Exposure to psychosocial risk factors in the gig economy: a systematic review

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Executive summary

The 'gig economy' refers to a market system in which companies or individual requesters hire workers to perform short assignments. These transactions are mediated through online labour platforms, either outsourcing work to a geographically dispersed crowd or allocating work to individuals in a specific area. Over the last decade, the diversity of activities mediated through online labour platforms has increased dramatically. In addition to the specific hazards associated with these different types of activities, there are also psychosocial risks related to the way gig work is organised, designed and managed. The aim of this review is to provide a comprehensive overview of these risks, identifying research gaps and strategies to address them.

Gig work generates challenges for workers in three broad areas:

— **Physical and social isolation.** Tasks are performed individually, without contact to and often in competition with fellow workers, thereby resulting in a lack of workplace social support, a blurring of boundaries between work and personal life, and difficulties in establishing a consistent professional identity.
— **Algorithmic management and digital surveillance.** Constant monitoring and automated managerial techniques contribute to an increasingly hectic pace of work, a lack of trust towards the platform and pronounced power asymmetries limiting workers' opportunities to develop effective forms of internal voice.
— **Work transience and boundaryless careers.** Because gig work is based on short-term assignments providing work only for a limited period of time, gig workers experience persistent feelings of job insecurity and engage in forms of emotional labour to preserve employability.

Looking behind these specific risks, the guiding thread is a greater imbalance between the job demands placed upon workers and the available organisational resources to deal with them. Although we found preliminary evidence of job strain for each of the aforementioned factors, further research is required to identify specific platform settings detrimental to OSH. Understanding these elements is key to improving regulatory and legal environments in a way conducive to gig workers' welfare.

Introduction

The 'gig' economy is a relatively new phenomenon and thus not yet fully explored or documented. The term was first coined by a British journalist in 2009 to reflect the trend of workers pursuing 'a bunch of free-floating projects, consultancies and part-time bits and pieces while they transacted in a digital marketplace' (Brown 2009). Although short-lived and flexible jobs taken on by freelancers are not new to the world of labour, recent digitalisation developments have shaped the modern gig economy by allowing platform businesses to connect customers and requesters (Bajwa et al. 2018b). These platforms act as middlemen between entities willing to hire workers for short-term assignments and a large pool of candidates seeking to complete gigs (Cabrelli and Graveling 2019). Since the initial launch of Amazon Mechanical Turk (AMT) in 2005, the number and diversity of digital platforms has increased dramatically. Digital platforms can be grouped into three primary categories: on-demand physical services, online freelancing and microwork.

On-demand physical services are the most common form of digital platforms (Lepanjuuri et al. 2018). They are location-based applications which distribute service-oriented tasks to individuals within a specific geographical area. The role of the platform is to fulfil consumer orders placed online by means of an immediate and convenient pool of workers performing offline services. Typical examples are food delivery (e.g. Deliveroo) and ride-hailing (e.g. Uber) platforms but also include a wide range of other activities such as babysitting (e.g. UrbanSitter), cleaning (e.g. Helpling) or mechanical services (e.g. YourMechanic). Task complexity and qualification requirements for workers vary greatly due to the variety of jobs performed on these platforms.

Besides "tangible" activities performed in the physical world, there are also platforms dedicated to various virtual services exclusively performed and completed online. **Online freelancing** platforms enable organisations to access a network of freelancers with high and specialised skills. In that sense, the platform economy is often regarded as a new offshoring institution taking advantage of the digital revolution (Vandaele 2018; Lehdonvirta et al. 2019). Examples of virtual services provided through OF include accounting, translating, copywriting or illustrating (e.g. Upwork).

A third type of intermediaries, known as micro-work or **crowdwork** platforms, divides virtual services into very small tasks (i.e. micro-tasks) sent out to and executed by a pool of candidates. Crowdwork not only involves a new way of organising digital work but is also the seabed of an emerging

industry: supervised machine learning. The vast majority of tasks performed on these platforms consist of gathering, cleaning or labelling datasets. In most cases, crowdworkers simply perform the work that artificial intelligence is not yet capable of. But in others, their work results are actually fed into learning algorithms, enabling further automation. Indeed, crowdwork has proven to be an infinite source of human knowledge that machine intelligence desperately relies on to make progress. This explains why, despite being wide-ranging, micro-tasks are often thankless, repetitive and low-skilled. Encoding scanned receipts, taking selfies or classifying keywords are classic examples of micro-tasks performed on crowdworking platforms. On a side note, market or academic researchers also increasingly rely on crowdwork as a cheap alternative for administering surveys or behavioural tasks.

Although more detailed classifications of gig work are available (Florisson and Mandl 2018; de Groen et al. 2018; Dazzi 2019; Scholz 2016; Flichy 2019), these main categories succeed in covering the wide scope of the modern gig economy (Figure 1).

Figure 1 **Classification of the main forms of gig work**

	On-demand physical services	Online freelancing	Crowdwork
Type of work	Physical services	Virtual services	Micro-tasks
Location	On-location	Online	Online
Task division	Low	Moderate	High
Task complexity	Variable	High	Low

Source: author's own elaboration

While corresponding to very different types of activities, these three kinds of platforms all share common characteristics (Johal and Thirgood 2016; Dhéret et al. 2019; Jamie and Musilek 2019; Hara et al. 2018; Manika et al. 2016):

— A tri-party[1] labour structure comprised of a customer, a middleman and a requester
— The absence of contractual relationships between the aforementioned parties
— Short-lived missions or assignments
— Piece-rate pay

In most cases, gig workers are treated as self-employed for tax, commercial and company law purposes (Johal and Thirgood 2016; Brancati et al. 2018). This becomes bogus self-employment when workers are subject to subordination and dependence relationships with the requester and/or the platform (Dazzi 2019; Williams and Horodnic 2018; Drahokoupil and Piasna 2017), a growing issue in the gig economy (Williams and Puts 2019). As self-

1. With the exception of food delivery platforms including a 4th agent – the restaurant.

employed, gig workers enjoy no social protection and bear most of the risk of doing business (Bajwa et al. 2018b). Moreover, gig work is often precarious due to low piece-rates and short-lived assignments (Manika et al. 2016 ; Dhéret et al. 2019; Jamie and Musilek 2019; Hara et al. 2018), making it difficult for self-employed workers to pay for sickness, accident and pension insurance. For instance, crowdworkers completing assignments on AMT earn a median hourly wage of ~$2/h, with only 4% earning more than $7.25/h (Hara et al. 2018).

Recent figures show that the gig economy's size remains modest[2] but is rapidly expanding thanks to the growing convergence of technology and telecommunications (OECD 2018; Pesole et al. 2018; Bernhardt and Thomason 2017; Gonzales et al. 2019; Schwellnus et al. 2019; Ellmer et al. 2019; Drahokoupil and Fabo 2016). There is even evidence that some of the characteristics of digital platforms are spreading to the general labour market, becoming pervasive features of work in the 21st century for many sectors (Huws et al. 2017; Goods et al. 2019). However, little is known about the effect of these new forms of work on occupational health. Despite the growing number of authors pointing to the potential risks of psychosocial harms, there is currently little evidence-based knowledge describing the nature and prevalence of these risks (Howard 2017). In a recent literature review, Bajwa et al. (2018b) reported only six studies on workers' experiences of the gig economy, with only one of them looking specifically at the health effects of platform labour.

One of the main difficulties in studying gig workers' experience resides in the fact that the gig economy covers a wide range of jobs and working conditions. Apart from the four common denominators described above, there is substantial heterogeneity in the way gig jobs are organised. Therefore, referring to gig work as a monolithic concept may cause confusion about what exactly is being studied, leading to inconclusive results (De Stefano 2018; Dunn 2018). It should instead be regarded as a new paradigm for labour relations and responsibilities allowing the expression of a wide range of atypical working conditions – all of them not necessarily predominant for a given gig job. Based on this premise and considering that data is lacking, an appropriate approach for assessing psychosocial risks in the gig economy would be (1) to make an inventory of these working conditions and (2) to discuss them separately in the light of existing psychosocial models and theories. While this approach only yields indirect evidence, it provides a first insight into the potential implications of gig work on social and psychological outcomes.

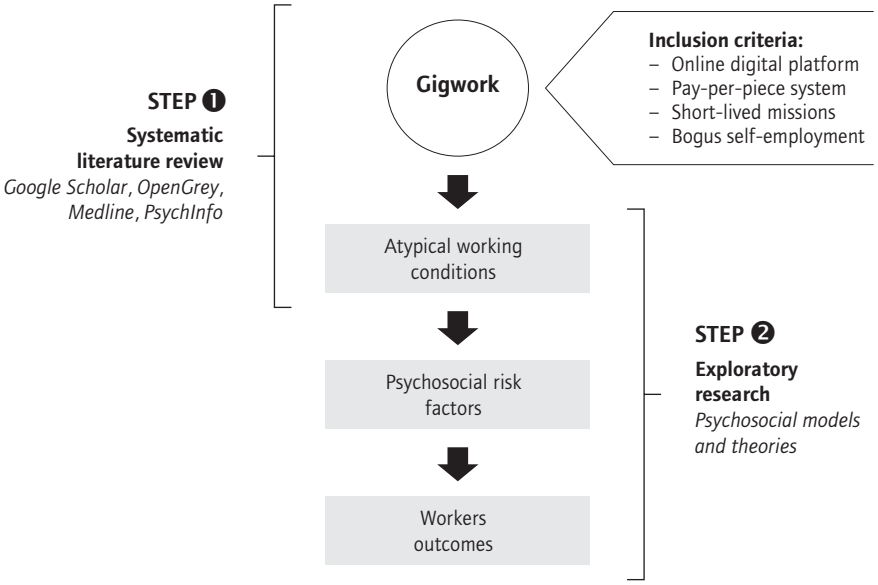
This is the first review to date that systematically investigates working conditions in the gig economy and their potential for causing psychosocial harm. Although research has accumulated evidence over a decade, the field

2. Estimates indicate that 1-3% of the working population earn 50% or more of their income via platforms and/or work via platforms at least on a weekly basis.

still lacks a comprehensive state-of-the-art overview. Analysing gig work is critically important for two main reasons. First, it is developing rapidly in the EU – so rapidly that policies and laws are unable to keep pace. At EU level, consultations are currently taking place on new instruments for regulating gig work (Hauben et al. 2020). Proposals range from the enforcement of / adjustments to the existing regulation to the introduction of a Directive on Platform Work. However, regulating digital labour platforms requires an in-depth understanding of how the gig economy is shaping both the labour market and working conditions, thereby allowing policymakers to develop effective and fact-based measures tailored to the specificities of gig work. Second, digital platforms are at the forefront of technological disruption and innovation and, as such, should be regarded as early adopters of the so-called 'new world of work'. Monitoring these developments will therefore help identify emerging trends that may go mainstream in the not too distant future. Looking at both issues, our work is intended as a guide for further research, establishing priority areas and relevant variables of interest. Besides identifying research questions, we also provide concrete recommendations on how to improve knowledge by conducting more informative studies.

The pursuit of the objectives set out above involved a two-step methodology (Figure 2).

Figure 2 **Two step methodology for investigating PSR factors in the gig economy**



Source: author's own elaboration

First, a **systematic review** was carried out in both the peer-reviewed and grey literature using Psychinfo, Medline, Google Scholar and OpenGrey (05R, 05S and 06E subdatabases[3]). Our search strategy was similarly applied to all databases and consisted of one block of keywords intended to cover the various denominations used for the gig economy or gig workers. Keywords were truncated and combined with the Boolean operator OR as follow[4]:

("platform econ") OR ("platform work*") OR ("gig econ*") OR (gig-econ*) OR ("uber econ*") OR ("crowd econ*") OR ("collaborative econ*") OR ("participative econ*") OR ("On-demand econ*") OR ("gig work*") OR ("gig job*") OR ("crowdwork*") OR ("crowd work*") OR (crowdsourcing) OR ("work-on-demand") OR ("work on demand") OR ("work on-demand") OR ("on-demand econ*") OR ("just-in-time workforce") OR (micro-task) OR (precariat)*

In order to account for potential misuses of these denominations in the literature, we further defined the boundaries of gig work based on the four key characteristics mentioned above: short-term, self-employed, piece-rate work contracted through a digital labour platform. Moreover, only articles examining or discussing the working conditions of gig workers were considered for review. The electronic search included sources published between 1 January 2000 and 29 February 2020 across all databases. Following the PRISMA guidelines (Moher et al. 2009), an initial selection was based on titles and abstracts in order to exclude unavailable sources or irrelevant articles that passed through our search strategy. Duplicates caused by the combination of multiple databases were also removed. Full texts for selected abstracts were retrieved for more in-depth reviewing, with reference sections used to identify additional articles (see Annex for an overview of the corpus). The end result was a comprehensive overview of the working conditions coexisting in the gig economy. For the sake of clarity, working conditions are grouped according to three major themes or dimensions:

— Physical and social isolation
— Algorithmic management and digital surveillance
— Work transience and boundaryless careers

The second step involved the systematic analysis of these dimensions in the light of the literature on psychosocial risks (i.e. **exploratory research**). Our critical analysis relies on well-established psychosocial models, constructs and theories published in the academic literature. We discuss inferences that

3. 05R: Sociology, social studies, welfare studies, social services. 05S: Labour studies. 06E: Medicine.

4. We purposely excluded 'sharing' and 'peer' economy from our keywords as it refers to predominantly private and often non-commercial transactions between individuals (Gössling and Hall 2019).

can be drawn from this confrontation and expose specific areas meriting further scrutiny. The present report is comprised of three sections, each dedicated to one of the aforementioned dimensions and subdivided according to relevant psychosocial risk factors.

Literature review

1. Physical and social isolation

As mentioned in the introduction, the gig economy has essentially been made possible by the concurrent advances in digitalisation and telecommunications. Digital platforms not only allow the remote connection of workers and requesters everywhere in the world, but also the highest possible degree of standardisation in the organisation and delivery of work. This is especially the case with crowdworking platforms where the entire process of contracting, executing and delivering assignments is mediated through automated managerial techniques (Cabrelli and Graveling 2019). Algorithms are also used to conduct typical HR procedures like performance appraisal without the need for face-to-face interviews (Duggan et al. 2019). In this context, social interactions with supervisors or co-workers are considered obsolete and even counterproductive as they introduce undesired variability into the process of matching gig demand and supply.

Although more interactive, platforms dedicated to physical activities such as food delivery or transport also involve a certain degree of social isolation (Fellmoser 2018). In most cases, the qualitative nature of client interactions is replaced by a quantitative and impersonal feedback delivered through the digital platform. For instance, Uber Eats riders receive tips and ratings directly via the mobile application used to match and monitor gigs. The Uber ride-hailing platform even offers a 'quiet preferred' option to the requester, turning the driver into a silent automaton (Ritschel 2019).

Gig workers also have few opportunities to directly engage with colleagues or supervisors due to the absence of shared premises (INRS 2018; Min et al. 2019). A survey conducted among 456 platform workers in Southeast Asia and Sub-Saharan Africa showed that 74% of them rarely or never communicate face-to-face with co-workers (Graham et al. 2017a; 2017b). In subsequent in-depth interviews, workers expressed mental health and well-being problems due to isolation and lone working. While working from home may be presented as advantageous, many felt that they were physically and mentally detached from other human beings. Even if workers proactively seek to counter social isolation, the piece-rate work and precarious aspects of gig work are likely to favour high productivity, discouraging any attempt to engage in trivial conversations. In fact, the heavy pace of gigs is a direct consequence of low pay rates, employment insecurity and high competition between workers (Jamie and Musilek 2019; Graham et al. 2017a; 2017b).

In the scientific literature, work-related physical and social isolation are together referred to as 'professional isolation'. It is defined as 'the unpleasant experience that occurs when a person's network of social relations at work is deficient [...] either quantitatively or qualitatively' (Perlman and Peplau 1981: 31). Many authors have identified professional isolation as a psychosocial hazard (Ladreyt et al. 2014; Crawdford et al. 2011; Kurland and Bailey 1999; Dussault et al. 1999). In this chapter, we will review the available literature regarding the psychological impact of professional isolation and discuss how it may translate into the modern gig economy. Three main psychosocial risk factors will be detailed: professional identity, work-life balance and workplace social support.

New wine in old bottles?

Unsurprisingly, most of the studies on professional isolation have been conducted on teleworkers. It may be tempting to make comparisons with gig work as both paradigms involve the completion of assignments outside the company's premises. However, one major difference resides in the fact that telework is mostly a complementary practice to regular work. Part-time telework in the EU was estimated to be about four times more common than full-time telework in 2005 (Parent-Thirion et al. 2007). In contrast, the modern gig economy has been built around the very idea of a boundaryless world free of proximity barriers and anchor points (Kost et al. 2020). Working outside company premises is therefore a core and permanent characteristic of the modern gig economy. Consequently, professional isolation and its effects on well-being are likely to be more pronounced among gig workers than occasional teleworkers. This view is backed by several studies showing that the negative effects of telework are exacerbated when it exceeds two or three days a week (Neufeld and Fang 2005; Bélanger et al. 2013; Gajendran and Harrison 2007). Therefore, the reader should bear in mind that available evidence on the psychological impact of professional isolation is likely to underestimate the actual magnitude of this issue among gig workers.

1.1 Professional identity

Professional isolation can lead to relational challenges as workers are short of role models or career mentors (Grugulis and Stoyanova 2011). Similarly, managers are likely to suffer from a sense of 'loneliness at the top' due to the absence of people-to-people contacts (Oplatka 2012; Draper and McMichael 1998). According to Ibarra (1999), the absence of role models leads to difficulties in establishing a consistent and coherent professional identity. Indeed, the way we perceive ourselves within our occupational context is mainly determined by socialisation (Joynes 2018). This process is first initiated when individuals reflect about 'what they want to be' in their future career, and further developed through recurrent exposure to professional behaviours and interactions (Ashby and Schoon 2012). Professional identity is an important cognitive mechanism that influences workers' attitudes, affects and behaviours both at work and beyond (Caza and Creary 2016). It is a way

for individuals to assign meaning to themselves and define their life's purpose more generally (Siebert and Siebert 2005).

Besides providing meaning, professional identity is also known to affect psychological well-being (Tajfel and Turner 1978). Identifying oneself with a valued profession is associated with a sense of efficacy, self-esteem (Ervin and Stryker 2001), enhanced motivation and engagement (May et al. 2004). It has been demonstrated that professional identity mediates the negative effects of a high-stress workplace (Sun et al. 2016; Hensel 2011) and protects against depression, anxiety and burnout (Edwards and Dirette 2010; Thoits 1983). Conversely, individuals employed in low-skilled jobs or having difficulties defining 'who they are' professionally speaking are more sensitive to occupational stress. A lack of meaningful work is recognised as a primary source of alienation, anxiety, emotional exhaustion and boredom (Seeman 1976; Kanungo 1982; Maslach et al. 2001; Shantz et al. 2016). Finally, research suggests that completing an entire unit of work leaves workers with a sense of pride and satisfaction (Hackman and Oldham 1976), while only doing a small part of a task is associated with an increased risk of burnout (Humphrey et al. 2007; Morgeson et al. 2013).

Crowdworkers perform various low-skilled tasks that may appear hollow and out of touch with reality. As previously mentioned, assignments mainly consist of gathering, labelling or cleaning various kind of datasets (Hitlin 2016). For instance, the tasks most often traded on AMT in 2015 pertained to identifying information in images (37%), followed by transcribing audio or video material (26%) and lastly, classifying images (13%). In addition to being tedious, these micro-tasks may seem to have little in common, as the end purpose is generally hidden from the worker. After a day spent working on retyping handwritten recipes and tagging cats in sets of photographs, crowdworkers may have difficulties explaining what their job is about and how useful it is for the requester. For these reasons, crowdworkers may represent an especially vulnerable population, with their professional identity fragilized by a lack of meaningfulness at work and role models. Without the protective shield of professional identity, workers are more likely to experience occupational stress and suffer from anxiety, burnout and depression. As Supiot (2019: 30) writes, 'a bleak despair threatens all those individuals whose work has no other reasons than financial ones'.

Several studies have attempted to compare depression rates between crowdworkers and the general population but have yielded contradictory results (Arditte et al. 2016; McCredie and Morey 2018; Shapiro et al. 2013; Walters et al. 2018). These discrepancies have been mainly attributed to insufficient data quality assurance procedures (Ophir et al. 2019). In fact, participants in those studies were recruited directly through crowdworking platforms. Therefore, low response quality could be the result of workers' inattentiveness, boredom or carelessness. Another factor affecting data reliability is the usage of illicit bots to complete surveys automatically (Kennedy et al. 2020; Bai 2018). Ophir et al. (2019) controlled for these biases and demonstrated that 19.2% of crowdworkers suffer from major depression,

a figure 1.6 to 3.6 times higher than estimated for the general population. Sampling differences in sociodemographics, health, physical activity and lifestyle only accounted for approximately half of this discrepancy. For the other half, the authors speculated on three possible explanations:

1. **Existing estimates of depression may be underestimating the actual rates in the general population.** Mental illnesses such as depression are still burdened with a negative stigma (Menke and Flynn 2009), possibly preventing an individual from reporting them in interviews (de Leeuw 1992; Tourangeau and Yan 2007), the standard data collection procedure for computing national estimates. Anonymous and computer-mediated depression questionnaires arguably enable more honest response patterns than standard face-to-face interviews, thus better reflecting the actual magnitude of depressive disorders in the general population.
2. **Platform work may attract a specific subgroup of individuals who already suffer from depression symptoms or other depression-relevant characteristics.** This is supported by studies showing that social anxiety, a dominant risk factor for major depression, is associated with preferences for computer-mediated over face-to-face interactions (Lee and Stapinski 2012; Prizant-Passal et al. 2016; Amichai-Hamburger and Barak 2009; Ophir 2017). Research also reveals that personality traits vary significantly between crowdsourced samples and traditional community and college students (Goodman et al. 2013; Kosara and Ziemkiewicz 2010; Colman et al. 2018). Specifically, crowdworkers tend to be more conscientious and open to experience, but less extraverted and agreeable. Among these personality traits, only low extraversion is a risk factor for depression, while high conscientiousness is actually a protective factor (Jourdy and Petot 2017). Thus, these results fail to show that it is the typical personality profile of crowdworkers that predisposes them to develop depression symptoms.
3. **Platform work may trigger depressive feelings.** Individuals working on crowdwork platforms for extended periods are arguably at increased risk of developing feelings of loneliness and a sense of purposelessness, all well-documented risk factors for developing depressive symptoms. As described above, this is in line with research conducted on professional isolation (Cacioppo et al. 2006) and professional identity (Kanungo 1982; Maslach et al. 2001; Shantz et al. 2016). Moreover, it has been shown that excessive screen time or smartphone use increases depressive symptoms (Twenge et al. 2018; Elhai et al., 2017).

Similarly, two other studies report that approximately 50% of crowdworkers on AMT suffer from clinical levels of social anxiety (Arditte et al. 2016; Shapiro et al. 2013), a figure significantly higher than the 7-8% prevalence estimates for the general population (APA 2013; Connor et al. 2001). This could be interpreted in favour of the second hypothesis of Ophir et al. (2019). However, it is equally possible that platform work generates higher levels of social anxiety. Indeed, isolation is both a symptom and a cause of social

anxiety and other mental issues (Teo and al. 2013). Further research based on longitudinal data is required to establish the causality of this relationship and determine which of these hypotheses better explains the increased prevalence of depression and anxiety among platform workers.

At the time of writing, there was no additional data regarding burnout rates or other disorders among gig workers. Additionally, depression and anxiety have been investigated in a very specific subcategory of gig workers, namely crowdworkers on AMT. More research is needed to expand these studies to other platforms, occupational settings and mental disorders. A further step would be to determine the role of professional identity in this heightened vulnerability, among other psychosocial constructs described in the following sections.

Questions and open issues for further research

- How does the prevalence of burnout and work-related stress compare between gig workers and the general population after controlling for sociodemographic factors? Are there any statistical differences with regard to the three general forms of gig work?
- What is the causal direction between crowdworking and the development of anxiety and depressive symptoms?
- Is the above-average prevalence of anxiety and depressive symptoms among crowdworkers also observed in the two other forms of gig work? If so, what is the causal direction for each subcategory of gig workers? Are there any sector-specific vulnerabilities?
- What is the role of professional identity in the higher rates of depression and anxiety disorders observed among crowdworkers?
- How can professional identity be fostered in the context of current or future gig work practices?

1.2 Work-life balance

Professional isolation often entails working outside a company's premises, potentially making it difficult to achieve a good work-life balance through blurring the boundaries of working time and space (Duxbury 2003; Tremblay et al. 2006; Taskin 2007; Halford 2005; Harris 2003). Having more permeable boundaries allows work to interrupt non-work-related behaviours, thereby increasing the risk of overtime and work-family conflicts (Jostel and Hemlin 2018; Trenblay and Thomsin 2012). In turn, work–family conflicts are associated with stress, depression and burnout, as well as with job, family and marital dissatisfaction (Amstad et al. 2011). A poor work-life balance is

also associated with sleeping problems and overall difficulties to properly recuperate from work (Ropponen et al. 2018).

However, a study conducted on 219 mobile workers showed that only one third of them considered this blurring of boundaries to be negative (Paridon and Cosmar, 2009). In fact, telework may represent either a resource or a constraint depending on the specific management context and the degree of autonomy given to the worker (Taskin and Tremblay 2010; Taskin 2007). Specifically, flexibility in organising working time may to some extent alleviate the negative effects of permeable boundaries (Tremblay and Genin 2010). However, individuals experiencing high job-related demands are less likely to handle blurring positively (Nordenmark et al. 2012). Such demands include long working hours, working at short notice, unpredictable work schedules, job insecurity, and being a supervisor (Mcginnity and Russel 2013). On balance, job resources like autonomy and flexibility do not offset the job demands faced by the self-employed in combining work and family. This view is backed by studies showing that independent contractors are more likely to experience work-family conflicts than salaried employees (Annink et al. 2016).

Work-life conflicts have been reported to be more frequent in precarious and temporary forms of employment (Bohle et al. 2004). Low predictability and control over working hours produce greater disruption to family or social lives and a poorer work-life balance. Gig workers' work-life balance may be especially at risk since they face a combination of both risk factors, namely self-employment and temporary assignments. This heightened vulnerability is reflected in the way crowdworkers strive to enhance productivity and maintain a decent income. Indeed, findings from an interview study show that veteran crowdworkers rely on third-party screening tools – 'catchers' – to find lucrative gigs (Kaplan et al. 2018) and that these tools encourage a 'work anywhere and anytime' attitude (Williams et al. 2019). Several interviewees quite explicitly referred to boundary-blurring and low predictability (Figure 3).

Figure 3 **Selected citations of crowdworkers regarding working hours and work-life boundaries**

P12: 'I wake up, and it's always time to work because it just never ends [...]. You never know when it's gonna get busy and when it's not.'
P21: 'Even when the catchers aren't running and I've shut it all down, sometimes the thoughts creep back in. What am I missing? What's on the market?'
P4: 'In the evening, I'm busy with other things. I've got other things that need my attention, but I might leave my catchers running to check in periodically.'
P1: 'If you're at a boring dinner or something, and you get an alert – 'oh, this batch pays well'. Yeah, sure. I'll just mindlessly tap this under at the table, and no one will know.'

Source: adapted from Williams et al. 2019

Boundary-blurring may be exacerbated by the 24/7 nature of online gig work. As self-employed workers, online gig workers are not covered by the terms of the Working Time Directive (2003/88/EU). Besides, the way platforms are designed encourages workers to always be on stand-by, on the look-out for potential upcoming gigs (Degryse 2016; Vendramin and Valenduc 2018; Moore 2018; de Groen et al. 2018; Valenduc 2017). Behind the 'anytime and anywhere' motto is an 'always and everywhere' working model that attracts and retains precarious workers. Floridi (2015) refers to this model as the Onlife paradigm, 'a fluid reality [...] that exposes our everyday experience and even our personal asset to financialisation or value extractive strategies'. Holts (2018) adds that virtual workers are required to approach their working life as a project that they must invest in, leading to an internalisation of external risks. The 'Fear of Missing Out' (FOMO) on lucrative assignments leads to an obsessional relationship with professional communication tools (Degryse 2016). Again, results from interview studies are very telling in this regard. Wood et al. (2019) conducted semi-structured interviews in six countries in Southeast Asia and Sub-Saharan Africa to evaluate the perceived job quality of crowdworkers and freelancers providing virtual platform-based services. The authors showed that most interviewees had to work intense, unsocial and irregular hours in order to meet requester requirements and maintain a decent income (Figure 4).

Figure 4 Selected citations of crowdworkers and freelancers regarding working hours and work-life boundaries

Simon: 'A client [is] paying me $3.50 an hour. I'm so broke, this is someone who's ready to give me the money, so why don't you want 18 hours in one day.'
Diana: '[The requester] would send work anytime [he] wants, [he] doesn't want to know if you're busy.'
Anita: 'Most of the jobs you can get are like from overseas. In [the] USA, it's time you want to sleep so you have to sacrifice [by] working in the middle of the night.'
Kennedy: 'Seven days a week. It can be at night, can be during the day, anytime... Sometimes you don't have any contracts, so when you have them, you have to work.'

Source: adapted from Wood et al. 2019

One could expect that workers involved in road transport activities might be less prone to boundary-blurring due to more regulated schedules. Indeed, drivers are regulated by a sector-specific directive (2002/15/EC) covering both employees and self-employed workers (Figure 5). Applying to any persons performing mobile road transport activities, this directive supplements the provisions of Regulation (EEC) No 3820/85 and, where appropriate, those of the AETR Agreement. It includes therefore, people working for ride-hailing platforms and motorised food delivery platforms. However, there is evidence that this directive may have little impact on working conditions as gig workers are often compelled to violate these rules to reach financial stability. Polkowska (2019) interviewed Uber drivers in Poland, all of whom stressed that their incomes were low and that they would not be able to

support themselves without working long schedules. Interviewees reported being able to maintain a decent income only by working up to twelve hours a day and/or at weekends. Another survey highlighted that gig work led some couriers to experience impairment caused by fatigue and pressure to violate speed limits (Christie and Ward 2019). 42% of them even admitted having been involved in a collision, and 10% said that someone had been injured – usually themselves. All in all, these results show that platform drivers are working long and unsocial hours despite stricter working time regulations, and arguably face similar challenges in terms of work-life balance.

Figure 5 **Main principles of the 2002/15/EC directive**

Main principles of the **2002/15/EC** directive:
- Average working time may not exceed 48 hours per week over a four-month period;
- Absolute working time may not exceed 60 hours per week;
- Drivers may not work for more than 6 consecutive hours without a break of at least 30 minutes;
- Night work cannot exceed 10 hours over a 24-hour period.

Source: Directive 2002/15/EC of the European Parliament and of the Council of 11 March 2002 on the organisation of the working time of persons performing mobile road transport activities. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32002L0015

Another factor contributing to boundary-blurring in ride-hailing platforms is the surge pricing mechanism widely adopted in this industry. Surge pricing is the output of an algorithm which dynamically increases the price of a trip when demand exceeds supply in a delimited geographic area (Chen and Sheldon 2015). It determines driver income, as the commission percentage remains unchanged during periods of peak pricing. Drivers are informed of the current fare in the area when offered a pickup through heat-maps displayed on the mobile application. These are designed to get drivers to work in surge areas and at surge times. Drivers taking advantage of multiple peak hours in different geographic areas will significantly out-earn their colleagues working a more traditional schedule. Lee et al. (2015) showed that some drivers only go out to drive on receiving surge-price notifications, though most consider that surge prices change too rapidly and unexpectedly to be effectively used. For the former category, the end result is a social life dictated by fluctuating supply and demand.

According to Risi et al. (2019), the 'power' of digital platforms lies in the fusion of life and work spheres, with a growing interdependence between paid and unpaid work. Their study of young freelance designers revealed that gig work requires the development of a personal branding strategy. Specifically, the imbalance between supply and demand for work leads to a highly competitive market where young designers strive to stand out from the crowd. They have to invest in free work in order to gain visibility and hopefully 'crowd

out' the most experienced professionals on the market. Creating portfolios, participating in contests, and promoting on social media are typical unpaid tasks done by young freelance designers. Most of them have no choice but to accept committing to free work because of their precarious socio-economic position. While the authors suggest that it has a positive influence on professional identity, the growing interdependence between paid and unpaid work also contributes to extending work boundaries.

Similarly, research shows that crowdworking often involves invisible work such as searching for gigs, and the time spent on gigs that are returned or rejected by requesters (Gupta et al. 2014; Martin et al. 2016; Huws et al. 2017). Hara et al. (2018) analysed over 3 million gigs on AMT, showing that returning gigs had the biggest impact on working time. On average, crowdworkers returned 26.5% of gigs and spent 17.2 hours on them. Potential reasons for requesters returning or rejecting gigs include poor task instructions prohibiting workers from completing tasks, technical outages and glitches preventing work being submitted, or a worker not enjoying the task. Moreover, the rating system encourages new AMT workers to accept low-paid work as a means of increasing their reputation score (Martin et al. 2014). By doing so, they will eventually gain access to more lucrative gigs. These various forms of invisible work end up lowering income predictability and, consequently, the amount of daily work needed to make a decent living. According to Graham et al. (2017b), 55% of crowdworkers reported overwork and long hours, while Gonzales et al. (2019) found that 13% of gig workers worked very long hours, in excess of 60 hours a week. Another study showed that platform delivery workers seek to maximise deliveries in the face of the constant unpredictability of the labour process, working up to twelve hours straight (Griesbach 2018). As previously mentioned, low working time predictability disrupts family or social lives and leads to a poorer work-life balance. In this regard, the preliminary results presented above suggest that novice gig workers operating in highly competitive or undersupplied markets may be especially at risk.

For other physical services such as babysitting, cleaning, or mechanical services, company opening times and the availability of private requesters are likely to result in more predictable hours of work. Moreover, working away from home may act as a protective factor in reconciling gig workers' work and private lives. Further research is necessary to determine which aspects of gig work are detrimental to or beneficial for work-life balance.

One of the limitations of current evidence resides in the means used to investigate work-life balance among gig workers. Most studies rely on qualitative data gathered through focus groups and interviews, or quantitative data from surveys not using validated instruments. Available surveys mainly aim at describing the nature of the work performed on the one hand, and the quality of the working life on the other. While such exploratory studies provide valuable insights into the experiences and perspectives of individuals working in the gig economy, they shed little light on the elements that could be built on to improve practices. Specifically, exploratory studies fall short in at least two areas:

– They fail to determine which aspects of gig work are detrimental to work-life balance. Demonstrating a causal link between specific work arrangements and the experience of an unbalanced life would be valuable to prevent such risks.
– They do not allow the systematic comparison of studies conducted on different sub-groups of gig workers, or with studies involving regular workers operating in similar sectors. Such comparisons would allow to quantitatively assess the risks inherent to the gig economy itself, distinguishing them from those inherent to the sector involved.

Studies relying on inferential statistics and validated instruments would allow to overcome these interpretational limits. Available instruments include the 3-item scale of Harr (2013) validated on two samples of parent or non-parent workers, and the 4-item scale of Brough et al. (2014) validated across four independent heterogeneous samples of Australian and New Zealand workers (Figure 6). Widely used on different sub-groups of workers, both scales could serve as reference samples for specific sectors.

Figure 6 **Work-life balance validated scale**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I currently have a good balance between the time I spend at work and the time I have available for non-work activities.	1	2	3	4	5
I have difficulty balancing my work and non-work activities.	5	4	3	2	1
I feel that the balance between my work demands and non-work activities is currently about right.	1	2	3	4	5
Overall, I believe that my work and non-work life are balanced.	1	2	3	4	5

Source: adapted from Brough et al. 2014

Nevertheless, it should be understood that exploratory research remains a necessary and essential step in the process of acquiring scientific knowledge. It is crucial to define the issues encountered by gig workers before committing resources to a more formal risk assessment. As reflected in this report, exploratory research is particularly effective in establishing priority areas and relevant variables of interests – two indispensable prerequisites for determining the types of research worth pursuing.

Questions and open issues for further research

- How does work-life balance compare between gig workers and traditional workers after controlling for sector or occupation?
- How prevalent are work-life conflicts, long working hours and sleep disturbance among the three types of gig workers? How does it compare to the general population after controlling for sector or occupation?
- Are novice gig workers more likely to work long and unsocial hours than experienced workers? What are the consequences on work-life balance and professional identity?
- What is the role of the supply/demand equilibrium on overwork and work-life balance?
- How does the prevalence of invisible work compare between the three types of gig work? How does it evolve throughout the career of a gig worker?
- What are the other specific work arrangements that result in gig workers experiencing an unbalanced working life?
- What measures could be taken to adapt these specific work arrangements and prevent them from resulting in a poor work-life balance?

1.3 Workplace social support

Another well-documented consequence of professional isolation is a lack of workplace social support (Marshall et al. 2007). Workplace social support refers to the degree to which individuals perceive that they are valued and supported by workplace sources (Sias and Gallagher 2009; Kossek et al. 2011). These sources encompass supervisors, co-workers and the broader employing organisation in which they are embedded (Eisenberger et al. 2002). Co-worker and supervisor support are both positively related to organisational support, although the latter has a significantly stronger effect (Kurtessis et al. 2017). This difference is partly due to the fact that supervisors are seen more as acting on behalf of the organisation through their responsibilities of directing and evaluating workers' performance, with the result that their subordinates tend to personify the employing entity through them. Furthermore, they play a key role in providing rewards and allocating resources to workers and are thus considered to be a greater source of organisational support than co-workers (Jabagi et al. 2020).

A supportive work environment is characterised by positive social interactions helping workers to cope with uncertainty or stressful circumstances (Nahum-

Shani et al. 2011; Chou 2015; Malik and Malik 2015). Workplace social support is dissociated into four main types (Hill et al., 1989):

– Coaching: teaching professional rules and goals
– Career mentoring: parentlike relationships with experienced workers
– Task support: sharing or exchanging work assignments and ideas
– Collegial support: sharing personal problems and confidences

Career mentoring and task support are associated with the highest levels of job satisfaction, while coaching and task support are the types of social support most predictive of job tenure (Harris et al. 2007). Sias (2009) proposes a broader distinction between emotional (e.g. empathy, trust, and encouragement) and instrumental support (e.g. practical help and advice). The first mainly refers to collegial support while the latter encompasses the three other types of support theorised by Hill et al. (1989). Research consistently shows that only instrumental support seems to be associated with job satisfaction, not emotional support (Brough and Pears, 2004).

Perceived organisational support is linked to a wide array of HR practices such as rewards, training or career development opportunities. Considering such factors to be directly tied to an enhancement of their welfare, workers view them as tokens of recognition for work done (Jabagi et al. 2020). For instance, providing workers with assurance that the organisation wishes to maintain and foster their future employment through training and development opportunities positively impacts perceived organisational support. Similarly, communicating a positive valuation of workers' contributions and favourable opportunities for rewards are positively linked to organisational support. It has been demonstrated that individuals feel less valued in large organisations where formalised policies and procedures may reduce flexibility in dealing with workers' individual needs (Kurtessis et al. 2017; Rhoades and Eisenberger 2002).

The perceived consequences of a lack of organisational support have been mainly investigated among field salespeople and home-based teleworkers. They typically report loneliness, a loss of camaraderie, less career support, job insecurity and a feeling of being excluded from company affairs (Mulki et al. 2008; Mann and Holdsworth 2003; Brandt and Brandl 2008; Paridon and Hupke 2009). Conversely, many studies have shown that social support is critically important for maintaining good psychological and physical health (Ozbay et al. 2007). It has been found to mitigate the association between occupational stress and the development of mental and physical diseases (Dormann and Zapf, 1999; Karasek and Theorell 1990). Social support also has a direct effect on workers' health and well-being (Park et al. 2004; EU-OSHA 2002). Higher levels of social support are associated with lower rates of cardiovascular diseases, musculoskeletal disorders, cancer and overall mortality (Shirom et al. 2011; Woods 2005; EU-OSHA 2002). Having supportive co-workers reduces role ambiguity, role conflicts and workload, ultimately leading to greater job satisfaction and organisational commitment (Chiaburu and Harrison 2008). Workers experiencing support from colleagues are less likely to leave the organisation in the short term (Moynihan and

Pandey 2008). Conversely, negative relations at work can cause stress and job dissatisfaction (Winnubst and Schabracq 1996), with a potential detrimental effect upon an employee's emotional wellbeing (Labianca and Brass 2006). Social relations at work which are disrespectful, distrustful and lack reciprocity are independent predictors of medically diagnosed depression (Oksanen et al. 2010). Workplace social support is positively associated with productivity rates, especially when it comes from supervisors (Baruch-Feldman et al. 2002; Park et al. 2004). Moreover, the quality of social support provided by supervisors determines job performance, career progression and intentions to leave the organisation (Sias 2009).

In the gig economy, human managers are replaced with algorithmic management practices and data-driven procedures. Although enabling the organisation and delivery of work, these lack the warmth of face-to-face interactions crucial for developing closer social relationships (Vayre and Pignault 2014). The lack of spontaneous and mutual exchanges is detrimental to social support as it prevents workers from sharing work concerns (Tran and Sokas 2017; Vendramin and Valenduc 2018). In fact, app-based management practices are mainly focused on instrumental support, leaving little room for emotional support. More precisely, these practices seem to be essentially directed towards task support rather than coaching or career mentoring. The psychological contract theory (Figure 7) suggests that the imbalance between these different forms of support may not be experienced as an issue by gig workers. According to McLean Parks et al. (1998), self-employed workers' expectations of support are mainly driven by economic rewards rather than socio-emotional ones such as growth, identification and respect. However, recent evidence suggests a more complex psychological contract wherein gig workers view their association with the platform in a broader, more relational sense (Duggan et al. 2019; Liu et al. 2020). It has been demonstrated that gig workers seek professional development opportunities (Graham et al. 2017a; 2017b), social interactions with peers and mentoring from senior colleagues (Ashford et al. 2018). These findings support the assumption that, even if they are not considered as employees, gig workers develop expectations of various forms of support. Failure to live up to these expectations is likely to have a detrimental effect upon an employee's emotional wellbeing, leading to counterproductive work behaviours (Li and Chen 2018).

Figure 7 **The psychological contract theory**

A psychological contract can be defined as the tacit terms and conditions of the reciprocal relationship between an employee and organisation, and mutual expectations held by them (Kotter 1973).

A psychological contract breach occurs when one party perceives that the other has failed to fulfil its obligations or promises (Morrison and Robinson 1997), which leads to subsequent counterproductive work behaviours (Li and Chen 2018).

Source: author's own compilation

One distinctive feature of gig work is that most of the tasks are performed individually, without contact with fellow workers and often in competition with them (Garben 2019; Drahokoupil and Fabo 2016). The gig economy is encouraging a logic of 'every man for himself', leading to disputes within the working class (Venco 2019). Consequently, interactions with co-workers are poorer in both quantitative and qualitative terms compared to traditional jobs. For instance, it has been shown that food delivery platforms use various incentives to push workers to achieve as many deliveries as possible within an hour, ultimately leading to a decreased sense of solidarity among colleagues (De Stefano and Aloisi 2018). Similarly, ride-hailing platforms such as Uber or Lyft pay on a per trip basis and cut the transaction fee when a driver achieves a given number of rides over a certain period of time. In an interview study, Polkowska (2019) underlined that Uber drivers were facing growing competition from other drivers, and that they were unable to earn the same pay in the same amount of time as three or four years earlier. The study of young freelance designers mentioned in the previous section (Risi et al. 2019) and several other studies on crowdworkers (Wood et al. 2019; Graham et al. 2017a; 2017b Eurofound 2018) also underline the fierce competition between gig workers. Although quantitative measurements are still lacking in this regard, such a context is arguably not favourable to camaraderie or other manifestations of collegial support and may contribute to gig workers' feelings of loneliness and isolation.

Increasing attention has been devoted to the study of digital social places emerging in the gig economy. There is evidence that gig workers seek both instrumental and emotional support through channels other than conventional interactions at work (Deng and Galliers 2016; Kuhn and Maleki 2017). For instance, Lee et al. (2015) analysed 128 postings on online forums used by Uber or Lyft drivers, finding a place where drivers socialise, ask questions of each other and exchange practical tips or strategies. Similarly, unofficial forums are growing within the Amazon Mechanical Turk community (Williams 2020). A quick browse through one of them reveals the expression of different types of peer support (Figure 8). However, it is still unclear whether such forms of social support represent a distinct, unrelated factor influencing worker outcomes. While co-worker support is an antecedent of organisational support in traditional jobs, platform workers' perceptions of peer support may have little influence on their attitudes towards the platform itself. As reflected in the threads below, fellow workers confirm the status quo as unchangeable and merely suggest approaches to adapt to the platform's policies. It has been suggested that the positive influence of peer support may depend on whether and to what extent these virtual communities are promoted or supported by the platform (Kuhn and Maleki 2017) – something that is generally not the case (Felstinerf 2011).

Figure 8 **The different types of peer support expressed in forum threads**

Task support

raitch: 'Is there a trick or a script to change the "next" or ">>" buttons into a keystroke? I feel like I lose so much time mousing down to the next button on every screen.'

NateMcCheezy: 'You can always hit Tab until it highlights the "next" or ">>" and then click Enter.'

Emotional support

ewd76: 'This whole master's requirement issue has got me depressed about MTurk. I'm sure I can find other things about MTurk to be depressed about, but that's enough for now.'

Ivycreek: 'It's not worth stressing about...the best thing to do is work on increasing your skill set so that you can do a wider variety of HITs, it might take a little bit of time to get proficient but in the end it will be worth it. That's what I keep tellin myself anyway J'

Turkingal: 'Keep your head up. MTurk, for me, has always been feast or famine. It's discouraging at times, but I've learned to turn it off when I need to in order to regain my sanity.'

Coaching and career mentoring

Killscreen: 'Hey y'all. Been a turker for a handful of days now. [...] What I've done so far is pretty shameful, I know. [Showing screen capture of earnings]. So, using that as a baseline, I'm open to suggestions, critiques and methods to use. [...] Any help getting to my goal would be appreciated.'

Fiora: 'Welcome to the forum! We all started pretty much like that. You'll get better with practice and have more HITs approved. More work will be available to you after you hit certain milestones like 500, 1000, 1K and so forth. Be careful with rejections at this point because that will harm your stats. Build your numbers is more important than earnings at the beginning. [...] If you have any questions, feel free to stop by the Great HITs daily thread where most of us hang out, share HITs, and chat. You'll likely get a quicker response there.'

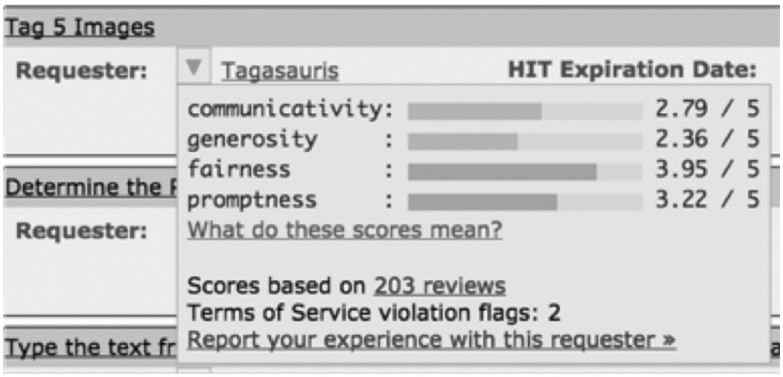
Source: author's own compilation of forum postings found on http://www.mturkforum.com

Besides online forums, third-party software specially developed for gig work may also act as a source of instrumental support. For instance, Turkopticon is a reputation system collecting reviews from AMT workers[5] (Harmon and Silberman 2018). Adding a button next to each requester on the website, it highlights requesters for whom there are reviews from other workers (Figure 9). Bad reviews allow crowdworkers to avoid shady requesters while good reviews help them find fair ones. More than just a tool, Turkopticon also acts as a portal to other valuables resources such as forums or information websites. This vast and convoluted network of mutual aid is mostly operated

5. Another example is 'FairCrowdWork' created by the German labour union IG Metall, which is now also collaborating with some of the creators of Turkopticon (See https://turkopticon.ucsd.edu/ and http://www.faircrowdwork.org/en/watch)

by AMT workers on a volunteer basis. According to Silberman et al. (2017), Turkopticon does not solve any of the problems facing workers on MTurk. While improving some of the common issues encountered by crowdworkers, it does not change the fact that MTurk is a challenging working environment characterised by automated management and fierce international competition. Moreover, it has been found that the proliferation of third-party tools can be counterproductive, as some workers rely on dozens of them simultaneously to navigate the market (Hanrahan et al. 2018). The combination of several tools produces interferences between their respective interface elements, as well as server-throttling issues preventing workers from completing further work. The authors conclude that solving these problems may require a more holistic and centralised approach rather than any further third-party software development. For these reasons, the extent to which these tools actually improve instrumental support may be limited. According to Al-Ani and Stumpp (2016), the development of such tools is likely to grow as the ability of the crowd to self-organise will drive their expansion over the coming years.

Figure 9 **Screen capture of the Turkopticon browser extension**



Research into the social support received by gig workers is subject to the same limitations described in the previous section of this report. Most of the available evidence stems from content analyses of interview transcripts and forum postings. There is a lack of quantitative studies relying on validated measurements of the different types of social support. Emotional support would arguably be particularly crucial for gig workers as they deal with unique challenges in terms of social isolation. Importance must be attached to determining to what extent each source of support available to a gig worker affects psychosocial outcomes. Moreover, it would be valuable to ascertain whether the peer support expressed in virtual communities helps overcome the lack of real-life interactions with co-workers. More generally, it appears that the HR management practices found in gig work differ significantly from traditional jobs in both their strategic purpose and in the way they are delivered (Duggan et al. 2019). Further research is required to fully understand how these practices affect the different types of social support and their associated outcomes.

Validated tools for measuring workplace social support include the 'Mentoring and Communication Support Scale' (Hill et al. 1989). This is a 15-item measure with subscale scores for career mentoring, coaching, collegial social support and task support. Items are rated on a Likert-type scale of 1 (strongly disagree) to 5 (strongly agree). The tool has been the subject of multiple studies demonstrating the high reliability and validity of the data it produces (Mansson 2013; Mansson 2011; Harris et al. 2007; Downs et al. 1994; Hill et al. 1989). Another tool developed by Lysaght et al. (2012) demonstrates similar psychometric qualities, while at the same time distinguishing between different sources of support – supervisors, co-workers and those unrelated to work.

Questions and open issues for further research

- How does social support compare between gig workers and traditional workers after controlling for sector or occupation? Is there any difference related to the different types (career mentoring, coaching, collegial, task support) and sources (supervisor, co-worker, organisation) of support?
- What are the expectations of gig workers in terms of organisational support? How do they differ from regular independent contractors? Is there any difference between the three types of gig work?
- To what extent does the peer support expressed in virtual communities overcome the lack of real-life interactions with co-workers? For which type(s) of support is this effect more salient?
- How does peer support expressed in virtual communities influence gig workers' attitudes toward a platform? Does it impact perceived organisational support and its associated psychosocial outcomes?
- Besides algorithmic management, what are the specific work arrangements that result in gig workers experiencing a lack of organisational support?
- What measures can be taken to adapt these specific work arrangements in order to enhance perceived social support?

2. Algorithmic management and digital surveillance

Algorithmic management can be defined as a set of supervision, governance and control practices driven by mathematical algorithms (Möhlmann and Zalmason 2017). An algorithm is a computational formula that makes autonomous decisions based on procedural rules or statistical models (EPRS 2019). It can be regarded as a sequence of precisely defined steps directed towards a specific goal. Instead of repeatedly applying a given set of instructions, algorithms have the ability to rewrite themselves as they work

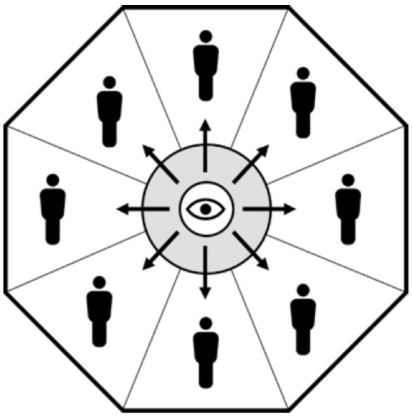
(Duggan et al. 2019). Thanks to technological progress, learning algorithms are used in increasingly complex domains such as creating products or autonomously managing business processes (Mann and O'Neil 2016).

The innovative character of digital labour platforms relates to their reliance on algorithmic management (Vandaele 2018; Flichy 2019). By endorsing HR-related duties, algorithms are given the responsibility for making decisions that affect work, thereby limiting human involvement in the labour process (Duggan et al. 2019). In this respect, it is difficult to separate the question of algorithmic management from the overall context of the physical and social isolation of gig workers. These two aspects are closely intertwined in the modern gig economy, as extending the boundaries of remote working necessarily presupposes a high degree of automation. According to Jabagi et al. (2019), 'the detached and distributed nature of the gig economy signals a radical reinvention of work, embodied by a significant shift towards novel management tools enabled by technology'. From a psychosocial perspective, it is however relevant to make a distinction between the two because they entail specific risk factors differing in the way they affect workers' health. Moreover, professional isolation and algorithmic management can exist on their own in today's world of work. This would typically be the case among door-to-door salespeople (i.e. working in isolation but free of algorithm control) or power plant operators (i.e. working in communal premises but in cooperation with algorithms). For these reasons, algorithmic management should be investigated as a distinct structural characteristic of the modern gig economy.

Digital surveillance is an essential component of algorithmic management (Mateescu and Nguyen 2019). The term originally described the act of real-time and retrospective viewing, processing, and cataloguing of online footprints against the will and/or without the knowledge of those to whom such data belongs (Marx 2003). However, defining digital surveillance in the context of gig work is still a matter of controversy, especially with regard to the notion of absence of consent that is not always seen as central. Some scholars place greater emphasis on the constant nature of surveillance, on workers' lack of a full and clear understanding about which data is being collected and how it is used by the platform (Anderson 2016; Wiener et al. 2020; Schmidt 2017). In fact, digital surveillance technologies are an essential prerequisite for algorithmic management. Automated or semi-automated decision-making requires a substantial amount of accurate data which can only be gained by intensively tracking workers' activities and whereabouts. Specifically, constant monitoring allows predictions about workers' future behaviours which are then turned into operational decisions, such as work scheduling or fitness for employment (Mateescu and Nguyen 2019). This aspect of supervision is often illustrated by the 'panopticon' metaphor (Foucault 1991) – a prison system allowing a single observer to simultaneously watch each prisoner from a central point (Figure 10). Such architecture is intended to 'internalise' the supervisory function, as the prisoner cannot know when the observer is watching and so assumes he could be watched at any point in time (Woodcock 2020). Similarly, digital surveillance can be seen as the panopticon of the modern gig economy, enabling the internalisation of the

supervisory function through automated long-range management practices (Warin and McCann 2018).

Figure 10 **Visual representation of the panopticon principle**



Source: author's own elaboration

In an attempt to further conceptualise algorithmic management, Möhlmann and Zalmanson (2017) identified five of its major characteristics:

1. **Continuous monitoring** of workers' behaviour (i.e. digital surveillance)
2. **Constant performance evaluation** from requester reviews and job rejection rates
3. **Automatic decisions** without human intervention
4. **Interaction with a system** with no opportunities for feedback or negotiation
5. **Low transparency,** as companies rarely disclose the 'rules' of an algorithm

These five features are found, to a certain degree, in the three main forms of gig work. For instance, most ride-hailing platforms make use of GPS (i.e. Global Positioning System) to monitor the speed and position of vehicles (i.e. #1), thereby keeping track of drivers' behaviours (Duggan et al. 2019). The Uber application even has built-in acceleration sensors meant to detect speeding and heavy braking (Prassl 2018). This data is merged with customer ratings (i.e. #2) to automatically identify (i.e. #3) the most capable drivers and assign tasks accordingly. Similarly, Deliveroo monitors the amount of time taken at every stage of the delivery process (i.e. #1). Couriers regularly receive reports (i.e. #4) outlining these performance metrics relative to a set of criteria to be met (Woodcock 2020). Akin to workers providing physical services, online freelancers are also subject to persistent surveillance and evaluation. Upwork, for instance, has introduced a feature called 'Work Diary' that allows requesters to virtually look over the shoulders of workers (Schmidt 2017). The software takes screenshots of freelancers' screens at random intervals, tracks

mouse clicks and keystrokes, and even takes pictures through the webcam (i.e. #1). Using this service, the requester can ensure that the freelancer is performing the assigned task at a satisfactory pace (i.e. #2). On crowdworking platforms, workers who fully comply with algorithmic assignments are immediately rewarded (i.e. #3, #4) with more work, higher pay and increased flexibility (Kellog et al. 2019).

Not entirely new to the world of labour, such practices have grown exponentially under the impetus of platform work. Besides assuming the duties of managers, algorithms are also intended, in the long run, to replace human work for specific tasks and processes (Duggan et al. 2019). Progress in automation depends heavily on machine learning, and thus on the availability of large datasets that algorithms can learn from. Without knowing it, gig workers are actually contributing to the development of leading-edge technologies meant to substitute them (Irani 2015). This invisible side of gig work has been regarded as a considerable source of intangible capital[6] for labour platforms. For instance, Lyft gained a stratospheric IPO valuation[7] of $24 billion in 2019 despite losing over $900 million the preceding year (CBS news 2019). Such figures underline that the main asset of a digital labour platform is not the current sustainability of its business model, but its future potential to spearhead the so-called fourth industrial revolution (see infobox below). Indeed, automation's potential is massive, unleashing opportunities for value creation across many sectors (González Vázquez et al. 2019; Manyika et al. 2016; Veen et al. 2020). According to Mary L. Gray – senior researcher for Microsoft –, crowdwork is actually 'the last mile of automation' (Schmidt 2017).

The fourth industrial revolution

This term was first introduced by the economist Klaus Schwab to denote a wave of innovation fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries (2016). According to Dhéret et al. (2019), this ongoing process is shaped by six converging technologies:

- **Big data**: massive and diversified databases generated at an ever-increasing rate.
- **The cloud**: on-demand data storage and computing power over the Internet.
- **Internet of Things**: interconnection of everyday objects for data exchanges.
- **Mobile apps**: software applications designed to run on mobile devices.
- **Online platforms**: virtual spaces connecting different parties remotely.
- **Artificial Intelligence**: performing tasks normally requiring human intelligence.

As with previous industrial revolutions, these innovations are theorised to profoundly affect not only consumers' habits, but also the working conditions of billions of

6. Intangible capital refers to organisational resources that do not appear on the balance sheet.
7. An IPO valuation is the process by which an analyst determines the fair value of a company's shares.

people all over the world (González Vázquez et al. 2019). Digitalisation and artificial intelligence will see many types of jobs disappear while creating entirely new categories of activities. Forecasting studies predict two main consequences for employment:

- **Job substitution**: Although specific estimates vary, there is growing consensus that the fourth industrial revolution will lead to an overall reduction in employment (Bianchi et al. 2018; De Stefano 2018a). For instance, a worldwide survey of major employers concluded that, between 2015 and 2020, 7.1 million jobs will be lost due to technological changes while only 2 million jobs will be gained (Schwab 2016).
- **Job polarisation**: It is a common ascertainment that high-skilled and educated workers will be able to meet the new technological requirements and enjoy higher wages. Less educated and lower-skilled workers, on the other hand, will be burdened by the cost of automation and more exposed to income loss and unemployment (Zervoudi 2020). Accordingly, technological changes will not have an equal impact on all workers and are expected to accentuate wage inequalities.

Therefore, digitalisation is seen by companies and investors as an opportunity to achieve more with less resources (Veen et al. 2020). Recent figures suggest that automatable activities represent US$14.6 trillion in wages worldwide (Bughin et al. 2017), the equivalent of 78% of the European Union's GDP.

From a research perspective, there are two issues at stake: 1) to determine how algorithmic management is currently shaping working conditions and employment relations in the gig economy, and 2) to determine to what extent this process will lead to job substitution and polarisation in the future. In line with our main objective, this chapter will exclusively focus on the first of these two aspects. Specifically, we will review the available literature regarding the psychosocial impact of algorithmic management, discussing how it may translate into the modern gig economy. Three main psychosocial risk factors will be detailed: occupational workload, organisational trust, and workplace power relations.

2.1 Occupational workload

Workload can be defined as the amount of mental processing capability required to complete a task (Hart and Staveland 1998). Inherited from cognitive science, this concept stems from an extensive body of task-specific research demonstrating the capacities and limitations of human cognition (Macdonald 2003). Specifically, these controlled experiments shed light on the margin that may exist between task demands and individuals' cognitive resources. Since then, workload has been widely applied within the domain of work psychology to refer to the intensity of job assignments (Nwinyokpugi 2018). Various measurement techniques have been developed to assess equipment and work systems with regard to the workload experienced by individuals using them (Macdonald 2003).

Research indicates that occupational workload has an effect on exhaustion (Ali and Farooqi 2014; Portoghese et al. 2014), stress (Rahim et al. 2016; van den Hombergh et al. 2009; Xiaoming et al. 2014), emotional commitment (Erat et-al 2017), intentions to quit (Qureshi et al. 2013), work performance and job satisfaction (Herminingsih and Kurniasih 2018; Rahim et al. 2016; van den Hombergh et al. 2009). Workload is also associated with physiological reactions such as backache, headache, gastrointestinal disorders (Ilies et al. 2010), and increased levels of cortisol – commonly referred to as the 'stress hormone' (Nixon et al. 2011).

The amount of work that has to be performed is a significant stressor for workers (Cooper et al. 2001). It has long been established that both overload and underload have an adverse impact on psychosocial outcomes. Since the pioneering 'Yerkes-Dodson Law', it has been realised that there is an inverted-U relationship between the amount of work to be accomplished and both the health and performance of workers (Yerkes and Dodson 1908). Each individual has an optimal 'band' of workload, with any substantial deviation above or below that band likely to induce strain. Equally important is the distinction between quantitative and qualitative workload. The first refers to the amount of work to be done while the second is related to the difficulty of assignments (Cooper et al. 2001). By crossing these two dimensions (Figure 11), four distinct aspects of occupational workload have been established:

- **Quantitative overload**
  (e.g. performing a high amount of work in a given timeframe)
- **Quantitative underload**
  (e.g. having insufficient work assigned in a given timeframe)
- **Qualitative overload**
  (e.g. performing assignments that are far above one's abilities)
- **Qualitative underload**
  (e.g. performing assignments that are far below one's abilities)

Figure 11 **Conditions affecting occupational workload**

Level of mismatch	Nature of mismatch	
	Work amount	Work type
Insufficient	Quantitative Underload	Qualitative Underload
Excessive	Quantitative Overload	Qualitative Overload

Source: adapted from Pettinger 2003

Having to work under time pressure to meet tight deadlines is a well-known source of quantitative overload (Narayanan et al. 1999). It has been linked to high levels of strain, depression and anxiety (Cooper and Roden 1985; Kushmir and Melamed 1991) ultimately resulting in low levels of job performance (Westman and Eden 1992). Conversely, the lack of challenges

from monotonous and routine work is an antecedent of quantitative underload, leading to boredom, anxiety, depression and job dissatisfaction (Kelly and Cooper 1981). Quantitative overload and underload may also result from an irregular flow of assignments, out of the control of the worker. This is the case with jobs dictated by paced assembly lines, climatic conditions, market needs or seasonal demands (Cooper et al. 2001).

Typically occurring when workers believe they lack the skills or capacities to successfully perform job assignments (Cooper et al. 2001), qualitative overload is associated with low levels of self-esteem (Udris 1981). A typical example would be a frontline worker promoted to a supervisory role due to superior performance, but with no past experience of delegating work. By contrast, qualitative underload happens when a worker is not given the opportunity to use acquired skills or to develop his full potential (Cooper et al. 2001). For instance, Hall (1976) showed that qualitative underload is predominant among graduate recruits as they often enter employment with high expectations that are not realised. This results in depression, irritation and psychosomatic complaints, as well as poor motivation, job dissatisfaction and high turnover rates (Udris 1981).

The notion of workload is central to algorithmic management and digital surveillance, and therefore to the gig economy. The overall objective of digital labour platforms is to maximise the number of assignments completed by gig workers. As remunerated middlemen, their prime motivation is to ensure that every single task posted by requesters is carried out on time and with good quality. Achieving this goal depends heavily on the collective productivity of gig workers. In this context, the aim of algorithmic management is to coordinate and maximise workload in response to the inherent variability of situational factors. This opportunistic optimisation process has been identified as a source of quantitative overload in many studies.

According to Poutanen et al. (2019), crowdworkers are at risk of quantitative overload due to exposure to a wide variety of information. They come up against a considerable amount of data in different formats and from multiple sources, bringing with it the potential of cognitive overload. In this context, crowdworkers are challenged to differentiate and filter information for importance, as well as to adopt strategies for maximising proficiency. This process is all the more difficult as requesters rely on very different and sometime inconsistent data structures. In fact, it has been shown that the consistency and adequacy of data structures are key incentives for workers when it comes to selecting an assignment (Williams 2020). Crowdworkers tend to prioritise requesters with whom they have worked in the past and with acknowledged straightforward rules and procedures. Another source of variability is related to the use of multiple platforms, each with different management practices. According to the authors, the financial insecurity experienced by crowdworkers requires them to monitor several platforms, to work on simultaneous tasks and to control various sources of information at the same time. In this regard, Jiang et al. (2015) describe how platform workers are sometimes unable to stop working due to a sudden and unpredictable

overload of work to be completed. Similarly, Taylor (2020) highlights gig workers' concerns about the predictability of their workload, as they have no genuine option to turn down offers of work.

It has also been suggested that the third-party tools used by crowdworkers may actually contribute to quantitative overload. In an interview study, Williams (2020) showed that catchers facilitate interruption overload – a type of distraction caused by an excessive amount of on-screen notifications or alerts (Okoshi et al. 2015). Participants reported situations where their tools had automatically found and accepted an excessive number of assignments. Consequently, crowdworkers were forced to momentarily switch from remunerated work to administrative work in order to free space in the assignment queue. These situations were reported as particularly stressful because they imply that a congested catcher won't be able to find 'the $10 surveys that everyone wants'. Managing the queue is a particularly demanding task, as it requires crowdworkers to systematically compare queued assignments for task demands, time constraints and rewards. Interviewees unanimously described these situations as 'overwhelming', 'distracting' and "highly disruptive'. One of the participants compared the catcher to 'a terrible manager who's unaware of your already insurmountable to-do list'. In spite of their detrimental effect on workload, catchers are recognised as vital for identifying 'the path of greatest reward', meaning that crowdworkers 'just have to deal with them'. Williams (2020) also administered the Multitasking Preference Inventory (i.e. MPI) – a questionnaire assessing individuals' preferences and tendencies to engage in multitasking behaviours. Crowdworkers' MPI scores ranged from 14 to 51, with a large score indicating a preference for multitasking. Interestingly, even workers scoring high on the MPI reported interruption overload as a stressful event, suggesting that individual preferences play little role in the lived experience of quantitative overload (Figure 12).

Webster (2016) underlined the irony of coping with overload using the very same online technologies that contributed to work intensification in the digital era. According to the author, this paradox reflects the general tendency of gig workers to individualise and internalise the issues they encounter. Specifically, workers exposed to information overload experience feelings of guilt and anxiety about their inability to meet the demands placed upon them. Both the issue and its solution are personalised in relentless self-exploitation, often justified by both workers and employers as 'flexible working'. In other words, workers develop strategies to deal with conditions that are highly intensified because they are considered as individual rather than structural by nature. Gig workers cope with what Fleming (2017) describes as a radical responsibilisation – becoming solely responsible for their own economic survival. The financial stress experienced by gig workers make these choices especially crucial, as good decisions will contribute to economic success while bad ones will threaten it (Ashford et al. 2018). Even though freedom to choose may be empowering, such a heavy burden can also be intimidating at times. Largely documented in the literature, the negative consequences of too many choices include quantitative overload, demotivation, and job dissatisfaction

(Iyengar and Lepper 2000; Schwartz 2004). These aspects will be investigated in greater detail in the section dedicated to job security.

Figure 12 **Selected citations of crowdworkers with low (P2), moderate (P12) and high (P1) preference toward multitasking**

P2 (MPI = 23): 'I get stressed when I have a ton of work in my queue, and I want to do all of them. Even after managing the notifications, new HITs are still coming in like crazy, and I'm being alerted. And that is when I get stressed. When I'm doing this, I'm thinking about 'Oh my God, I gotta hurry up and finish this' because I have all these other HITs that I have to get done, too. And there's a time limit. It's constant stress.'
P12 (MPI = 34): 'Notifications from these tools always come at the wrong time, but there isn't a 'good time' for them to come either. You're trying to make as much money as possible, and it's hectic – but hectic means that I'm have more money lined up and stuff to do.'
P1 (MPI = 46): 'There's times where your tools catch so many things drop at once, and you have to stop and consider 'Okay. What can my hourly be if I switch to this task?' or 'Which tasks do I enjoy more? Which one's going to be faster?'. I know that this requester typically uses bad servers, but I always make really good money from their HITs. It's like a stress-inducing game in your head where you have to decide 'What is my attention to going to?'

Source: adapted from Williams 2020

Möhlmann and Zalmanson (2017) suggest that the gig economy encapsulates a more subtle paradox between workers' sense of autonomy and these systems' need of control. Even if some workers appreciate the autonomy over which assignments to take on and when to fulfil them, they remain subject to intensive forms of surveillance and control that will, in turn, limit other aspects of their autonomy. In that sense, many scholars argue that the perceived independence from managerial control does not actually result in more autonomy for gig workers (Kahancová et al. 2020; Drahokoupil and Piasna 2019; Gershon and Cefkin 2017; Lehdonvirta 2019; Liu 2019; Shibata 2019a; 2019b). This view is backed by several studies highlighting the various forms of control exercised by algorithmic management and their detrimental effect on workers' autonomy (Prassl 2018; Rosenblat and Stark 2016; Shapiro 2017; Wood et al. 2019; INRS 2018).

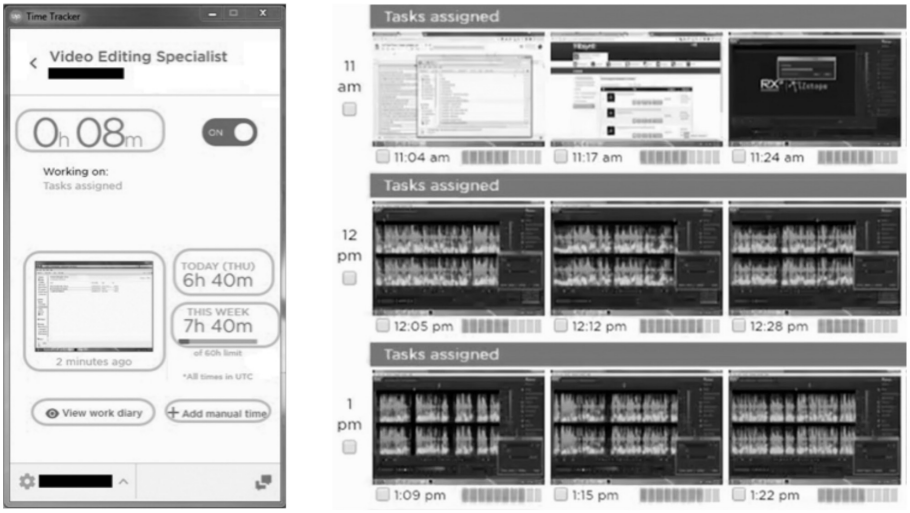
Workload is a major component of the Job Demand-Control model of Karasek (1979) – one of the most cited models on occupational stress. According to the JDC model, high demands are particularly stressful when the worker has low control over job-related decisions. In other words, control acts as a protective factor in situations where the workload is high. Karasek's pioneering work was later expanded into the Job Demand-Control-Support model suggesting that it is the combination of high decision latitude and high social support that buffers the detrimental effects of high workload (Johnson and Hall 1988). As described above, the autonomy paradox underlined by several authors

suggests that workers actually have little control over job-related decisions. Moreover, the first section of this report highlighted that gig workers lack peer and supervisor support. Therefore, there is reason to believe that gig workers are especially at risk of experiencing occupational stress resulting from high workload.

While employment relations have always entailed a certain form of organisational control, platform work enables levels of monitoring and micro-management that would be difficult to attain in conventional jobs (OECD 2019). It has been demonstrated that these kinds of authoritarian practices have practical implications in terms of quantitative overload. For instance, Upwork allows requesters to track time spent on tasks and capture time-stamped screenshots of workers' computers (Figure 13). A worker may not get paid if a screenshot reveals that he was playing games or using social media at any moment during the assignment. Moreover, a requester may cancel the assignment if he considers that the worker is not sufficiently productive. As a consequence, workers reported working long hours out of fear of not getting paid for the work performed (Anwar and Graham 2019). Another example is a webcam monitoring software enabling requesters to take periodic photos in order to check on workers' productivity (Solon 2017). Illustrations of digital surveillance are also plenty in other forms of gig work. Deliveroo monitors the amount of time spent at every stage of the delivery process (Ajunwa et al. 2017; Warrin et al. 2018). Honor, a homecare platform, monitors caregivers to check their times of arrival as well as various suspicious activities such as sitting down for some time, making phone calls or checking social media (Choudary 2018). Similarly, research on Uber unveiled how the proprietary app monitors and controls drivers' activity through a wide range of algorithms and incentive schemes (Banning 2016; Rosenblat and Stark 2016). Jarrahi et al. (2019) highlight Uber's double-speak of 'be your own boss' while drivers remain subject to the rules and controls put in place to ascertain their full compliance. Although data is still lacking on the consequences of these practices, constant monitoring coupled with monetary sanctions arguably encourages gig workers to maintain a hectic work pace, ultimately leading to quantitative overload.

This new trend towards close monitoring have been regarded as a modern take on the principles of scientific management initially introduced by Frederick Winslow Taylor in the 1880s. Going beyond authoritarian control, the analogy also encompasses the concept of breaking down jobs into tiny, simple and repetitive tasks (Degryse 2016). It is particularly salient in crowdwork where such micro-tasks are distributed to large pools of candidates. Overall job completion is turned into a machine-like process where each worker completes a micro-task following a strict modus operandi. As in Taylorism, platform work thus creates a contingent labour force of disposable workers. In cases of failure, the worker is simply replaced, like a broken piece of machinery. By doing so, platforms are able to guarantee a high degree of consistency and predictability in the delivered product. Although highly standardised processes may indeed limit the risk of error, such rigidity also tends to increase work arduousness and inhibit professional growth (Jürgens et al. 1993).

Figure 13 **On the left: Upwork's time tracker**
On the right: Upwork's screenshot capture tool



Source: adapted from Anwar and Graham 2019

From a crowdworker perspective, micro-tasks are repetitive, short-lived, and very low-skilled (Valsamis 2015). It is estimated that one third of gig workers have a mismatch between the low-skilled tasks they perform and their level of education or competence (Pesole et al. 2018). On a broader perspective, widespread algorithmic management will mean that workers become automatons merely responding to signals expressed in step-by-step instructions (Stacey et al. 2018). The tasks left to workers will require low skill levels and expertise and could result in workers becoming less and less able to solve problems on their own. In a distant future, workers could cease to make decisions and become entirely dependent on artificial intelligence. Jobs would lose content and variety, leading to a de-skilling of the workforce. In that sense, the effect of algorithmic management on workload is driven by two separate mechanisms: 1) the need for a hectic pace of work in order to meet deadlines (i.e. quantitative overload), and 2) the division of jobs into very simple tasks with strict modi operandi (i.e. qualitative underload).

It has long been demonstrated that increasing automation is leading to an overall simplification of work favouring the development of repetitive jobs that are potentially stressful in terms of workload (Martin and Wall 1989). Repetitive work and qualitative underload are both linked to subjective monotony, in turn associated with higher levels of psychological distress and job dissatisfaction (Melamed et al. 1995). A review by Freund et al. (2003) demonstrated that the combination of quantitative overload and qualitative underload is particularly damaging to health, including outcomes such as increased levels of heart attacks. However, most of these studies were conducted in a context of piecework and paced assembly lines. While interesting parallels have been drawn between traditional piecework and the modern gig economy (Devoe 2019), the juxtaposition of underload and overload in gig work

may have different consequences on workers' health and safety. Moreover, workload management may significantly differ between on-demand physical services and online work such as crowdworking or freelancing. Further research is required to ascertain the prevalence of quantitative overload and qualitative underload in the three main forms of gig work, and to investigate their consequences on relevant psychosocial outcomes.

Questions and open issues for further research

- How does quantitative overload and qualitative underload compare between the three main forms of gig work?
- To what extent do third-party tools contribute to quantitative overload in crowdwork and online freelancing?
- To what extent do digital surveillance practices and monetary sanctions produce quantitative overload?
- What are the consequences of the juxtaposition of quantitative overload and qualitative underload in crowdwork? How do they differ from those identified in studies on piecework and paced assembly lines?
- What can be done to raise gig workers' awareness on the autonomy paradox and the adverse effects of radical responsibilisation?
- What measures can be taken with respect to these specific work arrangements to reduce quantitative overload and qualitative underload?

2.2 Organisational trust

Organisational trust can be defined as 'an employee's feeling of confidence that the organisation will perform actions that are beneficial, or at least not detrimental, to him or her' (Tan and Tan 2000). Similar to other psychosocial constructs such as organisational culture or climate, trust cannot be measured directly. Instead, the assessment relies on the perceptions of individuals within the organisation, who will have different views of recalled situations and contexts based on their experience (Adams and Wiswell 2007). Trust has been highlighted as a crucial determinant for achieving long-term stability in an organisation and preserving the welfare of its members (Cook and Wall 1980). A trusting work environment is associated with a wide array of organisational outcomes such as low employee turnover, high sales and profits (Davis et al. 2000) and increased levels of cooperative behaviour among workers (Gambetta 1988). Promoting effective cooperation and communication within the organisation, it can compensate for the limited capabilities of workers (Fischer 2013; Laschinger and Finegan 2005). Organisational trust is also a significant predictor of job satisfaction, mental and physical health (De Stefano et al. 2018). It has been demonstrated that organisational trust sometimes takes the

form of a longstanding process. Some workers are cautious about complying with the organisational system, carefully observing actions taken in order to determine whether they should trust the organisation (Carnevale 1998).

This definition implies that trust is also reflected in a set of organisational characteristics that create an atmosphere for workers to act in certain ways (Adams and Wiswell 2007). In the psychosocial literature, those characteristics have been mainly investigated through the lens of organisational justice, a concept referring to the extent to which workers perceive workplace interactions, procedures and outcomes to be fair in nature (Baldwin 2006). This fairly new concept extends traditional psychosocial models that tend to consider job demands, job control and social support as the main determinants of well-being and productivity (Baldwin 2006). It succeeds in capturing more fundamental elements of the social structure in which these other psychosocial factors are imbedded. In most cases, the notion of organisational justice only becomes tangible and relevant when said justice is violated. Typical examples include arbitrary dismissals or unequal pay for workers doing the same job.

Organisational justice is comprised of three main dimensions (Folger 1977; Folger and Konovsky 1989; Adams 1965; Thibaut and Walker 1975; Bies and Moaq 1986; Simons and Roberson 2003):

- **Distributive justice:** perceived fairness in the amount of compensation received for performing work
- **Procedural justice:** perceived fairness in the methods and processes used to determine compensation
- **Interactional justice:** perceived fairness in the interpersonal treatment received by workers

Distributive justice is intrinsically linked to the equity principle as it entails that outcomes are proportionally distributed according to inputs (Adams 1965). In work settings, outcomes may take the form of wages, job security and career opportunities while inputs typically include experience, training, education and effort (Baldwin 2006). Workers tend to assess distributive justice in relative terms, seeking to achieve an input-outcome ratio similar to their peers. In most organisations, the equity principle is fulfilled through compliance with standardised HR policies such as salary bands, universal training and equal development opportunities. Despite these usual precautions, there may be situations where a worker feels he has been unfairly treated regarding the distribution of outputs. When these situations arise, workers may seek to redress inequity either by campaigning for compensation or by reducing subsequent efforts. However, research has shown that applying the equity principle does not necessarily ensure a positive appraisal of distributive justice. For some, equity may be overruled by the notion of equality (i.e. everyone receiving the same) or 'need' (i.e. workers receiving different outputs based on personal circumstances). It has been demonstrated that these individual preferences are notably driven by cross-cultural variations, for example with the Dutch favouring the principle of equality, Indians that of need, and Americans that of equity (Storey 2001).

Procedural justice pertains to the fairness of the decision-making process leading to a given outcome (Baldwin 2006). Perceptions of procedural justice can be enhanced by the 'voice principle', namely the opportunity for workers to express concerns before a decision is taken (Cremer and Stouten 2005). Having a voice is regarded as confirmation of being valued as a participative group member (Storey 2001). It may involve simple habits such as managers lunching with frontline workers, engaging in 'walk-arounds' or promoting an open-door policy. While these simple activities may appear trivial at first sight, they contribute to the feeling of workers being heard and able to influence procedures (Baldwin 2006). More straightforward initiatives include empowerment programmes, suggestion schemes and participative management (Sheppard et al. 1992). Beside the voice principle, additional aspects of procedures have been identified as drivers of perceived procedural justice (Figure 14).

Figure 14 **Additional factors contributing to workers' perceptions of procedural justice**

- **Consistency**: Procedures are consistently applied across workers, situations, and time
- **Neutrality**: Decisions are based on facts rather than personal interests or feeling
- **Accuracy**: Information used to justify decisions is accurate and directly available
- **Correctability**: Possibility to challenge or reverse ill-advised decisions
- **Representativeness**: Concerns of all workers affected by the outcome are considered
- **Morality and ethicality**: Extraneous factors have no bearing on the decision

Source: adapted from Leventhal et al. 1980

Interactional justice refers to the quality of the interpersonal treatment received by workers (Baldwin 2006). Workers perceiving a lack of fairness in interpersonal exchanges may hold feelings of resentment towards their supervisor or the overall organisation. They will demonstrate increased expressions of hostility towards the perceived offender, eventually leading to counterproductive work behaviours (Aryee et al. 2007). Bies and Moag (1986) identified four main aspects of interactional justice (Figure 15).

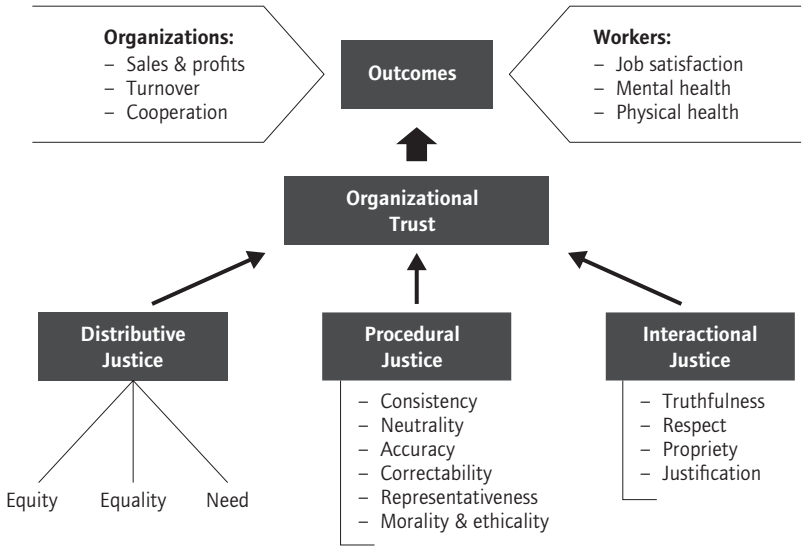
Figure 15 **Factors contributing to workers' perceptions of interactional justice**

- **Truthfulness**: Information is disclosed in an open, realistic and foresight manner
- **Respect**: Workers are treated with dignity, with no recourse to discourteous behaviour
- **Propriety**: Questions or statements do not involve prejudicial elements
- **Justification**: Perceived injustice is handled by giving an explanation or an apology

Source: adapted from Bies and Moag 1986

The promotion of distributive, procedural and interactional justice is beneficial to both workers – appreciating the way they are treated – and organisations – maintaining control over potential threats and challenges from its staff (Baldwin 2006). Organisational justice fosters trust in the organisation, ultimately leading to constructive professional behaviours and healthy outcomes (Figure 16). Conversely, perceived injustice is associated with stress, job dissatisfaction, retaliation, workplace aggression, lower work commitment and withdrawal (Elovainio et al. 2010). Research also suggests that factors associated with perceived injustice such as discrimination may be related to heightened susceptibility to illness (Richards et al. 2000; Raikkonen et al. 1999). Specifically, low organisational justice has been shown to increase the risk of mental distress, psychiatric disorders and poor self-rated health status (Kivimaki et al. 2005; Tepper 2001). Epidemiological studies suggest that organisational injustice may also contribute to serious health problems such as cardiovascular disease (Kivimaki et al. 2005). Additionally, the perception of injustice can pose a threat to workers' resources and evolve into burnout and destructive organisational behaviours, such as theft, sabotage, withdrawal and harassment (Shkoler and Tziner 2017).

Figure 16 **Effect of distributive, procedural and interactional justice on organisational trust and its associated outcomes**



Source: author's own elaboration

It has been demonstrated that procedural justice can outweigh distributive justice (Greenberg 1994; Folger and Konovsky 1989; Konovsky and Cropanzano 1991; Moorman 1991). In other words, workers may tolerate a negative outcome if they believe the underlying decision-making process is fair. An example would be a worker who is denied promotion but eventually agrees with the decision as he is convinced that the promotion process was transparent and free from bias. In this instance, perceptions of distributive

injustice are offset by the perceived fairness of the procedure leading to it. Multiple studies show that procedural justice is the strongest predictor of organisational trust (e.g. Akpinar and Tas 2013; Hubbel and Chory-Assad 2007; Lind and Tyler 1988).

Moving from the traditional manager-worker hierarchy, authority in the gig economy is entirely embodied by algorithms and mediated through the platform's interface. Danaher (2016) refers to this organisational model as the 'algocracy', whereby decisions related to work allocation, monitoring, and assessment are all endorsed by algorithms. According to Zuboff (2015), these practices 'eliminate the need for – and therefore the possibility to develop – trust', as the psychological contract is lifted from the social sphere and reimagined as a machine process. In fact, a large body of literature highlights organisational trust issues in the gig economy (Gleim et al. 2019; Malhotra 2020; McInnis et al. 2016; Laplante and Silberman 2016; Ryan 2019). The psychological distance created between workers and decision-makers contributes towards feelings of mistrust by dehumanising the work relationship (McInnis et al. 2016). For workers, this distance is perceived as demotivating and isolating (Marlow and Dabbish 2014), while for requesters it is perceived as an excuse to forget that workers are real human beings deserving fair labour practices (Bederson and Quinn 2011; Bernt 2014; Felstiner 2011). Drawing from the literature on organisational justice, we will explore how algorithmic management and digital surveillance contribute to workers' sentiments of distrust towards labour platforms. Specifically, the three forms of organisational justice will be investigated as potential sources of distrust in the gig economy.

2.2.1 Distributive justice

At first glance, the gig economy may appear as a prime example of distributive justice on account of two main reasons. First, algorithmic management may be regarded as a step forward in ensuring that all workers benefits from the same procedures. Indeed, automating HR practices has the potential to negate the formation of an in-group based on nepotism or other extraneous factors. Second, digital surveillance could guarantee that all decisions affecting workers are justified and backed by relevant data. The intensive collection of various metrics would allow rewards to be distributed according to each worker's relative contribution and performance. However, behind the promise of a 'one-size-fits-all' evidence-based approach lies an opaque system whose inner workings often leaves workers in doubt.

With no figures of authority to turn to, workers naturally share their complaints and experiences in virtual communities. Although providing space for sense-making and peer support, any information provided through such forums is unlikely to be attributed to the platform or its concern for workers' well-being (Jabagi et al. 2020). These forums are neither supported nor promoted by platform owners and, as such, provide no avenues for workers to have a voice in decision-making. Nonetheless, virtual communities remain a valuable source of information for understanding gig workers' criticisms

of platforms. For instance, Malhotra (2020) conducted a qualitative analysis of online exchanges on Uberpeople.net, a forum that brings together drivers across multiple platforms, highlighting distributive justice as a main source of grievance (Figure 17).

Figure 17 **Selected citations of rideshare drivers on the topic of distributive justice**

> **P1**: 'A brand new driver who hasn't given 5 rides makes the exact same money as a driver who has been driving for years. Welcome to rideshare.'
> **P2**: 'Benefits of a high star rating*: NOTHING. And I mean NOTHING. I have a 4.97 [rating] after hundreds of rides and I get no type of bonus or anything else. Why should I continue to maintain such a high rating? I'm treated the same as someone with a 4.6 rating.'
> **P3**: '[The platform] keeps lowering our wages, gas is going up, insurance is going up and riders won't tip. This is going to keep happening as long as riders are not willing to pay a fair price for a cheap ride. Do you work for nothing? More and more drivers are realising that they are.'
> **P4**: '[The platform] needs to pay the drivers accordingly. Don't drop fares, allow an influx of drivers into the various markets and claim higher demand while still expecting a Gold Star customer service. There is [something] called overhead cost and as of this writing, the drivers are paying thru their noses and thus making little to no profit.'

*Star ranking = worker's reputation score based on requester ratings, 5 stars is the maximum score.
Source: adapted from Malhotra 2020

In these examples, worker inputs such as experience or effort have little to do with how outputs are distributed within the workforce – a violation of the equity principle resulting in feelings of distributive injustice. At first sight, it may seem that ride-hailing platforms are favouring the principle of equality (i.e. everyone receiving the same). However, research has highlighted race and class hierarchies in favour of higher education and whiteness (Schor 2017; Schor and Attwood-Charles 2017). In contrast to claims that they provide widespread opportunity, ride-hailing platforms favour drivers with human capital or attractive physical assets, such as a late-model vehicle. This is not only a violation of the principle of equality, but also of that of 'need', as least-favoured individuals are clearly disadvantaged. In fact, the lack of consistency in the values promoted by ride-hailing platforms probably reflects a much simpler reality – policies are entirely dictated by value-extracting strategies, opportunistically fostering either the equity or equality principle.

Distributive unfairness is not unique to ride-hailing platforms, with several cases of injustice evidenced in the other forms of gig work. For instance, Graham et al. (2017a) showed that online gig workers from lower-income countries often feel discriminated because of their country of origin. This is caused either by platform policies restricting access to a list of eligible countries, or by requesters' reluctance to hire workers from certain parts of the world. Howcroft et al. (2019) term the latter as a form of 'statistical

discrimination' where requesters assume that workers from low-income countries will be less qualified for the job. New gig workers are especially at risk of statistical discrimination since they lack work histories attesting the quality of their work (Graham et al. 2017a; 2017b). These workers are trapped in a vicious circle where their lack of experience scares off requesters, preventing them from building up a work history to overcome statistical discrimination. With respect to racial segregation, it has been demonstrated that race is significantly correlated with worker evaluations and could potentially harm future employment opportunities (Hannák et al. 2017). This ultimately leads to wage inequalities, with individuals from low-income countries earning disproportionately less than those from high-income countries. For instance, Indian and US workers operating on AMT respectively earn a median hourly wage of $1.77 and $4.65 (Berg 2016). Since July 2012, Amazon has made it more difficult for Indian workers to open new accounts while some requesters have publicly stated that Indian workers perform 'substandard work' (Milland 2017). Another study on Upwork involving 24 Indian freelancers showed that 13 of them experienced bullying and racial harassment from requesters or fellow workers (D'Cruz and Noronha 2018). As Kuhn (2010) notes, 'Not only do freelancers lack paid sick days, they are also not covered by antidiscrimination employment legislation or safety net programmes'. Gender inequality is also a reality in the gig economy, with women's hourly wages averaging about 2/3 of men's rates (Barzilay 2019; Kullmann 2018). However, it should be noted that some platforms have recently instituted minimum wage policies. Although these measures should indeed reduce pay disparities, they may also disparage requesters from hiring women and workers from poor countries. A more adequate approach would be to simply hide worker information from requesters, including profile pictures or any other relevant clues. Further research is needed into how requesters use other clues for prejudging worker abilities.

2.2.2 Procedural justice

As described earlier, the literature on organisational justice has demonstrated that perceptions of distributive injustice are alleviated when procedural justice is high (Greenberg 1994; Folger and Konovsky 1989; Konovsky and Cropanzano 1991; Moorman 1991). In this regard, the findings of Fieseler et al. (2017) raise an interesting point. Such a high degree of distributive injustice may only be possible in a setting where procedures are also perceived as biased. In other terms, the distribution of outputs is seen as particularly unfair because the underlying decision processes that lead to it are probably an issue as well.

Indeed, research shows that procedural justice is another major source of concern for many gig workers. The study of Malhotra (2020) on ride-hailing platforms underlines multiple cases of unfairness that can be discussed in light of Leventhal's criteria (Figure 18). First, there is evidence that procedures are not consistently applied across workers, situations and time. The most common complaints relate to inconsistencies in the calculation of drivers' commissions and platform fees. It appears that ride-hailing platforms may

end up 'confusing' the algorithmic system in their quest for incentive-based earnings. This situation has worsened to such an extent that drivers have developed their own spreadsheets to compute earnings. Comparing their estimates with actual wages leads drivers to repeatedly contact the platform to get their earnings corrected, causing a great deal of frustration. As shown in the figure below, drivers also consider that algorithmic management creates a double standard in the calculation of platform fees and drivers' commissions, with the two outputs seemingly governed by different rules that are often perceived as disjointed and profoundly unfair.

Drivers' frustration over these inconsistencies is exacerbated by the reluctance of platforms to communicate algorithmic rules. Workers are unsure about what data is gathered from them and how it is used to compute wages and ratings. Dynamic pricing and surge mechanisms are perceived as unpredictable, resulting in avoidance behaviours. Even when these technologies are meant to help them, drivers remain suspicious, shedding doubt on the platform's true intentions. The guessing game is in full swing in virtual communities where workers attempt to understand the system and determine how new policies will impact them. In the face of such uncertainty, most drivers take a rather cynical view of their jobs, feeling like they are part of a grand experiment conducted by the platform.

Another major topic of complaint is related to Leventhal's criteria of representativeness. Drivers regularly criticise the platform for being heavily biased towards its customers. The main grievance is related to the fact that drivers' and customers' ratings elicit different rule structures. Most platforms now allow drivers to rate passengers, but it appears that the threshold for punitive action varies considerably between the two. Perceived as unfair, this double standard contributes to feelings of injustice and despair. More generally, it appears that the usual 'customer is always right' mantra is taken to a whole new level, resulting in relentless pressure on drivers. Platform companies tend to place very high expectations in drivers in the form of constant demands to integrate additional features as services. For instance, one of the latest additions is a music player integrated into the app and directly connected to the car speakers. The passenger is able to wirelessly take control of the music from the app and, as one driver put it: 'become the car's DJ". This is only one example of many customer-friendly features implemented with little consideration for drivers' quality of working life.

Finally, Leventhal's principles of morality and ethicality also seem to be violated, with drivers considering ratings to be very sensitive to extraneous factors such as the time of the ride or a passenger's mood. Resulting in frustration about not being rated on the basis of 'true' performance, this discourage drivers' attempts to continuously improve their work skills.

Figure 18 **Selected citations of rideshare drivers on the topic of procedural injustice**

Inconsistency
P1: 'Not one week has gone by without a mistake in my pay. This week their math doesn't add up and they left out deliveries made in non-guaranteed hours. Once again I have to fight with them about a missing $70.'
P2: '[The platform] takes your commission out of the shortest estimated route but take their service fee out of the real fare. They are playing games.'

Accuracy
P1: 'Acceptance rate I don't think really mattered, at least not in the last year or two, but cancellation rate may matter for account standing, I'm not sure. I'm sure they still track these things and use them in various ways in their algorithms, but for whatever reason they decided it wasn't beneficial to show us.'
P2: 'My rating dropped to 4.79 but I don't fully understand [how the] calculation is being done. I have a total 21 trips, 14 rated trips, and 14 Five stars. Base on my math, I should have an average rating of 5 but the app shows me an average rating of 4.79.'

Representativeness
P1: 'While drivers are complaining of wear and tear on their cars, low pay, falling demands, saturated markets, unfair ratings from [...] rude and disrespectful passengers, [platform provider] in their board meeting room where everything is made of gold and diamonds asks "how can we improve the experience of these already SPOILED [passengers]?
P2: '[Passengers getting] low rates for bad behaviour or whatever [should] get deactivated, and [shouldn't be able to] call for a ride [anymore]... I believe in what is good for the goose is also good for the gander.'

Morality and ethicality
P1: 'For all those wondering, yes driving late night on weekends will tank your rating. Maybe it is the surge, drunkenness or simply **** baggery, your ratings will take a hit and there isn't **** you can do about it.'
P2: 'Notice how [ratings] parallels human body cycles for blood sugar levels and Circadian rhythms. It proves that [platform name] ratings are not a reliable source of driver abilities. Too much is "mood" dependant.'

Source: adapted from Malhotra 2020

It should be noted that one of Leventhal's criteria of procedural justice is not reflected in drivers' complaints, namely correctability or the possibility to challenge or reverse ill-advised decisions. The above citations suggest, on the contrary, that drivers are capable of pressing legitimate claims and eventually obtaining redress. However, this result needs to be qualified, as several studies underline that drivers have little to no recourse in cases of being deactivated due to low customer ratings (Dunn 2018; Bajwa et al. 2018a; 2018b; Stewart and Stanford 2017). In fact, current evidence instead suggests that ride-hailing platforms' correctability is mainly limited to pay-related issues. For the rest, drivers actually have little say in decision-making.

In cases of deactivation, the only option for a worker is to successfully complete an approved third-party course at his own expense. Upon proof of completion, workers are allowed back onto the platform and can continue driving. According to Cassady et al. (2018), Uber is currently working on an appeal option for drivers who consider they were wrongfully removed from the platform. If properly implemented, such arrangements will enhance drivers' sense of procedural justice, resulting in a more durable relationship with the platform.

Cases of procedural injustice are equally common on crowdworking platforms. On AMT, completed assignments that are rejected result in lost pay, time and reputation, with crowdworkers left with little possibility of contestation or appeal (McInnis et al. 2016; Burston et al. 2010; Kneese et al. 2014). In fact, the platform does not even require requesters to share their reasons for rejecting completed assignments. Opacity also applies to platforms' decisions such as account suspension or banning and is a major source of frustration for crowdworkers (Martin et al. 2016). Similarly, the criteria to be met in order to become a 'Master' – an elite group of high-performing workers – are unclear. The path towards this coveted recognition is obscure and seemingly at the firm's whim (Deng and Galliers 2016). It is assumed that AMT relies on decoy tasks to assess a worker's performance, possibly explaining why the platform is reluctant to disclose evaluation criteria (Kuhn and Maleki 2017). Crowdworkers also feel unfairly treated in disputes with requesters (Fieseler et al. 2017). They see no procedural means to hold requesters accountable for unfair behaviour such as unjustified rejection, late payment or inaccurate estimation of the time needed to complete a task. Just like Uber and Lyft drivers, AMT workers end up discussing issues in virtual communities in an attempt to gain some understanding of these obscure mechanisms (Lee et al. 2015; Martin et al. 2016).

One distinct characteristic of crowdworking platforms is the extent to which workers are exposed to privacy issues (Xia et al. 2017; Xia and McKernan 2020). While it is typically assumed that the identities of requesters and crowdworkers are not mutually known, it has been demonstrated that the latter can actually be revealed using various security breaches. For instance, data triangulation can be used to associate a worker's ID with a shopping profile on Amazon (Lease et al. 2013). Alternatively, requesters can deliberately de-anonymise workers using a sequence of surveys on AMT (Kandappu et al. 2015). The prevalence of these privacy threats is still unknown and may have even more far-reaching consequences than those described in this section. In 2015, it was demonstrated that AMT was leveraged by politicians to mine data from workers and their Facebook contacts in order to match their profiles to existing voter databases (Harry 2015). As these findings were widely covered by the American press, it is likely that thousands of US platform workers realised that AMT was putting little effort into preserving their anonymity. Subsumed under Leventhal's criterion of ethicality, invasion of privacy is therefore likely to contribute to crowdworkers' feelings of procedural injustice.

The last form of gig work to be investigated with regard to procedural justice is online freelancing. However, there are currently very few studies on freelancers' experience of procedural fairness. Most of the available sources are opinion papers not backed by relevant data. For instance, Kuhn and Maleki (2017) suggest that Upwork has a relatively good record when it comes to developing fair procedures. One unusual feature of the algorithm responsible for performance assessment is that it purportedly considers whether a requester's feedback is potentially unfair and adjusts the freelancer's score accordingly. In particular, the algorithm is designed in such a way that problematic requesters are flagged, with their feedback down-weighted. However, freelancers cannot appeal to have a rating removed and Upwork has not precisely revealed how the algorithm works. Procedure opacity is legitimated by the platform as a means to prevent users from artificially boosting their ratings. This down-weighting initiative represents an attempt to promote perceptions of procedural fairness, but how it is actually received by workers remains an important topic for further research.

2.2.3 Interactional justice

In the literature, interactional justice is typically investigated on the basis of interpersonal exchanges between workers and decision-makers. In fact, several authors consider interactional justice solely from the perspective of inter-personal communications. For instance, Collie et al. (2002) framed this construct as pertaining to the attitudes and behaviours of the exchangers. Based on this definition, the relevance of interactional justice in the context of the gig economy could be called into question. Indeed, both the decision-making process and the delivery of the decision are performed by automated algorithms. In this respect, it is quite inappropriate to refer to attitudes and behaviours as a starting point for analysing interactional justice. Most studies of gig workers do not actually distinguish between interactional justice and procedural justice (Jabagi et al. 2020; Heeks 2017; Kuhn and Maleki 2017).

This raises questions about the legitimacy of investigating these two concepts separately in the gig economy, as this may only be relevant for conventional forms of employment where communications are endorsed by human beings. What is relevant, however, is to dissociate the substance – i.e. the decision-making process – from the form – i.e. the way a decision is communicated. From this perspective, interactional justice reflects the way gig workers are treated during and after the decision-making process, while procedural justice pertains to the fairness of the decision-making process itself. Separating the two allows the communicational component of the interaction to be dissociated from the processes used to arrive at the decision. Moreover, interactional justice places a specific emphasis on the values promoted by platforms, such as respect and truthfulness. Therefore, it has the potential to narrow down the perceived causes of unfairness to a set of platform attributes. For these reasons, dissociating interactional and procedural justice is beneficial for understanding the experiences of gig workers. Doing so presupposes a broader definition of interactional justice, namely 'the way decisions are communicated to workers'. Using Bies and Moar's criteria (1986),

we will now review current evidence in an attempt to identify which aspects of interactional justice are perceived as dysfunctional. Given the scarcity of relevant study materials, the following analysis is not conducted separately for each type of gig work.

Dignity and respect at work have been highlighted as strong drivers of crowdworker frustration. Several studies raise issues about the way some requesters are rejecting or failing to pay for work (Martin et al. 2016; Berg 2016; Heeks 2017). More generally, it appears that crowdworkers expect not only a fair business transaction but also a positive social relationship with requesters (Fieseler et al. 2017; Duggan et al. 2019). They expect requesters to treat them with respect and not merely as a temporary and disposable resource. Platforms' failures to enforce those standards are perceived as a clear lack of consideration for workers as well as an open declaration of being fully committed to requesters. Similarly, the absence of an appeal or dispute resolution mechanism contributes to the sentiment that workers are not considered as valuable partners (Berg 2016; Brawley and Pury 2016, Martin et al. 2016, Schmidt 2017). These findings are consistent with the psychological contract theory exposed in the first section of this report, and with the extensive literature on gig workers' expectations of organisational support (Duggan et al. 2019; Graham et al. 2017a; 2017b; Ashford et al. 2018).

Following Bies and Moar's criterion of 'property' (1986), the racial and gender inequalities exposed earlier may also contribute to perceptions of interactional injustice. In addition to being procedurally unfair, any such treatment is likely to be interpreted as a deliberate act of discrimination. As one of the participants of the Graham et al study (2017b: 9) states: '[…] they would not hire you because you're from the Philippines. That's how racist some companies are'. Another participant describes how he constantly struggles to overcome discriminatory practices and 'survive online' (see infobox below). Evidence of racism on the part of requesters notably takes the form of abusive and offensive comments directly posted on the platform (Moore and Starren 2019). Inter-worker racism is also evident, with some gig workers blaming their Indian counterparts for undercutting prices (D'Cruz and Noronha 2016). What remains to be ascertained is the actual impact of co-worker and requester behaviour on the perceived interactional fairness of the platform itself. Discriminated workers would arguably hold the platforms responsible for letting such behaviour go unpunished. Further research is required to determine the prevalence of discriminatory behaviour, the countermeasures deployed by platforms, and the overall impact of these practices on interactional justice.

Inaccurate descriptions of assignments and incorrect estimates of the time needed to complete them may also be perceived as a lack of truthfulness on the part of requesters (Fieseler et al. 2017). Workers may feel wronged and cheated when they realise the assignment is more time-consuming or less straightforward than suggested in its description. Similarly, the procedure opacity reported in multiple studies may contribute to workers' perceptions that the platform does not consider them as meaningful actors in the labour

process (Martin et al. 2016; Deng and Galliers 2016; Kuhn and Maleki 2017). More broadly, any issues related to procedural accuracy may equally affect perceptions of interactional fairness. All depends on whether workers attribute unfairness to a platform's deliberate intention to wrong them. Further research is required to narrow down the potential causes of perceived unfairness and to identify sense-making mechanisms that lead to such perceptions.

The case of Moses, an online freelancer struggling to overcome discriminatory practices

Moses is a 26-year-old translator from the Nairobi slums who uses a digital gig work platform. He often changes the geographical location listed on his profile, explaining how the platform makes it hard given he's a Kenyan. He says that identifying clients in gig-based work forces you to constantly realign your profile to fit the job description. As a result, many of Moses's clients believe that he is based in Australia, just as they are unaware that he is a college dropout rather than a successful translator. The pronounced discriminatory practices Moses is met with means that he is constantly creating a persona in order to be able to win tasks. Moses and others like him say bowing down to discriminatory practices on digital gig work platforms is a commonplace necessity: "You have to create a certain identity that is not you. If you want to survive online you have to do that."

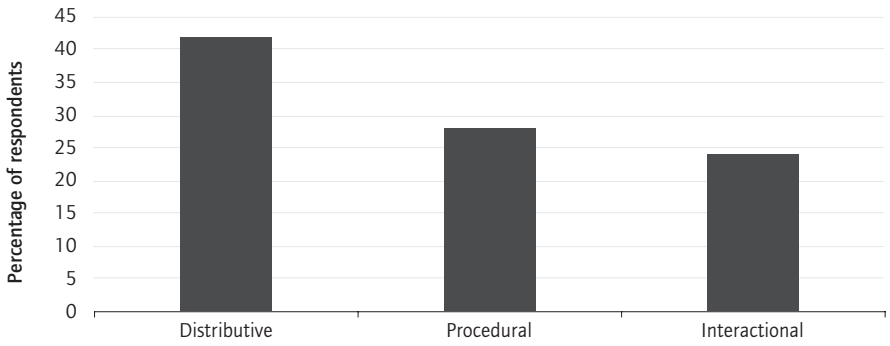
Source: adapted from Graham et al. 2017b

The absence of apologies or justifications following a ride-hailing platform's pay mistakes is likely to lead to perceived interactional injustice. Findings from Malhotra (2020) highlight drivers' frustration over platforms' lack of acknowledgement of pay-related mistakes. In most cases, disputes over payment of wages or tips are answered by automated mailing. Even when the error is corrected, workers are left with little information on why and how miscalculation occurred. Likewise, gig workers are typically provided with no justification in cases of temporary or permanent deactivation (Dunn 2018; Bajwa et al. 2018b; Stewart and Stanford 2017).

In this section, we have investigated the three different forms of organisational justice in an attempt to identify the root causes of workers' sentiment of mistrust towards labour platforms. Findings suggest that platforms do not live up to workers' expectations of distributive, procedural and interactional justice. Commonly quoted concerns seem to be related to unfair pay, procedure inconsistencies and the lack of information on how algorithms work. Unfortunately, the current state of the art does not allow anything more than this mere observation. Further research is required to concurrently assess the three sub-types of organisational justice for each type of platform work. This could be achieved using multidimensional questionnaires, such as the Organisational Justice Scale (Niehoff and Moorman 1993), showing adequate reliability and validity (Gurbuz and Mert 2009). Such an analysis would allow the development of countermeasures tailored to specific platform features.

To date, only one study has attempted to concurrently assess distributive, procedural, and interactional justice, though the analysis conducted by the authors is questionable. Fieseler et al. (2017) conducted an open-ended survey on 203 AMT workers to investigate perceptions of unfairness and potential improvements from a worker point of view. Following a content analysis approach, participants' comments were analysed for cues pertaining to each of three forms of organisational injustice. A classification was then carried out to identify the most problematic dimensions of organisational justice on AMT. Findings revealed that distributive injustice was the prime concern for more than 40% of participants (Figure 19). Workers' complaints centred around three main topics: requesters undervaluing their hard work, time spent on rejected assignments, and not being in a financial position to walk away from crowdwork. Procedural and interactional justice follow each other closely, with respectively 28% and 24% of participants reporting them as a prime source of concern. However, under closer scrutiny, it appears that several comments may have been misclassified by the authors. At least three of the illustrative comments of procedural and interactional injustice partly or fully reflected a lack of distributive justice (Figure 20).

Figure 19 **Prime concern of fairness**



Source: adapted from Fieseler et al. 2017

Figure 20 **Instances of potential misclassifications**

Misclassified as procedural injustice:
P8. 'I have encountered many hits with abysmal pay for a large amount of tedious work'
P97: 'There have been times that requesters have Turkers like me working for less than a dollar an hour. It is robbery pure and simple'

Misclassified as interactional injustice:
P95: 'Many requesters think that because we aren't 'real' employees that we don't deserve fair wages'.

Source: Fieseler et al. 2017

These inconsistencies are likely to undermine the actual discrepancies between the three forms of organisational justice. Proper classification can be expected to result in an increase in the prevalence of distributive injustice at the expense of the two other forms. Even so, it is safe to conclude from these results that distributive justice is indeed the main concern of AMT crowdworkers. For procedural and interactional justice, findings should be considered with more caution, with further research necessary to gain an accurate picture of their relative distribution.

Questions and open issues for further research

- How does organisational justice compare between the three types of gig work? Is there any difference related to the forms of justice (distributive, procedural, interactional)?
- The lack of which form of justice is most detrimental to organisational trust and associated psychosocial outcomes? Is there any difference between the three types of gig work?
- To what extent does unfair requester behaviour impact workers' trust in the platform? How much of it is due to inadequate platform policies or requester violations of said policies?
- What are the expectations of gig workers in terms of organisational justice? What role could virtual communities play in structuring and voicing gig workers' concern?
- Beside algorithmic management, what are the specific work arrangements that result in the experience of a lack of organisational justice?
- What measures could be taken to adapt these specific work arrangements to enhance organisational justice?

2.3 Workplace power relations

Algorithmic management is leading to high job standardisation due to more predictive patterns in the delivery of work. Platforms are the primary beneficiaries of such practices as they are able to exercise greater control over the terms of the exchange (ILO 2019). Gig workers, on the other hand, are left with very little discretion or latitude in the way they perform their duties. Besides adding rigidity to work processes, many scholars argue that algorithmic management erodes the reciprocity found in traditional employment relationships and strengthens power asymmetries at gig workers' expense (Chan and Humphreys 2018; Duggan et al. 2019; Al-Ani and Stumpp 2016; Rosenblat and Stark 2016; Kinder et al. 2019; Dazzi 2019). Owing to the widespread use of remote and automated supervision, workers have very few

opportunities to resist authority and reshape their relations with management. Algorithmic management is creating what several authors describe as a 'black box', obscuring the true nature of decision-making processes and placing gig workers in a weaker position than traditional workers (Degryse 2016; Chen 2017; Lee et al. 2015; Scholz 2016; Moore and Joyce 2019).

Bogus self-employment plays a major role in gig workers disempowerment. By individualising the employment relationship, platforms provide workers with fewer resources to withstand job demands and exercise workplace rights (Huws et al. 2019; Cippec 2019; Moore 2018; de Groen et al. 2018; Drahokoupil and Piasna 2017; Graham et al. 2019). For instance, Uber describes itself as a technology company that facilitates access to goods and services (Rosenblat and Stark 2016; Smith and Leberstein 2015). In 2014, the company argued that it was a neutral intermediary that 'does not provide transportation service' (Uber Technologies 2014). Still today, drivers are not considered workers but 'partners' or 'consumers' depending on which location they operate from (Muller 2020; Gregg 2011). Similar to passengers, they are merely treated as end-users of the application mediating the labour process. This terminology allows platforms like Uber to dissociate from the traditional employer-employee relationship and circumvent drivers' rights as workers (Rosenblat and Stark 2016; Silberman 2017). What is even more alarming is that gig workers can hardly unionise and, in some cases, are even prevented from doing so (Prassl and Risak 2015). The level of collective rights is therefore extremely low, if not non-existent (Kahancová et al. 2020).

Following the literature, asymmetric power relations are reflected in 'vulnerabilities to workplace authoritarian, abusive or threatening treatment, and powerlessness to exercise legal rights' (Vives et al. 2013). In this regard, workplace power relations are highly relevant for workers' mental health. A potent workplace stressor (Vives et al. 2010; Brooker and Eakin 2001; Benach et al. 2007), power asymmetry leads to overwork, sleep deprivation, exhaustion and discriminatory practices (Wood et al. 2019; Amable et al. 2001). It also impacts workers' mental health through the unequal distribution of material resources (Benach et al. 2010). Weak structural power affects both women and men but is exacerbated by gender-related asymmetries within or outside the workplace (Menéndez et al. 2007). Unbalanced power relations are often perceived as organisational injustice, thereby contributing to organisational distrust and associated psychosocial outcomes (Scott and Byrd 2012).

In traditional employment, power asymmetries are reflected in the hierarchical structure and enacted by various means of managerial observations (Townley 1993; Patriotta and Brown 2011). In these environments, workers exercise agency either through compliance, individual resistance or collective actions (Crozier and Friedberg 1980; Vallas 2006; Elmer 2012). However, current theories fail to explain power asymmetries in digital platforms for two main reasons (Curchod et al. 2019). First, the traditional distinction between managers and workers is blurred, as is the hierarchical structure. Second, face-to-face managerial interactions are replaced by impersonal algorithmic management and digital surveillance practices. Consequently, assumptions

relating to hierarchical power and subordinates' exercise of agency do not hold in these increasingly virtual environments.

That said, the recent work of Pastuh and Geppert (2020) offers an innovative framework for understanding how algorithmic management shapes workplace power relations in the modern gig economy. By applying core ideas of the 'circuits of power' theory (Clegg 1989), the authors distinguish between five types of control-and-influence mechanisms used by platforms to influence workers' behaviour.

– Digital platforms rely on an **algorithmic bureaucracy** regime where activities are standardised in simple '*if-A-then-do-B*' rules. These routines are meant to reduce the vast uncertainty and limit the manifold alternatives of possible user activities (Kirchner and Schüßler 2018). In contrast to traditional bureaucratic organisations, these mechanisms of control are almost entirely embedded in the platform's software.

– Digital platforms implement **rating systems** that allow requesters to evaluate workers' performance. In this way, platforms outsource managerial tasks, empowering requesters to act as direct managers (Stark and Levy 2018; Rosenblat and Stark 2016). These systems represent the only visible element of output control, since gig workers usually have no direct contact with platforms.

– Digital platforms apply various forms of **market manipulation** such as surge or dynamic pricing systems (Chen et al. 2015). In most cases, these systems are coupled with monetary incentives and push-up notifications sent to workers whether they are logged in or offline (Rosenblat and Stark 2016; Shapiro 2017).

– Digital platforms purposely leverage selective information in order to influence workers' behaviour. These mechanisms, often referred to as '**info-normative controls**' (Gandini 2019), are meant to motivate workers to act in certain ways profitable for the platform. Taking advantage of information asymmetry, platforms expose, hide and circulate certain information to induce a desired behaviour (Scheiber 2017).

– Digital platforms embed **automatised nudges** in their software to influence workers in a non-coercive way, including **gamification** elements such as gratification badges and target incomes (Scheiber 2017). These persuasive mechanisms have been demonstrated to effectively trigger cognitive biases and social influence in predictable ways for businesses (Fogg 2002; Nyr 2014).

These mechanisms form a diversified portfolio of control-and-influence measures firmly rooted in algorithmic management. There is mounting evidence that platforms are taking advantage of these practices to shape power asymmetries and limit workers' opportunities to resist or develop

effective forms of internal voice. In this section, we will review available data related to each of these power mechanisms, discussing how they may impact psychosocial outcomes.

2.3.1 Algorithmic bureaucracy

Comparable to traditional bureaucracies, digital labour platforms have precise rules that workers must comply with. These rules define the types of services that can be exchanged and specify the underlying processes and conditions of the transaction. What is unique to gig work, however, is that these rules are entirely implemented through a user interface (Kirchner and Schüßler 2018). What may appear to be a trivial difference is actually a major source of disempowerment for workers as the interface demarcates every corner of the labour process. Workers simply cannot act in a way not already included in the interface, and therefore have no margin in deciding how to complete an assignment (De Stefano and Aloisi 2018). The rules of the algorithmic bureaucracy not only erase variability, but also channel thinking into a narrow technological determinism projecting an inescapable uniformity upon labour. In this context, bargaining and negotiation are likely to give way to feelings of fatalism and resignation among the workforce.

In traditional forms of employment, even the most rigid work arrangements provide workers with certain zones of uncertainty that can be used for voice, bargaining and resistance (Strauss et al. 1963; Crozier 1964; Barley 1986). In the gig economy, however, the combination of algorithmic bureaucracy and bogus self-employment impedes worker access to such basic power resources as guaranteed pay rates, participation rights and protective labour regulations (De Stefano 2016). Interface-mediated processes eliminate the need for face-to-face interactions with platform managers, which might otherwise provide unwanted room for developing personal relations and voicing concerns (Vandaele 2018). For instance, an interview study conducted among technical translators showed that the anonymous management of their work had a demotivating effect by making it difficult for them to influence their working conditions (Bertil et al. 2019). In that sense, algorithmic management does a fantastic job at obscuring and containing anticipatable criticism or potential constructive claims. In the absence of proper channels to communicate their demands, gig workers –once again– turn to virtual communities. As demonstrated in previous sections, forum postings reflect a certain degree of fatalism. Confirming the status quo as unchangeable, most workers merely discuss ways of making the best of the rules dictated by the platform. Moreover, the vast majority of virtual communities are not supported by the platforms, meaning that workers are probably clear about the unlikelihood of their concerns being heard by platform holders.

That said, recent evidence suggests that virtual communities allow some forms of contestation. The concept of 'algoactivism' is advanced by Kellogg et al. (2020) to describe emerging tactics along these lines. Workers use the encouragement and social support they receive from the forum to regain control by resisting, switching or gaming the system (Malhotra 2019; De

Stefano and Aloisi 2018). Möhlmann and Zalmanson (2017) illustrate these three types of mechanisms through forum threads posted on Uberpeople.net (Figure 21).

While such findings show that some drivers appropriate the system to protect their employment opportunities, they also demonstrate workers' inability to change the rules. These strategies can be thought of as second-best solutions reflecting workers' resigned acceptance of the binding nature of algorithmic bureaucracy. It should be noted that most of these resistance mechanisms are in violation of a platform's code of conduct and could therefore result in deactivation. For instance, Rosenblat and Stark (2016) report an e-mail from Uber advising a driver against surge manipulation: 'A passenger let us know that they felt you unfairly cancelled their trip to wait for surge to kick in, or that you otherwise unfairly gave preference to surge trips instead of their request.' The communication goes on to state that the driver will be deactivated if similar situations happen again. Such evidence suggests that these strategies may be experienced as stressful by workers, depending on the perceived risk of 'being caught'. Further research is required to ascertain the prevalence of these practices and their impact on psychosocial outcomes.

Figure 21 **Selected citations of rideshare drivers resisting, switching, or gaming the system**

Resisting the system
P1: 'If possible, refuse all pool trips. Great for Uber, bad for us.'
P2: 'Turn on all apps and ignore pool [or] line jobs*. Trust me, you will be happier.'

Switching the system
P1: 'Make the switch to Lyft and save our jobs while we have a chance. Uber just wants to give our jobs to machines and keep lowering rates.'
P2: 'You ever heard of Juno? Lyft? Gett? You get logged off [Uber], go on another platform, and work.'

Gaming the system
P1: 'I tell them this: "I am going to drop you [the passenger] off and end the trip" … Then I drop them off and cancel [the trip] so they cannot rate me, [and] report the issue immediately as a rude and angry [passenger].'
P2: 'Guys, stay logged off until surge. Less supply [and] high demand = surge.'

*Uber's pool and Lyft's line jobs are unpopular ridesharing options where passengers are pooled together with strangers heading in the same direction.
Source: adapted from Möhlmann and Zalmason 2017

Apart from virtual communities, Vandaele (2018) identified additional forms of collective representation among online freelancers and on-demand platform workers. These forms follow either a logic of membership such as grass-roots unions and union-affiliated guilds, or a logic of influence such as longstanding unions and labour market intermediaries. While the impact

of the latter is difficult to estimate accurately, further research should be considered to determine the ways the logic of membership is reshaping power resources in the modern gig economy.

2.3.2 Rating systems

Whereas platforms' architecture enforces the rules of algorithmic bureaucracy, rating systems cover a wider range of activities or information not directly processed through the interface. Ratings relate to the experienced quality of the service, including potential misconduct or violation of rules (Kirchner and Schüßler 2018). They are used to create a climate of discipline, ensuring that workers' behaviour panders to rating requirements (Florisson and Mandl 2018; Cockayne 2016). Requesters' feedback is processed by algorithms to identify and dismiss unproductive or 'borderline' workers, with no right to appeal (Aloisi 2016a; 2016b). In that sense, rating systems and algorithmic bureaucracy conveniently complement each other in a way maximising platforms' enforcement power.

Catchy terms used by platforms to designate assignments further obscure the labour process. Customers may no longer be aware that, behind gigs, rides or HITs, are fellow human beings performing the work (Aranguiz and Bednarowicz 2018). Indeed, current evidence suggests that the impersonal nature of rating systems induces uninhibited and careless behaviour. Raval and Dourish (2016) surveyed 121 platform drivers, showing that 45% rated the effectiveness of the rating system as very poor. They reported frustration over seemingly arbitrary requester ratings with no underlying rationale. Similarly, participants of Aloisi's (2016) study indicated that ratings were 'arbitrary, unfair or biased', with few options for recourse. Silberman et al. (2010) reported frequent problems for AMT workers, including arbitrary rejections, fraudulent tasks, prohibitively short deadlines, long pay delays and uncommunicative requesters. Bederson and Quinn (2011) noted that one of the underlying problems was the relative lack of consequences for cheating behaviour. Most platforms have no policies or structures in place to deal with workers who suffer damage to their online reputation, or to recompense lost income (Florisson and Mandl 2018).

Through arbitrary ratings and low correctability, platforms are tilting the balance of power in favour of requesters – raising the 'customer is always right' motto to a whole new level. For workers, such a system brings with it enormous risks of unfair, arbitrary or inaccurate evaluations. Scholars point out gig workers' tendency to tolerate abusive or exploitive behaviour from requesters, out of fear that their ratings may be adversely affected by complaining or resisting (Brustein 2016; Slee 2016). Stanford (2017) concludes that as 'long as it is legally permissible to discharge workers on the basis of unverified consumer survey responses, this rating system will be a powerful and inexpensive weapon in employers' labour extraction arsenal'.

2.3.3 Market manipulation

Several scholars point out that algorithmic management can potentially result in abusive practices (De Stefano 2018; Moore and Joyce 2019; Risak 2018). When designing algorithms, platforms can deliberately deceive workers by encouraging behaviour that works against the latter's economic interests but improves platform profitability. Given the inherent opacity of algorithmic management, these practices would be simple for platforms to implement but difficult for workers to detect. In fact, there is preliminary evidence that Uber has – at least – experimented with deceptive market manipulation practices (Calo and Rosenblat 2018). For instance, Uber's app shows a passenger an upfront price by estimating the time the ride will take, but calculates the driver's fare according to the distance and time the ride actually takes. Multiple cases have been documented where the Uber app has shown passengers and drivers drastically different fares for the same ride. Setting aside Uber's commission, drivers earned substantially less than the customer paid, even when the ride took approximately the time and distance estimated (Muller 2020). Another example comes from an interview with a researcher working for Uber (Withnall 2016). The researcher disclosed that the company had evidence that passengers whose phones were running out of battery were willing to pay a higher price for a ride. In a subsequent communication, Uber representatives hastened to clarify that this information was 'absolutely not' used to charge higher fees to passengers… Was it to advance scientific knowledge on such a hot topic? We leave it to the reader to assess which of the two scenarios is most probable.

Leaving irony aside, this embarrassing interview reveals that Uber measures users' inputs beyond mere localisation, fuelling growing suspicion that the company uses such information for extracting further profit (Muller 2020; Popper 2014; Griswold 2017). Considering the scope of data that modern smartphones can collect, there is no shortage of levers that platforms could experiment with to manipulate workers' behaviour. For instance, Uber could wage-discriminate its drivers by offering only low-value fares to those demonstrating a willingness to accept them. Conversely, the company could reserve high-value rides for drivers on the verge of ending their shift or leaving the platform. This is echoed by studies showing inconsistencies in Uber's surge pricing mechanism (Chen et al. 2015; Muller 2020). On initially registering the patent for this, Uber stated that it was a means to encourage more drivers to get on the road when demand was high (Rosenblat and Stark 2016). However, there is preliminary evidence that surge pricing redistributes the existing supply of drivers rather than adding to it. For instance, Chen et al. (2015) showed that San Francisco has three times more surges than Manhattan despite having a much greater supply of cars. Additionally, the authors demonstrated that surge prices have only a very minor impact on car supply. The company claims that the system only 'affects a tiny minority of all Uber rides, less than 10% of all trips' (Gurley 2014). Again, this is a rather surprising claim since surge pricing features as a recurrent concern among drivers. Analyses of postings on virtual communities suggest that the system leaves no one indifferent (Rosenblat and Stark 2016; Lee et al. 2015). Many

drivers express frustration / enthusiasm alike over the opacity / dynamism of surge pricing. Screenshots of surge rates and zones are often posted to display eagerness for the pay lottery. In this regard, Rosenblat and Stark (2016) drew interesting parallels with gambling or gaming as surge pricing propels individuals into a similar emotional space (Cherry, 2012; Schüll, 2012). These findings add to the growing body of evidence that Uber's narrative on the underlying mechanisms of surge pricing may not reflect reality.

Far from being anecdotal, these personal testimonies also reveal that algorithmic management profoundly affects working conditions. By coordinating clusters of labour in response to market fluctuations, Uber has the power to steer drivers to work at particular places at particular times. Moreover, there is little to protect workers from decisions that increase a platform's profitability at the expense of their individual earnings. Current legislation does not require platforms to provide workers with guarantees on the reliability of their incentive programmes. In this context, the benefits of algorithmic management accrue mostly to the platform while the costs of errors and inefficiencies are borne by the workers. This allows platforms to experiment with a wide range of arrangements without having to worry about the consequences of any wrong step. Many authors stress the need to examine how mechanisms such as surge pricing affect workers' behaviour, and what importance workers attach to algorithm transparency (Lee et al. 2015; Chen and Sheldon 2015; Kreis 2019). Further research is required to unveil the underlying mechanisms of Uber's surge pricing algorithm, and to investigate other means of market manipulation in other types of platforms. Another area deserving further scrutiny concerns the impact of such features on power asymmetries and workers' opportunities to develop effective forms of internal voice.

2.3.4 Info-normative controls

Regardless of the specific terms used to describe their legal obligations, most digital labour platforms rely on info-normative controls to exert power and authority over workers. For instance, Uber drivers are not shown destination or fare information until they accept a ride. Hiding these details prevents drivers from turning down trips that they might consider insufficiently lucrative (Dunn 2018). Blind acceptance is made even riskier by Uber's imposition of minimum fares. According to Rosenblat and Stark (2016), drivers in Savannah (Georgia, USA) could earn as little as $3.20 for a ride without taking fuel or car wear and tear into account. Workers daring to cancel unprofitable rides bear the risk of being temporarily or permanently deactivated. In an interview study, Mäntymäki et al. (2019) highlight the lack of information as a major source of complaints relating to the administrative dimension of work relations. Many drivers stressed the need for more transparent work-related information in order to make better decisions regarding their work options. For instance, having an idea about where a passenger is heading would help them to effectively plan their working day, especially when considering driving a last passenger on their way home.

On AMT, workers are unable to effectively filter and search for assignments in line with their interests (Chilton et al. 2010). According to Silberman et al. (2010), the interface only allows assignments to be sorted by creation date or reward amount, not providing more advanced features like wage rate, type of task or level of difficulty. Therefore, workers agree to a rate before even knowing what the assignment involves (Graham et al. 2017a; 2017b). There is evidence that requesters take advantage of these limitations in at least one way, manipulating the metadata of unchosen assignments so that they are listed as new and appear at the top of the list (Chilton et al. 2010). However, most of the studies on the usability of AMT are rather old and may not reflect current features – stressing the need of further research.

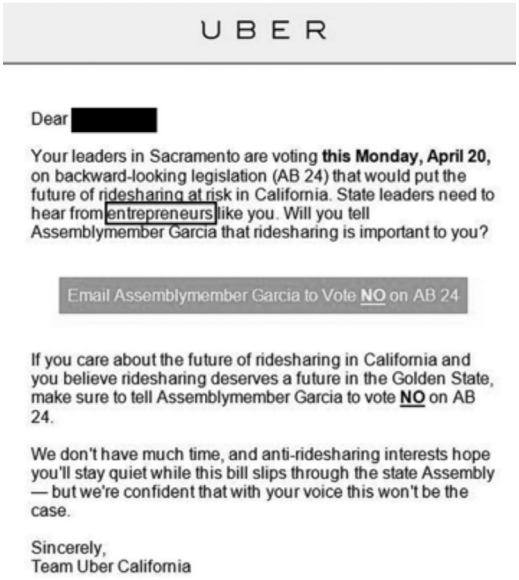
AMT's reputation features are equally asymmetrical (Irani and Silberman 2013; Marlow and Dabbish 2014). Workers build reputation by successfully completing tasks which allow them to access better paying tasks. Consequently, many assignments are not directly available to new or underperforming AMT workers. By contrast, requesters with a bad reputation or a fresh account have all of the same tools and resources as a veteran. They are able to judge workers by a number of metrics such as qualifications, location or number of tasks completed. Workers do not have access to similar information regarding requesters, making it difficult for them to spot abusive requesters (Martin et al. 2014). Similarly, online freelancers working on Upwork do not have access to any information on requester reputations, while their own metrics are available to requesters (Jarrahi et al. 2019). This means that requesters are far less reliant on their reputation to access labour, while AMT workers are unable to use reputation to reduce risks (McInnis et al. 2016).

These various practices seem to converge towards a common goal: preserving a high degree of information asymmetry. In contrast to requesters, workers only have access to a narrow range of tools to help them make informed decisions. One potential explanation for this discrepancy is related to the willingness to work. Displaying accurate information about requesters' reputation or wage efficiency would arguably discourage some workers from taking on certain tasks. Considering that most platforms rely on a commission-based business model, they naturally have a vested interest in preserving information asymmetry to ensure that no assignment is left uncompleted. Information asymmetries are even more salient between workers and platforms. As described in the previous section of this report, gig workers have no access to the information used by algorithms to match assignments, set prices or compute ratings. Such procedural opacity allows platforms to dodge bargaining and enforce unfair practices on a 'take it or leave it' basis.

Besides hiding relevant information from workers, there is evidence that platforms employ 'sense-giving' strategies to legitimise their self-employment model (Rosenblat and Stark 2016). Using internal communications, ride-hailing platforms deploy info-normative controls framing driving work as 'autonomous, self-determined entrepreneurship'. According to the authors, these manoeuvres can be seen as an attempt to influence workers and impede

the emergence of counter-discourses. For example, in 2015, Uber attempted to induce drivers to protest against the regulation of ride-hailing in Sacramento, California. The platform sent empowering e-mails calling on them to vote NO to state legislation bringing new restrictions for ride-hailing companies (Figure 22). Despite these desperate efforts to manipulate public opinion, current evidence suggests that very few drivers actually consider themselves as entrepreneurs due to these power asymmetries (Rosenblat and Stark 2016). Even more disturbing is the recent report of 'Cash Investigation' showing that food delivery company Deliveroo used its monitoring system to locate couriers who protested against unfair working conditions (Cash Investigation 2019). The analysis of more than 6000 pages of internal e-mails revealed that the company intensively reviewed strikers' profiles to find grounds for deactivating them. This confirms Vandaele's (2018) initial concerns that digital surveillance and algorithmic management may be used by platforms to stifle any protest by simply disconnecting 'troublemaking' couriers.

Figure 22 **In April 2015, Uber drivers in Sacramento received this notice from the platform**


UBER

Dear [redacted]

Your leaders in Sacramento are voting **this Monday, April 20,** on backward-looking legislation (AB 24) that would put the future of ridesharing at risk in California. State leaders need to hear from entrepreneurs like you. Will you tell Assemblymember Garcia that ridesharing is important to you?

Email Assemblymember Garcia to Vote NO on AB 24

If you care about the future of ridesharing in California and you believe ridesharing deserves a future in the Golden State, make sure to tell Assemblymember Garcia to vote NO on AB 24.

We don't have much time, and anti-ridesharing interests hope you'll stay quiet while this bill slips through the state Assembly — but we're confident that with your voice this won't be the case.

Sincerely,
Team Uber California

As shown by these examples, info-normative controls are in direct contradiction to the rhetorical framing of gig workers as entrepreneurs and demonstrate that platforms have full power to control virtually all aspects of the activity. Much of the literature on gig work focuses on dispelling this rhetoric of neutrality and displaying how labour platforms are restructuring power relations. Several studies demonstrate that information asymmetries result in uneven power dynamics between workers, platforms, and requesters (Rosenblat and Stark 2016; Jarrahi et al. 2019; Kingsley et al. 2015). Trust and cooperation are hard to develop in a context of asymmetrical relationship,

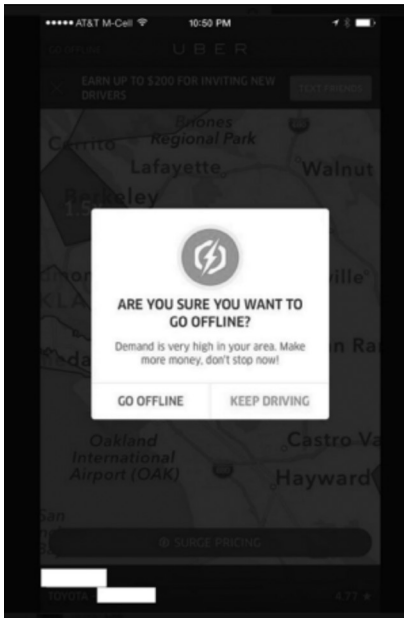
as the underdogs lack clarity on the true intentions of the figure of power (Granovetter 2005). In an attempt to regain control and clarity, workers experiment with third-party tools and share insights on virtual communities (Malhotra 2019; De Stefano and Aloisi 2018; Möhlmann and Zalmanson 2017). In either case, they bear the costs of information asymmetries.

2.3.5 Nudging and gamification

Mechanisms used to influence gig workers' behaviour also include elements of gamification and nudging intended to stimulate worker productivity (Gandini 2019). This involves setting up soft-control systems giving individuals information on potential additional income when they behave in certain way (Allaire et al. 2019). For instance, the Uber app displays working times, digital interactions and individual performance data fostering the achievement of 'personal bests' (Scheiber 2017). Achieving performance thresholds can result in higher compensation levels and upgrades within the driver hierarchy, incentivising drivers to take on higher workloads. Similarly, the 'Uber quest' feature rewards drivers with a bonus for completing a certain number of trips within a given timeframe (Kreis 2019). Similar to video games, the app provides a stimulus when a worker reaches a milestone (e.g. a small firework display combined with a pleasant tune). Surge pricing is another example of Uber's institutionalised nudging practice as it includes heat maps, incentives, and frequent messaging (Rosenblat and Stark 2016). Rather than an appeal from Uber in its position as employer (i.e. 'we would like you to keep working'), these messages reflect an – presumably – algorithmically derived idea that demand is high in a specific location at a specific time. These push-up notifications arrive at key moments, such as when drivers are about to log off (Figure 23). Drivers' responses to nudging range from scepticism of exaggerated demand to an enduring willingness to continue working despite significant fatigue (Rosenblat and Stark 2016).

If workers are merely 'users' of a leading-edge application, then nudging is just another form of persuasive advertising. However, when coming from an employer, it certainly has a stronger managerial element of control. What Woodcock and Johnson (2018) characterise as 'gamification-from-above' is particularly relevant for securing cooperation where arm's-length relationships restrict platforms' ability to closely supervise workers. According to Scheiber (2017), such practices limit workers' informed decision-making and hinder any forms of resistance potentially challenging existing work arrangements. Uber's surge pricing mechanism demonstrably increases competition among drivers, thereby impeding the emergence of solidarity, collective action and interest formation among workers (Schor 2018). Aloisi (2015) uses the term 'atomised' with reference to the absence of direct encounters between workers and, more generally, to capture the firm grip that a platform has on the type and frequency of social interactions between them. Interestingly, Kreis (2019) notes that gamification and nudging strategies mainly pertain to platforms proving physical services. The author suggests that it could be due to the fact that most online work can be done at any time, and therefore does not require workers to be encouraged to work during high demand times.

Figure 23 **An example of nudge delivered to drivers when logging off**



Source: adapted from Rosenblat and Stark 2016

In sum, much of the research points to a power structure dominated by platform owners and their customers. There is growing consensus that algorithmic management and digital surveillance are shaping historically entrenched inequalities. Platforms are able to foster power asymmetries using a diversified portfolio of techniques, ranging from bureaucratic routines and financial incentives to various attempts of nudging and sense-giving. These persistent attempts to influence worker behaviour further complicate platforms' claim that they operate as neutral intermediaries (Rosenblat and Stark 2016). Current evidence suggests that algorithmic management prepares the ground for unfavourable working conditions and hinders workforce resistance. However, very few studies have investigated these mechanisms on crowdworking or online freelancing platforms. Most research on this topic focuses on platforms mediating physical services, and especially on Uber. Future studies should investigate the nature and prevalence of influence-and-control mechanisms in the two other type of platforms. Following Vandaele (2018), 'any meaningful analysis of the representation and voice of platform workers should take into account the diversity of platforms and the associated variance in workers' power resources'. The innovative framework presented in this section (Pastuh and Geppert 2020) should enable researchers to further explore some of the unique implications of this type of power mechanism in the gig economy, and to engage in future research around what can be done to mitigate negative worker outcomes associated with algorithmic management. Comparative and longitudinal studies based on circuits of power should provide a more clear-cut and systematic picture of the link between power configurations and labour conditions in heterogeneous gig work settings. Moreover, the emergence of a wide range of resistance strategies opens

up new research avenues and perspectives. Further research is needed to understand how these reactions modulate the impact of digital surveillance and algorithmic management (Kellog et al. 2020). This kind of research could ultimately contribute to providing detailed blueprints for successful worker emancipation triggered both 'bottom-up' by workforce resistance and 'top-down' by better regulation. Looking further ahead, specific attention should be devoted to contact-tracing apps used to fight COVID-19 and their potential to further sow the seeds of a culture of workplace hyper-surveillance (Ponce Del Castillo 2020).

Questions and open issues for further research

- How prevalent are the various types of influence-and-control mechanisms in the three types of gig work? To what extent do these various practices contribute to fostering power asymmetries?
- Besides surge pricing, internal communications and one-sided rating systems, what other specific work arrangements do platforms rely on to deploy these mechanisms?
- To what extent do influence-and-controls mechanisms contribute to psychosocial outcomes such as work-related stress, organisational trust and exhaustion?
- What regulative measures would facilitate power structures more supportive of gig workers' voice and micro-political activities?

3. Work transience and boundaryless careers

These last few decades have been marked by radical changes in employment relationships and organisational structures, mainly driven by globalisation, competitive pressure and rapid technological advances (Fernandez and Enache 2008). In their book 'The Boundaryless Career', Arthur and Rousseau (1996) urge researchers to rethink their ideas of what a career entails. Because most companies are no longer able to guarantee lifetime employment, workers have gradually developed careers transcending the boundaries of a single employment setting. In that sense, a boundaryless career is characteristic of working life in modern organisations that place less emphasis on intra-organisational boundaries (i.e. hierarchical levels and functional partition) and that require the crossing of boundaries between the organisation and the myriad of networks it establishes with other organisations and individuals (Greenhaus et al. 2010).

One distinguishing feature of boundaryless careers is that they involve both physical and psychological mobility dimensions. While physical mobility relates to actual transitions between jobs, organisations, occupations and geographical areas, psychological mobility refers to an individual's perceived

capacity to make transitions such as intra-role and extra-role adjustments (Sullivan and Arthur 2006). It relates to perceptions of career boundaries, and beliefs about how much the individual is constrained by them or can transcend them (Erdogmus and Aytekin 2012). Career perspectives can therefore be described under a two-by-two matrix comprised of the two independent continua of mobility (Figure 24). To make this model more comprehensible, the authors describe four quadrants reflecting 'pure types' of careers. However, a boundaryless career is not an either-or proposition, instead characterised by varying degrees of physical and psychological mobility.

Figure 24 **Two dimensions of boundaryless careers**

		Physical mobility	
		Low	High
Psychological mobility	Low	Quadrant 1	Quadrant 2
	High	Quadrant 3	Quadrant 4

Source: adapted from Sullivan and Arthur 2006

Quadrant 1 is characterised by low levels of both physical and psychological mobility. According to the authors, such careers may be appealing but also enduring. For instance, a long-tenured NASA engineer may have difficulties crossing career boundaries due to the low transferability of his highly specialised knowledge. On the other hand, such a person may have little interest in switching employers or occupation because of the unique challenges and job security his current position offers. In this specific case, physical and psychological boundaries are likely to remain. Chronically unemployed individuals or those lacking basic skills and training also belong to this quadrant. Unlike NASA engineers, they are more than likely to negatively experience the lack of career opportunities.

Quadrant 2 is characterised by high levels of physical mobility but low levels of psychological mobility. This would the case of a waiter or bartender willing to travel the globe, switching jobs as he moves from one country to the other. Another example would be a teacher changing schools at short notice to follow the geographically mobile career of his partner. In either case, individuals in this quadrant do not seek any psychological benefit (career-wise) from these physical transitions. Some careers in this quadrant may become dysfunctional as they unfold. For instance, a software developer unwilling to learn new programming languages may decide to change jobs when his current employer decides to migrate to the newest system. While his skills may remain in demand for some time, he will find fewer employment opportunities as the number of old systems dwindles.

Quadrant 3 is characterised by low levels of physical mobility but high levels of psychological mobility. Individuals in this quadrant sustain high expectations of their own employability without actually changing employers. They may seek other kinds of psychological mobility outside the workplace

(i.e. volunteer work) or by introducing new ideas into the workplace. This is typically the case with respected academics, skilled nurses or experienced consultants. Psychological mobility can however cause problems. This would be the case of a specialised researcher assigned to projects unrelated to his research specialisation. Confidence in his own abilities may lead the researcher to lose touch with developments in his field, making it difficult for him to find a more psychologically meaningful situation in the future.

Quadrant 4 is characterised by high levels of both physical and psychological mobility. Individuals in this quadrant regularly switch to a new job or employer, while also frequently changing their psychological career orientation. This would be the case with a chef who worked for several restaurants before opening his own establishment. Each new job helped build up his expertise, both inside and outside the kitchen, allowing him to muster enough self-confidence to coordinate every aspect of the job. It should be noted that the subjective sense of career success may differ from the expectations of society at large. For instance, individuals may purposely 'get off the fast track' to pursue less demanding schedules allowing self-reflection and renewal. Conversely, one may take on unattractive work or accept lower-paying positions if these match a partner's schedule. Finally, compulsive learners also fall into this quadrant as they make many lateral transitions to experiment with different roles and functions.

As demonstrated in these quadrants, the boundaryless career perspective presupposes that individuals maintain a high degree of self-responsibility for their career choices and follow personally meaningful values in making career decisions. Individuals are assumed to be adaptable and proactive in managing their careers, especially in times of personal or organisational change. This contrasts with a more traditional career perspective where individuals look to the organisation to determine the career path to be followed. According to Parker and Arthur (2004), pursuing a boundaryless career (i.e. Quadrant 4) presuppose three types of career competencies:

– Knowing how: skills and expertise in specific fields
– Knowing whom: development of career-relevant networks
– Knowing why: motivation and professional identity

Using these competencies allows individuals to cross boundaries from one organisation to another by pursuing job contacts or leads, expanding knowledge and skills, and establishing connections with a wide network of influential people outside the employing organisation. In fact, it has been demonstrated that workers can transfer these competencies between jobs and employers (Arthur et al. 1999; Mayotte 2002).

To summarise, the boundaryless career perspective offers a range of combinations of psychological and physical mobility that can occur during the course of a working life, as well as the core competencies required to make these transitions. Defenders of this framework claim that most careers are moving towards greater psychological and physical mobility,

and that workers generally benefit from a boundaryless career (i.e. Forrier et al. 2009; Miles and Snow 1996; Zeitz et al. 2009). Opponents, on the other hand, argue that research on the topic has tended to overlook the harmful effects of psychological and physical mobility. According to Van Buren (2003), such effects may be especially relevant in the context of a two-tiered workforce. While the upper level consists of individuals exhibiting valuable and sought-after skills enabling them to demand and receive fair treatment from employers, the lower level consists of individuals whose skills are easily replaceable. Scholars have also criticised the boundaryless career perspective for ignoring the support structures that allow workers to develop the career competencies necessary for a successful boundaryless career (Zeitz et al. 2009). Although knowing-how/-whom/-why competencies are assumed to be independent of any specific setting, being part of an organisation makes it easier to acquire them. Building these competencies presupposes resources typically acquired through HR management practices found in traditional employment, such as on-the-job training, certifications in specific fields, coaching and networking events (DeFillippi and Arthur 1994). More generally, there is debate on whether careers are largely the product of organisations or of individuals' agency, even though organisational processes clearly impact individual ones and vice versa (Inkson et al. 2012; Lazarova and Taylor 2009).

As Abraham et al. (2018) argue: 'A key missing piece of the puzzle is to understand where non-traditional work fits into the career paths of workers. This issue is of general interest but especially important in terms of understanding the role of the gig economy in changing the nature of work in the future'. In this regard, the boundaryless career perspective appears as a highly relevant framework for analysing labour market changes brought about by the gig economy. Traditionally, organisational boundaries are very rigid, strictly demarcating the internal workings of an organisation from the external environment. Although, even in traditional jobs, long-term careers in a single organisation or occupation are no longer guaranteed, workers can typically expect some form of continuity in employment. Organisations and occupations provide a certain degree of clarity regarding expected career paths along which individuals can anticipate moving, giving them guidance about the sort of roles they might take on in the future (Tolbert 1996).

In the gig economy, these boundaries are becoming increasingly flexible, with platforms using this flexibility as a strategic asset. Gig work is mostly based on short-term assignments that guarantee work only for a limited period of time, making future work relationships uncertain. Instead of belonging to a particular organisation or a continuous, bounded, occupational group, workers find themselves in what Ibarra and Obodaru (2016) call a 'liminal space' between occupations. Disrupting traditional work relationships gives platforms considerable competitive advantages as they can coordinate work in novel, more cost-effective ways. In that sense, digital platforms do not gain their competitive advantages through what they are doing but through how they are doing it (Constantiou et al. 2017). High work transience and the lack of clear career paths are two of the consequences of this ever-increasing flexibility (Ashford et al. 2018).

What is often presented as an opportunity for variety actually burdens workers with managing the growing complexity of their working lives. Following the boundaryless career perspective, thriving in such an environment requires individuals to reinvent themselves, to develop their own expertise, and to apply their skills to new combinations of tasks as they make transitions between jobs (Damarin 2006). According to Ashford et al. (2018): 'if individuals are to succeed in creating a workable work life, it will be through their personal characteristics and actions that account for and cope with the elements of this new world of work. [...] The new world of work will require much more from them than work ever has and may even take everything they've got'.

Recently, Kost et al. (2020) challenged the assumptions of the boundaryless career perspective in the context of the gig economy, raising awareness to the fact that gig workers may actually have limited opportunities to engage in career self-management. While platforms appear to be structurally inviting for Quadrant-4 careers, the inner workings of these structures hinder professional development, thereby preventing gig workers from building up a valuable portfolio of skills. In contrast to traditional employment, neither platforms or requesters provide formal resources or opportunities for career development (Moore 2018; de Groen et al. 2018). This is not only true for knowing-how competencies, but also for knowing-whom competencies, as the contract between workers and requesters typically cannot take place outside of the platform (Gandini 2019). Similarly, the absence of direct contact with requesters decreases gig workers' knowledge of how their actions impact others, which is detrimental to the development of knowing-why competencies (Grant 2007). In that sense, Kost et al. (2020) argue that inter-organisational boundaries constrain gig workers from using their experience to transition into more traditional forms of employment. In line with Van Buren (2003), the authors argue that low-skilled individuals may experience poorer psychological mobility than highly skilled ones, and therefore have a much harder time finding work outside the gig economy. Similarly, while there is a relatively high degree of flexibility in terms of workers' choices among platforms, intra-organisational boundaries are designed in a way that prevents gig workers from 'climbing the ladder' and accessing roles with genuine responsibility. In that sense, the very idea of pursuing a boundaryless career in the gig economy is an oxymoron.

However, this general picture must be qualified by the segment or subsegment of activity. It has been suggested that gig workers providing physical services are more likely to develop the career competencies required to pursue boundaryless careers, and can thus cope better with the uncertainty of this type of work (Vincent 2016). In contrast to online freelancers, workers providing physical services usually have more control over their work, as they often perform assignments on-site and over longer periods of time (de Groen et al. 2018). Although they also experience career development as a burden (Kunda et al. 2002), many are able to maintain professional networks and build long-term relationships allowing them to develop knowing-whom competencies (Kost et al. 2020). Furthermore, on-site operations allow direct contact with customers, favourable for developing knowing-why competencies

(Grant 2007). Besides, it should be noted that many individuals work in the gig economy on top of a regular job, either to supplement their income or to fund their studies or hobbies (Lepanjuuri et al. 2018; Ellmer et al. 2019; Drahokoupil and Piasna 2019; Abraham et al. 2018; de Groen et al. 2018; McDonald et al. 2019; Pesole et al. 2018; Serfling 2018). For instance, a survey found that over 40% of on-demand workers worked for two or more companies in a given week, and about 14% work for three or more companies (Smith and Leberstein 2015). Another survey highlights that platform work constitutes less than a quarter of the total income of around 50% of crowdworkers in Italy, Sweden and the UK, 65% in Switzerland, Germany and the Netherlands and 73% in Austria (Huws et al. 2017). For these individuals, the boundaries described in this section may matter less than for workers more reliant on the gig economy. Specifically, the flexibility of choosing when, where, how many, and which assignments to complete may offset the lack of career perspectives associated with this type of work. Nonetheless, intra- and inter-organisational boundaries are significant for a growing number of gig workers, meaning that any measures to overcome them are becoming increasingly important (Kost et al. 2020).

In sum, the apparent fluidity of the gig economy is at best illusory, and at worst serves to mask a grimmer reality (Shibata 2019a; 2019b). Gig work is like 'quicksand', trapping individuals in a cycle of financial vulnerability and low-skilled work not allowing them to stabilise their professional and personal life (Perera et al. 2020). Although some gig workers have alternative career options through former education or planned training, research shows that many cannot disengage from the gig economy because they lack financial safety nets and foresee limited employment options (Fieseler et al. 2017; Joyce et al. 2019; De Ruyter and Brown 2019). These are the ones facing the boundaryless career oxymoron theorised by Kost et al. (2020). In the light of the psychosocial literature, they are likely to experience career advancement as a burden due to the lack of any platform-provided psychological and material resources (Inkson et al. 2012; Pringle and Mallon 2003; Zeitz et al. 2009). In this section, we review the potential implications of the boundaryless career oxymoron through the lens of two psychosocial risk factors, namely job security and emotional demands.

3.1 Job security

Job security can be defined as an employee's perception that their job or an important feature of their job is secure (Burchell 2014). Conversely, job insecurity refers to the potential loss of the job itself or of its key components such as pay or supervisory activities. The wider definition involves underlying themes of risk, anticipation and powerlessness (Rogelberg 2017), entailing the risk of a corresponding loss of something of value. In this sense, workers faced with job insecurity anticipate the consequences of losing their job. These can be simply monetary but may also be intangible, such as a loss of the status provided by the job. Finally, definitions often incorporate the concept of powerlessness to reduce job insecurity. This construct can be further

defined as subjective or objective, cognitive or affective, global or multifaced (Rogelberg 2017).

While most research measures job security through employee's own perceptions, there are instances where the construct is 'objectively' measured. Objective outcomes include redundancy and industry contraction rates, or simply the number of workers in organisations where downsizing or closure programmes have been announced. That said, there is broad consensus in the literature over the fact that job security is subjective in nature (Rogelberg 2017). Psychological interpretations of job security vary greatly amongst workers facing a similar situation, with these interpretations playing a crucial role in individual responses. If a worker is unaware or refuses to believe that his job is at risk, then he will not perceive job insecurity even if it objectively exists. This view is supported by multiple studies showing a relatively weak relationship between objective and subjective job security (Rogelberg 2017). However, investigating job security on the sole basis of workers' perceptions has one major drawback. As there may be individuals not prone to worrying about job security when their job is actually at risk, it is equally arguable that others may have an unwarranted belief that their job security is low. Hence, it has been argued that perceived job insecurity also contains an element of neuroticism which itself may be associated with health outcomes (for additional details, see Waynforth 2018). Therefore, the most accurate way to measure job security consists of a combination of both objective and subjective assessments.

The cognitive aspect of job security refers to beliefs that one's job will be lost, while the affective component is related to feelings that one has about the possible loss (Rogelberg 2017). This classification allows a distinction to be made between the perceived likelihood of job loss and the concerns one might have about its consequences. Workers may believe that they are likely to lose their jobs without feeling concerned. For instance, this may be the case with individuals already prepared to quit the organisation concerned, such as those close to retirement age or with other job offers. Conversely, workers might feel concerned about potential job loss even if they believe that their jobs are secure. There is evidence that the affective component of job security has a stronger effect on worker outcomes than the cognitive one (Huang et al. 2010; 2012; Jiang and Lavaysse 2018), i.e. concerns about job insecurity may outweigh beliefs that one's job is secure for individuals with great financial responsibilities or for those who feel that few job options are open to them. Affective job insecurity is an outcome of cognitive job insecurity, as well as a mediator in the relationship between cognitive insecurity and worker outcomes (Figure 25). Overall, the literature considers that it is empirically meaningful to treat cognitive and affective job insecurity as two separate constructs, with affective job insecurity more closely related to workers' outcomes than cognitive job insecurity (Jiang and Lavaysse 2018).

Figure 25 **Model of cognitive and affective job security**

Source: adapted from Huang et al. 2012

The global job security approach focuses on the potential loss of one's job in its entirety, while the multifaceted one covers the potential loss of either the entire job or elements thereof. Global job security is sometime termed as quantitative and multifaceted as qualitative. There are ongoing debates on the relative impact of global and multifaceted job security on worker outcomes (Rogelberg 2017). Losing specific job elements might not be as severe as losing the job itself because, even when these are lost, the individual retains membership of the organisation. The contrasting argument states that reactions to the threatened loss of certain job elements is substantively similar to the threat of losing the job itself. Nevertheless, the multifaceted approach offers a sharper analysis of both the antecedents and outcomes of job insecurity.

Job insecurity is one of the most important psychosocial risk factors. The central role of employment in a person's life often turns the prospect of job loss into a significant threat, not only jeopardising financial security but also affecting intangible social needs partly fulfilled by work. Consequently, job insecurity is a major work-related stressor linked to several negative health outcomes (Burgard et al. 2009). The potential loss of one's job or some of its elements is associated with decreased job satisfaction and organisational commitment (Darwish 1998). Numerous reviews and meta-analyses have consistently found job insecurity to be linked with poorer mental health (Sverke and Hellgren 2002; Bonde 2008; Stansfeld and Candy 2006). Specifically, perceived job insecurity may result in burnout, depression and anxiety disorders. However, it has been demonstrated that these relationships are partially mediated by perceived control (Rogelberg 2017). Job insecurity also boosts the detrimental effects of other psychosocial risk factors such as organisational trust (Shoss 2017; De Cuyper and De Witte 2006), perceived organisational support (Lee and Peccei 2006; Rhoades and Eisenberger 2002) and professional identity (Burgard et al. 2009).

Job insecurity is also related to poorer self-rated physical health (Burgard et al. 2009; Hellgren and Sverke 2003). Physical health issues include somatic complaints such as fatigue or pain, and cardiac problems such as high blood pressure or ischemic heart disease. Longitudinal studies have revealed that job insecurity is a chronic stressor which significantly impacts workers' short- and long-term health (Rugulies et al. 2008; Ferrie et al. 2005; De Witte 1999). What is less clear, however, is whether job insecurity impacts physical or mental health first. Some authors suggest that, because job insecurity is

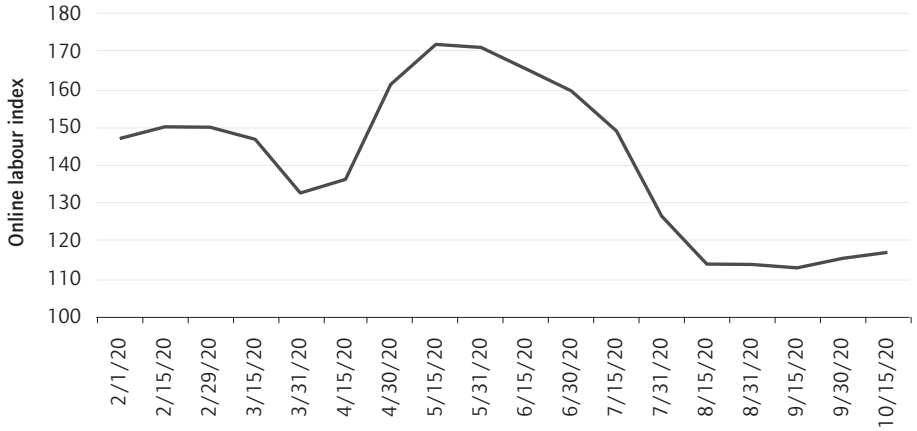
a cognitive state, it may have a stronger effect on mental than on physical health (Hellgren and Sverke 2003). Others argue that mental health issues take longer to manifest themselves and that physical symptoms are an early manifestation of job insecurity (Burgard and al. 2009; Sverke et al. 2006). Regardless of this debate, there is broad consensus that job insecurity is detrimental to both the physical and mental health of workers.

Because job security is traditionally framed as a predictor, less attention has been given to the study of its own antecedents (Rogelberg 2017). Experiencing an organisational change such as a downsizing, merger or acquisition causes job insecurity (Jeon and Shapiro 2007). Interestingly, job security appears to be affected regardless of whether the change is in the future, present or past (Rogelberg 2017). Psychological contract violations such as failure to meet career advancement expectations are also associated with increased job insecurity (Dhanpat and Ngoberi 2019). Additional antecedents include poor organisational communication, global competition and contingent work (Rogelberg 2017). A study of a large sample of women with temporary jobs showed that somatic complaints and psychological distress were higher among those involuntarily performing temporary work (Connelly and Gallagher 2004). The role of choice is therefore critically important, as it appear to moderate the relationship between job insecurity and workers' health.

Most digital platforms are based on zero-hour contracts giving employers the freedom to only pay for work when they need it. This offers platforms significant flexibility in the management and organisation of workloads, allowing them to perfectly adjust the workforce to demand. This model, however, entails significant social risks as it shifts the entire risk of inactivity onto workers (Fabrellas 2019; Moore 2018; de Stefano 2016; Graham et al. 2017a; 2017b). Unlike regular workers who are covered by relevant employment laws, gig workers are self-employed and therefore responsible for their own financial upkeep and career planning (Codagnone et al. 2016; Farrell and Greig 2017; Spreitzer et al. 2017; Graham et al. 2017a; 2017b). The work relationship can be ended without notice or any form of dismissal protection and, even when the relationship is active, there is no guaranteed minimum wage since pay is dependent on performing assignments (Jamie and Musilek 2020; Garben 2019). Similarly, there are no guaranteed hours, sick pay, pensions, parental leave, overtime or redundancy entitlements. Workers bear the cost of periods of inactivity, lack of demand, delays and any malfunctioning of the app or software (Fabrellas 2019). Other risk determinants include the short duration of tasks, the surges and falls in demand (Smith and Leberstein 2015), and the high degree of competition between workers (Florisson and Mandl 2018). Precariousness therefore defines this type work, with many gig workers unclear from one day to the next whether they will have work, and if so, what it will consist of, or even whether they will be paid. There is evidence that platforms do little to mitigate these risks, as some of the largest ones clearly claim that gig workers are on-demand and can be fired at any time. As an illustration, Graham et al. (2017b: 6) documented the following platform advice to requesters: 'all users have the freedom to end a contract at any time […] Ending a contract without warning can be interpreted as firing'. Because

of these features, several scholars argue that gig work can be objectively described as a highly insecure form of employment (De Groen et al. 2018; Howcroft et al. 2019; Curtarelli 2017; Kilhoffer 2019; INRS 2018). A more recent finding comes from the Online Labour Index, an economic indicator that measures the supply and demand of online gig labour by tracking the number of assignments posted on digital platforms (Stephany et al. 2020). The longitudinal follow-up of this indicator revealed that the COVID-19 pandemic has significantly impacted gig workers' job security (Figure 26). Findings show a significant drop in demand in the early stages of the pandemic (± 13%), followed by a major rise in April/May (± 30%) and an even more massive slump from June to September (± 35%). These striking results demonstrate the contingent nature of gig work, as well as the issue of predictability and control regarding future professional prospects.

Figure 26 **Online labour demand on major digital platforms from February to mid-October 2020**



Source: data retrieved from http://ilabour.oii.ox.ac.uk/online-labour-index

Several studies demonstrate that a significant portion of gig workers are aware of the precarity of their situation. In a recent survey, Graham et al. (2017b) showed that 43% of online gig workers felt easily replaceable. This figure is significantly higher than the overall level of perceived cognitive job insecurity among European workers, estimated at 16% in 2015 (Eurofound 2016). In a subsequent interview, one of the participants explained: 'There's a lot of people out there, if [requesters] are not satisfied with you, they are going to try somebody else [...] This is one of those jobs that you can be replaced'. Shokoohyar (2018) analysed more than 7000 reviews posted on Indeed, a job search engine allowing workers to rate their employer, demonstrating that 'job security and advancement' are the most problematic work aspect for Lyft and Uber drivers, with mean ratings of 54% and 57% respectively. Another survey carried out for the European Parliament found that only 30% of platform workers reported satisfactory levels of job security, while only 20% were satisfied with their future professional prospects (Forde et al.

2017). Berg (2016) showed that 90% of 1167 crowdworkers would like to be doing more crowdwork than they are currently doing. The primary reason for not doing so was the lack of available assignments on the platform. Moreover, around 65% of participants also indicated that they would like to do more non-platform-based work, though a majority reported a lack of available jobs. Similarly, Fieseler et al. (2017) demonstrate that one of the main concerns of gig workers is not being in a financial position to walk away from crowdwork.

All in all, these results show that gig workers are more likely to experience cognitive job insecurity than traditional workers, and that uncertainty over gig work availability and a lack of job opportunities outside the gig economy are commonly encountered issues. This body of evidence corroborates the idea that pursing a boundaryless career in the gig economy is an oxymoron. In accordance with the general assumption of Kost et al. (2020), it appears that inter- and intra-organisational boundaries limit gig workers' mobility, and certainly do not favour career advancement.

As mentioned previously, separating cognitive from affective job security allows a distinction to be made between the perceived likelihood of job loss and concerns one might have about its consequences. Affective job security is a more meaningful concept from a psychosocial point of view, as it is more closely related to workers' outcomes (Jiang and Lavaysse 2018). The main challenge is therefore to determine to what extent gig workers are concerned by the potential loss of their jobs. Following the psychosocial literature, the notion of choice is likely to play a decisive role here (Connelly and Gallagher 2004). More specifically, the fact that most gig workers feel they have no other choice than performing such insecure jobs is likely to heighten the resulting psychological distress.

Several surveys have been carried out to better understand the impact of new forms of work on workers' well-being. Findings indicate that job insecurity, a lack of predictability and income insecurity in old age are three major sources of concerns for atypical workers. According to Riso (2010), atypical workers are three times more likely to be worried about losing their jobs than standard employees (34% compared to 11%). Another survey states that more than 50% of platform workers report payment delays, while over 75% report having to put in more time than agreed for completing the work (Forde et al. 2017). Similarly, Shibata (2019b) finds that many crowdworkers experience anxiety associated with both the need to be highly competitive and the uncertainty regarding payment for work completed. In a study, it was estimated that 29% of gig workers performed work for a platform for which they did not receive payment (Smith 2016). As Kreis (2019) underlines, the lack of a guaranteed wage could be a threat for poverty-stricken workers living from paycheck to paycheck, as earning less than expected is likely to result in missed payments and increased debt. Following Curtarelli (2017), job insecurity in the context of new employment forms creates higher levels of stress and work intensity as workers tend to work harder in the hope of gaining more security if they prove to be 'good soldiers'. Moreover, the intermittency of work requires daily

or even hourly job searches, resulting in added stress and excess working time (Garben 2019). Dhéret et al. (2019) conclude that fears over the unpredictability of hours and pay are a recurrent issue for individuals engaged in new forms of employment. Finally, job security is intricately linked to the surveillance data collected by platforms (Samant 2019). As described in the previous section of this report, digital surveillance technologies further increase gig workers' concerns of insecurity, resulting in them working long hours out of fear of not getting paid for the work accomplished (Anwar and Graham 2019). In that sense, the burden of being under constant surveillance is detrimental to the psychosocial working environment.

Besides fears of losing their jobs, it appears that gig workers are also concerned about losing some element of the work relationship (Graham and Shaw 2017). Platforms reserve the right to change the terms of service at any time, rendering the contractual relation highly insecure for gig workers (Codagnone et al. 2016; Rosenblat et al. 2017; Garben 2017). Furthermore, the terms and conditions of most agreements give platforms the right to terminate workers' accounts when they consider that the agreement has been breached – which, to reiterate, can be modified at will (van Doorn 2017). In an interview study, Huws et al. (2017) point out that such sudden changes in terms and conditions make platform workers feel insecure. Furthermore, participants report being reluctant to speak out against these practices because they are afraid of their contracts being terminated.

Apart from the fact that the work relationship with the platform is subject to sudden changes, each assignment is – per se – an additional relationship with a given requester. Covered by the platform's general terms of service, these short-lived 'contracts' are also prone to premature termination on the part of the requester. In other words, each assignment can be regarded as a job element that may potentially be lost, without the relationship with the platform being terminated. This additional source of insecurity is especially critical for crowdworkers since average task duration is less than 15 minutes (Sterfling 2018). Again, results from interview studies are very telling in this regard. One online freelancer had this to say: 'It's so insecure… unless you have 10 clients; then you can breathe. But then with 10 clients it means each client has an expectation of a certain workload for you to do… So you can say, 'I'll get 10 clients for security', but then can you satisfy all those 10 clients? You can have three clients, but then when they disappear that's it' (Wood et al. 2019). On AMT, a 'mandatory satisfaction' clause in the terms and conditions gives requesters the authority to reject completed work without justification or payment (Bergvall-Kåreborn and Howcroft 2014) while retaining full ownership of the completed work. This leads to unethical requesters posting assignments, obtaining the completed work, and then rejecting it without paying the worker. It has been demonstrated that such wage theft is common on AMT (LaPlante and Silberman 2016). Resulting in lost pay, time and reputation (McInnis et al. 2016; Burston et al. 2010; Kneese et al. 2014), rejected assignments are likely to lead to perceptions of job insecurity. Another study highlights a definitive presence of unclear tasks on crowdworking platforms, calling for mechanisms to improve task clarity,

build trust and foster healthy relationships between workers and requesters (Gadiraju et al. 2016).

The multifaceted job security approach is therefore particularly relevant in the context of gig work. Yet, most available surveys target either global job insecurity or the financial element of said loss. This approach may be inappropriate in the context of gig work as it fails to capture the evolving and variable state of work relationships with platforms and requesters. This view is supported by interview studies highlighting several cases of procedural injustice, and more specifically a lack of work policy predictability (see Section II). More generally, the single-item measures of job insecurity typically used in OSH surveys are likely to miss essential elements of the overall picture. Opting for a multifaceted approach allows a sharper analysis of both the antecedents and outcomes of job insecurity, thereby allowing recommendations to be tailored to the specific features of gig work. For instance, it would be valuable to differentiate between job insecurity caused by a platform's policies and that caused by requesters' behaviour. Similarly, the relative impact of losing various features of a platform's policies is another important topic for further research.

Altogether, income volatility, uncertainty over work availability, the endemic lack of training and powerlessness in the face of changing terms of use or requesters' unethical behaviour make gig work a highly contingent form of work. As a result of these multiple uncertainties, both high- and low-skilled gig workers typically report high levels of job insecurity (Shibata 2019b). Fragmentation and flexibility become permanent traits of the workforce, fostering the emergence of a 'cybertariat' (INRS 2018; Veen et al. 2020; Arcidiacono et al. 2019; Piasna and Drahokoupil 2019; Muntaner 2018). According to psychosocial literature, such levels of job insecurity are more than likely to impact gig workers' physical and mental health. The few available quantitative studies consistently demonstrate higher-than-average cognitive job insecurity as well as significant levels of affective job insecurity. However, while there is converging evidence pointing to the detrimental effect of gig work features on OSH, further research using the multifaceted approach is required to determine the relative weight of each of these aspects on perceived job insecurity and the resulting workers' outcomes. To this end, the Employment Precariousness Scale (EPRES) appears to be a promising multidimensional tool as it allows researchers to pinpoint the precarious features of the employment relationship (Vives et al. 2010). The tool features excellent psychometric qualities and has been used on several European datasets that could be used as benchmarks (Vives et al. 2015; 2017; Puig-Barrachina et al. 2014; Tsopoki Vassiliki et al. 2019).

Questions and open issues for further research

- To what extent are gig workers concerned about losing specific elements of their jobs? What is the hierarchical distribution of these elements in terms of affective job insecurity? Is there any difference related to the different forms of gig work?
- What portion of affective job insecurity can be attributed to platform policies or to requesters' unethical behaviour? Is there any difference related to the different forms of gig work?
- What measures could be taken to enhance job security within platforms, to protect gig workers from unethical requesters, and to ensure proper career development within and outside the gig economy?
- What policy changes are needed to rebalance the responsibility of platforms in ensuring gig workers' financial security?

3.2 Emotional demands

In the 1980s, sociologist Arlie Russell Hochschild coined the term 'emotional labour' to reflect the ways flight attendants were trained to present a calm, friendly and professional attitude to customers — even when the latter were angry or abusive (Hochschild 1983). Over the years, having to control their own emotions at work slowly became second nature to flight attendants. Hochschild expanded his fieldwork to other occupations, classifying jobs requiring a higher degree of emotional labour: personal services, healthcare and some other customer-oriented professions. According to the sociologist, organisations are increasingly willing to direct and control how workers present themselves to others.

Hochschild and other scholars demonstrated that emotional labour produces emotional dissonance, a conflict between the surface feelings workers are expected to display and how they really feel (Zapf 2002; Morris and Feldman 1996; Zapf and Holz 2006). Unless managers acknowledge and appreciate the emotional efforts of their workers, the pressure of emotional dissonance created by surface acting is likely to cause stress, anxiety, sleep disturbances, poor physical health and resentment against employers (Sohn et al. 2018; Lim et al. 2016; Hochschild 1983). Moreover, when facing persistent stressors such as those produced by relational and emotional challenges, one's coping resources are constantly being depleted by constant low-grade strain leaving no time for recovery (Ashford et al. 2018; Hobfoll 1989). Sustained over a prolonged period, such insidious emotional exhaustion eventually results in burnout (Bakker and Heuven 2006; Bakker and Demerouti 2007), conceptualised as a three-dimensional work-related syndrome comprised of emotional exhaustion, cynicism and lack of personal accomplishment (Maslach et al. 1996).

Hochschild's pioneering work on the service-oriented economy posits that emotional labour is sold for a salary and therefore has an exchange value in the world of work. Today, scholars theorise emotional labour as a comprehensive process integrating not only emotional regulation and performance, but also the emotional demands of work (Grandey and Gabriel 2015). The latter refer to the emotional pressure experienced by workers in the execution of their work, including dealing with direct demands from clients or having to hide feelings (Eurofound and ILO 2019). Jobs involving constant customer care and public relations are known to be emotionally demanding (Boekhorst et al. 2017; Huang et al. 2011). This is especially the case with workers facing imbalanced power relationships in which they have to directly meet and please clients, sometimes working under their direct supervision (Kilhoffer 2019). A work environment characterised by high work transience and job insecurity favours surface acting as a coping strategy. Casual or temporary workers with no guarantee of future employment strive to keep their employer satisfied in the hope of a more stable contract (Vereycken and Lamberts 2018). They experience a 'learning-credibility' tension similar to consultants encountering new clients — the need to appear credible while still learning about a new context (Bourgoin and Harvey 2018). The ability to present a positive and competent image when interacting with clients is crucial for getting further work (Ashford et al. 2018). Finally, a lack of control over the working environment and future work allocation can lead to additional stress and emotional exhaustion (Howcroft et al. 2019).

Companies in the service sector have long struggled to get the balance right when it comes to asking for and acknowledging emotional labour. What is striking in the gig economy is the extent to which platforms take emotional labour for granted, given its core importance for their ongoing success. Gig workers are required to engage in forms of emotional labour as a fully recognised and mandatory component of their work (Gandini 2019). In contrast to the traditional service industry, it no longer represents a kind of invisible labour but actually a very visible one owing to constant monitoring and public evaluations. Elaborating on Vincent (2011), gig work actualises a previously hidden economy of feelings by embedding emotional labour within a prescriptive environment (i.e. the platform) through feedback and rating systems.

In the ride-hailing industry, Rosenblat and Stark (2016) highlighted several instances of drivers being de facto required to perform emotional work. It appears that the way the app is designed encourages workers to perform emotional labour by reminding them, both explicitly and implicitly, that this aspect of work is crucial to maintain a five-star rating and, in turn, to safeguard future employability (Gandini 2019). For example, the platform suggests that drivers 'stay calm, patient and polite with riders' in order to receive the best reviews and should 'never ask' passengers for a five-star rating (Rosenblat and Stark 2016). Malhotra (2019)'s study of virtual communities came up with several cases of gig drivers complaining about this aspect of work, one of which is exemplary of how pervasive and frustrating surface acting can be (Figure 27). What is even more striking is the degree of cynicism reflected in

virtual communities – to reiterate, one of the key dimensions of the burnout syndrome (Maslach et al. 1996).

Figure 27 **Selected citation of an Uber driver on the topic of surface acting and emotional labour**

> *You are not a driver, stop thinking that you are actually a driver. You are a clown. Your job is to entertain people who ride with you, not for the sake of getting a tip, but a stupid 5 stars. The way it works, the moment you get a ping, you drive to the pickup location, and you get to meet this rider who you have to study their personality in few seconds and put the clown face and start to make sure they are comfortable. Also you have to make sure that you accommodate their ideas and views. Your job is not to only take the rider from point A to B, you have to provide water, mint, dance for them and have to put up with their confusing directions for the sake of getting 5 stars. A Virtual Appreciation that meant to keep you on the system. As a clown, you have to please multiple kings, I mean riders. Some of them are impressed, others are not. Some will give you 5, but it would take one who give you 4 to ruin your day.*

Source: retrieved from Malhotra 2019

As shown in this rather cynical posting, the constant performance evaluation plays a major role in the emotional dimension of gig work. Although this has always been part of service work, the new element in this picture is the visibility of these metrics and the fact that they are tied to a number of managerial aspects, particularly performance evaluation, monitoring and control (Gandini 2019). Because potentially biased ratings determine drivers' employment opportunities, the rating system leads drivers to perform emotional labour in exchange for a good rating (Glöss et al. 2016; Raval and Dourish 2016; Rosenblat and Stark 2016). Workers feel pressured to be exceptionally affable, tolerate inappropriate behaviour and leave no wish unanswered, all of which can be emotionally exhausting and stressful (Bajwa et al. 2018b). According to the interview study of Griesbach (2018), mastering the rating system requires a precise blend of emotionally pleasing customer service and professionalism. As one of the participants explains: 'You are encouraged to be this stoic, non-emotional person. Yet when you are too much of that, [...] the person kind of rates you - well 3 stars, because they say, 'He didn't ask me if the food was okay". The driver added that he would often get 4.5 or 4.6 stars instead of 5 due to oversights like forgetting a napkin.

Lee et al. (2015) emphasise that, in the context of ride-hailing, passengers tend to underestimate the importance and impact of their ratings on drivers' future employment prospects. Gig workers in the ride-hailing industry constantly live with a sword of Damocles hanging over their heads, fearing that the next professional encounter may have longstanding consequences for their online reputation (Rosenblat and Stark 2016). Following De Stefano (2016), this applies not only to ride-hailing platforms, as the possibilities to continue working on a platform or to access better-paying assignments are

strictly dependent on past ratings. Living in such a constant state of insecurity further stresses the paramount importance of engaging in emotional labour – image matters and gig workers need to constantly sell themselves. This can be challenging for self-confidence as the emotional stress involved in being constantly evaluated, forever 'for sale' and jockeying for favourable positions with requesters can seep into one's self-image (Gandini 2019; Lane 2011; Storey et al. 2005; Sharone 2013).

It should be noted that not all gig workers have direct and physical contacts with requesters. This is the case with crowdworkers and freelancers whose work is entirely mediated through digital platforms. At first glance, one might think that the emotional dimension of labour matters less for these workers. However, both psychosocial literature and initial studies of gig work suggest that online work can also be analysed in terms of emotional labour (Kilhoffer 2019; Raval and Dourish 2016).

According to Sutherland et al. (2019), online freelancers put extra effort and thought into maintaining good virtual connections with requesters. They feel the need to develop emotional skills to strengthen the typically transient relationships they have with requesters. During interviews, Upwork freelancers considered emotional labour as essential for ensuring long-term employment. As one of them reported: 'I try to engage them in a little conversation [...], to build a rapport and a little longer lasting relationship. I don't know if that really helps my [ratings] but it does get me repeat business'. Another participant provided a similar view from the requester perspective, underlining the value of a worker's ability to communicate and refine the work with feedback. Interestingly, these interactions differ from the kind of emotional labour reported by Uber drivers. Sociability is not manifested as friendliness in a rating but more closely resembles long-term networking and relationship-building. Unlike Uber drivers, many freelancers on Upwork build reputation through long-term engagements, especially on more complicated projects possibly covering a longer period of time or even morphing into a semi-permanent contractual relationship with the requester. One freelancer described how he was unable to recover from a bad review early in his Upwork career but was able to continue work off-platform with requesters he initially met through assignments. Conversely, a requester admitted using Upwork to train workers over longer periods of time instead of relying on transient projects and impersonal gigs which, in his opinion, were mostly unreliable. Some requesters believe that workers in longer-term engagements are likely to provide more desirable results because of a better understanding of expectations and preferences on both sides. Similarly, Alacovska (2018) reports that online freelancers undertake 'strategic relational work' with requesters in order to forge 'intimate and close relationships and to secure a favourable position in online relational infrastructures'. Additional studies confirm how decisive these aspects when requesters hire workers (Leung 2018; Gandini et al. 2016; Schmidt 2017) and the extent to which they are 'fetishised' by online freelancers for the same reason (Moriset 2017).

To sum up, these 'off-grid' practices can be regarded as networking activities aimed at promoting professional stability through reliable and perennial work relationships. From a worker point of view, they can be an opportunity to escape from the boundaryless career oxymoron described earlier. Nevertheless, building off-grid relationships is likely to require as much – if not more – emotional labour than the usual transient assignments gig workers are expected to deliver. Hoping for such an unguaranteed escape from the gig economy may result in an added stress, heightening the emotional burden of online freelancing. In that sense, further research is required to investigate the individual consequences of emotional labour both as a structural characteristic of gig work and as a coping strategy to escape from it.

Emotional labour is arguably also of great importance in crowdwork. Similar to online freelancing and physical services, worker metrics come to be used in the same way as a reputational score by the hiring party (Gandini 2019). On AMT for instance, the main metrics available to requesters are the number of completed tasks and their approval rate. Obviously, these metrics do not reflect the performance of emotional labour, as rejection can be motivated by many other reasons. However, in practice, only approved tasks are paid, thus making the approval metric an implicit proxy for workers' trustworthiness (Silberman and Irani 2016). Consequently, gig workers' behaviours are shaped by the same underlying mechanism, namely the threat that any encounter could become antagonistic if requester demands are not fully satisfied. What is specific to crowdwork, however, is the high prevalence of wage theft perpetrated by unethical requesters (LaPlante and Silberman 2016). In this regard, the emotional burden borne by crowdworkers may be higher than that in more 'regulated' forms of gig work on, for example, ride-hailing or online freelancing platforms. On the other hand, the impersonal nature of relational exchanges on crowdwork platforms is likely to act as a protective shield when it comes to emotional exhaustion. Considered together, these pros and cons may cancel themselves out – leaving crowdworkers with similar challenges in terms of emotional labour. Further research would be required to properly evaluate the relative influence of each of those aspects on emotional exhaustion.

In sum, the current state of the art suggests that gig workers perform emotional labour regardless of the type of work they do (Kilhoffer 2019). Even if many are hired for individual tasks that are not emotionally demanding, the way the gig economy is designed requires much more from them than work ever has (Ashford et al. 2018). The sword of Damocles hangs over the heads of thousands of disposable workers, all working in fear that the next assignment may have lasting consequences for their future prospects (Rosenblat and Stark 2016). In that sense, high work transience and the lack of career perspectives make these jobs far more emotionally demanding than their counterparts outside the gig economy (Raval and Dourish 2016). This pressure is further compounded by constant monitoring, customer ratings and fierce competition between workers (Aloisi 2016a; 2016b; Lee et al., 2015; Kilhoffer et al. 2020). To thrive in such an environment, gig workers have no choice but to cultivate a strong service mentality (Raval and Dourish 2016). They have to commit to

surface acting, presenting themselves as overly flexible, friendly and affable despite difficult working conditions and unethical requesters. Elaborating on the emotional labour theory, the lack of workplace support characterising gig work is likely to heighten the pressures of emotional dissonance created by surface acting (Hochschild 1983; Howcroft et al. 2019). The consequence of such constant low-grade strain is a gradual depletion of one's coping resources, eventually resulting in burnout (Brotheridge and Grandey 2002; Ashford et al. 2018; Hobfoll 1989). While the burnout rate among gig workers is still unknown, one striking fact is the degree of cynicism displayed in virtual communities – one of the main dimensions of the syndrome. This mere observation points to the need for further quantitative research into the impact of emotional labour on gig workers' occupational health.

As a final point, it appears that the psychosocial implications of emotional labour in the gig economy are still poorly understood, though its potential to harm workers is crystal clear. While a growing number of scholars highlight gig work's structural effect on emotional exhaustion, there is a desperate need for relevant data to back up these legitimate concerns. Not only would this allow a better understanding of the scope of the problem, but it would also act as a catalyst to stimulate debate at EU level. An initial step would be to ascertain the burnout rate among gig workers, and then to correlate this with the specific structural features of each platform type. To this end, the widely used Maslach Burnout Inventory (MBI) and the Employment Precariousness Scale (EPRES) introduced in the previous section appear to be relevant complementary options. Additional items not covered by the EPRES could be included in order to investigate all the potential correlations exposed in this section.

Questions and open issues for further research

- How do burnout rates compare between gig workers and 'standard' workers after controlling for sector or occupation?
- How do burnout rates compare between the three general forms of gig work? What are the specific work arrangements explaining varying rates of burnout?
- What measures could be taken to adapt these specific work arrangements to reduce the emotional demands of the job, and thereby to prevent burnout among gig workers?
- To what extent are gig workers able to take advantage of emotional labour to develop 'off-grid' relationships with requesters? What are the implications of such practices for career advancement and future prospects within or outside the platform?

Conclusion

The primary objective of this report was to describe the atypical working conditions of gig workers operating on different types of digital platforms. Based on an extensive review of the grey and peer-reviewed literature, we conclude that these working conditions can be approached from three main perspectives or dimensions:

1. Physical and social isolation
2. Algorithmic management and digital surveillance
3. Work transience and boundaryless careers

Each of these dimensions should be considered as a continuum, with some degree of variation across gig jobs. For instance, isolation may be less pronounced for gig workers providing physical services due to the more interactive nature of platforms dedicated to physical activities. Similarly, boundaryless careers may be less important for the minority of online freelancers involved in long-running projects or regularly working for the same requester. Nevertheless, there are various expressions of each of these dimensions in every type of gig work. The three are therefore part and parcel of the same reality and, taken together, define gig work as a new paradigm for labour relations and responsibilities.

Not entirely new to the world of labour, these dimensions constitute radical extensions of pre-existing trends. Regarding isolation, Nilles (1975) was the first to highlight how increasingly sophisticated communication technologies encourage the decentralisation of 'information industries' to a dispersed network of workers. Since then, telework has become increasingly recognised as a commonplace feature in traditional jobs. What is different in the modern gig economy, however, is the extent to which remote working is central and essential to the sustainability of the underlying business model. In contrast to telework in traditional jobs, working in isolation is not a complementary practice but a core and permanent characteristic of the activity itself.

The same goes for the idea of pursuing 'boundaryless careers' comprised of many positions in multiple organisations. The movement towards greater mobility and flexibility has been marked by several major steps over the last decades, including the sharp rise in temporary agency work in the 1990s and the 'flexicurity' strategy topping the European Union's policy agenda in the mid-2000s. While these arrangements concern only a portion of traditional workers at some points in their working lives, they represent pervasive

features in the careers offered by online labour platforms. Indeed, we have found that intra-organisational boundaries are designed in a way preventing gig workers from gaining access a standard employment contract. In contrast to agency workers, gig workers cannot hope for a longer contractual option, even if proving to be successful contributors.

Regarding algorithmic management and digital surveillance, the underlying foundations may be found in the principles of scientific management introduced by Taylor in the 1880s. His intention was to prevent workers having to take process-related decisions by establishing a myriad of rigid rules and procedures. To enforce these rules, he sent managers with stopwatches and notebooks to the factory floor, instructing them to constantly look over workers' shoulders. It was probably the first iteration of the 'panopticon' principle, as the omnipresence of managers was intended to internalise the supervisory function. Taylorism was followed by a profusion of spiritual successors such as the Efficiency Movement in the 1900s, Fordism in the 1930s, lean management in the 1980s, and Six Sigma in the 1990s. The common denominator of these systems is the interlinkage of rule-driven work processes and close monitoring. In this respect, algorithmic management and digital surveillance can be regarded as the evolution and iteration of a long-standing movement towards greater control. Once again, a striking difference stems from the centrality of these processes in the sustainability of online labour platforms, as pushing the limits of remote working necessarily presupposes the highest degree of automation.

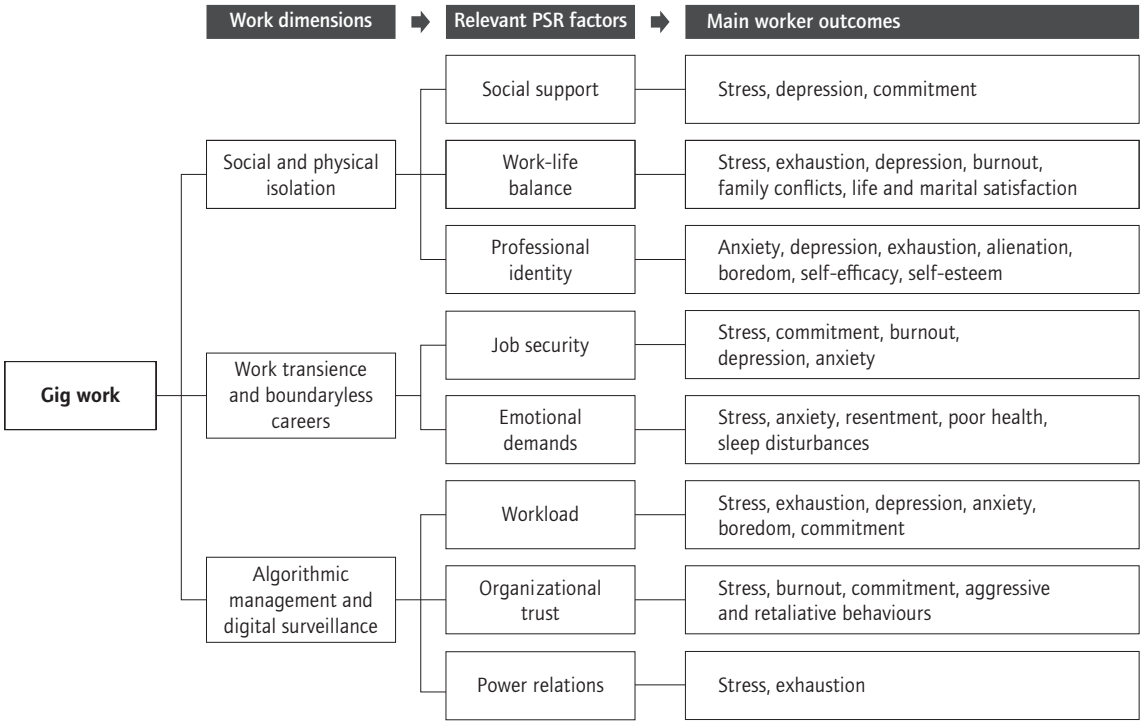
In this sense, what is unique to gig work is that it combines and extends three longstanding movements in order to reinvent labour relations and responsibilities. The human consequences of this paradigm as a whole are not yet well documented. Research is still at an early stage and much remains to be done to fully grasp how the gig economy is disrupting work relationships. The systematic assessment of the literature shows that most studies are either descriptive or conceptual. However, because they stem from established trends, the literature can inform us on the potential implications of gig work in terms of worker outcomes. Indeed, current psychosocial models bring to light the potential risks of being exposed to each of these work dimensions. While this approach only provides indirect evidence, it succeeds in laying the foundations for future research by establishing priority areas and relevant variables of interest. In this regard, our analysis shows that each dimension has the potential to give rise to multiple psychosocial risk factors, ultimately leading to several negative worker outcomes (Figure 28).

– **Physical and social isolation.** Gig workers have few opportunities to engage with colleagues or supervisors as most of the tasks are performed individually, without contact with fellow workers and often in competition with them. In this regard, gig workers are likely to experience a lack of various forms of social support, a blurring of boundaries between work and personal life, and difficulties in establishing a consistent professional identity.

– **Work transience and boundaryless careers.** Gig work is mostly based on short-term assignments providing work only for a limited period of time and leaving future work relationships uncertain. In the face of uncertainty, both high- and low-skilled gig workers experience persistent feelings of job insecurity and are forced to engage in forms of emotional labour to preserve their employability.

– **Algorithmic management and digital surveillance.** Pushing the limits of remote working necessarily presupposes a high degree of automation and control. In this regard, preliminary evidence suggests that constant monitoring and automated managerial techniques contribute to an increasingly hectic pace of work, a lack of trust towards the platform, and pronounced power asymmetries limiting workers' opportunities to resist or develop effective forms of internal voice.

Figure 28 **Summary of findings – tentative model of psychosocial risks in the gig economy**



Source: author's own elaboration

Looking behind those specific risks, the guiding thread is a greater imbalance between the job demands placed upon workers and the resources available to deal with them. In contrast to traditional employers, online labour platforms provide workers with few organisational resources. They provide no workplace support, no channels to voice their concerns or exercise agency, no means of contesting unfair decisions or unethical behaviours, and do not guarantee any form of job security. Platforms nevertheless have high standards of

performance and require workers to be highly autonomous, flexible, affable and productive. Following the literature, the interaction between high job demands and low organisational resources is likely to generate strain. In fact, we found preliminary evidence of strain for each of the eight psychosocial risk factors described in this report. A growing corpus of qualitative research suggests that gig workers' experience with platforms is unsatisfactory and stressful in many regards. However, our review also highlights a lack of quantitative research demonstrating the magnitude of these issues. Only few studies aim to assess the prevalence of these risks and their impact on different aspects of occupational health. The evidence available only partially validates the overall picture described in qualitive studies and much remains to be done to systematically investigate psychosocial risks in the gig economy.

More generally, it appears that the current state of the art is mostly comprised of conceptual papers (see Annex for an overview of the corpus). Although gig workers' working conditions and occupational health are receiving increasing interest, our review highlights that the influx of new data sources remains rather limited. Another striking finding is the wide array of terms used to refer to gig work. Our initial search strategy included no less than 21 keywords designating gig work, yet the second phase of the reviewing process revealed that many publications passed through this initial step. Additionally, it appears that definitions of some of these terms vary significantly across authors. For instance, though the 'sharing' or 'peer' economy is a term usually used to designate non-commercial transactions between individuals (Gössling and Hall 2019), some scholars use it to designate both commercial and private transactions (Möhlmann and Geissinger 2018; Scholz 2016). The lack of uniformity and consistency in the terminology used by researchers to designate gig work further complicates the process of gathering evidence in the both the peer-reviewed and grey literature, stressing the need for consensus on how to refer to this emerging phenomenon and its specific ramifications.

Geographically, the United States is overrepresented, with less work focusing on the European Union and the United Kingdom. Only one publication investigates gig work in the Global South, concluding that the global and geographic interplay of this economy is worth exploring (Graham et al. 2017a; 2017b). Overall, there is a clear lack of country-specific knowledge in this area and limited evidence on the European context.

These limitations characterise a research field still in its infancy. In this regard, our literature review highlights several research gaps and opportunities directed towards specific psychosocial factors and outcomes. Research should not only investigate individual elements of these concepts but their 'full sets', as psychosocial risk factors are known to be highly interdependent. Overall, one of the main challenges is to move on from descriptive analyses and to engage in quasi-experimental studies establishing causal links. This would allow us to empirically demonstrate that it is the work environment that is responsible for gig workers' heightened levels of stress, depression and anxiety. Moreover, our review highlights additional psychosocial outcomes that remain to be investigated such as burnout, exhaustion and self-esteem.

Systematically assessing these outcomes presupposes the use of validated scales and questionnaires. Not only would this result in a more accurate picture, but it would also allow comparisons of gig workers with reference samples available in the literature. Sector-specific comparisons between gig workers and 'traditional' self-employed workers have the potential to narrow down the risks specific to the platform itself. However, researchers should ensure that constructs and measures are adapted to studying gig work, as commonly used questionnaires may need to be reviewed before being further used in this new context. Ideally, comparative studies should encompass multiple type of platforms in order to better single out detrimental working conditions and neutralise more structural characteristics. Finally, research effort should also be more equally distributed across platforms, covering more than the 'usual suspects', i.e. AMT, Upwork, Deliveroo and Uber.

In conclusion, this review provides new insights into the psychosocial dynamics of gig work, opening up a broad set of issues for future research. Our analysis offers a structured framework for studying gig work and, as such, is intended to pave the way for a more systematic and comprehensive assessment of psychosocial risks in the gig economy. To advance the field, we propose that future studies answer three general questions:

1. What is the prevalence of each of these factors in different types of platforms?
2. To what extent do these factors lead to adverse outcomes among gig workers?
3. How can gig work be regulated in a way preventing workers from being exposed to these factors?

Additionally, our work highlights specific research gaps and open issues regarding each of the psychosocial factors investigated in this report:

– **Professional identity.** Current evidence suggests that crowdworkers may represent an especially vulnerable population with a professional identity fragilised by a lack of meaningfulness and role models. Several studies demonstrate that crowdworkers are at increased risks of depression and social anxiety. More research is needed to expand these studies to other platforms, occupational settings and mental disorders, and to determine the role of professional identity in this heightened vulnerability.

– **Work-life balance.** Although an increasing body of evidence highlights work-life balance issues, most current studies fail to determine which aspects of gig work are detrimental to work-life balance. Demonstrating a causal link between specific platform settings and the experience of an unbalanced life would be valuable to prevent such risks and to organise gig work within a strictly regulated context.

– **Workplace social support.** Multiple interview studies underline the lack of spontaneous and mutual exchanges, the absence of human

managers in the field, and the fierce competition between gig workers. This context is arguably not favourable to any manifestations of workplace support, possibly contributing to gig workers' feelings of loneliness and isolation. Further studies should determine to what extent gig workers lack different types of support (career mentoring, coaching, collegial, task support) and from different sources (supervisors, co-workers, organisation).

– **Occupational workload.** In gig work, workload is driven by two separate mechanisms: the need for a hectic pace of work to meet deadlines (i.e. quantitative overload), and the division of jobs into very simple tasks with strict modi operandi (i.e. qualitative underload). Research on piecework and paced assembly lines has long demonstrated that the combination of quantitative overload and qualitative underload is particularly damaging to health. Although interesting parallels have been drawn between gig work and traditional piecework, the juxtaposition of underload and overload may have different consequences on gig workers' health and safety – an aspect still to be investigated.

– **Organisational trust.** Findings suggest that platforms do not live up to workers' expectations of distributive, procedural and interactional justice. Most commonly quoted concerns seem to relate to unfair pay, procedure inconsistencies and the lack of available information on how algorithms work. Unfortunately, the current state of the art does not allow anything more than this mere observation. Further research is required to concurrently assess and compare the three sub-types of organisational justice for each type of gig work.

– **Workplace power relations.** Much of the research points towards a power structure dominated by platform owners and their customers. Platforms are able to foster power asymmetries using a diverse portfolio of techniques, ranging from bureaucratic routines and financial incentives to various attempts of nudging and sense-giving. However, most research on this topic focuses on platforms mediating physical services, while only very few studies investigate such mechanisms in crowdwork or online freelancing platforms. Moreover, the emergence of a wide range of resistance strategies opens up new research avenues and could ultimately provide elaborated blueprints for successful worker emancipation.

– **Job security.** The few available quantitative studies demonstrate higher-than-average levels of job insecurity among gig workers. While there is converging evidence of the detrimental effects of platform features in terms of job security, further research is required to determine the relative weight of each of these features on the overall level of perceived job insecurity.

– **Emotional demands.** The current state of the art suggests that gig workers are performing emotional labour regardless of the type of work

they do. High work transience, the lack of career perspectives and the constant pressure resulting from constant monitoring and customer ratings makes these jobs far more emotionally demanding than their counterparts outside the gig economy. To thrive in such an environment, gig workers have no choice but to cultivate a strong service mentality and engage in surface acting. From a theoretical standpoint, the consequences of such constant low-grade strain is a gradual depletion of one's coping resources, eventually resulting in a burnout. While the burnout rate among gig workers is still unknown, one striking fact is the degree of cynicism displayed in virtual communities – one of the main dimensions of the syndrome. This mere observation hints at the need for further quantitative research into the impact of emotional labour on gig workers' occupational health.

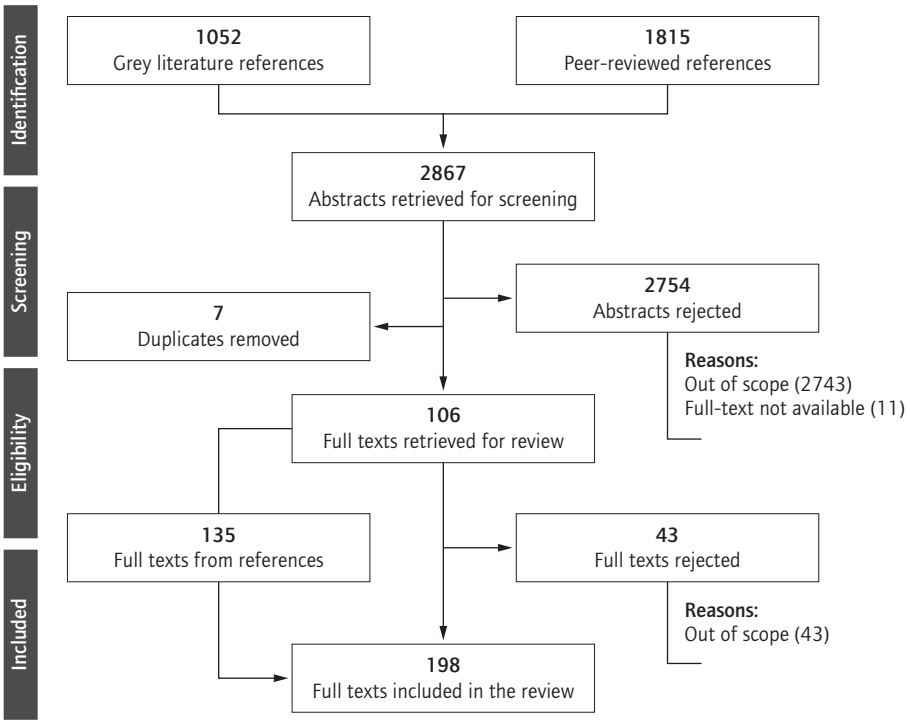
Understanding these elements is key to improving regulatory and legal environments in a way conducive to gig workers' welfare and providing the facts and figures desperately needed to stimulate debate at European level. As a final remark, recent events have made it abundantly clear that gig workers are the guinea pigs of the new world of work, and that some aspects of this paradigm may go mainstream sooner than expected. Indeed, professional isolation and digital surveillance are all the more pertinent today, with full-time telework becoming increasingly popular in the COVID-19 pandemic. Research on these topics has even more far-reaching implications than those pertaining to gig work and should therefore be given priority.

Annex

Overview of the corpus

In the period 2000–2020, a total of 2867 publications were found in the Psychinfo, Medline, Google Scholar and OpenGrey database that matched our search strategy (Figure 29). Of these publications, only 63 (2.2%) met the inclusion criteria. Reference sections of selected studies led to the inclusion of 135 additional entries, making for a total of 198 publications. The significant amount of additional entries shows that many publications slipped through our initial search strategy, either because they were absent from the 4 databases consulted or because none of the 21 keywords of our search strategy were found in their title, abstract or metadata.

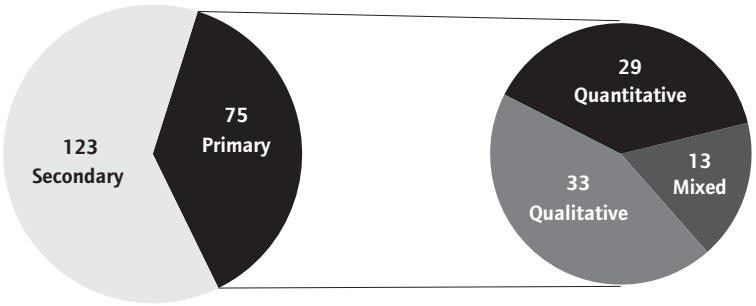
Figure 29 **Flow diagram of study selection for the systematic review**



Source: adapted from 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' [PRISMA], Moher et al. 2009

More than half of retrieved publications (62.1%) involve secondary research – publications not involving the gathering and analysis of fresh data (Figure 30). Conversely, only 75 publications (37.9%) are primary studies involving data collection and analysis. Among these publications, we found 33 studies (44.0%) involving qualitative data collection; 29 (38.7%) involving quantitative data collection; and 13 (17.3%) involving both.

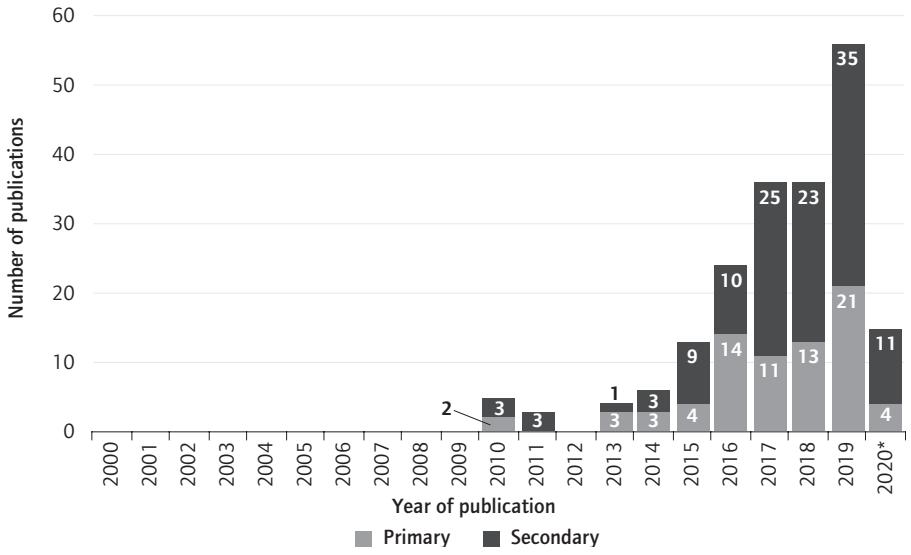
Figure 30 **Nested pie chart of study type (i.e. primary and secondary) and data type (i.e. qualitative, quantitative, and mixed) for primary studies**



Source: author's own elaboration

The oldest publications included in the review date back to 2010 (Figure 31). From 2013 to 2019, the numbers of articles published annually increased by 1300%. 143 of the 198 references (72.2%) were published in the last four years. The growth of the literature is more pronounced for secondary research, accounting for 25% of annual publications in 2013 and 62.5% in 2019. Preliminary data suggests that this growth is set to continue in 2020, with 15 additional references published over a two-month period. Similarly, preliminary data points to a growing prevalence of secondary research in 2020 (73.3%).

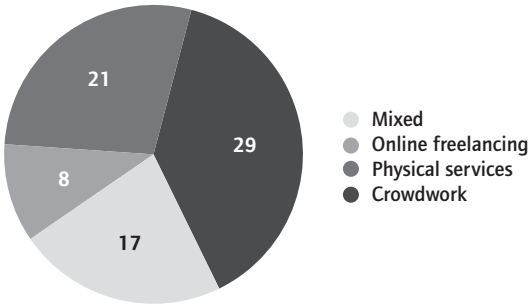
Figure 31 **Histogram of primary and secondary studies published per year**



* 2020 only covers the period from January 1 to February 28.
Source: author's own elaboration

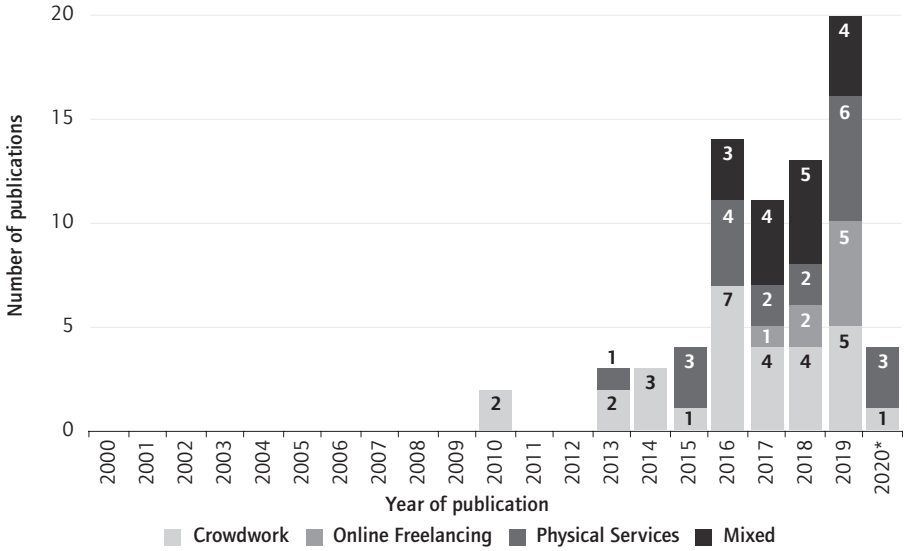
Among primary studies, we found 29 studies (38.7%) on crowdwork; 21 (28.0%) on on-demand physical services; 8 (10.7%) on online freelancing; and 17 (22.6%) on more than one of these types of digital platforms (Figure 32). Crowdwork was the first type of platforms to be investigated in primary studies, followed by on-demand physical services in 2013 and online freelancing in 2017 (Figure 33). The first primary studies investigating more than one type of platform date back to 2016. We note an increasing number of primary studies dedicated to online freelancing from 2013 to 2019.

Figure 32 **Pie chart of study population for primary studies, sorted according to our typology of digital platforms**



Source: author's own elaboration

Figure 33 **Histogram of primary studies published per year, sorted according to our typology of digital platforms**



2020 only covers the period from January 1 to February 28
Source: author's own elaboration

We identify seven key patterns and trends based on the corpus overview. These should however be considered with caution given the relative short time span covered by the analysis.

- There is a **lack of uniformity** in the terminology used by researchers to refer to gig work. This complicates the process of reviewing the literature and stresses the importance of checking reference lists to improve exhaustiveness.
- The literature on gig workers' working conditions and occupational health has experienced **rapid growth** and expansion since 2013
- Secondary research is increasingly prevalent while the **influx of new data** sources remains rather limited
- Only a small portion of primary studies investigates gig work in a **transversal** manner.
- **Online freelancing** is currently the least studied type of digital platform but has been receiving growing attention since 2017
- **Crowdworking** is currently the most studied type of digital platforms but has accounted for a decreasing proportion of yearly publications since 2016
- The growth of primary studies is becoming **more evenly distributed** across the three main types of digital platforms.

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