

Title	Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM
Authors	Duggan, James;Sherman, Ultan;Carbery, Ronan;McDonnell, Anthony
Publication date	2019-09-12
Original Citation	Duggan, J., Sherman, U., Carbery, R. and McDonnell, A. (2019) 'Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM', Human Resource Management Journal. doi: 10.1111/1748-8583.12258
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://onlinelibrary.wiley.com/doi/abs/10.1111/1748-8583.12258 - 10.1111/1748-8583.12258
Rights	© 2019, John Wiley & Sons Ltd. This is the peer reviewed version of the following article: Duggan, J., Sherman, U., Carbery, R. and McDonnell, A. (2019) 'Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM', Human Resource Management Journal. doi: 10.1111/1748-8583.12258, which has been published in final form at https://doi.org/10.1111/1748-8583.12258 . This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.
Download date	2024-04-18 20:41:30
Item downloaded from	https://hdl.handle.net/10468/8584

Algorithmic Management & App-Work in the Gig Economy: A Research Agenda for Employment Relations & HRM

James Duggan*, Ultan Sherman, Ronan Carbery & Anthony McDonnell

Cork University Business School, University College Cork, Ireland

*jamesduggan@umail.ucc.ie

Abstract

Current understanding of what constitutes work in the growing gig economy is heavily conflated, ranging from conceptualisations of independent contracting to other forms of contingent labour. This paper calls for a move away from problematic aggregations by proposing a classification of gig work into three variants, all based strongly upon key technological features: app-work, crowdwork, and capital platform work. Focusing specifically on the app-work variant, this paper's more delineated focus on the textured dimensions of this work proposes new lines of enquiry into employment relationships and HRM. Examining the crucial role of algorithmic management, we critically discuss the impact of this novel mediation tool used by gig organisations for the nature of employment relations within app-work, work assignment processes and performance management. In so doing, we propose a series of research questions that can serve as a guide for future research in this increasingly important field.

Keywords

Gig economy; Employment relations; App-work; Algorithmic management; HRM, Precarious employment, Digital platform

Please cite as:

Duggan, J., Sherman, U., Carbery, R., & McDonnell, A. (2019). Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM. *Human Resource Management Journal*. DOI: [10.1111/1748-8583.12258](https://doi.org/10.1111/1748-8583.12258).

1. Introduction

Working arrangements are increasingly precarious, with independent contracting and temporary work becoming more commonplace (Bonet, Cappelli & Hamori, 2013; Harvey, Rhodes, Vachhani & Williams, 2017). The emergence of the ‘gig economy’ – an economic system that uses online platforms to digitally connect workers, or ‘individual service-providers’, with consumers – represents a new form of contingent labour (Harris, 2017). The ‘gig’ business model bypasses many of the regular responsibilities and costs of employment, leading to widespread legal ambiguity, which has resulted in challenges as to whether workers should in fact be classified as employees (Collier, Dubal & Carter, 2017; Fabo, Karanovic & Dukova, 2017). Discourse around work in the gig economy, or ‘gig work’, traverses from the positive, with emphasis on the apparent autonomy and flexibility afforded to workers, to the negative, with critics viewing it as a means by which businesses lower costs and erode employment standards and labour regulation (Friedman, 2014; Stewart & Stanford, 2017).

The gig economy is disruptive to our traditional understanding of work, as its digital on-demand, or work-as-required, principle sees personnel, as subordinate workers, becoming increasingly disposable (Todolí-Signes, 2017). It produces less long-term jobs, as people are hired to complete hyper-flexible ‘gigs’, working to complete tasks for a defined, short period of time, often with low commitment existing between workers and organisations (Friedman, 2014; Harvey *et al.*, 2017). Gig workers tend to be classified as independent contractors, with the numbers legally employed by organisations operating in the gig economy significantly smaller (Todolí-Signes, 2017). For example, Uber, a prominent ‘ride-hailing’ or transportation gig organisation, currently has almost four million drivers across 700+ cities worldwide (Madrigal, 2019), but only legally employs 22,000 in total (Uber, 2019). Similarly, Lyft, another ride-hailing service, operates in 600+ locations across the US and Canada with almost two million drivers on the platform, but employs less than 5,000 (McNeill, 2019). Likewise, Deliveroo, a food-delivery company, has over 35,000 ‘riders’ in 200 cities but only directly employs an estimated 2,000 (Hurley, 2018).

Across Europe, Eurofound (2017) estimate that the number of people engaging in gig work as their main labour market status makes up less than 0.5 per cent of all employment. The UK has the highest incidence of gig work within Europe, with estimates of 4.4 per cent, or

approximately 2.8 million people, engaged in this form of work in 2017 (Lepanjuuri, Wishart & Cornick, 2018). Of these, 25 per cent reported that some form of gig work was their main job (Eurofound, 2017). Based on these figures, it is suggested that over 5 million people could be working in the UK's gig economy by 2022 (Dupont, Hughes, Wolf & Wride, 2018). The United States appears similar to Europe, with figures of 0.5 per cent estimated to be participating in this form of work as of 2015 (Katz & Krueger, 2016). However, measuring the overall size of this new economy proves difficult because organisations are not obliged to publish figures, and most gig working arrangements fall outside existing capabilities of labour market measurement tools.¹ Also, despite boasting large worker numbers, little is known regarding how many individuals regularly engage in this work, rather than being one-off or periodic workers.

Uncertainty exists in respect to what gig work does and does not involve, with different forms of contingent labour commonly subsumed into gig classifications (Howcroft and Bergvall-Kåreborn, 2019; Bernhardt & Thomason, 2017; Kuhn, 2016). This, we argue, is erroneous. Despite outward similarities with non-traditional forms of work, key differences exist that warrant specific consideration (e.g. number of parties involved and the influence of technology). Likewise, there is no one universal work classification or set of 'rules' that can be implemented in the gig economy. Individuals who occasionally boost income by renting out apartments on Airbnb, an online platform for property rental, are very different from those who make a living by working for ride-hailing or food-delivery services like Uber or Deliveroo (Rozzi, 2018). Again, each of these is strikingly different from crowdworking platforms, such as Amazon Mechanical Turk, that connect businesses with skilled freelance workers (Rozzi, 2018). Because work and conditions are hugely individualised across platforms, employment relations and HRM implications along with policy and union responses will vary and need to be tailored accordingly. This paper's first objective is to provide conceptual clarity on gig work by moving away from monolithic perspectives and differentiating it into three key variants: capital platform work; crowdwork; and app-work. This, we argue, enables a more textured understanding of the idiosyncratic nature of gig working arrangements (Liao, Wayne &

¹There is a lack of clarity as to what precisely gig work entails and this in turn means estimates of the size of the gig economy are difficult to corroborate and compare. Different estimates exist because of significant variation in definitions of what is included or excluded in the gig economy. Consequently, caution is necessary in interpreting the size, scope and spread of the gig economy.

Rousseau, 2016). Accordingly, this conceptualisation of gig work provides the paper's first contribution.

The paper's second objective is to examine the criticality of management-by-algorithm, a relatively novel and alternative means of utilising the influential role of technology to monitor, manage and control workers (Rosenblat & Stark, 2016). By focusing on the app-work variant of gig work, our second contribution involves nuancing the key implications of algorithmic management for employment relations and HRM. Algorithmic management automates HR related duties and functions traditionally undertaken by human managers. Therefore, our app-work focus stems from it being a gig work variant that is particularly problematic from an employment relations and HRM perspective, as evidenced by the burgeoning academic, practitioner and press narrative (e.g. widescale protests, debates and legal issues surrounding app-work organisations) (Schmidt, 2017; Stewart & Stanford, 2017; Tran & Sokas, 2017; Wright, Wailes, Bamber & Lansbury, 2017).

The paper elucidates several research questions around the nature of employment relations and HRM responsibilities in app-work organisations. Given the relative infancy of academic enquiry on gig work, we argue that an appropriate point of departure is to examine the impact that algorithmic management has on the formation and development of the working relationship in the first instance. Gaining insight into the process through which workers establish a working relationship, as well as investigating how they adhere to and are managed by the algorithm's instructions, holds the prospect of better understanding the intricacies of labour within app-work. Building on this, we identify several areas strongly impacted by algorithmic management, specifically the nature of employment relations, work assignment processes, and performance management procedures (Prassl, 2018; Rosenblat, 2018), as central strands of the proposed research agenda.

2. Classifying & Distinguishing Gig Work

Building on Wolfe (1941), many conceptualisations of the terms 'work' and 'employment' have been offered by legal and organisational scholars. These reflect the changing nature of working relationships and the emergence of non-standard forms of employment over time. Most point to the idea of an employee being 'controlled' by the organisation, 'in the service' of an 'employer', 'directing' the work process in exchange for 'remuneration', or the reciprocal

obligations involved (Cappelli & Keller, 2013; Connelly & Gallagher, 2004; Schein, 1980). While researchers conceive of an employee in different ways, the means by which gig organisations view their workers has been controversial. In distancing themselves from legal responsibility towards ‘employees’, many gig organisations have adopted other monikers for worker classification (e.g. ‘taskers’ with TaskRabbit; ‘riders’ with Deliveroo). There are, however, several cases being taken by gig workers, with the support of unions, challenging the legal status of their employment (McGaughey, 2018).

Working arrangements are traditionally classified as either ‘employment’ or ‘contract work’. Situating gig work in the literature on employment classifications, it is a hybrid of contingent work types (Kuhn, 2016). Figure 1 illustrates how gig working compares to other types of employment. It has obvious similarities to independent contracting (Carr, Hall, Mason & Varney, 2017) and forms of subcontracting with the involvement of at least three parties. Gig work also bears similarities to temporary employment, which is neither full-time nor open-ended (Friedman, 2014); temporary agency work, which distributes work via third-party labour intermediaries (Ward, Grimshaw, Rubery & Beynon, 2001); and zero-hour contracts, where no guaranteed hours are offered (O’Sullivan *et al.*, 2015). The precarity of these arrangements makes them comparable to aspects of gig work in terms of a lack of commitment to long-term relationships; flexible working hours; project-based work; and piece-rate payments.

INSERT FIGURE 1 HERE

The common denominator across all gig work, and a critical distinguishing feature from other contingent labour, is the presence of an intermediary in the form of a digital platform organisation. Digital platforms present a new way of organising work and offering services, functioning as online businesses that facilitate commercial interactions between at least two parties – workers and customers (Gramano, 2019). This enables the meeting between the worker and customer, and, in doing so, mediates this relationship (Gandini, 2018). Building on work by De Stefano (2016), this distinctive feature allows us to identify three different variants of gig work: capital platform work, crowdwork, and app-work.

Capital platform work exists where individuals use a digital platform to sell goods peer-to-peer or to lease assets (e.g. Airbnb and Etsy). In this context, the role of the digital platform is to connect customers with a form of capital owned by an individual. The term ‘sharing economy’,

often used interchangeably with the gig economy, is most closely associated with capital platform work. However, the critical distinction is that capital platform work relies on the 'sharing' of underutilised assets, such as accommodation, for financial gain, rather than the completion of work (Schmidt, 2017). Consequently, the arrangement between capital platform workers and the gig organisation is more akin to an e-commerce or business-to-business relationship. This is sometimes referred to as a form of micro-entrepreneurship, in that these 'workers' share greater similarity with small businesses than employees (Vandaele, 2018; Zervas, Proserpio & Byers, 2017).

Contrastingly, crowdwork and app-work exist on platforms that allow workers to connect with customers to sell their services by performing tasks. *Crowdwork* refers to work-mediating digital platforms, such as Amazon Mechanical Turk and Fiverr, through which workers remotely complete tasks (De Stefano, 2016). In a typical crowdworking scenario, an organisation or individual posts a task or project to be completed via a platform. Tasks can range from software coding, to survey completion, to audio transcription. Any potential number of contributors can attempt to undertake the task from any geographic location, with the most suitable crowdworkers selected (Berg, 2016). On some crowdworking platforms, individuals may work simultaneously on the same task, with the customer selecting and paying for only the best product (De Stefano, 2016). Different crowdwork platforms set minimum compensation for certain tasks, whilst others let the compensation be set by their requester. In other cases, no clear relationship exists between the customer and the worker: they complete the task autonomously and are paid by the platform, which then provides the result to the customer. Crowdwork has proved popular for both workers and customers. For example, figures show that 10,000 new tasks are published and 7,500 are completed per hour on Amazon Mechanical Turk (Berg, 2016).

While crowdwork is generally conceptualised as one form of work, it can be subdivided into four distinct types. **Cloud-based crowdwork** is where tasks can be completed remotely via the Internet. If the task is not given to a specific individual but to an undefined group of people online, it is **crowdwork**. If the task is further subdivided into smaller units for piecemeal work, with each individual remunerated with an equally small amount of money, it is **micro-tasking crowdwork**. If tasks cannot be subdivided but work is carried out simultaneously, by a large group of individuals, while in the end only one result is used and paid for, it is **contest-based crowdwork** (Schmidt, 2017). However, as all types of crowdwork allow for the completion of

tasks remotely, thereby lacking a discernible employer, we argue that it is less likely that these workers will develop a transparent working relationship with the gig organisation (Berg, 2016).

The third variant of gig work, *app-work*, refers to service-providing intermediary digital platform organisations (or ‘apps’) that utilise workers to perform tasks locally (e.g. transport, food-delivery) for customers who pay for these services, with the organisation retaining a percentage of the exchange (De Stefano, 2016). An app (short for ‘application’) is a software program designed to perform a specific function directly for the user on mobile devices, most typically smartphones (Dickinson, Ghali, Cherrett, Speed, Davies & Norgate, 2014). App-work is a form of labour wherein the offering of traditional working activities in local markets is conducted through apps, managed by intermediary digital platform organisations, that intervene in setting minimum quality standards of service and in the selection and management of individuals who perform the work. Howcroft and Bergvall-Kåreborn (2019) suggest that app-work is a distinct form of crowdwork (which they combine with *capital platform work* and label as “asset-based services”). We, however, argue that when work is to be completed locally at a specific location and time, by an assigned worker who is managed and subjected to minimum performance standards by a single intermediary digital platform, it is wholly distinctive to crowdwork. In app-work, an algorithm quickly identifies and offers labour to one person; whereas in capital-platform work and crowdwork, it is the customer or requester who decides and selects whose services to pay for.

The speed at which the working relationship is created in app-work is strikingly unique. That is, many workers are hired almost instantly once they have agreed to the terms and conditions set out in the app and uploaded the relevant documentation (e.g. driving licence, proof of identity, etc.). Within some digital platform organisations, individuals must electronically accept the platform’s terms each time they pursue work opportunities or gigs – in the case of an Uber driver, for example, they must accept the associated terms and conditions each time they log in to the app (Tran & Sokas, 2017). Consequently, app-work participants may, over time, develop a working relationship with digital platform organisations, due to the agentic relationship being more transparent.

App-work relationships are generally not rooted in traditional employee–employer dyads, but rather involve multiple parties contributing to the dynamic exchange agreement. Trilateral, and sometimes quadrilateral, relations exist in app-working arrangements. For example, Deliveroo

describes itself as offering a service that links workers with partner restaurants to provide a food-delivery service to customers (Deliveroo, 2018). A *customer* uses the Deliveroo app to order food from a participating restaurant or *supplier*. The *app* notifies the restaurant, which prepares the order. At the same time, the app notifies a registered courier or *worker* that a delivery from the restaurant to the customer is required. Thus, the four italicised parties indicate that this is a multi-party working relationship. Indeed, all app-work involves a minimum of three parties, with platforms facilitating and mediating transactions between workers, customers, and occasionally suppliers (e.g. partner restaurants, in the case of Deliveroo). These multiple parties are illustrated in Figure 2. It is the app that connects and directs each party in the work arrangement, thereby functioning as a centralised mechanism governing the dynamics of this working relationship. The next section explores the algorithmic architecture of apps and the extent to which it manages app-workers who utilise platforms.

INSERT FIGURE 2 HERE

3. Algorithmic Management and App-Work

Technology is changing how organisations manage work. The management practices found in app-work arrangements borrow extensively from how digital media platforms, such as Facebook and Netflix, manage and influence their users. An algorithm is a computational formula that autonomously makes decisions based on statistical models or decision rules without explicit human intervention (Eurofound, 2018). It is a sequence of instructions telling a computer what to do within a set of precisely defined steps and rules designed to accomplish a task. However, instead of repeatedly processing a stable set of consistent instructions, algorithms rewrite themselves as they work. Technological advances have allowed organisations to utilise artificial intelligence that simultaneously learn and solve problems in increasingly complicated domains, from creating products to autonomously managing business processes (Mann & O’Neil, 2016). Algorithms are presented as objectively and mathematically correct and, as a result, people trust and abide by them (Lee, Kusbit, Metsky & Dabbish, 2015). However, Jago (2019) finds that people believe technological agents lack the same level of moral authenticity as human agents. Algorithms increasingly make decisions that have tended to be the remit of managers and HR professionals. On hiring platforms such as LinkedIn, algorithms sort through thousands of profiles to recommend promising job candidates to company recruiters (Carey & Smith, 2016). Likewise, in the gig economy, algorithms match

customers or requestors with workers (Lee *et al.*, 2015), and also function to evaluate worker performance on many platforms (Rosenblat, 2018).

Management-by-algorithm, or algorithmic management, is commonplace within app-work. We define algorithmic management as a system of control where self-learning algorithms are given the responsibility for making and executing decisions affecting labour, thereby limiting human involvement and oversight of the labour process. It replaces some of the tasks and processes that workers typically engage with by using algorithms that are developed by the very same individuals' data on the platform. Consequently, workers and consumers contribute, unremunerated, to the stock of intangible capital of the platform. This has seen stratospheric valuations placed on app-work platforms such as Lyft, valued at \$24 billion at IPO in 2019 despite losing over \$900 million in 2018 (Ovide, 2019).

For app-workers specifically, algorithms embedded within digital platforms govern the rules used to select and manage labour when facilitating a transaction between a customer and worker (see Figure 2). A key feature of app-work platforms is the automatic coordination and matching of the transaction through a set of advanced algorithms, creating a space where supply and demand integrate through automatic management and enforced mechanisms (Lehdonvirta, 2018). In other words, platforms use algorithms to match supply-and-demand in the market, while also mediating and closely monitoring the work performed (Gandini, 2018). The use of algorithms allows platforms to track workers' movements and assign work using workers' smartphone-based GPS systems. Algorithms are used to undertake typical HR processes like work assignment and performance management without the need for face-to-face interaction. Within this context of HR processes, a particularly apposite question concerns the creation of the app itself. Certainly, as digital platform organisations continue to expand, marketing specialists, system designers, programmers and data scientists are recruited to work exclusively on these platforms (Meijerink & Keegan, 2019). These core staff are effectively responsible for the design, maintenance and development of the app. In the absence of HR professionals to coordinate app-workers, policies for recruiting, monitoring and managing workers are mainly developed by these core staff (Meijerink & Keegan, 2019). In many ways, then, their role in the organisation is akin to a rudimentary HR function, as the platform that they are responsible for overseeing manages the working arrangement for app-workers.

Algorithmic management keeps marginal and labour costs relatively low (Schmidt, 2017), with considerable savings stemming from platforms functioning as virtual automated managers, thus negating the need for human supervisors and managers (Lee *et al.*, 2015). App-workers are typically managed via tracking mechanisms and customer ratings, thus forming one of the fundamental principles of the gig economy in that most core HR processes (i.e. the assignment of tasks, performance evaluation) are fulfilled by one of the two groups of users, the worker or the customer, through the medium of the app-work platform (Schmidt, 2017). For example, Uber and Lyft drivers are not directly supervised, nor are they required to wear a uniform or display organisational signage in their vehicles. However, the platforms have been known to provide drivers with precise instructions on cleanliness of their workspace, how to behave with customers, and guidelines for maintaining proper hygiene (Steinberger, 2018). Likewise, both platforms monitor the quality of work based on anonymous customer ratings (Steinberger, 2018).

Algorithmic management tracks, disciplines and sets expectations for workers without human supervision or recourse, often potentially to the detriment of workers' social protection (Vandaele, 2018). Through its very purpose, algorithmic management eliminates the more interpersonal and empathetic aspects of people management. Without an organisational partner advocating their needs and maintaining a balanced working relationship (Gilbert, De Winne & Sels, 2011), app-workers may lose trust and confidence, resulting in a reduced sense of well-being. As a means of exerting control, algorithms essentially automate management practice. This, however, does not extend to protecting workers or facilitating their supposed autonomy: platforms determine the eligibility of workers (e.g. the newness of vehicles is a factor in working with Uber and Lyft); some platforms allow workers to rate customers, but these ratings rarely influence customers' ability to use the platform; and levels of demand and time-pressures across many platforms mean workers have less choice to work entirely on their own schedules (Kuhn & Maleki, 2017). Algorithmic management also extends to pay, with many app-work platforms allowing workers to operate wherever they want. The platform then relies on 'economic nudges' (Rosenblat & Stark, 2016) in the form of algorithmically determined surge-pricing (Gandini, 2018) – called 'boosts' – to entice workers to areas of high demand, a process Woodcock & Johnson (2018) term 'gamification-from-above'.

The disparity that exists between those who design the app and those who physically provide the service it sells, and between those who offer the infrastructure for labour but no stability or

benefits to accompany it, are a defining feature of many app-work platforms. Algorithmic management therefore facilitates asymmetric information in the working relationship by controlling the supply of labour, targeting different workers with variable incentives, removing workers from platforms without remedy, and mediating disputes at its discretion. Slee (2017) compares facets of the algorithmic management structure to the ‘boss from hell’, describing it as erratic and bad-tempered with the potential to fire workers on a whim with no recourse to appeal. The nascent literature is gradually addressing algorithmic management and control, but considerable knowledge gaps remain in terms of the employment relations and HRM implications of this approach, to which we now turn.

4. App-Work’s Implications for Employment Relations and HRM: A Research Agenda

Algorithmic management, as one of the defining features of app-work, significantly impacts on the functioning of the working relationship. While the relationship initially appears to be an entirely transactional, economic exchange, recent research on the nuances of app-working arrangements signals the potential existence of a more complex, textured psychological contract, wherein app-workers view their association with the digital platform organisation in a broader, more relational sense (Ashford, Barker Caza & Reid, 2018). For instance, some app-workers are reported as seeking professional development opportunities from organisations (Graham, Hjorth and Lehdonvirta, 2017), social interaction and support from colleagues and managers, and mentoring from more senior colleagues (Ashford *et al.*, 2018). This aligns with emerging research on the psychological contract, which calls for a ‘multi-foci’ perspective to better understand the individualised nature of contemporary working arrangements (Alcover, Rico, Turnley & Bolino, 2017). This indicates that modern working relationships, like those found in app-work, are not simply based on an agreement between two parties, but are instead derived from the multiple parties in the employment network.

Of course, one of the parties in this working arrangement is the app itself, which, as explained, is controlled by the organisation and utilises algorithmic management. Organisations do not have psychological contracts, but their human agents do (Rousseau, 1995). When one examines employment relationships in app-work, the agency question becomes especially apposite. Emerging research highlights that Uber drivers successfully make demands of the app in terms of encouraging and facilitating tipping from customers (Riesman, 2014, Kuhn & Maleki, 2017), or improved performance ratings for engaging in citizenship behaviour (e.g. returning

a passenger's lost item) (Rosenblat & Stark, 2016). Likewise, Ravenelle (2019) argues that the capricious nature of apps may impact workers' experiences of psychological contract violation or fulfilment. Findings like this support the argument that the app-worker, in part at least, may develop expectations, even if the digital platform organisation rejects any notion of individual workers being employees.

Despite this, the fragmented nature of app-work, through its reliance on technology via digital platforms and governing algorithms, may erode the reciprocity found in traditional employment relationships. Therefore, app-work challenges our understanding of HRM concepts and practices. Certainly, it is evident that established practices such as employment relations, work assignment processes, and performance management exist in the app-work context. However, the overall approach towards HRM appears to differ significantly from established models, both in the context of its strategic purpose and the way in which activities are delivered and implemented.

App-work seems to pass the risks of employment almost entirely onto individual workers, predicated by the organisational view that these workers are independent, self-employed contractors. Thus, on the surface, the denial of employment status and associated rights for app-workers indicates little relevance for HRM as a profession and function. However, with multiple court rulings making determinations in favour of individual workers gaining employment status, HRM naturally becomes increasingly relevant. Notwithstanding this, we highlight that HRM practices are implemented for app-workers, despite the lack of an official HR function. We now critically discuss several of these key areas of HR practice, commencing with considering the nature of employment relations in app-work, and, in so doing, outline worthwhile research questions for future scholarly enquiry.

4.1 Employment Relations

As the term implies, the centrality of the 'app' in app-working relationships is absolute. That the algorithm underpinning the app is designed, developed and implemented heavily or entirely by marketing specialists and system designers within organisations, with little, if any, worker contribution, challenges established thought on the HR function's role in effectively managing working relationships (Meijerink & Keegan, 2019). While gig organisations have a HR function, this largely serves the core staff (i.e. employees) of these firms, rather than app-workers. This raises many challenges around the existence of an employment relationship and

its dynamics, while also raising questions for the future role of the HR function within the gig economy's business model.

A heavily transactional relationship appears to be at the heart of app-work, with workers paid for the quantity of work undertaken rather than the time spent working. The seemingly non-existent focus on the development of mutual trust and commitment in the working relationship further solidifies the transactional nature of this exchange. At the recruitment stage, most roles are advertised on the basis that workers have the autonomy to work when they wish with considerable independence, indicating that there are little or no expectations of a long-term relationship unless desired (Jabagi, Croteau, Audebrand & Marsan, 2019). Likewise, workers are typically onboarded quickly, via a prompt screening process, ensuring a readily accessible source of labour for the organisation (Kuhn & Maleki, 2017). While this approach to onboarding workers certainly reduces costs by eliminating many of the labour and time costs involved (Healy, Nicholson & Pekarek, 2017), it may prove problematic when looking beyond short-term, transactional cost benefits towards recruiting motivated workers who are likely to succeed in roles. Traditionally, organisations seek to strategically identify workers who 'fit' well with the organisation, as a means of improving and sustaining performance in the long-term (Ahmad & Schroeder, 2002). Fit theory argues that workers who recognise that their values align with those of the organisation are more likely to be intrinsically motivated, which, in turn, impacts on positive work outcomes and intentions to remain with the organisation (Ahmad & Schroeder, 2002). However, app-work predominantly ignores this concept, both in terms of 'person-job' and 'person-organisation' fit (Carless, 2005). For example, there is an evident lack of consideration of cultural fit and a limited consideration of technical expertise, with seemingly little interest in worker retention on a long-term basis (Friedman, 2014). Of course, the socialisation literature identifies the importance of determining the alignment between employee and organisation early in the working relationship (Woodrow & Guest, 2017). Perhaps if gig organisations made more of a concerted effort to ensure 'fit' between worker and platform, they would move towards reducing labour turnover and retaining its elite workers (Campbell, 2018), although their business model currently appears unconcerned with such matters.

Furthermore, given the focus on the completion of specific, narrow tasks within most app-work, investment in training and development opportunities for workers is severely limited or non-existent (Meijerink & Keegan, 2019). In some cases, workers attend an information

session or watch online induction videos prior to commencing work. This, in effect, acts as the entirety of the training and socialisation processes. As such, aspects of app-work can be viewed as bearing resemblance to Taylorism and Fordism, wherein work is fragmented into on-demand tasks and workers' performance is measured closely (McGaughey, 2018). Furthermore, the crucial role of algorithmic management at the core of app-work arguably allows greater complexity and management of tasks and people than established, long-standing concepts (Wood, Graham, Lehdonvirta & Hjorth, 2019). This raises several research questions pertaining to the transactional foundations upon which app-work relationships are formed. For example, are digital platform organisations entirely unconcerned with recruiting workers that fit well within the organisation? If so, how sustainable is the gig economy's business model in terms of retention and high worker turnover, particularly as most organisations withhold any development opportunities?

While the transactional aspect of app-work is clearly evident, we argue that this conceptualisation may under-appreciate the inherently nuanced structure of app-work, which forms a working relationship with a minimum of three parties involved (Wood & Lehdonvirta, 2019). In particular, arguments that app-work relationships are centred solely around economic gain should be challenged, particularly as this ideal may be perceived differently by each party involved. For example, emerging evidence signals that app-workers are seeking a more co-determined and relational work arrangement, populated by opportunities to develop new skills useful in furthering their careers, in addition to craving social interaction and networking opportunities (Graham *et al.*, 2017; Petriglieri, Ashford & Wrzesniewski, 2018). Consequently, psychological contract theory may be useful in this context, as the perception of each party is of critical importance and the terms may differ significantly through each individual's 'eyes' (Rousseau, 1995). This theory appreciates that one party can perceive a particular relationship and expectations that the other does not recognise. Baruch & Rousseau (2019) note that the norm of reciprocity, found in traditional employment relationships, may not always be clear when multiple parties are involved, each holding different positions and resources. This can conceivably be problematic if one party feels that a violation or breach has taken place. Thus, while a legal employment contract may be denied by the gig organisation, it is feasible that psychological contracts exist and develop, at least from the worker's perspective. The idea that app-workers only seek to work for financial gain appears at odds with recent research and wider scholarship on the sociology of work, around the relevance of relational arrangements (Woodcock & Johnson, 2018; Wood & Lehdonvirta, 2019).

Shared understandings and reciprocal contributions for mutual benefit are at the core of traditional, functional exchange relationships between workers and organisations (Dabos & Rousseau, 2004). From the app-worker's perspective, having no say in how work is assigned and how performance is assessed means that the working relationship is less representative of one that has been mutually co-determined, and could instead be perceived as a working arrangement of subjugation (Harvey *et al.*, 2017). According to organisational support theory, employees interpret organisational policies, practices and treatment – such as HRM – as indicators of the organisation's support and commitment to them (Vanhala & Ritala, 2016). But, for app-workers, traditional understandings around reciprocity and organisational support no longer apply or, at a minimum, are considerably different. In its role as intermediary, the digital platform organisation is the only party with full access to and control over the data, processes, and rules of the platform (Jabagi *et al.*, 2019).² If this trend is indicative of future developments in the world of work, it represents a significant shift from established conceptualisations of the employment relationship. Again, this form of labour management raises several worthwhile research questions: Besides the obvious financial implications, why do gig organisations typically adopt a 'hard' approach to managing their workers? What effect would a more co-determined work arrangement, whereby workers have a greater voice, have on the working relationship?

The relationship between app-workers and their organisations strays significantly from a conventional employment relationship. With multiple, unique sources of dependence across at least three parties, app-work constitutes a working relationship in which platforms simultaneously generate dependence and determine the rules that shape, afford, and limit worker agency (Wood & Lehdonvirta, 2019). Likewise, for most app-workers who encounter issues of any type in their roles, their primary point of contact with the platform is by email. In the absence of a human manager, enquiries are handled by support representatives, the email equivalent of a call centre, often managed by third parties. Responses to queries, issues or concerns are typically met with automated responses based on an algorithmic assessment of key words within emails (Rosenblat, 2018). Automated responses may be appropriate for

² In March 2019, a number of Uber drivers in the United Kingdom initiated legal action under the General Data Protection Regulation, requiring that the company provide data it holds about them. Specifically, the drivers want to know how Uber uses its algorithms to assign work and to track working time. The drivers have requested this data to enable them to accurately calculate holiday pay and other pay owed.

factual enquiries but lack the ability of a human to understand and respond to nuanced issues. As debate increases around this complex reimagining of work, controversy surrounding working conditions and workers' rights has led to legal issues and attempts at collective industrial action. Despite the provision of some autonomy and flexibility for app-workers, ongoing power asymmetries and struggles undoubtedly exist between workers, those customers requesting labour, and the platforms that act as both intermediaries and algorithmic managers by enabling and managing work processes (Lampinen, Lutz, Newlands, Light & Immorlica, 2018).

The industrial relations literature has long focused on the power dynamics of the employment relationship (Atchison, 1991; Fudge, 2017; Smith, 2006). In comparison to more traditional employment relationships, the power distance between digital platform organisations and app-workers appears to be weighted in favour of the former. In most cases, app-workers represent the party with the least significant power in many aspects of the working arrangement. App-workers are subjected to sophisticated forms of control, continuous surveillance, and anonymous customer ratings, with organisations and customers holding the most dominant positions (Pichault & McKeown, 2019). Most platforms and apps are designed to give the appearance of offering choice to the worker but this is usually executed in a manner wherein platforms directly shape the engagement in such a way that workers are disadvantaged by not agreeing, i.e. penalising workers for rejecting tasks or for not working during peak periods (Flanagan, 2018). Likewise, many app-work platforms fully exploit the possibility to minutely monitor the activities of app-workers in real time, rendering them heavily at the mercy of the platform's instructions, expectations and demands (Kuhn & Maleki, 2017). This creates an 'always-on' form of control that some workers perceive as unfair, given their employment classification (Gandini, 2018). This has significant implications, in that research already indicates that when a power imbalance exists between two or more parties, those in the more vulnerable position find it difficult to have their voice heard (Mowbray, Wilkinson & Tse, 2015), resulting in perceptions of unfair treatment (Van Buren & Greenwood, 2008). Algorithmic management fragments work into individual tasks, closely monitors workers, and links pay to performance as a means of segregating workers (Healy *et al.*, 2017), leading scholars to likening the gig economy to a modern-day, digitalised Taylorism (McGaughey, 2018).

The well-being of app-workers has emerged as a concern, with app-work frequently characterised by health and safety issues, inadequate social protection, troubling management structures, and a lack of investment in workers (Vandaele, 2018). Recent research reports that some app-workers feel exploited at the hands of organisations as a consequence of having little input into how work is assigned or completed (Wood *et al.*, 2019). Accordingly, worker morale and well-being undeniably decline (Fleming, 2017). Some digital platform organisations refute these claims, arguing that they provide workers with a voice through in-house surveys and support groups (Dupont *et al.*, 2018). Uber, for instance, contends that it provides opportunities for involvement to its workers through arranging quality improvement courses where workers can have their voice heard (Rosenblat, 2018). Likewise, if drivers are at risk of deactivation from the platform due to low customer ratings, Uber sometimes offers a training course to facilitate improvement. However, there is a fee for attending. Effectively, the cost of low ratings for drivers is to pay for your own training. From the organisation's perspective, initiatives like this are in lieu of recognised HR processes, such as training or appraisals, and serve as the most appropriate means of managing the unique nature of app-work (Kuhn & Maleki, 2017). Such features intimate that HRM in app-work is not focused on the maintenance of a relationship between employer and employee, but rather on control and coordination (Meijerink & Keegan, 2019). It can therefore be argued that, through algorithmic management, the traditional notion of the 'tyranny of the clock' has been replaced by the 'tyranny of the algorithm' (Lehdonvirta, 2018).

The power imbalance in employment relations was central to the origins and rise of the union movement and collective bargaining. Collective bargaining is a process whereby workers come together to address pressures for undercutting the price of each other's labour. While collective action and reform is an option for gig workers, the very nature of app-work makes this especially difficult: the manager is an algorithm, co-workers are independent contractors (potentially geographically dispersed and in competition with each other), and the work is often carried out in isolation or in contact only with the customer (Prassl, 2018). This undoubtedly complicates the organisation of collective action, as workers can be difficult to engage with, find and reach. Despite varied success, attempts have highlighted that collective industrial action is far from structurally impossible for app-workers (Schiek & Gideon, 2018). Many trade unions have sought to engage with app-workers, most famously including GMB in the UK and the New York Taxi Worker Alliance, both of whom have brought multiple cases against Uber (Johnston & Land-Kazlauskas, 2018). Additionally, there are a host of ongoing

legal cases proceeding through the courts surrounding app-work platforms, with the majority seeking to determine who is an ‘employee’ and who is a ‘worker’ (McGaughey, 2018).

4.2 Work Assignment

Algorithmic management dictates how work is assigned and commences as soon as app-workers log-in to the platform. The supposed non-financial reward of app-work is that workers are afforded a high degree of flexibility and autonomy by choosing when and where to work (Healy *et al.*, 2017). The realities of these claims are, we argue, highly debatable. It is an algorithm that identifies the worker who is better or more quickly able to cater to a certain customer, thereby allocating gigs amongst workers to ensure the highest level of speed and efficiency (Gramano, 2019). Most app-work platforms suggest that they are merely in the business of ‘matching’ workers with customers that request services (Prassl, 2018). However, this portrays a further power imbalance. For example, although app-workers operating on courier and ride-hailing platforms are not paid while waiting to be assigned tasks, platforms still gather and generate useful data and analytics from workers on ‘dead miles’ (i.e. driving while waiting for tasks to appear, but not being paid to do so), thereby enhancing its algorithms (Thomas, 2018). Accordingly, with potential issues of a power imbalance in the context of work assignment, what are the ethical implications of the intense algorithmic control exercised by platforms? More specifically, how transparent is the process by which work assignment algorithms are formed and updated using app-workers’ data?

Although regularly advertised as a key benefit of app-work roles, the realities of the autonomy in choosing when to work and which tasks to accept is more limited than often claimed (Wood *et al.*, 2019). Most platforms employ a range of strategies to ensure that jobs are accepted as quickly as possible. For example, ride-hailing platforms often do not reveal passengers’ destinations to drivers until after the trip has been accepted (Cunningham-Parmeter, 2016; Prassl, 2018). Likewise, many platforms are known to penalise workers who do not maintain high acceptance rates for tasks offered. For example, Uber has been known to designate drivers as unavailable for work if three consecutive rides are declined (Steinberger, 2018). Uber also stimulates oversupply in times of potentially high demand by algorithmically urging drivers to temporarily relocate and benefit from ‘surge-pricing’. During periods of excessive demand when there are not enough drivers on the road and customer wait times are long, Uber increases its normal fares. Drivers, however, may be offered ‘non-surge’ priced trips once they arrive at the location, and may subsequently be penalised if they decline the trip, despite having

absorbed the costs of travelling to the location (Rosenblat, 2018). Algorithms also identify future periods of potentially high demand, with drivers notified via the app that, for example, they are likely to earn above average fares if they work the upcoming Friday and Saturday. If the monetary benefit is not quite as substantial as promised, this may constitute a breach of their psychological contract.

The gig economy has pioneered algorithmic techniques of worker control, such as behavioural nudges and scheduling prompts, based on volatile real-time and predictive analytics that produce economic incentives intended to allocate workers to high-demand areas (Van Doorn, 2017). In theory, workers can choose when to work and they can also operate on more than one platform simultaneously, which may pose health and safety concerns given the lack of oversight on hours worked. However, many app-workers are encouraged to keep high acceptance rates through occasional promotions that offer higher pay (Lee *et al.*, 2015). Likewise, when a worker is ready to finish work, algorithmic control again becomes apparent, as workers on some platforms are often enticed to earn more money by staying active on the app while customer demand is high (Prassl, 2018).

As supposed independent contractors, app-workers should be free to avail of promises to choose when to work and which tasks to accept. Yet, for most app-workers, platform control via algorithmic management heavily limits autonomy. In reality, workers must work long hours and at peak times to garner high earnings and maintain good ratings and are often left with little choice but to accept whichever tasks are offered (Prassl, 2018). Thus, for most platforms, rather than simply ‘matching’ workers and customers, they instead act as digital work intermediaries that use algorithms to tightly manage a large, invisible workforce (Prassl, 2018). Therefore, any ideal of individuals possessing full flexibility of their own work schedule may be rare, though empirical evidence is required to establish how extensive this is. Accordingly, we pose the following research questions: As worker autonomy often appears more limited than advertised, what are app-workers’ experiences of work assignment processes? Is there variability in these experiences across different organisations? Likewise, if app-workers are penalised or disadvantaged for exercising the autonomy promised to them, what are the implications of this potential psychological contract breach for the working relationship?

4.3 Performance Management

The means through which platforms exercise algorithmic control over app-workers' performance are many and varied, and, as a result, are central in approaches to performance management. Once 'active' on an app, platform control and associated monitoring takes hold in an intensive way (Prassl, 2018). For example, GPS systems can be used to monitor the speed and position of vehicles, along with tracking every movement of app-workers, and, consequently, can verify what an individual is doing. The Uber app tracks workers' GPS locations and has acceleration sensors built into the driver's version of the app to detect heavy braking and speeding (Prassl, 2018). These data, along with customer ratings and reviews, are then used to identify the best performing workers and to alter the algorithm that assigns tasks to workers. However, much like the work assignment processes, there appears to be limited transparency and understanding about how exactly these algorithms are altered, by whom, and under whose instruction.

Several platforms issue performance metrics to app-workers, which often include comparisons to other workers and to overall performance rankings, as a means of ensuring high levels of productivity (Van Doorn, 2017). Additionally, most platforms utilise customer ratings of workers via anonymous systems as a means of performance evaluation. Before being shared with workers, assessments are forwarded to platforms, who have the opportunity to verify – albeit indirectly – the quality and punctuality of the service rendered (Gramano, 2019). The importance of these ratings ultimately leads to further informal or 'soft' platform control (Wood *et al.*, 2019), by way of driver behaviours in terms of offering customers bottled water, phone chargers, and similar 'extras' in order to receive high ratings. All such extras are at the expense of individual workers.

'Harder' platform control approaches are utilised to create high-performance expectations and the need to satisfy organisational and customer needs. For example, Uber previously operated immediate ten-minute deactivation periods for drivers who repeatedly refused less profitable trips (Prassl, 2018). This sanction is derived through data generated via the platform, and as such is automatic and immediate. These approaches appear to be highly effective in eliciting strong performance levels, with workers striving to maintain above-average ratings for fear of being deactivated from platforms (Kuhn & Maleki, 2017). The pursuit of high-performance levels may come at the expense of worker safety, with recent research highlighting the implications of pressurised working environments on some app-workers' health and well-being

(Wood *et al.*, 2019). Consequently, regulation may be required to mitigate against the potentially detrimental effects of monitoring on app-work platforms.

As the platform has the opportunity to exercise penetrating control over all aspects of the service delivery, the worker can be described as being in a situation comparable to a permanent probationary period (Gramano, 2019). Indeed, such is the potential intensity of monitoring and control in app-work that it could be described as possessing characteristics of an electronic panopticon (Prassl, 2018) that goes far beyond what one thought possible in the past (Dagnino, 2017). The panopticon, associated with the philosopher Bentham, refers to a central tower that can observe occupants without them knowing fully whether they are being watched. This may lead to an assumption amongst workers that they are under constant observation, thereby impacting their behaviour.

A potential danger arising from the use of algorithms in managing workers is that such extensive data becomes viewed as a reliable and objective truth, eroding any scope for human interpretation of the nuances of workplace behaviour. This is problematic, given the inherent weaknesses in simplistic and entirely quantitative measures of performance. Likewise, we are also learning that algorithms can contain significant biases (Guszcza, Rahwan, Bible, Cebrian & Katyal, 2018). Given the fundamental role of customer ratings, and that workers in receipt of low ratings are potentially subjected to being deactivated for future work (Tran & Sokas, 2017), such concerns are magnified. For example, in some cities, Uber drivers with an average rating, calculated by an algorithm, of lower than 4.6 out of a possible 5 are at risk of disbarment from the platform (Kuhn & Maleki, 2017). These levels of control perhaps provide context as to why the majority of drivers do not seek to remain with the organisation in the long-term, as exemplified by reports suggesting that 11 per cent of drivers become inactive within the first month, while only 4 per cent remain on the platform for longer than one year (McGee, 2017).

When app-workers are disbarred, the reasoning is often unclear, as is any potential scope for reinstatement with the lack of an appeals process. Indeed, the way that sanctions are applied based on ratings is often unpredictable and arbitrarily employed (Prassl, 2018). The lack of human interaction in seeking to address such issues is noteworthily absent and troubling (Kirven, 2018). Given that app-workers are unlikely ever to actually meet their 'employers' or a line manager, performance management in the gig economy is a substantially different concept compared to more traditional work roles (Barley, Bechky & Milliken, 2017). This

leads us to ask what processes, if any, exist to allow workers to challenge customer evaluations? The accuracy of these processes raises concerns for worker protection and for allowing recourse to a perceived unfair rating (Vandaele, 2018). If ratings are treated as sacrosanct and app-workers have no ability to provide context or an alternative account, their earning capacity is ultimately at the peril of unknown customers.

There are many occasions where an app-worker's performance evaluation may be strongly impacted by circumstances outside of their control, given that multiple parties exist in the working relationship and success is dependent on all parties fulfilling their obligations (Alcover *et al.*, 2017). Consider the working arrangement within food-delivery platforms, such as Deliveroo or UberEats, for example. For illustration, if the restaurant supplied the courier with the wrong order, he or she would then be confronted with an unhappy customer upon delivery. If the courier had not been sufficiently trained to deal with difficult customers, he or she may perceive that this error and subsequent aggravation from the customer constitutes a violation of the exchange agreement. This encounter may then disrupt delivery metrics or result in a complaint, and as a result the worker's performance report is impacted (Kuhn & Maleki, 2017), potentially resulting in the worker voluntarily ending his/her relationship with the platform or being less likely to receive future gigs. From the organisation's perspective, an error from another party in the working arrangement could result in the untimely exit of a worker or in less use being made of a strong performer.

5. Conclusion: Looking Forward

The gig economy is a small, but growing component of the global labour market. This 'new' economy has been embraced by customers. While welcomed by some workers, it does, however, represent a further trend towards precarious working. Existing conceptualisations of gig working have, we argue, resulted in some misleading classifications and conflation of what gig work entails and the size of this economy. Having identified the crucial role of technology in facilitating work in the gig economy, we propose that distinguishing app-work from other variants of gig work represents an important first step to a more coherent typology of gig workers, which, in turn, is central to better understanding the issues such workers face and the implications for HRM and the employment relationship. Moreover, this is also important for public policy-making bodies, who are being asked to consider appropriate protections in several jurisdictions (Berg, 2016; Friedman, 2014).

While most gig organisations deny the existence of an employment relationship, the strict levels of control enforced by many app-work organisations via algorithmic management raises noteworthy contradictions that warrant developed empirical consideration (Kuhn & Maleki, 2017). Conflict between app-workers and organisations on issues surrounding control, dependency, and working conditions, for example, would suggest that there is more to the working relationship than simply remuneration and flexibility (Meijerink & Keegan, 2019). In other words, app-workers may view their working relationship beyond a merely economic or transactional exchange. Although scholarship is beginning to consider and address issues around the employment relationship and HRM in the gig economy, there is an under-theorisation, which is not unexpected in a new domain such as this. 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. While digital platform organisations typically position themselves as providers of an app, functioning simply as a neutral technology platform to match workers with customers, the reality appears more likely to be that most platforms act as digital work intermediaries in the business of tightly managing a large, invisible workforce (Prassl, 2018). From an employment relations and HRM perspective, the gig economy creates a new dynamic where these technologies do not just mediate economic and social relations, but also help to co-constitute them (Wood & Lehdonvirta, 2019).

The practice of HRM, serving to effectively manage people within organisations, has typically been based on the notion of traditional employment. In the absence of a conventional employer–employee relationship, app-work arrangements disrupt this conceptualisation. Despite the lack of a discernible employment relationship, gig work still incorporates HRM-like activities, including, but not limited to, managing working relationships, work assignment processes, and performance management and evaluation (Meijerink & Keegan, 2019). The preceding discussion has, for example, considered how the working relationship in app-work is established and managed in ways that raise concerns around power imbalances, fairness and worker well-being, and in a way that places little value on the development of a deep relationship with associated levels of commitment (Healy *et al.*, 2017). Similarly, work assignment processes form a complex reimagining, with algorithmic mechanisms contradicting claims of supposed flexibility and autonomy (Collier *et al.*, 2017; Harris, 2017). Likewise, with its primary focus on quantitative customer ratings and tracking mechanisms, performance

management is strikingly different from, but no less important to our traditional understanding. App-workers are subject to tight levels of control, where the customer evaluation is often critical (Healy *et al.*, 2017), and without recourse to question or refute performance scores. This arguably results in a generally one-sided process (Flanagan, 2018), which leads to a further shift in power away from workers.

The implications of app-work and the pervasiveness of algorithmic management for the HR profession needs greater consideration. Some have noted that the gig economy redefines the role of HRM away from upholding employment relationships towards the governance of exchanges on platforms that serve to allow the co-creation of value for all parties involved (Meijerink & Keegan, 2019). Others question the long-term viability of the role of HRM in the gig economy, particularly within the strategic context of motivating workers, ensuring high-quality performance, and providing social support (Jabagi *et al.*, 2019). With algorithmic management replacing human supervision across the majority of platforms, organisations must instead rely on workers to self-organise and self-motivate to advance task performance and organisational goals (Jabagi *et al.*, 2019). HRM activities tend to be outsourced to the system designers that develop and manage algorithms, which removes many of the costs of HRM and passes employment risks to the individual (Snyder, 2016). This data-dominated approach moves work into an inhuman form, with algorithms undertaking roles that were traditionally the preserve of HR professionals. The concomitant rise of interest in big data and HR analytics may further indicate the removal of the more interpersonal and empathetic aspects of people management (Angrave, Charlwood, Kirkpatrick, Lawrence & Stuart, 2016). This raises questions around what the HR function serves to do, or how it should act, in these organisations (i.e. a HR function that serves permanent staff within the organisation, but has no responsibility for ‘independent’ gig workers)? While gig work may bring increased organisational productivity, how ethical and appropriate may this be? With the tendency to refuse employee rights, HRM may be sleepwalking into the eradication of ethical responsibility (Greenwood, 2013), for example, in relation to the level of protection and use of individual data, transparency and accountability of algorithmic processes, and worker well-being. All things considered, the rise in app-work and the all-pervasive role of the algorithm brings a need for a more critical consideration of the consequences of this for employment relations and of how HRM, as a function and discipline, should react and evolve.

References

- Ahmad, S. & Schroeder, R.G. (2002). The Importance of Recruitment and Selection Process for Sustainability of Total Quality Management. *International Journal of Quality & Reliability Management*, 19(5), 540–550. DOI: 10.1108/02656710210427511.
- Alcover, C.M., Rico, R., Turnley, W.H. & Bolino, M.C. (2017). Multi-Dependence in the Formation of the Distributed Psychological Contract. *European Journal of Work and Organisational Psychology*, 26(1), 16–29. DOI: 10.1080/1359432X.2016.1197205.
- Angrave, D., Charlwood, A., Kirkpatrick, I., Lawrence, M. and Stuart, M. (2016). HR and Analytics: Why HR is Set to Fail the Big Data Challenge. *Human Resource Management Journal*, 26, 1–11. DOI: 10.1111/1748-8583.12090.
- Ashford, S.J., Caza, B.B. & Reid, E.M. (2018). From Surviving to Thriving in the Gig Economy: A Research Agenda for Individuals in the New World of Work. *Research in Organizational Behaviour*. DOI: 10.1016/j.riob.2018.11.001.
- Atchison, T.J. (1991). The Employment Relationship: Un-Tied or Re-Tied? *Academy of Management Perspectives*, 5(4), 52–62. DOI: 10.5465/ame.1991.4274750.
- Barley, S.R., Bechky, B.A. & Milliken, F.J. (2017). The Changing Nature of Work: Careers, Identities, and Work Lives in the 21st Century. *Academy of Management Discoveries*, 3(2), 111–115. DOI: 10.5465/amd.2017.0034.
- Baruch, Y. & Rousseau, D.M. (2019). Integrating Psychological Contracts and Ecosystems in Career Studies and Management. *Academy of Management Annals*, 13(1), 84–111. DOI: 10.5465/annals.2016.0103.
- Berg, J. (2016). Income Security in the On-Demand Economy: Findings and Policy Lessons from a Survey of Crowdworkers. *ILO: Conditions of Work and Employment Series No. 74*. Available: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_479693.pdf.
- Bernhardt, A. & Thomason, S. (2017). What Do We Know About Gig Work in California? An Analysis of Independent Contracting. *UC Berkeley Labour Centre*. Available: <http://laborcenter.berkeley.edu/what-do-weknow-about-gig-work-in-california/>.
- Bonet, R., Cappelli, P. & Hamori, M. (2013). Labour Market Intermediaries and the New Paradigm for Human Resources. *The Academy of Management Annals*, 7(1), 341–392. DOI: 10.1080/19416520.2013.774213.
- Campbell, H. (2018). *The Rideshare Guide*. NY: Simon & Schuster, Inc.
- Cappelli, P. & Keller, J.R. (2013). Classifying Work in the New Economy. *Academy of Management Review*, 38(4), 575–596. DOI: 10.5465/amr.2011.0302.
- Carless, S.A. (2005). Person-Job Fit Versus Person-Organisation Fit as Predictors of Organisational Attraction and Job Acceptance Intentions: A Longitudinal Study. *Journal of Occupational and Organisational Psychology*, 78, 411–429. DOI: 10.1348/096317905X25995.
- Carr, C.T., Hall, R.D., Mason, A.J. & Varney, E.J. (2017). Cueing Employability in the Gig Economy: Effects of Task-Relevant and Task-Irrelevant Information on Fiverr. *Management Communication Quarterly*, 31(3), 409–428. DOI: 10.1177/0893318916687397.
- Carey, D. & Smith, M. (2016). How Companies Are Using Simulations, Competitions, and Analytics to Hire. *Harvard Business Review*. Available: <https://hbr.org/2016/04/how-companies-are-using-simulations-competitions-and-analytics-to-hire>.

- Collier, R.B., Dubal, V.B. & Carter, C. (2017). Labour Platforms and Gig Work: The Failure to Regulate. *Institute for Research on Labour and Employment: Working Paper 106–17*.
- Connelly, C.E. & Gallagher, D.G. (2004). Emerging Trends in Contingent Work Research. *Journal of Management*, 30(6), 959–983. DOI: 10.1016/j.jm.2004.06.008.
- Cunningham-Parmeter, K. (2016). From Amazon to Uber: Defining Employment in the Modern Economy. *Boston University Law Review*, 96, 1673–1728. Available: <https://search.proquest.com/docview/1851662998?accountid=14504>.
- Dabos, G.E. & Rousseau, D.M. (2004). Mutuality and Reciprocity in the Psychological Contracts of Employees and Employers. *Journal of Applied Psychology*, 89(1), 52–72. DOI: 10.1037/0021-9010.89.1.52.
- Dagnino, G.B., King, D.R. & Tienari, J. (2017). Strategic Management of Dynamic Growth. *Long Range Planning*, 50(4), 427–430. DOI: 10.1016/j.lrp.2017.06.002.
- Deliveroo (2018). *Legal Information*. Available: <https://deliveroo.ie/legal>.
- De Stefano, V. (2016). The Rise of the ‘Just-In-Time’ Workforce: On-Demand Work, Crowdwork and Labour Protection in the Gig Economy. *International Labour Office: Conditions of Work and Employment Series*, 71. Available: <http://heinonline.org/HOL/P?h=hein.journals/cllpj37&i=507>.
- Dickinson, J.E., Ghali, K., Cherrett, T., Speed, C., Davies, N. & Norgate, S. (2014). Tourism and the Smartphone App: Capabilities, Emerging Practice and Scope in the Travel Domain. *Current Issues in Tourism*, 17(1), 84–101. DOI: 10.1080/13683500.2012.718323.
- Dupont, J., Hughes, S., Wolf, R. & Wride, S. (2018). *Freedom and Flexibility: The Relationship Deliveroo Riders Have with the Labour Market*. Public First: London. Available: <https://www.scribd.com/document/392753154/Public-First-Freedom-and-Flexibility#download>.
- Eurofound (2017). *Non-standard Forms of Employment: Recent Trends and Future Prospects*, Eurofound, Dublin. Available: <http://eurofound.link/ef1746>.
- Eurofound (2018). *Automation, Digitalisation and Platforms: Implications for Work and Employment*, Publications Office of the European Union, Luxembourg. Available: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef18002en.pdf.
- Fabo, B., Karanovic, J. & Dukova, K. (2017). In Search of an Adequate European Policy to the Platform Economy. *Transfer: European Review of Labour and Research*, 23(2), 163–175. DOI: 10.1177/1024258916688861.
- Flanagan, F. (2018). Theorising the Gig Economy and Home-based Service Work. *Journal of Industrial Relations*, 61(1), 57–78. DOI: 10.1177/0022185618800518.
- Fleming, P. (2017). The Human Capital Hoax: Work, Debt and Insecurity in the Era of Uberization. *Organisation Studies*, 38(5), 691–709. DOI: 10.1177/0170840616686129.
- Friedman, G. (2014). Workers Without Employers: Shadow Corporations and the Rise of the Gig Economy. *Review of Keynesian Economics*, 2(2), 171–188. DOI: 10.4337/roke.2014.02.03.
- Fudge, J. (2017). The Future of the Standard Employment Relationship: Labour Law, New Institutional Economics and Old Power Resource Theory. *Journal of Industrial Relations*, 59(3), 374–392. DOI: 10.1177/0022185617693877.
- Gandini, A. (2018). Labour Process Theory and the Gig Economy. *Human Relations*, 1–18. DOI: 10.1177/0018726718790002.

- Gilbert, C., De Winne, S. & Sels, L. (2011). The Influence of Line Managers and HR Department on Employees' Affective Commitment. *International Journal of Human Resource Management*, 22(8), 1618–1637. DOI: 10.1080/09585192.2011.565646.
- Graham, M., Hjorth, I. & Lehdonvirta, V. (2017). Digital Labour and Development: Impacts of Global Digital Labour Platforms and the Gig Economy on Worker Livelihoods. *Transfer: European Review of Labour and Research*, 23(2), 135–162. DOI: 10.1177/1024258916687250.
- Gramano, E. (2019). Digitalisation and Work: Challenges from the Platform Economy. *Contemporary Social Science*. DOI: [10.1080/21582041.2019.1572919](https://doi.org/10.1080/21582041.2019.1572919).
- Greenwood, M. (2013). Ethical Analyses of HRM: A Review and Research Agenda. *Journal of Business Ethics*, 114(2), 355–366. DOI: [10.1007/s10551-012-1354](https://doi.org/10.1007/s10551-012-1354).
- Guszcza, J., Rahwan, I., Bible, W., Cebrian, M. and Katyal, V. (2018). Why We Need to Audit Algorithms, *Harvard Business Review*. Available: <https://hbr.org/2018/11/why-we-need-to-audit-algorithms> [Accessed: 10 December 2018].
- Harris, B. (2017). Uber, Lyft, and Regulating the Sharing Economy. *Seattle University Law Review*, 41(1), 269–285. Available: <http://heinonline.org/HOL/P?h=hein.journals/sealr41&i=277>.
- Harvey, G., Rhodes, C., Vachhani, S.J. & Williams, K. (2017). Neo-Villeiny and the Service Sector: The Case of Hyper Flexible and Precarious Work in Fitness Centres. *Work, Employment and Society*, 31(1), 19–35. DOI: 10.1177/0950017016638023.
- Healy, J., Nicholson, D. & Pekarek, A. (2017). Should We Take the Gig Economy Seriously? *Labour and Industry: A Journal of the Social and Economic Relations of Work*, 27(3), 232–248. DOI: 10.1080/10301763.2017.1377048.
- Howcroft, D. & Bergvall-Kåreborn, B. (2019). A Typology of Crowdwork Platforms. *Work, Employment and Society*, 33(1), 21–38. DOI: 10.1177/0950017018760136.
- Hurley, J. (2018, February 26). Boss Determined to Deliver the Right Ingredients for Success. *The Times*. Available: <https://www.thetimes.co.uk/article/boss-determined-to-deliver-the-right-ingredients-for-success-6gtczs8xq>.
- Jabagi, N., Croteau, A.M., Audebrand, L.K. & Marsan, J. (2019). Gig Workers' Motivation: Thinking Beyond Carrots and Sticks. *Journal of Managerial Psychology*, forthcoming. DOI: 10.1108/JMP-06-2018-0255.
- Jago, A.S. (2019). Algorithms and Authenticity. *Academy of Management Discoveries*, 5(1), 38–56. DOI: 10.5465/amd.2017.0002.
- Johnston, H. & Land-Kazlauskas, C. (2018). Organising On-Demand: Representation, Voice, and Collective Bargaining in the Gig Economy. *Conditions of Work and Employment Series No 94*. International Labour Office: Geneva. Available: https://www.ilo.org/wcmsp5/groups/public/-ed_protect/---protrav/---travail/documents/publication/wcms_624286.pdf.
- Katz, L. & Krueger, A. (2016). *The Rise and Nature of Alternative Work Arrangements in the United States, 1995–2015*. Available: https://krueger.princeton.edu/sites/default/files/akrueger/files/katz_krueger_cws_-_april_26_2016.pdf.
- Kirven, A. (2018). Whose Gig Is It Anyway? Technological Change, Workplace Control and Supervision, and Workers' Rights in the Gig Economy. *University of Colorado Law Review*, 89(1), 249–292. Available: <http://heinonline.org/HOL/P?h=hein.journals/ucollr89&i=267>.

- Kuhn, K.M. (2016). The Rise of the 'Gig Economy' and Implications for Understanding Work and Workers. *Industrial and Organisational Psychology*, 9(1), 157–162. DOI: 10.1017/iop.2015.129.
- Kuhn, K.M. & Maleki, A. (2017). Micro-Entrepreneurs, Dependent Contractors, and Instaserfs: Understanding Online Labour Platform Workforces. *Academy of Management Perspectives*, 31(3), 183–200. DOI: 10.5465/amp.2015.0111.
- Lampinen, A., Lutz, C., Newlands, G., Light, A. & Immorlica, N. (2018). Power Struggles in the Digital Economy: Platforms, Workers & Markets. *CSCW Companion*. DOI: 10.1145/3272973.3273004.
- Lee, M.K., Kusbit, D., Metsky, E. & Dabbish, L. (2015). Working with Machines: The Impact of Algorithmic and Data-Driven Management on Human Workers. *Association for Computing Machinery: Conference on Human Factors in Computing Systems*, 1603–1612. DOI: 10.1145/2702123.2702548.
- Lehdonvirta, V. (2018). Flexibility in the Gig Economy: Managing Time on Three Online Piecework Platforms. *New Technology, Work and Employment*, 33(1), 13–29. DOI: 10.1111/ntwe.12102.
- Lepanjuuri, K., Wishart, R. & Cornick, P. (2018). *The Characteristics of Those in the Gig Economy*. Department for Business, Energy & Industrial Strategy. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687553/The_characteristics_of_those_in_the_gig_economy.pdf.
- Liao, C., Wayne, S.J., & Rousseau, D.M. (2016). Idiosyncratic Deals and Contemporary Organisations: A Qualitative and Meta-Analytical Review. *Journal of Organisational Behaviour*, 37(1), 9–29. DOI: 10.1002/job.1959.
- Madrigal, A.C. (2019). The Uber IPO Is a Landmark. *The Atlantic*. Available: <https://www.theatlantic.com/technology/archive/2019/04/ubers-ipo-historic-despite-its-10-billion-loss/586999/>.
- Mann, G. & O'Neil, C. (2016). Hiring Algorithms Are Not Neutral. *Harvard Business Review*. Available: <https://hbr.org/2016/12/hiring-algorithms-are-not-neutral>.
- McGaughey, E. (2018). Taylorism: When Network Technology Meets Corporate Power. *Industrial Relations Journal*, forthcoming. DOI: 10.1111/irj.12228.
- McGee, C. (2017, April 20). Only 4% of Uber Drivers Remain on the Platform a Year Later, Says Report. *CNBC Technology*. Available: <https://www.cnbc.com/2017/04/20/only-4-percent-of-uber-drivers-remain-after-a-year-says-report.html>.
- McNeill, J. (2019, March 26). Introducing Lyft Driver Services. Medium. Available: <https://medium.com/@jmaclyft/introducing-lyft-driver-services-ac1ab9488ac6>
- Meijerink, J. & Keegan, A. (2019). Conceptualizing Human Resource Management in the Gig Economy: Toward a Platform Ecosystem Perspective. *Journal of Managerial Psychology*, forthcoming.
- Mowbray, P.K., Wilkinson, A. & Tse, H.M. (2015). An Integrative Review of Employee Voice: Identifying a Common Conceptualisation and Research Agenda. *International Journal of Management Reviews*, 17(3), 382–400. DOI: 10.1111/ijmr.12045.
- O'Sullivan, M., Turner, T., McMahon, J., Ryan, L., Lavelle, J., Murphy, C., O'Brien, M. & Gunnigle, P. (2015). A Study on the Prevalence of Zero Hours Contracts Among Irish Employers and Their Impact on Employees. *Kemmy Business School, University of Limerick*. Available:

<https://dbei.gov.ie/en/Publications/Publication-files/Study-on-the-Prevalence-of-Zero-Hours-Contracts.pdf>.

- Ovide, S. (2019). It's the First Day of the Rest of Lyft's Life. *Bloomberg*. Available: <https://www.bloomberg.com/opinion/articles/2019-03-29/lyft-ipo-it-s-the-first-day-of-the-rest-of-its-life>.
- Petriglieri, G., Ashford, S.J. & Wrzesniewski, A. (2018). Agony and Ecstasy in the Gig Economy: Cultivating Holding Environments for Precarious and Personalised Work Identities. *Administrative Science Quarterly*, 1–47. DOI: 10.1177/0001839218759646.
- Pichault, F. & McKeown, T. (2019) Autonomy at Work in the Gig Economy: Analysing Work Status, Work Content and Working Conditions of Independent Professionals. *New Technology, Work and Employment*, 34(1), 59–72. DOI: [10.1111/ntwe.12132](https://doi.org/10.1111/ntwe.12132).
- Prassl, J. (2018). *Humans as a Service: The Promise and Perils of Work in the Gig Economy*. Oxford: OUP.
- Ravenelle, A.J. (2019). “We’re not uber:” Control, Autonomy, and Entrepreneurship in the Gig Economy. *Journal of Managerial Psychology*. DOI: 10.1108/JMP-06-2018-0256
- Riesman, A. (2014). We Asked 10 Black-Car Drivers if They Prefer Working for Lyft or Uber – Here’s Why Lyft Won by a Landslide. *Intelligencer*. Available: <http://nymag.com/intelligencer/2014/12/lyft-uber-drivers.html>.
- Rosenblat, A. (2018). *Uberland: How Algorithms Are Rewriting the Rules of Work*. Oakland, California: University of California Press.
- Rosenblat, A. & Stark, L. (2016). Algorithmic Labour and Information Asymmetries: A Case Study of Uber’s Drivers. *International Journal of Communication*, 10(27), 3758–3784. DOI: 10.2139/ssrn.2686227.
- Rousseau, D.M. (1995). *Psychological Contracts in Organisations: Understanding Written and Unwritten Agreements*. London: SAGE Publications.
- Rozzi, F. (2018). The Impact of the Gig Economy on US Labour Markets: Understanding the Role of Non-Employer Firms Using Econometric Models and the Example of Uber. *Junior Management Science*, 3(2), 33–56. DOI: 10.5282/jums/v3i2pp33-56.
- Schein, E.H. (1980). *Organisational Psychology*. Englewood Cliffs, NJ: Prentice Hall.
- Schiek, D. & Gideon, A. (2018). Outsmarting the Gig-Economy Through Collective Bargaining – EU Competition Law as a Barrier to Smart Cities. *International Review of Law, Computers & Technology*, 32(2–3), 275–294. DOI: 10.1080/13600869.2018.1457001.
- Schmidt, F.A. (2017). Digital Labour Markets in the Platform Economy: Mapping the Political Challenges of Crowd Work and Gig Work. *Friedrich-Ebert-Stiftung*. Available: <http://library.fes.de/pdf-files/wiso/13164.pdf>.
- Slee, T. (2017). *What’s Yours Is Mine: Against the Sharing Economy*. London: Scribe.
- Smith, C. (2006). The Double Indeterminacy of Labour Power: Labour Effort and Labour Mobility. *Work, Employment and Society*, 20(2), 389–402. DOI: 10.1177/0950017006065109.
- Snyder, B. (2016). *The Disrupted Workplace: Time and the Moral Order of Flexible Capitalism*. Oxford: Oxford University Press.
- Steinberger, B.Z. (2018). Redefining Employee in the Gig Economy: Shielding Workers from the Uber Model. *Fordham Journal of Corporate & Financial Law*, 23, 577–596. Available: <https://ir.lawnet.fordham.edu/jcfl/vol23/iss2/5>.

- Stewart, A. & Stanford, J. (2017). Regulating Work in the Gig Economy: What Are the Options? *The Economic and Labour Relations Review*, 28(3), 420–437. DOI: 10.1177/1035304617722461.
- Thomas, C. (2018). Ride Oversharing: Privacy Regulation Within the Gig Economy. *Cardozo Arts and Entertainment Law Journal*, 36, 247–276. Available: <https://heinonline.org/HOL/P?h=hein.journals/caelj36&i=257>.
- Todolí-Signes, A. (2017). The Gig Economy: Employee, Self-Employed or the Need for a Special Employment Regulation? *Transfer: European Review of Labour and Research*, 23(2), 193–205. DOI: 10.1177/1024258917701381.
- Tran, M. & Sokas, R.K. (2017). The Gig Economy and Contingent Work: An Occupational Health Assessment. *Journal of Occupational and Environmental Medicine*, 59(4), 63–66. DOI: 10.1097/JOM.0000000000000977.
- Uber (2019). *Company Information*. Available: <https://www.uber.com/newsroom/company-info/>.
- Van Buren, H.J. & Greenwood, M. (2008). Enhancing Employee Voice: Are Voluntary Employer-Employee Partnerships Enough? *Journal of Business Ethics*, 81, 209–221. DOI: 10.1007/s10551-007-9489-y.
- Van Doorn, N. (2017). Platform Labour: On the Gendered and Racialised Exploitation of Low-Income Service Work in the ‘On-Demand’ Economy. *Information, Communication & Society*, 20(6), 898–914. DOI: 10.1080/1369118X.2017.1294194.
- Vandaele, K. (2018). *Will Trade Unions Survive in the Platform Economy? Emerging Patterns of Platform Workers’ Collective Voice and Representation in Europe*. Working Paper, European Trade Union Institute.
- Vanhala, M. & Ritala, P. (2016). HRM Practices, Impersonal Trust and Organisational Innovativeness. *Journal of Managerial Psychology*, 31(1). DOI: 10.1108/JMP-03-2013-0084.
- Ward, K., Grimshaw, D., Rubery, J. & Beynon, H. (2001). Dilemmas in the Management of Temporary Work Agency Staff. *Human Resource Management Journal*, 11(4), 3–21. DOI: 10.1111/j.1748-8583.2001.tb00048.x.
- Wolfe, J.H. (1941). Determination of Employer-Employee Relationships in Social Legislation. *Columbia Law Review*, 41(6), 1015–1037. DOI: 10.2307/1117747.
- Woodcock, J. & Johnson, M.R. (2018). Gamification: What It Is, and How to Fight It. *The Sociological Review*, 66(3), 542–558. DOI: 10.1177/0038026117728620.
- Wood, A.J. & Lehdonvirta, V. (2019) *Platform Labour and Structured Antagonism: Understanding the Origins of Protest in the Gig Economy*. Paper presented at the Oxford Internet Institute Platform Economy Seminar Series. 5 March.
- Wood, A.J., Graham, M., Lehdonvirta, V. & Hjorth, I. (2019). Good Gig, Bad Gig: Autonomy and Algorithmic Control in the Global Gig Economy. *Work, Employment and Society*, 33(1), 56–75. DOI: 10.1177/0950017018785616.
- Woodrow, C. & Guest, D. E. (2017). Knowledge Acquisition and Effective Socialisation: The Role of the Psychological Contract. *Journal of Occupational and Organizational Psychology*, 90(4), 587–595. DOI: [10.1111/joop.12178](https://doi.org/10.1111/joop.12178).

Wright, C.F., Wailes, N., Bamber, G.J. & Lansbury, R.D. (2017). Beyond National Systems, Towards a 'Gig Economy'? A Research Agenda for International and Comparative Employment Relations. *Employee Responsibilities and Rights Journal*, 29(4), 247–257. DOI: 10.1007/s10672-017-9308-2.

Zervas, G., Proserpio, D. & Byers, J.W. (2017). The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry. *Journal of Marketing Research*, 54(5), 687–705. DOI: 10.1509/jmr.15.0204.

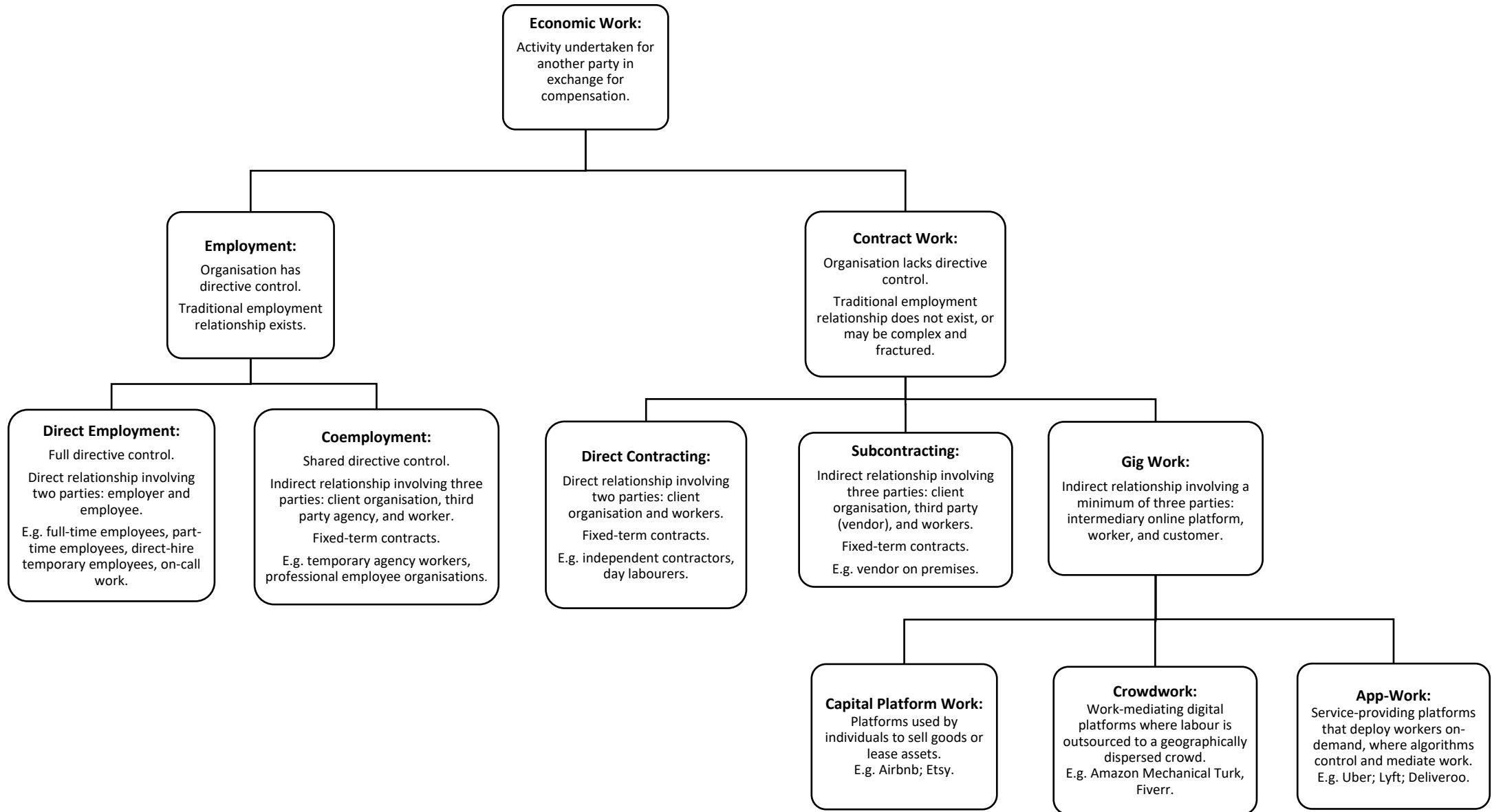
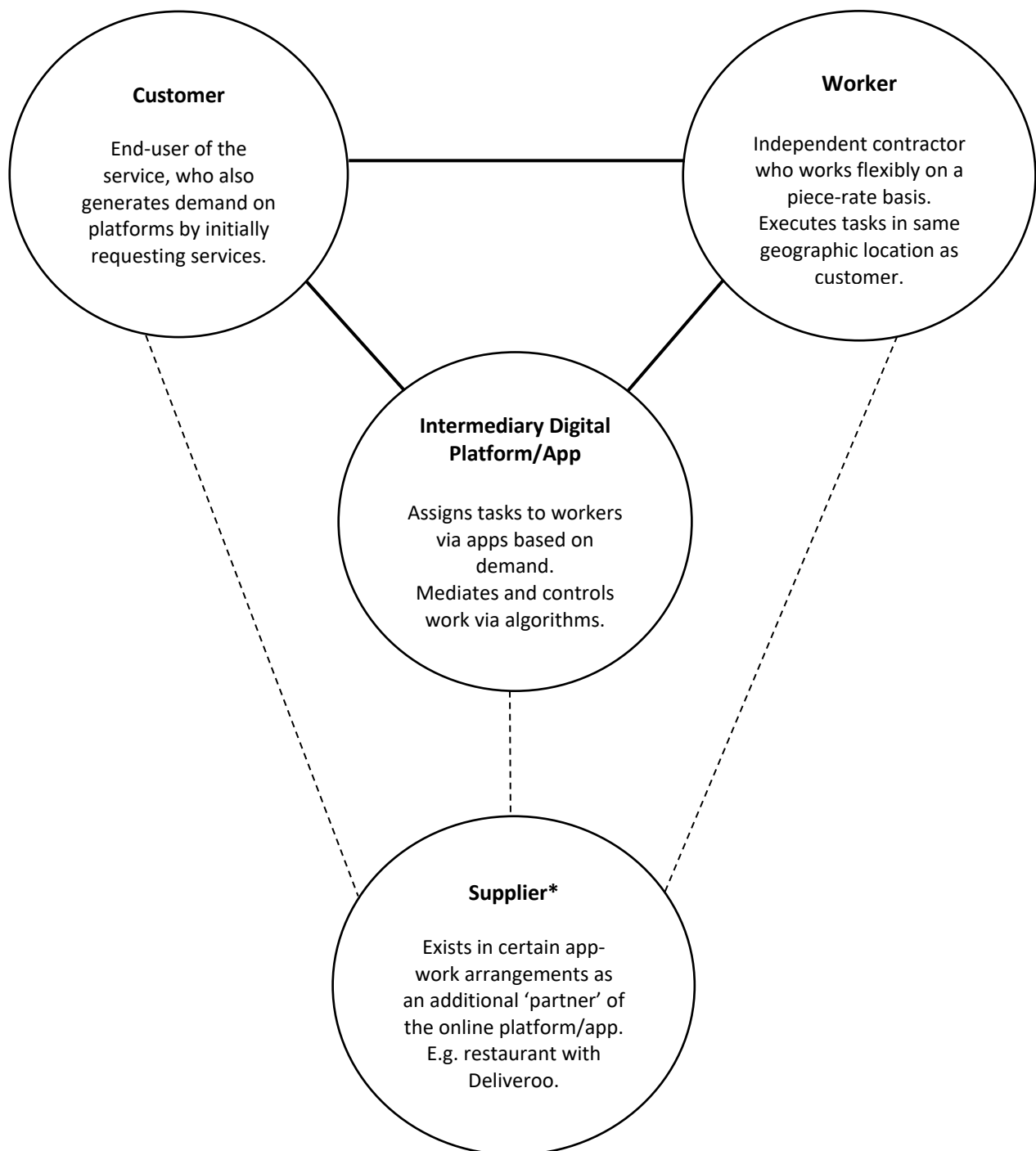


Figure 1: Summary of Working Arrangements, adapted from Cappelli and Keller (2013)

Figure 2: Parties involved in App-Work



**A broken line connects the supplier to other parties to indicate that the supplier only exists in certain app-working arrangements.*