Riding Against the Algorithm: Algorithmic Management in On-Demand Food Delivery

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Abstract. In many countries, on-demand food delivery platforms (e.g. Deliveroo, Wolt, Uber Eats) have become an inseparable part of the hospitality and tourism ecosystem. A key area of interest in technology research has been how platforms algorithmically manage the interaction between task requesters (e.g. customers, tourists) and task fulfillers (e.g. restaurants and delivery couriers). However, there is a lack of research on how such algorithmic management practices impact workers and what strategies workers adopt to counteract the algorithm. To that end, this qualitative study explores forms of expressing algoactivism in the context of on-demand food delivery platforms by conducting interviews with delivery couriers (n = 5) and restaurant workers and managers (n = 7). It is found that both couriers and hospitality employees adopt specific behaviors to optimize and game the platforms' algorithms, and that some algorithmic management practices are perceived more negatively than others. Implications for e-tourism management and research are discussed.

Keywords: Platform · Algorithmic management · AlgoActivism · Food delivery

1 Introduction

Hospitality and tourism businesses instrumentalize digital infrastructures or 'platforms' to exploit labor and control resources they do not own and create value through facilitating interaction between different hospitality and tourism stakeholders [1]. These businesses then collect rent from those who interact on the platforms through e.g. user fees or commissions. In tourism and hospitality, digital platforms have transformed the accommodation sector (e.g. Airbnb), transport (e.g. Uber), and most recently, delivery of restaurant food (e.g. Deliveroo). Gig economy platforms (platforms that facilitate freelance on-demand work) in particular have received wide media coverage and research interest due to the ongoing debate of whether people working through such platforms should be classified as employees of the platform or self-employed contractors [2]. The European Commission [3] estimates that in Europe alone, 28 million people work through digital labor platforms.

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On-demand food delivery platforms offer one of the most visible examples of gig economy work conducted through digital labor platforms in the context of hospitality and tourism [4, 7]. Spurred by the COVID-19 pandemic, Ahuja et al. [5] estimate that in the US, on-demand food delivery has more than doubled in value since early 2020. Convenience, ease-of-use, availability of choice as well as safety concerns with regards to eating in restaurants have been found as key drivers of consumer adoption of on-demand food delivery amidst COVID-19 [6]. From a hospitality management and e-tourism research perspective, the rise in demand for restaurant food delivery brings various new considerations to the forefront, e.g. when and what kind of a virtual or ghost kitchen should a restaurant operator open, how the delivery process should be organized, and what the ideal menu for delivery should be [7].

In terms of scholarly literature, studies looking at on-demand restaurant food delivery have thus far explored overall experience of working for a food delivery platform [8], logistics (e.g. optimizing courier routing) [9], impacts of using courier services on customer satisfaction and loyalty towards the original restaurant brand [10], the precariousness of couriers' working conditions [11], as well as strategies workers adopt to manage, optimize and game the algorithms that define how work on the platform is facilitated [12]. There is a general lack of research from hospitality management and e-tourism scholars vis-à-vis the ways in which couriers and partner restaurant employees navigate the competing interests of stakeholders (platform, its users, partnering restaurants) and affordances of technology (design decisions systems) [7].

Adopting a qualitative approach, this paper aims to explore what Jiang, Adam and Benlian [13] dub 'algoactivism', that is, the various actions workers perform to mitigate, counteract and undermine AI algorithms that control how work on digital labor platforms is conducted. Semi-structured interviews were conducted with on-demand delivery couriers ($n = 5$) and restaurant employees and managers who use delivery platforms as part of their day-to-day job ($n = 7$). The specific research questions this study addresses are: In what ways does worker-led algoactivism manifest in the context of on-demand food delivery platforms? How do algorithmic management practices affect workers?

2 Platform Economies of Hospitality and Tourism

The term "platform economy" arguably signifies a relatively new economic configuration that relies on digital infrastructures of connectivity and the internet to generate a wide variety of value-creating exchanges and activities [14]. The networking technologies that underpin platforms allow their users to communicate, interact, exchange, sell and buy goods and services, as well as contribute, circulate, and consume digital content. Their main aim is to bring together and govern so-called two-sided or multi-sided markets made up of two or multiple users [15, 16]. Within the context of tourism and hospitality, these markets may consist of e.g. short-term accommodation owners and their tenants, food delivery workers, restaurant owners and their customers, taxi drivers and transport seekers, and tour guides and tourists.

As a discursive construct, the term "platform" has meaning in different semantic areas, but – in reference to how the word is commonly used today– came into wider

circulation through the early and mid-2000s, initially in association with the proliferation of new spaces for digital social interaction, such as Youtube and Facebook [15, 16]. Platforms are "programmable" through an Application Programming Interface, allowing platform companies to make their content and functionality available to other third parties through data exchange (ibid.). For example, online travel agency and platform TripAdvisor and short-term rental platform Airbnb grant their users to log in with Facebook accounts, made possible through data-exchange between these respective platforms. This is a deliberate strategy that allows platform companies to expand their reach in other social spaces.

The business models that underline the platform economies of tourism and hospitality vary widely [17]. Some platforms are based on collaboration and promote non-monetized exchanges and are often associated with the so-called "sharing" or "collaborative economy". However, a substantial share of tourism and hospitality platforms now mirror "traditional" capitalist relations of production, having extraction, profit generation, expansion, and market monopolization at their core [17, p. 30]. Aside from charging their users commissions for each transaction, platform companies capture and accumulate data from the users of their digital infrastructures from which they derive value that is "dynamically determined" [18, 19].

3 From Algorithmic Management to AlgoActivism

The ever-growing role of artificial intelligence (AI) algorithms in allocating, overseeing and managing workers on digital labor platforms brings new considerations to conventional people management strategies. The term "algorithmic management" was coined to express how algorithms assume managing roles in organizations and enable organizations to essentially control a large and dispersed workforce [20]. In their review of algorithmic management, Kellogg et al. [21] highlight six mechanisms through which algorithms assert control over workers: directing workers by restricting and recommending, evaluating workers by recording and rating, and disciplining workers by rewarding and replacing. Further evidence illustrates that the unique features of algorithmic management such as persistent surveillance [22], continuous performance assessment [23], automated decision-making [12], little human-to-human contact [24], and poor transparency of algorithmic decisions [25] facilitate important power asymmetries between workers and management [26].

Like in other sectors, exchanges on tourism and hospitality platforms are governed through algorithms, which are "the instructions with which input data can be transformed in desirable output data" [17]. The central organizing role that algorithms might fulfill is one that would allow the market that the specific platform enables to "operate on itself". For example, the search engine of short-term rental platform Airbnb automatically executes guests' search queries (data inputs) to provide a ranking of accommodation listings (data outputs) based on a guest's desired dates, their budget, accommodation type, and data related to their prior interactions on the platform. The latter include review and rating data provided by their previous hosts about their past behavior as guests [19]. While review- and rating data may similarly "serve to discipline host performances according to corporate guidelines" by algorithmically ranking their listings lower in a

guest's search results [27, 28], users also increasingly deploy tactics to (collectively) challenge the algorithms employed by the company to govern the platform [27, 29].

In line with labor process scholars, who have made significant contributions at the intersection of organizational control and worker resistance as a response to power asymmetries [cf. 30], algorithmically managed workplaces are examined from a perspective of conflict between workers and management-implemented-algorithms [2, 31, 32]. Nevertheless, the addition of instantaneous, opaque, interactive and comprehensive algorithmic control mechanisms into the management process [21] in turn elicits more varying degrees of worker resistance. As a result, the concept of individual and collective resistance to such algorithmic control – "algoactivism" – has emerged [13]. Correspondingly, Möhlmann & Zalmanson [12] identify resisting, switching and gaming the system as forms of algorithmic resistance of workers, Ferrari & Graham [33] describe manipulation, subversion, and disruption and Jarrahi et al. [23] sense making, circumventing and manipulation as techniques for developing algorithmic competences.

In the context of on-demand delivery platforms, non-cooperation [34], tricking and reverse-engineering the algorithms [34, 35], social sensemaking of algorithmic functions [34], collective unionizing and organized strikes [31] have been recognized as varied forms of algoactivism. In view of this, we argue that employees interacting with and working on restaurant delivery platforms in particular have a greater potential for algoactivism owing to a number of platform-specific core variables that enable this. For operators, the delivery platform system often runs parallel to the restaurant's own point of sale system, adding increased complexity to the service process. For couriers, the inclusion of the restaurant as an extra stakeholder on the platform creates new forms of interaction, e.g. a common waiting zone in front of or inside the restaurant where users may gather and discuss their platform experiences [36]. This fosters common shared knowledge about the platform experience and a sense of solidarity among couriers. Finally, the visibility of riders in urban spaces impacts tourism experience, with increased social awareness, activated forms of unionism and widespread media coverage [31] reinforcing the public awareness for tighter regulation of gig labor.

4 Method

Data for this study were collected between April-August 2022 in Helsinki Metropolitan Area, Finland. The Finnish context of on-demand food delivery consists of two major platforms: Wolt (owned by US-based DoorDash) and Foodora (owned by Germany-based Delivery Hero). Both companies launched their Finnish operations in 2015. Two rounds of semi-structured interviews were conducted in English, with 1) on-demand food delivery platform workers (n = 5) and 2) restaurant employees and managers who, as part of their day-to-day job, interact with on-demand food delivery platforms (n = 7) (Table 1). In contrast with previous studies on algorithmic management and algoactivism, we include the restaurant as a stakeholder in our analysis to broaden the understanding of algorithmic control practices in the context of on-demand food delivery platforms. Table 1 illustrates basic characteristics of interview participants. Interviews were conducted online through a teleconferencing platform, and they lasted for 24 min on average. Interviews were audio recorded, automatically transcribed and

transcripts were manually checked for accuracy. Interview guide drawing on Kellogg et al.'s [21] conceptualization of algorithmic management practices was used. Data were thematically analyzed by one researcher, following a structured approach which systematically moved from open coding to axial and theoretical coding. Data were analyzed manually.

Table 1. Characteristics of participants

Participant ID	Role	Time worked with platform	Platform
P1	Courier	4 years	Wolt
P2	Courier	2 years	Wolt
P3	Courier	5 years	Wolt
P4	Courier	1 year	Wolt & Foodora
P5	Courier	3 years	Wolt & Foodora
P6	Cashier	1 year	Wolt
P7	Chef	2 years	Wolt
P8	Chef	2 years	Wolt & Foodora
P9	Supervisor	2 years	Foodora
P10	Manager	4 years	Wolt
P11	Waiter	1 year	Wolt
P12	Head Chef	4 years	Wolt & Foodora

5 Findings and Discussion

Four key themes illustrating how algorithmic control manifests in the context of on-demand food delivery platforms were found: 1) Optimizing the restaurant work process, 2) Surveillance of task completion, 3) Keeping up with system updates and finding loopholes, and 4) Emergent power asymmetries.

5.1 Optimizing the Restaurant Work Process

The introduction of on-demand delivery platforms brings changes to value creation in traditional food service business [7, 35]. Prior research has noted how such changes can influence work processes across the ecosystem involved in the production and delivery of hospitality service offerings [7]. In a similar vein, we found several concrete examples of workers optimizing their work processes to better capitalize on the affordances and constraints of the platform. In terms of front-of-house, changes included rethinking the service process and use of servicescape. In terms of back-of-house, changes included rethinking the composition and packaging of dishes. As put by participants:

"The front-of-house team directs the couriers to a separate line, where we've installed a pick-up locker for the delivery orders." P10, Manager.

"We always serve customers in the restaurants first, and only then take orders from the platforms. If the line in the restaurants gets too busy, we close the platforms for the day." P12, Head Chef.

"The platform has increased our delivery orders so much that we've made changes to some of the packaging that we use, to make it more sustainable and better able to keep the food looking proper during delivery." P7, Chef.

Beyond concrete changes to the restaurant service process, participants also expressed negative affect towards push notifications sent by the platform to algorithmically nudge them towards increasing their productivity [37]:

"Usually in a kitchen there's a lot of communication. You talk to the other chefs all the time. There [in a ghost kitchen] it wasn't like that […] people had headphones on, super focused on the job to meet whatever targets the system were giving. It felt like a production kitchen." P8, Chef.

"When it's busy, [the platform] will send you notifications to try to get you to work." P1, Courier.

"The platforms can be very difficult to use. For orders with multiple dishes, which is most orders really, you can't choose when you start preparing what dish, only the entire order as a whole. The system also gives unrealistic time targets for preparing the food, particularly bigger orders." P8, Chef.

Collectively, these different approaches to optimize work processes, given the on-demand food delivery platform's constraints and affordances, resonate well with Kellogg et al.'s [21] notion of using AI algorithms to restrict workers and recommend/nudge workers to behave in a certain way. Based on our interviews, such algorithmic nudges seem to primarily benefit the platform or the partner restaurant business rather than the worker in the restaurant or the worker completing the delivery task.

5.2 Surveillance of Task Completion

Besides restricting and recommending, the strongest evidence of the presence of algorithmic control mechanism as conceptualized by Kellogg et al. [21] was found to be algorithmic recording and rating for the purpose of evaluating workers. Most notably, participants' comments related to two distinct features one of the food delivery platforms that operates in Finland has [8]. First, the platform allows users ordering food to track in real time how the delivery of their order is proceeding; second, the platform allows users ordering food to rate the performance and professional conduct of the delivery worker (e.g. courier professionalism, delivery time estimate), along with a feature related to the product itself (e.g. taste, packaging). While participants seemed rather neutral about live tracking, performance rating caused them worry:

"The customer following the progress of my delivery route doesn't really bother me, as I can't really see what he or she is seeing on the other end. I'm just driving, the app is telling me that I have five minutes to make this delivery. If I'm late, [the platform] has this system that they let the customer know the order is going to be delayed." P3, Courier.

"Customers rating my performance, particularly with the contactless delivery [introduced during COVID-19], it doesn't sound that good to me, as I don't even meet the customer, I just go to the door, put the food there, and I leave. So I don't really know what are they rating. Whether I'm there on time or not? Of course if I'm not on time it's my own fault if I get a bad rating. But let's say I have a one on one interaction with the customer, then maybe the way I speak to them, how I present their food to them, how organized I look? How clean I look? That will impact the rating. But now, with contactless delivery, I don't even see the customer, I'm really worried, I've thought about this a lot, what are they rating me on? I don't consent to this, because you can't really rate me when you don't see me, when we don't have that interaction." P2, Courier.

5.3 Keeping up with the System Updates and Finding Loopholes

As Jarrahi et al. [23] point out, workers and platforms mutually shape each other, and as such, the overall system evolves. Indeed, participants reported several examples of trying to keep up with system updates and even proactively experiment with the platform's new features to find loopholes that could be exploited and in some cases informally shared with other workers. Drawing on Kellogg et al. [21], we find evidence of workers exploiting loopholes primarily related to rewarding, in this case to direct remuneration. Interestingly, no examples of algorithmic control related to replacing (e.g. deactivation or forced logout due to certain behavior, e.g. inactivity) were reported, despite other studies drawing attention to such practices [26].

"During the beginning of [the platform], the payment was not that attractive. We used to get paid by hours. I didn't really like the payment system at that time, so after a while I decided I'm not going to do it. And then when I came back two years ago the payment model had changed, and I had to recalibrate my thinking." P2, Courier.

"Some restaurants do free delivery, so it's worse for me too as I get paid less for that task, and then some restaurants have free delivery after a certain threshold, like after €40 it's free. So that's again a bad order, you should avoid that." P1, Courier.

"Drivers know the restaurants where orders are always late. It's a double-edged sword, when it's busy you actually lose money waiting there, but when it's quiet it pays off. So determining when to stay and when to go is key." P32, Courier.

"Nowadays, the app has an in-built system where after ten minutes delay from the restaurant's side, [the platform] gives you extra money because of the delay. So

if the delay is only like eight minutes, you feel sad as you almost got the delay money. In those cases I sometimes ask the restaurant to hold the order for a while longer." P5, Courier.

5.4 Emergent Power Asymmetries

Prior research has examined algorithmically managed work from the perspective of conflict between workers and management-implemented-algorithms [2], noting how the locus of control is deniably skewed towards the platform on which the algorithms operate [23, 26]. Similarly, our participants commented on this general power asymmetry, highlighting how, in their view, it originates from the lack of transparency on how different platforms' systems function. Specifically, they queried what data goes into the algorithmic decision-making process and how it is weighted. We found that platform workers' lack of ability to participate in the co-design of the system was a key point of frustration, as well as subsequent difficulties with time management and maintaining work-life balance. As put by participants:

"I think the algorithm gives you a task if it knows that you know the area well, you have been there before. Also task bundles are allocated based on this, so priority is given to drivers who have previous experience of delivering to that address." P2, Courier.

"At the beginning you could switch between many areas in [city], but now it's just available in [city]. Like you could look at e.g. [area] to see if it's busy, or the city centre, and then decide where you should go. And in the very beginning you could just go anywhere and start the app. Now you're locked to an area and have to ask them [the platform] for permission to switch areas." P5, Courier.

"When it's quiet, you have to wait for a long time, on a bad day, you have to wait for one hour without an order." P3, Courier.

6 Conclusion, Limitations and Further Research

Managers have always tried to monitor and optimize how work is conducted, i.e. oversee what workers do with their time in order to improve productivity [32]. From factories adopting scientific management principles in the spirit of Taylorism to call centers precisely measuring the quantity, quality and length of phone calls through what Fernie & Metcalf [38] dubbed the 'electronic panopticon', the rise of algorithmic control practices presents a logical continuation of this trend, whereby companies are still buying workers' time and therefore have an imperative to monitor what workers do with it [32]; cf. Tussyadiah et al. [39] for a comprehensive review of factors underlying organizational adoption of automation. However, a key difference in on-demand food delivery is that workers' time is split into smaller, locally tethered gigs that involve perishable products, and that performance is monitored in real time through the platform company's app and website e.g. by GPS [8, 35]. In response, research has found that workers develop algorithmic competencies [23] to exploit fissures in algorithmic power [33].

In this study, four forms of expressing such algoactivism in the context of on-demand food delivery platforms are identified. First, drawing on Kellogg et al.'s [21] conceptualization of algorithmic management, both restaurant and delivery workers involved with on-demand food delivery platforms adopt specific behavior to optimize the restaurant work process, that is, how the platform's algorithm restricts workers and recommends/nudges workers to behave in a certain way. Second, we find that worker performance is systematically recorded and rated. Our findings suggest that workers are neutral about the former, but apprehensive about the latter. Third, we find that workers and managers involved with on-demand food delivery make efforts to keep up with system updates and find loopholes, i.e. proactively experimenting with the platform and at times informally sharing lessons learned with other stakeholders. Fourth, we highlight emergent power asymmetries, most notably the lack of transparency about how on-demand delivery platforms' algorithms work and how this affects workers' time management and work-life balance. We call for more dialogue between platform stakeholders, including greater inclusion of platform users in the co-design of on-demand food delivery platforms' algorithms. Recently, in response to the European Commission's [3] tighter view on digital labor platforms, platform companies have started to alleviate concerns over transparency by publishing various transparency reports. In the context of on-demand food delivery, Wolt for instance released an algorithmic transparency report in February 2022. Such practices, while a commendable first move from a corporate social responsibility point of view, only affect sustainable change when one-way communication moves to comprehensive and systematic dialogue between all stakeholders on the platform, coupled with measurable indicators of impact.

In previous studies looking at algorithmic management and algoactivism in the context of delivery platforms, a key point of debate has been the tension surrounding platform worker status, i.e. should they be classified as employees of the platform or independent contractors [31]. The European Commission [3], along with many labor unions, seem to push towards the former; platform companies towards the latter. Interestingly, in our study the platform workers themselves did not hold much interest in the debate from the social security point of view (e.g. insurance, sick pay, holiday pay, parental leave). Instead, interviewees called for attention towards issues related to immigration, e.g. better recognizing work conducted on digital labor platforms when applying for or renewing immigrant work visas. As such, we join van Doorn et al. [40] in calling for more future research on the role of migrants in platform economy.

In terms of other avenues of future research, and to acknowledge the limitations of our study, we note the small and geographically limited sample. Future research could extend our work through quantitative methods, or by looking at on-demand food delivery platform operations in more rural areas or other countries. Further, future research could also adopt a more cross-platform view, examining workers' algoactivistic behavior across both locally-tethered (e.g. Deliveroo, Wolt) and virtual (e.g. Upwork) platforms. We note that algorithmic management is a continuum, whereby some platforms adopt more heavy and some more light versions of algorithmic control. As evidenced by prior research, the platforms analyzed here fall on the more lenient side [8]; future studies could aim to comparatively study more lenient and more heavily AI-controlled labor platforms.

Finally, from an e-tourism point of view, more research could explore how different platforms fare against the principles of decent work, making a connection to the body of tourism and hospitality literature that has highlighted worker precarity in relation to emerging technology [41]. We also note that currently, the food delivery platform economy and its infrastructure is mostly embraced by big cities, and therefore provide a potential for food tourism, whereby an increasing number of international travelers will use food delivery platforms whilst on holiday, particularly as the app's global reach expands. As the reach of these platforms expands, they will foster new forms of (oppositional and other) attitudes from tourists, locals, restaurant partners, and delivery couriers, for e-tourism researchers to study.

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