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Boundaryless careers and algorithmic constraints in the gig economy

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ABSTRACT

With low barriers to entry and ease of access to work, the gig economy offers the prospect of boundaryless opportunities for flexible working arrangements characterised by increased autonomy. This form of work, however, may leave individuals without development opportunities and could stymie career progression. Drawing on boundaryless career theory, this study examines the potential of gig workers to develop the transferable career competencies required to effectively pursue opportunities beyond these precarious roles. Through insights from 56 gig worker interviews, we analyse the lived experiences of workers in attempting to develop ‘knowing-why’, ‘knowing-how’, and ‘knowing-whom’ competencies. In so doing, we find that the potentially unmovable boundaries posed by algorithmic management practices within platform organisations constrains workers’ abilities to navigate their roles and develop transferable competencies. The study lends empirical support to the bounded effect of gig work on individuals’ careers in a domain characterised by precarity where organisations dismiss the existence of an employment relationship, where individuals may simultaneously work for multiple platforms, and where secretive algorithms heavily influence the experience of work.

KEYWORDS

Gig economy; app-work; algorithmic management; boundaryless careers; intelligent career framework; career competencies

Introduction

Contemporary career literature increasingly emphasizes an understanding of careers in their context (Khapova & Arthur, 2011). Understanding how careers unfold in the context of the gig economy is highly complex. Representing a radical shift from human-centred management within organisational boundaries towards self-management enabled by

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algorithmic technologies and falling outside the organisation (Duggan et al., 2020), gig work is heavily fragmented and saturated with contingent, short-term arrangements. These algorithmic technologies, while innovative, can create a hyper-flexibility that leaves some workers isolated in roles and without secure employment, development opportunities, or a progressive career path (Ashford et al., 2018). Despite recognising that gig work considerably challenges our understanding of people management (Meijerink & Keegan, 2019), the burgeoning literature has provided limited insight into the lived experiences of gig workers in how they navigate within the boundaries of this form of labour. Relatedly, the concept of a 'career' in the gig economy has been debated, primarily in conceptual research, with uncertainty on the potential that exists for career progression (Jabagi et al., 2019; Kost et al., 2020).

On the surface, gig work is a seemingly apposite type of boundaryless work: it facilitates crossing between and/or working for multiple platforms (Gherardi & Murgia, 2013), there is an absence of hierarchical reporting relationships (Storey et al., 2005), and roles purportedly offer workers substantial autonomy in task selection (Kuhn & Maleki, 2017). Thus, while gig work is characterised by precariousness and a largely short-term focus, it may be simplistic to assume that every worker is unable to develop a career in this domain. First, there are multiple variants of gig work with contrasting earning potential for workers (Duggan et al., 2020), ranging from food-delivery, to website design, and a host of conventional and emerging 'gigs' in between. Researchers have called attention to how an increasing number of workers are attracted to this form of labour (Kuhn & Maleki, 2017) where some see it as a temporary arrangement in their career development, whereas others see gig work as an open-ended, potentially long-term endeavour (Ashford et al., 2018). Second, gig work aligns closely to the concept of the contemporary career suggested by Li et al. (2021) in that it is self-directed and typically involves multiple firms across different industries. While gig work may be viewed as an 'interruption' in some career paths, it may be considered an 'opportunity' in others (Li et al., 2021). Unsurprisingly, scholars have called for empirical research that clarifies these issues (Duggan et al., 2020; Jabagi et al., 2019), particularly in examining gig workers' experiences and the potential, or lack thereof, to either develop a career within the gig economy or to progress to more secure roles beyond this domain.

In this paper, we focus specifically on app-based gig work, where intermediary platform organisations deploy on-demand workers to perform tasks locally for customers (e.g. Uber, Deliveroo, etc.) (Duggan et al., 2020). The novelty of 'app-work' lies in the technology-enabled algorithms that underpin the execution of tasks by managing and

controlling the working relationship in various ways, including assigning tasks and monitoring exchanges between parties (Veen et al., 2020). Due to the lack of human supervision, these digitalised control mechanisms, known collectively as ‘algorithmic management’, are increasingly viewed as agentic in nature (Wood et al., 2019). App-work is offered on extremely transactional grounds, with platform organisations rarely engaging in meaningful, personalised interactions with workers. Workers are instead peripheral to the organisation, completing tasks on an ad-hoc basis under the remote supervision of an invisible, but ever-observant algorithm (Kaine & Josserand, 2019).

Drawing on boundaryless career theory (Arthur, 1994) and the intelligent career framework (Arthur et al., 1995), this paper examines gig workers’ abilities to develop transferable career competencies in their roles, and whether the role of algorithmic technologies in gig work may hinder these efforts. We have chosen the boundaryless career perspective as we see this as being particularly apposite for the app-work context, where the nature of this arrangement can be viewed as an even more radical perspective on the individualisation of career management. Although protean and kaleidoscopic career models also offer interesting perspectives by implying that individuals strive towards developmental progression and self-fulfilment (Hall, 1976; Sullivan & Baruch, 2009), we see the focus within boundaryless careers on high physical and psychological mobility as being most pertinent in app-work.

Specifically, we are interested in understanding whether the unique nature of gig working arrangements enables workers to develop the ‘knowing-why’, ‘knowing-how’, and ‘knowing-whom’ competencies required to effectively pursue a boundaryless career (Defillippi & Arthur, 1994). These competencies, conceptualised as the ‘three ways of knowing’, enable workers to pursue an ‘intelligent career’ by increasing their mobility across physical and psychological boundaries (Sullivan & Arthur, 2006). An understanding of these competencies allows individuals to evaluate which skills, competencies or networks can facilitate mobility in the future and identify which skills may become obsolete. Drawing on in-depth interviews with 56 app-workers across the food-delivery and rideshare sectors, this paper unpacks workers’ efforts and abilities to form these competencies while attempting to navigate the uncertainties and challenges presented by algorithmic management. More specifically, we address two research questions:

1. What are app-workers’ experiences of attempting to develop knowing-why, knowing-how, and knowing-whom career competencies?

2. How does algorithmic management influence app-workers' efforts to form these competencies?

The contributions of the paper are threefold. First, we address the lacuna surrounding career-related issues for app-workers and the competencies that may be gained (Ashford et al., 2018). Abraham et al. (2018) argue that understanding where non-traditional work fits into the career paths of workers forms a key gap in existing research, and that addressing this issue in the context of the gig economy is of particular importance. Second, we add to the growing literature on algorithmic management by exploring the potential of digitalised people management mechanisms to influence the development of one's career, both within and beyond this domain. This is particularly important, given the continuous debates spurred by platform organisations' claims that gig work facilitates the development of boundaryless career opportunities by allowing workers to overcome the constraints of traditional work settings (Kost et al., 2020). Accordingly, our third contribution speaks to the contemporary career literature that sees individuals taking more responsibility for their career development and employability (Sullivan & Baruch, 2009). Specifically, we add to knowledge on the boundaryless career concept in an especially independent and insecure form of work, where platform organisations dismiss the existence of any formal employment relationships, where individuals may simultaneously work for multiple organisations, and where secretive algorithms heavily influence the experience of work (Duggan et al., 2020).

The 'boundaryless' career

The employment landscape has undergone considerable change in recent decades. This has seen individuals enticed to move beyond the increasingly permeable, typical career boundaries in pursuit of less confinement and increased flexibility. Organisational ties have weakened, with less reliance on relational, long-term commitment and more use of transactional, short-term, financial and demarcated exchanges (Strauss et al., 2012).

From here, the boundaryless career emerged, where workers are viewed as 'contractors of choice' and career paths are discontinuous by moving beyond the 'boundaries' of a single organisation (Arthur & Rousseau, 1996). The term most often refers to the movement across physical boundaries of separate organisations (Arthur, 1994). It can, however, also be used to refer to the breaking of structural constraints such as hierarchical reporting and advancement principles, or an individual's effort to move across psychological boundaries by developing

extra-organisational networks that draw validation and marketability (Arthur & Rousseau, 1996). The common emphasis in boundaryless careers is the transition from determined career systems with one employer, to the prospect of multiple careers within and across organisations (Zeitz et al., 2009). While some interpret these trends as signifying that responsibilities for career management are entirely shifting from being organisation-centric to individual-led (Eby et al., 2003), others adopt a more balanced view by suggesting that more stable and traditional career systems are not dead, at least not in all sectors and industries, but that boundaryless career trajectories are becoming more commonplace and individuals must be more adaptable and proactive in managing their career choices as a result (Baruch, 2006).

To craft boundaryless careers, individuals must acquire degrees of physical or psychological mobility. While physical mobility is captured by transitioning across organisational boundaries, which is firmly the case in gig work, psychological mobility relies on workers making intra-role and extra-role adjustments based on their attitudes towards pursuing multiple work-related relationships (Zeitz et al., 2009). Therefore, research has attempted to make sense of this 'new deal' between workers and organisations, where individuals seek to develop 'meta-competencies' that allow for easier mobility between successive temporary roles (Li et al., 2021; Sullivan & Arthur, 2006). These meta-competencies are explored in greater depth in the intelligent career framework (Arthur et al., 1995, 2016), which is grounded in the boundaryless career perspective. This framework was originally developed to describe the experiences of contract, contingent, and nonstandard workers in the knowledge economy where the use of internet and technology is widespread (Defillippi & Arthur, 1994). Much research on the intelligent career framework has focused career actors in highly skilled roles, whose careers require substantial investment in education or professional training (Beigi et al., 2018; Guptill et al., 2018). Yet, the most recent manifestations of the knowledge economy are embodied in digital platforms like Uber, Lyft and Deliveroo, who build upon the capabilities and opportunities afforded by mobile devices by independently matching service-providing workers with customers (Manyika et al., 2016). The intelligent career framework therefore facilitates the examination of career experiences of a new pool of independent, and often contingent, workers who have emerged as a by-product of digital markets (Beigi et al., 2020; Li et al., 2021).

As part of the boundaryless career perspective, the intelligent career encompasses 'three ways of knowing': why, how, and with whom people work (Defillippi & Arthur, 1994). First, *knowing-why* addresses the 'why' question as it relates to career motivation, personal meaning, and

identification. Disconfirming beliefs about the stability of employment, knowing-why competencies consider an individual's motivational energy to explore possibilities and to make sense of their constantly changing work situations (Arthur et al., 2005). Second, *knowing-how* reflects career relevant skills and job-related knowledge, including tacit knowledge, which accumulates over time. By demanding continuous change in skills and knowledge, knowing-how competencies feature an idiosyncratic component, whereby people seek job redesign to accommodate their distinctive talents and future potential (Defillippi & Arthur, 1994). Finally, *knowing-whom* relates to the career networks, mentoring, and contacts of an individual both inside and outside the organisation. Knowing-whom competencies expose people to new career possibilities and allow workers to utilise networks to develop expertise, access new opportunities, and gain competitive advantage *via* learning experiences (Arthur et al., 2005). Together, these competencies enable workers 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 (Bérastégui, 2021).

These 'ways of knowing' are interdependent. For example, an individual's knowing-why motivation to seek new experiences stimulates a search for knowing-how job challenges, which in turn brings about new knowing-whom connections (Sullivan & Arthur, 2006). Thus, developing these competencies is of crucial importance in boundaryless careers, allowing individuals to strengthen self-direction and adaptability, and to craft career identities aligned with personal values (Arthur et al., 2005). Research has supported this, illustrating that those with greater levels of each competency reported greater levels of perceived career success (Eby et al., 2003). In the next section we discuss the contours of the app-work landscape and how algorithmic management facilitates the development of career competencies

App-work: bounded or boundaryless?

The promises and assumptions underpinning the structure of app-work, if they come to fruition, raise the possibility of workers pursuing something that resembles the trajectory of a boundaryless career (Beigi et al., 2020; Kost et al., 2020), where individuals are empowered to move beyond the 'boundaries' of a single organisation in forging a prosperous career path (Arthur & Rousseau, 1996). Generally, digital platform organisations tend to support narratives of increased flexibility and autonomy when advertising the opportunity to work or 'partner' with them. For example, Uber Eats recently issued promotional material using a worker

testimonial as the tagline, stating that ‘*with Uber Eats, I’m basically CEO*’, to illustrate the value of working independently and ‘being your own boss’. Similar discourse is evident across most major digital platform organisations, such as Deliveroo, JustEat, and Fiverr.

In the career context, gig economy scholarship is theoretically and empirically underdeveloped. The transactional nature of app-work results in individuals being left with little choice but to depart from established conceptualisations of traditional, linear career paths (Kuhn & Maleki, 2017). Yet, little is known about what alternative pathways are available for these workers. This is perhaps representative of mainstream research on contemporary careers, which remains broadly underdeveloped in studying organisational forms wherein workers are not defined as employees – as in the case of the gig economy (Kost et al., 2020). Where contract workers’ careers have been empirically examined, examples are most limited to interim managers, leased executives, or journalists (Parker, 2002; Van den Born & Van Witteloostuijn, 2013). The gig economy calls attention to a very different form of labour, where roles are typically non-professional and require little investment in education or training (Beigi et al., 2020).

App-workers, such as rideshare drivers, work as independent contractors and can be categorised as boundaryless career actors. Research suggests that independent contract work is closely related to the core idea of a boundaryless career, i.e. independence from an employer (Beigi et al., 2020). In theory, app-workers should possess high levels of control and autonomy over their work and career choices (Kuhn & Maleki, 2017). In fact, it is likely the attraction of increased autonomy over scheduling and work that reinforces the sentiment that the quality and flexibility of work life is greater outside of traditional work settings (Sutherland et al., 2020). Occhiuto (2017) suggests that schedule control is a significant attraction for taxi drivers as it enables them to pursue opportunities for career development by allowing them to drive part-time while studying for college-level courses, for example, and enables them to frame taxi driving as a stepping-stone occupation to alternative occupations. Esbenshade et al. (2019), however, found that taxi drivers who drove full-time were not seeking a career outside the industry but rather full independence within it.

Ostensibly, app-work appears to align closely with the development of boundaryless careers: arrangements lack hierarchical reporting relationships (Storey et al., 2005), temporal attachment is relatively low (Kuhn & Maleki, 2017), and thresholds are minimal for crossing between or working for multiple platforms (Gherardi & Murgia, 2013). Thus, the potential for app-workers to form anything resembling an ‘organisational career’ (Clarke, 2013) is extremely low. Boundaryless careers

hold much relevance within organisations that operate in unpredictable, opportunistic markets where individuals are exposed to a high degree of employment uncertainty (Arthur & Rousseau, 1996). On the other hand, however, the reality of the working arrangement is vastly different, with organisations tightly managing workforces through the use of algorithmic technologies (Meijerink & Keegan, 2019). By possessing a temporally embedded capacity to intentionally monitor and constrain worker activities (Vallas & Schor, 2020), algorithmic technologies digitally regulate interactions between parties and complicate the level of independence afforded to workers (Panteli et al., 2020). This is a point of notable criticism within gig economy research, with concerns raised over its potentially exploitative nature (Wood et al., 2019).

Research methods

Data collection

Our research design consists of a qualitative study of two of the most popular app-work sectors, food-delivery and ridesharing. From October 2018 to November 2019, we conducted 56 in-depth, semi-structured interviews, comprising of 32 with food-delivery workers and 24 with rideshare workers. While these services are not new, there is novelty in the reconfiguration of these arrangements *via* digital facilitation in the form of algorithmic management (Goods et al., 2019). Thus, a qualitative approach is warranted to investigate and make sense of app-workers' lived experiences in these domains.

Our sample of food-delivery workers operated across three organisations: Deliveroo, UberEats, and JustEat. Similarly, all rideshare interviewees worked with either Uber and/or Lyft. The sampling focused on workers who were active on at least one of these platforms and had been so for at least three months. A limitation of extant research on gig work is that most empirical studies focus on singular platform organisations. Our approach allows for the generation of novel insights and useful comparisons, not only across different organisations, but across different job-type sectors. By focusing on two distinctive sectors, our study offers the ability to construct a more inclusive, well-rounded account of the commonalities of app-workers' experiences in low-skill, low-paid work.

To capture interviews, a multi-tiered participant recruitment strategy was employed. This was primarily purposive and opportunistic in nature, consisting of street intercepts (Herzog, 2012), online participant recruitment (Mendelson, 2007), and snowball sampling techniques. The street-intercept technique, which is common in gig economy scholarship (e.g. Goods et al., 2019; Veen et al., 2020) provided randomised but

enhanced access to hard-to-reach segments of the population in a safe manner. This was particularly effective when sampling app-workers, as the technique allowed for the indiscriminate selection of all those actively engaged in app-work duties in a particular urban area. In all cases, the researchers approached the first eligible respondent they saw who was in the area as the interview period began. This initial contact consisted of verbally introducing the project and issuing an information sheet which outlined the objectives of the study. Because participants were actively logged-in to digital platform organisations and waiting for work opportunities when street intercepts occurred, participants were asked to arrange an alternative time and location for the completion of the interview. This method allowed the researcher to identify potential respondents quickly, particularly as the ‘invisible’ characteristics of this population meant more conventional recruitment strategies would have been difficult to achieve.

Recruitment occurred across several international contexts, primarily in major cities in the Republic of Ireland, United Kingdom, the Netherlands, and United States. Despite the geographical spread of participants, it is important to note that participants’ experiences did not vary in any significant way based on their location. Instead, it quickly emerged that the various procedures, policies and practices implemented by digital platform organisations were centralised to the organisation itself, rather than varying across geographical boundaries. As interviews were conducted across multiple settings, often while participants were actively waiting for work to be assigned to them, the duration of interviews varied between 28 and 118 min, with an average of 67 min per interview.

Across sectors, there were similarities in how workers are classified as independent contractors, the direction and facilitation of work processes *via* apps, and proclaimed levels of mutually beneficial flexibility. Of the 32 food-delivery workers, 44% indicated that they were multi-homing (i.e. operating on multiple platforms simultaneously and interchangeably). Deliveroo was the most common platform used by workers (62%), followed by UberEats (22%) and JustEat (16%). These trends were similar within our sample of rideshare workers. Of the 24 participants, 67% were multi-homing on both Uber and Lyft. Uber was undoubtedly the most popular platform, with 79% citing this as their most commonly used app for undertaking rideshare work. Full participant characteristics are presented in [Tables 1](#) and [2](#).

During interviews, participants were asked about a variety of issues related to their roles. This included, for example, their motivations for engaging in app-work, what they saw as being the benefits and drawbacks of their roles, and their encounters with various aspects of the

Table 1. Characteristics of food-delivery participants.

Identifier	Age	Gender	Duration in Role	Associated Platform(s)	Engagement	Location
FD01	20	M	3 months	Deliveroo	Part-time	Ireland
FD02	44	F	5 months	Deliveroo	Part-time	Ireland
FD03	22	M	7 months	Deliveroo, UberEats	Part-time	Ireland
FD04	25	M	4 months	Deliveroo, JustEat	Full-time	Ireland
FD05	28	M	3 months	Deliveroo	Part-time	Ireland
FD06	30	M	1 year	Deliveroo, UberEats	Full-time	Ireland
FD07	37	M	2 years	Deliveroo, UberEats	Full-time	Ireland
FD08	41	M	3 years	Deliveroo, JustEat	Full-time	UK
FD09	30	F	9 months	JustEat	Part-time	UK
FD10	27	M	1 year	JustEat, Deliveroo	Full-time	Ireland
FD11	32	M	8 months	JustEat	Full-time	Ireland
FD12	22	F	3 months	UberEats, Deliveroo	Part-time	Ireland
FD13	29	M	6 months	UberEats, Deliveroo	Full-time	Ireland
FD14	31	M	2 years	Deliveroo, JustEat	Full-time	UK
FD15	38	M	3 years	Deliveroo	Part-time	UK
FD16	45	M	2.5 years	Deliveroo	Full-time	UK
FD17	28	F	1 year	Deliveroo	Full-time	Ireland
FD18	34	M	1 year	Deliveroo	Part-time	Ireland
FD19	26	M	2 years	Deliveroo, JustEat	Full-time	Ireland
FD20	28	M	1 year	Deliveroo	Full-time	Ireland
FD21	26	M	2 years	Deliveroo	Full-time	Ireland
FD22	27	M	3 years	UberEats	Part-time	Netherlands
FD23	23	M	1 year	UberEats, Deliveroo	Part-time	Netherlands
FD24	30	M	2 years	JustEat, UberEats	Part-time	Ireland
FD25	32	M	2 years	Deliveroo	Full-time	Netherlands
FD26	40	F	3 years	UberEats	Full-time	Netherlands
FD27	22	M	1 year	JustEat	Part-time	Ireland
FD28	36	M	2 years	Deliveroo, UberEats	Full-time	Netherlands
FD29	21	M	6 months	Deliveroo	Part-time	Ireland
FD30	28	F	10 months	UberEats, Deliveroo	Part-time	Ireland
FD31	20	M	4 months	UberEats	Part-time	Ireland
FD32	27	M	2 years	Deliveroo	Full-time	Ireland

Table 2. Descriptive characteristics of rideshare participants.

Identifier	Age	Gender	Duration in role	Associated platform(s)	Engagement	Location
RS01	29	F	8 months	Lyft, Uber	Full-time	US
RS02	43	M	4 years	Uber, Lyft	Part-time	US
RS03	40	M	4 years	Lyft	Full-time	US
RS04	60	M	3 years	Uber, Lyft	Full-time	US
RS05	36	M	6 months	Uber, Lyft	Full-time	US
RS06	46	M	3 years	Uber, Lyft	Full-time	US
RS07	37	M	8 months	Lyft	Full-time	US
RS08	32	F	2 years	Uber, Lyft	Full-time	US
RS09	28	F	1 year	Uber, Lyft	Part-time	US
RS10	54	M	3 years	Uber, Lyft	Full-time	US
RS11	31	M	1 year	Uber, Lyft	Part-time	US
RS12	49	F	2 years	Uber	Full-time	UK
RS13	62	M	4 years	Uber	Full-time	UK
RS14	33	M	2 years	Uber	Full-time	UK
RS15	36	F	3 years	Uber	Full-time	Netherlands
RS16	52	M	4 years	Uber	Full-time	Netherlands
RS17	29	M	10 months	Uber	Part-time	Netherlands
RS18	33	F	2 years	Lyft, Uber	Part-time	US
RS19	48	M	3 years	Uber, Lyft	Full-time	US
RS20	68	F	3 years	Lyft, Uber	Part-time	US
RS21	35	M	6 months	Uber, Lyft	Full-time	US
RS22	57	F	2 years	Uber, Lyft	Full-time	US
RS23	39	F	1 year	Uber, Lyft	Part-time	US
RS24	34	M	10 months	Uber, Lyft	Full-time	US

algorithmic management function. Specifically, participants were asked a series of career-related questions, including their perceptions of job security in roles, whether their current role aligns with their career aspirations, and whether they see potential in app-work to aid their professional development. Following a similar approach to Beigi et al. (2020), our interview approach focused on examining app-workers' careers as they unfolded in their roles. Throughout the data collection process, we reviewed initial codes and emerging categories against several contemporary career perspectives and ultimately selected the boundaryless perspective as the intelligent career framework aligned best with initial findings.

Data analysis

All interviews were audio recorded with participants' permission and stored in accordance with ethical protocols. The first author transcribed all interviews, which helped with immersion in the richness of the data and re-experiencing each participant's recollections. The analytical process was led by the first author, who wrote numerous brief notes and memos to document the choices made and to further develop insights. The remaining three authors then engaged in blind, secondary coding of a sample of transcripts to ensure inter-coder consistency (Auerbach & Silverstein, 2003). Finally, all four authors jointly reviewed coding procedures, discussed ambiguous codes, and then made agreed refinements to categories and themes (Mantymaki et al., 2019).

Interviews were anonymised and identified with a code throughout (e.g. FD01 refers to food-delivery interviewee #1; RS02 refers to rideshare interviewee #2, and so on). Using NVivo software (Version 12), the data were analysed using Vaughan's (1992) theory elaboration approach. Theory elaboration occurs when pre-existing conceptual ideas drive a study's analytical strategies, providing a basis for developing new theoretical insights by contrasting, specifying, or structuring theoretical constructs to account for and explain empirical observations (Fisher & Aguinis, 2017). This approach is particularly useful when analysing cases where commonalities and comparisons occur, as the iterative approach facilitates understanding of how similarities and differences affect findings. Given the prevalence of multi-homing in app-work, the decision was made to analyse data across sectors, rather than by individual organisation.

As per Vaughan's (1992) approach, interviews were grouped and analysed individually by sector, identifying emerging themes related to the 'three ways of knowing' career competency development framework (see Table 3 for a sample of the analytical process). This process allowed for concept- and data-driven development of initial first-order codes,

Table 3. Sample of coding structure.

First-Order Codes	Second-Order Categories	Aggregate Dimensions
Insecure working arrangements Unstable income Limited interaction with organisations	Precariousness	Knowing-Why Competencies
Opportunistic work Flexible arrangements Advantages versus traditional roles	Motivations to engage	
Desire to capture meaning/value Feelings of empowerment Potential for 'stepping-stone' opportunities	Navigate & make sense of roles	
Enthusiasm to succeed in role Going the extra-mile Desire increased commitment	Seeking relational arrangements	
Unfulfilled promises or expectations Platform organisations as 'hands-off' Impersonal interactions with organisations	Transactional nature of work	Knowing-How Competencies
Unclear instructions and guidance Withholding of information Lack of transparency	Boundaries of algorithmic management	
Self-discipline and adapt behaviour Weak engagement with platform organisations	Detached relationships	
Low commitment between parties Frustration with conditions Anonymity of roles	Solitary nature of roles	
Feelings of social isolation Acting as 'long-rangers' Engagement in social media groups or online discussions Informal meet-up locations Workers behaving strategically	Efforts to form networks	Knowing-Whom Competencies

informed by existing literature on boundaryless careers and gig work. New codes were also developed from an iterative process, where we aimed to remain open and alert to additional emerging themes (Schafheitle et al., 2020). Following this, second-order categories were established by systematically combining initial codes with similar content in order to detect consistent and overarching themes. During the final stage of analysis, we aligned our categories with knowing-why, knowing-how, and knowing-whom competencies. We examined how these dimensions manifest themselves in our data and analysed factors that obstruct competency development (Mantymaki et al., 2019). These individual analyses allowed for the subsequent comparison of similarities and differences among sectors, leading to the development of novel theoretical conclusions on the potential for app-workers to pursue boundaryless careers.

Findings

The themes presented below help to form a narrative of app-workers' experiences and potential to develop career competencies. Findings are presented by individual app-work sector, highlighting comparisons where relevant. A summary of key findings and extracts from both app-work sectors is also presented in [Table 4](#).

Theme 1 – knowing-why: from precariousness to empowerment

Our findings suggest that the fragmented nature of app-work makes it difficult for workers to identify with either the role or the platform organisation. App-workers from both sectors expressed concern around precariousness and job insecurity. However, while food-delivery workers showed moderate success in developing knowing-why competencies, rideshare workers held generally pessimistic impressions about platform organisations' practices, making it difficult to navigate their volatile work situation.

Food-delivery workers

Food-delivery participants expressed generally positive sentiments regarding their experiences in roles and how this aligned with their motivations. However, respondents initially expressed feelings of caution or concern regarding the precariousness of their work: *I'm under no illusion about the distance between me and Deliveroo. The job is incredibly insecure and you can never feel comfortable that you've got any sort of guaranteed income* (FD08). Respondents also highlighted the transactional nature of their work, noting that *it's really hard to rely on this as a steady source of income* (FD23), and that *there are loads of riders to take your place* (FD04). For some workers, this led to feelings of discontent and the formation of a pressurised working environment: *you're very much out on your own, working off your phone, cycling under a lot of pressure* (FD06).

However, most respondents viewed these issues as *a side effect of such an opportunistic and flexible job* (FD11), where individuals wished to *work three or four hours when it suits me* (FD01). Despite recognising the inherent flaws, respondents made sense of their roles by *learning to accept the work for what it is* (FD19), noting that *it's really casual so you have to take the bad with the good* (FD05). This resulted in a sense of cautious optimism and perseverance amongst food-delivery workers, who stated that *it's never going to be the best job in the world, but you have to make it work for you and your circumstances* (FD27).

Table 4. Summary of app-workers’ “ways of knowing”.

		Rideshare Workers	
	Food-Delivery Workers	Key Findings	Data
‘Knowing-Why’	<p>Sense of optimism and perseverance</p> <p>Feelings of empowerment</p> <p>Concern regarding precariousness of work</p> <p>Highly transactional nature of work</p> <p>Unnoticed efforts to invest in roles</p> <p>Lack of job security</p>	<p>Long-term engagement in roles</p> <p>‘Stepping-stone’ opportunity</p> <p>Highly transactional nature of work</p> <p>Feeling undervalued</p> <p>Unnoticed efforts to invest in roles</p>	<p>“I signed up with the intention of doing a few months and that was over three years ago. It’s hard to stop when it’s so flexible; you feel like you shouldn’t sacrifice that flexibility and the good ratings you’ve built up” (RS15)</p> <p>“I really only started doing this because I was between jobs. I mean, it’s not what I want to do, it’s not who I am, and I don’t particularly enjoy it. But it meant I didn’t have to go unemployed at the time. That was a security I enjoyed, so I kept doing it after and I’ve been driving for over a year now” (RS11)</p> <p>“I don’t think anyone who’s been doing this for a long time is under any illusion that Uber is this amazing company to work for. Everyone has stories of being treated badly. I think it’s pretty clear they they’re just in it for the money, rather than being a good ethical company that values their workers” (RS01)</p> <p>“I’ve been doing this for four years and I don’t think I’ve once been able to say that ‘yeah, Uber values me, Uber appreciates me as a worker’. That’s just not how they operate” (RS13)</p> <p>“When I started the job, I reached out so many times to try to learn more about the job – how it worked, what could I do to make sure I did well, what should I avoid doing. Just all that normal stuff that you try to learn when you start a job. But there was nothing – no engagement, no interest” (RS19)</p> <p>“No one told me how to be a ‘good’ driver. I didn’t know if there was an etiquette for picking up customers or interacting with them. It’s kind of something you have to learn yourself on the job, but even then, you’re trying to teach yourself, so you have no idea if your way is the best way” (RS06)</p>
	<p>“I think the job is fine if you’re happy to have something really casual and you know it’s never going to go beyond that. It’s about leaning to accept the work for what it is in that sense and trying to see the positives” (FD19)</p> <p>“The role definitely wasn’t what I expected and it’s not perfect by any means. But overall, I’d say I definitely feel more empowered to work harder and faster, because in a job like this, your earnings depend on it. How hard you work and how much you earn is entirely up to you” (FD27)</p> <p>“They’ve made it so that you can’t actually engage with them. Everything is automated and there’s no personal touch or real representation” (FD07)</p> <p>“The fact that there’s no guarantee of your next job, of being here in a week, a month, certainly not a year – that can be hard to deal with and it’s really hard to rely on this as a steady source of income” (FD23)</p> <p>“I’m the type of person who’s pretty committed to their job. And yeah, I definitely tried to go the extra mile – you know, trying to reach out to Deliveroo to say ‘here’s how I think I can improve things’ or whatever. But they had no interest. It was like ‘do your job’ and that’s it” (FD29)</p> <p>“The way the work is structured is extremely casual. It’s not designed to be something that you develop from. It’s literally a case of doing whatever the app tells you to do, going where you’re supposed to go” (FD31)</p>		



Algorithmic management as a boundary	<p>"The app is basically the only form of guidance you have on the job. But it's not very good – it just gives you prompts and guidance without making it clear why. And you can't question anything because it's an app, not a human. So, you just have to take everything at face-value" (FD16)</p>	Algorithmic management as boundary	<p>"One of the worst things about it is not being able to see where each trip is going to take you until after you accept it. You could end up with really short journeys which don't pay much, or else you could end up miles outside of the city late at night. It's very constraining to not know that information before you accept a job (RS05) 'I always worry about being deactivated. The app does that automatically if, well I'm not sure why, but I think it's if you get a bad review. There's no one at the platform to speak to about it, so I'm always left wondering what I did wrong" (RS08)</p>
'Knowing-Whom' Lack of social capital development	<p>"You basically don't know anyone from the company in this job. I don't know my boss, my manager, my supervisor – nobody. It's not possible to know them, I don't even know if those roles exist or if it's just the app" (FD28)</p>	Lack of social capital development	<p>"I think you need to realise that Uber doesn't know who you are, nor do they care, really. They've got millions of drivers, so it won't hurt them to lose me. But right now, this work is my income, so it'd be a huge blow for me to lose this" (RS19)</p>
Anonymity and social isolation	<p>"I think it's a very low status role. You're part of this big group of food-delivery couriers in the city, but you're entirely alone as you have no idea who they are. Nobody bothers getting to know each other because you have to just be out for yourself" (FD33)</p>	Social isolation and lack of networking opportunities	<p>"There's not really a chance to meet any other drivers. We all work in our own cars, there's no lot or meeting-point because everything comes through the app. You're almost competing with each other in some ways, so people don't really seem to mix or get to know each other" (RS22)</p>
Efforts to establish informal networks with fellow workers	<p>"I'm in a big WhatsApp group with other riders here in the city. That's the only way I've gotten to know a few of them. It's usually just chat about the job or what's going on in different restaurants, but still, it's nice to feel like you belong to something as part of the job" (FD03)</p>	Efforts to act strategically to overcome challenges of role	<p>"You have to try to learn how things work if you want to make any sort of decent money. Like, when will a surge happen? When's busy and when's not? What type of trips should I try to get, long or short? All that stuff is important; you really need to maximise the amount of control and money you can earn" (RS20)</p>

Subsequently, our analysis suggests that food-delivery workers capture value by moving away from hierarchical authority over the nature and content of the work. For example, one participant *grew to like the work because you're always moving around and not confined to an office...it's less stressful than most jobs because you're not dealing with people all the time* (FD30). Similarly, many respondents described feelings of empowerment, arising from solitary working arrangements and flexible scheduling: *I definitely feel more empowered to work harder and faster, because in a job like this, your earnings depend on it* (FD27). Feelings of empowerment are typical of individuals pursuing boundaryless careers, although the notion in this context is seemingly experienced as a consequence of pressurised conditions and a lack of organisational supports. This is common across our sample, with many illustrating their personal motivation to engage in this work, rather than describing any professional identification with platform organisations:

I've had good and bad experiences. Some days, you feel free, being paid to explore the city. Other days, you're at your wits end, earning nothing and exhausted. For me, being able to do my own thing on my own time is something I've come to appreciate more than anything else. Is it perfect? No. But would I be happier in an office job? Probably not. (FD21)

Rideshare workers

Rideshare workers expressed similar concerns regarding precariousness and a lack of job security. However, a notable difference emerged in how they make sense of their roles *via* their predominantly negative perceptions of platform organisations. For example, participants noted that *it is pretty obvious that the company doesn't care about us as long as we're getting the job done* (RS11); and that platform organisations were *just in it for the money, rather than being a good ethical company that values their workforce* (RS01). Compared to the food-delivery sector, rideshare workers expressed almost no feelings of empowerment, with few attempts to highlight any positive aspects of the work. One respondent, describing how they do not feel valued or taken care of, stated that they are *not blind to how it works*, claiming that platform organisations brand workers as 'partners' to *make us feel like we can do whatever we want and that we are some sort of team, but that is simply untrue* (RS03). In these ways, rideshare workers' ability to develop knowing-why competencies seems low.

Respondents cited various motivations for pursuing rideshare work, most of which indicated intentions of relatively short-term engagement, e.g. becoming unemployed, a lack of alternative opportunities, or a desire to supplement income. Despite this, most participants expressed no

immediate intentions to leave their roles or to explore opportunities beyond the sector. All participants had been in their roles for at least six months, with some working in the rideshare sector for over four years, indicating adaption to the casual working conditions offered by platforms: *while it was never my intention to stay for the long-haul, I grew used to it and couldn't really give up the convenience of it* (RS18). Similar sentiments were shared amongst most participants, with convenience and the availability of flexible scheduling emerging as the most appealing aspects of the role. However, despite these advantages, respondents were keen to highlight the difficulty of navigating the inconsistencies that accompany the working arrangement. For example, workers recalled experiences where they were made to feel that they *should not or cannot avail of the flexibility* (RS11) to which they are entitled: *I have to remind myself that I'm a contractor and I can say I'm done at any point, because the platform won't ever tell me that* (RS02).

Elsewhere, although the potential for developing knowing-why competencies appears low, our analysis uncovered limited evidence that rideshare work may act as a type of 'stepping-stone' for workers who have been previously unemployed or disadvantaged in their employment opportunities. Although roles may not align with workers' values in the long-term, individuals recalled how rideshare work has provided an opportunity to re-start their careers by developing emotional and social competencies that may boost their future employability. Notwithstanding this, it remains unclear whether workers can build upon this opportunity to ultimately move beyond the 'stepping-stone' into a more secure role. The excerpt below describes the experiences of an individual who became a rideshare driver through Lyft's car rental programme, following a long period of unemployment.

I am certainly not rich, but I have a little money to play around with and I have a rental car that I can use for personal errands thanks to Lyft. I need to be a bit more grateful because, for me, it has been a great opportunity. The industry that I was working in collapsed overnight. I lost it all. But now, Lyft gives me something to do every day; something to live for. I can just about make ends meet, but I finally have the ability to work and earn money again, so it would be a huge blow if this opportunity were to be taken away. (RS07).

Theme 2 – knowing-how: capturing career-related knowledge

Our findings illustrate the efforts made by app-workers to accumulate career-related knowledge, skills and expertise associated with the formation of knowing-how competencies. However, the analysis reveals that such efforts go unnoticed by platform organisations, who rely on the algorithmic management function to maintain a heavily transactional

arrangement. Consequently, the potential for app-workers to develop these competencies is low.

Food-delivery workers

Many food-delivery participants described themselves, in various ways, as attempting to invest in the role or to extend the arrangement beyond transactional conditions. These recollections illustrate efforts to develop knowing-how competencies. For example, respondents expressed how they were *initially enthusiastic about the job* (FD02), by seeking information on *how best to approach the work* (FD06). Similarly, workers who were *serious about making it work* (FD19) described their efforts *to go the extra mile* (FD29) as a means of illustrating their enthusiasm. However, any such efforts *went unnoticed, without any recognition from the platform* (FD29). This is because platforms are *entirely hands-off as you could delete the app tomorrow, never work again, and they wouldn't ask why* (FD12). Elaborating on this, respondents stated that they would enjoy if roles offered *more of a personal touch to avoid the distant, automated vibes* (FD06) exuded by platform organisations.

The issue of automation, in the form of the algorithmic management function, emerged throughout our analysis as a key boundary to workers' ability to effectively navigate their roles. For example, participants described their supposed autonomy as a *big masquerade* (FD19), noting the strict observation that unfolds as the app directs *where you need to go and what you need to do, while swiping to confirm that you've done every step as it's been laid out* (FD30). Subsequently, food-delivery workers often possessed less autonomy than anticipated, instead needing to abide by basic, automated instructions on labour processes. Discussing the prevalence of algorithms, respondents highlighted that *while you might think not having a human manager is great, the app makes the work seem more pressurised and you feel like you're constantly racing against the clock* (FD03). With workers being *closely monitored all the time* (FD08), this approach is likely to hinder the development of knowing-how competencies.

Furthermore, food-delivery workers appeared to be unsure of how the algorithmic management function operates when making workforce management decisions. Respondents described *a clear lack of transparency on the app and a feeling that you are being guided in ways that you couldn't or weren't allowed to understand* (FD02). Similar sentiments were shared by the majority of food-delivery participants, who highlighted that *you don't know why the app is behaving in a certain way or telling you to do certain things* (FD14), resulting in workers needing to *tailor my behaviour to it all the time* (FD07). Food-delivery workers' lack of transparency in understanding the algorithmic management

function is troubling, particularly given its importance in determining continuity in roles.

Consequently, food-delivery workers face significant challenges in accumulating job-related knowledge and career-related skills. Respondents recognised these challenges, describing the scenario as *pretty bleak when you realise how awful the job security is* (FD12). Similarly, discussing the lack of career potential, respondents noted that *it's hard to feel like you've got any sort of future here* (FD05). Even workers who have remained in roles for long periods stated that *it's not anything that you could put on your CV* (FD02), primarily because workers are almost never presented with any formal training or progression opportunities. Instead, the work is designed to be *extremely casual* (FD31), with strikingly low levels of commitment:

I've been with Deliveroo for three years and UberEats for 18 months, but I might as well have joined this morning. There's no recognition for being loyal and committed. I could easily be kicked off the app or have no hours next week based on my last shift. (FD03)

Rideshare workers

Our evidence suggests that rideshare workers experienced similar challenges in developing knowing-how competencies. An example of this is illustrated by an experienced rideshare worker who attempted to join their platform organisation's driver advisory council, *to have the sense that I was contributing to something and using my knowledge to make the work better* (RS17). Clearly proactive in seeking this developmental opportunity, the participant claimed to have contacted the organisation's area representative to be told that he would be *perfect for the job due to my experience* (RS17). However, this opportunity never came to fruition: *the area representative told me what I wanted to hear at the time and then never contacted me again* (RS17). Such efforts to seek job-related knowledge useful in forming career-based identity are typical of individuals pursuing boundaryless careers. However, if platform organisations are unwilling to extend opportunities to workers, individuals' knowing-how competencies will remain largely under-developed, thereby hindering the potential for future progression.

Many rideshare workers also highlighted the capacity of the algorithmic management function to *intentionally withhold information from workers* (RS20), describing this as *very constraining* (RS09) to efforts to develop knowing-how competencies. Respondents noted that they must maintain *consistently high acceptance levels to know how far a ride is going to be* (RS20). This lack of transparency and limited availability of basic task information was problematic for workers who *might not want to drive an hour out of town, but don't have the information* (RS04) to

make such decisions. In this scenario, or if workers are faced with any significant issues in their roles, they can choose to *grin and bear it* (RS20), or enter what is described as *a black hole filled with bots and inconsistent, generic support* (RS11). Similar descriptions are provided by most respondents, who highlight that workers could *drive for years and never interact with a human from Uber* (RS02). This was particularly troublesome for workers who desired increased stability, greater long-term commitment, and *a sense that we weren't so easily disposable in Uber's eyes* (RS02).

Theme 3 – knowing-whom: efforts to broaden career networks

The role of technology in app-work largely negates the need for human supervision, instead relying on algorithms to manage large, dispersed workforces in ways where *no excuses are allowed* (FD19). Consequently, our findings suggest that the overall potential for app-workers to develop knowing-whom competencies is extremely low. Noteworthy, however, is that participants described several efforts to move beyond the heavily transactional relationship inherent in this work while seeking to gain such competencies.

Food-delivery workers

Our food-delivery interviewees described a range of experiences that emphasise the detached nature of the relationship between workers and platform organisations. Participants highlighted a *strong lack of any meaningful engagement* (FD29), noting that the reliance on technology in place of human interaction makes it difficult to move beyond the transactional nature of roles. One participant, who has held their role with a food-delivery platform for over two years, described the working relationship as *a series of one-night-stands*, illustrating it as *great in the short term, but they don't want to have anything serious or commit to you. You feel like they are completely disinterested in you* (FD22). Similarly, given the lack of human supervision, intraorganisational opportunities to advance to such positions are non-existent. Consequently, careers within platform organisations likely remain stagnant, perhaps only developing horizontally if workers choose to multi-home by, for example, working for Deliveroo and UberEats simultaneously (Jabagi et al., 2019).

Participants also described the anonymity and social isolation experienced, highlighting the role of technology and algorithms as key contributors. By limiting and predefining interactions, algorithmic management restricts workers' potential for personal development and learning opportunities. Participants recalled the frustration arising from this isolation and lack of meaningful relationships with management or

co-workers: *you go home thinking about how miserable and frustrating the job is, and how there's nobody at work to even talk to about why it's so miserable* (FD06). Consequently, respondents described platform organisations as *big, anonymous superstructures, sending you notifications just signed off as 'Deliveroo'* (FD14), noting that remaining in roles long-term could be *very damaging to your self-esteem* (FD18). Relatedly, several respondents identified as being in *a very low status role* (FD33), feeling as though they hold *the lowest possible position that you could be in* (FD18).

Overall, the potential to create a more meaningful working arrangement, and in turn, to develop knowing-whom career competencies appears to be heavily constrained and narrow. Because workers effectively act as *lone-rangers* (FD25), co-worker networks are difficult to establish. However, our analysis uncovered some evidence of workers' efforts to develop informal networks. For example, some informed us of attempts to form channels *via* WhatsApp groups, where workers can *basically share experiences and stories about the job* (FD07). Likewise, respondents made reference to informal meeting-points across city centre locations, where workers have the opportunity to *congregate if it's quiet or while you're waiting for orders* (FD05). These worker-initiated attempts to develop something resembling knowing-whom competencies represent an active effort to overcome an inherent structural boundary of food-delivery work.

Rideshare workers

Our findings from rideshare workers suggest that these individuals face similar challenges in the pursuit of relational-oriented arrangements. Participants described the distant, detached nature of their engagements with platform organisations: *They don't know who we are; they don't care who we are* (RS22). Our findings also suggested that guidance or mentorship is typically non-existent for workers, who *need to learn how to navigate the entire system because nobody is going to show you how it works* (RS19). Consequently, it appears that the potential for rideshare workers to develop knowing-whom competencies is a difficult and perhaps unattainable endeavour. Instead, workers are subject to highly casual and insecure arrangements, where they may be immediately removed or 'deactivated' from platforms if issues arise or customer complaints are logged, resulting in workers *always feeling on edge* (RS01).

Insightful accounts of the anonymity and social isolation created by the algorithmic management function were also reported. Participants described the negative implications that exist for workers who attempt to exert too much autonomy over labour decisions or fail to meet

performance standards. A lack of transparency is evident in such scenarios, with workers stating that it is *unclear what exactly they do if you cancel rides or have bad timekeeping, but there is definitely some clear disadvantage for the rider, like some sort of punishment* (RS03). Elaborating on this, one respondent illustrated the anonymity that surrounds the working arrangement: *Uber is way off in the distance somewhere, totally invisible to me as someone who works for them every day, but pulling all the strings by hiding behind an app* (RS14).

Furthermore, co-worker networks appear to be non-existent, except for occasional opportunities to *briefly chat to other riders while waiting in pickup lots* (RS12), or for the small number of respondents who engaged in online discussion boards for rideshare work. Interestingly, the prospect of a more relational, commitment-focused working arrangement appealed to participants: *Getting to know other drivers, area representatives, even people from Lyft – that’s something that would be really enjoyable, just to be recognised while also being able to recognise them* (RS19). However, respondents felt that this was *something that clearly won’t happen, but it would be nice in an ideal world* (RS19).

Finally, reflecting on these challenges, participants described the importance of being a *smart-thinking and strategic driver* (RS16), in order to *maximise the amount of control and money you can earn* (RS20). Such strategies may include multi-homing across various platforms and choosing to work during quieter periods with reduced traffic and congestion. This is particularly important for workers who are reliant upon rideshare work and lack alternative employment opportunities. This type of worker was extremely common in our sample, with almost three-quarters of participants engaging in full-time rideshare work. For these workers, they *try to make it work* (RS03), because rideshare work *is a really substantial part of what I earn and I simply can’t afford to lose it* (RS14). Concerningly, this represents a risk of becoming ‘locked-in’ to the gig economy, whereby workers are trapped by their circumstances and lack the potential to develop the competencies required to move to more secure employment.

Discussion

This paper examined the potential for app-workers to develop transferable career competencies which may enable them to pursue opportunities beyond their current roles. Using the intelligent career framework within boundaryless career theory, we specifically set out to examine app-workers’ experiences of attempting to develop career competencies, and how the algorithmic management function may influence these efforts. While some literature has proposed that gig work may allow individuals to

pursue a boundaryless career trajectory (Barley et al., 2017; Bérastégui, 2021), this paper notably contributes to scholarship by illustrating that app-work roles heavily constrain workers' developmental abilities. Paradoxically, while platforms espouse boundaryless opportunities for psychological and physical mobility with the lure for many being the self-authority to choose when and how often to work, our findings indicate that career self-management is heavily bounded by algorithmic technologies.

While some workers expressed satisfaction with their work and signs of developing *knowing-why* competencies were evident, we attribute this to workers seeking to make the best out of the hyper-flexible and precarious arrangements in which they find themselves immersed. Our examination of knowing-why competencies revealed that, when considering workers' experiences and career aspirations, there is no single, homogenous profile of an app-worker, regardless of job-type or attachment to platform organisations (Kuhn & Maleki, 2017). Instead, app-workers within both sectors described varying levels of engagement and satisfaction with their working arrangement and perceived prosperity within roles. Whilst researchers critique app-work for its failure to provide career development opportunities (Ashford et al., 2018; Kost et al., 2020), we build upon existing literature by demonstrating that a proportion of this workforce simply do not expect or desire these opportunities. Rather, some workers engage only for opportunistic reasons, such as the potential to supplement existing income or to earn money quickly without the commitment of a full-time role (Kaine & Josserand, 2019). Some app-workers, particularly in the food-delivery sector, appeared to develop moderate knowing-why competencies by accepting and being somewhat satisfied with the transactional nature of their roles. These workers highlighted the positives gained from the trade-off between flexibility and precariousness while noting feelings of empowerment.

However, our findings also clearly represented app-workers who are less satisfied with their work, a dominant feature of literature to date (Veen et al., 2020; Wood et al., 2019), despite actively working in these roles for several years. It appears that these app-workers, common across our sample but typically more vocal in the rideshare sector, are more likely to desire career development opportunities and criticise the transactional nature of their roles. By struggling to make sense of their volatile work environment, we argue that these workers face significant challenges in developing knowing-why competencies, especially if they see themselves remaining on the platform in the future. Above all, we see that the significant absence of meaningful contact with other parties decreases app-workers' knowledge of how their actions impact others,

which is detrimental to the development of knowing-why competencies (Beigi et al., 2020).

Our findings align with the broader platform-mediated gig work literature which depicts working relationships as low in commitment and offering limited progression opportunities (Ashford et al., 2018; Vallas & Schor, 2020). We argue that this trend, common across ride-share and food-delivery sectors, makes it difficult for individuals to develop 'knowing-how' and 'knowing-whom' competencies in their roles, and subsequently, to pursue careers beyond the gig economy. What this means is that app-workers must play an especially active role in managing their own development and employability if they wish to eventually pursue a career more in line with their aspirations.

An especially apposite finding is that careers in app-work are quite significantly bounded, rather than boundaryless. Speaking specifically to our second research question, the evidence gathered in this study clearly indicates that this stems largely from the algorithmic management function. In particular, we point to the lack of operational transparency and the manner in which it limits interactions between parties (Mantymaki et al., 2019). This, in turn, creates what appears to be new, unmovable boundaries for app-workers. The lack of transparency and app-workers' subsequent efforts to make sense of these digitalised people management mechanisms, which directly and indirectly limit one's ability to develop knowing-how competencies, was apparent and caused much frustration. The opaque algorithmic structures, policies and work designs leave app-workers uncertain of even basic labour processes and decisions, meaning the potential to develop more advanced, transferable knowledge that could serve career development is practically non-existent. Instead, we note how workers must constantly seek to understand how best to succeed in roles, navigating a pressurised environment where they must constantly adapt their behaviour and self-discipline to receive work (Jabagi et al., 2019).

Likewise, in the context of knowing-whom competencies, app-work offers extremely limited networking opportunities, as algorithms and pay structures 'penalise' down-time and limit human interaction. This constrains one's ability to engage with management and fellow workers which, in turn, will negatively impact the development of one's social capital and networks. Thus, the algorithmic management function represents an absolute and seemingly unmovable boundary in app-working relationships that has significantly negative repercussions for workers' capacity to develop key competencies for career progression.

Consequently, this paper extends the extant literature (Ashford et al., 2018; Goods et al., 2019) by identifying the algorithmic management function, with its ability to tightly control app-workers and withhold information, as most heavily hindering competency development which, in

turn, impedes career-based mobility. The longer one stays in this type of work may also be expected to magnify such disadvantages, with the diminished developmental potential of these roles starkly contrasting with suggestions that some gig workers may seek to develop new skills and networking opportunities useful in furthering their careers (Petriglieri et al., 2018). The ability to develop transferable skills and competencies is a key component of boundaryless career theory, and something that is often assumed to be a perk of the independent contractor status assigned to gig workers (Bérestégui, 2021; Kost et al., 2020). Yet, this research illustrates that the social aspects of gig work are heavily shaped by algorithmic technologies, which subsequently weakens social ties and forms perhaps the largest obstacle for individuals seeking to craft anything resembling a more conventional, meaningful working arrangement (Wang et al., 2020).

This study argued that, although app-workers are notionally mobile, they are hindered by the structural constraints inherent to a heavily transactional working relationship reliant upon algorithmic mechanisms. App-workers are not bound to any single organisation and should be able to freely move in and out of roles in the gig economy (Duggan et al., 2020). The lack of competency development opportunities and social interaction that could lead to future employment opportunities serves to increase app-workers' dependence on platform organisations. Specifically, while there is a relatively high degree of flexibility in terms of app-workers' choices among platform organisations, interorganisational boundaries exist due to the constraints that prevent individuals from using their experiences to transition into more traditional, secure forms of employment. The opportunities for career competency development appear, therefore, to be limited. What this means is that interorganisational transitions beyond platform organisations and thus, boundaryless careers, are exceptionally difficult for app-workers to pursue. These interorganisational boundaries, in addition to the intraorganisational boundaries (i.e. the lack of upward mobility in platform organisations) may cause app-workers to believe that they are trapped or 'locked-in' to the gig economy. Bérestégui (2021) recently suggested that the fluidity of the gig economy is at best illusory, and at worst like 'quicksand', trapping individuals in a cycle of financial vulnerability and low-skilled work without enabling them to stabilise their professional lives. This study extended this argument by illustrating that although some app-workers have alternative career options or may currently enjoy aspects of their working arrangement, many cannot effectively disengage from the gig economy because they lack financial safety nets and foresee limited employment options. Thus, if roles are more heavily bounded than anticipated, primarily due to algorithmic mechanisms that constrain app-workers' developmental abilities, Kost et al. (2020) argument that the notion of boundaryless careers in app-work is oxymoronic appears apt.

Our overall focus on career-related issues for app-workers forms a particularly valuable contribution to existing knowledge, which, to date, has been extremely limited and primarily conceptual in nature (Ashford et al., 2018; Kost et al., 2020). App-workers find themselves in what Ibarra and Obodaru (2016) call a 'liminal space' between occupations: immersed in hyper-flexibility; completing short-term assignments; and only offered work on a task-by-task basis (Wood et al., 2019). Existing research tells us that working in isolation is detrimental to professional identity as workers are shorn of career mentors (Bérastégui, 2021), and also highlights the damaging consequences for workers when all social aspects of the working relationship are reduced to 'spot' digital transactions in place of human interactions (Walker et al., 2021). Thus, this research extends this discussion by illustrating that app-workers are an especially vulnerable population in this regard, with their professional identity rendered fragile by a lack of meaning. While platform organisations do not view app-workers as their employees, we suggest that this should not preclude them from displaying some social responsibility in terms of considering how the all-prevailing use of algorithmic management may be detrimental to individuals' long-term careers.

Likewise, this study extends knowledge of the boundaryless career concept into this new, predominantly unexplored domain, illustrating how the digitally enabled employment practices utilised by digital platform organisations disrupt the contours of traditional working relationships by coordinating work in novel, more cost-effective ways. A potential implication of algorithmic management may be that workers become automatons merely responding to signals expressed in step-by-step instructions (Beigi et al., 2020). This is particularly relevant in examining the impact of digitalization for HRM – something that has consistently been identified across literature as an important area of consideration (Bondarouk, 2020). As a result of this ever-increasing flexibility in app-work, our findings suggest that workers seem likely to experience higher work transience and a lack of clear career paths. With evidence that gig work has started to emerge in a number of professional areas (Minifie & Wiltshire, 2016), the importance of creating a gig economy where arrangements can truly represent a stepping-stone for workers to develop their careers is paramount.

Limitations & future research

This paper represents one of the few empirical studies that seeks to understand the career competencies of app-workers. A key strength of this study is the substantial in-depth interviews that incorporate two of the most widely debated sectors in the gig economy. However, we are

also cognisant of several limitations that are common to studies wherein theoretical insights are garnered from a distinctive sample by using inductive qualitative methods. The double-sector and qualitative approach clearly constrains the capacity to generalise across the vast nature of the gig economy and its diverse forms of work (see Duggan et al., 2020). The boundaries that algorithmic management functionalities represent for gig workers may vary in other parts of this novel economic sector. Thus, future studies that broaden the empirical context would be welcome. We are also conscious of the sampling method and the limitations this may serve on our conclusions, although given the difficulty of reaching the population of interest, this approach was appropriate. Future research may consider using a comprehensive survey study to make a compelling point on the potential and sustainability of careers in the app-work domain. Relatedly, we studied the experiences of app-workers at one point in time. Longitudinal research would offer great potential in offering different and valuable vantage points on the competency development issues we describe.

Finally, against the backdrop of the COVID-19 pandemic, the essential nature of many app-workers came into focus. In a post-pandemic world, we propose that researchers seek to examine the contradictory claims on the opportunities versus risks posed for app-workers. For example, there is opportunity to explore the resilience or vulnerability of app-work, as well as the possibility to examine short and long-term effects of the crisis on work motivations and career attitudes.

Conclusions

In this paper, we reported on app-workers' experiences and ability to develop boundaryless career opportunities in the gig economy. Utilising the 'three ways of knowing' intelligent career framework, we concluded that the algorithmic management function used by platform organisations acts as a new, seemingly unmovable boundary to competency development. Specifically, this function serves to severely constrain the potential of individuals to develop knowing-why, knowing-how, and knowing-whom competencies. Despite the fluidity of platform organisations appearing to be structurally inviting for the development of boundaryless careers, the same fluid structures are simultaneously restrictive, preventing app-workers from pursuing such opportunities (Kost et al., 2020).

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