Workers and the Post-COVID Transportation Gig Economy

Amelia Regan and Nicola Christie

Abstract The COVID-19 pandemic significantly reduced the demand for ride-hailing services but saw a sharp increase in e-commerce, grocery, and restaurant delivery services. As the economy recovers and demand increases, several issues are emerging. The tension between companies that wish to keep drivers as independent contractors, but which hope that large enough numbers of them return to the industry, and drivers who increasingly demand to be considered as employees will likely lead to more attractive labor contracts, and perhaps even unionization in the future. Prices for ride-hailing and delivery services are increasing rapidly, rendering the savings relative to the now mostly defunct taxi industry and traditional package delivery industries near zero. While that will lead to a reduction in demand, no one knows how much that reduction will be and how long it will last. This chapter addresses three overarching themes dominating analyses of these industries. The first is labor, the second safety, and the third environmental impacts.

1 Introduction

The COVID-19 global pandemic significantly reduced the demand for ride-hailing services but e-commerce, grocery, and restaurant delivery services have experienced a sharp increase. Ride-hailing drivers, aware of the plunging demand and wary of providing rides to strangers, reduced their engagement with ride-hailing companies such as Uber and Lyft in the United States, and increasingly added multiple delivery services to their portfolios. While the simultaneous use of multiple phone apps can cause many complications and safety concerns (see for example, [11, 12]), working

A. Regan (✉)
Computer Science and Institute of Transportation Studies, University of California, Irvine, CA, USA
e-mail: aregan@uci.edu

N. Christie
Centre for Transport Studies, University College London, London, England
e-mail: nicola.christie@ucl.ac.uk

A. Loukaitou-Sideris et al. (eds.), *Pandemic in the Metropolis*, Springer Tracts on Transportation and Traffic 20, https://doi.org/10.1007/978-3-031-00148-2_4

for multiple companies is also easier than in the past due to aggregators such as Gridwise [20] and third-party apps such as [43].[1] Some drivers also shifted to driving for Amazon and Walmart, or perhaps working in their warehouses, as these companies (and many others) saw huge increases in e-commerce deliveries. New additions to the industry, whose emergence was hastened by the pandemic, are urban grocery delivery companies promising rapid (as fast as 10 or 20 min) deliveries. The so-called "dark stores" or "micro-fulfillment centers" are showing up in cities across the world, with New York City and London on the leading edge of this trend.

Some drivers in the United States took advantage of the federal unemployment benefits that were made available to self-employed workers, gig workers, and independent contractors under the federal CARES act that was signed into law in March, 2020 [47]. Those drivers do not appear to be returning to jobs with ride-hailing companies even as demand for rides begins to return.

This chapter summarizes the relevant literature (both academic and popular press) on transportation gig economy work pre-, during- and post-pandemic. The main goal is to identify the themes that will dominate the landscape of this industry in the next couple of years. The chapter addresses three overarching themes: labor, environmental impacts, and safety. In what follows, we discuss recent relevant studies and articles in the popular press in the context of these three themes. We also provide examples of under-reported benefits of the gig-economy industries and make some predictions about the industries going forward.

2 Overarching Themes

Before we review the related literature and popular press articles, we want to address some overarching themes. The first theme is labor. When Uber and then Lyft began operations in the United States, they claimed that they would provide value for customers by improving access and drastically reducing fares, and to drivers by providing flexibility and higher wages relative to the taxi companies. They have provided value for customers and, in some cases, increased mobility and access for those without private automobiles. They also appear to have broadened coverage for lower income travelers. To a certain extent, they have also provided flexibility for drivers. However, driver earnings were vastly exaggerated or perhaps cast in the best possible, rather than typical light, as most drivers earn under the minimum wage after fuel, insurance, and maintenance expenses are taken into account. After continuously losing money since their inception, the industry leaders have been steadily raising prices for passengers in 2021, without a corresponding increase in driver wages. We suspect this is because the success of the ride-hailing industry was predicated on the

[1] Gridwise is a free app for workers in the gig economy which helps them get more rideshare or delivery pings, and has features that allow them to track their mileage, compare earnings across platforms, etc. Sherpashare is also an app for ride-hailing drivers that offers them some financial management tools, allows them to track mileage, analyze their expenses, etc.

fact that they expected to be running huge fleets of autonomous vehicles (AV) by now. These companies never planned on a financially successful model with large numbers of drivers. The fact that both Uber and Lyft recently sold their autonomous vehicle development units (Uber to Arora for $10 billion in December 2020, and Lyft to a Toyota subsidiary company for $550 million in April 2021) suggests that, while development of AVs continues, large-scale deployment is *at least* 5–10 years in the future.

The second theme is safety. Research has shown that piece work and working for several apps at a time, which requires drivers to respond to requests while they drive, has led to significant safety issues for drivers. This holds both for ride-hailing and delivery drivers. Work in Amazon warehouses has been shown to be twice as dangerous as in similar companies, evidence that safety is not a prime concern for that company [18]. Another recent report provides evidence that delivery drivers working for Amazon partners have been instructed to turn off their safety monitoring software because they cannot meet their delivery quotas without speeding [24]. Further, the race to the bottom at Amazon also impacts the delivery operations at UPS, FedEx, and the US Postal Service because of their need to compete on price and delivery times. All three of these companies are hiring larger numbers of part-time workers, who do not receive the same benefits, nor the extensive training that full-time drivers receive.

The final theme is the negative environmental impacts of increased next- and same-day deliveries and of a shift from transit to ride-hailing. The impact on car ownership has proved to be minimal at best, and the increased reliance on ride-hailing operations has led to an increase in overall vehicle-miles-traveled (VMT) in nearly every market in the world. Finally, while it does not warrant discussion as an individual theme, no discussion of this industry would be complete without pointing out that for years in the United States and in many other markets, Uber and Lyft have engaged in persistent predatory pricing. Such pricing was only possible at first due to generous private funding for these companies, and then because of optimistic market valuations, which were based not on profitability, but on future company potential. Both companies have lost money hand over fist for years. For example, according to recent data on Statistica, Uber lost $8.5 billion in 2019 and $6.8 billion in 2020, while Lyft lost $2.6 billion and $1.76 billion in those years [44]. The fact that their losses went down in 2020, when they were providing fewer rides, is an indication of just how much they lose on typical rides. Delivery services (some of which are owned by Uber) also saw losses in 2019 and 2020, despite a huge uptick of demand in those years.

3 Overview of Recent Studies

Here, we discuss some of the primary works on ride-hailing services and e-commerce and restaurant and delivery operations. We separate these along the thematic lines discussed above.

3.1 Labor Issues

We first note that many studies conducted around the world find positive impacts on workers in the transportation gig economy. For example, a study of Chinese restaurant delivery workers, based on in-depth interviews with 50 workers and 800 responses to an online survey, found that workers experienced improved autonomy, belonging, convenience, enjoyment, equity, knowledge, and earnings [33]. On the other hand, studies in the UK have found that delivery drivers struggle with safety issues directly related to the algorithmic management nature of gig platforms [19, 37]. Other studies find that platform work creates a false sense of self-employment and that transportation gig economy companies such as Uber use technology against workers [10, 16, 49, 50].

In the United States, Uber and Lyft inflated driver wages from the start. In 2017, Uber paid a $20-million fine to settle US Federal Trade Commission charges that it had recruited drivers with false claims [48]. In addition, both companies misled drivers with their vehicle financing programs. On the one hand, those programs helped drivers who might not have been able to get vehicles to obtain financing, and also helped drivers to finance much nicer vehicles. But on the other hand, the programs left many workers beholden to jobs that were sold on flexibility but then forced them to work long hours, and with vehicles they could not easily afford to maintain. Gig economy driving jobs have benefits—both for consumers and for drivers—but the drivers who benefit the most are not full time (sometimes called "dependent" drivers); rather they are part-time ("supplemental" drivers), many of whom do not pay for their automobile expenses themselves [40].

Many states in the United States, and many countries, have worked hard to get gig economy drivers classified as employees rather than independent contractors. In some cases, these attempts have been successful, in others they have not. In November of 2020, India set new regulations on ride-hailing services specifying that the firms (Uber and Ola are dominant in the Indian market) can take no more than 20% of the drivers' fares and that surge prices are limited to 1.5 times of the regular fares. Work hours are also limited to 12 hours per day, and the companies must provide insurance [45]. In February 2021, the U.K. Supreme Court ruled that Uber drivers must be treated as workers and provided minimum wages and holiday pay [2]. California passed Assembly Bill Number 5 in September 2019 classifying many gig economy workers as employees [8]. The law was based on the Dynamex case. Dynamex is a last-mile parcel delivery company operating in North America. They perform last-mile delivery for many companies including Amazon and the U.S. Postal Service. Their drivers use and maintain their own vehicles. However, before the law was applied to ride-hailing and restaurant delivery companies, those companies banded together to write and then back a 2020 ballot initiative exempting their workers from the law [15]. They outspent the opposition by 10:1 in the fight to classify California drivers as independent contractors. Measure 22 passed in Fall 2020, with 59% of voters in favor. This was the single most expensive proposition in the state's history, costing more than 200 million dollars (LA Times 2020). Like

many successful Proposition measures in California, it succeeded based largely on false and misleading advertisements. The measure was written by the corporations for the corporations, yet the advertising suggested that both drivers and consumers would benefit [51]. At the same time, findings in many studies indicate that most transportation gig workers are making far less than the minimum wage, that the impacts on prices of granting benefits to full-time workers would be modest, and that part-time drivers could continue to provide service during peak times [25, 26, 38]. Nevertheless, such findings were drowned out by the vast advertising campaign. By early 2021, all of these companies had increased their rates, betting that the fees which undercut any competitors in the first few years of operation had made consumers dependent enough on their services to keep using them. Time will tell how consumer demand will respond in the long run. And the saga in California is not over. In August 2021, a state Superior Court judge ruled that Proposition 22 was unconstitutional and unenforceable. The case will likely be finally decided by the California Supreme Court in 2022.

On the food delivery side of the gig economy market, the fact that Uber Eats, Grubhub, DoorDash, and other delivery companies inflate the costs of meals and often take 30–35% of the bill is leading to new emerging restaurant delivery services and also to new driver collectives which will cut out ride-hailing and delivery companies as middlemen and pay drivers more [35]. These companies represent a small share of overall services but should see an increased market share over the next few years. In some cases, cities are setting limits on the amount that delivery companies can charge for their services. In New York for example, the limit is set at 23%. Those limits will be tested in court in 2022 and perhaps beyond.

In the United States, unionization is an emerging issue that is gaining traction. The Teamsters, a union with a complicated history, but considerable success in related industries, announced that it would be targeting Amazon warehouse workers [35]. While other unionization drives in the United States have been unsuccessful, the Teamsters, who represent most hourly UPS employees and employees of several major trucking companies, seem better suited for this task than the other unions that have tried. They also have experience with nationwide (and North American-wide) unionization, and relatively deep pockets, which will be necessary to go head-to-head with Amazon. If they are successful, ride-hailing and delivery drivers would be the logical next target. Even if these unionization efforts fail, they will surely pressure companies to improve working conditions.

It is possible that this pressure (along with labor shortages) is already having an impact on gig economy companies. Amazon has recently increased tuition benefits for part-time warehouse employees and is offering significant signing bonuses for new employees. While these benefits do not directly impact the Amazon-uniformed independent contractors, who deliver Amazon packages in Amazon label vehicles, or the drivers who deliver at all hours of the day in their own unmarked vehicles, competition for labor is so high that these changes might trickle down into other markets.

3.2 Safety

Several recent studies have shown that ride-hailing and delivery drivers cause more crashes than typical drivers. An extensive study studied safety in U.S. cities where ride-hailing services had been introduced, finding an increase of approximately 3% in fatalities and fatal crashes, an increase in vehicle miles (km) traveled, an increase in hours of delay in traffic, and additional new car registrations. The authors' back-of-the-envelope calculations suggested that the annual cost in human lives in the United States due to ride-hailing services ranges from $5.33 billion to $13.24 billion [3]. Another study found that Uber was not associated with a decrease in alcohol-involved fatalities but it was associated with increased traffic fatalities in densely populated urban areas [4]. While other studies have been consistent with the ones just mentioned, some studies in the United States and the UK have found modest reductions in accidents as ride-hailing services entered markets [13, 29, 30].

The problem with gig workers in transportation is that the pressure to complete tasks and to work for several app companies at once leads to cognitive and physical strain. In turn, those strains, coupled with very tight schedules, lead to cutting corners, rushing, and crashes [11, 12]. Distracted driving is a primary cause of serious vehicle collisions. Krishen et al. [31] argue strongly that in transportation, safety is a culture and not a concept. We argue that gig economy transport operations do not have a dominant culture—much less the culture of safety that is found in leading trucking companies and established package delivery companies such as Schneider, JB Hunt, UPS, or FedEx. In fact, the pressure from Amazon to cut costs is creating ripple effects of poor safety conditions even in companies that have a decades-long history of strong safety cultures. Hudson's often cited "ladder of safety" culture starts with the first step coined "Pathological" (safety is the lowest priority), and then moves through "Reactive" (safety is important if there is an incident), "Proactive" (systems are in place to identify future safety issues), "Calculative" (systems are in place to manage incidents before they occur), and "Generative" (safety is the highest priority) [23]. As organizations move through these phases, there is increasing trust and increasing information sharing. However, the very nature of gig economy work and the attitudes of its major companies make gig work in transportation firmly planted in *pathological safety cultures.* Recent reports of Amazon flex drivers being managed and fired by bots are troubling. Of course, new technologies are important in supply chains, but gig workers are already alienated from the companies they work for, thus, adding a new level of distance helps to further erode safety.

3.3 The Environment

Hailed as environmentally friendly in the early days, even credible academic studies imagined that ride-sharing (as these companies were initially referred to) services would lead to a reduction in car ownership and vehicle miles (km) traveled [9, 14].

Ride-hailing companies were sold to the public on the basis of improved utilization of assets that would lead to a reduction in environmental impacts. The argument was that if a few automobiles were used much more, then fewer would need to be produced and sold. Further, if drivers could gain easy access to public transit (by using ride-hailing services for the first and last mile), then transit use would increase and car ownership would decrease. These predictions (and promises) were false. Several recent studies show that ride-hailing has led to significant increases in VMT in large U.S. cities, that those increases are largely due to transit users shifting to ride-hailing, and also due to deadhead (empty) miles driven by drivers between paid rides [39, 46]. In the meantime, car ownership has continued to increase in the United States and in China where ride-hailing services are widely available.

If fares continue to increase, and all indications are that they will, shared or pooled ride-hailing services might finally see an increase in use. To date, however, none of these services has been successful because most consumers are unwilling to book shared rides. This was true before the pandemic, and it became even more true during the pandemic. In fact, ride-hailing services killed off one of the longest running true shared-use transportation companies in the United States—Super Shuttle and their partner Execucar in 2019 (though they have since been reborn with different owners). At the same time, the increase in airport traffic due to ride-hailing services has been overwhelming in many locations [21].

That said, pooled ride sharing has promise, and a number of studies have examined the potential and characteristics of its demand [1, 22, 28, 41]. Most of those studies are done from the perspective of customers, but a recent study examines this issue from the view of drivers, finding that they are largely unhappy with the service and with its fee structures, which do not compensate them enough for the added trouble of serving multiple customers at once [34].

Studies have not demonstrated positive environmental impacts of grocery and restaurant delivery services; however, a recent emerging industry, namely extremely rapid grocery delivery, might finally have promise because its companies, some of which promise 10–20 min deliveries, tend to rely on active transport modes (bicycles and walking) to deliver within very narrow radii of urban grocery warehouses and grocery stores.

Just as ride-hailing services were expected to be dominated by autonomous vehicles by now, Amazon, UPS, FedEx, and other delivery companies have been counting on a faster rollout of sideway autonomous delivery robots, drones, and road delivery robots by now. Eventually, such autonomous systems may have positive environmental impacts [17].

4 Under Reported (And Perhaps Unrealized) Benefits

This chapter would be remiss without a discussion of some benefits of ride-hailing services that have perhaps gone under reported. In the United States, low-income neighborhoods that have been historically underserved by taxi services have

been better served by ride-hailing services [5]. Further, race-based discrimination, common in taxi services, appears to be less prevalent in ride-hailing services in the United States [6]. Transit agencies and advocates have long argued that ride-hailing services could complement transit for first and last-mile travel and could also be used as cost-effective substitutes for many paratransit services [7, 28, 32].

Other benefits that might not be obvious to researchers in the United States is that in many cities in the world, travel by shared motorbike or automobile is much safer and more efficient than the alternatives such as walking in crowded urban areas, cycle-rickshaws, and now often electric cycles, which are common in cities in South Asia. Therefore, both workers (who now have access to a motorbike or automobile) and passengers are better off. In some instances, as in the examples of Grab and DiDi in Singapore, companies have provided accident insurance, critical-illness micro insurance, and financial aid to the families of drivers [42]. These benefits have made car ownership, which provides both benefits and status, possible for drivers who would not have achieved this otherwise. Studies in China have noted that delivery drivers can earn incomes that far exceed those in similar occupations such as waiting tables in restaurants [33]. In some countries travel for persons with disabilities has become much safer and widely available. In India for example, people with visual impairments have been much better served by relatively inexpensive ride-hailing services than they were with the alternative mostly chaotic forms of transportation [27].

5 The Future

As we discussed in this chapter, the COVID-19 pandemic has brought about significant impacts on the gig economy, negative for some companies, positive for others. But what will the future bring about for gig economy companies and their workers? In her recent in-depth book on the gig economy, Schor [40] points out that despite the promise of empowering workers, "at their worst, the companies have morphed into predatory employers." She sees promise, however, in regulation, contracts for drivers and unionization. We see promise there too. A recent study by Pitlik [36] suggests that federalism in the United States impedes the realization of human rights for gig economy workers. Using Uber drivers as an example, she shows how discrepancies in regulations and decisions across states can result in human rights violations. It may well be that federal regulations will be needed to improve working conditions for transportation gig workers in the United States.

All three of the forces, regulation, improved contracts and unionization, could point the industry toward one in which both customers and drivers are treated with respect, in which the environmental impacts of these services are taken into account, and in which a safety culture is adopted across the board.

References

1. Alonso-González MJ, Cats O, van Oort N, Hoogerdoorn-Larsen S, Hoogerdoorn S (2021) What are the determinants of the willingness to share rides in pooled on-demand services. Transportation 48:1733–1765
2. BBC News (2021) Uber drivers are workers not self-employed, the UK's Supreme Court has rules, February 19. https://www.bbc.com/news/business-56123668
3. Barrios JM, Hochberg YV, Yi H (2018) The cost of convenience: Ridesharing and traffic fatalities, Chicago Booth research paper, No 27, Available at *SSRN* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3259965
4. Brazil N, Kirk D (2020) Ridehailing and alcohol-involved traffic fatalities in the United States: the average and heterogeneous association of uber. PLoS ONE. Public Library of Science San Francisco, CA, USA, 15(9):e023874
5. Brown A (2019) Redefining car access: ride-hail travel and use in Los Angeles. J Am Plann Assoc 85(2):83–95
6. Brown AE (2019) Prevalence and mechanisms of discrimination: evidence from the ride-hail and taxi industries. J Plan Educ Res. https:/doi.org/10.1177/0739456X19871687
7. Brown A, Manville M, Weber A (2021) Can mobility on demand bridge the first-last mile transit gap? Equity implications of Los Angeles' pilot program. Transp Res Interdiscip Perspect 10. https://doi.org/10.1016/j.trip.2021.100396
8. California Legislative Information (2019) https://leginfo.legislature.ca.gov/
9. Cannon S, Summers LH (2014) How uber and the sharing economy can win over regulators. Harv Bus Rev 13(10):24–28
10. Cant C (2019) Riding for Deliveroo: resistance in the new economy. Wiley, New York
11. Christie N (2021) Pandemic and recovery: what are the implications for road safety? Transp Rev 41(5):529–532
12. Christie N, Ward H (2019) The health and safety risks for people who drive for work in the gig economy. J Transp Health 13:115–127. https://doi.org/10.1016/j.jth.2019.02.007
13. Conner CR et al (2021) Association of rideshare use with alcohol-associated motor vehicle crash trauma. JAMA Surg 156(8):731–738
14. Cramer J, Krueger AB (2016) Disruptive change in the taxi business: the case of Uber. Am Econ Rev 106(5):177–182
15. Didlake R (2020) The gig economy's battleground—California proposition 22. Golden Gate University Law Review Blog. https://digitalcommons.law.ggu.edu/ggu_law_review_blog/77/
16. Englert S, Woodcock J, Cant C (2020) Digital workerism: technology, platforms, and the circulation of workers' struggles. TripleC: Commun Capitalism Crit 18(1):132–145
17. Figliozzi MA (2020) Carbon emissions reductions in last mile and grocery deliveries utilizing air and ground autonomous vehicles. Transp Res Part D: Transp Environ 85:102443
18. Greene J, Alcantara C (2021) Amazon warehouse workers suffer serious injuries at higher rates than other firms. Available at: https://www.washingtonpost.com/technology/2021/06/01/amazon-osha-injury-rate/
19. Gregory K (2021) My life is more valuable than this: understanding risk among on-demand food couriers in Edinburgh. Work Employ Soc 35(2):316–331
20. Gridwise (2021) Gridwise. Available at: https://gridwise.io/
21. Hermawan K, Regan AC (2018) Impacts on vehicle occupancy and airport curb congestion of transportation network companies at airports. Transp Res Rec 2672(23):52–58. https://doi.org/10.1177/0361198118783845
22. Hou Y et al (2020) Factors influencing willingness to pool in ride-hailing trips. Transp Res Rec 2674(5):419–429
23. Hudson PTW (2001) Safety management and safety culture: the long, hard and winding road, Occupational health and safety management systems. In: Proceedings of the first national conference. Crown Content Melbourne, Australia, pp 3–32

24. Insider (2021) Amazon drivers are being told to turn off their safety apps in order to hit delivery quotas, report says. Available at: https://www.businessinsider.com/amazon-drivers-mentor-app-safety-told-to-turn-off-quotas-2021-5
25. Jacobs K, Reich M (2019) The effects of proposition 22 on driver earnings: response to a Lyft-Funded report by Dr. Christopher Thornberg. University of California Berkeley: Institute for Research on Labor and Employment
26. Jacobs K, Reich M (2019) The Uber/Lyft Ballot Initiative Guarantees only $5.64 an Hour - Center for Labor Research and Education. UC Berkeley Labor Center, 31. https://laborcenter.berkeley.edu/the-uber-lyft-ballot-initiative-guarantees-only-5-64-an-hour-2/
27. Kameswaran V et al (2018) "We can go anywhere" Understanding independence through a case study of ride-hailing use by people with visual impairments in metropolitan India. In: Proceedings of the ACM on human-computer interaction. ACM, New York, NY, USA, 2(CSCW), pp 1–24
28. Kang S, Mondal A, Bhat A, Bhat C (2021) Pooled versus private ride-hailing: a joint revealed and stated preference analysis recognizing psycho-social factors. Transp Res Part C: Emerg Technol. Elsevier 124(3):102906
29. Kirk DS, Cavalli N, Brazil N (2020) The implications of ridehailing for risky driving and road accident injuries and fatalities. Soc Sci Med 250:112793
30. Kontou E, McDonald N (2021) Associating ridesourcing with road safety outcomes: insights from Austin, Texas. PLoS ONE 16(3):e0248311
31. Krishen AS et al (2015) Safety culture from an interdisciplinary perspective: conceptualizing a hierarchical feedback-based transportation framework. Transp J JSTOR 54(4):516–534
32. Lewis AN, Regan AC (2020) Enabling paratransit and TNC services with blockchain based smart contracts. In: Science and information conference, pp 471–481
33. Lin PMC, Ching AuW, Leung VTY, Png K-L (2020) Exploring the meaning of work within the sharing economy: a case of food-delivery workers. Int J Hosp Manag 91:102686
34. Morris EA, Zhou Y, Brown A, ….Chowdhury M (2020) Are drivers cool with pool? Driver attitudes towards the shared TNC services UberPool and Lyft Shared. Transp Policy 94:123–138
35. NY Times (2021) The Teamsters consider a new emphasis on organizing Amazon workers. Available at: https://www.nytimes.com/2021/06/22/business/economy/amazon-union-teamsters.html?searchResultPosition=1
36. Pitlik V (2020) The road to rights: protecting on-demand workers in the United States gig economy. Columbia University
37. Popan C, Anaya-Boig E (2021) The intersectional precarity of platform cycle delivery workers. SocArXiv. tk6v8, Center for Open Science. https://ideas.repec.org/p/osf/socarx/tk6v8.html
38. Reich M (2020) Pay, Passengers and profits: effects of employee status for California TNC drivers. University of California, Berkeley: Insitute for Research on Labor and Employment, Working Paper #107–20
39. Schaller B (2021) Can sharing a ride make for less traffic? Evidence from Uber and Lyft and implications for cities. Transp Policy 101:1–10. https://doi.org/10.1016/j.tranpol.2020.12.015
40. Schor J (2020) After the gig. University of California Press, Berkeley
41. Shaheen S, Wong S (2021) Future of Public Transit and Shared Mobility: Scenario Planning for COVID-19 Recovery. University of California: ITS Report. https://escholarship.org/uc/item/15t657r2
42. Shen KJ (2020) The rise of monopolistic rideshare companies in Asia: how ride hailing companies' market control impacts drivers. Penn Libraries: Scholarly Commons
43. Sherpashare (2021) https://www.sherpashare.com/
44. Statistica (2021) Ridesharing services in the U.S.—statistics & facts
45. TechCrunch (2020) India sets rules for commissions, surge pricing for Uber and Ola. Available at: https://techcrunch.com/2020/11/27/india-sets-rules-for-commissions-surge-pricing-for-uber-and-ola/
46. Tirachini A (2019) Ride-hailing, travel behaviour and sustainable mobility: an international review. Transportation 47:2011–2047

47. USDOL (2020) New COVID-19 Unemployment Benefits: Answering Common Questions. Available at: https://blog.dol.gov/2021/01/11/unemployment-benefits-answering-common-questions
48. USFTC (2017) https://www.ftc.gov/business-guidance/blog/2017/01/20-million-ftc-settlement-requires-uber-have-proof-earnings-auto-financing-claims
49. Wood AJ (2021) Algorithmic management consequences for work organisation and working conditions. In: JRC working papers on labour, education and technology 2021–07, Joint Research Centre (Seville site)
50. Woodcock J (2021) The fight against platform capitalism: an inquiry into the global struggles of the gig economy. University of Westminster Press.
51. Zimmerman A (2020) The California gig economy law: just how far will employers go to avoid providing health insurance? Voices Bioethics 6. https://journals.library.columbia.edu/index.php/bioethics/article/view/6961

Amelia Regan is a Professor of Computer Science and Transportation Systems Engineering at the University of California, Irvine. Her work focuses on the efficiency, sustainability and security of transportation systems using optimization, communication, pricing and cybersecurity tools. She and Professor Christie have been examining the transportation gig economy for several years. She has published more than 170 refereed journal articles and conference proceedings.

Nicola Christie is a Professor of Transport Safety at University College London. She has been researching road safety since 1985. Her research interests have focused on the causes and consequences of road traffic collisions and other unintentional injuries and the evaluation of interventions to reduce injuries. She is a member of the UK Parliamentary Advisory Council for Transport Safety.