# Platformic Management, Boundary Resources for Gig Work, and Worker Autonomy

Mohammad Hossein Jarrahi, University of North Carolina at Chapel Hill

Will Sutherland, University of Washington

Sarah Beth Nelson, University of Wisconsin-Whitewater

Steve Sawyer, Syracuse University

## Abstract

We advance the concept of platformic management and the ways in which platforms help to structure project-based or "gig" work. We do so knowing that the popular press and a substantial number of the scholarly publications characterize the "rise of the gig economy" as advancing worker autonomy and flexibility, focusing attention to online digital labor platforms such as Uber and Amazon's Mechanical Turk. Scholars have conceptualized the procedures of control exercised by these platforms as exerting "algorithmic management," reflecting the use of extensive data collection to feed algorithms that structure work. In this paper, we broaden the attention to algorithmic management and gig-working control in two ways. First, we characterize the managerial functions of Upwork, an online platform that facilitates knowledge-intensive freelance labor - to advance discourse beyond ride-sharing and room-renting labor. Second, we advance the concept of platformic management as a means to convey a broader and sociotechnical premise of these platforms' functions in structuring work. We draw on data collected from Upwork forum discussions, interviews with gig workers who use Upwork, and a walkthrough analysis of the Upwork platform to develop our analysis. Our findings lead us to articulate platformic management -- extending beyond algorithms -- and to see the platform as a ''boundary resource" to articulate the paradoxical affordances of Upwork and similar platforms. That is, these platforms (1) enable the autonomy desired by gig workers, while (2) also serving as a means of control aimed at maintaining the viability of the gig or project while protecting the platform from disintermediation.

**Keywords:** Gig work, knowledge work, Upwork, platformic management, algorithmic management, autonomy paradox, boundary resources, sociotechnical systems.

# Introduction

We advance the concept of platformic management, focusing on the algorithmic features and related functions that together help to structure gig work and shapes gig-workers' control over their work. To do this we use data from a study of the online freelance platform, Upwork.com, one of the most popular of the many online job-posting/job-seeking platforms that are helping to reshape how part-time, gig and freelance workers find work (Chapman 2018).

Findings from this study make two contributions to the fast-growing body of research on gig-work platforms, platform-based work, and worker autonomy in online labor markets. First, we advance the concept of platformic management as distinct from algorithmic management. We do this by outlining how the platform's features, policies and norms of use are structured in ways that locate the algorithms being used to be one part of an overall managerial structure. Second, we focus explicitly on knowledge work, distinguishing the work of programmers, editors, architects, designers and other forms of work that rely on formal education, abstraction and conceptual knowledge and complex tasks (that often rely on both collaboration and extensive interaction with the client). In doing this, we seek to distinguish freelance and knowledge-based gig work from the fogginess that comes from so much attention to gig work as ride-sharing and home-sharing.

We are motivated to explore platforms and platformic management given the growth of gig work and the expanding roles that online or digital platforms play in this work. To the first, on-demand or "gig" work, data show the number of American gig workers is expected to nearly double in the next few years and to reach 9.2 million in 2021, many of whom pursue the knowledge-based freelance work that serves as our focal interest (Molla 2017). Many see this shift to gig work as "liberating" workers from traditional work environments, providing them with opportunities to work independently and flexibly (Hannák et al. 2017). Flexible work is thus seen as one of the primary attractions of the gig economy, since it is argued that gig workers enjoy higher autonomy in deciding where and when to work (Friedman 2014; Kuhn and Maleki 2017). In fact, the "rhetorical markers" of the on-demand economy are "freedom, flexibility, and entrepreneurship" (Rosenblat and Stark 2016, p. 3761).

The rise in their central role and impressive functionality suggest to us that a deeper understanding of a platform's management strategies requires consideration of the digital features and resources that mediate knowledge-intensive gig work. Pursuing this goal, we examine Upwork's managerial functions relative to how gig workers navigate and interact with the management and administrative functions, features, and algorithms of the platform. We begin with the research question: *What are the managerial functions of Upwork that enable the platform to manage gig workers?*

To respond to this question, the paper continues in seven sections. First, we outline why we choose to focus on Upwork for this study. In the next section, we review related literature, focusing on the sociotechnical basis of gig-working and the rise of the digital platforms as a form of managing. Following this, we conceptualize these digital platforms as boundary resources to focus attention to the ways in which Upwork serves as a boundary and a resource between those seeking work and those seeking workers. In the fourth section, we provide an overview of the research approach, data collection and analysis. In section five, we present the findings, and

then discuss these and their implications in the sixth section. In the final section, we summarize the work and highlight future needs.

# Focusing on Upwork

We focus this study on Upwork.com[1] as a proxy for what these online platforms provide to freelance and gig-based work and workers. We selected Upwork because it is the world's largest online freelancer platform (both in terms of revenue generated and number of workers, with three million jobs posted annually) (World Economic Forum 2016). Upwork serves as a market-making platform, providing a means to connect those offering work to potential workers (Kuhn and Maleki 2017). Market-making platforms provide mechanisms to 'make a market,' such that the independent worker performs a job with the platform seemingly replacing the boss (Spreitzer et al. 2017). In this simplified view, platforms like Upwork are seen as providing workers both flexibility and independence. Furthermore, and returning to oft-used examples, gig-enabling digital platforms like Care.com and Uber tout these attributes as a central part of their service (Kuhn and Maleki 2017; Ticona et al. 2018).

Upwork allows employers to post a range of knowledge-based gig work such as web design, digital marketing, strategic business consulting and intellectual property law, to be seen by potential workers who can bid for these jobs. Both job seekers and job posters create accounts on Upwork, as doing so gives them access to the see or post the work, and to take advantage of the resources and functions that Upwork provides. The jobs or "gigs" posted to Upwork typically involve engagements with clients that range from days to months and require more complex interactions than what is posted to microtasking sites like Amazon Mechanical Turk (AMT) or TaskRabbit (De Stefano 2015; Green et al. 2018; Kalleberg and Dunn 2016).

Jobs posted to Upwork typically require a relatively higher level of tacit expertise and therefore a different approach, beyond mere algorithmic management, to managing and coordinating transactions between service providers and receivers (Claussen et al. 2018). Kalleberg and Dunn have argued that gig workers on Upwork may enjoy more control and flexibility, compared to workers on ride-sharing and microtask platforms, because Upworkers are provided with mechanisms to create a portfolio, decline projects, negotiate wages, dispute pay and work, and rate clients ("employers") (Jarrahi and Sutherland 2019).

As detailed below, we focus specifically on exploring Upworkers' understanding of and experiences with the management functionality provided, critically examining how the management functions reflect and enforce managerial structures and principles, more broadly. Finally, by using interview data and, particularly, the functional walkthrough method, we seek to open the black box of Upwork's technological arrangements and managerial functions.

# Related Literature

What we know about gig-work platforms and worker (or work) autonomy can be situated at the nexus of two streams of literature: (1) the nascent literature defining and explaining some common dynamics of the gig economy and digital platforms, and (2) the recent theorizations of platforms or algorithms as managers. This literature provides some description of some of the

[1] http://www.upwork.com

mechanisms of digital control exercised by platform spaces as well as worker responses to these mechanisms. Both streams provide insights into the kinds of management structures, rules, and algorithms that might be embedded in a gig-working platform.

## The Sociotechnical Basis of Gig Work and Digital Platforms

Gig workers are typically characterized by the transactional nature of their relationship with employers. Gig workers may not be “professionals” or work full time on gigs, in the sense of gig work being their primary source of income. Rather, gig workers often work “on the side” (alongside another job) or as a hobby (Brinkley 2016). Gig work centers around specific, finite projects (gigs), rather than full-time employment (Wood et al. 2018).

For the gig worker, this at-will relationship implies flexibility in selecting and scheduling work, and also flexibility in choosing both where and how they accomplish work (Friedman 2014; Spreitzer et al. 2017). Gig work therefore lends itself to flexible, autonomous work, in which the gig worker has more say in setting their own hours, choosing which projects to pursue, taking on a variety of projects and roles, and in some cases, guiding their own business as an entrepreneur (Abubakar and Shneikat 2017; Donovan et al. 2016; Torpey and Hogan 2016). In some cases, however, the gig or digital workers may run into precarious work situations by engaging in menial work. For example, Irani (2015) examines the divisions of labor and the cultural norms of microworkers, and concludes that the notion of humans as computational services, embodied in the design of AMT, may alienate crowdworkers and raise the question of fairness.

The gig economy is bound up with the rise of digital platforms as mediators and facilitators of temporary, often impersonal work arrangements (Dunn 2017; Lehdonvirta 2018). Digital platforms play an important role in connecting people, and providing rating systems and other forms of evaluation to build trust between workers and employers (Acquier et al. 2017; Yoganarasimhan 2013). In the absence of a traditional work organization, the digital platforms’ features and functions help to provide structure for working arrangements and the articulation and evaluation of tasks (Irani and Silberman 2013; Lehdonvirta 2018). The centrality of these digital platforms means gig workers’ professional situations, and the amount of control they enjoy in conducting work and negotiating pay, are bound up in both the functions provided by and the policies of the platform (Kalleberg and Dunn 2016; Kuhn and Maleki 2017). Like other structural metaphors such as ‘network’ or ‘infrastructure,’ the concept of platform means different things to different audiences. Gillespie (2010) brings to the fore the political dynamics and rhetorical utility of the term ‘platform’ for various stakeholders (e.g. technology vendors, advertisers and policy makers), and argues it has been used to spark discussion of new business models, technical architecture, and information policies.

The mutual dependence of digital platforms in supporting gig work and gig work’s reliance on digital platforms invites a more theoretically grounded understanding of digital platforms and how they operate as distinct sociotechnical structures in mediating work (Howcroft and Bergvall-Kåreborn 2018; Kuhn and Maleki 2017; Sutherland and Jarrahi 2017).

## Digital Platform as Manager

We focus on two aspects of Upwork's managerial functions. First, we summarize the burgeoning literature looking at the roles of algorithms and other platform features relative to their managerial roles. Second, we focus on the concept of "programmability," or the ability for the platform and related functions, guidance and rules of use to adapt.

### Algorithms and Other Platform Features

Central to the functioning of many digital platforms, algorithms now make autonomous decisions, taking over practices previously handled by managers (Brynjolfsson and McAfee 2014; Lee et al. 2015). The prevalence of algorithmic management signals an important shift in how work is conducted and managed and how gig workers make sense of their work and autonomy: what Möhlmann and Zalmanson call "the autonomy paradox." The autonomy paradox encapsulates the situation where even as workers can enjoy autonomy over how they choose which work to pursue, and when (and where) they do work, they are subject to new forms of control and surveillance. And, this control and surveillance serves to limit aspects of their autonomy (Mazmanian et al. 2013).

Therefore, the seeming independence from direct, human-centered, managerial control in gig work may or may not result in more autonomy (Gershon and Cefkin 2017; Lehdonvirta 2018). Recent research points to the control exercised by gig platforms that limits workers' autonomy (Prassl 2018; Rosenblat and Stark 2016; Shapiro 2018; Wood et al. 2018). These scholars highlight a range of control functions, collectively known as "algorithmic management" or the "oversight, governance and control practices conducted by software algorithms" (Möhlmann and Zalmanson 2017, p. 4).

Seen this way, the gig economy is an experiment in worker autonomy using under-regulated market-making mechanisms (a well theorized issue of online markets, per Bar 2001). Workers seek out flexible arrangements via online platforms. Nevertheless, to take a job, these workers are increasingly being required to adhere to the time and project structures put in place by the platform. More broadly, and as contemporary empirical work is helping make clear, worker autonomy is a complicated concept, becoming that much more complex as overlapping digital platforms are helping (re)define work practices (Bucher and Fieseler 2017; Lehdonvirta 2018; Shapiro 2018). Underscoring the autonomy paradox, Gershon and Cefkin (2017) argue, "Just because a person is continuously consenting to do work for others does not necessarily mean that the person has more autonomy or has more equitable work relationships than a person occupying a more traditional job."

As early success stories in the development of the gig economy, Uber and AirBnB have taken on a larger (and perhaps too-visible) role as templates for understanding other gig economy business models (Mikhalkina and Cabantous 2015). The term "Uberization," for instance, has come to encapsulate the shift toward short-term or project-based work and increased risk for workers (Aloni 2016; Davis 2015; Fleming 2017; Kalleberg and Vallas 2018). Corporaal (2018) highlights the problem presented by this preoccupation, writing, "We know surprisingly little about the diversity of platforms that are out there and what types of work can be outsourced through them." Specifically, little is known about the organizing principles of the platforms

supporting online freelancing, a complex form of knowledge-intensive gig work involving skilled work, such as editorial work, public relations, and others (Premilla D'Cruz and Ernesto Noronha 2016).

The limited understanding of the organizing and managerial principles that structure online freelancing platforms is a significant gap. The prospect of managing knowledge-intensive projects, often with unspecified processes and subjective deliverables, is typically more daunting than managing tasks that can be effectively broken down into piecework such as those typically handled by AMT (Alkhatib et al. 2017).

Moreover, the effects of algorithmic management on worker autonomy have become entangled with the automation of decision making and the diminishing control of workers over their work (Howcroft and Bergvall-Kåreborn 2018; Newlands et al. 2018; Rosenblat 2016; Wood et al. 2018). For example, research on Uber helps make visible how functions on Uber's app monitor and control drivers' activity through an assortment of algorithms and incentivization schemes (Banning 2016; Rosenblat and Stark 2016; Simonite 2015). Whereas Uber proclaims that you can "be your own boss," the app and algorithms become a subtle and perhaps downbeat counter-rhythm. That is, you can "be your own boss - subject to the rules and controls we put in place as we gather your data to assess compliance."

Simplistic discussions focus attention to algorithms performing these controls, with little or no direct human intervention (Agrawal et al. 2017; Miller 2018). More thoughtful analyses make clear that Uber's algorithmic controls are part of a larger suite of material features and specific rules that bind this complex system together (van Doorn 2017). Beyond algorithmic control, gig platforms may leverage various technological and social mechanisms in order to manage how gig work is conducted (Ticona et al. 2018). For example, gig work platforms may require the use of controlled measurements, such as time trackers for hourly projects (with intrusive features like periodic screenshots) (Kuhn and Maleki 2017), or they have policies requiring gig workers to commit to windows of availability—that constrain flexibility and autonomy (Lehdonvirta 2018).

What these examples make clear is that platforms embody technological resources and rules that both enable and manage work. Our premise in this paper is that some of these dynamics cannot be reduced to algorithmic management, particularly in the context of knowledge workers conducting work through online freelancing platforms (e.g., Upwork, Freelancer.com, Toptal, and Fiverr); we denote these dynamics as platformic management to make clear this is more than "just" algorithmic functionality in play. Despite the recent scholarly attention paid to the management and control aspects of digital platforms for gig work, both public discourse and contemporary academic research have been largely focused on more conspicuous forms of gig work as icons of the gig economy (Heeks 2017; Howcroft and Bergvall-Kåreborn 2018; Sutherland and Jarrahi 2018).

A recent report by Ticona et al. (2018) provides a typology of job-seeking platforms, and argues that the management model used by market-making platforms (e.g., Upwork, Freelancer.com, or Fiverr) is more complicated than those of on-demand platforms such as Uber. This is because market-making platforms must provide more than "automated matching between clients and workers"; they need to mediate a complex hiring process "through sorting, ranking,

and rendering visible large pools of workers" with varying levels and forms of skill (Ticona et al. 2018, p. 3).

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## Programmability and Autonomy

One of the core features of a digital platform is "programmability," which describes how platforms actively invite user innovation by offering opportunities for "programmability", allowing a bottom-up extension of the base beyond the designer's intentions (Plantin et al. 2016). In their role as mediating gig-workers and gig work, these "programmable" platforms often take on managerial tasks and roles relative to structuring work (Howcroft and Bergvall-Kåreborn 2018; Rosenblat 2016). Lee et al. (2015) identify three specific managerial tasks that have been taken over by algorithms within the Uber and Lyft platforms: assigning work, providing information to workers, and evaluating their performance. Algorithms draw on large data sets to provide guidance on how to assign tasks to workers through filtering, ranking, and coordinating activities (Lustig et al. 2016; Raval and Dourish 2016). The traditional (middle) management structure of human supervisors is replaced with the automated enforcement of decisions based on large amounts of data (Aneesh 2009; Möhlmann 2015; Schildt 2017).

Most conceptualizations of algorithmic and data-centric decision making take a human-centered approach. That is, understanding the algorithms demands seeing these as merely analytical and technological systems of formal mathematical techniques (e.g., Knuth 1997). Rather than fixed systems of procedural formulas, these algorithms are heterogenous, dynamic sociotechnical systems, enacted through the practices of those who utilize them (Dourish 2016; Seaver 2017), which undergo evolution in deployment. For platforms, this is not just a fact, but rather a core criterion. The platform should be programmable, intentionally allowing and benefitting from specific kinds of appropriation by a crowd of users. This "programmability," and the ostensibly participatory relations it suggests, is in fact the basis of the platform's apparent neutrality: the notion of the platform as an intermediary that simply connects the activities of otherwise disconnected actors (Gillespie 2014).

Much of the literature on digital platforms has been aimed at dispelling this rhetoric of neutrality, and outlining the specific ways in which platforms restructure relations. Platforms' reliance on data requires a level of surveillance that is not present in most workplaces, and which may create significant information and power asymmetries between the worker and the platform core (Möhlmann and Zalmanson 2017; Wagenknecht et al. 2016). For example, Kingsley et al. (2015) discusses how AMT's platform design generates information asymmetry and consequently power asymmetry between AMT workers and those who post tasks. Furthermore, workers report that the management processes of on-demand platforms are opaque: hard to see or understand (Chan 2019; Rosenblat and Stark 2016). Given the lack of transparency around how the algorithms work, gig workers face significant sensemaking efforts in order to become familiar with the management and control processes under which their work is

structured (Möhlmann 2015; Raval and Dourish 2016; Wagenknecht et al. 2016). These information asymmetries, combined with the impersonality of platform spaces, contribute to a rearrangement of client and worker interactions such that human labor is accessible programmatically (Raval and Dourish 2016), or, as Irani and Silberman (2013) describe it, they provide 'humans-as-a-service'. The workers then find themselves working in an impersonal and inscrutable system (Möhlmann and Zalmanson 2017).

The working environment presented by the platform therefore both supports and obstructs the gig worker's desire for more professional flexibility and autonomy. Building off of Mazmanian et al. (2013), Möhlmann and Zalmanson (2017) discuss an autonomy paradox, in which platform workers gain work flexibility and autonomy, while simultaneously subjecting themselves to controlling information asymmetries and surveillance policies. In this way platform-based work invites meticulous surveillance and a host of algorithmically enforced control mechanisms which tie the worker to the platform and curtail their agency, while ostensibly enhancing their autonomy (Alkhatib et al. 2015; Howcroft and Bergvall-Kåreborn 2018; Rosenblat and Stark 2016). Balancing these tendencies towards programmability and algorithmic control, it is possible to see a relation between worker and algorithm that is mutual and emergent (Jarrahi and Sutherland 2019).

This dual role of the platform, as both market-making and managing, is central to our thesis. As noted in the introduction, the dynamics of control and autonomy in the platform space have largely been explored in either microtasking sites (Alkhatib et al. 2017; e.g., Irani and Silberman 2013; Lehdonvirta 2018) or in the specific context of ridesharing (e.g., Lee et al. 2015; Ma et al. 2018; Rosenblat and Stark 2016). The notion of algorithmic management has largely developed to describe on-demand platforms such as Uber, in which many of the decision-making responsibilities have been assumed by algorithms (Ticona et al. 2018). The lack of research on platforms mediating knowledge-intensive work is a significant absence, as the gig worker's experience with a platform, and particularly their autonomy, is highly dependent on the kind of work they are doing and the way the platform structures that work (Kalleberg and Dunn 2016; Lehdonvirta 2018). We address this gap by focusing on a platform space, which is less rigidly orchestrated by algorithms, and by focusing on a broad array of platform features as managerial mechanisms.

## Digital Platforms and Boundary Resources

To help pursue this deeper understanding, we draw on the concept of boundary resources (Eaton et al. 2015; Ghazawneh and Henfridsson 2010; Karhu et al. 2018). The concept of boundary resources has emerged of late from the information systems research community as a useful conceptual mechanism for describing the paradoxical affordances of these digital features, which may enable both worker autonomy and platformic control (Barrett et al. 2015; Eaton et al. 2015; Ghazawneh and Henfridsson 2013, 2015; Schreieck et al. 2016). The boundary resource draws on the concept of the boundary object as a way of discussing the cooperation of heterogeneous groups. However, boundary resource is a concept used in platform studies and information infrastructure research to describe the relationship between the organizer/owner of a platform and users as 'complementors' of the platform. In this context, boundary resources are those specific resources and facilities provided to a group of platform

users with the intent of facilitating innovation through controlled coordination (Ghazawneh and Henfridsson 2010).

A boundary resource is provided by the platform or service and delivers both specific functions and “the interface for the arm’s-length relationship” between the platform and participants or contributors (Ghazawneh and Henfridsson 2013, p. 23). In the case of gig platforms, boundary resources might include search and matching algorithms, badges that signal skills and abilities, templated profiles to communicate expertise, financial services to help manage project payment, messaging systems to support discussions between those offering and those seeking work, and arbitration policies and support. In each of these examples, it is both the functionality and the intermediating relationship of the platform that make them boundary resources.

Boundary resources are provided to a large group of complementors (users of the platform) by a digital platform (core or owner) with the intention of enabling and facilitating their participation and contribution to the platform’s network of value, while maintaining control of the complementors’ activities and assuring the quality of contributions (Ghazawneh and Henfridsson 2013). Analysis of boundary resources, therefore, focuses attention to the struggle between the users’ appropriation of a boundary resource and the platform’s design of the resource in order to promote and reinforce particular usages (Eaton et al. 2015).

Boundary resources are, therefore, valuable tools in understanding the managerial relations unfolding on digital labor platforms. We use this theoretical grounding to analyze a collection of data about the Upwork platform’s functions, features, use policies, and guidance on use (e.g., the frequently asked questions or FAQs). Furthermore, we seek to uncover the variety of relationships, which might exist between the platform and workers of different professions, levels of experience, ages, and genders. In this analysis, we understand Upwork and its platformic management from the perspective of the gig worker, while inferring from the design of the platform the perspective of the Upwork designers and Upwork leadership.

# Research Approach

We pursued an exploratory case study of Upwork, seeking multiple sources and forms of data in order to minimize the limitations of any one source or form. We chose Upwork as the digital platform supporting gig work we would study for three reasons. Firstly, it has a large population, and this community is accessible to the researchers through a number of social media sites (World Economic Forum 2016). Secondly, and as noted, much of the work, which occurs through Upwork, is highly skilled or creative work (Green et al. 2018). Thirdly, Upwork provides a large and evolving suite of tools and resources to workers, which will help us better understand and theorize on the sociotechnical arrangements of platformic management.

## Data Collection

Three types of data were collected: (1) Upwork forum discussions and other documents found online, (2) interview data with Upworkers, and (3) data created from a walkthrough analysis. The interview data were used as the primary source of analysis in this research, and other methods helped coborrate findings from the interviews.

Forum discussions were retrieved from the Upwork forums and from a reddit forum[2] dedicated to Upwork. Additionally, the researchers collected data from official Upwork web pages, help pages, and excerpts from the Upwork Terms of Service. The goal of this part of the data collection effort was to collect perspectives from different discursive contexts. The official documents were used to represent Upwork's official stances and policies, whereas the Upwork forum is a context in which workers are able to communicate with each other, but are under the supervision of Upwork moderators, and often interact with these moderators directly. The reddit forum is a space in which workers and clients are not supervised by Upwork moderators and cannot be connected to their Upwork accounts, meaning that they are able to speak more frankly about activities, which contravene Upwork's Terms of Service. The researchers read through each forum, beginning with the most recent posts. They collected posts that 1) had more than one response, and 2) in some way related to the workers' interactions with the platform, rather than concerning the state of their respective professions more broadly or freelancing in general. Researchers stopped collecting posts when new posts were no longer causing the researchers to reevaluate themes established in the coding process. The data collected from the two forums and from Upwork totaled 118 documents, ranging from 2015, after Upwork's rebranding from oDesk, to early 2018.

Interview participants were recruited by identifying freelancers through their professional websites, and social media sites where users are not anonymized (e.g. Twitter and the question-and-answer site Quora). Because these sources are not anonymous, the researchers could evaluate whether the individuals were, in fact, gig workers. The sites also had contact information. Potential participants were also chosen so as to provide a variety of professions, genders, and levels of experience with the platform.

The resulting pool of 20 participants comprised Upwork community members, successful workers, and those who were new to the platform. All workers performed digital work that required specialized, skilled labor. Some worked through Upwork as a primary source of income, whereas others used it as an ancillary form of employment, fitting gigs into their free time around other, more stable jobs or responsibilities. For some it was a stopgap form of employment that they were pursuing temporarily, with the intention of moving into a more stable position or a dream job. The interview protocol covered a few major themes:

1. The general experience of the workers with the Upwork platform, and how they use it to connect with clients.
2. Constraints or obstacles that they have encountered in working with the platform.
3. How they make sense of different platform functions and how they work around its constraints.

Interviews were semi-structured and lasted approximately an hour. Interviewers followed up on certain parts of interviewees' answers as themes developed throughout the course of the study. For instance, as many of the participants mentioned going off-platform in order to conduct transactions, interviewers increasingly inquired about how and why this was done when participants mentioned it. After the interviews were conducted, they were transcribed and included, along with the forum data, in the process of coding. Participants were interviewed by

[2] /r/upwork

phone or via web conference, as they lived in locations across the world. This limited our ability to observe body language and facial expressions during our conversations. However, doing remote interviews allowed us to include a greater diversity of participants than would have been possible otherwise. More importantly, we had to fit into the schedules of individuals who work from their mobile devices throughout the day. To many of our participants, scheduling the interviews this way felt like less of a demand on their time.

As summarized in Table 1, these data are gathered from nine females and 10 males. The average age of our participants is about 37: the youngest is 25, the oldest is 58 (and one person declined to provide their age). Fourteen respondents have extensive Upwork experience (they are classified as established) and six are new to the platform. We also report the Job Success Score that Upwork posts for each person. This score is partially based on completed jobs, so newer workers do not have this distinction yet. There are a range of professions represented, and their hourly work rates range from $11 to $150 per hour.

**Table 1: Participant information**

| | **Gender** | **Age** | **Knowledge Domain** | **Upwork Experience** | **Hourly Rate (in USD)** | **Job Success Score (%)** |
|---|---|---|---|---|---|---|
| **P1** | F | 30 | Industrial Design | Established | 85 | 100 |
| **P2** | F | 33 | Lifestyle Writing | New | 30 | n/a |
| **P3** | M | 32 | UX Design | Established | 79 | 99 |
| **P4** | M | 43 | Systems Administration | Established | 30 | 100 |
| **P5** | M | 57 | Blog / Article Writing | Established | 11 | 100 |
| **P6** | F | 57 | Research Blog Writing | Established | 30 | 93 |
| **P7** | M | 43 | Marketing | Established | 150 | 100 |
| **P8** | F | 25 | Blog Writing | Established | 31.25 | 89 |
| **P9** | M | 28 | Animation | New | 25 | n/a |
| **P10** | M | 40 | Voice Acting | Established | 100 | 100 |
| **P11** | F | 25 | Content production | Established | 17 | 95 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **P12** | F | 28 | Photojournalism | New | 50 | n/a |
| **P13** | M | 27 | Survey Analytics | Established | 29.99 | 88 |
| **P14** | M | 58 | Photography | Established | 100 | 100 |
| **P15** | M | 33 | Creative Storytelling | Established | 100 | 100 |
| **P16** | F | *** | Copywriting | New | 25 | n/a |
| **P17** | F | 34 | Legal Writing | Established | 100 | 99 |
| **P18** | M | 36 | Marketing | Established | 27.5 | 98 |
| **P19** | F | 26 | Content Writing | New | 20 | n/a |
| **P20** | M | 57 | Writing | New | 45 | 100 |

Our participants worked on jobs through Upwork that could take anywhere from a few hours to several months to complete. Participant 17, for instance, who worked as a copywriter and legal writer, typically took gigs lasting a couple months, but also had a few ongoing gigs, which involved doing occasional tasks for the same client over a number of years. Participant 14, a photographer, typically worked on one-time projects, requiring a couple hours each, and only occasionally took longer gigs lasting around a month. Some participants formed good working relationships with clients such that they chose to work on multiple projects together.

In addition to these worker-centered methods, we also interacted directly with the platform. In studies of algorithmic or platformic management, in particular, application features and their constraints were points of control and breakdown. For this reason, we used the platform walkthrough method, per Light et al. (2016). The walkthrough method recommends evaluating a platform based on its governance of users, the expected uses, assumptions embedded in the design, and its emphasis on, or obfuscation of, particular pieces of information (Light et al. 2016). In learning the platform, we had to spend time working through various help pages and the Terms of Service. Doing so furthered our understanding of the platform's official stance on issues regarding employment contracts, the role of Upwork, and mediation processes.

Conducting the walkthrough provided us with direct empirical observations of the Upwork platform and the structure of its design and functionality. For the walkthrough, one author engaged another author in work through the platform, requesting a job and going through the process of contacting, interviewing, and executing a transaction through the workspace. To avoid wasting other Upworkers' efforts, the job remained private (unobservable to most workers), and no other workers were contacted or interviewed for this job.

The job was basic proofreading and editing of a piece of academic writing. The author taking the role of a “gig worker” used Upwork’s time tracker while doing this editing. The “worker” and “client” used Upwork’s chat and video conferencing system to arrange the job and interview for it. They then conducted the transaction through the platform, paying through Upwork’s escrow system. The platform walkthrough method allowed us to mimic, but not exactly replicate, the process of hiring on the platform. We identified specific platform features and related them with the accounts provided by workers. Furthermore, this approach allowed us to experience parts of the platform that are only observable to transacting parties.

### Data Analysis

As is common for exploratory work that relies on multiple forms and sources of data, analysis was done through a process of inductive coding, guided by the research questions (Corbin and Strauss 2008). After the initial data were collected, the research team began the first round of independent analysis, which led to memo writing and extended conversation. Doing so allowed the team to become familiar with the collected data and to collaboratively engage in sense-making. Rather than calculating percentages of agreement/disagreement among researchers, we followed the norm of qualitative research, which encourages conversation and “the negotiated agreement method” among researchers (Campbell et al. 2013, p. 306). This required the research team to meet regularly to work through differences and understand the data. The goal was to achieve consensus in relation to the final coding scheme, categories, and relevant sets of evidence. This pursuit of consensus meant that for each question, data were explored to identify specific control or management activities. These included instances in which the platform exhibited its platformic management by coordinating things and providing boundary resources, and workers interacted with the platform as an organizing authority.

At first, these codes represented specific actions taken by both the platform and workers or expressions of their opinions and strategies. In the second round of coding, the original codes were combined and abstracted to represent broader managerial affordances of the platform. In this round, the different data sources informed each other. For example, workers’ understandings of policies and processes on Upwork could be compared to the published policies themselves, and features of the platform described in interviews and forums were experienced directly through the walkthrough method. Final codes are a combination of direct observation of the platform’s resources, the perspectives and experiences of breakdowns associated with those resources, and examples of circumventions or strategic usages.

## Findings

Participants’ accounts converged on a set of common affordances and constraints of the Upwork platform, such as the benefits of trust and greater exposure versus the drawbacks of surveillance and technical breakdowns. Accounts similarly agree about the core platformic management functions performed by the platform, referencing its quality requirements, its provision of resources, and its match-making affordances. This noted, participants had distinct interactions with the affordances, constraints, and functions of the platform. For those who had extensive experience with Upwork, the platform’s functions/algorithms and their role in organizing gig work was considerably less visible.These gig workers in our dataset were not as cognizant of Upwork’s infrastructure, since the platform’s arrangements tended to reinforce their

already established positions (e.g., by listing them higher in searches). However, those who had recently begun to use Upwork tended to pay more attention to the underlying technological mechanisms of the platform, and how they can harness these to create a competitive advantage.

In what follows, we will include examples from all the participants, but place Participant 3 in the spotlight to present a more vivid illustration of an experience with online freelancing. As a 32-year-old user experience (UX) professional, he approached freelancing out of necessity: "*I started out in freelancing because I got fired from a corporate job and at the time I was just a burned out software developer who did not want to write another code in his life and so in 2012 I was having health problems for the last several months and I was in corporate because the stress was just getting to me and so when I went into freelancing it was a matter of necessity because I couldn't go back into the corporate world*." In this transition, Upwork (and its predecessors, O-Desk and eLance) served as a critical tool; we will illuminate its role further below.

## Common Affordances of the Platform

Almost all the participants appreciated the unique affordances of the Upwork platform, which undergird online freelancing. Several gig workers in our sample had worked as freelancers before; however, online freelancing increasingly differs from traditional freelancing, in the presence of digital platforms, which are now entangled in the development of digital gig work. Effective implementations of these affordances enable the platform to distribute work, facilitate transactions, provide means to resolve conflicts, and help establish some level of trust among transacting parties. The platform is, furthermore, dynamic in supporting these needs. Workers populate their profile with customized descriptions and portfolios, and negotiate specific milestones and hourly contracts with clients. These technical resources are open enough to facilitate the workflows of a wide array of professions. In this way, they are not so much programmable, in the sense of an API, but rather they are open to appropriation by workers and clients for the specific needs of a given project.

Participants viewed the mediating role of the digital platform as consequential in achieving scale and extending their reach by providing them with access to a global network of clients. Participant 20 appreciates how using Upwork helped expand his reach beyond his local area, giving him access to projects in other geographic locations, as well as projects with more variety, thereby "*...expanding the playing field geometrically so far beyond what I could do as a local freelancer...*" The scale of the platform's population therefore lends the worker more options and more flexibility in landing gig work.

Upwork and its affordances helped Participant 3 establish himself as a top-rated freelancer and turn freelancing into a viable career option with enough flexibility to work remotely while traveling back and forth between the US and Australia: "*I have more of a need for more stable income ... at the same time I also have the need to stay remote because I'm engaged to a woman who lives in Australia.*" He sees freelancing as a "feast or famine" career, as he had worked for one of the world's largest consumer goods companies for a year, typically billing 64

hours in a week, but he also went through periods of "famine" with very little work. Through its vast network of clients, Upwork provides a steady revenue stream, helping him deal with the precarity of online freelancing. In particular, he was able to build on the reputation system provided by Upwork (positive reviews and UX tests): "*I'm the only top rated freelancer in Upwork who's based in the US and has a top 20% score [in UX]. So I'm using that in my marketing now."* The positive reviews from several small contracts he has completed over months have also enabled him to reach $70K lifetime earnings on Upwork in 2016 and attract more clients with a higher hourly rate ($79). In situations like this, the platform lends stability to typically sporadic gig work.

The benefits of network externalities and scale go hand in hand with the platform as a digital infrastructure, building on the processing power of computational and network-based systems, and conducting automatic and semi-automatic decision-making. For example, Upwork facilitates matchmaking between thousands of clients and gig workers through two mechanisms: (1) Upwork draws on algorithmic assignment, which automatically connects gig workers with clients based on a set of attributes, and features that enable the two parties to actively search and sort projects or gig workers. (2) The platform also enables users to reach scale and lower transaction costs by providing communication and reputation systems, transaction services, and contractual agreements, which facilitate professional interactions. Concretely, the Upwork platform supports security and efficiency in transactions, such that the overhead of logistical problem-solving which is required of the gig worker is lessened, as is the uncertainty of conducting transactions with strangers.

## Common Constraints of the Platform

Despite important affordances provided to gig workers, the Upwork platform creates information asymmetries between the users and the platform, in which users may lack important information on how the platform works and how various automatic decisions are made (we will provide examples of information asymmetries in the rest of the findings section). These information asymmetries may turn into power asymmetries that favor Upwork or clients over gig workers. For example, when Participant 3 and his client (a startup company) agreed to amicably end a contract because of the ambitious timeline: "*They told me they were not going to leave me a review as long as I didn't leave them one, so I held up my end of the bargain and then a few days after the contract ended I noticed my job success score went down from 99 to 93% and I stopped getting any new leads at that point. It was because there was actually hidden feedback, so they had left me with a bad rating but they left it in such a way that only Upwork could see it, but Upwork uses those ratings when they're computing the job success score...and this is a platform where it's 5 stars or fail.*"

Information and power asymmetries coupled with the technological limitations of the platform (e.g., inefficient communication channel or file sharing features between workers and clients), constrain the work practices of gig workers and may impinge upon their sense of autonomy. Such constraints can serve as the impetus for workers to work around the platforms and its managerial mechanisms to retrieve some of their professional autonomy (we detail some of these strategies that help workers circumvent the platform) or extend the platform with their own

configurations or practices. In situations where the resources and functions provided by the platform are inefficient, workers (and clients) may seek resources outside the Upwork platform. The use of external communication applications and external websites is a good example of this, as workers can bring these external resources together with the matchmaking affordances of Upwork in order to accomplish more efficient transactions. These practices may contravene Upwork's terms of service, but as several participants note they improve the experience for both workers and clients.

In the remainder of the findings section, we return to our research questions and describe platformic management functions the Upwork platform encompasses and the ways gig workers may understand and interact with them.

## Core Functions of Platformic Management

Data show that Upwork manages through a combination of algorithmic decision-making, technological features, and business rules. We identify six management functions performed by the Upwork platform: (1) managing transactions, (2) channeling communication, (3) resolving conflicts, (4) providing information, (5) evaluating performance, and (6) gatekeeping. As we note in the Discussion section, these parallel some of the basic roles of managers as articulated by Henry Mintzberg (1989). In what follows, we describe these functions and the ways in which gig workers make sense of and appropriate them in relation to their work autonomy.

### *Managing Transactions*

Upwork provides functionality that helps coordinate the tasks and people by structuring and automating transactions. This is a feature of the platform that is not so much algorithmic as automatic. Although algorithms may underlie even the simplest tasks the platform undertakes, releasing funds to a freelancer upon completion of a project is very different from ranking freelancers in search results. This functionality benefits the worker primarily by automating and securing transactions, addressing some of the central difficulties of conducting work independently. However, automation and security come integrated with norms of surveillance and tie the worker to platform-provided tools and procedures.

One of Upwork's primary coordinating resources is a developed contracting system workflow that automates much of the administrative and clerical work of invoicing and time tracking. This workflow provides automatic invoicing, automatic currency conversion, and tax withholding information in the form of a spreadsheet. These resources are useful for gig workers, who typically must coordinate their own transactions and projects. Participant 15 finds that, as a freelancer, just "*chasing down late paychecks*" from clients can take up a lot of his time, and that Upwork's automatic escrow system helps with this. Participant 12 notes: "*I have a time tracker which I turn on and then I do my work and I turn it off when I'm done and it automatically goes to Upwork and it's an automatic pay system, like you don't have to invoice anyone."* Although freelancers could potentially get paid more quickly if they worked off-platform (no waiting period), many found the invoicing and conversion services to be a benefit. Participant 15 adds that he may ask clients approaching him off-platform to hire him through Upwork, simply to "*keep everything in one place.*"

In addition to automating transactions, Upwork provides transaction security through an escrow service. Workers in the forums and in interviews indicate that this escrow service, along with Upwork's '*payment protection*' policy, is an important resource because scams and unreliable clients are a persistent threat when working independently. Receiving the security benefit of these resources requires the freelancer to follow Upwork's policies and protocols. According to an Upwork moderator responding to a question on the forum: "*In order to be eligible for our Upwork Payment Protection, you will need to be hired on an official contract and track your time with our desktop app if its hourly or have the full agreed amount funded in Escrow if it is fixed price.*" Upwork's time tracker runs on the gig worker's device, recording hours worked and taking screenshots six times per hour. These are then provided to the client. In another forum post, a worker explains that Upwork needs this documentation to enforce payment. Without it, "*all Upwork can do is suspend the client if there is proof of them paying outside the platform*."

Some workers circumvent Upwork's contract system in order to avoid Upwork's transaction fees, maintain privacy, or to preserve their autonomy. Participant 6 initially uses the platform to coordinate with new clients, but then moves off-platform when she has established that they are trustworthy: "*I tell them I can charge you less because I'm not paying a fee now, so they pay less, I make more and everybody is happy except for Upwork but who cares what they think.*" Similarly, because the escrow system is tied to a system of surveillance, many workers avoid Upwork's hourly contracts, and use their fixed-price system instead, which provides escrow based on milestones rather than time tracking. Participants 13 and 15 and forum contributors, report that certain clients, especially larger organizations, wished to conduct transactions off of Upwork because they had preferred payment systems, such as Paypal or Venmo, or established hiring and billing systems through their own human resources departments. Transacting off platform in this way contravenes Upwork's terms of service, and the worker risks their account being flagged or suspended. In these situations, being tied to Upwork's provided resources constrains the worker to certain technologies and norms of surveillance, and the workers circumvent these control mechanisms in order to maintain autonomy and privacy in coordinating transactions.

## *Channeling Communication*

Upwork's platform provides functionality to facilitate communication between transacting parties. Algorithmic management is not part of these communications. Upwork simply provides communication tools through the platform. The mobile app and desktop extension allow workers to receive messages instantaneously and communicate on the go. "*If a client that I'm working with needs to discuss something or if they send a message throughout the day, even though I'm not at my computer, it will ping on my phone and when I have a minute I can respond*" (Participant 14). It also allows more involved activities like bidding and sending files, making it easy to secure contracts and conduct work remotely and quickly. A gig worker on the forum shared: "*Upwork's 'interviews,' for me, consist of a brief text conversation with a prospective client about defining their needs, and determining whether I can meet them, and at what cost.*" The nature of communications between clients and gig workers, with the exception of long-term engagements, is in line with the notion of impersonal interactions noted by the current studies of gig work (Alkhatib et al. 2017). Most communication is handled remotely with little face-to-face communication. Some workers, however, push back on this norm. Participant 15 suggests "*I do*

*everything I can to try to find out who they are and what their deal is*." Participant 1 likes to talk to the client on the phone before accepting a job because "*you can usually tell if you talk to somebody for a half hour if they're a crackpot or not, and that helps*."

Although Upwork's suite of communication channels connects workers with their contracted employers, it is also designed to tie workers to the platform. Workers therefore substitute their own applications to retain flexibility. To help enforce communication through the platform, Upwork automatically generates pop-up warnings when certain words such as "*skype, phone, tel, email*" (from the forum) are typed into the chat. As Participant 6 puts it, the messages remind workers "*make sure that you don't work outside of Upwork because blah, blah, bad people out there*." Upwork also sends similar messages when workers and clients share email addresses or phone numbers, or talk about using other cloud sharing platforms like Google Drive or Dropbox. Upwork sometimes punishes workers for what it considers more serious infractions. For example, Participant 5 had his account frozen for 48 hours after he sent a client to his website to view his writing samples. Even though several participants highlight the centrality of personal websites, as these provide a more extensive and flexible presentation of their past projects and their portfolio, the Upwork profile does not provide a space for workers to link to their websites. This may reflect the broader attitude on the part of Upwork regarding information that facilitates connecting off platform. In summary, most participants feel that communications through Upwork are monitored, and Upwork actively encourages communication within the platform, particularly when it comes to payment.

Upwork's communication channels have technical constraints and some workers must work around them because they are not designed for their kind of work. Although it is possible to deliver files through Upwork or attach them to Upwork's messages, the application tends to compress images in damaging ways, and some files are too large to send through Upwork (e.g. "*two hours worth of video,*" Participant 20). Cloud services like Dropbox are popular alternatives. Upwork also provides a mobile app, but Participants 16 and 19 state that this had limited functionality, such as not allowing the worker to look at their money. Participants and forum contributors also reported technical problems with Upwork's other communication channels, and found them to be less reliable than Skype or Slack.

## *Evaluating Performance*

Upwork's platform provides several mechanisms designed to perform the evaluation role of managers. These include processing and presenting ratings and reviews left by other clients, providing an aggregate rating called the "*job success score,*" posting badges earned for accomplishments, monitoring of worker behavior, and directly evaluating the worker's skills via tests. The goal of these evaluations is to build trust and confidence in a worker's capability by presenting many types of information about them, including their past success, their responsiveness, and their technical skills. Many of these ratings and evaluations are likely factored into a freelancers ranking in client search results by Upwork's algorithm.

As resources, calculated badges and ratings, such as the job success score, help workers promote themselves to clients but also constrain them to the sometimes fickle client review process. All participants noted their rating strongly influenced their experience with the platform. Highly rated workers have to put less effort into bidding on projects, as they often have clients

approaching them with work. In this sense, the rating is an important resource for gaining attention in the network and winning jobs. Conversely, workers are constrained to maintaining a good rating, and must go out of their way to protect their rating. For instance, Participant 6 has given some clients a full refund to avoid any negative feedback. Gig workers are also smart, in that they "*game the system*" by nudging happy clients to give them a review but say nothing to unhappy clients. Participant 2 makes sure to remind clients to write a review before closing a contract. Similarly, workers must follow specific rules for maintaining various badges. New workers can move toward *Rising Talent* status by making sure their profile is completely filled out, including a headshot and portfolio. Upwork also monitors how quickly workers respond to job invitations, and gives a "*Response in 24 Hours*" badge to those who consistently respond in under 24 hours. In this way, the platform can encourage certain behaviors and norms by making them implicit in the platform's calculations of value.

Upwork also helps workers present and promote their skills by providing a number of proficiency tests (e.g., knowledge of English grammar, Javascript, or payroll management). The opinions about the real affordances of these competency tests vary, but they seem to be more critical in the case of highly competitive jobs (e.g., copyediting) and for newcomers to the platform, who need to use as many means as possible to showcase and promote their competencies. Participant 14 states that the tests do not accurately reflect his capability. Participants 14 and 15 report that taking tests does not make much difference in securing work, and other participants (such as Participants 7 and 20) do not think that clients look at tests when hiring. However, Participant 15 reported that taking a test will help rank him higher on searches for that skill.

Gig workers extend the platform's evaluation and reputation systems in ways not necessarily intended by the designer. Workers, for instance, might maintain professional websites and social media accounts, which supplement and are supplemented by their Upwork profiles. Upwork conceals workers' last names and forbids them from taking clients "off-platform." This said, workers do mesh on-platform and off-platform reputational resources, maintaining some autonomy in how they market themselves and providing proof of their quality. Participant 15 describes how he pasted client testimonials from off-platform onto his Upwork profile in order to gain some credibility when he first joined Upwork. Participant 5 advertises his Upwork rating off-platform by taking screenshots of five-star reviews and sharing them on Twitter. Non-Upwork clients find him through Twitter, helping him establish his reputation outside Upwork. Participant 1 described how her Upwork profile led clients to her professional website: "*they'll say I found you on Upwork and I Googled you and I found your website so here I am.*" These strategies allow the worker to retain some autonomy in their own branding and professional development.

## *Gatekeeping*

Upwork has in place certain vetting policies, which are meant to ensure the safety and integrity of the work which occurs through the platform while also retaining control over how the platform's resources are used. Many of these policies are designed to encourage, or punish, certain behaviors and professional tactics; some enforce conformity with the platform's other policies. It seems that gatekeeping is done automatically by the platform, but may also involve human actors.

Upwork requires identity verification of workers in order to prevent duplicate accounts, or misrepresentation of a worker's location (Upwork Help Center 2018). Workers on the forum note that they cannot submit new proposals until they get their profile verified, and those who fail the verification process cannot complete their profile or accept new jobs. Workers may be asked to provide a digital copy of a valid government-issued photo ID and/or a recent billing statement. In some cases, Upwork also requires the gig worker to participate in a brief video chat with an Upwork representative. This is an example of human involvement in an otherwise, largely automated process.

Upwork also hides or blocks users in order to manage supply and demand in the network and to ensure that workers presented in the network are active and present themselves well. During our walkthrough, one of the authors was rejected from joining as a freelancer because there were "*already too many freelancers with a similar skillset.*" According to the message received by the author, this rejection was based in part on the prevalence of their skills on Upwork, but also on the incompleteness of his profile. We were unable to ascertain if this had been reviewed manually or algorithmically. The message could have been automatically generated and sent out to any new freelancers of that skill set with an incomplete profile. It is also possible a human looked at the profile and made the decision to send the message.

Upwork is similarly concerned with making sure that workers are active. Participant 6 notes: "*If you don't work for 30 days, like you don't earn any income on that site they change your profile status to private so nobody can find you, so I'm forced to go and look for jobs and I don't like that at all*." Not working enough is not officially against the rules, but it makes the worker a less desirable part of the platform. In this way, the ability of workers to use Upwork's resources to publish themselves to the network is contingent on their offering some valuable good, and on their professional conduct.

Upwork also limits and monitors workers' interactions with clients through a currency-like resource called "*connects.*" Workers are allocated a certain number of connects per month and they are expended when a worker submits a proposal on a project. Gig workers' accounts can get suspended due to overuse of connects. A poster on the forum speculates that proposals are limited because in the past, workers got "*trigger happy*." They were sending proposals to a large number of clients hoping something would stick. The poster suggests that limiting proposals is a way to force workers to focus on jobs that fit their skills. A recent announcement from Upwork explains: "*We see freelancers who aren't successful in their attempts to find clients through Upwork. They're regularly submitting many proposals but aren't winning projects nor earning money. This isn't good for any of us. With this in mind, in the next couple of days we're going to start closing the freelance accounts of some users with a history of not delivering winning proposals to clients" (Upwork Community 2016)*. Controlling workers' accounts in this fashion is also a way of keeping people on the platform. The announcement goes on to say that workers who submit many proposals but do not enter into contracts on the platform *"might be violating our Terms of Service[3], specifically our policies on circumvention[4]*" (Upwork Community 2016).

[3] https://www.upwork.com/legal
[4] https://support.upwork.com/hc/en-us/articles/211067628

### *Providing Information*

The informational affordances of Upwork's management functionality include: (1) algorithms to provide best matches (between clients and gig workers) and (2) general guidance about how to function as a successful gig worker on the platform.

Finding new projects is both a critical and constant challenge for most gig workers. Upwork alleviates this by making a large network of clients visible and searchable. It does this by providing specific resources, which enable the worker to search and evaluate clients. Workers can search by keywords or category and can filter results based on the qualifications required (e.g. experience level) or by country. Participant 7 limits his searches to US companies, because they "*pay closer to market rates*."

Experienced Upworkers can describe how they make judgements about clients based on information gleaned from job descriptions and hiring history. For instance, Participant 6 describes evaluating a client's hiring patterns and the clarity of their job description: "*I can see if they're primarily hiring in the country or out of the country, and if their directions are pretty clear in their job description … because then I know it's going to be like pulling teeth to try and figure out exactly what they want. So I like more information.*" In this regard, Upwork's matching process is not one of algorithmic assignments as used in some other gig platforms (Lee et al. 2015), but rather the provision of information and searching algorithms which help clients and workers match themselves.

Upwork's algorithmic matching systems, which send job recommendations to workers through the site or through email, are much less used in comparison with the searching features. Some participants found Upwork's job recommendations useful, but many reported that they were largely inaccurate and shared jobs that did not match their skillset. According to Participant 10, "*it's sort of a running joke among the Upwork community just that you know you can pretty much count on the recommendations to be worthless.*"

Through these functions, Upwork can shape how the network of work opportunities is visible and searchable for workers and clients, even as it controls certain information asymmetries, which influence interactions between workers and clients. Upwork's functionality maintains semi-anonymity by displaying only the first names and last initials of workers. Conversely, clients' identities are not required and a number of participants have worked for clients whose names were not known to them. Participant 2 disliked that on Upwork "you don't know who they [clients] are." She wished they would "at least tell me your first name." Clients can also leave private reviews, which are not seen by the worker but which affect their job success score. The lack of transparency on the platform can be somewhat isolating, and in general, more information is provided to the client than to the worker. Participant 14 laments that on eLance (Upwork's predecessor) it was possible to see who else had bid on a project and who ended up getting the project. He argues that even if workers did not communicate directly, this created a competitive camaraderie between them, which is missing from Upwork. Because of these information-sharing asymmetries, workers seek to supplement information provided by Upwork with advice from other successful Upworkers and may experiment with the platform themselves. For example, Participant 15 relates how he received a lot of concrete advice about how to use the platform from an online class he took, taught by an experienced Upwork freelancer. Other

participants (e.g. Participant 3) created and used a client account in order to learn how things (particularly their own profile) appear to clients, and how to improve them.

Upwork provides some transparency concerning the operations of the platform itself. Upwork's official information resources are aimed at educating workers on how the platform works, and encouraging certain professional behaviors and conformity with platform policies. A recent post on Upwork's official blog gives the basic formula for the Job Success Score: "*(successful contract outcomes* – [minus] *negative contract outcomes) / total outcomes*." The blog post also enumerates the various pieces of information that are considered in calculating the score: "*Job Success contains more than just public feedback. It also includes private feedback, long-term contracts, and repeat contracts.*" Despite the information provided about the platform's algorithms, workers continue to have uncertainties about what behaviors will get their accounts flagged or banned, and how calculations about the Job Success Score or Top Rated badge are made. Gig workers are not completely clear, for instance, on what will be considered a positive or negative contract outcome in calculating their Job Success Score.

## *Resolving Conflict*

Another core managerial function performed by Upwork is arbitrating conflicts between gig workers and clients and resolving them by dispensing payment. As with Upwork's other managerial functions, the structuring of conflicts and the ability of the platform to help resolve conflicts is embedded in rules, guidelines, workflow, and algorithms. Human Upwork employees can become part of this management task, reviewing available information to make a determination.

Disputes arise when there are misunderstandings about how the platform structures transactions. A client notes on the forum: "*The very first freelancer I hired got confused as to the contract we agreed upon. It was a 'fixed' contract (for said amount); however, the freelancer thought said amount was an 'hourly rate.' I realized the mistake 2 days into a 2 month deadline."* Conflicts may also occur in relation to what work needs to be done for the contract to be fulfilled. Participant 7 provides an example of a client asking for "*tons of extra revisions*" when Participant 7 felt that he had completed the project as described. When the automated process of payment breaks down in this manner, a "*dispute*" is initiated in which an Upwork representative reviews the disagreement and arbitrates about who should receive the money in escrow. As part of this, Upwork can examine all the communication between the gig worker and client. In the example involving Participant 7, Upwork could use all of their recorded communications, the contract, and work completed to determine whether or not the gig worker has completed the job as described. Then Upwork could release funds from escrow to pay the worker.

Upwork's understanding about a dispute is largely dependent on its surveillance of the work being done and on the worker's and client's using of its contracting resources. Upwork's management of disputes draws on provided functions of escrow, time tracking, and the contract systems. This also includes the worker- or client-provided documentation of the work/project. A forum contributor described how a client disputed his work, and "*he ended up getting the full refund he was asking for because I had not inputted any memos while working, which means my hours weren't protected under the Upwork protection guarantee for freelancers.*" Failure to

use these boundary resources as instructed by Upwork means losing the security benefits advertised and provided by it.

Furthermore, Upwork only has control over money, which is sitting in escrow, and does not otherwise attempt to retrieve money from workers or clients, leading both clients and workers to pursue external methods for resolving disputes. A client on the forum described how a former worker tried to retrieve money through a debt collector: "*I hired a person to do some API integration. He was over budget and when I checked his work he was integrating with the wrong service. I caught it but he said he would only fix his mistake if I paid more. I declined and paid someone else to do it right. Now I'm getting emails from a debt collector."* Similarly, Participant 1 approached the Freelancer's Union of New York City to get pro bono legal advice on how to push her client to pay.

# Discussion and Implications

What Upwork provides via its platform policies, workflow, data collection, algorithmic management, and human interventions resembles many of the basic roles of managers (per Henry Mintzberg, (1989)). The Upwork platform acts as a *resource allocator* by structuring financial transactions. It acts as a *liaison* by facilitating communication between different parties and a *disturbance handler* by dealing with conflicts and disputes. Upwork can be understood as a *disseminator of information* and finally, acts as a *monitor* by conducting automatic evaluation and gatekeeping. In this way, Upwork provides more than algorithmic management, it provides platformic management.

Platformic management as described in this paper can also be understood as the "organizing affordances" of the platform (Zammuto et al. 2007). In what follows, we further discuss platformic management relative to the flexibility and autonomy it affords, and control it exerts through provision of boundary resources. We finally return to what platformic management entails beyond algorithmic management in the context of knowledge-intensive gig work, focusing on the was in which this mutes some of the roles of managing, while also altering what is expected of the worker.

## Platformic Management as Boundary Resources

Findings make clear that the concept of boundary resources provides insight into the ways in which platform-provided resources mediate the relationship between the platform owner and users (Eaton et al. 2015). Workers act as "complementors" and through their uses extend the scope and diversity of a platform. At the same time, the platform owner leverages the same resources and uses to exert control over the platform and complementors, making the platform a boundary resource (Ghazawneh and Henfridsson 2013). This makes boundary resources a useful conceptual frame for describing how Upwork carries out platformic management and how gig workers negotiate their autonomy and reliance on the platform.

Conceptualizing platforms as a boundary resource foregrounds the materiality of platform features, and positions agency as balancing platform organizers, the employers and the workers. Seeing platformic management as a boundary resource allows us to move from a concept of automated rules, or algorithmic management, towards a concept of dynamic negotiations between people and the constraints and affordances of plastic, digital material

artifacts. This allows us to highlight the ways in which platform-based management has departed from the traditional modes of organizational management.

Two dimensions of the platform form the core of the boundary resource: (1) the provision of material features and policies that enable and enhance the autonomy of gig workers (as a primary draw of the gig economy (De Stefano 2015), and (2) the use of the services provided by the platform to guide workers to conform to particular norms and structures of work (Wood,et al. 2018).

## *Boundary Resources Enabling Autonomy and Flexibility*

As mechanisms of managerial control, the resources provided by Upwork are designed to coordinate, facilitate, and inform gig-working freelancers. Gig workers use these to support their temporal and spatial flexibility;  giving them freedom in selecting projects, while providing for a higher level of autonomy (in that they need not negotiate with peer workers or a manager in doing so) (Spreitzer et al. 2017).

As discussed in the findings section, workers are able to use the platform to reach a larger clientbase and systematize their transactions. This improves workers' ability to operate flexibly and sustainably by allowing them to find work reliably, and spend less time on the coordination and administrative aspects of multiple, ongoing gigs. In this way, the platform's boundary resources address some of the central difficulties of gig work.

The precarity of gig work stems in large part from the unpredictability of finding work, and the increased responsibility of the worker for performing all of the ancillary marketing and negotiating tasks associated with finding and carrying out work. Upwork provides a framework which automates many of these tasks while remaining nonspecific, meaning that it can facilitate workers in undertaking work of different types and timeframes at will. The worker is therefore able to work flexibly, without shouldering the full managerial overhead.

The platform provides communication channels and evaluation metrics, which allow for remote hiring and job seeking. These boundary resources enhance worker flexibility and are most valuable when there is a large enough population of clients to allow workers to find consistent work. Through these mechanisms, the platform aids the worker and the client in making matches that could not have been accurately predicted by algorithmic assignment.

Some of the most useful boundary resources are those that provide the gig worker some customizability or interpretability, while remaining durable enough to support complex work and interactions. Given the complexity of many of the gigs posted to Upwork, the platform is unable to make firm determinations about the appropriate transaction procedures because the nature of the work (tools used, extent of communication, length of project, etc.) is variable. And, the quality of the work is also difficult to measure or quantify.

The platform's digital features also help enforce standards. For instance, contracts provide a structure for clients and freelancers that clarify agreed-upon milestones and enforce (through the execution of code) a particular structure to a working relationship. Ideally, these resources have enough plasticity to allow clients and freelancers to negotiate their own milestones and

hours but also enough structure to enforce those agreements. In line with what has been described in previous work on platform labor, both customizable and constraining aspects of the platform can serve to increase the flexibility and stability of work (Lehdonvirta 2018). This emphasizes the dual nature of boundary resources; they are “plastic” enough to be appropriated for worker use, but also rigid enough to provide structure across several heterogeneous parties (Ghazawneh and Henfridsson 2010, p. 4).

### *Boundary Resources as a Means of Platformic Control*

Even as they enable some level of worker autonomy, the boundary resources provided by Upwork also impose constraints. These constraints are built into the interface, enforced algorithmically, and enabled with deliberate information asymmetries. By participating on the platform, workers take on these constraints. Findings reveal two different objectives of these constraints: (1) structuring working relationships, and (2) protecting the platform from disintermediation.

To provide structure, the platform focuses on specific information asymmetries, and these serve, intentionally or unintentionally, to curb workers’ autonomy (Deleuze 1995). Upwork’s services reflect some information asymmetries similar to those reported in prior work on algorithmic management (Möhlmann and Zalmanson 2017; Rosenblat and Stark 2016; Wood et al. 2018). That is, these services limit the worker’s ability to fully understand how the platform works (e.g., how they are evaluated) and controls their work. The boundary resources supporting Upwork’s reputation system do not share workers’ last names, prevent them from posting links to their personal websites, and warn them to use platform-provided communication channels or face sanctions.

Boundary resources are also leveraged by the platform to mitigate concerns with disintermediation. Upwork’s concern about being disintermediated in favor of other payment or communication channels is reflected in the design of platform resources such as automated monitoring of the chat application, flagging of accounts, and the “non-circumvention agreement.” The platform’s interfaces and messages leverage the threat of scams as incentive to keep all communications and transactions on the platform. These measures describe an attempt on Upwork’s part to maintain what Ghazawneh and Henfridsson (2013) call platform “sovereignty,” or the platform’s control over its own system and resources. However, in a number of cases, these attempts to prevent disintermediation become obstacles themselves to the smooth coordination of clients and freelancers on the platform and to gig workers’ flexibility in leveraging various technologies in aid of their work. By joining the platform, workers are taking up a set of effective boundary resources in the form of tools and a network, but they are also adopting a semi-closed system, which may not interoperate with some of their own preferred work processes and those of their clients.

More broadly, the tensions between workers’ autonomy and control imposed by information systems is known and has been captured in the concept of the autonomy paradox (Mazmanian et al. 2013). Gig work-enabling platforms are just another medium to help surface these tensions. This noted, the concept of boundary resources helps foreground two important dynamics of digital platforms: 1) platform stability and central control, and 2) platform generativity (opening up the platform to multiple flexible uses). Our application of the concept of

boundary resources extends the current conceptualization of the concepts by presenting gig workers as 'complementors' of the platform, who integrate boundary resources in their practices to extend the core of the platform (e.g., Eaton et al. 2015; Ghazawneh and Henfridsson 2013). They complement the platform by creating new norms and work practices around platform-centered work, and even workarounds that facilitate their interactions with platformic management. The existing applications of the concept of boundary resources only embrace application developers and technical workers who extend the technological core of the platform by adding explicit technical resources/features (e.g., creating new Firefox add-ons). Finally, it is noteworthy that the term 'resource' in the concept of boundary resources can have a misleading connotation. Reflecting critically on the limits of this connotation, we recognize that the term 'resource' does not effectively convey the constraining roles that platform features and management system may play. In addition to providing opportunities for workers to facilitate platform-mediated gig work, they may act as control or lock-in mechanisms, restraining workers' sense of autonomy.

## Platformic Management beyond Algorithmic Management

We use the study of Upwork to advance our conceptualization of platformic management as broader than that of algorithmic management. Both are sociotechnical, involving technologies and practices (e.g., how users make sense of the system and engage the platform). However, platformic management conceptualizes a wider array of technological features than algorithms. Clearly, Upwork draws upon algorithmic decision-making and evaluation. This noted, Upwork also relies on other design features and policies to control the way workers interact in the platform space. These include templated profiles, specially designed communication systems, textual suggestions or descriptions, user options, and non-circumvention policies.

It may be that differences in the management of labor on Upwork and the management of workers on microtasking and ridesharing platforms demands a broader suite of rules and functionality. For example, in contrast to AMT where a "thousand to one worker-to-requester ratio" makes communication between them almost impossible (Irani and Silberman 2013, p. 4), projects on Upwork often require frequent communication between parties. Furthermore, measuring work quality of more open-ended and complex projects found on Upwork requires multiple evaluation and monitoring methods. Upwork allows workers to control tasks, choosing not to create means to decompose or deskill them—unlike what is found in some studies of algorithmic management (Alkhatib et al. 2017; Irani and Silberman 2013; Lehdonvirta 2018). Platformic control mechanisms such as the work diary and time tracker present a more complex data space for tracking than, say, GPS positioning relative to time on ride-sharing apps.

Additionally, matching clients and freelancers for knowledge work is complex enough that many workers reported that the platform's algorithmically generated suggestions were not useful. Compared to ridesharing platforms, Upwork has to rely, to a greater extent, on worker and client participation in filling out descriptions, scrolling through possibilities, contacting each other, and negotiating a job. The process of matching relies on a combination of search algorithms, the platform's structuring of search and matching activities, and also the contributive matching and negotiating activities themselves, carried out by a crowd of gig workers and clients. Although the process of matching is chaperoned by the platform's algorithms and interfaces, it is more reliant

on the platform dynamics than the kind of algorithmic assignment, which infringes so significantly on the autonomy of Uber and Lyft drivers (Lee et al. 2015; Rosenblat and Stark 2016).

These points noted, the agency of the gig workers and their practices help to shape management relations on the platform. That is, gig workers are not passive recipients of platformic management and use creative strategies to appropriate or work around issues. For example, we observed that gig workers negotiate or avoid non-circumvention policies in various ways in order to fit the platform into their work processes.

It is useful to broaden the discussion from gig workers' relationships with algorithms and other automated aspects of platformic management to also consider their role as embedded in a larger ecosystem of workers and clients and as workers negotiating with centralized platforms. In other words, platforms do not organize people just through the "doing" of digital procedures, but rather, gig workers and platforms enact managerial relations through negotiations over information, algorithmically enforced rules, and the use of digital boundary resources.

Upwork seeks to be a market-making platform, the place that brings together workers and clients by maintaining its control of the whole online freelancing marketplace through an information and power asymmetry that largely strengthens the position of the platform owner/organizer (Upwork Global Inc.) (Bar 2001). From this perspective, it makes sense for Upwork to choose to not fully disclose how certain badges are acquired, and to carefully surveil workers interactions with the platform, progress reports, and communications with clients. The power asymmetry comes from Upwork's ability to gather this data from many sessions, clients and workers and use this to guide policies and algorithms. Doing so contributes to work precarity by diminishing workers' control over their work practices.

Freelancers on Upwork may work around this asymmetric system envisioned and organized by the platform by negotiating with clients, circumventing Upwork's Terms of Service (and its position as the sole mediator), enlisting the help of external digital platforms in their work practices (e.g., Paypal and Dropbox), and assembling their own ecosystem. Within this broader ecosystem Upwork plays a central role, but the ecosystem is more of a product of shifting alliances and negotiations between clients and freelancers. When workers subvert the platform or seek solutions outside of it to alleviate uncertainty and precarity of work, they reclaim some of their agency lost to Upwork's platformic management and control.

Our research question and findings focus attention on the interactions with the platform from the perspective of gig workers. We know clients are also key stakeholders of the platform. Future research is needed to accommodate the dynamics of interactions and alliances among these stakeholders. Such studies can provide a more comprehensive understanding of the concept of autonomy, which is negotiated with different parties and through disembedded labor relations.

There are at least two other implications of this work we have not pursued here, leaving these for future work and perhaps for others. First, the move to transaction-based work relations and arrangements such as what Upwork supports leads to the worker doing more and more unpaid labor to present, explain, negotiate and support their work. In traditional labor relations, these tasks were apportioned between worker and manager, negotiated and often discursive. We don't have a language or set of concepts to easily express this labor shift in which all of this is

laid on the worker. Two sources of guidance for how to conceptualize this shift of added work to the worker seem promising. First, there is the literature on the move to having consumers do work that was once done by vendors (e.g., completing sales forms, providing information) (e.g., Boltanski and Chiapello 2005; Rieder and Günter 2010). Second, the literature on labor markets provides some guidance on how to better conceptualize the shift of risk from shared to primarily on the worker (Cuñat and Melitz 2012).

The empirical context of our study, Upwork, also serves to illustrate how the automated management of knowledge work presents a more complex set of work-matching needs than that of the more commonly reported forms of gig-working and algorithmic management. Compared to ridesharing and microtasking, workers on Upwork may enjoy higher levels of task autonomy and control, (since they can negotiate things like the order of tasks, methods of work, and speed/rate of work (Maestas et al. 2017, p. 54). Such knowledge workers are harder to arrange programmatically, and the workers themselves are more active (as complementors) in contributing to and extending platforms. This broader and more complex remit requires a coherent platformic management: one that embeds but includes more than algorithms to effectively serve as a market-maker. Given this market-making, and the importance of algorithms, there are a set of labor-policy issues about transparency and labor security that deserve attention, beyond us noting with some concern that current labor policies that the potential for freelancing work is also the formalizing of work precarity.

# Conclusion

In this paper we have advanced the concept of platformic management, focusing specifically on ways gig-work-enabling platforms like Upwork serve to structure these workers' autonomy and work flexibility. We conceptualize platformic management and its digital features and protocols as critical points of control in the emerging labor relations of the gig economy. We also use the concepts of boundary resources to help characterize worker flexibility and autonomy in relation to the structuring role of platforms in freelance work. Findings from this work have ramifications relative to the design and control of the digital features and protocols, which support work (among other things) and are increasingly coming under the purview of private, centralized platforms, as articulated by Plantin et al. (2016).

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# Appendix: Upwork Job Example

Here we present an example of an Upwork job, contrasting this with the more commonly used examples of Amazon Mechanical Turk (AMT) and Uber. For example, AMT tasks include “the moderation of web and social media content, categorization of products or images, and the collection of data from websites or other resources” (“AMT” 2019). These tasks include specific instructions on how they ought to be completed and are often tightly time-bound. For example, in AMT, a worker may be asked to categorize one image per task and only be able to categorize that image in a handful of ways. In contrast, most jobs advertised on Upwork involve larger projects with fewer instructions from clients on how exactly the jobs should be completed. These can be open-ended projects that require high skills or specialization in certain areas (reflecting what Malone et. al. (2011) calls hyperspecialization of work). Figure 1 provides an example of such a project posted on Upwork.

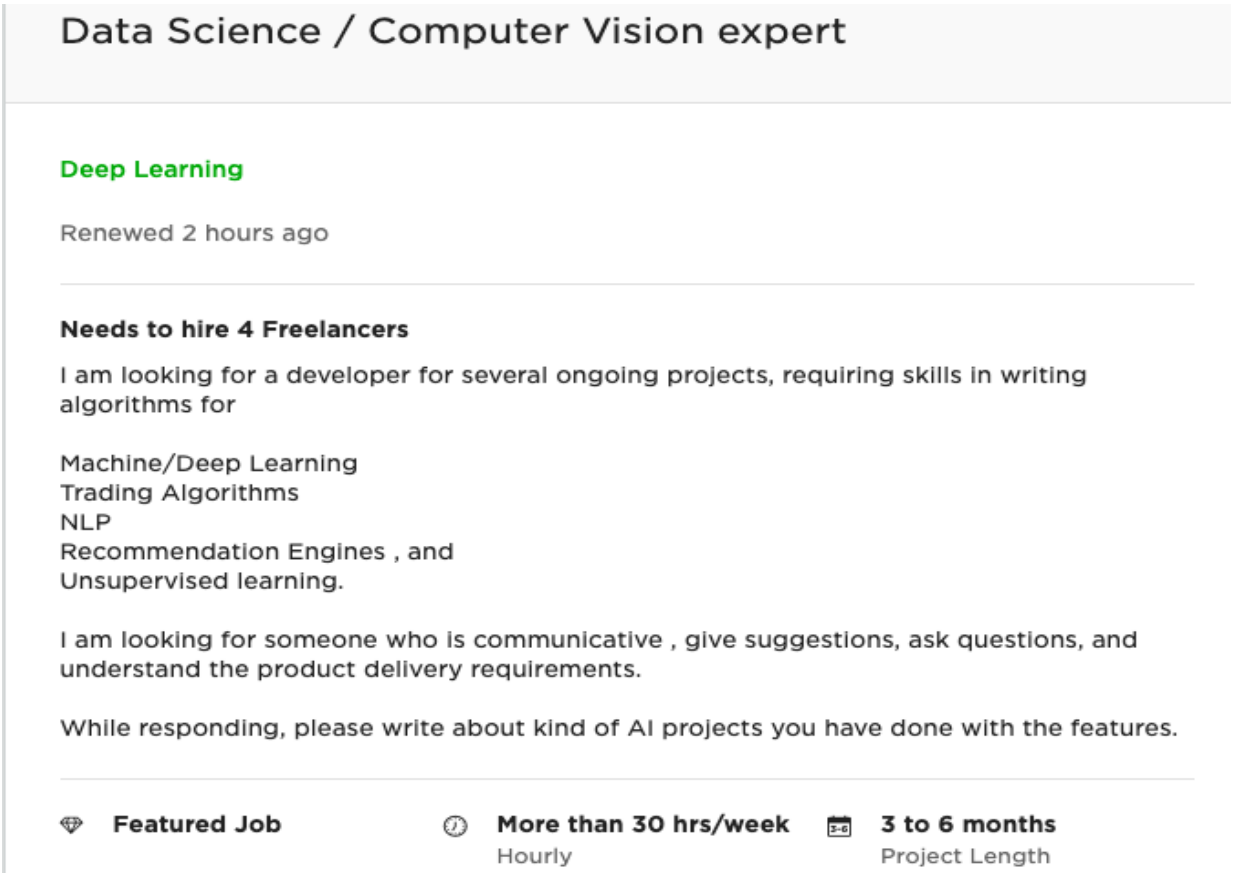


Figure 1. Example of a knowledge-intensive job on Upwork

Projects on Upwork, such as what is presented in Figure 1, tend to have a longer scope and less specification than task-based, ride-sharing or delivery gigs. This means the freelancer must make a plan of action and update this in the face of changes to the scope, needs and deliverables that arise. This also requires ongoing communication between the worker and the client, and perhaps others, as part of the work.