

Regulating app-based mobility services



This Toolkit note was written by Rex Deighton-Smith. It was reviewed by Steve Perkins, and it was approved by International Transport Forum management in November 2020. The note was prepared for publication by the OECD Secretariat.

This Toolkit note is a contribution to the OECD Going Digital project, which aims to provide policy makers with the tools they need to help their economies and societies thrive in an increasingly digital and data-driven world.

For more information, visit www.oecd.org/going-digital.

#GoingDigital

Please cite this publication as:

Deighton-Smith, R. (2021), "Regulating app-based mobility services", *Going Digital Toolkit Note*, No. 4, https://goingdigital.oecd.org/data/notes/No4_ToolkitNote_AppBasedMobility.pdf.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

© OECD 2021

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for commercial use and translation rights should be submitted to: rights@oecd.org.

Table of Contents

Regulating App-based Mobility Services	4
Regulatory dynamics affecting app-based mobility services.....	7
Policy issues raised by app-based mobility services.....	8
Balancing policy priorities	17
Annex – A selection of policy initiatives to regulate app-based mobility services ..	22
References	28

Boxes

Box 1. App-based mobility services.....	5
---	---

Regulating App-based Mobility Services

App-based mobility services have brought large consumer benefits by expanding choice and improving service quality, as well as driving down consumer prices and creating new jobs. At the same time, the rapid growth of these new services has given rise to concerns about a range of actual or potential negative impacts, and poses new challenges for policy makers and regulators. This note identifies key issues and principles that policy makers should consider when regulating app-based mobility services. It also discusses the key regulatory dynamics affecting the markets for ridesourcing, e-scooters and shared bicycles. The Annex provides case studies of the regulation of these services and identifies key lessons from this experience.

The wide dissemination of smartphones and GPS location services has enabled the development of a range of new urban mobility services that rely on smartphone apps as their basic operational platform. Their history spans less than a decade, but app-based mobility services have grown exponentially and now constitute a significant part of the urban mobility landscape. Emerging services such as van-pooling and demand-responsive transport, as well as the prospect of autonomous vehicles being widely adopted, suggest that app-based mobility services will continue to grow in importance in the urban landscape.

Box 1. App-based mobility services

App-based mobility services can be defined as shared mobility services which use smartphone-based apps and GPS location services to link users with mobility options and complete booking, billing and tracking functions. The main types at present are:

Ridesourcing: Cars or motorcycles providing taxi-like services.

Bikeshare: Usually free-floating (i.e. dockless) bikes for hire, with or without electrical assistance.

Scootershare: Electric scooters (e-scooters), either stand-on (“trottinette”) or Vespa-type, also free-floating.

App-based mobility services have brought large consumer benefits by expanding choice and improving service quality in key dimensions including availability, timeliness, comfort and the subjective customer experience, while often driving down prices (OECD, 2018^[1]). These benefits derive in large part from the synergistic combination of technological innovations that they embody: For example, GPS location and app-based communication and payment services have allowed rapid and reliable matching of services and customers, provided for reliable, cashless payment and enabled effective identification of riders and drivers and recording of journeys.

However, particularly in the case of ridesourcing, the welfare gains achieved also derive in part from the effect of these innovations in overcoming regulatory failures and bringing transformative change to the sector. They have effectively unblocked some long-standing political economy problems. For example, ridesourcing pioneer Uber was established as a response to the sustained failure of the taxi industry to meet passenger demand in San Francisco. The size of ridesourcing’s disruptive impact reflects the rapid removal of monopoly rents that previously flowed from artificial supply restrictions enforced by regulation (ITF, 2019^[2]).

While there have been large benefits, the rapid growth of new app-based mobility services has also given rise to concerns about a range of actual or

potential negative impacts. This has posed new challenges for policy makers and regulators and sharpened some pre-existing concerns. In relation to ridesourcing, concerns relate to the safety and security of users, accident insurance cover for users and third parties, the labour conditions of drivers and externality issues, including congestion and pollution. Questions have also been raised as to whether ridesourcing services compete fairly with taxis, given that they have generally not faced the same detailed and costly regulatory requirements as have been applied to taxis in many jurisdictions. In relation to dockless bikeshare and e-scooters, the key issues relate to safety, including the potential for safety issues to result from e-scooters using the same road space as other modes (e.g. pedestrians, cars), and externalities such as the cluttering of public spaces with excessive numbers of sometimes derelict vehicles.

Concern about the impact of new mobility services has often been increased by the mode of entry employed by operators. Many ridesourcing companies have exploited regulatory ambiguity to enter markets and establish market share quickly, displaying “calculated indifference to regulatory logic” (Rayle, 2016^[3]). Bikeshare companies have also frequently asserted a right to enter a city, without prior discussion with municipal governments. Attempts by new entrants to assert their right to operate outside the regulatory frameworks applied to competing services have necessarily raised concern within governments about their ability to address negative impacts.

The combination of these factors and the disruptive impacts app-based services have had in many markets have led many governments to attempt to block their entry, particularly in the case of ridesourcing (ITF, 2019^[2]). However, strong consumer demand has often led to rapid changes in policy, with prohibition replaced by light-handed regulation. This light-handed approach has, in turn, been criticised as failing to deal adequately with the negative impacts noted above, giving rise to demand for more regulation.

Given the range of benefits and challenges, and uncertainty as these services evolve, policy makers have taken a range of approaches to regulating app-based mobility services. This policy note provides an overview of the regulatory dynamics associated with app-based mobility services, the policy issues that have arisen following the entry of app-based mobility services, and analyses the merits and performance of the regulatory and other policy approaches governments have adopted in response. The final section identifies a set of principles governments can use in responding to app-based mobility services in order to ensure systematically that their benefits to society are maximised and their costs are minimised. The Annex provides several examples of innovative approaches to the regulation of app-based mobility in individual cities.

Regulatory dynamics affecting app-based mobility services

A common problem in meeting the challenges of new mobility services is that governments fail to adopt a strategic and thoroughgoing approach to reforming existing regulatory structures to address new and different market realities. Such an approach should include both:

- developing new regulatory approaches that are better-adapted to the innovative business models that have emerged, and
- identifying and removing or modifying restrictions that inhibit incumbents from competing on a level playing-field with disruptors.

One common reason for this failure to adopt a strategic approach to regulatory reform is that the extent of the disruption that the new mobility option could cause is not readily visible when market entry first occurs. Another is that governments often face strong lobbying in favour of the status quo by incumbents. This group typically sees the body of detailed and demanding regulation, which they are experienced at navigating, as providing a source of competitive advantage, if new entrants are also required to comply.

A third factor is that key aspects of the app-based mobility platforms can, at least arguably, address many of the problems that underlie current regulations, as discussed below. However, there is often scepticism of such market-based solutions on the part of governments, some users and incumbent service providers. This is reinforced by a natural risk-aversion within government.

This dynamic is apparent in relation to ridesourcing, given the detailed and extensive nature of taxi regulation in most OECD countries. For example, ridesourcing's elimination of anonymity and adoption of cashless payment systems provides significant security benefits for both passengers and drivers, compared with the traditional taxi model. Accountability levels are high, as there is a high level of certainty that both driver and passenger can be identified for any given trip, while GPS location means that the time and trajectory of trips is readily confirmed. Despite these important features, governments, users and others may not be readily convinced that significantly simplified or reduced regulation of various safety-related elements of the industry are justified.

Still more challenging is the fact that many new mobility options have significant implications for governments' wider urban planning policies. Ridesourcing has led to large increases in the number of taxi-like vehicles on city streets, raising concerns about congestion and pollution, and potentially undermining government efforts to promote mode shift toward public and active transport. Conversely, some research suggests they may help solve first and last mile problems and help accelerate the trend to carless households (Lee, 2019^[4]). Bike and scootershare schemes also have the potential to address first

and last mile problems and to increase the use of active transport. However, concerns over negative impacts on urban amenity have led governments to take a cautious, or even hostile approach in many jurisdictions. Complicating the issue is the need for investment in appropriate urban infrastructure (e.g. physically separated bike paths) to support any significant shift toward embracing new modes of travel.

In sum, the growth of app-based mobility services, poses numerous actual and potential challenges across a range of policy areas including sustainable urban mobility, accessibility and public safety. The range of issues involved and the many interactions between them means that careful analysis of the case for further regulation is needed. Key regulatory policy tools including regulatory impact assessment and structured consultation processes should underpin this analysis (OECD, 2012^[5]). These approaches can clarify the relative merits of possible policy interventions and help governments judge when sector-specific regulation is the preferred tool and when broader approaches would be more effective and equitable.

Policy issues raised by app-based mobility services

App-based mobility services have raised multiple policy issues for governments. This section discusses key aspects of these issues, including examples of policy approaches that have been used to address them.

Ridesourcing

The policy issues arising from ridesourcing are of four broad types: safety and security; congestion and pollution; employment conditions and industry disruption.

Safety and security

Much of taxi regulation is concerned with ensuring the safety of both passengers and drivers. Key risks addressed include the risk of assault and robbery, and the risks of injury due to accidents caused by either poor driving or poorly maintained vehicles. Common regulatory responses include “fit and proper person” checks for drivers, driver identification requirements in vehicles, in vehicle CCTV requirements and vehicle age limits, maintenance requirements and mechanical checks.

Ridesourcing companies have often argued that they should be exempt from most or all of these rules because of the specific characteristics of their business model. In particular, booking and payment through apps, together with GPS tracking, means that both driver and passenger are readily identified, creating substantial accountability. Real-time ride-tracking and in-app “panic buttons” provide further security. Credit-card based payment (again via the app) means

that cars are cash free and cards cannot be used fraudulently, thus essentially eliminating fraud and robbery risks. The bilateral rating system also provides high levels of accountability and information, also incentivising good behaviour, although some research points to problems with the dynamics of the rating process (MacEachen E, 2018^[6]). Platform providers also increasingly use telematics to directly monitor driving behaviour, providing further incentive effects. In principle, private ownership of the vehicle by the driver should provide incentives for better maintenance and more careful driving than is the case when drivers operate cars of a taxi or rental company.

A significant limiting factor in assessing the practical impact of these factors is that little information is available on the relative safety performance of the taxi and ridesourcing sectors, either in the aggregate or in relation to specific issues. Subjective consumer perceptions, as per published surveys, suggest taxis and ridesourcing are seen as having similar levels of safety in countries with historically strong taxi regulatory systems, while, in jurisdictions with poorer historical regulatory systems, ridesourcing is often favoured over taxis by consumers largely on the grounds of greater perceived safety (OECD, 2018^[1]). This suggests that consumers see the “system based” safety mechanisms of ridesourcing as a relatively good substitute for government regulation overall. However, scandals such as that relating to sexual assaults by Uber drivers in London in 2018 demonstrate that this consumer confidence can be eroded quickly, even though data did not demonstrate poorer safety performance in the ridesourcing sector (ITF, 2019^[2]). This points toward a continued need for government intervention. Importantly, improving data availability, including by regulating to require reporting and/or data sharing, can underpin better informed regulatory decisions in these key areas.

Congestion and pollution

The potential for large numbers of taxis to contribute substantially to congestion and pollution in densely populated inner city areas has traditionally been used as an argument for regulatory restrictions on the number of taxi licences issued. Where ridesourcing has become established, there has invariably been significant growth in the total size of the fleet (i.e. of taxis plus ridesourcing vehicles). This has often brought concern about the impact of the sector on congestion and pollution to the forefront. The fact that taxis and ridesourcing vehicles are frequently mobile even when not carrying passengers (as they seek to reach the most favourable position from which to obtain the next hire) means that their impact on congestion and pollution is disproportionate to their representation in the total vehicle fleet.

Some quantitative studies – including those commissioned by city governments – have shown that the impact of ridesourcing vehicles on congestion, and particularly on congestion growth, has been substantial in particular cities. For example, ridesourcing was found to have been responsible

for 47% of the increase in congestion observed in San Francisco between 2010 and 2016 and 25% of total 2016 congestion, despite accounting for only around 5% of vehicle kilometres travelled in 2016 (San Francisco County Transport Authority, 2018^[7]). However, the academic research literature draws differing conclusions regarding ridesourcing's broader impact on congestion, with (Conway, Salon and King, 2018^[8]) concluding that the evidence on the impact of ridesourcing on congestion is inconsistent, with ridesourcing "...found to increase, decrease and have no effect on traffic congestion" by different researchers.

Despite this mixed evidence base, some governments have regulated to address ridesourcing's impact on congestion. A few have frozen ridesourcing licence numbers (e.g. New York City since 2018), while others have considered or implemented area based congestion charges applicable specifically to ridesourcing vehicles, or else to ridesourcing plus taxis (e.g. São Paulo). However, other governments have been reluctant to limit the growth of ridesourcing out of concern at potentially compromising the improvements in service and availability obtained since the development of the sector.

A key perspective is that, while ridesourcing may be a significant contributor to recent increases in congestion in some specific contexts, all vehicles ultimately contribute to congestion. This implies that measures that solely address the ridesourcing (and, potentially, taxi) sectors will necessarily be limited in their impact. The most effective counter-measures are those that apply to all vehicles, such as area-based congestion charges (used in London and Stockholm) or differentiated, distance-based user charging. In some cases, governments have seen measures targeting ridesourcing (and/or taxis) as more politically feasible than general congestion charges, though the fact that they apply to only a minority of the fleet clearly limits their potential effectiveness. However, other potentially more effective policy options exist, even where road user charging is seen as infeasible. These include addressing parking availability, duration and cost as part of an integrated policy covering inner city areas.

Conversely, in relation to pollution impacts, there may be a case for interventions that are targeted specifically at the taxi and ridesourcing sector. The substantial number of kilometres travelled without passengers by these vehicles means that their emissions, measured on a per passenger kilometre basis, are relatively high. The large average distances covered by many of these vehicles also mean that their contribution to pollution is higher than average on a per vehicle basis. Care is needed to avoid imposing undue burdens on occasional drivers of ridesourcing vehicles, which would risk distorting the market. However, California's Clean Miles Standard provides an example of a targeted policy instrument that is likely to avoid such risks (ITF, 2020^[9]).

Employment conditions

Ridesourcing companies have been widely criticised for their employment practices. A threshold concern is that drivers are not treated as employees, but rather as independent contractors. In the ridesourcing sector, companies argue they simply provide a platform that links service providers to customers, rather than being mobility service providers and employers themselves.

A key implication of the “independent contractor” status of drivers is that they do not receive employment-related benefits, such as sick leave and paid holidays, even where they are full-time workers using a single platform (an increasingly uncommon situation, given the ability to use two or more platforms simultaneously). Their position in this regard is similar to that of many taxi drivers: Where taxi licences have been limited in number and are exchanged at high prices, many drivers lease the taxis they drive, typically on a short-term (sometimes shift-by-shift) basis, and receive only the residual fare-box income. This situation has existed at least since the 1980s¹.

Given that ridesourcing drivers typically own or lease their own vehicle, it is arguable that they can be better compared to self-employed truck drivers in terms of their employment status. Self-employed truck drivers are also treated as independent contractors in most countries. However, where they are substantially economically dependent on a single contractor, the level of independence (i.e. control over their working environment) which they can exercise is likely to be very small. In this respect, ridesourcing drivers differ to some extent in being able to work simultaneously on two or more platforms.

The observation of low average income levels is common to all these groups. However, while little effective action has been taken over time to improve the position of taxi drivers or self-employed truck drivers, the recent focus has been strongly on the ridesourcing sector. That said, the only direct attempt to regulate the incomes of drivers as independent contractors appears to be that taken by New York City in 2018 (see Annex). While this initiative does appear to have the potential to improve ridesourcing driver incomes, it has not been (and cannot readily be) applied to taxi drivers, whose income position was found by an inquiry to be broadly similar. This necessarily adds to concerns regarding regulatory consistency between competing sectors.

Recent court decisions in some countries, including the UK and US, may result in drivers being found to be employees, and thus potentially subject to employment laws setting minimum wages and conditions (ITF, 2019^[2]).

¹ By allowing taxi medallion owners to sell and/or lease the medallions and employ others to drive the taxi to which it was affixed, it was expected that the limited supply of medallions would be exploited with maximum efficiency. However, the “scarcity” of medallions was itself solely a product of regulators’ decisions. Prior to this, taxi driving had been a solely owner-operator endeavour.

More broadly, while concerns over ridesourcing drivers' income levels appear widespread, this can be seen as part of the broader concern about the "gig economy", or precarious employment, which spans many industries and sectors. The OECD notes that "platform based" work entails both opportunities and challenges. Benefits include a high level of efficiency in matching labour demand and supply, the ability to work flexibly, a broadening of effective job opportunities and the potential for part-time platform based work to provide supplemental income to groups such as the recently laid off and those moving to retirement. Conversely, platform based work is associated with a lack of job security, lack of access to social benefits and restricted opportunities for training and career development. The OECD has identified a number of generally applicable policy tools for the effective regulation of platform based work. A consistent, cross-sectoral approach is required to address this issue effectively (Lane, 2020^[9]).

Industry disruption

Where taxi licence supply has been heavily restricted, substantial scarcity values have resulted. Many governments allowed licences to be bought and sold, ostensibly to facilitate the most efficient exploitation of the (artificially) limited supply, but arguably as a result of lobbying by incumbents wishing to monetise the capital value of the monopoly rents they obtained from exploiting the scarce licence. Licences changed hands for as much as USD 1.3 million per licence in New York City early in the last decade. Where ridesourcing has entered, captured a large market share and eroded scarcity values by greatly increasing the supply of taxi-like vehicles, licence values have fallen rapidly as a result. For example, values in NYC were reported to have fallen more than 90% from their high of USD1.3 million to as little as USD110 000 by mid-2019 (Williams, 2019^[10]).

Governments have frequently faced calls to compensate taxi licence owners for these losses, despite court decisions in several jurisdictions affirming that a taxi licence does not constitute a property right, and there is consequently no legal obligation for governments to compensate licensees for any change in policy that may affect their interests. Nonetheless, many governments have been sensitive to concerns about hardships caused by disruption. Perhaps for this reason, few have removed restrictions on taxi licence numbers following the entry of ridesourcing. As a result, licences have retained some, residual "scarcity" value, perhaps reflecting taxis' continued monopoly over unbooked service provision (i.e. street hails and taxi ranks). However, the maintenance of supply restrictions necessarily inhibits the taxi sector's ability to compete with ridesourcing, which has (other than in NYC) not had limits placed on fleet numbers.

In a few jurisdictions, notably in Australia, a move to an open entry taxi industry was facilitated by the provision of transitional payments, or part-value licence

buybacks by government (See Annex). These policies have often been funded by imposing levies on the sector – usually extending to both taxis and ridesourcing and often on a “per ride” basis. Such policies have the undesirable result of transferring consumer and producer surpluses to previous incumbents, as well as creating welfare losses by distorting the market during the levy period. However, they may enable the removal of a significant distortion from the market that would otherwise potentially endure for a substantial period.

E-scooters and shared bicycles

E-scooters and shared bicycles are widely promoted as having important urban policy benefits. To the extent that they substitute for trips in private vehicles or taxis, they will contribute to reducing congestion, while also providing health benefits (at least in the case of bicycles). There are also sustainability benefits: recent analysis by the ITF (2020) suggests that the lifecycle greenhouse gas emissions from an e-scooter, calculated on a per passenger kilometre basis, may be around 25% lower than those of a conventional private car. Regulators must take these benefits into consideration when determining how to respond to the costs associated with these modes.

The potential harms associated with e-scooters and shared bicycles are largely related to the safety of users and third parties and the negative impact on urban amenity of large numbers of sometimes derelict vehicles occupying public spaces. Initial consumer protection concerns also arose, due to the early practice in the industry of providing access via a membership, or subscription, model, which involved the retention of a cash “deposit” paid by subscribers. However, this potential regulatory issue has become less important as the sector quickly moved away from this business model.

Safety issues

Safety concerns have been most acute in respect of e-scooters. E-scooters are often deliberately limited to speeds similar to those of cyclists (often 25km/h) by providers. However, their lesser gyroscopic stability (due to smaller wheels) and lower degree of consumer familiarity vis-à-vis bicycles have given rise to widespread concerns about potential safety issues. Potential modal conflict between e-scooters and pedestrians, in particular, is another concern, due to a tendency for some riders in unregulated environments to use footpaths in preference to roads. With both shared e-scooters and bikes, maintenance-related safety concerns have also been raised, since the vehicles are outside in all weathers and not necessarily subjected to regular maintenance.

The fact that safety statistics for e-scooters were unavailable at the time shared e-scooters first appeared meant that it was not possible for regulators to base initial decisions on regulatory requirements on evidence of their actual safety performance. However, as data has become available, the consistent

conclusion has been that the safety performance of e-scooters is comparable to that of bicycles. A recent ITF report (ITF, 2020^[11]) compiles crash and injury data collected over the first two years of shared e-scooter operation. It finds no difference between regular bicycles and shared e-scooters in the risk of being killed, controlling for the number of trips made. The urban fatality rate is around one in 10 million trips in both cases. Early data contained in the report suggests that the fatality risk of e-bicycles with limited power outputs (pedelecs) is also similar to that of bicycles and e-scooters.

While fatality rates for e-scooter riders are similar to those of cyclists, the evidence on injury rates is more mixed. The rate of emergency department visits is similar for the two groups, but the limited available evidence on the number of hospital admissions suggests higher rates for e-scooter riders. However, the ITF (2020) notes that “the safety performance of e-scooters compared with other transport modes remains a topic where evidence is weak”, and recommends further investigation. Notably, monthly e-scooter sharing company data compiled by ITF shows a clear downward trend in the reported accident rate from late 2018 to late 2019, possibly reflecting learning effects, in terms of user skills and/or hazard perception.

Motor vehicles are involved in around 80% of e-scooter fatalities, and around half of the serious injuries (i.e. resulting in trauma admissions), although they are implicated in a much lower proportion of less serious injuries. This is similar to the experience of cyclists, where the involvement of motor vehicles is also associated with more serious injuries. The ITF report concludes that the overall impact of shifting trips by car and motorcycle towards bicycles and e-scooters would be to reduce the number of road deaths in dense urban areas, particularly by reducing the number of pedestrian deaths.

Regulatory approaches to shared e-scooters have varied widely. Legacy laws in many jurisdictions effectively ban their use on either roads or footpaths and, frequently, from bike lanes. Safety concerns have largely explained the refusal of many governments to amend laws to enable their operation. Thus, for example, while e-scooters are in widespread use across a range of US and European cities, they remain illegal throughout Australia and most of the United Kingdom, including London. At the opposite end of the spectrum, in cases in which e-scooter operators have entered the market after some preliminary consultation with government, some city governments have allowed them to operate for short initial period outside the regulatory framework. This has effectively been a case of delaying a regulatory response until better information is available regarding their impact in the specific urban environment. This can enable the issues that require regulation to be understood and separated from issues that could be addressed by operators without government intervention. An example is that of Paris, which did not regulate e-scooters for well over a year after their mid-2018 appearance in the

city (see Annex). This reflected a view that the potential value of shared e-scooters in adding to the options available as an alternative to using cars and taxis would be likely exceed any short-term nuisance costs incurred prior to regulation.

Specific regulatory responses to e-scooter safety issues have commonly included imposing speed limits, limiting their use to cycle paths, and sometimes roads with lower speed limits, and prohibiting “two-up” riding. In addition, design specifications have been introduced, such as requiring front suspension, lighting systems and horns and specifying braking requirements. In some cities, the rapid uptake of e-scooters has also added to pressure for expansion of cycling/scooter infrastructure, such as separated bike paths.

Data on the effectiveness of the various regulatory interventions adopted to date in reducing fatality and injury risks are not yet available.

Urban amenity

Some early dockless bike-share schemes featured the distribution of very large numbers of bicycles from the outset, far exceeding the number needed to meet consumer demand. Many bicycles remained unused and became derelict, while users and other members of the public frequently left bikes in inappropriate locations, causing inconvenience and visual intrusion for the public. Similar problems have been encountered with e-scooters, although because of their higher unit cost this problem has been smaller in scale.

Regulatory responses to these amenity issues have included attempts to restrict the supply of bikes and/or e-scooters by licensing a limited number of operators and imposing fleet size limits. In addition, rules regarding the parking of bikes and e-scooters have been adopted. Attempts have been made to use “geo-fencing” technology to enforce these requirements, while some cities have moved to collect and impound improperly parked vehicles and imposed often substantial fees.

Concessions and fleet size limits

The approach of tendering a limited number of concessions is being quite widely adopted throughout Europe, with the focus increasingly being on e-scooters, given the clear consumer preference for them demonstrated in most markets in which they compete. A key point of difference between these concession models is in the number of operators to be licensed. Many cities have opted to license only a small number of providers; for example Paris’ current request for tender seeks to license three operators. Others have licensed far more – for example, Copenhagen has licensed 10.

Cities that have chosen to grant a smaller number of concessions are usually also imposing limits on e-scooter numbers, sometimes at levels below existing

numbers. For example, the proposed limit of 15,000 e-scooters in Paris is well below the levels of 20,000 or more seen in summer 2019. In this context, governments may be taking the view that limiting the number of concessions is necessary to make participation in the market attractive, particularly where a range of service, environmental and other standards are also being imposed as tender conditions, or assessment criteria.

However, this approach may have significant costs. Given the unprofitability of the sector, there is a risk that the sudden exit of one of a small number of concession holders could leave the city under-supplied for a period, until alternative arrangements can be put in place. More broadly, such a low limit on the number of market participants can be expected to reduce competitive pressures, particularly where concessionaires do not have the opportunity to increase market share by expanding their fleets: in competition law and policy, there are typically significant concerns about the potential for oligopolistic behaviour in markets with only three players.

A more fundamental question concerns the rationale for adopting the concession model, rather than simply applying a set of conduct rules to all who choose to enter the market. This appears to be driven largely by concern to control overall fleet numbers as a means of limiting the commercial use of scarce public space. This concern may have been largely driven by early experiences with dockless bikeshare schemes that suddenly introduced very large numbers of bicycles, many of which were misused and became nuisances (ITF, 2019^[2]). However, it is not clear from the early experience with e-scooters that this is a major concern in this context. Moreover, a broader comparison with other mobility options such as taxis suggests that e-scooters' call on public space is comparatively quite small.

Conduct rules

Some cities have sought to address the urban amenity issues associated with dockless bicycles and e-scooters by adopting a range of conduct rules, which can be applied to providers and/or users. For example, Paris' initial regulatory response to e-scooters includes prohibitions on parking them on footpaths and roadways, with operators able to be fined for contraventions. This was supplemented by the provision of designated parking spaces for e-scooters and enabling them to be parked in on-street car parking spaces. Operators can seek to enforce user compliance by using GPS location tracking to penalise incorrect parking of the vehicle.

Such policies have the benefit, *vis-à-vis* concession schemes, of directly addressing the policy problem, while avoiding the potential loss of welfare that arises from restricting market entry and supply growth.

Regulatory fees

In parallel with these regulatory interventions, some cities have imposed large regulatory fees on operators. For example, in Los Angeles, a relatively modest USD 5 000 fee for licence applications is supplemented by an annual fee of USD 32.50 per bicycle (Yanocha, 2019). Seattle approved regulations imposing an annual fee of USD 250 000 per operator in July 2018, together with a fleet size cap of 5 000 - equivalent to a minimum of USD 50 per bike per annum (Seattle Times, 2018). Several US cities have adopted similar approaches in relation to e-scooters, with annual fees ranging from USD 25 to USD 300 per e-scooter (CBS 17 News, 2018^[12]). Mexico City adopted a two-part charge in 2019 with a modest licence fee but a very large per e-scooter charge. The city auctioned quotas of bikes and e-scooters to operate in designated areas. It calculated a floor price of USD 53 per bicycle based on the parking space consumed and other costs to the community, discounted by the benefits of the modal shift induced. The auction yielded annual fees per bike for the three successful bidders ranging from USD 68 to USD 137, while the result was even more extreme for e-scooters, with fees ranging from USD 379 to USD 736 – amounts which exceed the annual regulatory fees paid by taxis (Licea, 2019^[13]).

Such fees significantly change the economics of the dockless bikeshare and e-scooter share models, in a context in which the operator's cost per bike is typically very low. Even e-scooters have unit costs that are quite small averaging around USD 300-500². In these contexts, high regulatory costs are likely to limit supply, reducing socio-economic welfare, or prove unsustainable with the exit of some of the operators facing the highest charges. Although often justified on the grounds of the need to recover regulatory costs, a key question is that of whether the regulatory cost base is an appropriate one, or whether it reflects an unduly interventionist model, in relation to the size of the actual or potential harms being addressed. Even if such fees are considered appropriate in respect of a mature business model, there may be a good case for subsidising regulatory costs in the short term as a means of encouraging innovation and experimentation, given that the urban policy objectives of many city governments include facilitating modal shift toward public, shared and active transport.

Balancing policy priorities

The context for app-based mobility services, and therefore the policy challenges they pose, can differ widely, both between cities and between different areas within the same city. For example, city centres can face substantial congestion issues, even while suburban areas struggle with poor

² See, for example, <https://qz.com/1325064/scooters-might-actually-have-good-unit-economics/>.

service standards due to limited availability of taxis and for-hire vehicles. Similarly, the distribution of shared bikes or e-scooters can be highly uneven across the urban area. This creates complexities in addressing the policy issues, which must be addressed when choosing between policy options and when designing regulatory models. There is also uncertainty regarding the impacts of various shared-mobility services on modal distribution in cities. For example, it is unclear to what extent, and in what circumstances, ridesourcing complements or substitutes for public transport and therefore what impact it will have on sustainable urban mobility and related policies.

In addition, the development of app-based mobility services has significant implications for a range of public policy objectives, as discussed above, including addressing congestion and pollution, accessibility, safety and public health. A key challenge for regulatory design and implementation is to ensure that all of these are recognised and taken into account, and that both synergies and trade-offs between them are understood and addressed. This also suggests that the objectives pursued via sector-specific regulation should not be unduly ambitious: for example, sector-specific (or mode-specific) regulation is unlikely to be the most effective way of pursuing some wider policy goals, such as addressing congestion and pollution. Attempts to pursue wider policy goals in this way may compromise the ability of regulation to achieve core objectives, by undermining its consistency, coherence and clarity.

Care is needed in regulating rapidly evolving sectors where technologies, service offers and business models can change rapidly as providers seek to understand and respond to consumer needs and demands. This implies that regulations will often reflect misunderstandings of evolving industry dynamics and the relationships between public and private objectives. Unduly intrusive regulation risks distorting, or preventing the development of, innovative new service offers.

The need for ex post evaluation of regulation is particularly acute in this context. Adopting scheduled review clauses in regulatory statutes is a potentially effective way of ensuring that timely review occurs, that regulatory missteps are corrected and that regulation evolves along with these rapidly developing industries. At the same time, it is important to allow sufficient time to elapse to be able to make a reasonable assessment of the impact of the regulatory regime before making changes.

Regulatory review processes and methodologies that are robust and transparent will help minimise these risks. Involvement by regulatory experts from outside the industry, such as the competition authority or the body responsible for the oversight of regulatory policy, can bring a broader and more objective view, particularly where the influence of incumbents may be excessive. This is particularly important when decisions as to whether and how

existing regulations should recognise and accommodate disruptors are being made.

Principles for regulating app-based mobility services

The OECD's International Transport Forum endorsed the following set of principles for the regulation of app-based mobility services in 2019. The principles aim to ensure that the potential welfare benefits of app-based mobility services are realised in practice, while consumer harms and negative externalities associated with these innovative service offerings are effectively addressed. They have been developed as the result of an extensive programme of research on this topic, including a 2018 Roundtable (ITF, 2019^[2]).

Maintain a permissive regulatory environment

The substantial size of the welfare benefits from app-based mobility services has driven their very rapid growth. This makes it extremely important that regulatory restrictions do not unnecessarily act as an impediment to these gains being fully achieved. Regulation should reflect an essentially permissive and facilitative approach to innovation, which accepts market disruption, rather than seeking artificially to slow or impede the adoption of new business models and technologies. However, this does not imply inaction where there is a clear need to protect consumers from the risk of significant harm.

Minimising regulatory barriers is particularly important where new modes and business models, with uncertain viability are concerned. Small trial schemes, with limited regulation may provide valuable practical experience. Governments should consider bearing the initial regulatory costs in such circumstances, rather than seeking to recover them from new businesses, as a means of encouraging innovation.

Treat incumbents and entrants equally

Regulatory frameworks should be designed to facilitate the welfare gains that app-based mobility services bring, while ensuring safety and other consumer protections are maintained and other public policy objectives are not undermined. A key principle is that of equal regulatory treatment of incumbents and entrants; that is, that regulation should be pro-competitive. This does not mean that all market segments must be subject to identical regulation, as different business models may require different regulatory arrangements. Rather, it implies that regulation should not have the purpose of favouring incumbents over new entrants, or vice-versa, and that proposed regulation that would have very different impacts on incumbents and entrants should be carefully reviewed. If governments wish to cushion former incumbents from the impact of disruption, this should generally be done through other policy instruments, in order to avoid the risk of distorting

competition and artificially constraining welfare-enhancing innovation. Regulation should be neutral as regards both technology and business models.

Focus regulation on addressing clearly-identified market failures

Regulation should be based on a clear understanding of the dynamics of the relevant market and the identification of significant market failure(s) and/or equity issues. While governments may wish to regulate ex ante, to address clearly foreseeable harms, care must be taken to ensure that the nature of new services and the emerging market in which they operate are sufficiently well-understood, to avoid imposing ineffective regulation with unanticipated costs.

Revise outdated and fragmented regulatory frameworks

Where new regulation is adopted to accommodate entrants, existing standards should also be reviewed to ensure they do not unreasonably constrain incumbents' ability to compete. Where wider public objectives such as addressing congestion and pollution are pursued, regulators should broadly favour generally applicable regulation over sector-specific rules, as this approach is likely to be both more effective and more consistent with the principle of competitive neutrality.

Governments should recognise that the rapidly evolving nature of app-based mobility services gives rise to substantial risks and difficulties in designing regulatory arrangements. This implies that they should avoid regulating until emerging market dynamics are adequately understood. However, even well-designed regulation may quickly become outdated and no longer fit-for-purpose. Regulation should, as far as possible, be adaptable in the face of innovation and market evolution. Scheduled reviews, based on transparent and rigorous methodologies, can ensure that regulation is systematically refined, improved and adapted to new realities over time. Regulation should be developed and reviewed using robust processes that are resistant to capture. Ensuring that performance data is being collected and analysed will contribute substantially to the quality of such reviews.

Take the broader urban policy environment into account when designing regulations

App-based mobility options have numerous implications for key urban policy objectives including addressing congestion and pollution, enhancing accessibility and connectivity and encouraging public and active transport. Regulatory design should take account of these factors, while also distinguishing clearly between objectives that should be pursued through sector-specific regulation and those that can only effectively be addressed through broader regulatory or policy interventions. Any negative impacts on broader urban policy objectives arising from the growth of shared mobility also

need to be assessed in the light of the significant consumer benefits it brings. However, businesses seeking to introduce new mobility services should engage with urban planning authorities to identify and minimise the potential external costs of their operations. Such proactive steps can reduce the need for potentially intrusive and distorting regulation.

Consider the need to invest in supporting infrastructure and the case for subsidising service provision

Facilitation of the available welfare gains from app-based shared mobility services may involve public expenditure in addition to regulatory accommodation. In relation to shared bikes and e-scooters, increased expenditure on adapting streets to provide segregated road space and parking space, together with supporting regulation in areas such as speed limits and overtaking rules, can speed progress toward the achievement of government policies favouring active transport, as well as minimising safety risks. In certain contexts, such as some vanpooling services and perhaps dockless bike/scootershare, it could imply the provision of direct subsidies to service providers to help achieve mobility ends at lowest cost.

Annex – A selection of policy initiatives to regulate app-based mobility services

Ridesourcing

Reforming taxi regulation in Victoria (Australia)

Responsible entity: Victoria State Government, Department of Transport.

Description: Taxis were tightly regulated when UberX entered the Melbourne market in 2014, with licence values of more than AUD 500 000. Following strong taxi industry lobbying, the regulator prosecuted several Uber drivers for operating an unlicensed vehicle. A guilty verdict in a test case was overturned on appeal in 2016 and it became clear legislative change would be required to block the operation of ridesourcing. By this time, Uber was well-established in the market and, in the face of strong consumer demand for ridesourcing, the government reconsidered its position.

New laws created a single regulatory system for both taxis and ridesourcing as of 2018. They removed limits on taxi licence numbers and provided for a partial buyback of existing licences, plus hardship provisions, at a cost of AUD 400 million. New regulation covering drivers and vehicles simplified the requirements for taxis and reduced compliance costs. Taxi and ridesourcing drivers were subject to the same requirements. The reforms led to a near doubling in taxi licence numbers within a year, while ridesourcing continued to flourish. Total trip numbers (i.e. taxis plus ridesourcing) were 131 per cent higher in 2018-19 than three years previously (Essential Services Commission, 2018^[14]). These reforms demonstrate that it is politically and economically feasible to open entry to highly regulated taxi sector and that, in such an environment, the taxi industry can compete effectively with ridesourcing.

Read more: <https://transport.vic.gov.au/getting-around/taxis-hire-car-and-ridesharing/industry-reforms>

Reforming taxi regulation in other Australian states

Responsible entity: Governments of the Australian Capital Territory, New South Wales and Western Australia (Departments of Transport).

Description: Most other Australian States and Territories had similar kinds of strong regulatory restrictions on the supply of taxi licences in place as Victoria, along with detailed and extensive quality regulation. Thus, they faced similar challenges to Victoria when ridesourcing companies entered their respective jurisdictions. Several States, including Western Australia, New South Wales and the Australian Capital Territory implemented broadly similar regulatory changes to the Victorian reforms described above. In each case, these reforms entailed a partial buyback of incumbents' taxi licences, the removal of restrictions on the supply of taxi licences and the adoption of consistent regulatory requirements for the taxi

and ridesourcing sectors. These reforms were all implemented within very similar timeframes. The broadly consistent approach taken across jurisdictions, with reforms occurring more or less simultaneously, appears to have helped to minimise the political risks and costs of reform, including the likelihood of legal and other challenges to the proposed reforms. There was also an opportunity to improve the detailed design of reform programmes due to the observation of implementation issues arising in other jurisdictions.

Read more:

www.transport.nsw.gov.au/projects/programs/point-to-point-transport/point-to-point-about-reform-process-since-2015

www.transport.wa.gov.au/On-demandTransport/on-demand-transport-reform.asp

www.parliament.act.gov.au/_data/assets/pdf_file/0011/1256573/Evaluation-of-the-2015-Innovation-Reforms-to-the-On-Demand-Transport-Industry-in-the-ACT-Summary-report.pdf

www.tmr.qld.gov.au/business-industry/Taxi-and-limousine/Queenslands-Personalised-Transport-Horizon/A-new-framework-for-the-personalised-transport-industry

Regulating ridesourcing and taxis in New York City

Responsible entity: New York City Government, Taxi and Limousine Commission.

Description: NYC also historically had a heavily regulated taxi industry, with a virtual freeze on taxi numbers since the 1930s seeing licence values peak at around USD 1.3 million, before declining by as much as 90% following the entry of ridesourcing companies. Rather than reforming taxi regulation, NYC has focused on increasing regulation of ridesourcing, citing concerns over its impact on congestion and driver income levels.

Initial proposals to restrict the number of ridesourcing vehicles failed in 2015, but a “temporary” cap on driver licence numbers was adopted in 2018 and extended in 2019. The regulator was also given the permanent power to set numbers. In 2019, a new anti-congestion rule required ridesourcing companies to increase vehicle utilisation rates from 59% to 69%, but did not affect taxis, which have significantly lower utilisation. However, this was successfully challenged in the courts in December 2019.

A 2018 “driver income rule”, sets minimum driver pay rates based on an economic model, and is designed to ensure a post-expense income at least equal to the NYC minimum wage. The minimum driver pay is determined by a formula with time and distance elements, modified by a utilisation rate. This creates an incentive for platforms to increase the utilisation rate, since the minimum payment per trip to drivers is lower if the rate is higher. The rule does not apply to taxi drivers. In addition, a 2017 rule requires a minimum percentage of For Hire Vehicle trips to be

despatched to accessible vehicles, with the percentage increasing progressively over several years.

Read more:

www1.nyc.gov/site/tlc/about/driver-pay.page

www1.nyc.gov/assets/tlc/downloads/pdf/faq_fhv_accessibility_rule_information.pdf

Congestion charging in São Paulo's ridesourcing sector

Responsible entity: São Paulo City Government.

Description: São Paulo (Brazil) began levying a congestion charge on ridesourcing vehicles in 2016. This is a charge per (occupied) mile, which is higher in the city centre and during peak periods and less expensive in suburban areas, off-peak and during weekends. The charge was set with the intention of limiting the total mileage covered by ridesourcing vehicles to a target level (initially 5 000 "taxi equivalents", later doubled to 10 000). The charge is intended to address congestion, as well as yielding a contribution toward road maintenance costs. Revenue from the tax is hypothecated to transport investments. The charge also initially had a pro-competitive objective, in that it was levied at a higher rate on providers with a market share above 20%. The market share of Uber subsequently declined from 95% to 70% within six months. However, this aspect of the policy was subsequently the subject of a successful legal challenge.

Read more: www.itf-oecd.org/regulating-ridesharing-services-sao-paulo

E-scooters and bikeshare

Regulating shared e-scooters in Paris

Responsible entity: City of Paris Government.

Description: Shared e-scooters arrived in Paris in June 2018. Provider and fleet numbers expanded rapidly, as did the area within which e-scooters were available. By summer 2019, 20,000 e-scooters were on the streets. The new mobility option arrived in a market that already included both the long-established "Velib" docked bicycle scheme and several dockless shared bicycle schemes. Despite this, it almost immediately proved extremely popular. The city government viewed e-scooters as potential contributors to its policy of reducing private vehicle use and decided to delay regulation until it saw how the market developed, and what issues arose.

Regulations were adopted in late 2019. They constitute a complete package, addressing user and third party safety and urban amenity. Vehicle requirements included limiting maximum speeds, requiring lighting and a horn and setting standards for braking systems. Usage requirements included requiring e-scooters to be used on bike lanes where available, banning them from roads with speed limits of 50kmh or more and from footpaths, banning 2-up riding and riding by under-12 year olds, and requiring helmets and high visibility clothing to be worn for on-road use. In addition, a code of practice for riders was developed with e-

scooter companies. Parking e-scooters on footpaths and roadways was banned on amenity grounds and designated parking areas developed. A EUR 50 per e-scooter annual licence fee was also introduced.

A second stage regulatory structure commenced implementation in late 2019. This sought to exercise greater public control over the industry by effectively establishing a licensing system. A call for tenders to operate e-scooters in Paris was released, which envisages the licensing of three operators, with a maximum of 5,000 e-scooters each. Tenders will be assessed against the criteria of user safety vehicle management, maintenance and recharging and environmental responsibility (Gauquelin, 2020^[18]).

Read more: www.paris.fr/pages/trottinettes-electriques-de-nouvelles-regles-de-circulation-7249

Regulating shared bicycles in London

Responsible entity: Mayor of London, Transport for London. London Councils, London Councils' Transport and Environment Committee.

Description: Dockless bikeshare arrived in London in 2017. The initial entrants to the market took advantage of the lack of specific regulation and did not consult either the City of London or the city's 32 borough councils. Within a short period, there were several competing providers and bikes numbers had reached saturation level. Regulators found that they had limited powers to address issues caused by the bikes, initially seeking to rely on nuisance powers to remove bikes causing obstruction, or to use the waste provisions of the Environment Protection Act.

TfL published a Code of Practice for operators in 2017. It requires operators to consult the relevant borough(s), TfL and other relevant authorities before commencing operations. In addition, an accreditation scheme for operators was established. Borough councils developed Memoranda of Understanding (MoU) to manage the relationship between the borough and the operators. In practice, most operators did engage with relevant government bodies. However, there has been no consistency in approach on the part of borough councils. Many granted a right to operate within their boundaries to single operators, often on a trial basis. The need to deal individually with each borough meant bikes can typically only be used in a selection of boroughs across the city with which a particular operator has concluded a MoU. This created significant operational problems, and significantly reduced the value and convenience of the schemes to users, by restricting their geographical mobility.

A whole of London bylaw was proposed as in 2017 and initially expected to be in operation by mid-2019. A proposal was published in late 2019, but by mid-2020 no final bylaw had been issued. The consultation proposal recommended that borough councils should delegate their bylaw-making power in this specific policy area to London Councils' Transport and Environment Committee. A further uncertainty affecting the market in London is that no decision has yet been made regarding the

future status of shared e-scooters, which are currently not authorised to operate in the city.

Read more:

www.londoncouncils.gov.uk/download/file/fid/26474

<http://content.tfl.gov.uk/dockless-bike-share-code-of-practice.pdf>

Bike and e-scooter share trial in Los Angeles

Responsible entity: Los Angeles Department of Transportation.

Description: In March of 2019, Los Angeles launched a large-scale dockless mobility pilot program, which permitted 37,000 dockless vehicles (both bikes and e-scooters) to operate on city streets. To obtain a permit to participate in the pilot, providers were required to meet a number of Council-directed requirements including insurance, liability, an equity plan, and a community engagement plan. The goals of the pilot were to understand the dynamics of an emerging marketplace of private mobility operators; learn from and collaborate with peer cities to develop best practices; gain insight into mobility trends through use of data; address concerns over equity, safety, and accessibility of various modes of transit; develop a program that can foster innovation and; prepare the city government to respond appropriately to new and unanticipated modes of transportation in the future. The city Department of transport prepared a comprehensive analysis of the programme after its first year of operation. The review report recommended retaining and expanding the "On-demand Mobility Program", to enable a wider range of vehicle types and business models to operate. A universal permit programme is to be adopted as the basis for regulating all for hire vehicles.

Read more: <https://ladot.lacity.org/sites/default/files/documents/ladot-dockless-year-one-report.pdf>

Bike share in Seattle

Responsible entity: Seattle Department of Transportation.

Description: Following the collapse of the Pronto docked bikeshare scheme in 2017, the Seattle city government decided to allow dockless bikeshare schemes to operate in the city. New regulations were published in mid-2018, enabling a maximum of four bikeshare operators to be licensed to operate up to 5 000 bikes each. The regulations also set an annual fee of USD 250 000 and an additional fee of USD 50 per bike. This implied total annual fees of USD 0.5 million for an operator with the maximum fleet size of 5 000 bikes. The regulations had a strong focus on appropriate parking, in designated areas, while the programme was to be accompanied by an accelerated bicycle infrastructure investment agenda.

At least one operator left the city shortly after the regulations were announced, citing the impact of the high fees on their cost of operating. By 2020, only one operator (Jump) was providing bikeshare services in the city and, after increasing between 2018 and 2019, the total number of trips taken showed significant

declines in early 2020. However, a 2019 evaluation of the bikeshare programme reached broadly positive conclusions.

Read more:

www.seattle.gov/transportation/projects-and-programs/programs/bike-program/bike-share#annualevaluationreports

[www.seattle.gov/Documents/Departments/SDOT/BikeProgram/2019_FreeFloat BikeSharePermit Evaluation.pdf](http://www.seattle.gov/Documents/Departments/SDOT/BikeProgram/2019_FreeFloat_BikeSharePermit_Evaluation.pdf)

References

- CBS 17 News (2018), Raleigh leaders hike electric scooter fees to \$300 each for companies involved, <https://www.cbs17.com/news/local-news/wake-county-news/raleigh-leaders-hike-electric-scooter-fees-to-300-each-for-companies-involved/1577078049/>. [12]
- Conway, Salon and King (2018), "Trends in Taxi Use and the Advent of Ridehailing, 1995–2017: Evidence from the US National Household Travel Survey", *Urban Science*, Vol. 2 (3)/79, <https://doi.org/10.3390/urbansci2030079>. [8]
- Essential Services Commission (2018), , <https://www.esc.vic.gov.au/sites/default/files/documents/Unbooked%20Commercial%20Passenger%20Vehicles%20Fare%20Review%202018%20-%20Final%20Decision.pdf>. [14]
- Gauquelin, A. (2020), *Analysis of Paris' e-scooter RFP*, <https://shared-micromobility.com/analysis-of-paris-escooter-rfp/>. [18]
- ITF (2020), "Safe Micromobility", OECD Publishing, Paris, https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf. [11]
- ITF (2020), "Good to Go? Assessing the Environmental Performance of New Mobility". ITF Corporate Partnership Board Report. <https://www.itf-oecd.org/sites/default/files/docs/environmental-performance-new-mobility.pdf>. [9]
- ITF (2019), "Regulating App-based Mobility Services: Summary and Conclusions", *ITF Roundtable Reports No. 175*, OECD Publishing, Paris, <https://www.itf-oecd.org/sites/default/files/docs/app-based-mobility.pdf>. [2]
- Lane, M. (2020), "Regulating platform work in the digital age", *Going Digital Toolkit Note 1*, <https://goingdigital.oecd.org/toolkitnotes/regulating-platform-work-in-the-digital-age.pdf>. [9]
- Lee, K. (2019), *Ride-Hailing Services and Sustainability: The Impact of Uber on the Transportation Mode Choices of Drivers, Riders, and Walkers*, SSRN, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3244207. [4]
- Licea, K. (2019), *Reflections on the regulation of micro-mobility systems in Mexico City [Presentation]*. [13]

- MacEachen E, R. (2018), "284 Safety management systems: peer-to-peer ratings in the sharing economy", *Occupational and Environmental Medicine*, Vol. 75/A156, <http://dx.doi.org/10.1136/oemed-2018-ICOHabstracts.1463>. [6]
- New York Taxi and Limousine Commission (2018), *Driver income rules*, https://www1.nyc.gov/assets/tlc/downloads/pdf/driver_income_rules_12_04_2018.pdf. [17]
- OECD (2018), "Taxi, ride-sourcing and ride-sharing services: Background note by the Secretariat", *OECD Working Party No. 2 on competition and regulation*, OECD, [https://one.oecd.org/document/DAF/COMP/WP2\(2018\)1/en/pdf](https://one.oecd.org/document/DAF/COMP/WP2(2018)1/en/pdf). [1]
- OECD (2012), "Recommendation of the OECD Council on regulatory policy and governance", OECD Publishing, Paris, <https://www.oecd.org/gov/regulatory-policy/49990817.pdf>. [5]
- Parliament of Victoria (2019), *Inquiry into the Commercial Passenger Vehicle Act 2017 Reforms: Report*, https://www.parliament.vic.gov.au/images/stories/committees/SCEI/CPV/Report/LC_EIC_59-01_CPV_Act_2017_reforms.pdf. [15]
- Parrott, J. (2018), "An Earnings Standard for New York City's App-based Drivers: Economic Analysis and Policy Assessment", <https://static1.squarespace.com/static/53ee4f0be4b015b9c3690d84/t/5b3a3aaa0e2e72ca74079142/1530542764109/Parrott-Reich+NYC+App+Drivers+TLC+Jul+2018jul1.pdf>. [16]
- Rayle, L. (2016), "Just a better taxi? A survey-based comparison of taxis, transit, and ridesourcing services in San Francisco", *Transport Policy*, Vol. Vol. 45, pp. pp. 168–178, <https://doi.org/10.1016/j.tranpol.2015.10.004>. [3]
- San Francisco County Transport Authority (2018), "TNCs and Congestion", https://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs_Congestion_Report_181015_Final.pdf. [7]
- Ville de Paris (2019), "Bulletin Officiel de la Ville de Paris", https://www.api-site.paris.fr/paris/public/2019%2F6%2F2019_07_30_BOVP_060.pdf. [19]
- Williams, Z. (2019), *What are taxi medallions worth?*, <https://www.cityandstateny.com/articles/personality/interviews-profiles/what-are-taxi-medallions-worth.html>. [10]