Resigning From Uber:
An Actor-Network Perspective on Algorithmic Management

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Uber is a controversial yet representative case of algorithmic management and its impact on the labor force. Algorithmic management refers to automated systems and algorithms that oversee workers and make managerial decisions in lieu of a human manager. Existing literature primarily focuses on the regulatory challenges and control mechanisms external to gig economy platforms, often overlooking the internal dynamics at play within platforms like Uber. Specifically, the existing literature misses the adverse impact emanating from interactions between drivers, riders, and the algorithm that manages their interactions. By not recognizing these relationships, researchers offer an incomplete picture of what causes the platform's instability. Ignoring the meaningful aspects of internal dynamics not only perpetuates driver dissatisfaction and high turnover but also undermines the platform's operational efficacy, negatively affecting all stakeholders involved.

In this paper, I argue that the root of Uber's instability lies in the intricate dynamics between its algorithmic management practices and the drivers, exacerbated by the company's reliance on misleading promises for driver recruitment. To examine these dynamics, this analysis uses Actor-Network Theory (ANT) as its conceptual framework, providing a comprehensive way to examine the roles and relationships within the Uber network. ANT is a sociological approach that examines the complex interactions between humans and non-humans in shaping networks, arguing for the direct study of real-world interactions over abstract theories of social forces (Latour, 2005). Through the ANT approach, we can aim to redefine the understanding of Uber's market success and also its inherent vulnerabilities. To corroborate my findings, in this paper, I analyze primary sources, including academic research that describes Uber's operational impacts,

surveys from platforms such as The Rideshare Guy that reveal driver perspectives, and Uber's own publications that outline its strategies and growth trajectories.

Literature Review

Previous literature has primarily focused on Uber's disregard for regulation and the impact of algorithmic control on gig workers' autonomy and job security. In the journal article titled "Algorithmic management and the politics of demand: Control and resistance at Uber, Accounting, Organizations and Society", McDaid et al. (2023) delve into the mechanisms of control employed by Uber, and how gig economy workers navigate and respond to these control regimes. Their research is interested in the dynamics of contemporary management control within the gig economy context. The study also outlines the historical context of labor and management control, emphasizing the shift towards a new industrial era characterized by advanced factory systems and customer-centric manufacturing activities. Algorithmic management is a significant departure from traditional management styles because individuals are expected to act as their own bosses. The study also discusses the consequences of gig work, such as the lack of workers' resistance due to the perception that it is better than unemployment, and the use of gamification strategies to create an attachment to the platform. The research also delves into the broader context of the fourth industrial revolution, which has transformed various sectors, including transportation through remote and on-demand services. McDaid et al. (2023) provide an overview of the control mechanisms employed by Uber and the broader context of the fourth industrial revolution's impact on labor and transportation, however, the analysis fails to incorporate the significance of the relationships within Uber's network in identifying dominance and instability.

A study conducted by Dudley, Banister, and Schwanen (2017) demonstrates that Uber's disregard for regulation and its competitive strategies are responsible for its successful expansion. Their research shows Uber's ability to navigate regulatory challenges and use public support to become dominant in the transportation industry. They also discuss Uber's strategic approach to growth, using user-friendly technology and the sharing economy model to challenge traditional taxi services. Despite facing backlash from regulators, governments, and established taxi operators, Uber continues to dominate the market. While Dudley et al.'s analysis underscores the influence of regulatory environments and market dynamics on platform success, it falls short of integrating the relationships that have shaped Uber operations as well as the relationships that cause instability.

Dudley et al. and McDaid et al.'s arguments relate in that they both explore factors contributing to Uber's operational model and success but from different angles. Dudley et al. focus on external factors like regulatory challenges and market competition, while McDaid et al. discuss management style trends and their impact on workers. There are gaps in both of these arguments; Dudley et al. do not sufficiently consider the consumer's role and the internal relationships that affect Uber's stability, and McDaid et al. do not fully account for the operational challenges faced by drivers due to algorithmic control. Neither fully integrates the role of individual actors within the network that impacts its functionality and the consumers' experiences. This paper advances understanding by addressing these shortcomings through an analysis of the internal relationships within Uber's network. The Actor-Network Theory methodology will provide a holistic view of the Uber network that incorporates the experiences of consumers, the role of technology, and the impact of these relationships on Uber's stability.

STS Framework: Actor-Network Theory

In this paper, I deploy Actor-network theory (ANT) to frame the analysis of Uber's relationships. This method is effective because ANT has been shown to be a valuable sociological framework for examining the complex interactions and relationships between human and non-human entities in social and technological contexts (Nickerson, 2023). ANT challenges other sociological frameworks and perspectives by emphasizing the importance of both human and non-human actors in shaping society. ANT argues that social forces do not exist as real, separate entities that cause social events. The framework says we should study and describe what is happening in the real world before discussing big ideas like social forces, which should be seen as theories instead of concrete things (Latour, 2005).

The first key tenant of ANT is the actors, which include human and non-human entities such as objects, technologies, institutions, and ideas. Each actor has equal agency in shaping social interactions and outcomes. The second key tenant of ANT is the networks, which link the actors together through various relationships and connections. These networks emerge through the interactions and associations among actors.

The concepts of translation and symmetry are central to the ANT framework. The translation process allows a network to become one stable entity; it involves aligning the interests and goals of actors to form one stable network. The symmetry principle states that all human and non-human actors have equal agency and importance in shaping social outcomes. ANT is particularly suitable for analyzing the sociotechnical issues related to algorithmic bosses because treating human actors as equal to non-human algorithms will be crucial. The algorithm takes the role of a human boss, so for this analysis, it is essential to treat them equally.

For these reasons, the ANT framework is an ideal tool to organize the analysis of Uber. First, the actors involved in the Uber network will be identified and their key characteristics will be discussed. The actors involved in the Uber network include engineers, management, drivers, users, the algorithm, and the application platform. A web will be constructed and will be used to understand the complex, dynamic, and perhaps malleable relationships between the actors.

Another aspect of ANT is the role of the network builder, who is responsible for the assembly and maintenance of the network. The network builder engages in the stages of translation, guiding the network from its initial stages to a final functional network (Latour, 2005). In the Uber network, Uber management acts as the network builder, coordinating the interactions between actors to achieve the company's objectives.

The stages of translation, include problematization, interessement, enrolment, and mobilization (Latour, 2005). Problematization identifies a central issue that the network aims to address. Interessement involves the network builder gaining the support of other actors, and ensuring their roles align with the network's goals. Enrolment is the process by which actors officially assume their roles within the network, often following negotiations. Finally, mobilization ensures that actors are actively involved in achieving the network's goals and operating cohesively. Using the ANT framework, the relationships between the actors in the Uber network will be understood to identify which relationships promote Uber’s success and which cause instability.

Analysis

This analysis delves into the dynamics of Uber's actor network, focusing on the relationships between heterogeneous actors and technological elements within the network. By using Actor-Network Theory as a framework, this analysis aims to systemically describe Uber's

network formation. Additionally, it seeks to reveal the underlying factors causing instability including issues with transparency, communication, and the promises made during the interessement phase.

Network Formation

Reconstruction of the Uber actor network will provide the necessary framework for the analysis to follow. The first step in this reconstructive process is to define the heterogeneous actors that are present within the network. Information was gathered from Uber's website, particularly from the sections on leadership and careers, to identify the actors involved and outline the stages of translation in forming the network. These actors are defined as follows: (i) drivers; (ii) riders; (iii) Uber engineers; and (iv) Uber management (Uber Technologies, Inc., n.d.). Similarly, I have identified the central non-human or technological actors. These actors are defined as follows: (v) the managerial algorithm; and (vi) the Uber interface in the form of a smartphone application. Uber's management acts as the network builder, leading the formation of the Uber actor network through translation.

The first phase of this translational process is problemization. During this phase, the network builder, Uber management, identifies the goal of the Uber network; to align drivers, and riders via an app interface (Uber Technologies, Inc., n.d.). In the second phase, interessement, human and non-human actors are recruited to join the network. During this phase, Uber management identifies the engineers that are needed to develop the algorithm and app interface as well as the human actors, drivers, and riders, that will be needed for the system to function. This stage demonstrates the role of Uber management in drawing these actors into the network by aligning their interests with the network's goals. During interessement, Uber management recruits the human actors, drivers, and riders, into the network with separate goals and promises

(Uber Technologies, Inc., n.d.). Promises of flexibility and good pay are made to drivers, and advertisements of convenience and good prices for riders. This recruitment is necessary for the enrolment phase, where actors formally agree to their roles within the network. In the optimal enrollment scenario, Uber management, the riders, drivers, and the algorithmic manager will all accept their allotted roles and form intended mutual associations. The enrolment phase solidifies these associations, leading to the final stage, mobilization, where all actors actively work towards the network's objectives, ensuring the network functions as a cohesive unit.

Figure 1 shows solid lines depicting two-way relationships, and dotted lines depicting one-way relationships. The two-way relationships signify communication flowing back and forth between actors. This relationship is demonstrated between the engineers' relationship with management and that of the algorithm and app they create. This two-way relationship is also shown between the drivers and riders who have the ability to chat via the Uber application platform. The dotted lines depict Uber management's one-way relationship with the drivers and riders. Management communicates to the drivers and riders indirectly through the app interface and algorithm, but the drivers and riders have no or limited ability to contact management. The algorithm also has a relationship with both the drivers and riders that is one way because users only see one end of the app interface with no communication back to it.

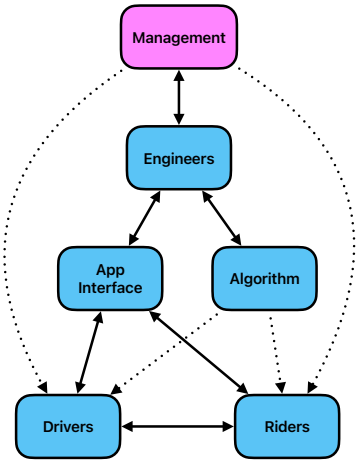

Figure 1: The General Uber Network

Transparency and Communication

Uber's issues are a manifestation of the relationship between the Uber drivers and their algorithmic boss that exists instead of a direct managerial driver relationship. Drivers and riders

interact with the platform through an app interface that assigns, optimizes, and evaluates work without direct communication back to the algorithm. This one-way interaction affects the work practices and experiences of drivers in several key ways. The algorithm assigns rides to drivers based on various factors, including proximity. However, drivers often accept assignments without fully understanding the reasoning behind them. The system pressures drivers to maintain a high acceptance rate, influencing their decision to accept rides even when inconvenient (Lee et al., 2015). The algorithm also provides drivers with information about surge-priced areas to incentivize them to move to locations with higher demand. However, the dynamic and unpredictable nature of surge pricing, combined with a lack of detailed understanding of how surge prices are determined, means that drivers do not always find this information useful for strategizing their work. Drivers are evaluated based on passenger ratings and their ride acceptance rate. This evaluation system creates a sense of accountability but also raises concerns about fairness and the impact of uncontrollable factors on ratings. The lack of direct feedback mechanisms further complicates drivers' ability to understand and improve their performance according to the algorithm's standards.

In 2020, Uber released data that showed 68% of all drivers quit after just six months (Cook et al., 2020). A Stanford study in 2020, found that within 26 weeks of giving their first ride, 65% of male and 76.5% of female drivers were considered inactive (Cook et al., 2020). In the Stanford study, inactive drivers were defined as those who had not given a single ride in the last 26 weeks, so even just one ride in that 6-month period would restart the inactivity timer. Therefore, these statistics of inactive drivers, in actuality, are probably much lower because the definition of inactive is very generous. These statistics highlight significant retention issues

within Uber's network, suggesting a problematic relationship between drivers and other actors in the network.

The "ride share guy" is a rideshare blogger named Harry Campbell who writes about his experience driving for companies such as Uber, and he shares helpful tips and tricks for drivers in the rideshare business. In addition to advice, he conducted a survey polling Uber and Lyft drivers to gauge satisfaction and preferences (Campbell, 2020). In 2019, the ride-share guy polled nearly 1,000 Uber and Lyft drivers and the findings are critical for understanding driver experience and satisfaction. Only 8% of drivers were satisfied with their experience driving for the Uber platform. 53% of Uber drivers said their most important aspect was the pay and 37% said it was the flexibility. These survey results are essential for analyzing driver dissatisfaction within Uber, particularly highlighting the drivers' prioritization of pay and flexibility, which demonstrates the disparity between their expectations and the realities of driving for Uber.

In 2020, Harry Campbell explored driver dissatisfaction in his blog post 'Why Do So Many People Quit Driving for Uber?' He uses personal experiences and survey data to outline key reasons behind the turnover rate among drivers. He describes the lack of training Uber drivers receive saying that Uber sends out a few 5-minute YouTube videos (Campbell, 2020). Because of this lack of training, Uber drivers have questions, but contacting Uber is challenging. Campbell's blog post on the top ways drivers can contact Uber is the most popular article on his site with millions of page views, which demonstrates Uber drivers' frustration with the existing customer service and the desire to have communication with their invisible manager. Campbell describes that driving for Uber is solitary, and unlike a traditional workplace where an employee has others to ask for help, the assistance Uber provides is not very responsive or useful. Uber drivers' desire for help, shows that the relationship in the Uber network between the algorithm

and drivers is a one-way relationship, with the algorithm instructing them what to do, but no way for the drivers to respond.

Campbell continues in his blog post to outline other issues Uber drivers experience that drive them to quit such as fare cuts and income variability. A telling account of the issues Uber drivers experience comes from the top-liked comment in the comment section below this blog post. The commenter lays out 15 reasons they believe most drivers quit Uber; a few notable ones to highlight are: "1) You are not making as much money as you thought you would; […] 3) You begin to realize the dangers of driving […]; 5) you realize that YOU are doing all the work and taking all the risks & it doesn't match the pay you get; […] 7) you always get responses (2 days later) from Uber that in no way address your original question; […] 12) Riders can complain; you can't." Below in the comment thread the original poster replies agreeing with another driver's concerns, "keep in mind Uber doesn't care about you, your life or your problems. They are an ivory tower, invisible boss that succeeds in part by deception and in part by evading your, or the media's, questions or complaints." The issues this commenter lays out include inadequate compensation, safety risks, disproportionate workload and risk assumption, unresponsive and unhelpful feedback, and limited ways to express complaints. These issues reflect significant concerns regarding the asymmetrical power dynamics and lack of support that Uber drivers experience. These elements are crucial as they illustrate the issues within Uber's network that contribute to high driver dissatisfaction and turnover.

Actor-network theory analysis demonstrates that the instability and challenges within Uber's network, evidenced by the retention statistics and Campbell's blog, stem from the unequal relationship between the algorithmic manager and the driver. The algorithm assigns rides based on factors like proximity and surge pricing but lacks transparency and reciprocal

communication. This opacity in how decisions are made, and the one-directional way of interacting weakens the system, leaving drivers with no real way to connect with the algorithm. The difficulty drivers face in understanding or affecting the rationale behind ride assignments and surge pricing shows a failure in the system's ability to communicate. The interactions between drivers and the algorithm through the app interface, reflect a power dynamic that favors the algorithm over its drivers. This imbalance is exacerbated by the drivers' limited ability to communicate with or understand the algorithm. In response, drivers attempt to navigate these limitations by gathering in areas with higher prices due to demand or choosing rides selectively to keep their acceptance rates up. Yet, the absence of feedback mechanisms and the unclear evaluation criteria prevent them from matching their actions to what the algorithm expects, leading to frustration and dissatisfaction.

Additionally, drivers' reliance on external forums and blogs for help and communication, emphasizes the network's failure to offer essential support and feedback. This dependence highlights the one-way relationship between the algorithm and the drivers, where drivers receive instructions without a way to respond. Moreover, drivers report earning less and spending more than expected. These issues contribute to the high turnover rates, with a significant percentage of drivers quitting within months of starting. This demonstrates a disconnect between the drivers' expectations and the network's capacity to meet them.

In framing this situation through ANT, it becomes evident that the instability and challenges within Uber's network come from the unequal relationships between its actors. The algorithm, designed to prioritize efficiency and control, fails to meet the drivers' needs for clarity, support, and communication. This lack of communication and visibility regarding job expectations and support leaves drivers feeling confused, misguided, and let down, ultimately

contributing to high turnover rates and low retention. As the driver on Campbell's blog would say, "As soon as drivers understand they have been betrayed they quit" (Campbell, 2020).

Therefore, the root of these problems lies in a lack of transparency and communication, leading to a sense of disappointment and betrayal among drivers, which directly contributes to their decision to leave. However, critics, such as Amazon, preach that algorithmic business models, like its and Uber's, are inherently designed to minimize direct communication, thereby streamlining processes, and reducing overheads (Carey, 2018). Amazon advocates for algorithmic management systems because they enhance productivity and ensure consistency in performance management. Its perspective is that these systems are impartial and track and manage performance, which streamlines operations and creates efficiency. However, evidence suggests these potential performance enhancements are at the expense of worker well-being and engagement. Research suggests that the lack of direct interaction and communication inherent in algorithmic management can lead to increased feelings of isolation, stress, and job dissatisfaction among workers. For instance, a study by Jarrahi et al. found that employees supervised by algorithms report lower job satisfaction and higher levels of stress compared to those supervised by humans (Jarrahi et al., 2023). This is attributed to the impersonal nature of algorithmic supervision, which fails to provide the emotional support and immediate feedback that human managers can offer. The study also shows that algorithmic systems often lack the flexibility to account for individual circumstances, leading to decisions that can seem unfair or insensitive to workers' needs. This strictness can exacerbate feelings of being undervalued and replaceable, further diminishing worker engagement and loyalty. Additionally, the reliance on algorithms for performance evaluation and task allocation can obscure the criteria for success, leaving workers uncertain about how to improve their performance or advance their careers. This uncertainty can

undermine motivation and effort, as workers may feel that their hard work is not adequately recognized or rewarded. Therefore, while algorithmic systems might appear to optimize productivity, they can also undermine worker autonomy and satisfaction, which are crucial for long-term success. In summation, the evidence from numerous studies and real-world experiences of Uber drivers reveals an unstable, opaque, and one-sided relationship between Uber's algorithmic management and its drivers, detrimentally affecting worker autonomy, satisfaction, and well-being.

False Promises

Uber's market dominance is overshadowed by a disparity between the perceived independence promised to drivers and the actual constraints imposed by its algorithmic system. Uber's app design, especially features like blind passenger acceptance and minimum fares, compel drivers to do as the company wants because the choices presented to them are heavily influenced by the company's strategic interests. The surge pricing mechanism, while unpredictable and a source of frustration, plays into this system by encouraging drivers to chase higher earnings, thus manipulating supply in response to demand (Hall et al., 2015).

Promises of entrepreneurial freedom and flexibility are made during the interessement phase of translation, which convinces stakeholders of the value and benefits of the platform. The success of this phase is shown by the number of new drivers which increased from 160,000 to 400,000 within one year (Uber Newsroom, 2015). However, the findings from the analysis section above describe a significant contradiction to this increase. While Uber advertises autonomy and control to its drivers, the reality is characterized by information asymmetries, which allow Uber to exert indirect but substantial control over driver behavior. These mechanisms illustrate how Uber's algorithmic management not only shapes driver behavior but

also perpetuates a cycle of dependency, where the allure of potential earnings keeps drivers hooked to the platform despite the lack of their autonomy and satisfaction.

While Uber continues to thrive because of its algorithmic management and the appeal of entrepreneurial freedom, the drivers' experiences reveal a different reality. The contradictions between Uber's promises and the actual driver experience suggest that the success of the platform comes at the cost of driver satisfaction and autonomy. However, Uber has continued to dominate the market because the promises it makes lure new drivers in at a rate faster than they can leave.

Conclusion

Through analysis, this paper challenges and expands upon the current understanding of Uber’s operational model. By exploring the asymmetrical relationship between Uber drivers and the platform's algorithmic management system, the root causes of network instability are understood more holistically. This analysis is significant as it moves beyond just identifying problems to offering a nuanced understanding of the complex actor-network relationships that define the gig economy. As the gig economy continues to evolve, this new understanding could inform future research, particularly in business management and technology policy, potentially influencing the professional engineering landscape by prompting more ethically designed and socially aware algorithmic management systems.

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