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ORIGINAL ARTICLE

Driving the digital value network: Economic geographies of global platform capitalism

Kelle Howson¹  | Fabian Ferrari¹ | Funda Ustek-Spilda¹ |
 Nancy Salem¹ | Hannah Johnston² | Srujana Katta¹ |
 Richard Heeks³ | Mark Graham¹

¹ Oxford Internet Institute, University of Oxford, Oxford, UK

² School of Law, Northeastern University, Boston, Massachusetts, USA

³ Global Development Institute, University of Manchester, Manchester, UK

Correspondence

Kelle Howson, Oxford Internet Institute, University of Oxford, Oxford, UK.
 Email: kelle.howson@oii.ox.ac.uk

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Abstract

This paper applies insights from global value chains (GVC)/global production networks (GPN) frameworks to explore the economic geographies brought into being by digital labour platforms. In particular, these perspectives facilitate analyses of power imbalances and value extraction across territories—an under-theorized aspect within platform studies. We theorize this dynamic by introducing the descriptor ‘digital value network’ (DVN): a digitally mediated nexus of platform operations that produce and distribute value between territories, on the basis of labour transactions. Empirically, we draw on a multi-year action research project, assessing the operations of platforms and the experiences of platform workers in 54 countries. Our analysis highlights that platforms as lead firms extend GVC/GPN logics of coordination and drivenness in DVN to (i) optimize production capabilities while externalizing ownership and costs, (ii) accumulate both monetary and non-monetary forms of value, and (iii) concentrate power at the global scale in both existing and new sectors.

KEYWORDS

digital labour platforms, embeddedness, gig economy, global production networks, global value chains, value

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INTRODUCTION

Digital labour platforms¹ are now well-established as players in an expanding number of sectors, from professional services such as design and translation, to transport, food and hospitality, and caring and cleaning. Much of the economic activity in these sectors has historically sat outside the reach of transnational networks of capital—that is, in which actors in multiple countries may benefit from a single transaction or chain of transactions. However, recent years have seen face-to-face services increasingly subsumed into cross-border apparatuses of production as a result of the advancement of digital infrastructures (Foster & Graham, 2017; Grabher & van Tuijl, 2020). Those infrastructures are rapidly reconfiguring international geographies of production and consumption, and giving rise to new possibilities for the creation and enhancement of value on and via digital labour platforms.

While analysis of the platform economy has placed much emphasis on its novelty, in fact the transnational value creation, enhancement, and distribution enabled by digital labour platforms in many ways conform to established patterns of networked global production and trade (Wood et al., 2019). While platforms may appear to disrupt established capitalist power relations, in order to understand the nature of this disruption and its possible outcomes for different economic actors, it is useful to examine platforms through the lens of conventional models of global economic exchange. Existing heuristics include theories of global value chains (GVC) and global production networks (GPN). These traditions pay particular attention to the power imbalances and inequalities produced and reproduced by uneven relations of global production, through an integrated geographical framework. Key conceptual reference points within the GVC/GPN literature, such as *lead firm*, *embeddedness*, *value* and *governance*, shed light on power relations produced by global networks of digitally mediated labour. However, in platform-mediated networks, it is sometimes unclear what exactly is the product, which actors qualify as (lead) firms, how they are spatially and economically embedded, what is the real value that is being created, and how this value is harnessed or captured. In this paper, we aim to demonstrate that digital labour platforms appear as lead firms in nebulous and distributed networks – wielding definitive and centralized control.

Approaches to theorizing digital labour platforms from economic geography remain scarce, and few scholars have attempted to understand them in relation with GVC/GPN literature (for exceptions; see Foster & Graham, 2017; Grabher & van Tuijl, 2020; Kenney & Zysman, 2020). Grabher and van Tuijl (2020) have taken significant steps towards addressing this gap as regards firm-level relations in the wider platform economy. Building on their work, this paper elucidates networks of digital production led specifically by labour platforms, with a view to understanding how they extend GVC/GPN governance logics to concentrate power and accumulate value across territories. We centre digital technologies as a core causal feature in the creation and configuration of value networks, as opposed to as secondary tools through which networks are governed and upgraded. At the heart of our argument is the concept of 'digital value network' (DVN). Inspired by Coe et al. (2008), a DVN is *a digitally mediated nexus of platform operations that produce and distribute value between territories, on the basis of labour transactions*. In unfolding the conceptual implications of DVN, we pay particular attention to aspects that are politically contested, including labour classification and commodification, value extraction, geographical unevenness, and regulatory evasion.

Methodologically, we draw on data from a multi-year action research project² to address these gaps. We discuss how DVN governance features are demonstrated by two case study lead firms, Uber (with evidence from Sub-Saharan Africa and Germany) and Upwork (globally), which serve as illustrative examples of two main typologies of the global platform model. By examining how networks intersect with local contexts, we illuminate how power is structurally enacted in DVNs. The logics inherent in DVN governance strategies are familiar to GVC/GPN scholarship, and we do not claim that they are unique to platforms. However, we argue that logics of coordination and value extraction are taken to new extremes in DVN, where digital technologies allow lead firms to (i) optimize production capabilities while externalizing ownership and costs, (ii) accumulate both monetary and non-monetary forms of value, and (iii) concentrate power at the global scale in existing sectors and create new sectors of concentrated global power.

The paper is structured as follows. First, we introduce key characteristics of digital labour platforms at the confluence of globalization and the digital transformation of production and labour. We then situate platforms in GVC/GPN theory, paying attention to the role of technology in their governance. Next, we use these analytical lenses to explore our case studies. In the subsequent discussion, we present key ways in which GVC/GPN approaches can better accommodate DVN research, in order to contribute to policy that better responds to protect workers amid rapidly changing governance strategies in global networks. Indeed, this work is of immediate political relevance as many workers subsumed into DVN face structural precarity and vulnerability, exacerbated in turn by the COVID-19 crisis.

DIGITAL LABOUR PLATFORMS AS LEAD FIRMS IN GLOBAL NETWORKS OF VALUE

Digital labour platforms and globalization

Global labour platforms deploy digital infrastructures to coordinate economic activity across diverse territories and siphon value from transactions to a central point of accumulation. Accordingly, they clearly function as lead firms in global networks of value production and distribution which link primary workers and producers, owners of productive assets (e.g. vehicles leased to ridehail drivers), app users (who in many cases also produce value in the form of data), providers of secondary services such as mobile services, and many other actors. Based on their labour geographies, labour platforms can be divided into two broad types. The first, geographically tethered platforms, require work to be done in a particular location, for example, cleaning an apartment, delivering food from a restaurant, or driving a person from one part of town to another. The second, cloudwork platforms, involve work that can, in theory, be requested and performed from anywhere on the planet.³ This includes work like data production and augmentation such as answering surveys and training machine learning systems, and online freelancing.

Many commentators have reflected on how these platform-mediated forms of value production sit at the frontier of economic globalization. Indeed, they have been heralded as a solution to dismantling structural and geographical inequalities by fostering inclusive development across the globe (McAfee & Brynjolfsson, 2017; Schwab, 2017). They are widely conceived as a 'disruption' (Christensen et al., 2015), rather than a continuation of established ways of organizing the circulation of products and services. However, critics contend that the disruption brought about by platforms extends beyond the circulation of goods and services, to encompass detrimental implications for workers' and producers' security, health, and well-being (Crouch, 2019; Graham et al., 2017; Standing, 2016). One criticism is that platforms exploit their apparent distinctiveness in order to systematically devolve social and economic risks to precarious suppliers, notably by positioning themselves as merely mediators of activities (Srnicsek, 2017), rather than producers, buyers, or employers. Applying a GVC/GPN parlance, we see platforms effectively characterizing individual workers as atomized 'firms'; clearly networked, but cast into individual competition with each other. Far from establishing a level playing field for economic exchange, critics assert that in instituting these relations, platforms compound the commodification of labour and engender a global race to the bottom in labour standards (Cherry, 2016; Heeks, 2017; Prassl, 2018). In this view, digital labour platforms do not disrupt capitalist relations of exploitation, but provide new opportunities for exploitation. In particular, we argue that they provide opportunities for concentrating economic coordination and power within new globalizing networks. Whether production is tethered or untethered from the territory in which the worker is situated, platforms represent a distinct development in the globalization of labour that goes beyond the new international division of labour (Frobel et al., 1980).

For instance, cloudwork platforms have given rise to a novel 'planetary labour market' (Graham & Anwar, 2019) in which workers from all over the world compete for piecework, with detrimental consequences for worker power that are only beginning to be understood. While it is supported by digital platforms which seem extraterritorial and intangible, this labour market is not immaterial. While the development of AI systems is presented by some technology companies as happening magically (Gray & Suri, 2019), it is in fact highly labour intensive, with that labour often performed in the Global South, enabled and constrained by the social, geographical, and political circumstances within

which it occurs (Graham & Anwar, 2019). As they accelerate trends in offshoring and outsourcing, cloudwork platforms coordinate the production and distribution of value between territories on a new economic terrain of their own making.

Geographically tethered platforms, too, globalize labour relations in specific ways. While they generally match a service provider with a service user directly, they do so via a digital infrastructure which is often designed and governed in a different country—typically in the Global North. In turn, rent from that (ostensibly) direct and localized transaction is extracted and captured offshore. In order to facilitate transactions in dozens of different countries, multiple permutations of a platform's proprietary digital infrastructure may be deployed. Decisions about management and allocation of tasks, about workers' earnings, and about enrolment and termination (or deactivation) of participants can all be made at the global scale and the unprecedented ease with which platforms control the supply of workers contributes to the commodification of labour in DVN. In turn this far-reaching operational embeddedness is accompanied by a normative (regulatory, institutional) disembeddedness (Graham, 2020; Wood et al., 2019), which allows lead firms in DVN to avoid costs associated with local operations, institutional accountability to labour protections, tax regimes, and so forth, and undermine structural labour power.

Moreover, the labour (or production) process is not only controllable from much further afield spatially in DVN, but is also controllable at a much more granular level (Woodcock & Graham, 2019). Workers are subject to anonymous dictates of managerial control emanating from beyond their borders, about the minutiae of where, when, and how they work, and what they get paid for that work. The automated decision-making which underpins this granular management is designed to maximize the value of labour under local conditions (Kellogg et al., 2020), (e.g. surge pricing to extract maximum value from peaks in local demand)—but can be heedless to the particular local risks and costs that workers might face. Beyond direct management, platforms have refined subtle forms of indirect control and gamification, including elaborate systems of incentives (e.g. ratings systems) and penalties (e.g. account blocks, losing accrued benefits and incentives, or deactivation) (Wood et al., 2019). In all of these instances of platform power, we see an erosion of states' influence in globalizing markets—the precise phenomenon that GVC/GPN scholarship emerged to deal with, by mapping new complex cross-border linkages and power relations.

A crucial point of distinction of DVN is that they globalize new types of markets in new ways. Platforms extend the ambit of global production and trade beyond the conventional pillars of commodities and manufactured goods, and financial markets. In this new economy, everything can be turned into a service, and all services can be commodified. Crucially, platforms insinuate their globalizing forces into face-to-face service sectors, transportation, hospitality, care, beauty, trades, and more. While previous phases of globalization in, for example, the restaurant sector were characterized by more vertically integrated transnational corporations such as McDonalds and Starbucks, in the food delivery platform model (e.g. Deliveroo), thousands of independent restaurant firms and independent delivery services are drawn into a proprietary network infrastructure, creating a de-integrated (in the sense of ownership), yet centrally coordinated value network.⁴ While GVC scholars may be familiar with de-integrated vertical chains which display profound power asymmetries (e.g. Nike), DVN appear as more horizontal business-to-business networks in which power remains, counter-intuitively, highly concentrated. This process is also increasingly visible in personal services previously characterized by very direct transactions, such as beauty, sex work, and residential trades and services (e.g. plumbing), as global lead firms (platforms) become more common in these sectors, and subcontracting increasingly becomes the norm rather than the exception.

Service sectors have historically been resistant to commodification, due to the difficulty of increasing labour productivity through economies of scale or automation in service work. Digitalization and advancement in information and communications technology (ICTs) offer solutions to these impasses. Labour platforms are also deepening globalization in sectors which are not as geographically sticky, but which are characterized by direct transactions between producers/service providers and buyers, such as creative content production, accounting, consultancy, legal services, and medical consultation and counselling; positioning themselves as rentiers and gatekeepers in a new planetary labour market.⁵ Finally, they are creating or consolidating altogether new forms of digital production, in data-driven sectors such as data cleaning and processing, content moderation, AI training, beta testing, user testing, captioning and

translation, and survey completion (Gray & Suri, 2019). In these cases, the platform is especially elusive and ethereal, and at the same time all-controlling. 'Clients know little about micro-workers – just as the latter are often unaware of the purposes of their tasks – and may find it difficult to interact with them' (Tubaro et al., 2020, p. 10). In all of these examples, we see platforms creating new digitally predicated global value networks in both new and existing industries.

Many digital labour platforms—following the canonical example of Uber—have been described as 'lean' businesses, meaning they are based on a logic of cost externalization. This digitally enabled business model, as illustrated in Srnicek's (2016) dissection of platform capitalism, prioritizes growth over profit (at least initially). Many platforms follow a strategy of rapid global expansion enabled by venture capital, and own little to no physical infrastructure or assets. This strategy of steep growth relies on network-effects (the compounding benefits of increasing the user base), and commonly involves creating demand in nascent or non-existent markets, through cross-subsidization of supply and demand (Hagiū & Rothman, 2016; Langley & Leyshon, 2017; Rochet & Tirole, 2003), as well as heavy investment in marketing and public relations (Woodcock & Graham, 2019). This strategy of aggressive expansionism is often prioritized even while platform companies continue to register a loss (van Doorn & Badger, 2020). Crucially, this strategy rests on anti-competitive logics, and the drive towards monopolistic market dominance. Through this analysis, we see that a key feature of DVN is that in order to produce and accumulate capital and speculative value they are highly oriented towards captive governance relations and explicit network coordination (Gereffi et al., 2005), coupled with rigorous externalization.

Digital labour platforms have not only accelerated and shifted globalization in the production and circulation of value, but also deepened the opacity of transnational labour relations, beyond what could have been anticipated even two decades ago. It is critical then, that the explanatory frameworks we use to understand the dynamics of the production and circulation of goods, services and value across borders, are equipped to deal with these emerging global networks. This is not only with a view to providing the language to discuss them in economic geography, but to elucidating, tracing, and responding to their consequences for the rapidly increasing proportion of the world's workforce that is subsumed into and dependent on them.

Digital labour platforms and technological chain/network governance

The new global networks created as a result of the rise of digital labour platforms may be novel in their configuration and ostensibly predicated on a business model of disruption. However, to some extent they have been anticipated by earlier chain/network scholarship beginning in the 1990s. In recent years, GVC/GPNs have seen ongoing conceptual advances in a number of directions, towards an agenda that Coe et al. (2019) have termed 'GPNs 2.0', which aims to better understand underlying political and economic drivers, and link GPN configurations to uneven development outcomes. This is partly in response to criticism that 'mainstream production network studies tend to dismiss macrogeographies of uneven development out of hand as a form of rigid structuralism that necessarily reduces actors and places to their functions in the global hierarchy' (Werner, 2019, p. 951). In line with the objective of giving prominence to the capitalist power relations that produce unevenness, this section identifies strengths and limitations of GVC/GPN approaches for analysing digital value networks, drawing on concepts as outlined in Table 1.

Economic geographers have long understood that transnational flows of labour, goods, and technology can result in uneven geographies and development outcomes (Dicken, 2004; Harvey, 2006; Peck & Tickell, 2002). This challenges neoliberal narratives that the world is now 'flat' (Friedman, 2006) due to a technology-enabled 'great convergence' (Baldwin, 2016). Indeed, a key strand in globalization studies is the role played by ICTs in time-space compression, expanding the possibilities for spatially distanced economic cooperation and coordination (Harvey, 1989). Dicken (2015, p. 75) identifies technological change as 'one of the most important processes underlying the globalization of economic activity', further noting that the current cycle of technological development is characterized by 'pervasive and influential' digitalization (p. 80). However, he stresses that technological innovation per se is not a determinant of

TABLE 1 Overview of how digital value network (DVN) relates to global value chains (GVC)/ global production networks (GPN) frameworks (inspired by Coe, 2009)

	Global commodity/value chains (GCC/GVC)	Global production networks	Digital value networks
Disciplinary background	Economic sociology Development studies	Economic geography	Platform studies Digital labour studies Digital geography
Object of enquiry	Interfirm networks in global industries	Global network configurations and regional development Interfirm relations (B2B)	Digitally mediated nexus of platform operations that produce and distribute value between territories, on the basis of labour transactions
Orienting concepts	Value-adding chains Governance models Organizational learning Industrial upgrading and rents	Societal, network, and territorial embeddedness Value creation, enhancement, and capture Corporate, collective, and institutional power	Technological governance as causal factor in the emergence of DVN Strategic (dis)embeddedness of lead firms: conjunctural geographies of platforms allows for cost-capability optimization Non-standard value creation, enhancements and capture through data assets rather than physical assets Governance through lead firm as intermediaries
Intellectual influences	MNC literature International business Trade economics	Relational economic geography, GCC/GVC Actor-network theory (ANT) Varieties of capitalism	GCC/GVC, GPN Platform capitalism New media studies

the outcomes of economic activity, but is itself socially and institutionally embedded: 'It makes possible new structures, new organizational and geographical arrangements or economic activities, and new products and new processes, while not making particular outcomes inevitable'. From this perspective, technological innovation is seen as a key sustaining process of economic growth, development, and organization—but the direction this process takes is a choice made by actors.

So how is technology used by actors to determine the outcomes of global economic organization? In the global commodity chains (GCC) and GVC approaches, technology has often been treated as one of a suite of sector-specific variables which contribute to inter-firm dynamics and industrial governance (Gereffi et al., 2005). Whether technological capabilities are retained internally or outsourced by the firms in a chain contributes directly to the power those firms have to control the activities of suppliers, and to capture the value produced. Technology can also connect firms in captive relations of interdependence, or allow for higher levels of outsourcing and cost-reduction:

'All of these interactions are being embedded in elaborate information technology systems that span the organizations of lead firms and their key contractors, creating new areas of risk for lead firms in the areas of intellectual property leakage and buyer-supplier lock-in. Shared information technology systems are evolving in two directions simultaneously: toward proprietary systems that increase asset specificity and lock-in, but better protect key intellectual property; and toward open standards (e.g., RosettaNet) and/or third-party systems that better support value chain modularity but that leave the door open for intellectual property leakage' (Gereffi et al., 2005, p. 95).

As Gereffi and colleagues argue as part of their typology of the governance of global value chains, digital technology allows actors to codify and transmit increasingly complex production specifications, even when the capabilities in the supply base are low. In other words, lead firms can reduce their costs by outsourcing supply activities (or vertically de-integrating), while retaining a close control over those activities, and constraining their suppliers' ability to contract elsewhere (Gereffi et al., 2005). Gereffi's framework foreshadows recent insights from different theoretical

standpoints into the workings of platforms across territorial scale. Peck and Philips (2020) propose a typology of the digitally enabled ways platforms exert governance over distributed economic transactions. In doing so, they cite Vallas and Schor (2020, p. 273) who argue that platforms 'externalize responsibility and control over economic transactions while still exercising concentrated power'. Gereffi's framework of governance through the codification and transmission of complex production information provides explanatory insight into these dynamics.

In GVC traditions, the particular configurations of global value chains are understood as being industry-specific, for instance, where knowledge and technological capabilities in the supply base are high (e.g., in high-value manufacturing in industrialized economies), value chains are likely to be 'producer-driven' or more integrated, with backward and forward linkages controlled by Northern manufacturers, such as in the automotive industry. In contrast, 'buyer-driven' chains are more likely to be controlled by monopsonistic retailers, also in wealthy countries, who compete with each other in global sourcing of products. In this case, branding, advertizing, and supply-chain management all provide sources of market power. These types of value chains have been more closely associated with sectors such as agro-food and textiles, that is, material goods that are relatively simple to produce, with no monopoly on production.

As early as 2001, however, Gereffi tried to anticipate the consequences of the internet for the producer-driven/buyer-driven dichotomy by introducing the notion of the 'internet-oriented chain' (Gereffi, 2001a, 2001b). Appearing in the service/B2C industries, including 'online brokerage', internet-oriented chains were intermediary-driven, and integrated on the basis of information sharing and access, rather than on the basis of ownership (producer-driven chains), or logistics (buyer-driven chains). They thus facilitated more direct transactions between suppliers and users. However, the position of lead firms in DVN is not as easy to pin down. Digital labour platforms self-identify as intermediaries, but they also exhibit both monopolistic (controlling production) and monopsonistic (controlling sourcing) tendencies. In service networks, it makes less sense to confine the lead firm to the category of buyer, producer, or intermediary. In fact, an intermediary definition may serve to obscure key aspects of control and accumulation exhibited by platforms which align with buyer behaviour in value chain theory.

As GVC/GPN theory has evolved over the last 2 decades, the concept of the internet-oriented chain has largely fallen by the wayside. It has not been carried through the many debates and permutations of these frameworks, and Gereffi has not revisited it. With the now overwhelming ubiquity of ICT and the internet across primary, secondary and tertiary production networks, a more nuanced understanding of digital intermediation and governance has emerged. *The Governance of Global Value Chains* (Gereffi et al., 2005) introduced a sophisticated typology of 'drivenness' in value chains, which took technological capability to be one of the variables contributing to the degree of explicit coordination emanating from lead firms. However, it did not deal distinctly with chains intermediated by internet-based platforms. With the rise to prominence of the GPN approach, binary conceptions of directional value chain governance have been superseded by more relational and dynamic understandings of the exercise of power in networks, coalescing around the analytical frames of value and embeddedness (Coe et al., 2008; Hess, 2018; Sunley, 2008)—that is, the gains derived from transactions and circulated within a network, and the geographical, social, and institutional landscapes in which those transactions are situated. Nevertheless, technology is still acknowledged as an important tool through which power is exercised by lead firms in order to drive outcomes, with Foster and Graham (2017) pointing to the role of 'the digital' in shaping networks, and as a site of contestation—rather than merely an infrastructural component of production.

Similarly, Yeung and Coe (2015) have pointed to GVC's under-theorization of technology as a causal factor in the creation and organization of global production networks. They also argue that GVC/GPN conceptions have not paid enough attention to the dynamics of market creation and development as an iterative process. While previous GVC/GPN scholarship has tended to treat markets of production and consumption as relatively static structures in which consumers and producers respond and act, in fact both producers and consumers are involved in 'developing new demand conditions and supplier capabilities that are mutually reinforcing and geographically mutable' (Yeung & Coe, 2015, p. 37). This view of active (co)creation of multi-sided markets by network actors, who enrol users and cross-subsidize supply and demand (Rochet & Tirole, 2003), in fact precisely describes the logic of platform business

TABLE 2 Worker governance in the platform economy (inspired by Gereffi et al., 2005)

Buyer	Spatial control	Temporal control	Ability to set rates	Digital legibility	Barriers to entry for workers	Repeat transactions	Degree of explicit coordination
Taxi and delivery work (e.g. Uber)	High	Mixed	High	Mixed	Low	Low	High
Domestic and care work (e.g. SweepSouth)	High	Mixed	High	Low	Low	High	High
Microwork (e.g. Amazon Mechanical Turk)	Low	Low	Low	High	Low	Low	Mixed
Online Freelancing Platform (e.g. Upwork)	Low	Low	Low	Mixed	Mixed	Mixed	Mixed

Note: Table reproduced from Woodcock and Graham (2019, p. 62).

models—which rely on the market-making possibilities afforded by greater digital connectivity (Hagiu & Rothman, 2016; Langley & Leyshon, 2017; Srnicek, 2017).

Yeung and Coe (2015) call on researchers to move beyond theorizations of technological infrastructure as a secondary facilitator of network governance, and towards a theory which centres technology as an enabler of network formation. They note that the GCC/GVC literature has framed technological leadership as an important tool in producer-driven commodity chains, and cost-reduction rationalities as key to the governance of buyer-driven chains. They endeavour to unite these two under the concept of a 'cost-capability ratio', in which governance is enacted through cost-capability optimization. In the most simple terms, this governance logic allows lead firms to reduce and/or outsource costs, whilst maximizing quality control over production activities, including 'labour, technology, know-how, and capital' (Yeung & Coe, 2015, p. 34). Again, these trends are not suggested to be novel in DVN, they have also been observed outside GPN literature since the 1990s, for instance, by Harrison (1997) who noted a turn towards concentration of power without centralized ownership in global corporate governance. This logic is undoubtedly at play, and taken to its extreme, in the DVN model, and DVN intensify pre-existing cost externalization tendencies in buyer-driven networks.

Alongside externalizing costs, capability optimization means ensuring the availability of suppliers, as well as controlling their behaviour. Recently, Woodcock and Graham (2019) have adapted Gereffi et al.'s (2005) typology of GVC governance to identify six factors determining the level of control exerted by digital labour platforms on workers. They outline the following conditions of labour governance: spatial control (where workers are), temporal control (when workers work), ability to set rates, digital legibility (the potential for workers to be replaced by automation), barriers to entry for workers, and likelihood of repeat transactions. The authors show that platform work by nature is subject to a high level of coordination, on the basis of centralized digital power (Table 2). Following Gereffi et al., we can hypothesize that where explicit coordination is high in a network, there is likely to be a more asymmetric distribution of value, with the lead firm extracting a greater share of value from the production and labour process.

In light of the fast-growing influence of digital labour platforms in global economic exchange, it is important that economic geographers employ a dynamic conceptualization of ICTs not as passive or neutral, but as distinct socio-technical infrastructures, which allow actors to enact and re-enact network governance in pursuit of pre-defined outcomes. Inspired by the geographers who stressed how globalization long ago created new patterns in the concentration of wealth and capital, resulting in highly uneven outcomes (Dicken, 2004; Sheppard, 2002), our case studies demonstrate the importance of ensuring that the heuristic frameworks we use to describe global economic linkages

and their outcomes are equipped to deal with the new configurations—or DVN—produced as a result of digital labour platforms.

CASE STUDIES

The following case studies empirically elaborate three governance characteristics of platforms as lead firms in DVN; namely cost-capability optimization, unconventional forms of value production and extraction, and network-making in new sectors. While we focus here on two lead firms, we argue that the features are common across DVN, as they flow from the digital governance affordances of the platform. Moreover, we note at the outset that these three features are not mutually exclusive, but interrelated and mutually reinforcing. Our chosen case studies are high-profile and illustrative examples of the business models of globalized geographically tethered and untethered platforms, respectively, and as such provide insight into common features of DVN.

Creating and capturing new networks through digital governance: Upwork

Upwork is a cloudwork (i.e. geographically untethered) platform that facilitates a wide array of work ranging from transcription to translation to computer programming. Global in scope, Upwork is used by clients and workers from around the English-speaking world (predominantly). Unlike microtasking platforms which disaggregate a project or task into a number of discrete 'microtasks' that can then be distributed to a crowd (e.g. tagging work), those that are listed on Upwork tend to remain intact. The platform tends to broker project-based production of varying duration and requiring various skills, such as design, editorial writing, professional services, and external consultancy, as well as a vast spatially dispersed workforce capable of meeting such requirements, suggesting that these jobs are less prone to being automated in the short or medium term, and that relatively high capabilities and skills might allow workers to retain some bargaining power in the DVN created by Upwork. Nevertheless, Upwork, like many other prominent cloudwork platforms, succeeds in concentrating power in a network which is incredibly spatially and sectorally diversified. It creates a coordinated network of production within a competitive planetary labour market. This centralization of decision-making in creative and knowledge sectors dovetails with significant barriers to worker upgrading within Upwork's DVN. A key issue faced by cloudworkers is that the local jurisdiction governing their work is usually murky at best, leaving them with little protection when things go wrong. Despite platform policies generally being universal, these vulnerabilities are not experienced uniformly, but map onto existing uneven geographies.

Upwork is a typical cloudwork platform in that it presides over a much greater level of supply than demand. Barriers to entry are very low for workers. However, barriers to participation are high. While it is straightforward to create an Upwork profile and to gain access to the platform, obtaining work is much more difficult. In our survey of approximately 60 Upwork workers globally, 38 per cent indicated that they felt they were working too few hours on the platform. Of these, four fifths attributed this to there not being enough work on the platform, or to their inability to demonstrate, via Upwork's reputational system, their capabilities. The need to secure jobs may therefore cause workers to conform to the working hours of the clients they are hired by. In line with previous research on business process outsourcing organizations (BPOs), this can lead to anti-social working hours, particularly among workers in the Global South who serve a Global North clientele (Anwar & Graham, 2019; Wood et al., 2018, 2019). Additionally, workers may be incentivized to accept low pay to attract work, frequently with the goal of building their reputation on the platform—the only means of attracting better work in the future. Indeed, the minority of workers who have achieved platform success and who have relatively high levels of reputational power can come to feel capable of rejecting job offers that do not conform to their expectations or for asking for more money via these communication channels.

Despite working in a planetary labour market, some workers, particularly those from emerging economies or less-developed regions, readily submit to pressure from clients, and feel they are expected to work for less because of

where they are from. One of our survey respondents, a woman from Macedonia, observed: 'I've noticed that some clients look down on people who come from countries outside of North America and North-Western Europe. They take us less seriously, consider our skills inferior, and try to pay us less money'. This sentiment was shared by several participants in the study, who felt they were at a disadvantage due to their location, background, or whether or not they were deemed 'native' in the languages they spoke. Thus, while workers can work from anywhere via the cloudwork platform, there is sometimes a geographic penalty imposed on them by clients, demonstrating the complex ways in which Upwork's seemingly geographically untethered network actually intersects with different spatialities.

Thus, Upwork's novel global market for creative and knowledge services reproduces long-standing global power asymmetries. This is in large part due to the digital infrastructure and algorithmic design of the platform interface, which governs and constrains interactions between users. The details of individual jobs are primarily determined by clients, who can either post a job publicly, which allows all workers to apply for the job, or solicit individual workers directly for non-advertized jobs. While workers and clients can easily sign up to the platform, their ability to view jobs or to advertize work depends on their Upwork membership status. Workers with basic membership plans are able to apply for a limited number of jobs free of charge and then must pay for each job application they submit, while those with 'top rated' status are charged lower fees for the work they do on the platform. These complex, algorithmically managed ratings systems form the cornerstone of Upwork's digital governance. Workers who have achieved platform success and who have relatively high levels of reputational power can come to feel capable of rejecting job offers that do not conform to their expectations or for asking for more money via these communication channels.

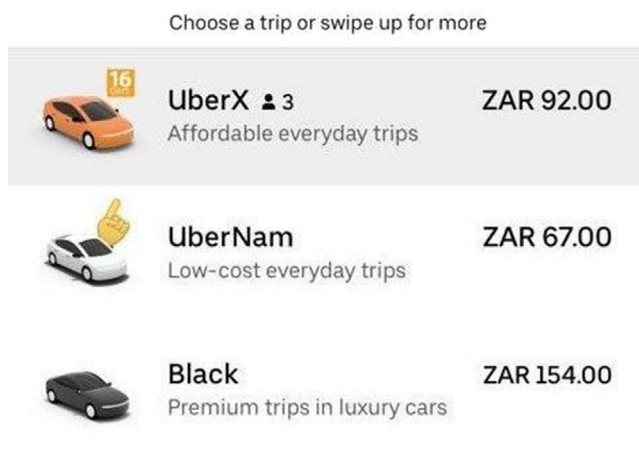
Upwork's infrastructure is built to facilitate direct communication between clients and workers. This has implications for workers' control over their time and rates, and is also an important mechanism for ensuring that jobs are completed satisfactorily. What is more, Upwork facilitates multiple ways of structuring jobs including task-based (one-off) jobs where workers are paid via piece rate, and ongoing, longer-term contracts where workers are paid hourly. Hourly pay is typical of continuing contracts with longer-term clients. Such situations suggest a greater reliance or integration of the worker into the client's firm. Upwork's governance mechanism also creates incentives for this type of arrangement, charging workers smaller commissions once they have surpassed a client-specific income threshold. Perhaps a partial feature of this, our survey of workers found that hourly working arrangements yielded higher incomes for workers. Across our global sample, workers who were paid by the hour earned approximately 25 per cent more per hour than those who were paid by the task.

In instituting an international governance apparatus to facilitate the concentration of value in creative and knowledge industries, Upwork establishes and sets the terms of engagement for a distributed value network. Extremely complex transactions and production can take place in this network with the platform retaining defining control through digital governance mechanisms. Furthermore, digital governance enables the establishment of the network in sectors which have previously been more resistant to concentration. Via Upwork as lead firm, we see these sectors becoming increasingly networked, with linkages and distributed across multiple territories, and accumulation concentrated in established centres of wealth. These new networks may appear de-territorialized, with work taking place fully online, however like longstanding primary and industrial commodity networks, the globalized power relations created by Upwork still exploit and reproduce existing geographical inequities.

Maximizing control, minimizing ownership, extracting value: Uber in Sub-Saharan Africa and Germany

Uber's ride-hailing service has become a standard fixture of urban life in over 900 cities of the world. Woven into diverse spatialities, Uber's presence in our transport systems is highly tangible. In response to specific local conditions, Uber pulls complex managerial levers from a centralized point of technological coordination in California, and legal coordination (incorporation) in the Netherlands. While Uber's power to control access and transactions, manipulate supply and demand, and influence the behaviour of actors in its network is spatially highly concentrated at a

FIGURE 1 Screenshot of the Uber app in Cape Town, South Africa. Source: the authors



global scale, it is also profoundly locally embedded in the sense of responsiveness to social, institutional, and market conditions in the places in which it operates. Uber optimizes value-producing capabilities in its dispersed supply base, through digital methods like surge pricing to better match supply and demand, ratings systems, robo-firing, worker surveillance, and many more hidden algorithmic interventions (Rosenblat, 2018). While these forms of management are ubiquitous across localities, Uber also adopts diversified strategies to optimize value production in different contexts. For instance, in response to geographies with unreliable internet connectivity, Uber offers a no-frills android-only application called 'Uber Lite' for drivers and customers using 'devices with limited data, storage, speed, network and battery' (Introducing Uber Lite, n.d.).

In Sub-Saharan Africa, Uber has also developed numerous low-cost services to gain a competitive foothold in established transport markets. In 2018, for instance, Uber introduced 'Uber Chap Rosenblatt' in Nairobi, Kenya. ('Chap Chap' in Kiswahili slang meaning 'hurry, hurry') by partnering with a Kenyan car importer to import a fleet of inexpensive, fuel-efficient cars; as well as with a Kenyan bank to offer financing to highly rated Uber drivers to purchase the cars (Shu, 2018). In this manner, Uber was able to substantially reduce ride fares, while maintaining its modus operandi of owning few physical assets on the ground; meanwhile transferring the risks of car ownership to the car importer and the drivers who borrowed loans, and the risks of loan defaults to the bank.

In late 2020, Uber introduced 'UberNam', (subsequently renamed UberGo), an affordable ride-hailing service using older hatchback cars, in certain parts of three South African cities (Johannesburg, Cape Town, and Durban) (UberNam, 2020). Unlike Uber's other South African ride-hailing services which operate chiefly in affluent and central urban areas, UberNam targeted lower to middle income areas such as townships and suburbs, where predominantly non-white populations reside. The phrase, 'UberNam', in Xhosa, means 'Uber with me', and the associated visual imagery of a raised finger (see Figure 1) recalls the manner in which minibus taxis (a popular mode of affordable public transport) are hailed. UberNam was renamed UberGo a few months after its introduction - seemingly in direct reference to its main competitor Bolt's low-cost product, BoltGo. With this service, Uber is aiming to undercut its main competitor to dominate transport markets including in neighbourhoods that it previously did not cater to. Uber drivers interviewed in Cape Town in December 2020 were concerned that if their vehicle was a hatchback or was older than a certain year, they would be automatically forced onto the UberNam service, and only able to take much lower fares, often from less safe areas, leaving them barely able to cover their costs.

There are other examples of Uber introducing low-cost services across the African cities it operates in. 'UberPoa' in Mombasa, Kenya, connects customers with auto rickshaw (tuk tuk) drivers; in this case, the company seeks to draw consumers by tapping into common frustrations among the city's tuk tuk riders, saying 'You no longer have to haggle on fares or walk in search of your ride' (UberPOA is Arriving, 2018). Similarly, 'UberBoda' in Kampala, Uganda,

connects customers with boda boda (motorcycle taxi) drivers. These examples show how the global company modifies and embeds its products into local economic geographies, and in so doing, contributes to their production and reproduction. Uber does this in numerous ways, whether through the use of platform interfaces that are customized to local network affordances (e.g. Uber Lite), contextually derived discursive framings (e.g. Uber Chap Chap and UberGo) or low-cost offerings that are in a better position to compete with existing transport providers (e.g. Uber Chap Chap, UberGo, and UberBoda).

However, competing with established low-cost transport options such as minibus taxis, necessitates subsidizing services heavily. It is unclear how Uber aims to be conventionally competitive in these markets, as Uber Chap Chap and Go's individual taxi rides (even in cheaper vehicles) can never achieve the economies of shared transport options. Uber's strategy with these offerings seems counterintuitive. What value is the firm deriving here? A cornerstone of the business model of platforms is the delayed realization of gains. As Van Doorn and Badger (2020) argue platforms pursue a 'dual value production', whereby the speculative value of accumulated data assets augments the monetary value of the labour process itself. Data is produced at multiple stages of the service provision, and platforms are argued to be betting on their future ability to valorize that data as a distinct asset class, either by improving the efficiency of their own (automated) processes, by using them to exert power, or by selling them. This strategy hinges on controlling as much information as possible in a market, and viewed in this light, helps to explain platforms' monopolistic expansionist tendencies even where they may be initially loss-making (Kenney & Zysman, 2020).

Uber's operations in Germany present contrasts and similarities to its strategies in Africa. Germany has among the most stringent institutional checks and balances against exploitation in supply networks, including digital platform power (Thelen, 2018). But in recent decades, the spread of non-standard employment arrangements and exploitative subcontracting practices have tested these institutional checks (Wagner & Hassel, 2016), including in the construction industry (Kahmann, 2006) and domestic care work (Lutz & Palenga-Möllnbeck, 2010). In response to labour, competition, and transport regulation in Germany, as in Nordic countries (Oppegaard, 2020), Uber has had to adjust its established business model dramatically, by contracting with private transportation intermediaries which are German companies that provide workers with employment status (Kozłowska, 2019), rather than relying on a workforce of 'independent contractors' (as Uber usually classifies its drivers).

Indeed, in December 2018, Germany's Federal Court of Justice ruled that Uber's business model violated the rules of public transport, and constituted unfair competition. In response, Uber has adjusted its German business model several times—most recently by operating with only one established private hire firm as a 'general contractor' in all cities, instead of with coequal intermediaries (Kapalschinski, 2019). The centrality of this intermediary (General Contractor GmbH⁶) in the DVN is complicated by the fact that it is an umbrella firm for a network of regional companies with limited liability (see Figure 2). These regional firms only employ a small number of drivers and subcontract most rides to third-party intermediaries, including smaller private hire firms as well as self-employed drivers. However, Uber and the general contractor take a commission for all rides that take place in the respective city.

Fieldwork undertaken by the authors with Uber drivers in Berlin found that these subcontracted employment arrangements can be extremely precarious, with several drivers—despite being employees of private hire firms—reporting that they earn below minimum wage, and others expressing uncertainty about whether they were insured through the platform in the case of an accident⁷ (Fairwork, 2020a). One Uber driver we spoke to received his payslips and the car he uses to work from a subcontractor of General Contractor Berlin GmbH (Figure 2). Although he works around 40 h per week, his income tends to fluctuate a lot. In the month we met him, he made just over half of what he had made in the previous month. Therefore, the inter-firm relations in this digital value network present themselves as a layered hierarchy with intersecting power asymmetries. The structural vulnerability of drivers as well as economic pressures of smaller subcontractors at the lowest layers of this hierarchy is not only exploited by the California-based platform giant itself but also by the Berlin-based general contractor. As such, this digital value network is a chain of dependencies. In the example of Germany, the platform acts more as a rentier, deriving a share of value from a labour transaction (taxi ride) that may have occurred regardless of the platforms' mediation. Moreover, the General Contractor also takes a share of the value produced, contributing little to expanding or enhancing that value. This extraction

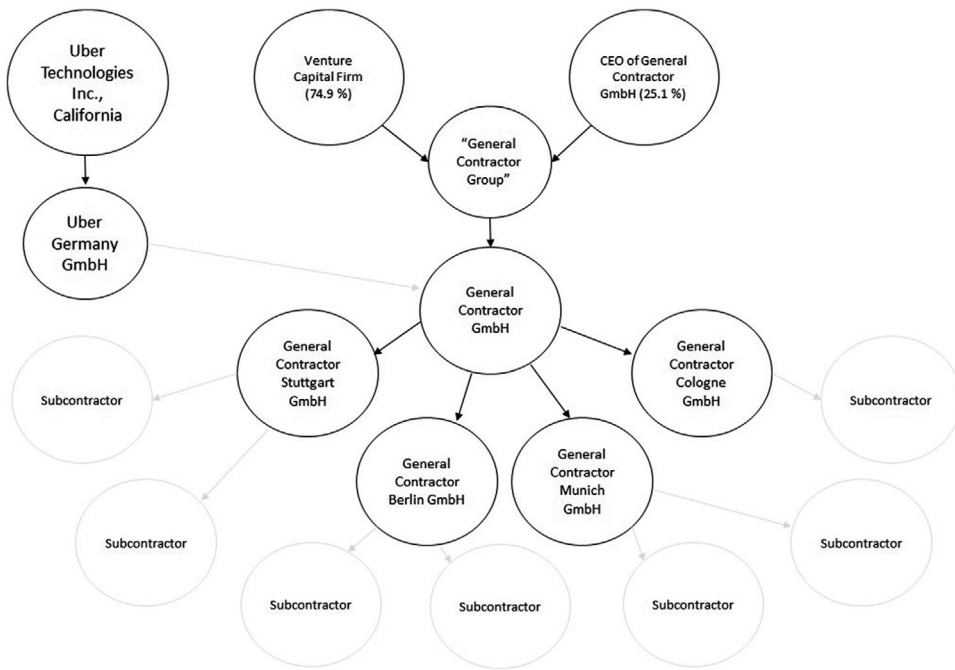


FIGURE 2 Layered inter-firm relations in Uber Germany's digital value network

of monetary value (alongside the speculative value of data) exerts pressure on drivers to the point where they may not earn their local minimum wage.

Taken together, the examples of Uber's operations in Sub-Saharan Africa and Germany reveal its governance strategies to be highly contingent and adaptive, manifesting differently in diverse geographies in order to maximize value production capabilities under local conditions of both low and high regulation. Within these contextual specificities, we see the myriad ways Uber retains close control over the labour process and market interactions, by transmitting complex production information through a centralized digital infrastructure. In addition, we see the importance of cost-externalization as a governance logic, as the lead firm avoids the costs of ownership of fixed capital (cars, motor-bikes, restaurants, and other transport infrastructure), production inputs (fuel, insurance, and licencing) as well as the costs of obligations to labour (social security, pensions, and provision of fair dismissal). Accordingly, Uber optimizes its cost-capability ratio to concentrate power in a distributed, layered, and contingent value network. The level of simultaneous coordination and externalization displayed by Uber contributes to an extreme concentration of power in its network, even where subcontracted nodes exist. In addition, we see Uber extracting value in multiple forms, including speculative value and rents. In this capacity, workers take on a hidden role—besides the immediate service they are providing, they are also producing data, the value (or potential value) of which they do not share in, but is entirely extracted. Diversified forms of value capture present themselves as key features of Uber's DVN. They also echo the concept introduced in Gereffi's internet-oriented chain model of information as a source of power and value.

DISCUSSION: NEW NETWORKS, OLD PROBLEMS—UNEVENNESS IN DVNs

Through our case studies, we see that platforms are not stand-alone entities, but that they constitute and are embedded in dynamic and relational networks linking diverse actors and interests. Despite their deliberate elusiveness,

neither are platforms in any way immaterial: they are always embodied and grounded in different places and social relations. Uber, for instance, deploys a globalized business model that coordinates transactions in numerous places through a centralized infrastructure, whilst capturing value from those transactions. However, in our case studies, we see Uber adapting its approach in specific places, either in response to regulation, or in pursuit of new markets. Uber's arms-length model allows it to navigate and even exploit local conditions, and to extend governance over local activities, while remaining insulated from local risks and consequences. While geographically tethered platforms like Uber remain more locally embedded, even highly digitalized production networks that fuse automated systems and cognitive labour—as in the case of Upwork—integrate with, and engender, particular local economic geographies. In cloud-work, work is still performed somewhere, and spatial relations do not disappear completely. GVC/GPN approaches provide an integrated theoretical roadmap to understanding these structural conditions of governance across differentiated DVN, and to map their uneven outcomes.

Our case studies demonstrate the myriad ways in which digital labour platforms exercise control over different actors within their networks, avoid costs, as well as guarantee and refine the efficiency and capabilities of their suppliers, and the quality of the service provided. Only in recent years has it become possible to outsource such a wide range of tasks on such a scale because of rapidly improved internet connectivity around the world (Woodcock & Graham, 2019), which in turn facilitates the kind of surveillance and algorithmic management required to centrally connect suppliers with buyers with extreme efficiency, and to direct and monitor the labour process and transactions (Srnicek, 2017; Wood et al., 2018). While early BPO adopters needed to be of a certain size to take advantage of outsourcing opportunities (such as outsourcing back-office functions and customer services), the decentralization brought about by platforms now permits actors to participate regardless of their size. In GVC/GPN terms, this blurs the conceptual line between 'firm' and 'labour'. This is an important insight which in turn serves to challenge standard regulatory conceptions of what constitutes a worker or an employee. While platforms contractually treat individual workers as firms (when they are classified as 'independent contractors'), workers do not experience a proportional elevation of their bargaining power, opportunities for upgrading, or the ability to set terms. As a result of this mismatch, a key battleground for labour resistance in the platform economy is to challenge the independent contractor classification, on the basis that platform workers do not have the autonomy and choice of independent contractors, yet shoulder all the costs and risks of the labour (Dubal, 2016).

CONCLUSION

Ultimately, by avoiding and suppressing debates about the socio-economic outcomes of their activities (with the dubious argument that they are merely technology developers), platform companies position themselves as somehow sitting outside the value chain or production network—whether it involves creative production or delivering a product to a consumer. The argument that multinational companies devolve socio-economic responsibility to less powerful economic actors by reducing their own role to the provider of digital infrastructure is more or less in line with treatments of technology in earlier chain and network approaches. However, with the rise of digital labour platforms, we see technology playing a direct, as opposed to a merely incidental role in producing, shaping, and governing transnational economic networks, extracting value (and rents) both in new productive sectors and in direct service sectors which have resisted globalized coordination and concentration in the past. In these networks, countless decisions are made by both humans and algorithms daily to optimize aspects of the production/labour process towards desirable outcomes. The possibilities now afforded by digital governance mean that platforms can be lead firms and drive global economic networks. Moreover, they can be more powerful and effective drivers, and in many cases exert greater power over outcomes than the traditional lead firms already described by GVC/GPN frameworks. Because platforms are in control of networks which are necessarily embedded, potential ambiguity over their role as lead firms should not be an excuse for us to overlook the governance they exert over local contexts, and the mechanisms by which they exploit and reproduce geographical unevenness. Researchers and regulators should not only pay attention to

the unequal distribution of agency and power in these processes but also hold platforms accountable for these uneven outcomes.

The endeavour of applying and reformulating frameworks from economic geography, to understand the structural configurations and implications of platform capitalism, is therefore not merely of theoretical relevance, but it is inherently political. It goes to the heart of the discursive and regulatory battles being fought around the world, and has fundamental consequences—in particular for the circumstances of the least powerful actors involved in DVN, that is, the piece-rate (or 'gig') workers who produce the value. To augment future research on how platforms as lead firms shape and control DVN, we conclude with a call to action. As we have shown in this paper, DVN are inherently cross-border phenomena. As Coe et al. (2008) put it, the very nature of global networks—'their organizational complexity, their multi-actor composition, and their spatial extent and geographical diversity—necessitates multi-national team research'. Given the centralizing nature of platforms and the fact that their operations are comparable across a range of contexts, we are presented with a unique historical opportunity to examine, understand, and perhaps eventually change global networks of capitalist relations. In this process, use of GVC/GPN frameworks to account for digital labour platforms as lead firms is an indispensable step.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ORCID

Kelle Howson  <https://orcid.org/0000-0002-5084-7993>

ENDNOTES

- ¹ The focus of this paper is on digital platforms that mediate transactions of labour (such as Uber, Helping, and Upwork), and therefore do not include platforms such as Airbnb or eBay where goods are exchanged or rent is leveraged from assets. This is as a result of the empirical focus of the research project that underpins our analysis, but we do not wish to rule out the application of the concept of digital value networks to other forms of platform capitalism beyond digital labour platforms. We define digital labour platforms as companies that mediate value-creating transactions between workers and consumers through digital tools, following Woodcock and Graham (2019).
- ² The Fairwork Project is a multi-institutional collaboration, centred at the Oxford Internet Institute, which has developed five principles of fair platform work, in close consultation with platforms, workers, and other stakeholders in multiple countries including South Africa, the UK, Germany, and India. Fairwork assigns platforms a score out of 10, against thresholds deriving from the five principles. The Project publishes yearly country rankings to highlight the best and worst practices and incentivise change in the platform economy.
- ³ Cloudwork platforms are also known *inter alia* as microwork or microtask platforms, online labour platforms, remote work platforms, crowdwork or crowdsourcing platforms, and freelancing platforms. We choose to use cloudwork because the term is not based on the type of work facilitated by the platform (i.e. microtasks vs. freelancing), and also because it inherently incorporates reference to the geographically disembedded nature of online digital labour platforms—on which interactions and transactions take place not on the ground, but in the cloud—a feature which contributes to the governance dynamics and power relations that they institute, and which we are particularly interested in.
- ⁴ The question of platform delivery workers' true functional independence from platforms has been the subject of recent and ongoing litigation in many jurisdictions, and workers' advocates and other critics have forcefully asserted that delivery drivers and other gig workers are not in fact independent contractors or self-employed (see Katta et al., 2020). In making this point, we do not wish to imply that platform workers are not dependent on, controlled by, or even employed by platforms. Instead, we aim to show that platforms had hitherto for the most part avoided all the attendant legal responsibilities and costs of employment of labour and ownership of productive assets and in so doing they have instituted a de facto de-integrated network.
- ⁵ For more on the rentiership of big tech firms, see Birch and Cochrane (2021).
- ⁶ The firm's name is Safedriver. For ease of understanding, it will be called 'General Contractor GmbH' here.
- ⁷ These concerns were echoed in the interviews we undertook with subcontracted Uber drivers in Johannesburg, Cape Town, and Bangalore (Fairwork, 2020b).

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