it is to some degree contingent on union membership which overall remains low (ILO, 2021: 215).

---

<sup>6</sup> *Uber BV v Aslam* [2021] UKSC 5

<sup>7</sup> Foodora-streiken er over: Signerer tariffavtale – VG

## The impact of the Covid Pandemic on Platform workers

The pandemic has further illustrated both the challenges and precarity associated with platform work and, conversely, the opportunities it can present. During this period of economic turbulence, platform work, both on location and online, has been a way for some of those out of work to access employment.

ILO (2021) analysis has shown that worker supply has indeed grown since the Covid outbreak. This has resulted in variable pressures on wages in different sectors. For instance, the sharp expansion of consumer delivery services (Rolf et al. 2021) can be contrasted with the declining business demand for purely web-based work, as evidenced by the Online Labour Observatory (ILO, 2021: 20).

The OLI has revealed trends for online workers in the US during the pandemic, of both a 'distancing bonus' and a 'downscaling loss'. There was a significant loss in demand for purely web-based platform workers at the start of the crisis. This was followed by a swift recovery and growth in excess of previous patterns as work shifted to online (Stephany et al., 2020). This was marked for skilled work, such as software development and translation, as opposed to clerical and data entry, which did not see the same uplifts. Stephany et al (2020) surmise that online work may have been more vulnerable as companies sought to protect permanent staff from reductions.

The complications arising from these conflicting pressures on hours and wages are enhanced by the lack of a dependant employment relationship, meaning that workers do not have access to comparable employment protections. The pandemic has amplified the need for decent work, exposing the imbalance of bargaining power and associated impacts of precarity for workers.

New forms of social protection were implemented by governments to recognise the unprecedented impacts of national lockdowns. However, the limited ability for those engaged in digital employment to benefit from such measures underlined the basic inequities in employment status, access to work, responsibility for the health and safety of working conditions (Verdin and O'Reilly, 2021; Adam et al., 2020; Conaghan, 2020).

The ILO found that 70% of app-based workers did not have access to paid sick leave during the pandemic (ILO, 2021: 174). The consequences of these emergent gaps have resulted in workers being unable to self-isolate when needed. They also lacked personal protective equipment with limited consideration of health and safety law (Hauben et al., 2020: 37; Booth, 2020; Paul, 2020). Their vulnerability was illustrated in the UK where taxi drivers or chauffeurs have been one of the occupations with the highest Covid related death rates (Windsor-Shellard and Nasir, 2021). This demonstrates the need to understand the intersectional ways these inequities operate, particularly for those in the lower skill segment of the digital labour market, although reliable and systematic aggregate data is still thin on the ground.



## Conclusion

This working paper has considered the extent, form and growth of digital work in selected European countries, including a global perspective from existing data sources. The analysis presented here provides the macro level framework of challenges presented by digital labour from existing quantitative data. While projections of the size, shape and scope for digitally mediated forms of employment are variable, the evidence shows that this is becoming a growing form of work both globally and within Europe, albeit at different rates. This presents a number of challenges for national and pan-European policy makers.

Digital technologies can enable labour solutions for businesses facilitated by platform companies, for instance reduced costs and the capacity to access large pools of flexible labour. Workers may also benefit from increased flexibility and access to new work opportunities. However, the potential benefits for workers are seemingly mismatched with the practical realities they experience when undertaking platform work. Platform labour is typically used as a means to supplement other jobs, though for some workers it is their main source of income.

The dynamic nature of digital employment presents emerging barriers to equitability which have not yet been adequately addressed. These patterns of exclusion affect citizens in different ways and have the potential to marginalise already vulnerable groups. Operating beyond the coverage of social protection systems, beneficial to those engaged in standard employment relationships, these new categories of worker are often impeded in their capacity to exercise full and effective social citizenship. Workers are subject to poor working conditions and precarity associated with this employment model. Their ability to seek collective redress is undermined by the imbalance of bargaining power resulting from this uncertain employment relationship. The regulatory loopholes identified also have the potential to extend beyond platform labour markets, underlining the need for caution about the spillover effects of this type of work for standard employees.

Robust income maintenance policies for those with insufficient income from paid work and social regulation of the labour market is needed to address emerging gaps in social protection coverage but also recognise how the broader digitalisation of employment may exacerbate inequities.

## References

- Adam, S., Miller, H. & Waters, T. (2020) Income protection for the self-employed and employees during the coronavirus crisis. London: Institute for Fiscal Studies. Available at: <https://www.ifs.org.uk/publications/14786> (Accessed: 17 September 2021).
- Adams-Prassel, A. (2021) 'The Gender Wage Gap in an Online Labour Market: The Cost of Interruptions' online lecture to Digit Debates 20<sup>th</sup> October 2021 Accessed: <https://digit-research.org/event/digit-debates-the-gender-wage-gap-in-an-online-labour-market-the-cost-of-interruptions/>

- Albert, F., Gábos, A., Gál, R. I., Kelemen, M., Kozma Turnpenny, A, Medgyesi, M. and Szivós, P. (2021) Hungarian National report on Social Protection Systems, Europship working paper
- Allen QC, R. & Masters, D. (2021) A report for the Trades Union Congress by the AI Law Consultancy. London: AI Law Hub. Available at: [https://www.tuc.org.uk/sites/default/files/Technology\\_Managing\\_People\\_2021\\_Report\\_AI\\_0.pdf](https://www.tuc.org.uk/sites/default/files/Technology_Managing_People_2021_Report_AI_0.pdf) (Accessed: 13 August 2021).
- Arciprete, C., Ciani, F., Galanti, T., Jessoula, M. and Pedersini, R. (2021) Italian National report on Social Protection Systems, Europship working paper
- Behrendt, C., Nguyen, Q. A. & Rani, U. (2019) Social protection systems and the future of work: Ensuring social security for digital platform workers. *International social security review* (English edition), 72 (3), pp. 17-41.
- Berg, J., Furrer, M., Harmon, E., Rani, U. & Silberman, M. S. (2018) Digital labour platforms and the future of work: Towards decent work in the online world. Geneva: ILO. Available at: [https://www.ilo.org/global/publications/books/WCMS\\_645337/lang-en/index.htm](https://www.ilo.org/global/publications/books/WCMS_645337/lang-en/index.htm) (Accessed: 13 August 2021).
- Bonin, H. (2017) The Incidence of Platform Work in Germany: Analysis of a survey commissioned by the Federal Ministry of Labour and Social Affairs. Bonn, Germany: IZA & University of Kassel. Available at: [https://www.oecd.org/els/soc/7\\_Bonin\\_The\\_Incidence\\_of\\_Platform\\_Work\\_in\\_Germany.pdf](https://www.oecd.org/els/soc/7_Bonin_The_Incidence_of_Platform_Work_in_Germany.pdf) (Accessed: 13 August 2021).
- Booth, R. (2020) Uber driver dies from Covid-19 after hiding it over fear of eviction. *The Guardian*, 17 April 2020. Available at: <https://www.theguardian.com/world/2020/apr/17/uber-driver-dies-from-covid-19-after-hiding-it-over-fear-of-eviction> (Accessed: 13 August 2021).
- Broughton, A., Gloster, R., Marvell, R., Green, M., Langley, J. & Martin, A. (2018) The experiences of individuals in the gig economy. London: The Stationery Office. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/679987/171107\\_The\\_experiences\\_of\\_those\\_in\\_the\\_gig\\_economy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/679987/171107_The_experiences_of_those_in_the_gig_economy.pdf) (Accessed: 13 August 2021).
- Conaghan, J. (2020) Covid-19 and Inequalities at Work: A Gender Lens. *Futures of Work*. Available at: <https://futuresofwork.co.uk/2020/05/07/covid-19-and-inequalities-at-work-a-gender-lens/> (Accessed: 17 September 2021).
- Deakin, S. (2020) 'Decoding Employment Status' *King's Law Journal*, 31:2, 180-193. Also Available on Digit Debates <https://digit-research.org/event/decoding-employment-status/>
- Dølvik, J. E. & Jesnes, K. (2018) Nordic labour markets and the sharing economy: Report from a pilot project. Copenhagen: Nordic Council of Ministers. Available at: <https://norden.diva-portal.org/smash/get/diva2:1182946/FULLTEXT01.pdf> (Accessed: 13 August 2021).
- Dubal, V. (2021) The New Racial Wage Code. *Harvard Law and Policy Review* [Online]. UC Hastings Research Paper Forthcoming. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3855094](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3855094) (Accessed 16 September 2021).
- Fairwork (2020) The Gig Economy and Covid-19: Fairwork Report on Platform Policies. Oxford: Fairwork Foundation. Available at: <https://fair.work/wp->

- content/uploads/sites/97/2020/04/COVID19-Report-Final.pdf (Accessed: 13 August 2021).
- Grages, C., Pfau-Effinger, B., Eggers, T. and Meid, J. (2021) German National report on Social Protection Systems, Europship working paper
- Gilbert, A., Thomas, A., Pissarides, C., Al-Izzi, H., Miller, C. & Burnell, E. (2021) The Amazonian Era: How algorithmic systems are eroding good work. London: Institute for the Future of Work. Available at: [https://uploads-ssl.webflow.com/5f57d40eb1c2ef22d8a8ca7e/60afae719661d0c857ed2068\\_I\\_FOW%20The%20Amazonian%20Era.pdf](https://uploads-ssl.webflow.com/5f57d40eb1c2ef22d8a8ca7e/60afae719661d0c857ed2068_I_FOW%20The%20Amazonian%20Era.pdf) (Accessed: 16 September 2021).
- Halvorsen, R., Harsløf, I., Hvinden, B., and Schoyen, M.A. (2021) Norwegian National report on Social Protection Systems, Europship working paper
- Hauben, H., Lenaerts, K. & Wayaert, W. (2020) The platform economy and precarious work. Luxembourg: Committee on Employment and Social Affairs (EMPL). Available at: [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652734/IPOL\\_STU\(2020\)652734\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652734/IPOL_STU(2020)652734_EN.pdf) (Accessed: 13 August 2021).
- HM Government (2018) Good Work: A response to the Taylor Review of Modern Working Practices. Industrial Strategy. London: The Stationery Office. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/679767/180206\\_BEIS\\_Good\\_Work\\_Report\\_\\_Accessible\\_A4\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/679767/180206_BEIS_Good_Work_Report__Accessible_A4_.pdf) (Accessed: 13 August 2021).
- Holtum PJ, Irannezhad E, Marston G, et al. (2021) Business or Pleasure? A Comparison of Migrant and Non-Migrant Uber Drivers in Australia. *Work, Employment and Society*: 095001702110347. DOI: 10.1177/09500170211034741.
- Howcroft, D. & Bergvall-Kärebörn, B. 2019. A Typology of Crowdfork Platforms. *Work, employment and society*, 33 (1), pp. 21-38.
- Hunt, W. & O'Reilly, J. (2021) Rapid recruitment in retail: Leveraging AI in the hiring of hourly paid frontline associates during the Covid-19 Pandemic. Digit Working Paper (forthcoming).
- Huws, U., Spencer, N. H., Coates, M. & Holts, K. (2019) The platformisation of work in Europe: Results from research in 13 European countries. Hatfield: FEPS, UNI, Hertfordshire Business School. Available at: <https://www.feps-europe.eu/attachments/publications/platformisation%20of%20work%20report%20-%20highlights.pdf> (Accessed: 13 August 2021).
- Huws, U., Spencer, N. H., Syrdal, D. S. & Holts, K. (2017) Work in the European Gig Economy: Research results from the UK, Sweden, Germany, Austria, the Netherlands, Switzerland and Italy. Hertfordshire: FEPS, UNI Europa & University of Hertfordshire. Available at: [https://uhra.herts.ac.uk/bitstream/handle/2299/19922/Huws\\_U\\_Spencer\\_N.H.\\_Syrdal\\_D.S.\\_Holt\\_K.\\_2017\\_.pdf?sequence=2](https://uhra.herts.ac.uk/bitstream/handle/2299/19922/Huws_U_Spencer_N.H._Syrdal_D.S._Holt_K._2017_.pdf?sequence=2) (Accessed: 13 August 2021).
- Ibáñez, Z., León, M. and Soler, L. (2021) Spanish National report on Social Protection Systems, Europship working paper
- ILO (2021) World Employment and Social Outlook 2021: The role of digital labour platforms in transforming the world of work. Geneva: ILO. Available at: [https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms\\_771749.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_771749.pdf) (Accessed: 13 August 2021).
- Joyce, S., Neumann, D., Trappmann, V. & Umney, C. (2020) A global struggle: worker protest in the platform economy. ETUI Policy Brief. Brussels: ETUI.



- Available at:  
<https://www.etui.org/sites/default/files/Platform%20work%20Leeds%20Index%20Joyce%20et%20al%20Policy%20Brief%202020.02.pdf> (Accessed: 13 August 2021).
- Kässi, O. & Lehdonvirta, V. (2018) Online labour index: Measuring the online gig economy for policy and research. *Technological forecasting & social change*, 137, pp. 241-248.
- Kässi, O., Lehdonvirta, V. & Staphany, F. (2021) How Many Online Workers are there in the World? A Data-Driven Assessment. Luxembourg: Publications Office of the European Union. Available at: <https://open-research-europe.ec.europa.eu/articles/1-53/v1> (Accessed: 13 August 2021).
- Kudyba, S. (2020) COVID-19 and the Acceleration of Digital Transformation and the Future of Work. *Information systems management*, 37 (4), pp. 284-287.
- Lazerson, M. (1995) A New Phoenix?: Modern Putting-Out in the Modena Knitwear Industry *Administrative Science Quarterly*, Vol. 40, No. 1 (Mar., 1995), pp. 34-59 <https://www.jstor.org/stable/2393699>
- Lehdonvirta, W (2021) How does labour market digitalisation affect social mobility? Evidence from a European survey of online platform workers. *Digit Debates lecture series*. Available at: <https://digit-research.org/events/digit-events/digit-debates-16-june-2021/> (Accessed: 17 September 2021).
- Lepanjuuri, K., Wishart, R. & Cornick, P. (2018) The characteristics of those in the gig economy: Final report. London: The Stationery Office. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/687553/The\\_characteristics\\_of\\_those\\_in\\_the\\_gig\\_economy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687553/The_characteristics_of_those_in_the_gig_economy.pdf) (Accessed: 13 August 2021).
- Makó, C., Illéssy, M. & Nostratabadi, S. (2020) Emerging Platform Work in Europe: Hungary in Cross-country Comparison. *European Journal of Workplace Innovation*, 5 (2), 147-172.
- Mandl, I., Curtarelli, M., Riso, S., Vargas Llave, O. & Gerogiannis, E. (2015) New forms of employment. Research Report. Luxembourg: Eurofound. Available at: [https://www.eurofound.europa.eu/sites/default/files/ef\\_publication/field\\_ef\\_document/ef1461en.pdf](https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1461en.pdf) (Accessed: 13 August 2021).
- OECD (2017) *Going Digital: The future of work for women. The pursuit gender equality: an uphill battle*. Paris: OECD Publishing. Available at: [https://read.oecd-ilibrary.org/social-issues-migration-health/the-pursuit-of-gender-equality/going-digital-the-future-of-work-for-women\\_9789264281318-26-en#page1](https://read.oecd-ilibrary.org/social-issues-migration-health/the-pursuit-of-gender-equality/going-digital-the-future-of-work-for-women_9789264281318-26-en#page1) (Accessed: 13 August 2021).
- Paul, K. (2020) Hundreds of Amazon warehouse workers to call in sick in coronavirus protest. *The Guardian*, 21 April 2020. Available at: <https://www.theguardian.com/technology/2020/apr/20/amazon-warehouse-workers-sickout-coronavirus> (Accessed: 13 August 2021).
- Pesole, A., Urzi Brancati, C., Fernandez-Macies, E., BIAGI, F. & GONZALEX VAZQUEZ, I. (2018) Platform Workers in Europe. Evidence from the COLLEEM Survey. Luxembourg: Publications Office of the European Union. Available at: <https://op.europa.eu/en/publication-detail/-/publication/fe8c6fdf-79b8-11e8-ac6a-01aa75ed71a1/language-en> (Accessed: 13 August 2021).
- Piasna A and Drahokoupil J (2019) Digital labour in central and eastern Europe. Available at: <https://www.etui.org/node/31491> (accessed 16 March 2021).

- Rani, U. & Furrer, M. (2019) On-Demand Digital Economy: Can Experience Ensure Work and Income Security for Microtask Workers? *Jahrbücher für Nationalökonomie und Statistik*, 239 (3), pp. 565-597.
- Renan Barzilay, A. (2019) The Technologies of Discrimination: How Platforms Cultivate Gender Inequality. *Law & ethics of human rights*, 13 (2), pp. 179-202
- Rolf S, O'Reilly J and Meryon M (2022) Towards privatized social and employment protections in the platform economy? Evidence from the UK courier sector. *Research Policy*  
<https://www.sciencedirect.com/science/article/pii/S0048733322000208>.
- Rolf S, O'Reilly J and Meryon M (2022) Towards privatized social and employment protections in the platform economy? Evidence from the UK courier sector. *Research Policy* Volume 51, Issue 5, June 2022, 104492.  
<https://doi.org/10.1016/j.respol.2022.104492>
- Schor, J. (2021) 'What do platforms do? Beyond the pro-con debate on gig labour' online lecture to Digit Debates 18<sup>th</sup> November 2020 Accessed: <https://digit-research.org/event/what-do-platforms-do-beyond-the-pro-con-debate-on-gig-labour/>
- Schou, J. & Svejgaard Pors, A. (2019) Digital by default? A qualitative study of exclusion in digitalised welfare. *Social policy & administration*, 53 (3), pp. 464-477.
- SSCU & HBS (2019) Platform Work in the UK 2016-2019. Hertfordshire: University of Hertfordshire. Available at: <https://www.feps-europe.eu/attachments/publications/platform%20work%20in%20the%20uk%202016-2019%20v3-converted.pdf> (Accessed: 13 August 2021).
- Schoukens P (2020) Digitalisation and social security in the EU. The case of platform work: from work protection to income protection? *European Journal of Social Security* 22(4): 434–451. DOI: 10.1177/1388262720971300. .
- Spencer D, Cole M, Whittaker X, and Stuart, M. (2021) Digital automation and the future of work. EPRS, European Parliamentary Research Service. Available at:  
[https://www.europarl.europa.eu/RegData/etudes/STUD/2021/656311/EPRS\\_STU\(2021\)656311\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/656311/EPRS_STU(2021)656311_EN.pdf).
- Staton, B. (2020) The upstart unions taking on the gig economy and outsourcing. *Financial Times*, 19 January 2020. Available at:  
<https://www.ft.com/content/576c68ea-3784-11ea-a6d3-9a26f8c3cba4> (Accessed: 13 August 2021).
- Stephany, F., Dunn, M., Sawyer, S. & Lehdonvirta, V. (2020) Distancing Bonus Or Downscaling Loss? The Changing Livelihood of Us Online Workers in Times of COVID-19. *Tijdschrift voor economische en sociale geografie*, 111 (3), pp. 561-573.
- Tassinari, A. & Maccarrone, V. (2020) Riders on the Storm: Workplace Solidarity among Gig Economy Couriers in Italy and the UK. *Work, employment and society*, 34 (1), pp. 35-54.
- Taylor, M. (2017) *Good Work: The Taylor Review of Modern Working Practices*. London: The Stationery Office. Available at: *Good work: the Taylor review of modern working practices - GOV.UK* ([www.gov.uk](http://www.gov.uk)) (Accessed: 13 August 2021).
- Trappmann V, Bessa I, Joyce S, et al. (2020) *Global labour unrest on platforms: the case of food delivery workers*. Friedrich-Ebert-Stiftung. Available at: <https://library.fes.de/pdf-files/iez/16880.pdf>.

- Tubaro, P., LE Ludec, C. & Casilli, A. A. (2020) Counting 'micro-workers': societal and methodological challenges around new forms of labour. *Work Organisation, Labour & Globalisation*, 14, 67-82.
- Unt, M. et al. (2021) Estonian National report on Social Protection Systems, Europship working paper
- Urzi Brancati, C., Pesole, A. & Fernandez-Macies, E. (2019) Digital Labour Platforms in Europe: Numbers, Profiles and Employment Status of Platform Workers. In: JRC Technical Reports. Luxembourg: Publications Office of the European Union.
- Urzi Brancati, C., Pesole, A. & Fernandez-Macies, E. (2020) New evidence on platform workers in Europe: Results from the second COLLEEM survey. In: JRC Science for Policy Report. Luxembourg: Publications Office of the European Union.
- Verdin, R. and O'Reilly, J. (2021) UK National report on Social Protection Systems, Europship working paper
- WEF (2020) The Charter of Principles of Good Platform Work. Available: <https://www.weforum.org/reports/the-charter-of-principles-for-good-platform-work> [Accessed 17 June 2021].
- Windsor-Shellard, B. & Nasir, R. (2021) Coronavirus (COVID-19) related deaths by occupation, England and Wales: deaths registered between 9 March and 28 December 2020. (Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/coronaviruscovid19relateddeathsbyoccupationenglandandwales/deathsregisteredbetween9marchand28december2020> (Accessed 13 August 2021)).