International Labour Organization

3

RESEARCH PAPER

ILO FUTURE OF WORK RESEARCH PAPER SERIES

The architecture of digital labour platforms: Policy recommendations on platform design for worker well-being

Sangeet Paul Choudary
Business Advisor and Founder, PLATFORMATION LABS

First published 2018

The architecture of digital labour platforms: Policy recommendations on platform design for worker well-being

ISBN 978-92-2-030769-4 (print)
ISBN 978-92-2-030770-0 (web pdf)

International Labour Office – Geneva: ILO, 2018

Printed in Switzerland

The architecture of digital labour platforms: Policy recommendations on platform design for worker well-being

Sangeet Paul Choudary
Business Advisor and Founder,
PLATFORMATION LABS
(sangeet@platformthinkinglabs.com)

Abstract

Digital labour platforms connect workers with consumers of this work and provide the infrastructure and the governance conditions for the exchange of work and its compensation. Yet the architecture, or business model design, of digital labour platforms has important consequences for workers, affecting whether they are empowered or exploited on the platform. This paper explores the business model design choices of digital labour platforms and which attributes – particularly the centralization of power, policies to retain consumers and workers and monitoring and reward systems – contribute to worker well-being. It puts forth policy recommendations for improving working conditions on digital labour platforms, addressing concerns such as the asymmetry of information, data access and usage rights, which can improve the fairness and conditions of platform work.

Preface

In August 2017, the Director-General of the International Labour Organization convened an independent Global Commission on the Future of Work. The Commission will produce an independent report on how to achieve a future of work that provides decent and sustainable work opportunities for all. This report will be submitted to the centenary session of the International Labour Conference in 2019.

The Future of Work Research Paper Series aims to support the work of the Commission by publishing in-depth, original studies on specific topics of interest to the Commission, ranging from explorations of artificial intelligence and the platform economy to lifelong learning and universal social protection. Each paper provides a critical analysis of current and future developments and raises important questions about how to ensure a future of inclusive development with decent work at its heart.

Digital labour platforms have garnered significant attention in recent years, owing to their rapid growth and their ability to reshape jobs, workplaces and entire sectors of the economy. This paper by Sangeet Paul Choudary brings a unique perspective among the growing body of literature on the platform or gig economy. Choudary is well-known in the business community as a tech business adviser and author of two leading popular press books on the platform economy: *Platform Scale* (2015) and *Platform Revolution* (2017).

Choudary emphasizes how understanding the business design choices of digital labour platforms provides insight into how platform architecture can affect workers on the platform, for better or for worse. Building on these insights, he explains how regulation of the platform economy needs to be tailored to the specificities of this economic model and that while the goals of industrial-era regulation may be the same, the means to achieve these goals have to change if they are to be effective. As a result, he emphasizes policies that would increase worker agency on the platform, particularly through greater data transparency that can improve worker bargaining.

We hope that this research paper can provide useful insights for grappling with the challenges of achieving decent work in the digital age.

Damian Grimshaw
Director
Research Department

1. Introduction

This paper seeks to identify the business model design (Zott and Amit, 2010) and policy choices that render labour platforms liable to empower their workers, or, conversely, to exploit them. It posits that certain choices implemented by labour platforms to create a successful business model may inadvertently lead to adverse working conditions and worker exploitation. It also describes how other factors, particularly the centralization of power and rewards in the hands of the platform's owner, can contribute to undesirable terms and conditions of work for platform workers.

The paper begins by developing a working definition of labour platforms, as a network that connects producers and consumers. It then introduces a framework for understanding the concept of exploitation as indicated by limited free agency, reduced bargaining power, domination, dependence and an unfair allocation of risk and rewards. These factors are discussed with particular attention to the context of platform mediated work, and the framework is used throughout the paper to understand how platform design decisions may result in either worker empowerment or worker exploitation. Exploitation, the paper argues, is more likely to occur when conditions for worker empowerment are at odds with what the platform perceives to be the conditions required for market efficiency and network growth.

In its analysis of platform architecture, the paper lays bare the key business design choices that platforms use to attract participants and foster growth within the producer and consumer network. It then turns to management techniques that platforms use to retain participants, encourage reliable interactions, and ensure market liquidity. Finally, the paper concludes with a discussion of potential avenues for regulation, evaluating existing approaches to regulation, as well as proposing new paths forward. Each regulatory response is discussed regarding its ability to contribute to greater choice and agency for workers and a more equitable power distribution between workers and the platform.

2. The platform business model

A platform is a business that connects external producers and consumers and enables value-creating interactions between them. A platform provides a participative infrastructure for these interactions and sets governance conditions for them. At the core of the platform's ecosystem are the parties using the platform to engage in value-creating interactions; however, the ecosystem may also encompass other actors, such as data partners or industry actors who do not directly participate on the platform.

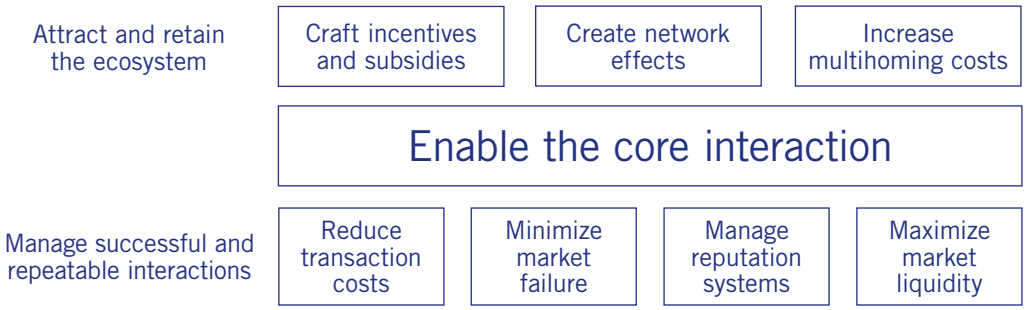
In the specific case of labour platforms, platforms connect workers with consumers of work. The platforms also provide the infrastructure and the governance conditions for the exchange of work, and facilitate the corresponding compensation. A platform's overall goal is to enable producers and consumers to find each other, engage in the exchange of goods and services for money, and in some cases build lasting commercial relationships (Parker, Van Alstyne and Choudary, 2016; Van Alstyne, Parker and Choudary, 2016; Choudary, 2015).

3. Business model design choices for platforms

If a platform is to enable value-creating interactions between consumers and producers, it must attract and retain participants and be able to orchestrate repeatable interactions within the network.

In order to attract consumers and producers, the platform will set up incentives and subsidies to attract one side, whose participation then attracts the other side. Then as more producers and consumers join, the platform is able to scale up its operations, due to network effects. During this phase, a platform needs to retain its participants, ensuring that its producers and consumers do not migrate to other platforms.

These business model considerations can be encapsulated in terms of the following framework:

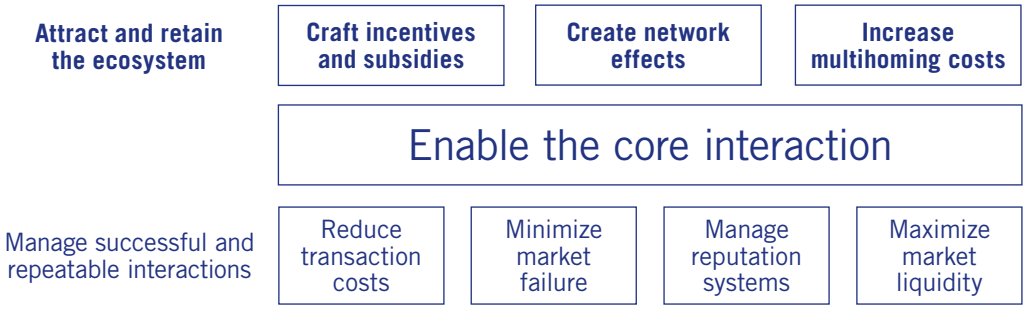


Value creation on a labour platform is centred around the core interaction between workers (as producers), and their clients (as consumers). The provision of work is usually in response to a specific request by the consumer, who then pays the worker. The core interaction can be described in terms of three phases: discovery, when producers and consumers find each other; exchange, when goods, services and money change hands; and relationship, fed by multiple interactions and repeated exchanges.

The relevance and importance of the three phases will vary. For some platforms, such as Uber, the first phase, discovery, is dominant; in this case every interaction involves the discovery of a new participant. For other platforms, such as UpWork, the relationship phase tends to dominate. Some platforms, such as Deliveroo or TaskRabbit actively track the exchange of work, whereas others, like Craigslist, will merely enable discovery, without tracking exchange at all.

3.1. Design choices to attract and retain participants

Three key considerations underlie efforts to attract and retain the ecosystem of producers and consumers.



3.1.1. Incentives and subsidies in two-sided markets

Labour platforms have a chicken-and-egg problem; workers and consumers are both required for labour platforms to function. Without workers, consumers do not find value in using the platform, and without consumer participation, workers may not use the platform. To overcome this hurdle, the platform may subsidize initial participation.

However, as the platform expands, its ecosystem becomes an increasingly self-sustaining network and subsidies are typically discontinued. Sometimes this change in policy may adversely affect workers or consumers, or both, who participate on the basis of receiving certain subsidies but then find that their costs increase. For example, some ride-hailing platforms, such as Uber, have initially subsidized the participation of drivers by guaranteeing them minimum earnings, but introduced successive changes to the pricing structure once their market share increased (Horan, 2017).

As in many two-sided networks, labour platforms may incentivize one side over the other, not just in the creation of policies but also in the arbitration of disputes. If a labour platform values consumers more highly than workers, it will tend to subsidize consumer participation while increasing the worker's cost burden. Equal distribution of incentives and subsidies can serve as a yardstick by which a labour platform can be measured: does the platform promote fair and equitable work, or, conversely, does it contribute to an unequal balance of power and the possible exploitation of workers?

3.1.2. Network effects

Whereas industrial businesses gained dominance through supply-side economies of scale, platforms rely on demand economies of scale (Shapiro and Varian, 1998). In particular, platforms benefit from two-sided network effects, a phenomenon whereby an increased volume of producers using the platform makes it more attractive for consumers to participate, and those consumers in turn attract more producers. Owing to network effects, there may be a propensity for a single labour platform to expand until it dominates its region or sector, having eliminated any rival platforms.

3.1.3. Multihoming costs

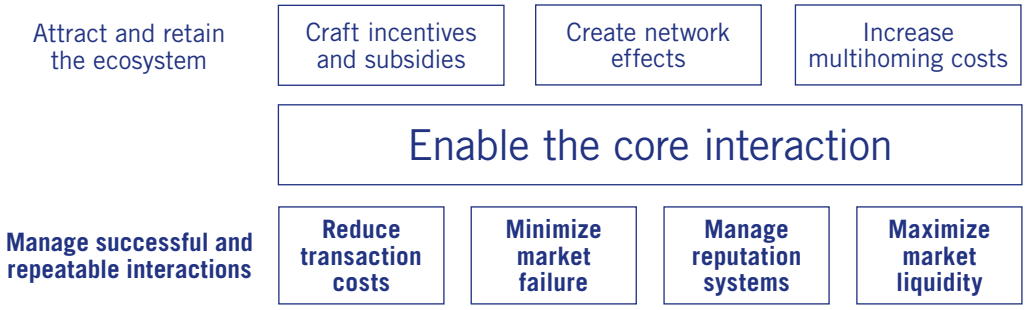
Multihoming occurs when users participate on more than one platform. Multihoming costs refer to the cost of participating on more than one platform. The higher the multihoming costs, the less likely users are to participate on multiple platforms. As a result, a platform that increases these costs without erecting any barriers against its

own participants, will succeed in retaining its user base. Facebook, as an example, has high multihoming costs, making it expensive for users to create their network of friends on multiple platforms or to transfer their entire network of friends from Facebook to a competitor. By contrast, a platform like Uber has very low multihoming costs: drivers and passengers can easily switch applications, moving from Uber to Lyft or vice versa.

On labour platforms, one of the ways to increase multihoming costs is to create enforced dependence (lock-in) through reputation systems. Workers who have invested in building a reputation on one platform are hesitant to move to another platform without the ability to transfer their reputation. This is especially true if a higher reputation rating affords them greater visibility and increased work opportunities on a particular platform.

3.2. Design choices to encourage repeatable interactions

Labour platforms make the following four design choices to ensure the success and repeatability of interactions.



3.2.1. Reduced transaction costs

Platforms seek to make markets more efficient by reducing three main types of transaction costs: (1) search and information costs, incurred in the discovery of relevant goods and services, including availability pricing; (2) bargaining costs, incurred by bringing the two transacting parties to a mutually acceptable agreement; and (3) policing and enforcement costs, which are incurred in ensuring that the parties adhere to the terms of the agreement, and include the costs of taking action to enforce these terms.

Labour platforms are designed to reduce all three types of transaction costs. By providing a central listings directory, as in the case of Upwork, or by directly matching consumers to workers, as in the case of Uber, labour platforms reduce search and information costs. Labour platforms can also reduce bargaining costs, often by providing bidding and auction tools that can mediate communication between producers and consumers, or by avoiding bargaining altogether, by directly setting prices. Finally, labour platforms may also serve as the arbiter of the interactions that they facilitate. Some labour platforms may provide an escrow service to ensure appropriate and timely payment as per the agreement. Some freelancing platforms, like Upwork, also provide tools for monitoring the production and delivery of work.

3.2.2. Market failure

On labour platforms, market failure occurs when the platform is unable to consummate interactions among its participants. Three common causes of market failure are: information asymmetry, when one party to an interaction has sole access to knowledge, conferring an unfair advantage; externalities, which arise when an interaction generates costs or benefits to a party not involved in that particular interaction; and high levels of risk, which may result in a bad transaction.

Labour platforms may seek to reduce market failure and increase the likelihood of repeat interactions by standardizing consumer experience and removing information asymmetry between workers and consumers. This reduces the risk for consumers participating in the core interaction and encourages them to participate repeatedly, confident that their next experience on the platform will be as satisfactory as their previous one. For example, platforms like Uber standardize the experience of recruiting and paying for a taxi by mediating these actions through the platform.

3.2.3. Reputation systems

A platform needs to guarantee quality and foster trust among its participants to prevent market failure and to encourage repeated interactions. In order to achieve this goal, the design of a platform needs to incorporate a reputation system – a mechanism to differentiate between good and bad actors among the platform's participants. The reputation system must be scalable to keep up with the growth of the network. Reputation systems often rely on codifying and tracking the actions of platform participants in order to determine patterns of good behaviour or abuse. They also rely on feedback mechanisms like ratings and reviews.

Labour platforms also ensure interaction success by creating trust among participants. The primary mechanism for doing this involves establishment of worker reputation (and in some cases, consumer reputation) through a reputation system. Labour platforms require clients to rate and/or review workers whenever they conclude the transaction. As workers gain a more favourable reputation, they may be given greater visibility on some platforms. On other platforms, reputation systems may primarily be employed to identify bad actors without rewarding the high-performing ones.

Labour platforms may also ensure the success of an interaction by tracking the delivery of work to determine whether it was completed in compliance with the contract mediated through the platform. This surveillance also enables the platform to arbitrate worker–consumer disputes, increasing trust in the system. Conversely, this surveillance may well give the platform an informational advantage over a worker who has only limited access to such data.

Labour platforms that provide favourably reviewed workers with greater market access can create a positive feedback loop, whereby increased work opportunities lead to further enhancement of the favoured worker's reputation. This is the essential design of any meritocratic market system and helps the platform retain the best workers. However, in order to promote equal opportunities, the platform's structure must be careful not to obstruct market entry for new participants (Choudary, 2017a).

3.2.4. Market liquidity

Market liquidity is a measure of the likelihood that successful interactions occur in the market. Labour platforms must continually monitor and manage market liquidity to ensure that client work requests are appropriately filled. To guarantee a liquid market,

some labour platforms focus on algorithmic scheduling and management of work to ensure that consumer demands can be met. Platforms like Deliveroo require workers to sign up for certain work schedules in advance, and automatically assign work requests to workers while limiting their ability to accept or reject requests.

Labour platforms also increase market liquidity by providing algorithmic feedback to workers and consumers and nudging them towards new behaviours (Eyal, 2014). For example, ride-hailing platforms provide notifications and feedback to workers advising them on how to manage their schedules to earn more money on the platform. This feedback, which is engineered to ensure driver availability when demand increases, can over time significantly influence the driver's schedule and working hours.

4. Management techniques

The management techniques used by labour platforms are an integral part of the framework that determines the propensity for workers to be either empowered or exploited. Two of these techniques should be noted: the lean startup methodology and management by metrics.

4.1. The lean startup methodology

Many startups, including labour platforms, adopt the lean startup methodology, evangelized by Eric Ries (2011) and described as a "scientific approach to creating and managing startups". The methodology bases product development on market feedback and encourages entrepreneurs to refine their offerings accordingly. The approach helps startups to reduce the time spent taking products to market and allows firms to respond quickly to market needs, avoiding long internal development cycles. Nevertheless, frequent changes to the platform's design choices and policies may adversely impact consumers or producers who spend considerable amounts of time or money to participate on the platform only to realize that the workings of the platform have changed.

4.2. Management by metrics

In line with the lean startup methodology, labour platforms base their development on actual market metrics. The culture of management by metrics is deeply ingrained in the workings of platform organizations. In addition to managing internal product development with metrics, platforms can also manage their ecosystem through metrics. Ride-hailing platforms, for example, use metrics to manage their drivers, who are obliged to achieve or avoid a given threshold as a pre-condition of continued participation on the platform.

5. Design choices that empower workers

Labour platforms can promote decent work and empower workers by providing them with access to new income generation opportunities and by removing barriers to market access. These platforms create new jobs, give workers the ability to choose schedules

they want, expand markets for creators of intellectual property, and enable workers to discover clients and build new relationships. To the extent that these platforms allow workers to set their own prices and manage customer relationships, they can encourage entrepreneurship in the place of wage labour, and present workers with opportunities to build client relationships based on a worker's growing reputation and brand development (Sundararajan, 2016a and 2016b; Botsman and Rogers, 2010).

Labour platforms can allow more efficient use of surplus assets, resulting in an increase in the impact of capital. In platform-mediated work, workers may be better positioned to utilize their physical assets. These platforms also empower amateurs by giving them access to technology and tools that augment their capabilities, leading in turn to new or expanded market access. Uber, for example, uses GPS and route-optimization technologies to enable anyone with a car to become a driver without needing intimate knowledge of a city's road network. This also allows workers to supplement their main source of income with extra work, or a "side gig", permitting a diversification of income streams that reduces their dependence on employers.

Labour platforms can also provide opportunities for workers who may be unable to participate in regular paid work, such as mothers or students, by giving them scheduling flexibility and part-time work opportunities (Everett, 2015). Platforms may also empower workers from marginalized communities by reducing the barriers to market access and democratizing participation, especially for those marginalized by low education or lack of funds to gain occupational licensing (Dillahunt and Malone, 2015). Temporary employment on labour platforms can also benefit workers who are transitioning between jobs, by providing a source of transitional income for them.

Research on labour platforms suggests that these networks can create work and income opportunities for producers. For example, widely cited research on labour platforms, using data from the ride-sharing platform Getaround, concludes that ride-sharing empowers lower-income populations, both as consumers of low-cost services and as workers on the platform (Fraiberger and Sundararajan, 2015). Labour platforms frequently release their own data to paint a picture of worker empowerment.[1] A report commissioned by and based on Airbnb data concluded that home sharing through the platform could enable households to earn significant additional income (Sperling, 2015). The report found that a single-property host was likely to earn an annual average of US$7,530 by renting their property for an average of 66 days per year.

Beyond empowerment of workers in their ecosystem, labour platforms can also create greater trust within communities. This is especially true for peer-to-peer platforms where participants trust the platform's central monitoring functions while transacting with peers (Bardhi and Eckhardt, 2012). Additionally, some platforms enable further entrepreneurship beyond the direct producer–consumer exchange by enabling the creation of supporting services, not always provided by the platform. For example, the rise of Airbnb has led to the creation of a whole range of services that serve Airbnb hosts in running and managing their properties.[2] Finally, by increasing consumer choice and eliciting greater consumer participation, labour platforms also create greater demand for the work being exchanged on the platform, which in turn benefits the workers on the platform.

1 *https://www.airbnb.co.in/economic-impact*

2 *https://skift.com/2014/11/18/the-startup-businesses-built-around-the-airbnb-ecosystem/; http://www.web-strategist.com/blog/2014/04/21/airbnb-blooms-an-entire-ecosystem-of-startups/*

While labour platforms can create new opportunities for workers that lead to worker empowerment, some business model choices can also inadvertently result in poor working conditions which, if sustained, can result in worker exploitation.

6. Design choices that lead to exploitation

The dominant narrative surrounding labour platforms is one of empowering entrepreneurship. To that extent, platform firms like Uber, Deliveroo, TaskRabbit and UpWork position themselves as intermediaries that provide infrastructure and market access that enables workers to run their own businesses. However, the primary business goal of labour platforms is the creation of an efficient or well-functioning market that can increase the platform's market share – not the empowerment of workers as entrepreneurs. If and when these two goals are aligned, labour platforms may well empower workers as entrepreneurs. However, if empowerment of workers as entrepreneurs proves to be at odds with the creation of a well-functioning market – and especially at odds with the platform's ability to monetize this market and capture value – then the labour platform will prioritize the creation of an efficient market even if it results in worker exploitation.

Tension between the goal of increased market share and worker empowerment explains most scenarios that lead to unfavourable work conditions on labour platforms (examples below). To create network effects, labour platforms need to enable an efficient market for both workers and consumers; guaranteeing successful interactions between consumers and workers is crucial to achieve this goal. This may cause labour platforms to create policies that require workers to commit to unprofitable or less-profitable interactions, working conditions and behaviours that may not be efficient for the individual worker (for example, if search or wait time is extensive, or if the worker is compelled to take on less profitable assignments), in order to guarantee an efficiently functioning market with assured outcomes for consumers. In this scenario, the labour platform values consumers over workers, and thus creates policies that result in better outcomes for the consumers, at a cost to the workers.

Finally, labour platforms may also require greater control over the ecosystem in order to guarantee an efficiently functioning system that favours the platform's goal of market expansion. This may involve control over workers as well as over consumers. This is especially true in markets with low multihoming costs, where both workers and consumers can switch platforms.

It is important here to note the distinction between platforms and tool providers. Although platforms are indeed tool providers, this function is subservient to their primary function of gaining market share. Platforms like Uber and eBay need to prioritize the functioning of an efficient market over the provision of tools, and will therefore provide tools merely to the extent that they serve the creation of an efficient market. This is in contrast with tool providers like Harvest or TimeTracker – providers of time-tracking tools for freelancers – which help workers manage their services, but do not provide market access. Because workers pay for these tools, the interests of the tool provider reflect the interests of the worker. In contrast, platforms that also provide market access, build a business model aimed at market efficiency rather than worker empowerment.

7. A framework for exploitation

This paper proposes a framework for understanding exploitation, which comprises five elements that are influenced by platform design. The presence of these characteristics indicates the propensity for the platforms to contribute to worker exploitation.

1. Removal of free agency: Free agency is central to empowerment and entrepreneurship. By removing free agency, platforms take power away from workers, making it more likely that workers' interests may be disregarded in favour of an efficient market on the platform, or even to directly profit the platform.
2. Reduced bargaining power and rights: If a platform's design and policies take bargaining power and rights away from the worker, the worker is more likely to be exploited.
3. Domination: If a platform's policies make workers subservient to the platform, the platform can use its superior position to exploit the workers.
4. Dependence: If a platform's design decisions make workers dependent on the platform, effectively locking them in – for example by making it difficult for them to switch to other platforms – the workers are more susceptible to being exploited by the platform.
5. Fairness: A platform that does not allocate risks and rewards fairly across the ecosystem may exploit workers who are forced to take on higher risks or who are not rewarded sufficiently.

The examples that follow illustrate worker exploitation along one or more of the above dimensions. Several examples show that under certain conditions, free agency, independence, or fairness for the worker may well be at odds with market efficiency. We also note examples of worker exploitation that arise inadvertently from the design choices that platforms make.

The first part of this section lays out a framework for evaluating the distribution of power between the platform and the worker as well as the power distribution between the worker and the consumer. In cases where workers have limited power relative to others in the network, they are at risk of exploitation. Second, we delve deeper into the issue of power distribution between the platform and the worker and identify factors that allow platforms to control workers and remove free agency from them during the exchange of work. Third, we explore how in addition to skewing power towards the central platform owner, a labour platform can disempower workers by fragmenting the workforce, thereby preventing collective action. Fourth, we explore the role of reputation systems in creating additional lock-in, or worker dependence on the platform, and the role of reputation systems in limiting personal choice and career development of workers. Finally, the fifth section lays out the impact of feedback loops in highly networked platform markets and explains how these loops exacerbate worker exploitation. Two scenarios are explored in this last section: the role that feedback loops play in the dynamics between competing platform markets, particularly markets where network effects result in one dominant firm, and the role that feedback loops play in increasing inequality within the ecosystem, particularly as they might contribute to issues of bias and discrimination.

7.1. Unequal distribution of power

To understand whether a labour platform is likely to exploit or empower workers, it is essential to understand the factors that determine the distribution of power between the platform and the worker, and the power distribution between workers and consumers. When workers are at a disadvantage, they lack bargaining power and are more susceptible to exploitation on the platform.

This analysis lays out three approaches to understanding power distribution in a platform ecosystem. First, it identifies factors that skew power in the direction of the platform and away from the worker, particularly through the platform's greater access to information. Second, it identifies factors that increase risks for the worker without offering commensurate rewards. Finally, the analysis explores power dynamics in the relationship between the worker and the consumer.

Throughout this section, we refer back to the framework laid out in section 3 to illustrate how the platform's design and policy choices, which can result in worker exploitation, are primarily made to enable and strengthen the platform's business model.

7.1.1. Power imbalance favours the platform

Platforms may reduce information asymmetry between workers and consumers but increase information asymmetry between the platform and its workers.

The conventional narrative around platforms suggests that they remove information asymmetries by giving producers transparent access to a market while giving consumers an opportunity to make informed choice across multiple available options (Cohen and Sundararajan, 2015). However, although most platforms can reduce information asymmetry between producers and consumers, some platforms actively create and increase information asymmetries between the platform firm and the ecosystem participants; typically this asymmetry is most acute between the platform and the worker. Such asymmetries are part of the functional design of the platform business model. Platforms gather vast amounts of data from across the ecosystem: this data is used to identify patterns and develop and implement learning algorithms used by the platform for governance and management purposes. Data visibility and access to the firm's data processing and intelligence is not available to individual workers in the ecosystem, thus giving labour platforms greater power over workers. Platforms may use their data collection and processing to optimize the functioning of the overall market; however, this can occur at a cost to the worker.

Information asymmetry between platforms and workers limits free agency for workers by preventing them from accessing information that would help them choose profitable interactions on the platform.

Labour platforms may design their interfaces such that limited information is presented to workers in order to maximize market liquidity and increase multihoming costs. For example, Uber's ride allocation algorithm and driver app interface withhold key information until after a driver has accepted a ride request. By creating this information asymmetry between itself and the worker, the platform uses its information advantage to remove workers' free agency (Slee, 2015; Rosenblat and Stark, 2016).

Uber's core interaction involves low multihoming costs. Both drivers and passengers can easily leave the platform and can participate on multiple competing platforms.

One of the key factors that encourage passengers to abandon Uber is a cancelled ride request or submitting a request for a ride that is not accepted. To mitigate this and stay competitive despite low multihoming costs, Uber creates an information asymmetry whereby the driver is required to accept a ride request without prior knowledge of the destination or the amount that might be earned from the job. While this reduces ride cancellation rates and increases acceptance rates, thereby increasing the likelihood that a passenger finds a ride, it drastically constrains the driver.

If drivers were operating as entrepreneurs, they would tend to choose the rides which delivered maximum financial outcomes at minimum cost. To empower drivers as entrepreneurs, the platform would have to provide them with all the information needed to make a decision about accepting a ride. However, by forcing the driver to accept a journey with scant information, the platform reduces free agency for the worker (Van Doorn, 2017). This is further exacerbated by the fact that drivers are required to keep their ride acceptance rates high in order to avoid being deactivated by the platform (Rosenblat and Stark, 2016). Uber penalizes those drivers who accept a ride and then cancel it upon learning the details of the ride, and requires drivers to keep ride cancellation rates low. In effect, information asymmetry enables Uber's business model; it is not incidental.

Information asymmetry empowers the platform at the expense of workers during the arbitration of disputes in the ecosystem. Labour platforms employ a variety of mechanisms to gather real-time information about work, and then use this information to arbitrate disputes that may arise between workers and consumers. For example, ride-hailing and delivery platforms track the exact route taken by the driver, while freelancing platforms may track work progress by taking screenshots of the worker's computer screen and by taking photos using the worker's webcam. All of this information gives the platform an upper hand when arbitrating disputes between workers and consumers. This information asymmetry is compounded on platforms which frequently change policies. In these situations, a worker often can neither access information about a disputed exchange nor determine which policies were in effect at the time of the incident (Calo and Rosenblat, 2017).

Changes in how platforms present information can also influence worker behaviour. This can result in favourable outcomes for the platform. In these cases, platforms may change the presentation of information after having established trust with platform participants. A notable example is Uber's approach to surge pricing, which entails higher fares during peak hours. Uber's original app design displayed detailed and precise surge price information to drivers, along with a heat map to inform drivers about how much money they could potentially earn in different areas. However, an app redesign in October 2015 retained the heat maps, but withheld precise price information (McQuown, 2016). By redesigning and presenting less information, the platform exploits the drivers' trust that was established by the earlier design. Thus drivers are still encouraged to move to surge locations, but the platform bears no responsibility for the level of demand that drivers will actually encounter when they arrive. From the platform's perspective, this change increases market liquidity during periods when the platform expects high demand, and encourages drivers to move in the direction of the expected surge. Meanwhile, the drivers are forced to resort to mere guesswork as they decide whether or not to "chase the surge" based on insufficient information.

Platforms may also exploit workers' trust in their recommendation systems that encourage targeted behaviour. These recommendation systems rely on data collected from workers to develop and train their algorithms.

Platforms give their users advice by means of recommendation systems which are built on data captured by the platform. The more data captured, the better the recommendations. These recommendation systems are perceived as being neutral and highly personalized, and they serve to build trust with the platform's users. Users expect recommendation systems to provide relevant and accurate information, or to clearly indicate when they are not doing so. A system that provides non-standard or inaccurate recommendations exploits the trust of platform users, often to the detriment of the user.

Power imbalances on platforms also occur when platforms rely on user input to develop machine learning models. These models are used to minimize market failure in future interactions by influencing how tasks are completed. In order to develop these models, the platform may require non-standard user input and often encourage or recommend choices that generate additional user data. As an example, navigation technologies employ the multi-armed bandit algorithm to map traffic and inform their learning models. The algorithm can guide most traffic along the best performing route, while routing a small fraction of the traffic via an alternate, under-tested, possibly sub-optimal route, merely to test the route and generate data about road conditions. This does benefit all users in the sense that it does improve the algorithm. However, if the driver training the algorithm is given a sub-optimal route without being informed about it, the platform has exploited information asymmetries to its own benefit. This is not to suggest that such algorithms should not be deployed at all. Instead, when they are deployed, the platform should ensure that there is appropriate communication regarding the recommendation of sub-optimal routes, and that workers taking those routes are compensated in some way through additional incentives. In the absence of clear communication and incentives, these algorithms risk becoming exploitative.

7.1.1.a. Algorithm creators gain an information advantage

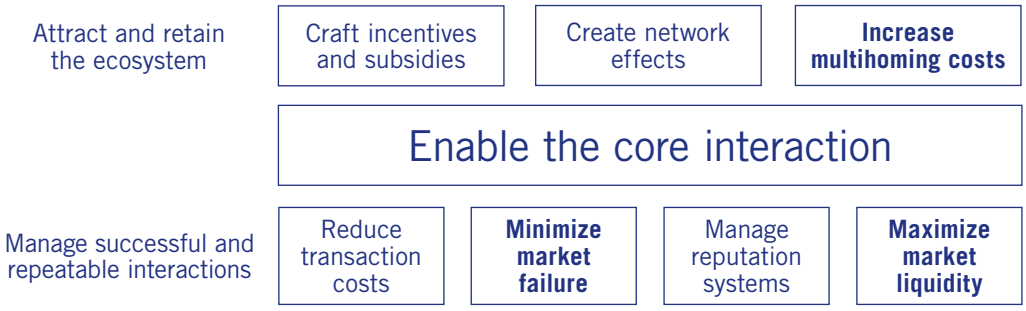
Programmers in labour platform companies have access to a wide range of data flows about the ecosystem and analyse these data flows to inform the creation and modification of the algorithms that manage the ecosystem. This allows them to alter their algorithms to optimize market outcomes by imposing policies in response to observed worker behaviour, either as explicit policies or encoded into their algorithms. These interventions have also been observed in other markets mediated by platforms (Gillespie, 2015).

Workers who are managed by these algorithms, however, often have a limited understanding of how they function. This information asymmetry further empowers the platform and disempowers workers. While the platform company can alter its algorithms in response to worker behaviour, workers find it much more difficult to appropriately adjust their behaviour when the algorithm changes. Even if workers are able to change their behaviour strategically, algorithms can swiftly track the relevant changes in behaviour patterns, identify such workarounds and render them ineffective. Feedback by Postmates workers on online forums shows that workers perceive a power imbalance between themselves and the invisible operators of the algorithms that govern their work (Biddle, 2014).

The above case studies illustrate how a platform may create an information asymmetry between itself and the worker in order to exert greater control over the worker, often removing free agency and disempowering the worker.

7.1.1.b. Design and policy choices

In sum, the aforementioned design and policy choices are employed by the platform for any or all of the following three reasons: (1) increasing multihoming costs, (2) minimizing market failure, and (3) maximizing market liquidity. Yet these choices can inadvertently disempower workers or limit their free agency.



7.2. Unfair allocation of risks

By virtue of their massive scale, labour platforms exercise high bargaining power relative to ecosystem participants. Power imbalances are particularly salient on platforms where highly standardized, routine and less-skilled work is provided (see discussion below). This allows the platform to profit steadily from the exchange of work while placing the burden of risk firmly on the shoulders of workers.

For example, ride-sharing platforms encourage workers to be available on the platform, to ensure ride availability for consumers, without any reciprocal guarantee of work. In order to minimize market failure, the platform must ensure that workers are on board. However, workers need to manage the cost of their time, of which an unpredictable proportion is spent being available on the platform, unpaid, waiting for work.

These platforms tend to pass on to workers the cost of any liability for unforeseen circumstances. For example, many offline work exchanges involve significant risks and the cost of insurance is often borne by the workers. Even when platforms appear to provide the necessary insurance, they may include clauses in their terms of agreement that workers find confusing. For example, Uber denied responsibility for an accident involving an Uber driver on the grounds that the driver was not "providing services on the Uber system" when the accident occurred. A court eventually ruled against Uber, but such examples demonstrate how labour platforms can ostensibly offer insurance and guarantees but subsequently employ the minutiae of legal agreements to avoid responsibility (Bradshaw, 2015; Pfeffer-Gillett, 2016). Additionally, some insurance policies are not valid when a car bought for personal use is on hire through a platform. Drivers on peer-to-peer car-sharing platforms can sometimes unwittingly take on huge risks when their personal insurance does not extend to leasing or renting (Wosskow, 2014).

Workers assume further risk owing to lack of clarity regarding the legality of their work, and bear the risk of potential penalties from regulators. Unlike platform owners, workers often lack access to legal protection and representation should a dispute arise over the legality of their provision of services.

Workers also lack clarity regarding the sustainability of current prices in the platform-mediated market. Many platforms do not operate at market-clearing prices, and instead choose to subsidize consumer participation using venture funding (Horan, 2017). In the long run, such platforms may either raise prices and experience a consequent drop in demand, or lower the wage share and adversely impact workers in order to continue subsidizing consumers. Both outcomes are unfavourable to workers and create uncertainty about the reliability of earnings. On ride-sharing platforms, the risk of unprofitable fares is passed on to the drivers while the platform continues to benefit from the high availability of drivers.

Finally, as alluded to earlier, the power imbalance is also manifest in the role of the platform as an arbiter. With its wealth of data, the platform often intervenes as an arbiter in case of conflict between the customer and the worker. These arbitrations may conveniently minimize the platform's liability while passing on the cost of resolving a conflict to the worker (Cherry, 2016).

7.3. Market and worker characteristics leading to exploitation

As we noted in section 3, platforms that mediate two-sided markets may subsidize the price-sensitive side to encourage participation. Their participation, in turn, attracts users from the other side. This sets up a virtuous cycle where greater participation on each side attracts participants on the other. On labour platforms, the lower the skills required for the job and the more standardized the work, the less responsive the labour supply is likely to be to wage fluctuations. This is partly explained by the fact that low-skilled, highly-standardized work tends to be performed by a much larger worker base. Conversely, high skilled workers tend to be much more responsive to wage shifts, giving them higher bargaining power vis-à-vis the platform, owing to the relative scarcity of their skills.

Because of these two-sided markets, labour platforms – especially those that mediate the exchange of low-skilled work – tend to subsidize the participation of consumers, both through economic incentives and through more favourable policies. In this situation, the interests of workers may remain of secondary importance as long as this has no direct bearing on outcomes for consumers.

7.3.1. Lower and more standardized skills are more likely to lead to worker exploitation

Workers are likely to have less bargaining power when the potential worker base is large and when workers are more easily substituted. Hence, in the case of standardized or low-skilled work, the power balance shifts significantly away from workers. Platforms that facilitate this type of work can create sustainable business models even if large numbers of workers regularly leave the platform when they feel exploited. For example, 20–40 per cent of new workers become inactive within 60–90 days of joining the cleaning services platform Handy (Griswold, 2015). Meanwhile, platforms that mediate high-skilled work cannot afford high turnover among their workers and are therefore likely to create policies that are more worker-friendly (Van Doorn, 2017).

Platforms such as Amazon Mechanical Turk, Postmates and FoodPanda (a food delivery platform) that facilitate the provision of low-skilled work may also find it easier to expand the network of workers rather than manage the concerns of existing workers (Tobias, 2015; Irani and Silberman, 2013). When the cost of nurturing the worker is higher than the cost of finding a replacement worker, the platform is likely to focus its efforts on network growth rather than on network management to retain workers.

Workers delivering standardized and low-skilled services may also have much lower bargaining power vis-à-vis the platform. It is well known that employee influence and representation within organizations decreases for low-skilled work (Van Buren and Greenwood, 2008). This is likely to hold true for platform work as well.

Low-skilled workers, especially those without a permanent job, are likely to become more dependent on the platform as their primary source of income. In contrast, high-skilled workers, especially those in information services, may use a platform to supplement other sources of income, or may participate on multiple platforms, leaving them less susceptible to exploitation that results from policy changes introduced by any given platform.

A striking characteristic of platform-mediated labour standardization – or what could arguably be described as the extreme commodification of labour – is the enhanced substitutability of workers, even for high-value work. This is already being observed among retail workers (Barocas, 2016). Some retail management technologies require store workers to input information about customer preferences to give shoppers a highly personalized experience when they return, and to support colleagues serving them. However, by externalizing this information, these systems make retail workers more substitutable and reduce their wage bargaining power. In this manner, new data ingestion technologies can reduce the power of workers by making them more substitutable. The more standardized the work, the further the balance of power shifts towards consumers and away from workers.

Some platform policies endeavour to create a superior experience for consumers, passing on the costs to workers. For example, if a passenger forgets something during a ride, Uber does not pay drivers for the time and effort required to return a passenger's lost property. Although this service undoubtedly enhances the consumer experience, it comes at a cost to drivers. The driver will rarely seek to negotiate on this issue, let alone raise any sort of protest, as the situation only arises on an ad hoc basis. On Amazon Mechanical Turk, consumers of work can choose not to pay for work if they are not satisfied. However, even in the case of non-payment, consumers are at liberty to use the already completed work, because the platform automatically favours the client.[3] Even on platforms like UpWork, where the work provided is not entirely substitutable or standardized, workers may be required to bid in a competitive auction-style system, encouraging a frenzy of wage undercutting. Qualitative studies of drivers show that when Uber takes on the role of arbiter during disputes between drivers and passengers, drivers feel that Uber tends to take the side of the passengers (Rosenblat and Stark, 2016).

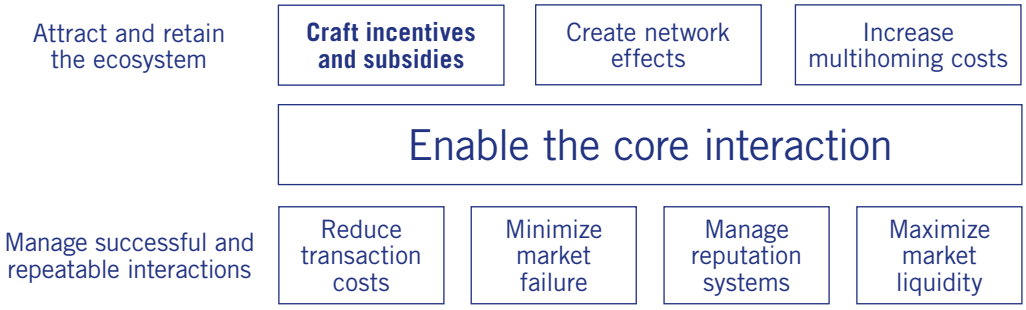
On some labour platforms, workers also bear the cost of uncompensated work, as the platform seeks to create a better value proposition for the client or consumer, as noted above in the case of Amazon Mechanical Turk. Furthermore, some platforms encourage workers to compete among themselves such that only the winner is paid.

3 For more information see: https://www.utoronto.ca/news/exploiting-digital-workers-through-global-crowdsourcing

On the platform 99Designs, designers create competing designs based on an initial brief, but only the winning designer – the one whose design is selected by the client – is paid. This suits clients, who can benefit from the creations of multiple designers before choosing the one they like, but requires every participating designer to bear the cost of unpaid work, apart from the winner.

Reputation systems also lead to greater power imbalance between consumers and workers. From the platform's perspective, reputation systems which rely on consumer input are essential to scale quality management necessitated by the expanding worker base. However, reputation systems – especially those that rely on consumer ratings as a source of input – put considerable power in the hands of the consumer (Van Doorn, 2017). Most platforms have a rating system which only enables consumers to rate workers. Even on platforms with two-sided rating mechanisms, there is evidence that consumers continue to command a position of greater power. On transport platforms like Uber and Lyft, drivers need to maintain a high rating to stay on the platform, but there is no equally stringent corresponding requirement for consumers. This results in an effective management of workers by consumers, and is further complicated when consumers fail to differentiate between platform and worker while giving feedback (Rosenblat and Stark, 2016). When asked to rate their overall subjective experience, a consumer left feeling disgruntled by an aspect of platform policy may simply leave a low feedback rating for the worker, irrespective of whether the platform or the worker was responsible for the experience.[4]

The platform's biased policies reflect the fact that consumers are harder to retain than workers. Reputation systems can impose a hidden cost on workers. Some qualitative studies have indicated that workers on labour platforms may be required to engage in "emotional labour", which may include going out of their way to be friendly with customers (Raval and Dourish, 2016). Again, this is likely to be more of an issue with standardized and low-skilled work where the worker has little else on which to differentiate him or herself, in order to secure a high consumer rating.



7.4. Labour management mechanisms

The degree to which a platform is likely to exploit its workers is also manifest in its labour management mechanisms. Some degree of control is important on platforms to ensure a consistent experience and a consistent set of policies for the platform's ecosystem. Platforms may rely on explicit control mechanisms that are formally communicated as

4 In November 2017, Uber updated its rating system by requiring passengers who rate drivers lower than five stars to select reasons why (e.g., GPS problems, traffic). If the reason is something that is out of the driver's control, it will not be reflected in the driver's rating.

design decisions or ecosystem policies, or on implicit control mechanisms which are achieved through metrics-based feedback or through more subtle forms of behaviour design.

7.4.1. Explicit labour management

Platforms may approach labour management through a combination of design decisions and policies.

The degree to which a platform controls the exchange of information, work and money, determines the power that the platform can exert over workers and hence their susceptibility to exploitation by that platform. This in turn depends on the type of transaction cost that the platform seeks to reduce or eliminate, as mentioned in section 3. For example, Craigslist primarily reduces search and information costs by providing a central platform for workers to list their services. In contrast, TaskRabbit and Honor also reduce policing and enforcement costs by tracking service delivery. Meanwhile, Uber and Lyft eliminate bargaining costs by directly connecting consumers with drivers without a need to negotiate prices.

7.4.1.a. Greater platform control over the terms of exchange increases the likelihood of worker exploitation

A platform's desire to control the terms of exchange is primarily driven by its goal of creating an efficient market. The greater the control, the more the platform can ensure that supply and demand are effectively matched. However, design and policy decisions that result in high levels of platform control over the exchange of information, work and money, lead to a greater imbalance of power between workers and the platform and may thus create conditions for exploitation.

Platforms that exert greater control over the terms of exchange may go beyond merely connecting the two sides: they determine how much workers get paid, and require confirmation of adherence to certain service standards, as well as surveille the tasks performed. Such controls deprive the worker of freedom of choice to participate and erode free agency, opening the door to exploitation.

Platforms like Uber and Deliveroo set the price for workers; this reduces the worker's power by precluding the possibility of bargaining with consumers over pay (Rosenblat and Stark, 2016). Transportation platforms also determine the route that drivers must take, further reducing their free agency. Route setting gives the platform considerable control in that it can require drivers to take a recommended route, even one that is clearly sub-optimal under prevailing weather or traffic conditions (Rosenblat and Stark, 2016). Lyft even tells drivers what to say: it instructs them on how to greet passengers in line with the platform's brand. Meanwhile, Handy gives workers an extensive checklist to fulfil while delivering work (Griswold, 2015). Deliveroo, on the other hand, schedules shifts for its couriers, which its couriers accept a week in advance; it also requires them to work at least two of three evenings on Friday, Saturday or Sunday (O'Connor, 2016). These policies prevent workers from working on their own terms.

7.4.1.b. Surveillance technologies enable tracking of workers, particularly those delivering standardized, low-skilled work

Owing to standard patterns in the service delivery process, platforms exercise considerable control over the terms of exchange using various technological surveillance mechanisms to

track service delivery. Freelancing platforms like UpWork exercise surveillance by taking regular screenshots of the freelancer's screen, recording keystrokes and mouse clicks, and by using the worker's webcam to determine when the freelancer is actually working (Ajunwa, Crawford and Schultz, 2017). Home-care platform Honor connects caregivers with customers and monitors the exchange by determining whether caregivers arrive on time, whether they check social media or take calls while on the job, and whether they are walking around, rather than sitting down, while logging in specific tasks (Said, 2015).

Ultimately, we observe that the more commodified the services that are exchanged over a platform, the more control a platform can exert over the exchange of those services. This is primarily because commodified and substitutable services involve relatively lower bargaining costs. Highly standardized jobs can be more effectively policed and enforced using technology owing to standard patterns in the service delivery process. Effectively, we again see greater control over the terms of exchange, and accordingly greater disempowerment of workers in the case of highly standardized commodified services.

7.4.1.c. Platforms may reduce workers' choice and force them into unprofitable interactions in order to create a liquid market

Ride-sharing platforms limit free agency by reducing choice for drivers. While platforms like Uber give drivers access to ride requests, they prevent them from making an informed choice on which rides to accept and which to reject. When a driver accepts a given job, the destination and remuneration are unknown to him or her. The quandary is then exacerbated because drivers with low ride acceptance rates or high cancellation rates may be subsequently removed from the system.

UberPool provides another example of control through policies that limit choice for drivers. UberPool's design illustrates, yet again, the relative importance of passengers in the ecosystem and the subsidies that the platform provides to attract them. Passengers pay less for a shared ride on UberPool than on a standard Uber journey, but the value for drivers is not as obvious. Drivers on UberPool need to pick up multiple passengers at different points, leading to a poor experience for passengers delayed by multiple pick-ups who may then feel motivated to give the driver poor ratings. If UberPool were merely an optional intermediary, drivers could withdraw from transactions at will. However, Uber does not allow its drivers to opt out of UberPool.

An Uber driver offered payment guarantees based on high acceptance rates is required to maintain those high acceptance rates for UberPool as well. The less attractive UberPool rides are bundled with the more attractive premium rides. Drivers who turn down UberPool requests risk being temporarily locked out of the entire platform, another form of domination that would not exist in a free-market setting (McFarland, 2016).

Deliveroo's platform design choices and policies limit choice for workers in a similar manner. The platform requires workers to respond to new orders within 30 seconds, the only electronic option available being: "Accept delivery". The delivery address is not revealed until the food is collected from the restaurant, at which point the only way to cancel the order is by contacting the driver support line directly. At that point, any refusal to deliver is recorded, to the detriment of the worker's reputation (O'Connor, 2016).

7.4.1.d. Platforms may attract workers with temporary favourable policies only to worsen the terms and conditions later

Labour platforms seeking rapid initial expansion have been known to effectively subsidize participation – whether through competitive pricing for consumers or incentives for producers – but these mechanisms may not be sustainable. When network effects have been achieved, platforms tend unilaterally to modify their policies.

During its initial launch, UberEats offered workers £20 per hour. As consumer demand grew and the platform gathered momentum, its workers began to depend on this level of income. Then the platform implemented a more complex incentive formula involving £3.30 per delivery plus £1 per mile plus a £5 "trip reward", subject to a 25 per cent transaction cut levied by Uber. A subsequent policy change revised the trip reward to £4 for weekday lunches and weekend dinners, and to £3 for weekday dinners and weekend lunches. Any delivery outside these periods didn't earn a trip reward. Similarly, Deliveroo initially launched with an hourly wage mechanism in London, whereby couriers were paid £7 an hour plus £1 per delivery, plus tips and petrol cost; pay was subsequently reduced to a flat fee of £3.75 per delivery (O'Connor, 2016).

Uber's competitor Lyft has also made frequent changes to its pricing and incentive mechanism, often in response to Uber's pricing. For example, the platform dropped fares by 30 per cent in several cities as a response to Uber, and instead created new incentives that rewarded the most active drivers, reducing its transaction cut to 5 per cent for drivers who worked 40–50 hours per week, and removing the levy altogether for those who worked more. Although the policy change did reward those who worked very long hours, most workers were negatively affected (Singer, 2014). Other labour platforms, such as Postmates, or the now defunct Spoonrocket, have also been known to change their pricing structures, reducing overall incentives for workers (Roose, 2014).

These examples demonstrate how some labour platforms often lure workers with guaranteed hourly wages, attractive consumer-side pricing or lower commissions in order to win their participation and guarantee a successful consumer experience during the initial days. However, once these platforms start to gain market share, they are able to switch to policies that they know to be more profitable and sustainable.

As platforms rapidly change their policies, workers may find it confusing to keep up with the complexity of new terms and conditions. As the workers lack easy access to consolidated action through unions or legal representation, the balance of power favours the platform, which can introduce policy changes with scant risk of a legal challenge (Calo and Rosenblat, 2017).

Increasingly complex contracts and frequent policy changes may also involve a deliberate attempt to consolidate a platform's power through ever greater information asymmetry. Workers may not have the capability and bandwidth to evaluate older contracts, or to fully understand the latest updates to terms and conditions (Horton, 2010). Frequent policy changes may further disempower workers if disputes arise over earlier completed work, especially as they may not have a record of the terms and policies in place on a particular date.

It has been argued that these mechanisms, by which platforms exercise control over the terms of exchange, and of worker participation, create an unfair power divide between the platform and the workers. This divide is encapsulated by the contention that while workers control the means of production (and assume the associated risks), they do not control the terms of production (Hill, 2015a; Slee, 2015).

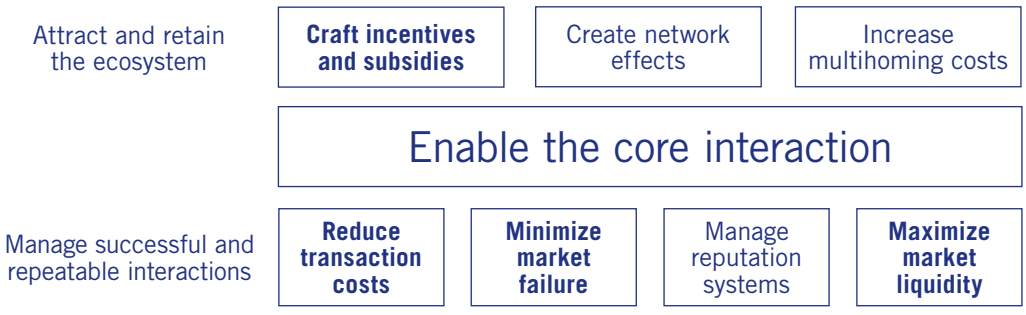
7.4.1.e. Frequent policy changes disempower workers

It should, however, be noted that platform policies may change to the detriment of workers but without mal-intent on the part of the platform owner. Many platform businesses adopt the lean startup methodology which, as explained earlier, advocates constant experimentation and encourages companies to switch rapidly to whatever business model best accords with data gathered from the market. While this is a very effective methodology for companies to improve their business model, constant experimentation tends to disempower workers, involving frequent changes to the terms of their participation and the rewards that accrue.

A further issue must be considered with regard to platforms like Uber, TaskRabbit and Deliveroo that facilitate local work delivery within a city or a neighbourhood. These platforms create and refine their policies based on their experience of launching and executing the platform in certain cities. When these platforms launch in a new city, they may initially apply existing policies that have worked elsewhere. However, as they gather data about local market conditions, they may need to change policies to account for unforeseen factors, such as local worker behaviours, dependent on geographical and other constraints, or local regulations. For various reasons, and in the absence of malicious intent, the platform might need to change its policies. Motivation notwithstanding, frequent policy changes may well disempower some or all workers on the platform.

7.4.1.f. Design and policy choices

Labour platforms exercise explicit control primarily to ensure a liquid market with low market failure and low transaction costs. This is particularly true for markets which require high liquidity (especially on-demand platforms) and markets involving substitutable and standardized low-skilled, routine work, with the labour platform making decisions about work allocation on behalf of the consumer. In such situations, platforms employ control to reduce transactions costs, minimize market failure and maximize market liquidity. However, as the examples above illustrate, this control over work allocation, delivery and arbitration can also lead to an imbalance of power between workers and the platform and may place workers at risk of exploitation.



7.4.2. Implicit labour management

In addition to controlling the terms of exchange for work and disempowering workers through frequent policy changes, platforms may also employ less explicit mechanisms that augment the power imbalance between workers and platforms. Several labour platforms, especially those tracking service delivery, gather large quantities of data about

individual worker's behaviours, both during active working time and during more passive periods of participation. These platforms use these data for implicit control purposes which become apparent through metrics-based feedback and gradual behaviour design, rather than overt policies or bold initiatives.

7.4.2.a. Metrics-based feedback allows platforms to control users and require them to attain certain levels of activity, thereby reducing choice and free agency

The notion of control through metrics-driven feedback is an important one. Labour platforms need to ensure that consumers in search of assistance are matched with the right workers. The success of the core interaction is the key priority of any platform. In order to ensure successful interactions, labour platforms focus on the following key metrics for workers:

1. Acceptance rate: This refers to the proportion of work requests communicated to a worker that are accepted by that worker. A higher work acceptance rate signifies more successful interactions.
2. Cancellation rate: This refers to the proportion of work requests that are cancelled by the worker after their acceptance. A higher work cancellation rate is indicative of failed interactions.
3. Reputation: This refers to the aggregate score for a worker gathered from ratings provided by consumers. Higher worker reputation indicates a history of successful interactions and a high likelihood of future success.
4. Number of successful platform interactions per unit time: This could be measured at the daily, weekly or monthly levels. Ride-sharing platforms measure this at the daily level per worker. Freelancing platforms may measure this at the monthly level for individual workers or for a cohort of workers.

Labour platforms use one or more of these metrics to manage workers and offer feedback to them. Some platforms may even set a failure threshold such that a worker may be barred temporarily or permanently from participating on the platform.

On-demand labour platforms that mediate standardized or low-skilled work and also need to maintain high liquidity of interactions are particularly likely to use metrics-based feedback as a means of controlling workers. On these platforms, enabling a work exchange requires successful automated allocation and a high acceptance rate from workers. By contrast, platforms that mediate skilled work rely more on providing consumers with the right information to make a decision on whom to engage. Immediate acceptance of work is less likely to be an issue on those platforms.

Ride-hailing and delivery platforms, in particular, use metrics-based feedback to ensure that workers maintain a high acceptance rate and a low cancellation rate, failing which the workers risk deactivation (Rosenblat and Stark, 2016). These platforms may also disincentivize workers who do not perform a minimum number of tasks or rides on a particular day by levying a higher transaction fee, as mentioned earlier in connection with Lyft (Singer, 2014). If drivers on Uber fail to accept three rides in a row, they are temporarily deactivated (O'Connor, 2016).

Deliveroo sends customized monthly reports to workers laying out a host of other metrics, including average "time to accept orders", "travel time to restaurant", "travel time

to customer", "time at customer", "late orders" and "unassigned orders" (O'Connor, 2016). The platform also compares the worker's performance to a standard threshold set by the platform for every metric.

This form of metrics-driven management applies to other forms of commodified work as well. Workers on the cleaning services platform, Handy, are also required to maintain high ratings to remain active on the system, and are penalized for missing jobs, while not being compensated for downtime and expenses incurred while delivering the job (Griswold, 2015).

On platforms like Airbnb and Upwork, worker reputation ratings are made available to consumers to help them make an informed decision before working with someone. Meanwhile, platforms like Uber, Postmates and Deliveroo use worker reputation as a metric to disempower workers, removing any who fall below a certain reputation score (discussed in detail below) (Cockayne, 2016). These platforms also use reputation and ratings as a mechanism to enforce certain kinds of behaviours and may advise consumers to give lower ratings to workers who fail to meet specified standards or display certain behaviours.

Metrics-based control can disempower workers further when workers are highly dependent on the jobs they acquire through the platform or are otherwise locked in. Platforms like BlaBlaCar provide workers with auto loans to enable them to participate on the platform. When these platforms enforce metrics as a precondition for continued eligibility for the loan, they constrain the worker's freedom of choice.

Platforms may also use peer benchmarking to promote certain behaviours among workers, in a manner analogous to performance evaluation at hierarchical organizations. Workers cannot contact one another via the ride-hailing and local services platforms they use, but comparison metrics nonetheless serve as a virtual hierarchy, with each worker pegged at his or her own level relative to the workforce average. These platforms thus create a continuous cycle of evaluation and competition, forever prompting workers to improve their status (Guyer, 2016). This kind of hierarchy may exist on all platforms, but it is particularly evident on platforms that control work allocation and need to maintain high liquidity of interactions.

7.4.2.b. Algorithmic feedback and behaviour design could push worker behaviour into line with platform requirements and reduce free agency

As a truly neutral intermediary, a labour platform would merely focus on helping consumers and workers find one another. But in practice, a labour platform may extend its influence on workers in order to retain them and increase the profitability of the platform. The more work interactions each worker has that are mediated by the platform, the more profitable the platform becomes; this explains the tendency for the platform to introduce additional triggers and incentives to spur workers on to more interactions.

Techniques to increase user commitment to, and participation on, particular platforms have been studied extensively (Eyal, 2014). Labour platforms like Uber and Lyft have used behaviour design as a mechanism for combating the effects of low multihoming costs, in order to retain workers on the platform. As multihoming costs are low, drivers often run multiple ride-hailing apps on multiple phones while driving, so as to increase their chances of securing a ride. In particular, drivers are more likely to switch to another app upon completion of a journey, while waiting for the next one. In order to combat

this, Uber introduced a new feature which allows a driver to accept the next ride before completion of the current one. This decreases the likelihood that the driver will shift to another application – as long as he or she keeps receiving new requests on the current application. Associated incentives reward drivers for accomplishing a certain number of rides in a day, and for working during certain hours of peak demand (Scheiber, 2017). Platforms like Handy also tie the worker's hourly rate to the amount of work delivered on the platform over the past 28 days, in an attempt to maximize worker commitment (Griswold, 2015).

7.4.2.c. Platforms may manipulate workers to behave in certain ways through ambiguous communication of data

Labour platforms may also use algorithmic tracking and feedback to mobilize drivers to be available in certain locations in anticipation of demand, based on historical data, rather than real-time demand (Rosenblat and Stark, 2016). This is particularly true for on-demand platforms like Uber and Lyft which need to offer real-time pick-ups to consumers with minimal waiting times. To guarantee a highly liquid market in an environment with low multihoming costs, these platforms extend their influence over workers in a manner similar to hierarchical management and control. Moreover, the platform's communication to workers does not always make it clear whether the platform's recommendations are based on real-time data or on projections from historical data.

7.4.2.d. Platforms that control pricing are also able to control schedules and work planning, thereby reducing workers' free agency

Another issue that affects drivers arises from the implementation of surge pricing on ride-hailing platforms. Platforms defend surge pricing as a mechanism by which the market manages itself. However, in order to sustain surge pricing, some ride-hailing platforms have started to subsidize the non-surge hours by pricing at a much lower level. While these platforms still claim that drivers can participate whenever they want, the low pricing at certain times of the day discourages drivers from coming on board at those points. Theoretically, workers have free agency in that they are flexible to work during off-peak periods. However, work at those times becomes economically unattractive, especially for those who have invested in a car and other tools of production. On platforms where workers set their own price, they are able to determine market outcomes for themselves, control their schedule and how much they earn, within the constraints of the market, by adjusting their pricing. By contrast, a driver's freedom of choice is drastically constrained on a platform where a variable price is set centrally, and continually modified.

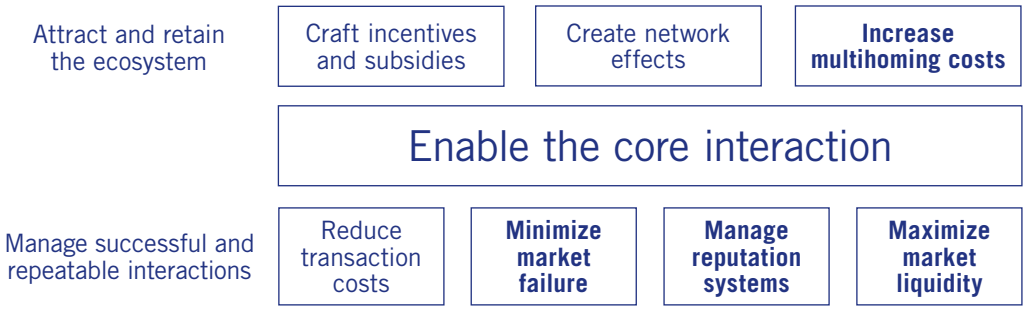
As pricing changes day by day and hour by hour, drivers are forced to adapt to an unpredictable, and yet inflexible, pattern of work. An added source of stress, as already discussed, is the way ride-hailing platforms also pay drivers a premium if they meet certain thresholds. The combination of metrics-based incentives and wide variability in pricing constrains the driver, who is motivated to follow the central algorithm's schedule and requirements.

Such algorithmic feedback to workers need not be intrinsically exploitative. In well-designed systems, workers may find the process of goal-setting, tracking, and feedback useful, even desirable, as a path to personal goals and self-improvement (Johnsen and Gudmand-Høyer, 2010). However, in order to empower workers, these systems must encourage free agency, by rewarding success without punishment for failure. Such systems can be observed to work particularly well for high-skilled work where workers can routinely differentiate themselves, signalling individual virtues rather than serving as disciplinary tool.

Behaviour design and market manipulation are exploitative only to the extent that they remove free agency for workers. Hence, when evaluating a platform's business and design choices, it is important to ask if these techniques are deployed in a manner that empowers or exploits the worker.

7.4.2.e. Design and policy choices

Labour platforms exercise implicit control primarily to ensure a liquid market with low market failure. This implicit control, achieved through metrics, enables reputation-based management of workers and also increases multihoming costs, as metrics-based management requires workers to commit to the platform. Clearly, such metrics-based management also takes away free agency from the worker, debunking the narrative of worker empowerment on these platforms.



7.5. Limiting collective action

Platforms can also disempower workers by discouraging collective action. Most platforms may not actively discourage it through policies; instead, they discourage it through design. Unlike social networks, labour platforms do not allow the creation of network connections between workers, as fostering connections between workers would seem to have little benefit for the platform. As a result, this contributes to worker isolation and workplace fragmentation, and increases the power divide between the platform and its workers.

Earlier research on collective action, and the effectiveness of trade unions in traditional organizational settings, has shown that the strength of identification with a group is the single most important determinant of unionization (Kelly and Kelly, 1994). Inter-personal and face-to-face contact is vital to the development of group solidarity, and several studies demonstrate that the lack of in-person engagement and co-location leads to lower identification with the group and creates greater difficultly for collective labour organization and action (Graham and Wood, 2016; Lehdonvirta, 2016).

7.5.1. Collective action may be observed across three phases

The emergence of collective action may be observed across three separate phases. First, workers need to have a means by which to develop social relationships and networks. Next, they need the tools of interaction to engage in discourse, sharing of experiences, and dissemination of information. Finally, they may organize themselves towards specific collective goals.

In the first phase, collective action is discouraged on labour platforms owing to the lack of provision for social network creation between workers. Many labour platforms retain elements of control similar to those wielded by hierarchical organizations (as demonstrated earlier); however, they go much further in that they preclude the development of the social networks and relationships between workers that are commonly observed in those organizational settings (Connelly and Gallagher, 2004). In this sense, the behaviour of labour platforms more closely resembles clearing houses and commodity markets, which ensure matches between demand and supply, without actively encouraging social relationships among workers. On TaskRabbit, the rabbits, as workers are called, cannot connect or communicate among themselves. Uber, by design, lacks many of the aspects of traditional taxi companies that encouraged collective action. For example, drivers do not gather at a central dispatch location. This lack of personal network creation makes it more difficult for workers to organize themselves. Moreover, the inability of workers to share experiences and exchange information further exacerbates the information asymmetry between the platform and the ecosystem of workers. New workers joining the ecosystem cannot benefit or learn from the experiences of existing workers. Furthermore, workers cannot organize themselves to identify responses to changing platform policies. Finally, platform policies that are not explicitly communicated to workers, but which emerge from specific anomalous situations, cannot be easily communicated to other workers. Some observers conclude that the inability to connect and develop social relationships has prevented the organization of large-scale collective action (Graham, Hjorth, and Lehdonvirta, 2017).

Although labour platforms do not encourage active community formation, workers have nonetheless been able to exchange information among themselves (the second phase of collective action) using third-party tools, including online forums and social networks. Uber drivers use online forums, including Facebook groups and subreddits, to discuss changing policies and their responses to these changes (Rosenblat and Stark, 2016). Workers on Amazon Mechanical Turk have also benefited from engagement on online forums (Irani and Silberman, 2013). More broadly, social media play a significant role in empowering collective action (extensively studied in other contexts) driving civic engagement and psychological empowerment (Leung, 2009; Shirky, 2011).

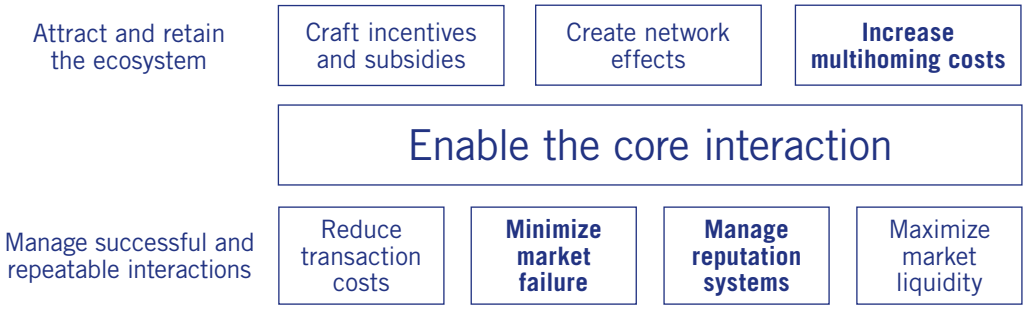
Finally, the third phase of collective action involves mobilization and organization towards specific goals. Despite the aforementioned difficulties, drivers of ride-sharing companies have frequently organized themselves in protest against Uber, Lyft, Ola and Grab.[5] It is also worth noting that the worker's classification as an independent contractor poses an additional impediment to the exercise of collective rights. In most jurisdictions, collective bargaining is allowed to employees only through unionization.

5 See: https://www.yicaiglobal.com/news/uber-didi-drivers-strike-beijing-protest-lower-wage-supplements; https://www.medianama.com/2017/12/223-ola-and-uber-mumbai-protests/

Collective action by independent contractors may be prohibited by competition laws as a form of illegal price-fixing cartel activity (Johnston and Land-Kazlauskas, 2018).

In summary, while collective action has been observed to varying degrees across all three phases, such collective action happens in spite of, not because of, labour platforms. Most of these platforms discourage such collective action.

7.6. Design of reputation systems



Reputation systems are an important indicator of a worker's quality, and hence visibility and future work allocation, on the platform. The likelihood that a platform will empower workers, or, conversely, exploit them, is governed by the key issue of how platforms design and use worker reputation systems.

7.6.1. Inaccurate reputation systems

Reputation systems, when not implemented accurately, can skew the platform unfairly against a few workers with poor ratings, even when those ratings fail to reflect the workers' actual performance. In other words, the accuracy of rating systems determines whether platforms distribute rewards fairly across the ecosystem or skew them towards a few workers.

Qualitative studies have noted that drivers on ride-sharing platforms felt that their rating was not representative of their actual performance. Drivers felt that passengers found it difficult to differentiate between the driver's responsibilities and those of the platform (such as the suggested journey route, or the tools used by drivers and passengers to communicate). Moreover, the platform's failure to educate consumers on such matters, coupled with the frequent testing of new features, may lead to consumer dissatisfaction. In such cases, passengers may rate workers poorly, even though the source of their dissatisfaction is with the platform's performance rather than the worker. In addition to their subjective nature, ratings also aggregate feedback for a multi-factorial experience into a single aggregate score, which may make it difficult for the platform to effectively distinguish good workers from poor ones (Godes and Silva, 2012).

Inaccurate reputation systems may further disadvantage workers if the platform doesn't allow workers an efficient channel for redress. Several platforms do not provide workers with easy access to a redressal system, instead relying on algorithmic responses which are unlikely to address the workers' concerns (O'Connor, 2016).

Multiple studies have also demonstrated that ratings on platforms like eBay show a bias towards positive feedback because buyers with poor experiences are less likely to leave feedback than to seek arbitration directly via the platform (Nosko and Tadelis, 2015;

Dellarocas and Wood, 2008). Similar bias towards positive reputation has been studied on oDesk and Elance. Furthermore, platforms with two-way feedback, allowing workers to rate consumers, encourage further bias towards positive reputation as consumers try to avoid negative feedback from workers in retaliation (Bolton, Greiner and Ockenfels, 2013). This is likely to make reputation systems less effective on platforms like Airbnb and Uber that allow both sides to rate each other. Ratings on Airbnb have been demonstrated to be more positive than ratings for similar properties on TripAdvisor, which does not allow two-way ratings or feedback (Zervas, Prospero and Byers, 2015). Conversely, if most reputations are positive, a few negative ratings can skew the platform excessively against any workers who receive negative ratings. Finally, rating systems may also encourage unfairness towards specific workers owing to biases that consumers express based on a worker's appearance or ethnicity (Ert, Fleischer and Magen, 2016; Edelman, Luca and Svirsky, 2017; Edelman and Luca, 2014).

7.6.2. Workers unable to transfer their reputation data become dependent on the platform

In order to increase multihoming costs for workers, platforms prevent workers from transferring their reputation to other platforms. While this helps platforms stay competitive and benefit from early mover advantages, it leaves the worker more dependent on the platform, thereby increasing the likelihood that the platform may exploit a worker without the risk that he or she will leave. If the worker were to move to a new platform, they would have to invest time, effort, and money in building their reputation from scratch. In this manner, platforms effectively control a worker's career, not just the allocation of their next job (Prassl and Risak, 2016).

Lack of reputation portability may also reduce a worker's ability to find non-platform work. For example, a recent university graduate may work on a platform like Amazon Mechanical Turk for a few years, but the lack of a formal employer relationship coupled with an inability to showcase his or her platform reputation through some formal mechanism like a letter or certificate, may in time reduce their employability in more traditional jobs.

The inability to transfer or display records of their past labour, their reputation or the client relationships built on the platform, prevents workers from investing in a career that is independent of the platform.

7.6.3. Ratings that inform the market may empower workers, but those that are used only internally by the platform may exploit workers

The likelihood that a platform exploits workers by exercising greater control may also depend on how the platform uses worker reputation. Platforms such as Airbnb use the reputation system primarily to help the market arrive at better decisions. Accordingly, hosts with a higher reputation are ranked higher in search results, travellers can read reviews before deciding where to stay, and hosts can approve or decline potential travellers (guests) on the basis of their ratings. Low ratings may lead to lower visibility or omission from certain search results altogether. While in some cases this may be perceived as unfair, in general the ratings are used to enable the market to arrive at better-informed decisions.

By contrast, labour platforms like Uber and Postmates use ratings more like a traditional organization, to allocate work directly on the basis of ratings or to remove workers from consideration due to low ratings. The cleaning-services platform Handy ties worker payouts to the rating system. Workers are graded into four rating levels with different hourly rates (Griswold, 2015). In these cases, ratings are not used to help the market arrive at better (objective and independent) decisions. To that extent, platforms like Uber and Handy approach the rating system in a manner less similar to market intermediaries and more similar to organizations.

7.6.4. Design and policy choices

Labour platforms use reputation systems to guarantee trust in the market and minimize market failure. They also use reputation as a means to retain highly skilled workers. However, this also creates enforced dependence on the platform. Moreover, the use of reputation systems predicated on punishment, rather than reward, will exploit workers rather than empower them.

7.7. The role of feedback loops

A final consideration while evaluating power and fairness on platforms is the impact of feedback loops. Feedback loops can impact workers in two ways. First, if a single platform emerges with a monopoly, it is able to exercise greater control over workers when its market dominance is combined with algorithmically mediated pricing and participation policies. Second, feedback loops may increase inequality within the workforce, often arbitrarily rewarding a chosen few while exploiting the majority.

7.7.1. The dominant labour platform may exercise greater control over workers, particularly when the platform can control pricing and participation policies

Platforms that develop network effects benefit from a virtuous feedback loop because when more of the market coalesces around a single platform, demand tends to match supply more rapidly and completely. As the market becomes more efficient, its expansion accelerates. This, in turn, attracts future market participants to the platform. In this manner, platform markets often scale towards an end state dominated by one or a few very large platforms – a situation of “winner takes all” or “winner takes most”.

As a labour platform comes to dominate the market, it gains much greater power over the ecosystem. All the control and power issues laid out in earlier portions of this section become further exacerbated. Devoid of options, worker dependence on the platform increases. At this juncture, a platform that has thus far subsidized both sides of the market using venture funding, may change policies to improve its profitability. As alternatives become more scarce, the worker’s dependence on the platform drastically increases, as does the risk of exploitation (Choudary, 2017b).

This concern is of greatest significance in platforms which manage prices for workers centrally. Unlike freelancing platforms such as Upwork, which allow workers to set their own prices, platforms like Uber and Deliveroo set prices centrally. With sufficient funding,

these platforms can artificially subsidize one or both sides of the market during the growth phase to outprice their competitors and move the market in their direction. However, as soon as a platform emerges to dominate a market, it can exercise even greater control over workers, most directly by pricing unfavourably but also by creating other policy changes that increase its profitability at the expense of workers (Rogers, 2015).

As the platform increases in scale, it may also include a time-limited non-compete clause into its worker contract, preventing workers from multihoming for a certain period of time. Although workers may view the clause merely as a temporary restriction, it may end up having long-term consequences if such clauses strengthen the dominant platform further by reducing competitors' access to workers and lead to a winner-take-all outcome.

This tendency toward single-platform markets is notable at the time of writing this paper (March 2018). Uber's withdrawal from the Chinese and South-East Asian markets has left a single predominant player in each arena (Didi in China and Grab in South-East Asia). In the absence of competition, and with a large dependent workforce at its disposal, these platforms are now free to dictate policies and control pricing.

7.7.2. Feedback loops increase inequality among workers in the ecosystem

Press releases from labour platforms often focus on highlighting outsized returns for the top workers in their ecosystem rather than talking about the spread of rewards across the ecosystem. This is because labour platforms, especially those mediating the provision of high-skilled non-standardized work, are designed to reward the best workers on a progressive scale (Schor, 2017). In these cases, successful workers can become wealthy as they benefit from a positive feedback loop that gives them access to a larger market share (Choudary, 2017a). The key to these successful careers is the digitization of worker reputation, often in the form of ratings.

Worker ratings are one factor that can determine workers' search result placement, and hence their visibility to consumers. Studies have broadly demonstrated the correlation between higher ratings, higher placement, and greater subsequent purchase behaviour (Ghose, Ipeirotis and Li, 2012). This creates a virtuous cycle whereby higher ratings lead to higher visibility and greater sales, which in turn lead to additional opportunities to achieve more work and higher ratings. A study of Airbnb also demonstrates that travellers are more likely to evaluate only a few hosts before making a purchase, resulting in more business for hosts who rank higher in search results (Fradkin, 2015).

Furthermore, the inequality created by worker ratings can be quite arbitrary, favouring early users of a platform. Three factors are at play here.

First, at launch, or while a platform's governance is still evolving, some workers may gain insight into the mechanisms behind the platform's reputation system algorithm and use this knowledge to generate fake reviews while the platform's governance structure and policies are evolving and not fully formed. For example, in its early days, Airbnb was plagued by fake reviews. Now, Airbnb flags situations where a host and guest repeatedly book rooms with one another, as it could be a ploy to accumulate fake positive reviews (Tanz, 2014). These governance mechanisms, however, were built over time and were absent at launch.

Second, platforms' policies may inadvertently encourage arbitrary allocation of positive reputation. Airbnb's rating system was initially designed to make a host's review of the guest public before the guest reviewed the host. This encouraged hosts to seek reciprocation by

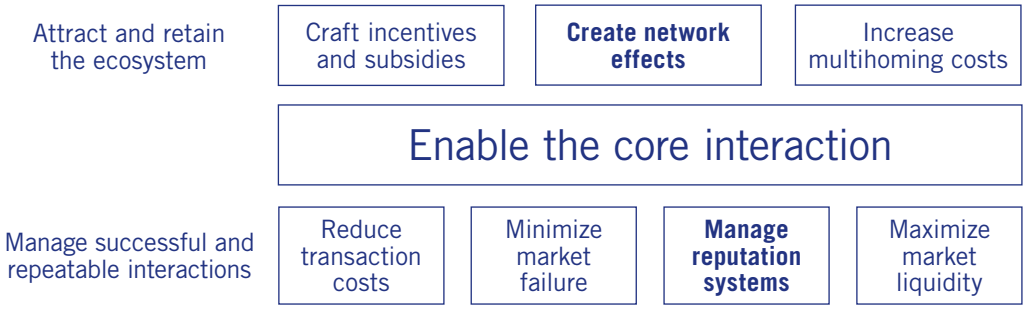
writing positive reviews of guests. As guests reciprocated, this skewed the ratings of early hosts. The platform changed its policy in July 2014, such that reviews are no longer made public until each side has reviewed the other. Hosts who joined the platform after this change missed out on the arbitrary initial benefit generated for early users.

Third, in its early days, a platform may select a small number of high-quality workers and feature them prominently on the platform. However, absent consistent and objective criteria, such selection may create arbitrary inequality.

In all three scenarios above, early workers may benefit from arbitrarily higher exposure or better reputation, which gets further increased through feedback loops, leading to arbitrary allocation of advantages towards workers who join a platform in its early days.

7.7.3. Design and policy choices

Labour platforms seek to create a meritocratic market using reputation and feedback loops. However, these feedback loops may also amplify inequality. Finally, although a successful labour platform needs strong network effects, the concentration of an entire market on a single platform is likely in the long run to damage the interests of the ecosystem participants.



8. Solutions

A coherent regulatory framework must extend beyond piecemeal reactions to lawsuits. Regulation should promote fair and decent work, and address the conditions that lead to an unequal balance of power between workers, consumers and the platform. Platforms should be regulated in a way that maintains broad consumer choice and allows the market to operate efficiently. Too little regulation encourages conditions that may lead to worker exploitation. Regulation must accord workers free agency as they participate in this economy, and guard against a process of increased commodification which, if left unchecked, could reduce workers' skills to a state of instantaneous substitutability. Nevertheless, too much regulation could stifle platform innovation. Optimal regulation would promote innovation while limiting exploitation.

8.1. Current approach to regulating platforms

To date, a variety of mechanisms and instruments have been applied to regulate labour platforms. They are outlined below:

8.1.1. Platform ban

Several jurisdictions have taken an extreme approach of entirely banning platforms which do not comply with existing regulations (Rhodes, 2017; Cambridge, 2017).This is unlikely to prove to be a nuanced or sustainable solution. Bans are often championed by lobbying incumbents, who seek to protect a traditional advantage, and these bans run the risk of disincentivizing innovation entirely (Oskam and Boswijk, 2016). Moreover, the imposition of bans is far from uniform, and this inconsistency tends to produce a fragmented regulatory landscape which can impede concerted and consistent regulatory action against the platform. More importantly, a fragmented regulatory landscape also has larger systemic effects, such as the migration of technology firms to jurisdictions with lighter regulation, with long-term repercussions for cities and countries imposing the ban (Khanna and Choudary, 2017).

8.1.2. No regulation

Another response, at the opposite end of the regulatory spectrum, is the complete absence of regulation. Some scholars argue that traditional regulation, when applied to platforms, will lead to over-regulation, thereby curtailing all benefits that labour platforms create (Koopman, Mitchell, and Thierer, 2015). Some proponents of eliminating regulation go so far as to suggest that, because the interests of the platform are intrinsically aligned with those of the workers, platforms will naturally be motivated to invest in worker protection. The analysis presented in the previous section, however, suggests that that argument does not always hold. Moreover, as already demonstrated across jurisdictions, "no regulation" is unlikely to be a practical approach that is widely adopted.

8.1.3. Self-regulation

A third related argument champions self-regulation by the platform (Cohen and Sundararajan, 2015). Self-regulation is frequently proposed as a feasibly implemented solution due to the information asymmetry that exists between the platform and other stakeholders, including the traditional regulator (Suzor, 2016). The argument for self-regulation rests on two key pillars: first, that reputation systems are effective in guaranteeing market efficiency, and, second, that market efficiency is aligned with positive outcomes for all platform stakeholders. However, as demonstrated in the previous section, both these arguments are tendentious. Reputation systems can be manipulated and biased. Market efficiency often results in worker exploitation, especially in markets involving the exchange of low-skilled and highly substitutable labour. While self-regulation may work to the extent that it creates an efficient market, it is unlikely to be successful as a means to empower workers when their interests are at odds with the interests of the platform owner. Though flawed, the argument for self-regulation throws a welcome but harsh light on the need for regulation to expand visibility into the opaque data and obscure workings of platforms. An independent regulator is required to ensure fair competition among platforms; delegating regulatory responsibility to the platform owner because of their exclusive access to this data is not a solution.

8.1.4. Evasive narrative as a tool for sidestepping regulation

Platform promoters like the phrases "sharing economy" and "collaborative consumption", which conjure a positive image of platforms in general, and labour platforms in particular (Dredge and Gymóthy, 2015). These narratives present the platform as an intermediary

that facilitates efficient, sustainable and decentralized markets in a manner that needs no regulation (Martin, 2016). However, these narratives are at odds with the aforementioned mechanisms that many platforms put in place to control workers. Moreover, the concept of sharing can be cynically obfuscated. Platforms such as Couchsurfing, which started as not-for-profit intermediaries, enabling sharing among participants, have moved on to create for-profit businesses, focused on maximizing shareholder value, sometimes to the detriment of existing stakeholders. These decentralized production systems encourage a culture of sharing but are answerable to centralized governance and funding; the sharing economy narrative of altruism and socialism is secondary to the platform's profit-seeking behaviour. While for-profit platforms may also encourage a culture of sharing, the eventual centralization of profits and maximization of shareholder value are at odds with the overall narrative. More specifically, these platforms may improve market access and generate additional surplus but this does not imply that such surplus is equitably distributed among all stakeholders. Any regulatory framework should ensure that these narratives do not function as a ploy to sidestep regulation while maintaining control, information asymmetry, and profit centralization that could lead to worker exploitation.

8.1.5. Privacy-first regulation

Several jurisdictions have crafted regulatory responses to platforms which do not fall at either extreme. The first such response is centred around privacy, which has emerged as a key concern, especially following the questionable data practices employed by platforms (Wolverton, 2018). Indeed, many jurisdictions have focused above all on regulating privacy.[6] However, over-regulation aimed at ensuring privacy runs the risk of imposing too many controls over data acquisition by platforms, which could in turn directly impact the platform's ability to enable efficient markets. Ideally, regulation would deal with data ownership and usage rights in a manner that not only enabled the platform to create an efficient market but also protected workers and assisted the bodies that represent them.

8.1.6. Regulation of worker status

Worker status has been in the regulatory spotlight for two key reasons: competition and tax. First, treating workers as independent contractors allows the platform to operate at a higher profit margin, making it particularly difficult for firms with full-time employees to compete with the platform (Van Doorn, 2017; Cherry, 2016). These firms therefore lobby vigorously for regulation on this issue. Second, governments are concerned about the issue because of tax avoidance by platforms (Bergin, 2017). Some governments, like Denmark, have responded firmly by banning the non-compliant platform and imposing a tax on the workers (Musaddique, 2018). Although such moves ensure fair tax payments, they can serve as a distraction from the central issue of worker exploitation.

Worker status is indeed an important factor in determining bargaining power between platforms and workers. If workers are classified as independent contractors, risks that should be managed by the platform are instead offloaded onto the worker's shoulders. However, the central issue for regulators seeking to empower workers is platform control, not worker status. Nonetheless, worker disempowerment is certainly exacerbated by the fact that classifying workers as independent contractors allows risks to be offloaded

6 See for example: https://www.oaic.gov.au/privacy-law/privacy-act/privacy-regulations; http://www.privacy-regulation.eu/en/ and https://www.eugdpr.org/; http://laws-lois.justice.gc.ca/eng/regulations/SOR-83-508/

to workers instead of being managed by platforms. Changing worker status from independent contractor to employee could well improve the social benefits and insurance coverage accorded to workers, but this change would have no effect on many of the control mechanisms and information asymmetries between the platform and workers.

Finally, a narrow focus on worker status – instead of a holistic view of worker empowerment – may lead to new forms of exploitation. Platform workers reclassified as employees might only be accorded part-time employee status. Tim O'Reilly (2017) calls this "the 29 hour loophole", taking the specific example of regulations in the United States, and argues that worker classification as employees may encourage platform managers to keep an individual's working week below 29 hours, automatically substituting an alternative worker when that threshold is reached. This would allow the platform to continue providing reduced benefits to those classified as part-time workers.

Any approach to regulation that is conducive to worker empowerment must be built on a comprehensive framework that understands the technological mechanisms and platform design choices that create conditions for worker exploitation and empowerment, and is able to leverage the vast reservoir of data captured by the platform.

8.2. Creating a regulatory framework

To combat worker exploitation by platforms, the goal of regulation should be the enablement of worker agency and a reduction of platform control. In effect, this involves granting workers greater bargaining power over any transaction. In creating a regulatory framework, it is also important to acknowledge the limitations of traditional regulation. Regulation of labour platforms must seek to restore worker power that has been eroded on labour platforms, while employing new models for regulation that apply to the platform economy.

8.2.1. Traditional mechanisms of worker empowerment

The relationship between worker and employer has been the subject of regulation since the industrial age. In the search for effective mechanisms to increase the bargaining power of workers in the platform economy, it would be helpful to revisit four past mechanisms used to achieve a power balance between workers and firms over the last 100 years. First, many countries created social benefits that provided protection to workers under various extreme circumstances, like unemployment. Second, laws were instituted to ensure protections, like a minimum wage and maximum working hours. Third, unionization allowed workers to take collective action. Finally, in certain fields, particularly those involving independent workers, some form of unionization or licensing of workers served to cap the size of the workforce, giving workers greater wage bargaining power by restricting supply. As labour platforms often erode all four mechanisms, new regulatory powers and safeguards are now needed for platform workers.

8.2.2. Worker empowerment in complex systems

Regulation of platforms must embrace twenty-first century complexity. There are two key points here. First, platforms are complex, emergent systems and cannot be effectively regulated using industrial-era regulation. They scale to millions of users, sometimes

billions, which evolve through the use of vast amounts of data and employ learning algorithms that evolve their operations over time. Second, but crucially, the data-ingesting processes underlying optimization of the platform business model can also be harnessed in the service of optimal regulation.

Industrial-era regulators worked as gatekeepers, imposing checks and raising or lowering barriers prior to market entry. This was largely because of the lack of visibility into the details of market behaviour. Platforms, by contrast, capture data beyond the point of market entry. This reduces the need for pre-entry qualification – provided that sufficient visibility into market behaviour is shared.

Platform businesses already demonstrate the kind of organizational and conceptual flexibility modern regulation will require. Instead of testing in detail upfront, they launch their offering and subsequently make changes based on actual usage data. This shift from testing-based metrics to usage-based metrics has allowed platform businesses to adapt to complex system behaviour. The regulation of platforms needs a similar shift from testing-based metrics to usage-based metrics. Venture capitalist Nick Grossman (2015) refers to this as Regulation 2.0.

To implement this effectively, platforms will have to share data on their behaviour and performance with regulators, while regulators will have to set up incentives for collaborative regulation whereby the platform and the regulator work together. There are, of course, two possible barriers to implementing this solution: platforms may resist sharing data unless absolutely required or incentivized to do so, and regulators may not have the technical skills needed to credibly participate in co-developed regulation.

Just as traditional firms have begun to develop the talent needed to participate more effectively in the platform economy, regulators will also have to equip themselves, as a matter of urgency, with the necessary expertise to regulate the platform economy. Additionally, this might also be achieved if platforms allow access to carefully filtered and organized (curated) data for the purpose of collaborating with third-party researchers and analysts, using appropriate software (application programming interfaces, or APIs) to analyse data for research and regulatory purposes.

Finally, data-based regulation also creates an opportunity for entrepreneurs to create new regulatory tools that interface with these platforms. In the age of data, regulation may find its own business model.

8.2.3. Worker empowerment in the platform economy

Regulators need to work towards the creation of appropriate worker protection and empowerment, while ensuring that such regulation is applied not at the point of market entry but subsequent to it, using actual data from platform usage.

Data play an important role in creating value and establishing power dynamics on the platform. Data enable the creation of efficient markets. Both consumer and worker behaviour can be influenced using data. Data also create enforced dependency for various platform users. Finally, the platform's exclusive ownership of data also creates greater information asymmetry between the platform and all other stakeholders.

An expandable and effective regulatory framework for platforms must be centred around the regulation of data. To that end, the regulatory framework should involve four key components:

1. **Decreasing information asymmetry between platform and worker**
   Several patterns of worker exploitation on platforms can be traced back to the information asymmetry that exists between the platform and its workers. Decreasing information asymmetry would increase the bargaining power of workers.

2. **Reducing worker dependency through proprietary data that locks-in workers**
   If a worker's reputation data are locked to a specific platform, it prevents them from moving to other platforms and further reduces their bargaining power.

3. **Regulating through open data**
   The exclusive ownership of data by the platform also serves to obstruct effective regulation. Lacking visibility into actual behaviours on the platform, regulators resort to traditional regulation, which can often impede innovation without increasing worker empowerment. At its most extreme, regulators may choose to ban a platform outright. Instead, platforms should cooperate with regulators by facilitating external access to their data (Calo and Rosenblat, 2017). The incentive to do so would be much lower regulation upfront. Access to these data would be heavily curated to alleviate concerns that third parties could gain insight into a platform's carefully nurtured competitive strengths. Regulators and platform owners would therefore need to work together to identify data that offer an understanding of relevant market behaviour without reducing the platform's competitiveness.

4. **Enabling alternate regulatory structures on the data**
   Even as platforms agree to provide access to their data, regulators must set up more agile and decentralized regulatory structures. With data access, the regulatory structure itself could work like a multi-sided platform. Workers using the platform would act as producers of data. These data could be consumed through API access by third parties. This would allow regulators to set up overall regulatory guidelines and empower third parties such as research agencies to analyse the data and propose regulatory interventions based on actual market behaviour. This would also allow regulation to expand at the rate of innovation. Just as platforms exploit decentralized value creation, so this form of co-developed regulation would allow regulators to exploit decentralized regulation, keeping pace with innovation on the platform.

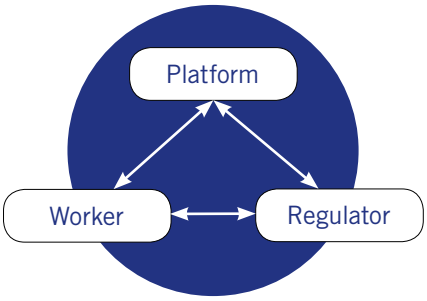
8.3. A platform approach to regulation

Regulators have long used transparency and disclosure as regulatory mechanisms. These mechanisms become all the more important in the era of platforms which constantly ingest, process and exploit data. Just as platform business models expand and gain efficiency by leveraging data, platform regulation too would require data to generate an effective response.

To that end, a regulatory framework for platforms would best be structured as multi-sided coordination between three stakeholders: the platform, the regulator and the workers (and their representatives). Three possible types of interactions would be enabled by this framework: regulator–platform interactions, platform–worker interactions, and regulator–worker interactions.

This regulatory framework would be built around data as a means of enabling these interactions. Access to data determines the bargaining power that one party has over

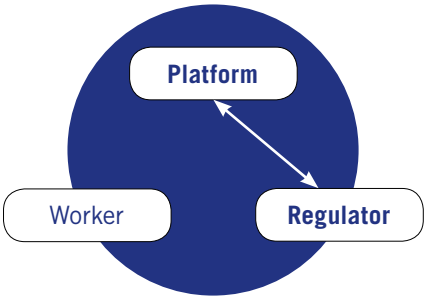
another. To the extent that the platform agreed to share data with other stakeholders, these stakeholders could work more purposefully to create mutually agreeable solutions.



8.3.1. Regulator–platform interactions for developing co-determined regulation

To enable co-developed regulation through regulator–platform interactions, platforms would need to give regulators access to their data. Regulators, in turn, would need to alleviate fears of over-regulation and assure platforms of greater freedom of manoeuvre provided they respect certain mutually agreed thresholds (metrics-based criteria).

There are several mechanisms through which such co-regulation might be achieved.



8.3.1.a. Experimentation sandboxes for co-determined regulation

One of the most effective ways to encourage platforms to provide access to their data would be the creation of an experimentation and innovation sandbox (a virtual environment where initiatives could be tested safely). This could be particularly effective for regulating proposed platforms in highly regulated industries such as health-care or financial services. The Monetary Authority of Singapore, for example, is currently implementing a financial technology sandbox where startups can experiment without being bound by the regulations of the traditional financial services industry.

According to this model, the regulator would create the sandbox and let startup platforms launch within it, on a test basis. The regulator would reduce barriers to market entry in exchange for greater visibility into the operations of these startup platforms. If the regulator observed the workings of these platforms at the outset, it would then be well placed to fashion appropriate policy responses later, as the platform expands. If platforms accepted greater accountability and scrutiny at the outset, they would be more

likely to accept the relevant additional metrics during subsequent phases of expansion. Currently, most platforms focus on optimizing for metrics that minimize market failure. According to the proposed model, platforms would additionally be required to optimize for metrics that track worker empowerment. It could be expected that if several countries adopted this model in a response to demands for tighter regulation, the necessary IT talent could easily be attracted.

8.3.1.b. Continuous metrics-based lobbying

The sharing of data could also make platform-regulator negotiations more efficient by enabling a form of continuous metrics-based lobbying.

Continuous metrics-based lobbying would enable platforms to avoid lawsuits and over-regulation by providing regulators with a dashboard of metrics, as stipulated by the regulator. To alleviate concerns around over-regulation, the regulator could in turn allow platforms a free hand in operations – as long as certain metrics-based criteria were met.

Platforms like Airbnb and Uber have already commissioned leading economists to write reports that use data to demonstrate their positive impact. Airbnb commissioned Gene Sperling to write a report, based on Airbnb data, on the platform's impact on host income (Sperling, 2015). Similarly, Uber and Alan Krueger co-authored a report on the positive impact of Uber on driver earnings (Hall and Krueger, 2015). These reports make use of actual data on platforms, but they offer a one-sided narrative. Some independent studies have questioned the veracity of claims made by platform-sponsored research (Greenwood and Wattal, 2015).

Moreover, research reports lack the flexibility and agility of continuous metrics-based lobbying whereby a platform could progressively demonstrate its impact on workers by providing a relevant dashboard to regulators that updates its metrics continuously based on new data.

8.3.1.c. Allocation of the social security burden across platforms

Metrics-based regulation could facilitate the restoration of worker safeguards. One of the challenges with implementing social benefits for platform workers is the question of funding, especially as workers typically work on more than one platform. A solution to this could involve the allocation of funding responsibilities across multiple platforms based on the number of hours the worker works for each platform (Hill, 2015b). Of course, successful implementation would require multiple platforms to adopt metrics-based co-developed regulation. To effectively implement this, the benefits fund would have to be subject to shared governance by representatives from different platform firms as well as representatives of worker collectives.

In practice, there are many challenges to implementing such a model. Whereas platforms that cater to city-level networks could be regulated at the local level, platforms facilitating remote work are unlikely to be effectively regulated locally. Also, this model could only be effective when the majority of platforms in a local area opt into metrics-based co-developed regulation. If a cautious start in a few initial jurisdictions proved successful, this would probably develop sufficient momentum to drive adoption on a larger scale.

8.3.1.d. Metrics-based compensation

At present, workers are often required to engage in unpaid work on the platform to guarantee subsequent platform success, an example being an Uber driver waiting for a passenger or the numerous unpaid qualification tests required by microwork platforms (ILO and IG Metall, 2018). Metrics-based regulation could also be used to inform platform policies and make them fairer to such workers. If regulators had access to the relevant data, platforms could be required to compensate workers for such work beyond a minimum threshold period of time.

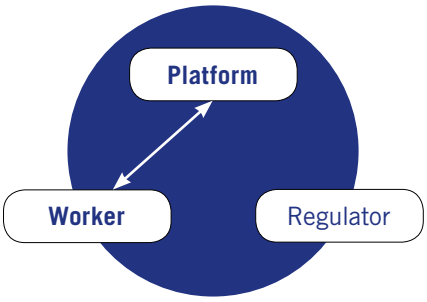
8.3.1.e. Regulation of feedback loops and deep learning

Finally, metrics-based regulation could also empower regulators to regulate adverse effects before they get amplified through a platform's feedback loops. Metrics-based regulation could identify early signs of bias in algorithm design and accommodate early critical responses from workers before any biases are reinforced by feedback loops.

Regulation developed cooperatively by stakeholders on the basis of data could also help regulators work alongside the platform in a way that avoids over-regulation of algorithms. Deep learning algorithms are non-transparent not by intent but because the creators themselves cannot trace algorithmic choices. Regulators should work with platform engineers to understand which algorithms are creator-controlled and which ones learn and adapt. Greater transparency could then be demanded with regard to creator-controlled algorithms, with a view to their adaptation where appropriate. For example, scheduling algorithms could factor in the needs of workers as additional inputs, allowing them to opt out of certain schedules without the risk of punitive action. In this manner, regulators could allow platform innovation while limiting worker exploitation.

8.3.2. Worker–platform interactions as a means of empowerment

Regulation could also address data usage and access to enhance workers' rights and reduce the information asymmetry between platforms and workers. If workers had the right to transfer their reputation data between platforms they would gain a level of control hitherto denied them, accompanied by significant bargaining power over platforms.



There are two principal mechanisms by which such empowerment could be achieved.

8.3.2.a. Worker empowerment through data access and usage rights

One of the most important factors determining worker-platform bargaining power is the information asymmetry created by the platform's exclusive access to data. As a platform begins to eliminate its rivals, the workers' alternative options shrink; in this case, dominant platforms are imbued with greater bargaining power and workers with less.

In order to empower workers, platform regulation would give a worker the right of access to data about their own actions. This right would extend beyond merely allowing workers to download their data in a format of the platform's choice, which might not be easily re-usable, or by providing new dashboards to workers, which can again be conveniently designed by platforms. Instead, worker access to data would be enabled through an API, mediating common standards and capabilities shared by all platforms.[7] A worker-centred API would allow a worker full rights over their own data and would allow them to transfer these data. A worker could then use those third-party applications to gain a better understanding of patterns in their data vis-à-vis the workings of the platform.

Emergent unionization

A worker-centred API could also create an entirely new form of unionization for the platform age. Platforms use algorithms to take action based on the vast troves of data they hold. At present, workers are disempowered by their inability to take analogous algorithmic action. With a worker-centred API, workers could port their data to third-party applications, giving them greater agency. Just as industrial-age workers were represented by unions, worker-centred APIs would allow platform workers to be represented by algorithms. This would enable a form of emergent unionization, whereby workers could be matched and coordinated based on certain needs, allowing workers with similar needs to band together and negotiate with the platform.

These algorithms would enable platform workers to organize among themselves, even managing much of the organization and coordination algorithmically. They could even help workers to use real-time metrics to bargain with platforms. Just as data access would, for the regulator, enable effective collaboration with the platform on the shaping of regulation, data access would facilitate more organized and coherent bargaining for workers.

Algorithms could also empower individual workers. A worker-centred API would allow workers to use a third-party algorithm to analyse data and plan future participation on the platform so as to maximize their outcomes. Such an algorithm could operate at both the individual and the collective level.

Worker-centred information could also enable greater coordination across platforms

For example, workers may provide their scheduling data with one platform as input to another in order to ensure that conflicting work schedules were avoided. This would require greater interoperability and adherence to common standards among platforms.

7 For expanded discussion, see: http://blogs.harvard.edu/vrm/about/

Such standards would have to be set by the regulator. If all platforms were to adhere to common data standards, new avenues for collaborative regulation would emerge without detriment to competitiveness.

Continuous metrics-based bargaining

Greater transparency would also allow worker representatives and unions to engage in a form of potentially continuous metrics-based bargaining with the platform owner, just as platforms currently use data to fuel a form of continuous metrics-based lobbying. This would however necessitate rules and norms to minimize constant negotiation as long as the platform operated within certain pre-approved boundaries.

8.3.2.b. Worker empowerment through reputation portability and dual reputation

Today's platforms limit worker mobility and choice by preventing workers from moving their reputation data to other platforms. Enabling workers' access to data, particularly reputation data, would increase their bargaining power by reducing their dependence on a particular platform. While enforced dependence (lock-in) would be outlawed, the platform would nevertheless need to retain access to data that helps it to differentiate itself from competitors.

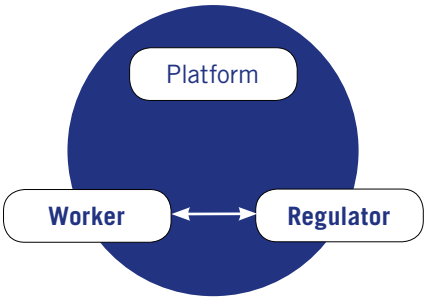
In a platform setting with regulation determined by multiple stakeholders, a dual-level reputation system could prove beneficial. This would give each worker a single base-level reputation, in addition to a platform-level reputation on each platform used. The regulator would be responsible for creating the base-level reputation, which would help all platforms identify bad actors. The regulator would also be responsible for giving workers access to the learning and re-skilling mechanisms needed to improve their reputation. This base-level reputation would be complemented by the platform-level reputation signalling the worker's capability to provide a differentiated service, tailored to the requirements of a given platform. The dual-level system would ensure that platforms share data about bad actors across the board, and thereby save individual platforms considerable time and money that would otherwise be spent on identifying those bad actors. Moreover, it would also ensure that platforms could continue to exercise some form of control over the worker via their own platform-level reputation mechanisms that seek to differentiate workers' skills.

Implementing a dual-level reputation could also help to ensure that all reputation systems are designed from a reward perspective. As noted earlier, platforms that mediate the exchange of highly standardized work use reputation systems primarily for punishing poor actors rather than rewarding high-performing workers. With a dual system, the platform-level reputation, which pertains to the worker's skill, could be used exclusively for rewarding high performers, while the base-level reputation could be used at the outset to determine who gains access to the platform.

Second, some theorists have also proposed to remedy inaccuracy in reputation systems. One source of inaccuracy is the obligation that a client usually feels to give overtly positive ratings to workers, leading to reputation inflation on the platform. One proposal is that clients who rate a worker highly must be willing to continue to transact with that person (Gaikwad et al., 2017).

Finally, a platform could be allowed to retain unique ownership of the details of platform-level reputation, such that a worker might transfer his or her overall scores to another

platform without any need to expose the underlying data. Allowing workers to access their reputation could also give them greater agency and opportunity, especially in the case of the best workers whom multiple platforms might seek to attract.



8.3.3. Regulator–worker interactions to create greater agency independent of platform involvement

Regulators and workers could also engage jointly in the process of regulation, especially when they need to work towards solutions independently of the platform. In instances where the platform fails or refuses to provide access to its data (to either regulators or workers), this third form of co-developed regulation might prove to be effective.

There could be several forms of collaborative development of regulation by the regulator alongside workers. Most of these approaches would involve some alternate means of data collection that gives an information advantage to regulators, workers, or both, thereby giving workers greater negotiating power when engaging with platforms.

8.3.3.a. Large-scale off-platform data collection

Regulators could use alternative tools to collect data on a large scale from workers as well as consumers. For example, the survey tool CoInspect allows workers to provide information through digital inspection forms. The collected data are aggregated and analysed to provide insights that cater to industry regulators. At present, such tools are largely used outside the platform economy, but they could easily be used to gather feedback from workers as well as consumers on a large scale, and thereby create an alternative pool of data to enable regulators to regulate platforms.

8.3.3.b. Alternate forms of worker protection

Regulators could also empower workers by engaging with private worker groups to create and deploy protection schemes for those who earn most or even all of their income on platforms. To prevent the abuse of such schemes, the regulator would need mechanisms to accurately identify those workers who rely on platforms for most of their income, rather than just supplementary income.

In view of their greater susceptibility to exploitation, low-skilled platform-mediated workers who provide highly standardized services could be offered special forms of social support and protection regulators. Governments could also subsidize their access to learning in order to provide these workers with opportunities to upskill themselves and move towards more differentiated types of work.

8.3.4. Self-empowerment by workers

In the absence of any other recourse, workers have actively engaged in empowering themselves. Ride-hailing platforms currently use their data to arbitrate conflicts between consumers and workers. Drivers who feel disempowered by the available processes have responded by collecting their own data, installing dashboard cameras in their vehicles.[8]

Drivers also organize themselves to outwit the platform's algorithms. Qualitative research as well as anecdotal evidence, suggest that drivers create an artificial shortage of supply by turning off their applications simultaneously when expecting a rise in demand, especially before and after big sporting or entertainment events (Sherman, 2017). This confuses the algorithm and triggers surge pricing, allowing the drivers to earn more money.

Workers have also learned to maintain a level of freedom for themselves by taking breaks in a way that shelters them from the risk of missing out on some form of platform incentive. On ride-hailing platforms, for example, some drivers take a break without turning off their app by parking between other cars working for the same platform. This shields them from having requests assigned to them while allowing them to continue to log in for the number of hours that the system requires in order to collect an hourly payment incentive. In another example, to counter the lower fares on UberPool, some drivers switch off the app after collecting their first passenger, allowing them to go directly to the destination instead of picking up various other consumers along the way (Lee et al., 2015).

8.3.5. Collective action

Collective action empowers workers in two important ways. First, collective action increases negotiation power for workers. Labour unions in the traditional industrial setting performed this role.

Second, collective action may also enable workers to deconstruct the platform's match-making and allocation algorithm and gain greater agency. As noted earlier, platforms discourage collective action and do not actively encourage workers to meet each other. Regulators could actively enable collective action among platform workers.

8.3.5.a. Collective action to develop worker power over algorithms

The role of collective action in deciphering and deconstructing algorithms, and hence reducing their opacity, could be hugely significant. There is an important distinction between unionization in traditional organizations, largely focused on negotiation, and collective action on platforms, where workers can collectively reduce the power of the algorithm, by identifying response patterns to changes it introduces.

Prior research on gaming mechanics suggests that game algorithms involve interactions that are not fully evident to players, but which are discovered through repeated interaction with the game and the ways in which the system changes its behaviour in response to user interaction (Wardrip-Fruin, 2009; Bogost, 2007). As players unravel

8 See for example: http://money.cnn.com/2017/07/19/technology/business/rideshare-drivers-camera/index.html; https://qz.com/985832/uber-drivers-are-filming-their-riders-with-dash-cams-to-protect-against-bad-reviews-and-false-accusations/

more of the game's half-hidden rules and patterns, they develop greater control over the game, based on the feedback available to them from the gaming system (Juul, 2013).

Workers on labour platforms can similarly identify patterns through repeated interaction with the platform. When connected with other workers, they can build a common body of knowledge that allows all workers to exercise greater control over their relationship with the platform's algorithm.

A study of online forum interactions among Uber drivers used semantic analysis to discover that drivers regularly interact and actively try to decode rules governing pricing, work allocation, and the rating system (Allen-Robertson, 2017). This is indicative of a collective effort to build a body of knowledge and gain greater control over the human algorithm relationship on labour platforms. Individual drivers, having attempted to decode this information single-handedly, may well have been highly motivated to share and discuss their experiences with their peers on online forums in the hope of achieving greater success. A larger group of interacting workers could expect to arrive at much better insights than any single worker.

Regulators could foster such worker empowerment by requiring greater interaction among workers participating on a platform and by providing the spaces for such interaction.

8.3.5.b. Enabling collective action at scale

Although many labour platforms have global operations, most regulatory responses have been piecemeal, on the basis of local jurisdictions and geographies. Traditional trade union bodies have also championed the cause of workers on labour platforms at the country and city levels. The Danish Confederation of Trade Unions (LO) is one such example that actively engages with workers, platforms and regulators to champion the cause of workers.[9] Local workers associations native to the platform economy have also arisen, such as the California App-Based Drivers Association. These efforts are not insignificant, but owing to the global power of platforms these responses may lack the negotiation power that a single global body might have vis-à-vis these global platforms.

A solution to labour issues may be the creation of an international workers' union (Graham, Hjorth and Lehdonvirta, 2017). This would enable greater bargaining power over platforms. Such a union could also interface with worker protection bodies at the local level to create safeguards relevant to a specific jurisdiction. However, the global scale would empower such a body to have greater negotiating power with the platform.

9. Conclusion

This analysis provides a framework for understanding empowerment or exploitation of workers based on the business model design choices made by the platform. As noted in section 3, business model design choices and platform management techniques are aimed at the creation of an efficient labour market, by maximizing the success and repeatability of the core interaction. To the extent that worker outcomes are aligned with market efficiency, these design and policy choices lead to the empowerment of

9 Disclosure: The author has frequently spoken at events organized by the LO in Denmark.

workers. However, when worker outcomes and market efficiency are at odds with each other, workers may well be exploited by the platform. We also note that such exploitation is especially exacerbated in the case of low-skilled, highly standardized work, where the platform exercises greater control and also creates greater information asymmetry between itself and the workers.

The regulatory solution proposed here is structured around the regulation of data. A scalable regulatory framework needs to involve data about the actual functioning of the market. Breaking down the regulatory framework into its three component stakeholder interactions affords a useful systemic view of a possible regulatory response. Depending on the choices of different stakeholders, the overall regulatory response might vary. For example, if the platform refused to share data, regulator–worker interactions and attendant responses might gain precedence. Conversely, certain platforms might prove to be worker-friendly even without regulatory guidance. In such scenarios, platform–worker interactions and the associated solutions might gain precedence. Finally, in jurisdictions with active regulation, regulators might consider the various options surrounding regulator–platform interactions. By laying out all types of interactions, this framework offers a holistic set of responses and interventions that could effectively regulate labour platforms and create greater agency for workers.

References

Ajunwa, I.; Crawford, K.; Schultz, J. 2017. "Limitless worker surveillance", in *California Law Review*, Vol. 105, pp. 735–776. Available at: http://www.californialawreview.org/wp-content/uploads/2017/07/3Ajunwa-Schultz-Crawford-36.pdf [6 May 2018].

Allen-Robertson, J. 2017. *The Uber game: Exploring algorithmic management and resistance*, 18th Annual Conference of the Association of Internet Researchers, Tartu, Estonia, 18-21 Oct.

Bardhi, F.; Eckhardt, G. 2012. *Access-based consumption: The case of car sharing*. Available at: https://www.cass.city.ac.uk/__data/assets/pdf_file/0011/203789/Access-Based-Consumption.pdf

Barocas, S.; Levy, K. 2016. "What customer data collection could mean for workers", in *Harvard Business Review*, 31 Aug. Available at: https://hbr.org/2016/08/the-unintended-consequence-of-customer-data-collection

Bergin, T. 2017. *Loophole allows Uber to avoid UK tax, undercut rivals*, Reuters, 7 June. Available at: https://uk.reuters.com/article/uk-uber-tax-britain/exclusive-loophole-allows-uber-to-avoid-uk-tax-undercut-rivals-idUKKBN18Y1Z6

Biddle, S. 2014. *Delivery startup lands $16M investment as employees cry exploitation*, Gawker Media, 19 Feb. Available at: http://valleywag.gawker.com/delivery-startup-lands-16m-investment-as-employees-cry-1525973227

Bogost I. 2007. *Persuasive games: The expressive power of videogames* (Cambridge, MA, MIT Press).

Bolton, G.; Greiner, B.; Ockenfels, A. 2013. "Engineering trust: Reciprocity in the production of reputation information", in *Management Science*, Vol. 59, No. 2; pp. 265-285.

Botsman, R.; Rogers, R. 2010. *What's mine is yours: The rise of collaborative consumption* (Harper Collins).

Bradshaw, T. 2015. "Uber settles lawsuit over child's death", in *Financial Times*, 15 July.

Cambridge, E. 2017. "What is Airbnb, where is it banned, how does it work and why has it been controversial?", in *The Sun*, 15 Dec. Available at: https://www.thesun.co.uk/news/2262225/airbnb-banned-controversial-work/

Calo, R.; Rosenblat, A. 2017. "The taking economy: Uber, information, and power", in *Columbia Law Review*, Vol. 117, No. 6, Oct. Available at: http://www.jstor.org/stable/44392959

Cherry, M.A. 2016. "Beyond misclassification: The digital transformation of work", in *Comparative Labor Law & Policy Journal*. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2734288

Choudary, S.P. 2015. *Platform scale: How an emerging business model helps startups build large empires with minimum investment* (Platform Thinking Labs).

—. 2017a. *How digital platforms increase inequality* (INSEAD Knowledge). Available at: https://knowledge.insead.edu/blog/insead-blog/how-digital-platforms-increase-inequality-6391

—. 2017b. *The dangers of platform monopolies* (INSEAD Knowledge). Available at: https://knowledge.insead.edu/blog/insead-blog/the-dangers-of-platform-monopolies-6031

Cockayne, D.G. 2016. *Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy* (Geoforum). Available at: https://www.sciencedirect.com/science/article/pii/S0016718516302305

Cohen, M.; Sundararajan, A. 2015. "Self-regulation and innovation in the peer-to-peer sharing economy", in *University of Chicago Law Review Dialogue*, Vol 82, pp. 116–133. Available at: http://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/uchidial82&section=9

Connelly, C.E.; Gallagher, D.G. 2004. "Emerging trends in contingent work research", in *Journal of Management*, Vol. 30, No. 6, pp. 959–983. Available at: https://www.sciencedirect.com/science/article/pii/S0149206304000704

Dellarocas, C.; Wood, C.A. 2008. "The sound of silence in online feedback: Estimating trading risks in the presence of reporting bias", in *Management Science*, Vol. 54, No. 3, pp. 460–476.

Dillahunt T.R.; Malone A.R. 2015. "The Promise of the Sharing Economy Among Disadvantaged Communitie". Source: http://socialinnovations.us/assets/papers/pn0389-dillahuntv2.pdf

Dredge, D.; Gyimóthy, S. 2015. "The collaborative economy and tourism", in *Tourism Recreation Research*, Vol. 40, No. 3, pp. 286–302. Available at: http://vbn.aau.dk/files/218999422/Dredge_Gyimothy_Ver10_preprint_upload.pdf

Edelman, B.; Luca, M. 2014. *Digital discrimination: The case of Airbnb.com*, Harvard Business School Negotiation, Organizations and Markets Unit, Research Paper Series No. 54. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2377353

—; Luca, M.; Svirsky, D. 2017. "Racial discrimination in the sharing economy: Evidence from a field experiment", in *American Economic Journal: Applied Economics*, Vol. 9, No. 2, pp. 1–22. Available at: https://www.aeaweb.org/articles?id=10.1257/app.20160213

Ert, E.; Fleischer, A.; Magen, N. 2016. "Trust and reputation in the sharing economy: The role of personal photos in Airbnb", in *Tourism Management*, Vol. 55, Aug, pp. 62–73. Available at: https://www.sciencedirect.com/science/article/pii/S0261517716300127

Everett, C. 2015. "Will the sharing economy strike the right legal balance between empowering and exploiting workers?", Diginomica, 6 Apr. Available at: https://diginomica.com/2015/04/06/will-the-sharing-economy-the-ubers-and-lyfts-of-the-world-strike-the-right-legal-balance-between-empowering-and-exploiting-workers/

Eyal, N. 2014. *Hooked: How to build habit-forming products* (New York, NY, Portfolio/Penguin).

Fradkin, A. 2015. *Search frictions and the design of online marketplaces*. Available at: https://pdfs.semanticscholar.org/b75a/56c4047b3df9d6ec84e49b24c6a2058346a6.pdf

Fraiberger, S.; Sundararajan, A. 2015. *Peer-to-peer rental markets in the sharing economy*, Working Paper No. 19, Stern School of Business, NYU (New York, NY).

Gaikwad, S. et al. 2016. *Boomerang: Rebounding the consequences of reputation feedback on crowdsourcing platforms* (Stanford, CA, Stanford University). Available at: http://web.media.mit.edu/~gaikwad/assets/publications/boomerang-uist.pdf

Ghose, A.; Ipeirotis, P.G.; Li, B. 2012. "Designing ranking systems for hotels on travel search engines by mining user-generated and crowdsourced content", in *Marketing Science*, Vol. 31, No. 3, pp. 493–520.

Gillespie, T. 2015. "Platforms intervene", in *Social Media + Society*, Apr-June. Available at: http://journals.sagepub.com/doi/pdf/10.1177/2056305115580479

Godes, D.; Silva, J.C. 2012. "Sequential and temporal dynamics of online opinion", in *Marketing Science*, Vol. 31, No. 3, pp. 448–473.

Graham, M.; Wood, A. 2016. *Why the digital gig economy needs co-ops and unions*, openDemocracyUK, 15 Sep. Available at: https://www.opendemocracy.net/alex-wood/why-digital-gig-economy-needs-co-ops-and-unions

Graham, M.; Hjorth, I.; Lehdonvirta, V. 2017. "Digital labour and development: Impacts of global digital labour plat-forms and the gig economy on worker livelihoods" in *European Review of Labour and Research*, Vol. 23, No. 2. Available at: http://journals.sagepub.com/doi/abs/10.1177/1024258916687250

Greenwood, B.N.; Wattal, S. 2015. *Show me the way to go home: An empirical investigation of ride sharing and alcohol related motor vehicle homicide*, Fox School of Business Research Paper No. 54. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2557612

Griswold, A. 2015. *Dirty Work*, Slate, 24 July. Available at: http://www.slate.com/articles/business/moneybox/2015/07/handy_a_hot_startup_for_home_cleaning_has_a_big_mess_of_its_own.html

Grossman, N. 2015. *White paper: Regulation, the internet way: A data-first model for establishing trust, safety, and security: Regulatory reform for the 21st century city*, Data-Smart City Solutions, 8 Apr.

Guyer, J. 2016. *Legacies, logics, logistics: Essays in the anthropology of the platform economy* (Chicago, IL, University of Chicago Press).

Hall, J.V.; Krueger, A.B. 2015. *An analysis of the labor market for Uber's driver-partners in the United States*, IRS Working Paper No. 587, Industrial Relations Section (Princeton, NJ, Princeton University). Available at: https://dataspace.princeton.edu/jspui/handle/88435/dsp010z708z67d

Hill, S. 2015a. *Raw deal: How the "Uber Economy" and runaway capitalism are screwing American workers* (New York, NY, St. Martin's Press).

—. 2015b. *New economy, new social contract: A plan for a safety net in a multiemployer world* (Washington, DC, New America). Available at: https://na-production.s3.amazonaws.com/documents/New_Economy_Social_Contract.pdf

Horan, H. 2017. "Will the growth of Uber increase economic welfare?" in *Transportation Law Journal*, Vol 22. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2933177

Horton, J. 2010. *Online labor markets* (Cambridge, MA, Harvard University). Available at: http://john-joseph-horton.com/papers/online_labor_markets.pdf

International Labour Office (ILO); IG Metall. Forthcoming. *Digital labour platforms and the future of work: Towards decent work in the online world* (Geneva).

Irani, L.C.; Silberman, M. 2013. "Turkopticon: Interrupting worker invisibility in amazon mechanical turk", in *Proceedings of the 31st Annual ACM Conference on Human Factors in Computing Systems*. Available at: https://dl.acm.org/citation.cfm?id=2470742

Johnsen, R.; Gudmand-Høyer, M. 2010. "Lacan and the lack of humanity in HRM", in *Organization*, Vol. 17, No. 3, pp. 331-344 . http://journals.sagepub.com/doi/abs/10.1177/1350508410363124

Johnston, H.; Land-Kazlauskas, C. 2018. *Organizing on-demand: Representation, voice, and collective bargaining in the gig economy*, Conditions of Work and Employment Series No. 94 (Geneva, ILO). Available at: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_624286.pdf

Juul, J. 2013. *The art of failure: An essay on the pain of playing video games* (Cambridge, MA, MIT Press).

Kelly, C.; Kelly, J. 1994. "Who gets involved in collective action? Social psychological determinants of individual participation in trade unions", in *Human Relations*, Vol. 47, No. 1, pp. 63–88. Available at: http://journals.sagepub.com/doi/abs/10.1177/001872679404700104

Khanna, P.; Choudary, S.P. 2017. *The world's megacompanies are about to become true stateless superpowers—in all their power and complexity*, Quartz. Available at: https://qz.com/954838/global-companies-local-rules

Koopman, C.; Mitchell, M.D.; Thierer, A.D. 2015. "The sharing economy and consumer protection regulation: The case for policy change", in *The Journal of Business, Entrepreneurship and the Law*, Vol. 8, No. 2, pp. 529–545.

Lee, M.K.; Kusbit, D.; Metsky, E.; Dabbish, L. 2015. *Working with machines: The impact of algorithmic and data-driven management on human workers*, working paper (Pittsburgh, PA, Carnegie Mellon University). Available at: https://www.cs.cmu.edu/~mklee/materials/Publication/2015-CHI_algorithmic_management.pdf

Lehdonvirta, V. 2016. "Algorithms that divide and unite: Delocalisation, identity and collective action in 'microwork'", in J. Flecker (ed.): *Space, place and global digital work* (Palgrave Macmillan). Available at: https://link.springer.com/chapter/10.1057/978-1-137-48087-3_4

Leung, L. 2009. "User-generated content on the internet: An examination of gratifications, civic engagement and psychological empowerment", in *New Media & Society*, Vol. 11, No. 8.

Martin, C. 2016. "The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism?", in *Ecological Economics*, Vol. 121, pp. 149–159. Available at: https://www.sciencedirect.com/science/article/pii/S0921800915004711

McFarland, M. 2016. How Uber punishes drivers who refuse to use UberPool, CNN Tech, 28 July. Available at: http://money.cnn.com/2016/07/28/technology/uber-uberpool-timeouts/

McQuown, P. 2016. *An analysis of the entrepreneurial aspects of Uber's driver-partner platform,* Case Study, Business Management and Entrepreneurship, Dec. (Providence, RI, Brown University). Available at: https://www.brown.edu/academics/engineering/sites/brown.edu.academics.engineering/files/uploads/UberCaseBrownUniversityMcQuown.pdf

Musaddique, S. 2018. "Denmark demands former Uber drivers pay millions in unpaid taxes", in *The Independent*, 4 Apr. Available at: https://www.independent.co.uk/news/business/news/demark-uber-millions-unpaid-tax-regulators-ride-hailing-a8288371.html

Nosko, C.; Tadelis, S. 2015. *The limits of reputation in platform markets: An empirical analysis and field experiment*, NBER Working Paper No. 20830 (Cambridge, MA, National Bureau of Economic Research). Available at: http://www.nber.org/papers/w20830

O'Connor, S. 2016. "When your boss is an algorithm", in *Financial Times*, 8 Sep. https://www.ft.com/content/88fdc58e-754f-11e6-b60a-de4532d5ea35

O'Reilly, T. 2017. *WTF?: What's the future and why it's up to us* (New York, NY, HarperCollins).

Oskam, J.; Boswijk, A. 2016. "Airbnb: The future of networked hospitality businesses", in *Journal of Tourism Futures*, Vol. 2, No. 1, pp. 22–42.

Parker, G.G.; Van Alstyne, M.W.; Choudary, S.P. 2016. *Platform revolution: How networked markets are transforming the economy and how to make them work for you* (New York, NY, W.W. Norton).

Pfeffer-Gillett, A. 2016. "When 'disruption' collides with accountability: Holding ridesharing companies liable for acts of their drivers", in *California Law Review*, Vol. 104, No. 1, pp. 233–266. Available at: http://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/calr104&section=9

Prassl, J.; Risak, M. 2016. *Uber, TaskRabbit, & Co: Platforms as employers? Rethinking the legal analysis of crowdwork*, Oxford Legal Studies Research Paper No. 8 (Oxford, University of Oxford).

Raval, N.; Dourish, P. 2016. "Standing out from the crowd: Emotional labor, body labor, and temporal labor in ridesharing", in *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, pp. 97–107. Available at: https://dl.acm.org/citation.cfm?id=2820026

Ries, E. 2011. *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses* (New York, NY, Crown Business).

Rhodes, A. 2017. "Uber: Which countries have banned the controversial taxi app", in *The Independent*, 22 Sep. Available at: https://www.independent.co.uk/travel/news-and-advice/uber-ban-countries-where-world-taxi-app-europe-taxi-us-states-china-asia-legal-a7707436.html

Rogers, B. 2015. "The social costs of Uber", in *University of Chicago Law Review Dialogue*, Vol. 82, pp. 85–102. Available at: http://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/uchidial82&section=7

Roose, K. 2014. "Does Silicon Valley have a contract-worker problem?" in *New York*, 18 Sep. Available at: http://nymag.com/daily/intelligencer/2014/09/silicon-valleys-contract-worker-problem.html

Rosenblat, A.; Stark, L. 2016. "Algorithmic labor and information asymmetries: A case study of Uber's drivers", in *International Journal of Communication*, Vol. 10, pp. 3758–3784. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2686227

Said, C. 2015. "Honor lands $20 million for senior in-home care agency" in *San Francisco Chronicle*, 2 Apr. Available at: http://www. sfchroni-cle.com/business/article/Honor-lands-20-million-forsenior-in-home-care-6173606.php.

Scheiber, N. 2017. "How Uber uses psychological tricks to push its drivers' buttons", in *New York Times*, 2 Apr. Available at: https://www.nytimes.com/interactive/2017/04/02/technology/uber-drivers-psychological-tricks.html

Schor, J.B. 2017. "Does the sharing economy increase inequality within the eighty percent?: Findings from a qualitative study of platform providers", in *Cambridge Journal of Regions, Economy*

and Society, Vol. 10, No. 2, pp. 263–279. Available at: https://academic.oup.com/cjres/article-abstract/10/2/263/2982086

Shapiro, C.; Varian, H.R. 1998. *Information rules: A strategic guide to the network economy* (Boston, MA, Harvard Business Publishing).

Sherman, E. 2017. *Uber costs too much because drivers trick the system. Here's how to fight back*, Inc., 2 Aug. Available at: https://www.inc.com/erik-sherman/new-study-shows-uber-drivers-trick-algorithm-to-ma.html

Shirky, C. 2011. "The political power of social media: Technology, the public sphere, and political change" in *Foreign Affairs*, Jan.–Feb. issue.

Singer, N. 2014. "In the sharing economy, workers find both freedom and uncertainty", in *New York Times*, 16 Aug. Available at: https://www.nytimes.com/2014/08/17/technology/in-the-sharing-economy-workers-find-both-freedom-and-uncertainty.html

Slee, T. 2015. *What's yours is mine: Against the sharing economy* (New York, NY, OR Books).

Sperling, G. 2015. *How Airbnb combats middle class income stagnation*. Available at: http://www.stgeorgeutah.com/wp-content/uploads/2015/07/MiddleClassReport-MT-061915_r1.pdf

Sundararajan, A. 2016a. *The sharing economy: The end of employment and the rise of crowd-based capitalism* (Cambridge, MA, MIT Press).

—. 2016b. "Crowd-based capitalism? Empowering entrepreneurs in the sharing economy", in *MIT Sloan Management Review*.

Suzor, N. 2016. *Digital constitutionalism: Using the rule of law to evaluate the legitimacy of governance by platforms*, GigaNet: Global Internet Governance Academic Network, Annual Symposium 2016. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2909889

Tanz, J. 2014. *How Airbnb and Lyft finally got Americans to trust each other*, Wired, 23 Apr. Available at: https://www.wired.com/2014/04/trust-in-the-share-economy/

Tobias, C. 2015. *Why the restaurant industry hates Postmates*, The Stranger, 26 Aug. Available at: https://www.thestranger.com/food-and-drink/feature/2015/08/26/22755941/why-the-restaurant-industry-hates-postmates

Van Alstyne, M.W.; Parker, G.G.; Choudary, S.P. 2016. "Pipelines, platforms, and the new rules of strategy", in *Harvard Business Review*, Apr.

Van Buren, H.; Greenwood, M. 2008. "Enhancing employee voice: Are voluntary employer-employee partnerships enough?", in *Journal of Business Ethics*, Vol. 81, No. 1, pp. 209–221. Available at: https://link.springer.com/article/10.1007/s10551-007-9489-y

Van Doorn, N. 2017. "Platform labor: On the gendered and racialized exploitation of low income service work in the 'on-demand' economy", in *Information, Communication & Society*, Vol. 20, No. 6. Available at: http://www.tandfonline.com/doi/abs/10.1080/1369118X.2017.1294194

Wardrip-Fruin, N. 2009. *Expressive processing: Digital fictions, computer games, and software studies* (Cambridge, MA, MIT Press).

Wolverton, T. 2018. *The Facebook-Cambridge Analytica scandal is the textbook case for why we need new privacy protections*, Quartz. Available at: http://www.businessinsider.com/facebook-cambridge-analytica-shows-the-need-for-a-new-privacy-law-2018-3/?IR=T

Wosskow, D. 2014. *Unlocking the sharing economy. An independent review* (London, Department for Business, Innovation & Skills). Available at: http://collaborativeeconomy.com/wp/wp-content/uploads/2015/04/Wosskow-D.2014.Unlocking-the-UK-Sharing-Economy.pdf

Zervas, G.; Proserpio, D.; Byers, J. 2015. *A first look at online reputation on Airbnb, where every stay is above average*, SSRN Electronic Journal. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2554500

Zott, C.; Amit, R. 2010. "Business model design: An activity system perspective", in *Long Range Planning*, Vol. 43, pp. 2016–2026.