

## RESEARCH ARTICLE

# Evaluating the impact of Uber on London's taxi service: A critical review of the literature

Walter Skok  | Samantha Baker 

Kingston University London, UK

**Correspondence**

Walter Skok, Business School, Kingston University, Kingston Hill, Kingston upon Thames, Surrey KT2 7LB, UK.  
Email: wskok@kingston.ac.uk

Uber is a very well-funded operation that has made innovative use of smartphone technology in the highly regulated and bureaucratic market of international taxi cab operations. The company has often adopted an aggressive approach when entering the marketplace in a given city, so the question arises as to how should the incumbent taxi trade react to such fierce competition that is popular with the public.

This paper describes a literature review related to the taxi and private hire industry in London that provides a foundation to answer this question. A second paper will present recommendations to help organisations prepare a response to the new competition.

From the collated journals, various themes emerged, and their reference lists were analysed to review recurring authors. The literature was organised into a thematic analysis grid to critique the content and analyse the implications for a project to evaluate the possible way forward for the taxi trade in response to Uber's aggressive approach. Six key themes were identified: disruptive innovation, sharing economy, business model, historical context, regulations, and labour.

The literature review was extended to include studies of the same area in the United States. Caution was exercised, as the U.S. market operates different ground transportation services and regulations. Nonetheless, comparisons were drawn regarding factors that were similar.

The identification of the six key themes will aid the taxi trade as well as researchers who wish to investigate the impact of Uber as and when it moves into new international markets.

## 1 | BACKGROUND AND FOCUS

### 1.1 | Introduction

London's private hire vehicle industry (sometimes known as "minicabs") provides a "pre-book" vehicle service for passengers. The term private hire differentiates the service from taxis (black cabs) who retain the privilege of being able to "ply-for-hire," that is, being hailed on the street, in addition to being pre-booked. The private hire service complements other ground transportation methods such as the underground (metro), buses, and trains.

The size of the UK taxi and private hire market is estimated at £9.4bn, with an expected compound annual growth rate of 1.1% to reach £9.9bn

in 2021–2022. The industry is mature, with high levels of revenue volatility, technological changes, and competition, with low barriers to entry.

Recent figures indicate that London's private hire market comprises 2,445 operators, 116,453 drivers, and 88,412 vehicles. Since 2012/2013, operator numbers have declined by 23%; however, driver and vehicle numbers have increased by 74% and 77%, respectively (Transport for London, 2017).

Transport for London (TfL) regulates the London industry and implements the Mayor's Transport Strategy. Within TfL, the Taxi and Private Hire (TPH) division acts as the regulator, licensing, enforcement, and strategic transport authority. Key stakeholders in the industry are the Mayor, TfL/TPH, operators, trade associations, trade unions, drivers, passengers, and the public.

Smartphone booking applications (apps) were first introduced in the UK in 2011 with Hailo (now MyTaxi) for London's black cabs. This was quickly followed by Uber, which was launched in London in July 2012 (Dumitru, 2016). Currently, 42% of private hire journeys are booked through a mobile app, with Uber at 85%, Addison Lee at 7%, and Kabbee at 5% (Taxi and Private Hire, 2016a).

## 1.2 | Rationale

Smartphone booking apps have revolutionised the way passengers book their journeys, with an annual TPH survey (Taxi and Private Hire, 2016a) identifying those most frequently used as Uber, Addison Lee, Hailo, Kabbee, Climate Cars, and Karhoo. Uber and Kabbee's usage increased from 2015 to 2016, whereas Addison Lee and Climate Cars decreased; Hailo (MyTaxi) did not feature in the 2016 results.

The overall satisfaction with TPH's service has declined among private hire vehicle operators and drivers, although it is still higher than taxi drivers (Taxi and Private Hire, 2016b). This is against a backdrop of policy and operational changes.

## 1.3 | Problem definition and scope

Smartphone booking apps have disrupted the private hire industry and driver earnings since they were launched (Cramer & Krueger, 2016; Elliott, 2016). According to Harding, Kandlikar, and Gulati (2016), smartphone booking apps do not have exclusive jurisdiction, leading to a potential overlap between fleets. Elliott (2016) suggests that the e-hailing and meter-like features of apps position them closer to the definition of a taxi. Cramer and Krueger (2016) examined the efficiency and capacity utilisation rate of Uber's ridesharing service by comparing the capacity utilisation rate of UberX drivers to that of taxi drivers. Their study found that UberX drivers had higher capacity utilisation.

The introduction of smartphone booking apps has transformed a traditional industry in two ways by providing on-demand availability, anytime, anywhere and converting idle car-and-driver assets from non-use to use through technology (Smith, 2016). According to Smith (2016), what is ahead is a shift in the dominant business model to one in which all consumer services will be available on demand, which is referred to as the "Uber-All" economy of the future. Berger, Chen, and Frey (2017) suggest that there is minimal impact on labour market outcomes from the introduction of Uber, although they do note that wage-employed drivers experienced declining earnings. While Hall and Krueger (2016) believe that the main interest in Uber for drivers is the flexibility it provides in terms of working hours and complementing other incomes.

Although many factors have been suggested for the impact smartphone booking apps have created, the effect of on-demand appears as a common thread (Cramer & Krueger, 2016; Smith, 2016). Unfortunately, very little attention has been given to exactly what private hire operators are doing to remain competitive considering the market changes.

## 2 | LITERATURE REVIEW

### 2.1 | Introduction

Utilising unused assets has become a new phenomenon since 2008, with organisations such as AirBnB and Uber. Kathan, Matzler, and Veider (2016) suggest that this transformation occurred after the economic crash where individuals needed to find temporary employment and earn extra income, combined with internet-based technology developments. Traditional industries such as the private hire vehicle market have been impacted, and the literature review seeks to understand the emerging themes.

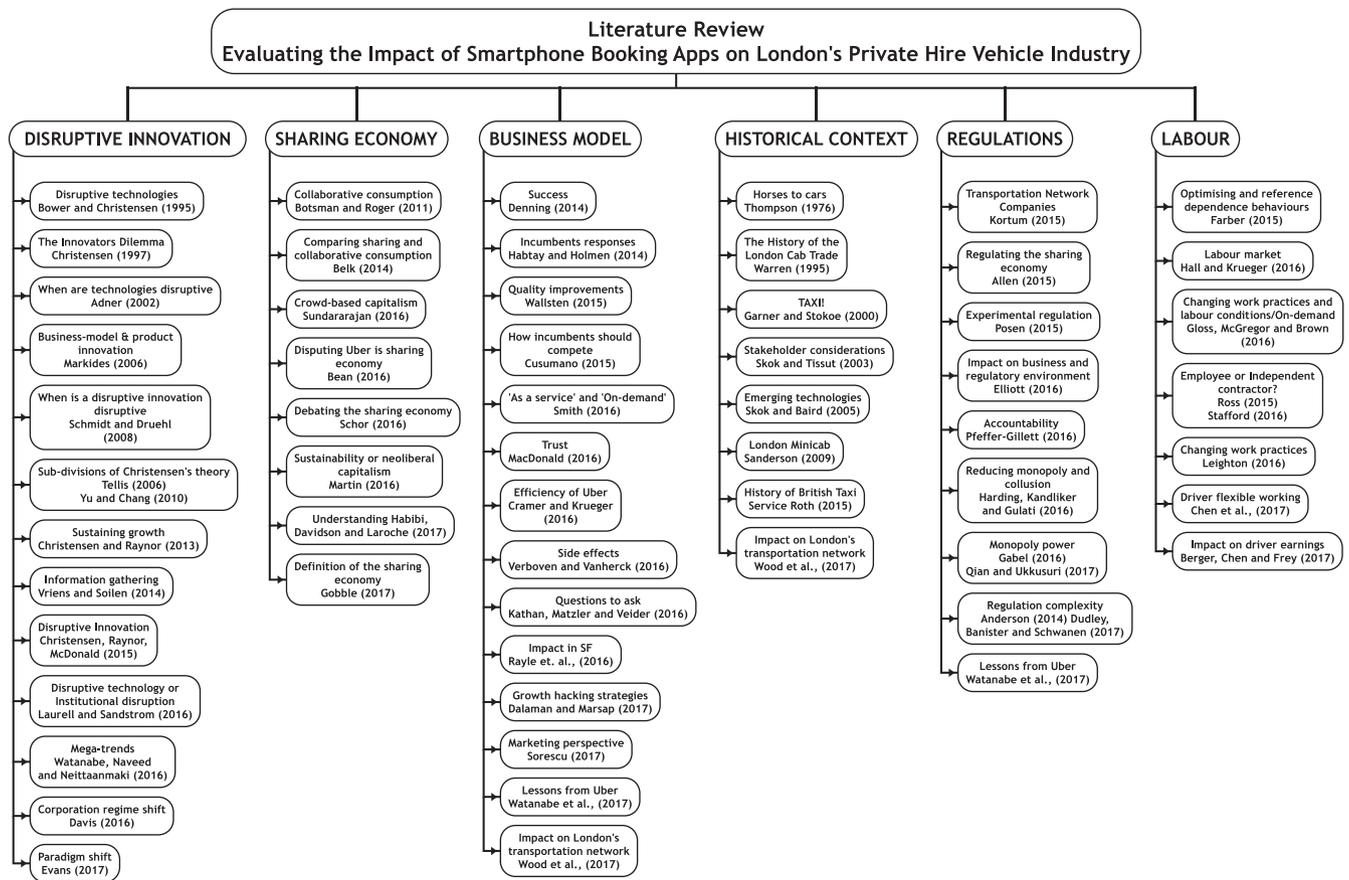
The literature review commenced with a wide article search related to the taxi or private hire industry in London. This found limited studies, so the search was extended to the United States. Caution was exercised as the U.S. market operates different ground transportation services and regulations. Nonetheless, comparisons were drawn regarding factors that were similar. From the collated journals, various themes emerged, and their reference lists were analysed to review recurring authors. The literature was organised into a thematic analysis grid (Anderson, Lees, & Avery, 2015) to critique the content and analyse the implications for this project. Six key themes were identified as illustrated in Figure 1.

The review concentrated on peer-reviewed journals to maintain high standards (Saunders, Lewis, & Thornhill, 2012). Clayton Christensen, the pioneer of disruptive innovation theory (Adner, 2002; Evans, 2017; Markides, 2006; Schmidt & Druehl, 2008; Tellis, 2006; Vecchiato, 2017; Vriens & Søilen, 2014; Yu & Chang, 2010), was one deviation, where Harvard Business Review publications were utilised. The review was distilled into 61 items from 112 resources, covering the period from 1995 to 2017, with one historical exception.

### 2.2 | Critical review

#### 2.2.1 | Disruptive innovation

Christensen, Raynor, and McDonald (2015) state that disruptive innovation is often misappropriated and corrected this by revisiting the initial disruptive technology theory (Christensen, 1997). The seminal work (Christensen, 1997) describes disruption theory as a smaller company with less resources being able to challenge larger, incumbent organisations. Christensen changed the term from disruptive technology to innovation when he co-wrote *The Innovator's Solution* realising it is the business model, rather than the technology which is disruptive (Christensen & Raynor, 2013). Disruptive innovation is either the production of substandard products, which are more affordable and reduce margins, or the creation of new markets where none existed. The dilemma for existing companies is they typically develop products for their best customers at higher prices. Bower and Christensen (1995) elaborate by suggesting that it is remiss to ask existing customers what new technologies they want as they prefer "sustaining technologies," such as client booking portals for high-end private hire services. Regarding Uber, Christensen et al. (2015) analysed them and declared the original definition remains, and they are not a disruptive innovation but a "sustaining innovation" because they have not



**FIGURE 1** Key themes identified from the literature review

offered an inferior taxi or private hire service and do not have less resources than the incumbents.

Watanabe, Naveed, and Neittaanmäki (2016) expand upon disruption theory and define Uber's success as "institutional enablers" due to three mega-trends, which are the advancements in ICT, a paradigm change, and a shift in people's preferences. They define this gain of un-captured gross domestic product as an ICT-driven disruptive business model. Markides (2006) argues that although he agrees with Christensen's ground-breaking theory, there are different innovation types in addition to technology which are (new-to-the-world) radical product innovation and business model innovation. He stresses that each type of innovation has different implications for incumbents and how they should respond. This is supported by Laurell and Sandström (2016) who outline that Uber is more prevalent as an "institutional disruptor."

Davis (2016) theorises that there is a regime shift in corporations where the transaction costs mean that they are unable to service customers in the same way that platforms can. He asserts that traditional share-owned corporations are not the way to organise the economy and that values and politics will shape enterprises. Ultimately, scholars agree with Christensen's theory, even if they add their own subdivisions (Adner, 2002; Tellis, 2006; Yu & Chang, 2010). Evans (2017) indicates that this paradigm shift could be bigger than the industrial revolution and suggests that board directors should make informed decisions about the strategic options available to them. He also raises the development of autonomous cars and the impact they will have. The literature demonstrates that technology will continue to have an

extreme effect; therefore, it is beneficial to review studies that indicate how organisations could respond.

Schmidt and Druehl (2008) complement Christensen's theory with a three-step framework for analysing whether an innovation will be an opportunity or threat. The method reviews the innovation and the diffusion to which it maps. For example, sustaining innovation is aligned to high-end encroachment, whereas a new product encroaches on the existing high end of the existing market and diffuses downwards. Conversely, "disruptive innovation" is the opposite with "new-market disruption" and "low-end disruption" as other variables. Vriens and Søjlen (2014) expand on this suggesting that an incumbent company should gather disruptive intelligence to predict the impact. Unfortunately, the literature focuses mostly on recommendations for large organisations and does not accommodate small businesses with limited resources or strategic acumen.

## 2.2.2 | Sharing economy

The sharing economy is interchangeably used to describe organisations such as AirBnB, ZipCar, TaskRabbit, and Uber; however, it appears that there is no consensus on what the term means or how it first came into use. Martin (2016) suggests that regime actors (policy makers and Government) frame it as an economic opportunity and creating unregulated market places. In comparison, he suggests that niche actors (sharing economy advocates and investors) refer to it as sustainable consumption, a pathway to a sustaining economy, and reinforcing the neoliberal paradigm. Gobble (2017) highlights that

even leading authorities on the subject (Botsman & Rogers, 2011; Sundararajan, 2016) define the sharing economy respectively as either collaborative consumption or crowd-based capitalism, and there are other iterations which Belk (2014) refers to as the post-ownership economy.

However, Gobble (2017) notes that the term is here to stay, so in the context of the private hire industry, it is important to understand the definition to determine if smartphone booking apps are part of the sharing economy. The conclusion is that if a company says it is part of the sharing economy, it is, because it says so, in what Schor (2016) refers to as self-identification.

These opinions are not helpful, and a framework for determining whether a phenomenon is the sharing economy or not should correlate with commercial gain. Habibi, Davidson, and Laroche (2017) developed such a framework and describe the model as either sharing or exchange. For example, one could question whether Uber is part of the sharing economy when industries are being built around it such as individuals buying cars for Uber drivers to rent or Uber drivers themselves entering in to long-term car leases to provide the service (Gobble, 2017). This view is supported by Bean (2016) who challenges those that identify Uber with the sharing economy when the organisation has achieved significant growth from undercharging customers and offering drivers cash bonuses. Gobble (2017) concludes by suggesting that Uber is not part of the sharing economy, but instead the access economy, and Martin (2016) asserts that all the time the sharing economy is involved in corporate co-option it is unlikely to drive a transition to sustainability.

### 2.2.3 | Business model

The shift in technology is best understood from a historical perspective where Denning (2014) explains that there have been three phases. The first he attributes to “by-passing the middleman” with the commercial internet, the second to the new value in “sharing” with sites such as EBay, and the third as an “economy of access” where there is a choice whether to access or own.

A thorough analysis facilitates understanding which components have made Uber’s access-economy business model, or as Watanabe, Naveed, Neittaanmäki and Fox (2017) suggest “ICT-driven disruptive business model” so successful. Sorescu (2017) claims that the business model must have three key components, which are value creation, value delivery, and value appropriation. The primary factor for Uber has been rapidly building a driver and passenger base and then using technology to match one with the other, combined with flexible labour.

MacDonald (2016) elaborates, explaining the business model exists because it is built on trust, although he does caveat this by questioning if it is sustainable. The result is capacity utilisation efficiency, which revealed that UberX drivers work 50% of the time, compared with 32% to 50% for traditional taxi drivers (Cramer & Krueger, 2016).

Combined with capacity utilisation is growth hacking strategies (online-based marketing processes), which start-up companies use for rapid growth, customer acquisition, and product market fit. Dalaman and Marsap (2017) reviewed Uber and attributed their

evolution to several growth hacking strategies. First, customer acquisition through technology, which provides the app experience along with driver information and the ability to pay securely. Second, a city-by-city expansion strategy, which understood the unique characteristic of each. Third, referral marketing through bonuses to boost customer acquisition and future rides. These strategies were combined with early adopter advocacy, mutual trust, and word of mouth marketing. Smith (2016) describes this business model shift as the “Uber-all” economy of the future, where assets are turned from non-use, to use, and services are provided as “come to” instead of “go to.”

On a positive note, the business model has reduced industry complaints to U.S. regulators, which related to drivers' attitudes or infrastructure issues such as broken credit card machines and improved the industry's service overall (Wallsten, 2015).

Although successful business models are impressive, there are naturally unintended side effects. Verboven and Vanherck (2016) refer to these as the “sustainability paradox” and suggest four features that can determine a business model's success long term: minimising consumption; partial internalisation of externalities and reinvestment in social projects; employee and user protection; and the prevention of aggressive competition and monopolies.

The impact that these business models represent is on the existing transportation networks and industry incumbents. Rayle, Dai, Chan, Cervero, and Shaheen (2016) provide the consumer's perspective and demonstrated that ridesourcing (app-based, on-demand, ride services) replaced taxi services 50% of the time, but 50% of the time, it replaced other modes of transport. This was attributed to the service being more comfortable and convenient, short waiting times, and avoiding the need to find a parking space and passengers being able to drink alcohol without losing their licence. In London, Wood, Parry, Carruthers, and Rose (2017) echo this by suggesting that the impact on London's transportation network has been filling a gap in transportation needs, providing easier movement, and moving away from traditional transport such as night buses.

To compete, Denning (2014), Habtay and Holmén (2014), and Cusumano (2015) recommend referring to the regulations for violations, offer solutions, and standardised services that cannot be matched and being mindful a response does not necessitate the need to establish a new business unit. Kathan et al. (2016) suggest that managers should ask themselves the following questions: is my customer value proposition affected, is my profit formula affected, are my key resources and processes affected?

The concern is whether smaller private hire operators can compete, or whether they fall by the wayside, with a few large operators remaining who could dictate higher fares and reduce driver compensation. Arguably, the biggest question is can organisations such as Uber survive beyond their current funding (Cusumano, 2015)?

### 2.2.4 | Historical context

Personal transportation in London has seen many impacts, starting in the 17th century when the hackney coach moved from tavern yards to ranks. This launched an industrial dispute between the coachmen and the Thames Watermen (Garner & Stokoe, 2000) as previously, the only way to cross the Thames was by boat or London Bridge

(Wood et al., 2017). What followed was an Act of Parliament, which established the Fellowship of Master Hackney in Coachmen 1654 and later by licensing and restricting coach numbers. In the 19th century, motorised cars caused controversy as they charged the same fare as coaches. Ironically, these were electric cars propelled by accumulator cells that could travel 50 miles before being recharged. There were many vehicle iterations, with some inherent faults, which the press reported, highlighting stories of accidents, injury, and breakdowns. Nonetheless, the situation inevitably changed when petrol vehicles were introduced in the early 20th century (Warren, 1995). In 1903, there were 11,000 horse carriages and one petrol vehicle, and by 1913, this had switched to 8,000 petrol vehicles and 1,900 horse carriages (Thompson, 1976).

In 1961, Welbeck Motors Ltd minicabs launched a rival to the incumbent taxis. A taxi shortage (approximately 1,000) and the requirement for cheaper fares were cited for their introduction. There were the inevitable protests by the licensed taxi trade foreseeing the impact that minicabs would have on their livelihoods (Roth, 2015; Sanderson, 2009). Lobbying by taxi drivers resulted in minicabs not being able to ply-for-hire, and this has remained a statute for the taxi trade. Conversely, minicabs were supported by new technology in the form of telephones in homes and phone boxes on the street, which allowed their service to be pre-booked (Sanderson, 2009). Although, the advent of radio circuits enabled taxis to provide the same service (Skok & Baird, 2005). In 1998, minicabs were finally licensed (although it took another 7 years for operator, driver, and vehicle regulations to be established). Licensing was partly attributed to Diana Lamplugh (mother of murdered Suzy Lamplugh) who campaigned for safer travel for working women due to an increase in sexual assaults, some of these suspected by illegal minicab drivers (Sanderson, 2009). Skok and Tissut (2003) considered the complexity, industry reforms, and high-profile stakeholders, especially as taxis did not want minicabs regulated, because unregulated minicabs fuelled the taxi industry's cause due to alleged safety issues.

Following successful regulation, smartphone adoption combined with apps and geolocation services transformed the way customers could book a journey, along with Uber entering the UK market.

### 2.2.5 | Regulations

Prior to reviewing the "regulations" themed literature, it was noted that taxis adhere to the London Hackney Carriage Act 1853 and private hire vehicles to the Private Hire Vehicles (London) Act 1998. Both were conceived before the concept of booking a journey via a smartphone app was imagined.

Dudley, Banister, and Schwanen (2017) suggest that TfL found it difficult to fit Uber's technology to the existing rules due to outdated regulations. The e-hailing nature of Uber's app is one example, which taxis argued is a form of taximeter reserved for their service and therefore contravenes the Hackney Carriage Act.

At the court case (No: CO/1449/2015), Lord Justice Ouseley ruled:

*A taximeter, for the purposes of Section 11 of the Private Hire Vehicles (London) Act 1998, does not include a device that receives GPS signals in the course of a*

*journey, and forwards GPS data to a server located outside of the vehicle, which server calculates a fare that is partially or wholly determined by reference to distance travelled and time taken, and sends the fare information back to the device.*

Uber, therefore, retained their app format in London (Watanabe et al., 2017). In contrast, Allen (2015) and Gabel (2016) propose that there is a symbiotic relationship between regulators and incumbent actors, which manifests itself as a quasi-monopoly. Although these studies relate to the Australian and U.S. markets, some similarities can be drawn with London's taxis. However, the private hire industry regulations were borne out of protection for passengers.

One area to highlight is passenger protection, where Pfeffer-Gillett (2016) questions whether app providers should be accountable for the conduct of their drivers. He argues they should, as they are the ones profiting from both the drivers and passengers. His U.S. recommendations cover what takes place in London already. However, whether a driver is an employee or self-employed is the root for determining the responsibility that the app providers take for their drivers' actions, along with how they represent their terms for passenger liability.

The remaining literature provides the following recommendations. Anderson (2014) proposes a new transportation criterion that is referring to "for profit ridesourcing" as Transportation Network Companies that harnesses innovation and separates them from regulatory constraints.

Whether the regulator would want to apply the same approach in London remains to be seen, yet a third provider tier could be an approach (taxi, Tier 1; private hire, Tier 2; Transportation Network Company, Tier 3). This is supported by Elliott (2016) who suggests that there should be a new regulatory framework based upon the service provided. She also states that this would enable the balance of innovation and public interest but notes that app providers should be involved in the process.

Kortum (2015) highlights a variety of issues regulators should consider such as insurance, background checks, driver fingerprints, surge pricing, data privacy, disabled vehicle access, and congestion. Although, Posen (2015) calls for experimental regulations, which focus on consumer interests and not market entry controls.

The discussions observed that incumbent monopolies are being protected (Gabel, 2016); however, there is a consensus that regulators should ensure that app providers are also monitored to avoid similar market dominance and monopoly control (Harding et al., 2016; Qian & Ukkusuri, 2017).

### 2.2.6 | Labour

Farber (2015) replicated a study to uncover whether taxi drivers in the United States use reference dependence or optimising behaviours. The view being that during inclement weather, a taxi driver will reach their daily income target more quickly and therefore be able to finish work sooner, rendering less taxis available for hire. The study found that although some drivers demonstrate reference dependence, optimising behaviour is more prevalent, and this is a skill which is important when working in the industry. It can therefore be concluded

that apps create this optimising behaviour electronically when matching drivers and passengers and therefore fill gaps in supply.

Berger et al. (2017) support the benefits of capacity utilisation and state that app providers have had no negative employment impact on their drivers but have reduced incumbent wage employed drivers' earnings. This viewpoint is balanced by Chen, Chevalier, Rossi, and Oehlsen (2017) who propose that *Uber's advantage is also its disadvantage* (e.g., wages are uncertain, and compensation may be low, but drivers can work whenever they want). Their study concluded that the opportunity for low-skilled, flexible work to support other incomes is valuable. This is echoed by Hall and Krueger (2016) where Uber's driver-partners choose the on-demand work to smooth fluctuations in their earnings in the knowledge that their earning per hour vary little to the hours worked.

However, Glöss, McGregor, and Brown (2016) contest this view and explain that responsibility should be acknowledged for labour. Furthermore, they state that "on-demand" labour transposes the optimising skills to emotional labour and new financial risks.

The studies may present a positive image of the on-demand workforce; however, the lines appear to blur between whether Uber's drivers are independent contractors or employees (Stafford, 2016). Moreover, drivers take a personal risk in the event of an accident, servitude may prevail (Leighton, 2016), and bearing operating costs, no overtime pay, and a lack of minimum wage may render the returns negligible (Ross, 2015).

## ORCID

Walter Skok  <http://orcid.org/0000-0002-7031-8749>

Samantha Baker  <http://orcid.org/0000-0001-6278-5921>

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