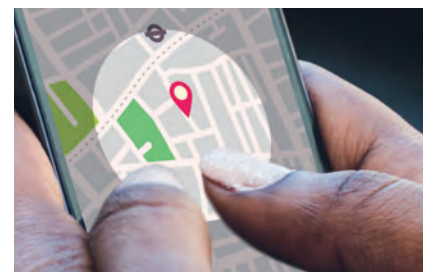




App-Based Ride and Taxi Services

Principles for Regulation



Corporate Partnership Board
Report

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Foreword

The work for this report was carried out in the context of a project initiated and funded by the International Transport Forum's Corporate Partnership Board (CPB). CPB projects are designed to enrich policy discussion with a business perspective. They are launched in areas where CPB member companies identify an emerging issue in transport policy or an innovation challenge to the transport system. Led by the ITF, work is carried out in a collaborative fashion in working groups consisting of CPB member companies, external experts and ITF staff.

Many thanks to the members of the Corporate Partnership Board involved in this work: Google, HERE, PTV Group, Uber. The author of this report was Philippe Crist of the International Transport Forum. The report **also draws from contributions and discussions during an expert's workshop, organised 26-27 October 2015** in Paris. Many thanks to Ande Monier of the International Transport Forum for her assistance in the organisation of this workshop.

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Executive summary

Background

For-hire passenger transport services are an essential component of well-functioning metropolitan areas. But the markets for taxis and other for-hire vehicles have historically been subject to imperfections that regulators have tried to correct or at least attenuate. The current regulatory frameworks surrounding for-hire transport reflects this history. But the arrival of innovative app-based ride services, generically referred to as Commercial Transport Apps (CTAs), in this report, challenges established rules. The growing popularity of these services has caught authorities off-guard, as CTAs typically do not fall under established regulatory structures. Moreover, the uptake of similar technologies amongst traditional for-hire operators blurs the line between existing regulatory categories, and in some cases obviates it.

In response, regulators have typically sought to block CTAs from entering the market or adapted existing regulations to address the specificities of CTAs - with more or less success and often under the influence of existing service providers. How this regulatory challenge will be met in the face of fast-growing CTAs and strong resistance from traditional for-hire passenger transport providers, is still an open question.

In this context, the International Transport Forum convened a workshop on “Principles for the regulation of for-hire road passenger transport services” in October 2015. This workshop, part of an ITF Corporate Partnership Board project, brought together representatives from the CTA and taxi industries, regulators, academics and other stakeholders to seek points of consensus on regulating for-hire ride services and identify persistent tensions that should be addressed. It also sought to provide public authorities with insights on the regulation of innovation amidst uncertainty.

Findings

Ride-hailing apps are popular because they often provide better consumer value than most existing services. For those able to access them, the service platforms deployed by CTAs - and increasingly by established providers - cut transaction costs, improve the allocation of available capacity and reduce information asymmetries between drivers, fleet operators and passengers. Consumers value them for providing an easy, consistent and universally available service. They also provide value to drivers through uniquely flexible work opportunities.

For consumers, there is little difference in the transport service provided by taxis and CTAs, as long as the trip is carried out satisfactorily and in a timely manner. Overall, there is convergence among services provided by taxis, private-hire vehicles and CTAs as they increasingly adopt similar technology. Regulatory distinctions amongst different forms of for-hire transport are thus becoming less relevant, although street hailing retains certain characteristics that currently warrant special regulatory treatment. How to book a ride matters a lot to many consumers, and app-based services provide greater transparency, certainty and accountability than traditional modes of access such as street hailing or radio-dispatched taxis.

Regulation of for-hire passenger transport, therefore, is still necessary, but it needs to adapt. Active regulatory oversight is required in order to ensure public safety, consumer protection and tax compliance. Oversight is also needed to moderate traffic and to ensure consumer and driver protection. Currently, regulatory oversight of taxis and CTAs is in many cases tilted towards incumbent service providers, often because of the specificity of taxi operations, notably street hailing, but in some instances also as a result of market capture by existing service providers.

Rules governing market entry, geographic restrictions and fare setting for taxis are neither in line with the reality of mobility demand in many cities, nor are they adapted to the types of services provided by CTAs. CTAs are not taxis - but, increasingly, neither are taxis - at least in the traditional and historic sense. The

trend for taxis to provide app-based services – such as online booking, real-time information on vehicle location or rating of drivers reflects this lack of alignment.

Policy insights

Focus policy regarding for-hire passenger transport on the needs of consumers and society

Policy should enable the development of innovative services to contribute towards public policy objectives such as equitably improving mobility, safety, consumer welfare and sustainability. This will likely entail lightening entry controls for the for-hire transport market and fares regulation for dispatched taxi services. It will require continued oversight for services obtained via street hail/rank, which are marked by lack of effective consumer choice. In some instances, it will require new types of regulation for non-taxi hire vehicles than currently in force in most markets.

Keep the regulation framework of for-hire passenger transport services as simple and uniform as possible

Regulators should avoid creating different categories of for-hire transport providers. If differentiations are required (to correct inherent inefficiencies in some markets, for instance street-hail taxis), these should be made explicit, substantiated and frequently reviewed. Regulators should seek to adapt frameworks to better deliver on policy objectives in innovative ways and not simply preserve the regulatory status quo.

Encourage innovative and more flexible regulation of for-hire transport services

The convergence of new technology and better data allow for-hire services to be regulated much more precisely and effectively than before. Automated collection of fare information for fiscal purposes, on-board monitoring of vehicle condition and driver behaviour and other possibilities allow authorities to better monitor and deliver on public policy mandates. To the extent that new technology or other alternative approaches can deliver on public policy objectives, including consumer protection, in the place of currently required rules, regulations should be adapted, streamlined, replaced or removed.

Embrace data-led regulation to improve societal outcomes

Regulators should leverage data-led regulation as a way of providing a lighter and more flexible approach to achieving public policy objectives. Operators should be able to choose such light regulatory schemes over broader, more burdensome frameworks in return for providing regulators with relevant data. This data would allow regulators specific insights into how for-hire transport operations support public policy objectives (or not). Shared data should be protected by recipients to preserve trade secrets. It should also be collected, formatted and processed to ensure high levels of protection for personal data.

1. Introduction

For-hire passenger transport services, including taxis, for-hire cars with drivers and some forms of on-demand micro-transit, are an essential component of well-functioning metropolitan areas. They deliver convenient door-to-door trips for those who either punctually or regularly require such services. Though they typically only account for a small share of overall trips, they are essential for some people, at some times and in certain circumstances. They are a stand-alone part of the urban mobility offer but can also serve as an important adjunct to public transport, walking, cycling, individual cars or car-sharing services. They have a long history pre-dating public transport systems and have been a steady feature of large and medium-sized cities around the world. They have historically been subject to certain market imperfections that regulators have tried to correct or at least attenuate. And they are now facing significant disruption due to the arrival of new mobility services based on app-based platforms.

These services are known by several names – e.g. ride-sourcing companies, on-demand information technology-based transportation aggregators (India), commercial transport intermediaries (International Road Transport Union), transportation network companies (TNC) – a term coined by a regulatory finding of the California Public Utilities Commission (CPUC) in 2014. According to the CPUC, a TNC is “an organisation, including, but not limited to, a corporation, limited liability company, partnership, sole proprietor, or any **other entity ... that provides prearranged transportation services for compensation using an online-enabled application or platform to connect passengers with drivers using a personal vehicle**” (CPUC, 2016). Many jurisdictions in the US and some elsewhere employ the CPUC framework but it is not universal.

The difficulty in finding a single term for these services underscores the way in which these services also challenge regulation and regulators. For this report, we make the distinction between relatively new for-hire market entrants like Uber, Lyft, etc. that provide services based on a software application platform supporting a two-sided marketplace connecting drivers and passengers on a commercial basis and incumbent taxi and other for-hire services. This paper will refer to the former as commercial transport apps (CTA) and the platforms they operate as CTA-platforms. Taxi rides can also be facilitated via app-based platforms – which we refer to as taxi app-based platforms. In the latter case, the taxi app-based platform arranges rides between passengers and regulated taxis. Just to underscore the state of flux in this field, some CTAs provide multiple levels of services – individual or shared rides, peer-to-peer or professionally-chauffeured services and some even incorporate taxis (Uber in some markets - e.g. Sydney, Berlin - and Didi Chuxing, formerly Didi Kuadi in China)

Clearly, there are many context-specific iterations of for-hire services that are based on local rules and regulations. One difficulty that regulators have faced is that the model espoused by many CTAs are generic and global while the services of their incumbent competitors are uniquely constrained by a local context. **That isn't to say that CTAs should not** or do not conform to local rules, but rather that local rules sometimes do not account for unique features of CTAs – including the efficiencies that they deliver.

The popularity of CTAs is manifest. Evidenced not only by the rapidity with which they have made significant inroads in the for-hire markets of many cities around the world but also by the way in which they have been able to mobilise significant sums of investment from equity partners as well as catalyse global alliances that may prefigure an entirely new configuration of urban transport services. There is considerable interest in how CTAs may impact urban transport markets, including public transport, and might ultimately reshape the cities in which they operate.

Because of these potential impacts and because the arrival of CTAs has in most cities disrupted highly-regulated incumbents, public authorities have been under intense pressure to regulate these new services. The pace of change has been rapid with the first CTA operations starting in 2009 in the United States and spreading soon thereafter around the world. Early innovators in the field have been joined by numerous

competitors that have sought to leverage the same technologies and similar business models. In response, incumbents, under pressure, have deployed smartphone-based applications (apps) in order to retain and increase patronage.

In many cases, the rapid pace of change has caught authorities off-guard as CTAs typically do not fall under existing regulatory structures and as the deployment of new technologies blurs the line between existing regulatory categories. Some CTAs have taken advantage of this regulatory ambiguity to deploy services that in the minds of many regulators, contravene or challenge the spirit of existing rules.

In response, regulators have typically sought either to block market entry by CTAs or by adapting existing regulations with more-or-less success and often under the influence of incumbents – the example of the Thévenoud Law in France (see Box 1) is an example of this incrementalist approach. These are short-sighted approaches on at least two grounds.

First, they fail to address the fact that CTAs deliver real efficiency gains, consumer benefits and are attractive to many workers including those seeking self-directed and flexible working arrangements and thus are a growing and permanent feature in many cities around the world. Few countries have looked at completely overhauling existing taxi regulations in order to adapt the regulatory environment governing for-hire services to new market conditions but there are indications that some may soon do so. For example, the Philippines created a national regulatory framework for transportation network companies in late 2015 and in March, 2016, the Chinese Ministry of Housing and Urban-Rural Development and the Ministry of Public Security announced that they were scrapping existing regulations governing taxi services as a prelude to issuing new regulations governing all for-hire services.

The second shortcoming is that such incremental responses fail to anticipate and provide a sufficiently flexible regulatory framework for even greater disruptions building on the horizon. Foremost among these is the plausible conflation of CTA-like ride-sourcing with highly automated and ultimately fully automated fleets of vehicles.

For these reasons, adapting regulatory frameworks to accompany the development of CTAs - allowing them to deliver consumer and other benefits while managing their potential negative impacts - and ensuring that these frameworks can flexibly address uncertainty regarding future developments is not a luxury, but a real and present necessity. Ideally, these efforts should anticipate, not only react to, market developments.

In that context, as part of the work program adopted in 2015 by the ITF's Corporate Partnership Board, the International Transport Forum (ITF) at the Organisation for Economic Development and Cooperation (OECD) convened a workshop in Paris on **"Principles for the regulation of for-hire road passenger transportation services"** on 26-27 October 2015, chaired by Damien Geradin, Founder and Managing Director of the EDGE: Legal Thinking law firm.

The workshop brought together representatives from the CTA and taxi industries, regulators, academics and other stakeholders to seek points of consensus on regulating for-hire services and, alternatively, to identify persistent tensions that should be addressed. It also sought to provide public authorities with insights on the regulation of innovation under uncertainty given that the regulatory angst posed by the arrival of CTAs is likely only a precursor to that generated by even greater changes to come.

Specifically, the workshop sought to address four fundamental questions that come back to "first principles" in the regulation of this sector:

1. What is the regulatory concern?
2. Is there a need for regulation?
3. Who should be regulated?
4. What principles should guide regulatory intervention?

This is the report of that workshop and reflects both the discussions that were held over the course of the day-and-a-half. Those inputs were complemented by background material provided by Professor Geradin, Richard Darbéra, CNRS-LATTS Ecole des Ponts, ParisTech, Ben Edelman, Harvard Business School and contributions provided by Molly Cohen and Arun Sundararajan, both of New York University. Further background materials were compiled by ITF staff and provided by participants after the workshop.

In the first section, we provide context to the discussion by describing for-hire passenger transport markets and provide some indication of their relative importance. In the second section we address the motivations for regulation of for-hire transport and assess if the arrival of CTAs diminishes or exacerbates these. We also discuss whether CTAs themselves give rise to new regulatory needs, and who amongst platforms, license holders, drivers or vehicles, should be the target of regulation and under which circumstances. Finally, in the third section, we discuss a broad set of principles that could serve as the basis for flexibly guiding regulation for these activities.

The scope of the discussions summarised here is limited to the regulation of for-hire transport services and explicitly leaves aside the question of the regulation of employment contracts and labour issues for taxi, CTA and other for-hire drivers. These are important issues, especially since many CTA business models are predicated on the principle that CTA drivers are independent contractors (or are working for independent third-parties) being put into relation with clients via the CTA on-line platforms. This vision of the labour relationship between drivers, their employers and CTA platforms is contested by some and is the subject of on-going litigation in early 2016. Nonetheless, the workshop touched upon labour issues indirectly when, for example, discussing ways in which to control for safety (and thus working hours), security and identification.

2. The for-hire passenger transport market

Efficiently matching supply and demand – e.g. driver/vehicles and passengers – is the fundamental task that for-hire markets must solve. This entails balancing supply and demand when it is needed and in conditions that provides a high level of service quality, gives rise to competition, and results in an efficient allocation of resources. The logistical challenges of achieving this balance are numerous and the historic inability to address these adequately has given rise to persistent service challenges, lack of efficiencies and slow adoption of innovation that have dogged the sector. At its core, however, the value proposition for users of for-hire transport is simple and revolves around a few fundamental questions: **“Can I get a ride to a desired destination when I want to travel? Who can give me this ride? Can I trust this person? Will I safely arrive at my destination? How long will it take? How much will it cost?”** (TRB, 2016).

For-hire passenger transport services first developed on the streets of London and Paris in the 17th century. Very early on, these services differentiated and fell under two regulatory frameworks. The first – taxis – could collect passengers in public space without advance reservation. The second – Private-Hire Vehicles (PHV – also known as hackneys, livery vehicles, mietwagon, voiture de tourisme avec chauffeur, etc.) could only service pre-arranged trips at negotiated rates and could not ply the street looking for passengers. The line between these different services has blurred in the past with the introduction of new technologies and continues to blur still with the arrival of platform-based CTA services. We describe each of these components of the for-hire market in the sections that follow.

Taxis

Taxis are licensed to operate in public spaces and to take on passengers who either hail them down on the street or who walk up to pre-determined taxi stands or ranks. Hailing and stand-based access modes have been supplemented over time with the advent of telephone and radio dispatch reservation centres. The

adaptation of taxi services to the arrival of new technologies continues today with the development and adoption of smartphone apps that seek to duplicate the success garnered by CTAs. Examples of e-hail app platforms that allow app-based platform access to registered taxis are e-cab, Flywheel, Line, Curb, Grab-taxi and Hailo. Some municipal governments (e.g. Chicago, Washington) have also deployed, sometimes mandatory, smartphone apps as a way to improve taxi services and competitiveness in the face of CTAs. Some cities like New York or Chicago have a strong street hail market whereas other, smaller cities or countries have a stronger radio or telephone dispatch market (e.g. the Netherlands). Many cities, like Paris, allow all three modes of access (street-hail, dispatch and taxi stands) and in many markets, smartphone apps aggregate multiple taxi operators in order to provide the scale necessary to compete with CTAs.

The regulatory framework surrounding the provision of taxi services has evolved over time in order to mitigate identified market failures and other negative impacts that have manifested themselves. Taxi regulations typically address market entry conditions, licensing of qualified service providers (e.g. companies, drivers, dispatch platforms), driver training, vehicle certification and appearance and operational rules (e.g. many authorities prevent taxis from ride-sharing, e.g. simultaneously serving multiple parties). Taxi regulators differ across the world –in some cases there is a national taxi regulator, in other cases a local authority is responsible for promulgating and enforcing taxi rules. In some, but not all instances, the regulatory body is specific to the sector (e.g. the New York Taxi and Limousine Commission) which may raise the risk of regulatory capture by incumbents. Furthermore, where taxi oversight is not centralised at least at the regional level, operators must contend with a complex regulatory landscape that constrains the manner in which they operate their services across multiple jurisdictions. The level of regulation of the taxi sector or more precisely, effective regulation of the sector differs across the world. In many OECD member countries, the sector is highly regulated and conformity to existing rules is arguably effective. In many other countries, however, the sector is either lightly regulated or regulatory control of the sector is so lax that that few rules effectively apply. The uptake of new services like those offered by CTAs may be motivated by very different reasons across the world – sometimes the result of too much regulation and sometimes the result of not enough effective regulation.

In most markets, taxis must service any hailed ride request that meets taxi rules just as they must service the first client walking up to a stand. In some cases, the first-come, first-served rule at taxi stands does not hold, as in the case of Ireland, allowing the client to shop amongst available taxis.

The street hail and taxi rank markets are qualitatively different than other for-hire markets and these differences have given rise to the bulk of taxi regulations. The potential client hailing a taxi on the street faces the basic questions outlined above along with two additional ones. The first is how long must the client wait for a taxi to come along and the second is how long will it take for the next taxi to come along should the client decline the offer of the first taxi. The lack of, and uncertainty around, supply-demand synchronisation leads to situations where, absent regulatory control, taxis can exploit natural monopolies at the expense of the consumer. The potential for market power abuse by taxi drivers diminishes for pre-booked or radio-dispatched taxis since the potential client can shop around for taxis according to their availability and fares –though the latter are still highly regulated in many markets.

Taxi trips typically do not represent a significant share of overall urban voyages. This does not mean that they are unimportant – to the contrary, for some people, for some trips and for some occasions, they provide valuable door-to-door convenience unmatched by all modes except the personal car. In particular, when adapted for the transport of passengers with mobility impairments or who may otherwise not be able to easily use a car or public transport services, they provide an essential mobility option. They also are valuable to low-income households who may need car-like mobility at times but who may not have access to a car, or in some contexts, to a second household car. Finally, because they allow for flexible access to car-like mobility, they serve as a valuable safety valve in urban transport systems allowing people to mix public transport, walking and cycling trips with a taxi leg when it is either convenient or necessary. In this

way, the availability of quality taxi services may help moderate car motorisation rates in certain urban contexts.

Taxi market shares are linked to household incomes, the relative costs of car ownership - especially the cost of parking - and the availability of alternative or complimentary modes of transport. Taxi trips represent 11% of all trips in Guangzhou (2011)¹, 7% of all trips in Seoul (2013) and Singapore (2012), 6% of trips in Beijing (2012) and Hong Kong (2011), 3% of all trips in Bogota (2008), 2% in Taipei (2013) and 1% or less in cities like Chicago (2008), London (2011), Madrid (2011) and San Francisco (2014).

Private Hire Vehicles

Private hire vehicles (PHVs) are a separate class of for-hire services that cover car-services that operate on the basis of pre-negotiated fares (that preclude fares set on actual trip duration and distance) and pre-arranged reservations. In some countries PHVs are limited in the type of service they can operate (e.g. lengthy minimum trip distances or durations) and in others not. In order to avoid competition with **street-hail taxis, PHVs often have an obligation to return to a "home" base between trips. These services** are generally regulated much more lightly than taxis and in some instances, outnumber taxis (e.g. London and New York). Some countries make little regulatory distinction between PHVs and taxis (e.g. the Netherlands) and others arguably over-specify this category of service in order to prevent competition with taxis (see Box 1). Depending on the licensing scheme for PHVs and the set of conditions under which they are allowed to operate, PHVs can compete directly, partially or not at all with taxis.

Box 1: PHV specifications in France

There is a long history of regulating PHV-type services in France, often in a way to make these services qualitatively different from taxis and, incidentally, to minimise the chance of the former competing with the latter. The most recent law on PHV services, the so-called "Loi Thévenoud", named after its sponsor, set out the conditions for PHV services in France in 2014.

The law seeks to establish "sustainable conditions for balanced competition between individual modes of passenger transport." **It sets the conditions for decrees that will define the "conditions of professional competence" required from the PHV (VTC in French) drivers and the "technical conditions and comfort" to be met by the vehicles.**

The law's enabling decrees specify dimensions and characteristics for PHV vehicles, ostensibly to ensure customer comfort. Thus PHV vehicles must be at least 4.50 metres long and have a minimum of engine power of 88 kilowatts. This precludes the use of the compact and sub-compact vehicles that are most common on French roads. **The law's implementing decrees also raise the level of driver training to 250 hours of paid courses (not required of taxi drivers) that nonetheless do not culminate in a test of that knowledge.** Because of the investment in time and money (approximately EUR 5 000) required for these courses, this requirement effectively limits the number of unemployed who might otherwise seek employment as PHV drivers.

The Thévenoud law reiterates the requirement that PHVs return immediately after each trip to the operator's premises or inside an underground car park where, incidentally, mobile phone networks work only imperfectly thus limiting the ability to redeploy vehicles with technology-based platforms. Finally, the law bans the use of the very technology that is at the heart of smartphone-based apps' very success by prohibiting PHVs "and the intermediaries that they use, informing a customer before booking / ... /, regardless of the means used, both of the location and of the availability, immediate or future of a vehicle / ... / when this vehicle is on a public road."

Source: Adapted from Darbéra (2015).

Commercial Transport Apps

Commercial transport apps (CTAs) make use of several technological developments in order to better match passengers with available for-hire vehicles². Key among these technologies are global navigation system services (like GPS), ubiquitous cellular and Wi-Fi access, mobile device-embarked sensor platforms, navigation services based on commercial or open-source digital maps, credit card processing and payment systems, pricing and dispatching algorithms, data logging and big data analytics. All of these enable clients and drivers who have downloaded the app and who are registered with the centralised platform to be put into touch with each other when the former requests a trip and the latter is nearby and accepts the request. Prospective passengers can specify their destination and can evaluate the exact or estimated fare - including any potential sur-charges for peak period travel.

Once a ride request is matched by the platform, the prospective passenger can monitor the progress of the vehicle to the pick-up point on-screen alongside the name of the driver and certain identifying features like the make of the vehicle and its license plate number. Information regarding the estimated arrival time and route is displayed in real-time to the passenger while underway and once the vehicle arrives at its destination, the passenger exits without handling any money since the platform automatically processes the payment to the driver taking a percentage of the overall fare. After the transaction, both driver and passenger rate each other and each has a reputational score associated with their profile that is visible to subsequent drivers or passengers. In addition to data regarding registered clients, drivers and vehicles, the platform also stores trip data including pick-up and drop-off locations, travel route and timing, and information on the driver providing the service as well as the passenger.

CTA fares are typically not regulated and are variable, comprising both a time and distance element, though some CTAs offer flat rates for some services. Certain CTAs apply peak period multipliers to the basic fare in

order to both modulate demand and to attract more drivers to take up service to meet peak demand. The applicable rate multiplier is communicated to customers before they complete the booking. Dynamic pricing is often capped in cases of local emergency. For example, in the United States, Uber has a national partnership with the American Red Cross to cap the multiplier during times of need and donate rides to community events like blood drives.

Uber is perhaps the best-known CTA, and certainly the best capitalised with a market valuation of over USD 60 billion in early 2016, however it is not alone. Several strong regional competitors are emerging with similar services and business models – including Lyft in the United States and Cabify in Spain and South America. In some markets, Uber faces dominant competitors as is the case with Didi Chuxing in China and Ola in India. Further, in order to gain scale and effectively compete against the current global dominant player (Uber as of 2016) competitors like Lyft are seeking international alliances with other CTAs (with Didi Chuxing, Ola and Grabtaxi) and with other firms (Lyft and GM have announced a partnership to develop self-driving CTA services, among other objectives). The current CTA ecosystem is also set to evolve over time since the basic value proposition for CTA services rests on technologies that are broadly available to competitors and algorithms that are not prohibitively difficult to replicate. Nonetheless early success at achieving scale will benefit early movers and this may create a market share barrier difficult for new entrants to overcome.

Indeed, market success for CTAs relies on rapidly achieving sufficient scale (in terms of vehicles and drivers in each locale as well as sufficient coverage among numerous cities) to deliver attractive services in terms of reduced wait times for, and increased reactivity to, customer ride requests. The drive for scale may explain some of the practices that have characterised the early deployment of CTA services and namely the need to recruit a large number of drivers and the willingness to simultaneously act in the margins of current regulatory frameworks while seeking to change these rules. Competitive pressures amongst CTAs are strong and the early successes of some may motivate others to follow that path despite legal complications since the uncertainty regarding regulatory sanctions is greater than the certainty of loss of competitive position.

Though there are broad similarities in CTA business models, there is also considerable diversity in the types of services deployed and their local or national characteristics. The offer of CTA vehicles and service classes varies from luxury cars and sports utility vehicles, vans, to medium-sized cars with vehicle characteristics often specified by CTA platforms (e.g. vehicle age or type). In India, both Ola and Uber have deployed auto-rickshaw services though only Ola continues to do so. In the same market, Uber has pioneered cash payments for its services. CTA services are differentiated between single-party occupancy of the vehicle and services that offer in-route ride sharing amongst multiple parties (e.g. UberPool, Lyft line, Didi Chuxing Hitch).

In most markets, CTA services are provided by vetted non-professional drivers using personal vehicles while in others, CTA services are provided by fully licensed professional for-hire drivers (e.g. in France and New York City). Though CTA business models have so far precluded the employment of drivers directly by the platforms, drivers may either be independent contractors or may be employed for companies that themselves are registered with the platform and/or licensed with regulators. Insofar as they are independent contractors, drivers can set their own hours and most CTA drivers only work part-time or in fractional shifts.

An Uber-commissioned study found that in six of the largest US cities in which the service was available in 2014, over half of the drivers worked less than 15 hours a week and a majority of all drivers noted that this flexibility was one of the reasons that motivated their signing up to the platform (Hall and Krieger, 2015), although a far higher percentage of trips are served by full-time drivers. CTA drivers, because they are independent contractors and have the ability to work in fully fractional increments (they simply have to turn

the app off or on) can “multi-home” – that is, work for many CTAs simultaneously. In some cases, CTAs also bring together taxis with fully registered and regulated taxis (e.g. UberTaxi in some markets and Didi Chuxing in China).

The impact of CTA entry into for-hire markets has not been studied in a broad and harmonised manner. Some cities have tried to evaluate the impacts on incumbents and on traffic (San Francisco and New York), though many have not. In some cities CTAs outnumber taxis (as in the case of San Francisco), a likely outcome where CTAs operate and where taxi supply is limited by regulators³. San Francisco estimates that CTAs account for slightly more than double the number of daily trips taken by taxis in 2014 (SFMTA, 2016) though there is anecdotal evidence that the deployment of smartphone apps for taxis in San Francisco has resulted in an uptick in the number of taxi licenses since some drivers perceive that they may earn higher hourly wages with taxis than for CTAs in that city. And the deployment of taxi apps now allow taxis to compete on more even footing with CTAs in San Francisco (Wells, 2015).

Though it seems that the arrival of CTAs would naturally lead to a direct substitution of taxi trips by CTA trips, this isn’t necessarily the case as many CTA trips (or taxi smartphone app trips) may be additional to those currently taken today (e.g. the CTA trip would not have otherwise occurred). There is as of yet no broad international consensus on CTA-taxi substitution effects but these are likely to be highly context-specific when they exist. But there is some evidence that CTAs meet untapped demand for for-hire trips. A recent study undertaken in New Orleans found that the arrival of CTAs did not significantly erode the taxi customer base but, rather, increased the overall size of the for-hire market in that city (City of New Orleans, 2016). **The report found that CTAs “provided approximately one million new trips that otherwise may not have occurred by meeting an untapped consumer demand for a different type of ridership experience”.** **The report also found** that taxi revenues continued to show increases in 2013, 2014, and 2015 despite the presence of CTAs in the market, partly due to changes in the fare structure for taxis.

There is also concern that CTA’s may erode public transport market shares. Again, broad international evidence is lacking but there are indications that, at least in some markets, CTAs complement public transport rather than detract from it. A recent study by the American Public Transportation Association for the United States found that people who use public transport and CTAs drive less, walk more, and report lower household vehicle ownership (APTA, 2016). Of course there may be directional effects at play – those without cars naturally use other modes more but the use of CTAs doesn’t necessarily lead to giving up a car. However it seems plausible and even likely that CTAs make living without a car easier in the cities studied.

Those surveyed as part of the study reported using CTA services most frequently between 10pm and 4am, which suggests that, at least in the US cities examined, shared modes complement public transport and enhance mobility during times when these services are infrequent or not available. Understanding how and where CTAs change daily trip-making patterns is still an open research question that has led some CTAs to partner with academic researchers to better understand the mobility and other related impacts of CTAs⁴. Already though, some CTAs have started deploying quasi-public transport-like services that allow the grouping of several riders going to similar destinations (e.g. UberHop, UberCommute, Lift Line), route-based services (Uber Smart Routes) or outright commuter shuttle bus rides (Didi Chuxing shuttle buses).

There is also the issue of fiscal control of revenues generated by CTAs and their drivers. Registered CTAs and their drivers must pay taxes on revenue earned on their services (revenue derived from the fare charged to the passenger). Depending on the tax domiciliation of the CTA, taxes will be paid in the CTA domiciled jurisdiction on the revenue earned according to local tax legislation. CTA drivers, who are considered to be independent contractors (this characterisation is under judicial review in California and under legislative review in Europe), are responsible for paying taxes on the revenue they earn. Thus, the total fare charged to the passenger is subject to taxation as the CTA drivers pay taxes on their share, and

the CTA pay taxes on the service provided to the drivers. The business model for CTAs improves the tax collection on the fare charged to passengers as all revenue is tracked and traceable (split between the CTA and its drivers), contrary to the current system where cash-based transactions may allow some drivers to hide fiscal revenues.

Table 1. **Principal characteristics of for-hire service providers**

	Taxi (Street and rank)*	PHV	CTA
How do passengers search for a ride?	Passengers search for a taxi in person either on the street or at a taxi rank. May involve uncertain waiting times.	Passenger contacts the PHV dispatch service by telephone, internet or app.	Passenger turns on mobile app, geolocation is automatically detected and passenger may enter destination. Available vehicles are visible on-screen as are wait times.
How do passengers secure their ride?	Once the passenger sees a passing, available taxi, they hail it down manually. Alternatively, they walk up to the first taxi at a rank.	The passenger is informed by the dispatch service that a vehicle has been routed. Estimated arrival time may be provided.	Passenger is informed that a driver has accepted their request. Driver name, picture and vehicle identification information is provided to the passenger who can track the vehicle on-screen to the pick-up point.
How do drivers accept passengers?	Drivers are under the obligation to service all street hails and to the first walk-up passenger at a rank. Drivers may ignore street-hailing passengers citing inattention or may refuse passengers at stands if the trip is deemed not lucrative enough or if the client asks to pay by bank card.	A driver on duty responds to the dispatch request.	An available driver nearby receives an alert and accepts it under a short time window. Information about the passenger, sometimes including destination, is displayed. The passenger's reputational score is also sometimes displayed after the trip is accepted.
How do passengers gain trust in the service?	Passengers trust the regulatory process provides necessary screening of companies, vehicles and drivers.	Passengers trust that the regulatory process and company due diligence provides necessary screening of drivers and vehicles.	Passengers trust that the regulatory process, company due diligence and reputational scores ensures selection of trustworthy drivers and vehicles.
How do passengers evaluate the price of the service?	Fares are regulated and displayed. In non-regulated markets, the elements of fare calculations and their rates are communicated in a transparent manner.	Fares and fare rates are communicated to passengers who are free to choose amongst service providers.	The elements of fare calculations (time, distance and peak hour multiplier) are communicated to passengers before the booking is finalised and passengers can obtain a fare estimate. For some rides, a fixed fare is applied.
* Taxis services may also be secured by smartphone applications, in which case, except for regulated fares and service restrictions, they function similarly to CTAs Source: based on http://www.oxera.com/Latest-Thinking/Agenda/2014/Is-the-ride-right-Transportation-network-companies.aspx			

How app-based platforms change the mobility market

None in the workshop contested the popularity of CTA services. However, the discussion underscored the fact that much of the popularity of these services is linked to transactional efficiencies offered by the app-based platform – a technology that taxis can and have started to adopt. Primary efficiencies include the reduction of transaction costs, the improved allocation of resources and information and pricing efficiencies (Edelman & Geradin, 2015).

Reducing transaction costs

App-based software platforms lower the cost of finding a suitable match to complete the transaction. Specifically, platforms remove the cost of dispatchers and eliminate specialised equipment such as purpose-built radios, taximeters and credit card and credit card processors as the services provided by these can be provided via mass-produced smartphones and by centralised servers. By lowering communication costs, platforms allow more useful information to be communicated to consumers and to drivers. **App-based platforms can show a driver's face, vehicle, and license plate to a passenger, and the passenger's photo to a driver, helping both parties to recognise each other. Where a taxi passenger concerned by a delayed vehicle might have called a phone dispatcher to inquire and receive potentially inaccurate information about vehicle location, app-based platforms provide continuous real-time localisation updates, reducing the uncertainty and anxiety associated with waiting for a taxi.**

Improved allocation of resources

Software platforms also improve allocative efficiency. They enable, for instance, greater useful work by vehicles over the course of the day by better matching supply and demand. They thus promote the efficient use of resources by assuring that expensive assets remain active. Improved allocative efficiency is not just the domain of CTAs. Taxis that employ app-based platforms also achieve better allocative efficiency. What matters is the algorithmic skill in matching real-time requests for rides with available drivers alongside scale effects. A recent study found that for selected US cities, CTA drivers (therefore using app-based platforms) spent a significantly greater share of their time with passengers on board than do taxi drivers in the same markets. The same holds true for distance driven. Better algorithms, greater scale effects, inefficient regulations hampering taxis and more flexible labour supply were all cited as factors explaining **CTA's** greater occupancy performance (Cramer & Krueger, 2016).

A separate source of allocative efficiency comes from putting the same vehicle to multiple uses. A driver can use a vehicle for personal obligations at some times of day, then for business at other times. CTA business models that encourage part-time drivers to log on during periods of peak demand improve this aspect of allocative efficiency. Relatedly, drivers avoid a commute, by personal vehicle or public transit, to pick up a dedicated vehicle from a depot. Instead, a driver can begin service from home or any other location. This reduces commuting time and costs for the driver, increases service availability to customers, and might lessen congestion.

The replacement of advance bookings with real-time adjustments also offers potential efficiencies. Previously, a driver had to decline a booking too close to a future commitment, but on-demand platforms allow for continuous adjustments. Scale effects reduce latency in handling these requests. Similarly, where a driver previously had to drive without a passenger to a predetermined origin for a prescheduled next journey, app-based platforms now accommodate drivers in any location. These improvements facilitate greater utilisation of vehicles, including less time driving without a passenger (saving time and fuel), and less time waiting, both of which can reduce prices to consumers while maintaining payment to drivers.

By leveraging the benefits of efficient algorithms and concentrated computational power, software platforms are also able to offer services that would otherwise be unworkable. These advances allow CTAs to coordinate the pick-up, shared ride and drop-off of multiple unrelated parties with minimal time penalties (e.g. for UberPool and Lyft Line services). It is difficult to imagine radio dispatchers collecting and organising sufficient data about customer requirements and vehicle locations to offer a similar service.

Information efficiencies, reputations, and accountability

Information efficiencies help make the improved allocation decisions outlined above, as well as uncovering and discouraging unwanted participants and behaviour. In the case of for-hire services, a first type of information efficiency comes from dispatching the optimal vehicle. Historically, radio dispatchers asked drivers, one by one, to report their availability and location and later to signal automatically the zone in which they are operating. **App-based platforms can collect this information from drivers' smartphones** instantaneously and automatically, making it easy to dispatch the nearest driver. Software platforms thus offer a major improvement in the dispatch task, improving both speed and accuracy, with a process that is recognised as fair by the drivers.

In addition, app-based platforms, especially those deployed by CTAs, collect and process information to better assess drivers and passengers. Passengers evaluate driver courtesy and vehicle condition—serving both to collect information for platform operators and to deter opportunistic driver behaviour. Notably, these methods collect information that is otherwise difficult to observe both because it is decentralised (in numerous geographic locations) and because service providers have every incentive to conceal low-quality activities. In contrast, platforms can easily ask customers about the experiences they just completed, and collect information about most or all transactions rather than the few checked by a random inspection. With this information, platforms can eliminate low-quality service providers and target others for remediation.

Platforms can use similar systems to assess customers. If a passenger is boisterous or unhygienic, **platforms can issue a warning, alert future service providers, or even disable the customer's account.** This approach to screening passengers is surely better than a driver denying service to clients on sight or because of short distance of the ride or the neighbourhood where they are located. Reputation-based systems seem to serve their intended purpose. In many markets, passengers report a higher level of courtesy from CTA drivers than from taxicabs - an outcome which is probably not surprising in light of available incentives and remedies. A passenger dissatisfied with a taxi driver hailed on the street could attempt to note the medallion number or license plate number of the taxi, then try to lodge a complaint with a fleet owner or local regulator - but many passengers do not, anticipating that such complaints usually have limited effect and are difficult to submit. Submitting a negative assessment to an app-based platform is both easier and, it seems, significantly more likely to yield a tractable record and response.

Software platforms potentially increase accountability by blocking certain opportunistic behaviour as well. For example, some taxi drivers report that telephone dispatchers direct preferred rides to drivers who pay bribes. This would be much less likely to occur with the algorithms supporting smartphone app-based services.

App-based platforms: blurring consumer and regulatory lines

From a consumer perspective and for a similar level of quality, there is little real difference in the effective service provided by taxis, PHVs and CTAs - **namely; "how to get from where I am to where I need to go, at the time I need to go and with a service I trust"**. However, the accountability features of smartphone applications help ensure service quality for passengers using the platform just as they improve service quality amongst alternative services by instilling healthy competition. While consumers may be indifferent to high quality service provided by taxis, PHVs and CTAs, the mode of securing a ride seems to matter a lot

to many consumers. Platform-based services provide greater transparency and certainty than traditional modes of access – including radio-dispatch taxis. And CTA services provide flexibility and value to drivers.

The arrival of app-based ride-sourcing platforms continues to blur the lines between dispatch taxi services and other for-hire passenger services that started with phone and then radio dispatch and later, computerised, GPS-based systems that function much like CTA systems once the ride request is received. At the same time, access modes to for-hire services have evolved in many markets and service quality improvements have been delivered to consumers via new market entrants and innovation amongst some incumbents. Though CTA platforms have met the greatest commercial success to date, some taxi firms have and continue to develop smartphone hailing applications - Taxi Magic being one of the oldest smartphone apps for taxis. The International Road Transport Union (IRU) federates many of these initiatives through the IRU Global Taxi Network (UpTop).

The confluence of all of these changes begs the question of why and when should existing regulatory distinctions remain in place? Arguably some should, but the conflation of separate for-hire markets offers an opportunity to re-think how these services can and should be regulated to better reflect current realities. In undertaking this exercise, however, there is a real risk to regulate to the lowest common denominator and to miss out on opportunities for real regulatory reform and innovation better able to deliver on public policy outcomes than the current set of rules. This should be avoided.

3. Regulating for-hire transport services

Much of the regulatory and social tension surrounding the deployment of CTA services relates to the fact that they do not comply with rules put in place to regulate taxi and PHV services. CTAs argue that their role is limited to being a technical intermediary putting drivers and passengers in touch with each other. This view may be supported by the fact that CTA platforms own no vehicles and employ no drivers. Incumbents and some regulators often take the opposite view that CTAs are service providers that directly compete with some parts of the taxi and PHV markets but without the constraints regulation imposes on the latter. It could be claimed that CTAs are thus unfairly, and some say, illegally competing with taxis and PHVs.

In this context, it is often easy to slip into a very superficial treatment of the questions at hand and focus on the specific instances where rules are being contravened without questioning the rationale motivating **neither these rules nor their applicability to CTAs. This is ultimately an unhelpful exercise as it doesn't allow** for the emergence of a different, and perhaps better designed regulatory framework addressing the innovations that CTAs bring. In accordance, workshop participants were urged to first focus on principles that should apply to the for-hire sector generally, and then where specific rules may still be necessary, what these might look like for each subsector. Much of the discussion revolved around the rules relating to taxi services and CTAs, less to those relating to PHVs.

Motivations for current regulatory regimes

There is no single regulatory model for the taxi sector though there are many shared features in similar jurisdictions. The workshop focused on four of these, namely: public safety rules, market entry conditions, service requirements and fares.

Public safety rules

These are rules that allow passengers to trust taxi drivers and vehicles and, in some cases, protect drivers against criminal action by passengers. These include checking drivers for criminal backgrounds, ensuring sufficient training and checking that vehicles meet safety standards. Few participants at the workshop questioned whether this should be a continued area of regulatory attention but opinions diverged on the manner in which public safety guarantees are delivered.

For-hire transport requires that strangers share vehicles. Drivers must allow unknown passengers into their vehicle and passengers must trust that drivers will not assault, harm or cheat them. The typical mechanisms for building trust between both parties have largely rested on vetting drivers, not passengers. Taxi drivers generally undergo background criminal checks and must provide proof of driver competence or training – especially since they will be driving much more than the typical citizen. In some jurisdictions, however, the licensing process for taxi drivers is weak or has been co-opted leading to a situation where taking a taxi can be unsafe. Examples of insufficient or absent driver vetting were given from both the Philippines and Mexico City at the workshop. In the case of the former, CTA vetting processes are more robust than those in place for taxis thus leading to safer and higher-quality services than most taxis. In the case of Mexico City, no background check effectively existed for taxis.

In many other jurisdictions, taxi drivers must submit to robust criminal background checks that may involve a higher level of scrutiny than those carried out by some CTAs. CTAs argue, however, that their background checks are equivalent, or better, than those carried out by taxis, especially when combined with the detailed, automatic and easily accessible logging of driver and trip details. Imposing stricter controls, they argue, may keep occasional drivers from signing up and this would be a loss to CTAs since many of their drivers are non-professional (in those markets where this is allowed) and work only part-time. At the same

time, restricting access to app-based platforms would also represent a loss to the drivers themselves who value the flexible working conditions the platforms allow. The workshop discussions revealed a clear **preference for a “workable” vetting framework for occasional drivers on the part of the CTAs and stronger taxi-like vetting procedures** on the part of some regulators. It also seems that the reputational score given to both drivers and passengers using CTA platforms is an equally strong, additional trust-building and traceability-enhancing innovation. Crucially, however, in the case of CTA services, and some taxi app-based platform services, both the rider and driver are fully identified, thus establishing accountability and an ongoing deterrent effect largely absent from non-platform-based taxi services.

Another part of the discussion highlighted the need to track hours worked by drivers in order to ensure that they do not become too fatigued to drive safely. This is especially important in the case of multi-homing drivers and those working other jobs. In the case of the former, a single and portable driver registration number could be sufficient to track how long a driver works but the group noted the issue of controlling for overall working time across sectors and activities was much more problematic. It could be that closer monitoring of vehicles (or drivers in vehicles) could lead to the early detection of behaviour betraying drowsiness which, it was suggested, is primarily what regulators should be concerned about. Drowsiness is the determinant factor in crashes though the correlation between the actual number of hours worked and risky driving is strong.

In terms of driver safety, it seems clear that cashless transactions greatly reduce the incentive for violent robbery. CTAs generally operate on a cashless basis as do some other smartphone apps services. However, many people do not have access to bank accounts or credit cards (which are necessary for registering with CTAs or other app-based services) and thus may still require cash transactions. This may be the case now, but it was pointed out that multiple alternative payment techniques for the bankless existed – including top-up cards that can be filled at using cash payments at convenience stores or other commerce. It could very well be in the mid-term, and in order to provide driver safety and transaction traceability, cashless payments could become the norm for all for-hire services.

Vehicle safety inspections are another part of the public safety regulations faced by taxis and other for-hire services. In some jurisdictions these are more rigorous for taxis (e.g. New York, London, San Francisco) and in others more rigorous for CTAs (e.g. Philippines). Participants generally felt that vehicle safety inspections and condition specification (primarily age restrictions) should still very much be part of the regulatory landscape. Participants diverged on the level of safety inspections that should be required for occasional, part-time drivers using their own personal vehicle with some expressing the view that current vehicle inspection regimes for individual drivers should be sufficient. In addition, it was pointed out that ultimately, operators and CTA platforms could directly access on-board diagnostic systems in order to ascertain, in real time, the condition of the vehicle obviating the need for periodic dedicated vehicle inspections. One other point raised was that vehicle safety inspections, either real or virtual, should become more frequent as vehicle use increases (e.g. as drivers work more). The data logged by CTAs and taxi app-based platforms could help determine the frequency and stringency of vehicle inspections. A car operating three hours a week on a CTA platform would likely require no more than existing vehicle inspections – a car operating 40 hours per week should be subject to stricter and more frequent controls.

Insurance

Taxis, CTAs and other for-hire service providers must typically provide adequate levels of insurance such that costs related to crashes and other mishaps are not borne by the public. Taxis and traditional forms of for-hire transport providers typically subscribe to commercial policies that take into account the higher exposure in terms of kilometres driven, and potentially lower per-kilometre risk of having professional drivers at the wheel. These insurance policies are crafted specifically for the industry and can be onerous compared to personal liability and crash insurance policies.

There is a move towards graduated insurance schemes for CTA services that default to personal policies when the vehicle is used for personal travel. When a CTA driver logs on to the platform and while waiting for a ride, commercial insurance kicks in. Once the ride is booked and is being carried out, a higher level of coverage is provided. These graduated insurance schemes are made possible because of the extensive data collected by CTAs. The workshop discussions revealed no consensus on who should contract coverage for insuring working hours but this question may be moot as several of the largest CTAs have started offering commercial insurance coverage for drivers using their platforms and in some markets, in the United States in particular, the issue is settled with legislation requiring the CTA to provide coverage if the driver doesn't buy a CTA specific policy. In markets where uniform coverage levels do not exist the question of disparities in coverage between platforms that could come into play when drivers multi-home.

Market entry restrictions and controls

Market entry restrictions were typically motivated by the oversupply of relatively unskilled workers to the taxi industry, especially in times of economic duress. This led to a number of problems in the hail/rank market that included too many taxis plying for passengers in certain popular parts of the city, violent altercations as a result of efforts to secure rides or to eliminate competitors, and undersupply of significant dispatch service where the probability of getting a fare for the driver was low.

There are four broad types of regulatory regimes controlling market access for taxis (Schaller in TRB, 2016). In the first regime, authorities issue a set number of permits (or medallions) as determined through regulation or by law. Only permit holders are allowed to operate street hail services and in some cases, dispatch services. When these permits are tradeable, their value is in line with available supply for a given demand. In growing cities with rigid permit allocations, this value can be considerable and represents an investment by permit holders who have expectations on the long-term rate of return on these. For individual permit holders, the value of the permit may serve as a pension account whereas for operators, these medallions represent high-yield investments.

In the second regime, certificate systems, companies receive operating authority to provide taxi services, typically conditioned to a specific number of vehicles that are authorised to operate. Companies may petition authorities for a change in the number of authorised vehicles and these are approved or rejected based on specific criteria. Certificates cannot be traded amongst companies but taxi companies can be bought and sold opening the door to creating a secondary market for certificate-holding companies.

In franchise systems, under a competitive bidding process, a franchise is granted for a set time period allowing the holder to operate taxi services in a specific geographic area. Franchises include specifications regarding how many taxis are allowed to operate and when their term expires, they are put to re-bid. Franchise regimes prevent pickups from other taxi operators in the franchise zone but allow drop-offs which leads to unbalanced trips for those entering the zone from the exterior.

With open entry regimes, the fourth regime, no limit is placed on the number of taxis operating in the jurisdiction. Individual drivers and/or operators meeting requirements (e.g. insurance, training, security checks, and vehicle inspection) can enter and leave the market freely.

Other market-entry models exist as well. One of the most well-known is that of London where there are no quantitative market entry restrictions for Black Cabs but where the entry is conditional on passing the **gruelling "Knowledge" test covering the minutiae of London street networks and routes. This test, requiring many years to study for, has naturally limited market entry for taxi services.**

The first three market entry frameworks above sought to address and limit the negative impacts of market over-supply and "destructive" competition which is documented for the hail/rank market. In many cases they were implemented with the express goal of protecting the rent of licence owners. In those cases, **drivers' income is maintained only when the driver owns** the personal vehicle medallion. In many cases

they have been maintained or strengthened expressly to limit competition from new entrants or to maintain high returns to incumbents.

Arguments in support of maintaining entry controls to for-hire markets have regularly been revisited in light of consumer welfare protection and competition policy reform. As noted above, entry controls are motivated by a number of concerns which are worth re-visiting in light of the arrival of new technologies and technology-enabled app platforms.

Impacts on productivity

The crowding of markets in excess of demand described above occurs partly because there are very low fixed costs associated with adding cars to for-hire services. This would certainly be a problem if those costs are **“sunk” in the sense that they are immobilised once the market entry decision is taken. However, the capital value of for-hire assets (e.g. cars) are not “sunk” in the sense that they can be resold relatively easily on secondary markets.** This is certainly less the case for operators of dispatch centres who invest in specialised equipment that is less mobile. So while there may be, and have been, gluts in supply with unregulated for-hire markets – there seems to be little empirical evidence that these are durable and do not adjust themselves over time absent interventionist regulation (OECD, 2015). Further, some in the workshop pointed out that the type of data that is increasingly being logged by operators could be used to modulate supply in a much more precise fashion and possibly even in real time.

One general principle to guide regulatory reform efforts is that those arguing for a departure from free-market entry conditions have the onus of providing sufficient evidence that this deviation provides markedly better outcomes. The workshop discussions revealed that no matter what the original motivations for imposing market entry conditions, these should be re-evaluated in light of new technologies deployed by app platforms.

Impacts on congestion and pollution

Many of those opposed to decreasing market entry barriers for taxi and other for-hire services (especially for CTAs) cite concern regarding increases in congestion, energy use and pollution caused by too many vehicles cruising for passengers – particularly at busy times of day and in popular locations. This argument is often supported by anecdotal evidence of cruising behaviour and empirical evidence of the high share of empty kilometres driven in search of passengers. However, many participants pointed out that there is little robust evidence supporting the finding that in aggregate, congestion and external environmental impacts are lessened by having market entry controls. Indeed, an artificially low density of for-hire vehicles may lead to increased car ownership and use. Furthermore, while it is true that traditional taxi services exhibit a **large share of “empty” kilometres** and display cruising behaviour, app-dispatched taxis and CTAs are much **more efficient in matching demand and have a much lower proportion of “empty” kilometres.**

The most recent study on the impacts of CTAs on traffic commissioned by the City of New York and released in January, 2016, finds that CTAs have not driven an increase in congestion and though they might contribute to some congestion in the future (particularly if they lead to a switch from public transport trips), this impact is likely small and difficult to **separate from the “noise” (see Box 2).**

In any case, participants pointed out that the share of overall vehicle kilometres travelled by for-hire services was extremely small compared to overall vehicle kilometres travelled by cars in cities. It therefore made little sense to put in place specific policies targeting the marginal impacts of for-hire kilometres travelled without first addressing overall impacts of all car travel except in those cases where specific impacts in time and place were attributable to for-hire services. Some participants again pointed out that trip logging data could help target measures specifically to those kilometres and those contexts.

Distributional impacts

Another of the motivating factors for restricting market entry is that this type of intervention purportedly protects the welfare of drivers against unreasonably low remuneration and highly cyclical employment cycles. As noted above, this may be the case - but that a market characterised by low entry costs and mobile capital would face such cyclicity is not unique to for-hire services. Justification to treat this sector differently from others facing similar conditions should be justified on empirical, not theoretical grounds. This line of analysis should encompass the welfare losses that may also be imposed on passengers and society at large from misaligned supply-demand ratios embedded in fixed caps.

Participants also pointed out that while drivers that are owner-operators of their taxis benefit directly from stable and elevated remuneration levels, many taxi drivers in numerous markets are either salaried or do not own the license associated with their vehicle and therefore must pay license-holders for the “right” to ply their trade. CTA drivers may earn more in those cases since the platform only retains a set percentage of overall fares, whereas non-owner taxi drivers must pay a fixed daily price to use the license, although recent fare cuts by CTAs in the United States have given rise to bitter driver complaints.

Furthermore, where licenses are traded and market entry is restricted, the future value of the license or medallion will fluctuate with overall demand. Thus, in a growing urban area, medallion/licence values have grown tremendously. The entry of CTAs and, to a certain extent, PHVs into these markets has either moderated the increase in licence values or led to an erosion of the cost of a license. This may be seen as a loss to license holders but it is unclear if this is a loss to be compensated by public authorities since the market for licenses is like any other speculative market and therefore subject to forward risk. Participants also pointed out that drivers and license holders are often not the same. In instances where commercial entities or holdings purchase and speculatively trade in licenses, drivers are not impacted directly if license values fluctuate. Indeed, if license values decrease under pressure from new entrants, then the fixed daily price paid by drivers for operating a licensed taxi may decrease as well over time. There are some instances where owner-operators may invest in a medallion as a proxy and provision for retirement savings. If this is the case and drivers are not availed social security protection in countries that guarantee universal coverage, authorities may need to assess what compensatory steps may be required.

Impacts on service quality

A final line of argumentation for those supporting market entry restrictions is that relaxing these would lead to declining levels of service and vehicle standards. With open entry, numerous, ostensibly less-trained, drivers would flood the market with vehicles of declining quality (since remuneration levels may decrease, drivers may be less willing to maintain their vehicles or invest in quality and cleanliness). This line of argumentation fails to separate market entry restrictions and service quality requirements. The former can be relaxed while maintaining the latter. Indeed, this is what has occurred in many cases with PHVs and seems to be the preferred strategy with those jurisdictions opening markets to CTAs. Participants also pointed out that consumers often judge CTA service quality to be better than taxi service quality in many (but not all) markets.

Box 2: Findings from New York City’s For-hire Transportation Study

Faced with concern about the potential impact of platform-based for-hire services on traffic, emissions, safety, revenue and other impacts on the city, the City of New York commissioned a study to better understand these impacts. The study was released in January 2016 and its main findings are summarised below (City of New York, 2016).

According to the City’s analysis, several factors have contributed to the recently observed drop in Manhattan central business district (CBD) travel speeds by taxis and buses, affecting practical vehicular roadway capacity and how it is used. Population and job growth, increased construction activity, growth in the number of deliveries, and record levels of tourism have all contributed to the reductions in vehicle speeds.

E-dispatch is a contributor to overall congestion, but did not drive the recent increase in congestion in the CBD. Vehicles of all types play a role in congestion in the CBD. The number of trips by all vehicle types in the CBD remained flat between 2014 and 2015 as increases in transit ridership offset increases in trip demand driven by growth. Increases in e-dispatch trips are largely substituting for yellow taxi trips in the CBD. Because these e-dispatch trips are substitutions and not new trips, they are not increasing vehicle miles travelled (VMT). Additionally, there is no clear evidence to suggest decisive capacity effects driven specifically by e-dispatch pick-up, drop-off, and parking behaviours in the period. Therefore, e-dispatch does not appear to be driving the additional congestion experienced in the CBD.

In addition to looking at congestion in the CBD as a whole, the study also briefly examined the impact changes in the for-hire vehicle sector (PHV – encompassing taxis, PHV and CTAs) could have at the micro level. Within the CBD, over the next five years, there are likely to be modest declines in vehicle speed. However, small macro-level changes may drive significant delays at discrete points. For example, if the growth in the for-hire vehicle sector is due to net new car trips, then high-traffic intersections could see significant increases in vehicular congestion.

The impact of e-dispatch vehicles on congestion in the CBD may change in the future. If rapid e-dispatch growth were to reduce public transit trips, there would be additional modest growth in congestion across the CBD due to for-hire vehicles. Given that much of the growth seems to be growth in e-dispatch, these scenarios show modest growth in the CBD as a whole, even with significant growth in other car modes.

While yellow taxi trips have declined over the study period, patterns of yellow taxi utilisation have not changed. Since the arrival of e-dispatch apps, the ratio of yellow taxi vehicle miles travelled with the meter engaged to yellow taxi vehicle miles travelled without a passenger has remained constant, with metered travel representing approximately 54% of taxi vehicle miles travelled.

Ride-sharing – a carpool service operated by e-dispatch and other providers – may have inadvertent, detrimental impacts on congestion. It is gaining momentum in New York City and in cities around the country. More and more e-dispatch providers are adding this feature to their menu of services for their customers’ **convenience, as** ridesharing works the same as other e-dispatch services, but offers cheaper individual rides. Though this service may provide some benefit for consumers individually, the effects on congestion vary depending on which pool of consumers ride-sharing pulls from. Ride-sharing could have a substantial impact in reducing vehicle miles travelled, but only if many consumers change from other car-based modes and few riders switch from public transit. The congestion mitigation of an 11-13% switch in yellow taxi and e-dispatch trips over to ride-sharing would be completely offset if less than 1% of public transit riders also switched to ride-sharing.

As e-dispatch continues to grow, the percentage of accessible for-hire vehicles will drop. Yellow and green taxi fleets, which are subject to accessible vehicle requirements, are losing their supply of willing drivers to e-dispatch services. E-dispatched cars are not accessible to many people with disabilities including vision and hearing loss, or people using non-folding wheelchairs. As more e-dispatch vehicles are added to the road, the number of accessible yellow and green taxis becomes a smaller and smaller percentage of all for-hire vehicles – even without the drop in supply of yellow and green taxi drivers that the City is beginning to experience.

The shift to e-dispatch will create a revenue shortfall for key transportation priorities. Every e-dispatch trip taken in place of a yellow or green taxi diverts revenue from measures to fund an accessible fleet and support New York **City’s subway and bus system even though** for-hire platforms pay fees/taxes to the city. Without regulatory intervention, the growth of e-dispatch services will have lasting impact on this important source of support for public transit and accessible vehicles.

Geographic restrictions

In traditional open taxi markets, drivers congregate where they know there is a high likelihood of finding remunerative rides. This typically leads to concentration and over-supply of taxis at major ride-generating points in the city including central business districts, airports, rail stations and hotel-dense zones. Conversely, other parts of the city may be under-served by drivers who would wish to avoid short trips, trips in and to less desirable neighbourhoods or to provide trips for which there is little likelihood of getting a return fare. For all of these reasons, and in order to ensure an adequate level of service coverage in licence-issuing jurisdictions, permissions to operate taxi services are typically conditioned by rules on the geographic scope of pick-ups and on service obligations within the license issuing jurisdiction. This ensures adequate coverage in many cases and a certain expectation that service quality in terms of availability is roughly maintained. The expectation is that highly remunerative trips would cross-subsidise low remuneration trips while delivering coverage that in the absence of geographic restrictions would either decline or disappear in low density areas and in off-peak hours (TRB, 2016).

Fare regulation

Fare regulation was motivated by the desire to prevent price gouging by operators in the street hail market due to the natural asymmetry of information regarding the availability supply and uncertainty regarding potential competitors' fares. Fare regulations also provide certainty to passengers on what they will be charged.

One major difference between many regulated taxi markets and CTAs is the **latter's** use of yield management tools to balance supply and demand. In many other markets characterised by uneven demand and relatively fixed supply, changes in prices are used to modulate demand for the service. This is the case for instance with airlines, some rail services and electricity. Many CTAs incorporate this approach in their business model (e.g. Uber's "Surge" or Lyft's "Prime time" pricing models) so as to ensure demand fits available supply, but also to ensure that supply is incentivised to come online when it is most needed.

This supply responsiveness is made possible by the flexibility of CTA labour pools – because many drivers are part-time and set their own hours, supply is fractional and can flexibly meet demand when peak pricing entices drivers to turn on their app. Some have countered that surges in prices can be excessive (as in the case of emergencies and exceptional events) and that these pricing models allow CTAs to extract quasi-monopolistic rents. This is a contestable assertion since other services (public transport, own vehicle, etc.) are often also available and that, over the long run, the app platform market is not a closed one with the only real barrier to entry being achieving sufficient scale to disrupt incumbent CTAs.

Some jurisdictions have nonetheless sought to limit variable pricing in cases of natural or man-made emergencies. For example, in response to surge pricing during Hurricane Sandy, Uber has reached an agreement with the New York Attorney General to cap price increases at 3.5 times the base fare for UberX and 2.5 times the base price for Uber Black when a state of emergency has been declared. This cap policy, according to Uber, is now operative throughout the United States. Outside of emergencies, surge pricing can lead to very high multipliers (historically up to approximately 10 times the base fare)⁵ and is now used a competitive differentiator amongst CTAs. In the United States, Uber caps its surge multiplier at eight times the base fare and Lyft caps its Prime Time multiplier at three times the base fare⁶.

Traditional taxi regulation: Impacts on service quality

Together, market entry restrictions, geographic limitations and fare regulation have characterised street hail markets and have proven not only to be durable but highly immutable parts of the for-hire regulatory package for taxi operations. Market entry restrictions have proven to be especially difficult to change and many cities (e.g. Paris, New York, Boston Chicago, London) have gone decades without adapting the

volume of taxis allowed to operate (or the market entry tests imposed – e.g. in the case of London) despite significant growth of resident population and visitors. Cities such as New York and Chicago, however, have substantially increased their cab fleets in recent years.

All of these measures were put into place in order to address real and vexatious problems faced by municipalities seeking to ensure a stable offer of for-hire transport services. However, these types of interventions have also introduced inefficiencies and rigidities into the markets they seek to regulate leading to several unwanted outcomes. The first of these is that rigid supply, especially in areas experiencing population growth, leads to shortages and unmet demand. Even passengers willing to pay for a ride cannot get one because vehicles are simply not available and/or drivers are prevented from charging fares that would make provision of that service worthwhile to them (TRB, 2016). Other rigidities include restrictions on the type of service allowed – for instance, many jurisdictions prevent taxis from providing simultaneous services to multiple passengers – e.g. ride-sharing – under the belief that this would lead to a loss of trips for other drivers. Even in jurisdictions where universal service requirements exist, there is consistent evidence in some markets that drivers simply by-pass these and underserve certain areas of the city or population groups (TRB, 2016).

Shortages and other market inefficiencies lead to higher rents than would otherwise exist and these are captured by incumbents – to be clear consumers are paying artificially inflated prices, with regressive effects. Because of this, there is considerable pressure by incumbents in many markets to maintain market entry restrictions and other measures that allow them to profit from a lasting and contrived supply-demand imbalance. It is in this economic and regulatory context that CTAs have taken hold and have experienced extremely high growth rates indicating a great unmet demand for travel of the quality and price that platform-based operators provide.

Traditional taxi regulation: Impacts on other operators

The dispatch market and other pre-booked ride markets have typically, but not always, been treated separately from the street-hail market and have typically faced less burdensome regulation. This is because the information asymmetries are lower for this market and fares can be negotiated ahead of time by both parties, either of which can seek alternative suppliers or riders. However, the dispatch market is characterised by higher barriers to entry. These include investments in centralised dispatch services and the concomitant investment in the fleet of vehicles to be dispatched since dispatch markets, unlike street hail markets, are often serviced by operator-owned fleets.

Against the backdrop of a relatively stable market that in many areas delivered high rents to incumbent operators and relatively low levels of overall passenger service (as described above), the arrival of app-enabled demand-responsive mobility services and platforms has disrupted the taxi industry and regulators. One of the reasons for the success of CTAs is that they have been able to reduce the inherent tension between information costs and entry barriers that have proven to be persistent in taxi markets. At the same time, they have deployed business models that have fundamentally changed the way in which for-hire services are offered.

By combining the virtual immediacy of the app-based dispatch with access to a wide range of drivers nearby, CTAs are able to provide transparency in vehicle locations and much shorter waits for a vehicle than is typically true with taxicabs. They have rapidly scaled up, and offered lower fares than cabs, via a business model that removes or shifts many of the upfront costs away from the platform-based CTA operator. For example, the costs associated with staffing and operating a centralised dispatching centre are eliminated and replaced by lines of code in the algorithms that put passengers and drivers in direct contact with each other. The up-front capital costs of acquiring and maintaining a fleet of vehicles is shifted to the drivers/"contractors" who bear sole responsibility for these. This last feature is not unique to CTAs nor is it

novel, having been a long common practice for independent owner-operators in for-hire transportation. In return, CTA drivers pay only a fixed percentage of the fare to the platform and face no fixed platform access costs unlike non-owner taxi drivers who face high fixed costs associated with dispatch centre affiliation and vehicle costs.

App-based platforms also diminish information costs and uncertainty between passengers, drivers and operators. Verified and tractable information on the identity and reputation of both drivers and passengers ensures a high level of transactional trust and also ensures robust recourse in case of dispute resolution amongst the parties to the transaction. It also increases the security of both the driver and the passenger by eliminating anonymity. When customers open the apps, they have a transparent view of current market supply. They see how many drivers are nearby and, once a driver has been booked, customers are provided with regular updates as to the time to pick-up and then, once on board, the estimated time to drop-off. Many apps also provide estimated fares based on real-time traffic conditions. All of these benefits accrue to passengers irrespective of whether the app connects to a CTA platform or to a taxi-based platform. But CTAs and taxis face different requirements and the former typically benefit from lower levels of regulation much like most pre-reserved dispatch services. In particular CTAs are almost never subject to the price and quantity controls described above, unlike street hail taxis and some dispatch services. In some cases, however, like in many US cities, they do face analogous geographic coverage requirements.

This discrepancy raises an important question for regulators – should CTA regulations be hardened and extended or, rather, should certain taxi regulations be scaled back or removed? The answer to that question lies largely in the trust that authorities have regarding whether public policy objectives can be delivered with more, less or different forms of regulation for both CTAs and taxis.

Other service and quality requirements

Many jurisdictions impose numerous other conditions on the provision of for-hire services. These include provisions regarding to driver training and qualifications, driver background checks, insurance coverage and vehicle safety inspections. These are required because they deliver clear public and social benefits. However, some of these rules were put into place in a very different time and context and may no longer deliver the benefits they once did – especially as technology has progressed. When these rules are not re-assessed, or unnecessarily restrictive rules are imposed, they in essence become indirect barriers to entry. This may be seen as the case with the requirement that drivers undergo unnecessarily extensive and onerous training (up to 250 hours in France, or retaining the gruelling London "Knowledge" test in the face of GPS navigation).

CTAs have argued that overly complex and burdensome requirements that are neither aligned with public policy objectives nor with the real risks posed by for-hire operation unfairly impact their ability to compete. This is especially true since many of the drivers affiliated with their platforms only provide services on a part-time basis and may be dissuaded from joining the platform if complying with rules requires a significant investment in time and effort. Another issue is that the way in which these rules are crafted and the way in which compliance with them is ensured by authorities remains very top-down, prescriptive and rarely leverages new compliance pathways – particularly those that make use of new technologies.

Authorities may also wish to ensure that for-hire services are available to the broadest representation of society, including those that have mobility or other impairments. This is especially the case since these impairments may prevent people from driving a car and limit their ability to use public transport. In many instances, taxis provide essential transport services for these people. For this reason, many jurisdictions either require service or incentivise service provision for those with impairments (e.g. through minimum fleet requirements for accessible vehicles, training requirements for drivers and incentives or subsidies for the carriage of mobility or otherwise impaired passengers). CTAs at present rarely face such constraints and

have typically argued that since they are not fleet operators, they should not be required to ensure fleet-based accessibility quotas.

However, insofar as CTAs successfully put pressure on taxi fleets that do face such requirements, the net effect may be a decrease in accessible taxi services and an erosion of service quality for the population requiring such services. Some cities provide alternative adapted para-transit services and provide support for these through social service or social security payments but where this isn't the case, mobility options for the impaired may indeed decline. A fundamental question here for regulators is whether these services should be required of CTAs as they are of many taxis or if alternative delivery methods, such as contracted dedicated fleets, make economic and social sense. In the former case, authorities could require that CTAs enrol a certain number of accessible vehicles or, alternatively, CTAs could seek to attract sufficient numbers of these vehicles to the app platform by adjusting remuneration rates for those drivers. In that case, it remains to be seen who bears the cost of the additional fare increment; the CTA, the rider or the public authorities?

4. Regulatory principles to guide for-hire passenger transport

The Chair, in his opening statements pointed out that there is a long history of regulatory reform in a number of sectors. Historically, reforms were motivated by the realisation that insufficient regulation exists to guide outcomes towards those that are deemed socially desirable. After regulations accrued and often calcified over many decades, new reform efforts were motivated by the converse – the realisation that regulation has evolved in such a way that it leads to regressive outcomes or that the context that originally motivated regulation has evolved while the regulatory framework has not lead to calcified rules that no longer reflect current realities. Another outcome brought up by participants but also supported in the broad research on for-hire transport – and of taxis in particular – is that regulatory bodies, processes and the ensuing rules can be captured by interests representing those of the incumbents.

In the discussion it became apparent that across the broad range of examples cited, all four of these could be said to be true in some measure and sometimes simultaneously when discussing for-hire transport. There can be too little regulation for some players – especially new entrants such as CTAs – the regulation can be said to have been captured by incumbents and now leads to regressive outcomes and, finally, many regulatory frameworks are simply out of phase with current realities – especially regarding the efficiencies that technology adopted by app-based platforms delivers. In the discussions, it seemed that many participants had a balanced view of where reform efforts should be directed. In some instances, taxis are likely too regulated – especially when it comes to market entry conditions – and they face too inflexible rules in other areas. On the other hand, there is a case to be made that CTAs should be more regulated than they have been in terms of public safety outcomes.

However, one of the key elements of the discussions that emerged was that as CTAs, taxis and PHVs should be regulated in broadly more similar ways than they have been in the past except in some very specific instances (e.g. the street-hail market) and even in those cases, regulation should be flexible enough to **adapt to rapidly changing conditions. It may well be that “manual” street-hails could be, for example, rendered irrelevant in the future if the penetration of mobile devices increases further still. Regulatory frameworks should not embed technological options, but rather, should remain relevant under changing conditions. Many participants noted that authorities must regulate from “where they are”, that is, they must account for current rules and practices. However, this should not be seen as an enticement to force existing regulatory frameworks onto all (incumbents and entrants).**

Ten general principles of regulation

The Chair broadly enumerated ten general principles that should guide regulation across sectors:

1. Regulation should be limited to correcting market failures.
2. Regulation should rely on the most efficient tools.
3. Regulation should be technology neutral and should not discriminate between operators in a market.
4. The impact of regulation and its relevance should be monitored and re-assessed.
5. Regulation should be adaptable.
6. There should be an adequate division of regulatory responsibility.
7. Regulation should be clear and easy to apply.
8. Regulation should be focused.
9. Regulation should be based on sound economic principles.
10. Regulation should be inclusive of all social groups.

Participants noted that, as general principles, these seemed reasonable and indeed have guided some prior reform efforts in for-hire transport (e.g. in Sweden and Denmark). One specific point not addressed in these general principles was the target of regulation. In the workshop discussions, this often came up – i.e. who should be the object of regulation? Should it be the app-based platform? The driver and/or vehicle? The owner of the licence? The dispatch centre? There seemed to be no consensus and clearly different jurisdictions have followed different strategies. The Philippines, for example, has put in place a national regulatory framework governing TNC operation (see Box 3). In this case, the principal concern of regulators was ensuring public safety outcomes linked to driver competence, driver behaviour and vehicle condition. Thus, the object of that regulation is the driver and the vehicle foremost. This particular approach is also helpful in tracking issues relating to multi-homing since drivers have unique identifiers that are portable across platforms.

Box 3: National regulations for Transportation Network Companies in the Philippines

The Philippines enacted the first national regulations governing Transportation Network Companies (TNCs) in May 2015 via the Land Transportation Franchising and Regulatory Board (LTFRB). The rules regulate TNCs separately from taxis and make the distinction between platform operators and vehicles (and the drivers) that provide services.

LTFRB Memorandum Circular No. 2015-015 defines TNCs as entities that provide “pre-arranged transportation services using an internet-based technology application or digital platform technology to connect passengers with drivers using their personal vehicles.” TNCs do not provide a transport service but, rather, facilitate transactions between passengers and those providing actual transport services. The latter, either individuals or companies, are referred to as operators of a Transportation Network Vehicle Service (TNVS) and fall under a separate circular (LTFRB Memorandum Circular No. 2015-017).

TNCs must obtain a Certificate of TNC Accreditation from the LTFRB. This certificate has a validity of two years and is non-transferrable. The TNC must pay an accreditation fee of PHP 10 000, or approximately EUR 200. In order to obtain certification, the TNC must also possess a valid Philippine business permit and be registered with the Bureau of Internal Revenue (BIR). In all app-based communication with the passenger, TNCs must transmit the **driver’s name and photograph, vehicle’s license plate number, and the case number issued by the LTFRB on the device used to connect with the digital technology application.** The passenger must clearly see the total fare, fare range or rate by distance or time. Finally, the TNC app must have a built-in complaint option so that passengers can submit complaints or report lost items. **The app must also include the LTFRB’s hotline number. Vehicles used to carry out TNC-brokered rides must have company-specific identifiers or “trade-dress” to match individual vehicles to the platform for which they working.** At the completion of the ride, the TNC must electronically transmit to the passenger a receipt that includes information on the fare paid, point and time of departure origin, point and time of destination arrival, actual route, distance and duration.

TNVS operators (individuals or companies) must obtain a one-year renewable Certificate of Public Convenience (CPC) from the LTFRB (a 45-day provisional certificate can also be obtained) and must pay a filing fee of PHP 510 or approximately EUR 10 for the first two vehicles with reduced fees for each additional vehicle.

TNVS drivers must be vetted and accredited by a registered TNC, **must hold a professional driver’s license and display the LTFRB-prescribed ID in clear view of the passenger. TNVS vehicles must always display TNC “trade dress” during a TNC-brokered ride** (the markings may be removable but must be readable during daylight at a distance of at least 50 feet; and reflective, illuminated or clearly visible in the dark. During TNC-brokered rides, TNVS drivers must always use an internet-connected digital device that is connected to the TNC-provided app and their vehicle cannot use toplights or taximeters. They must employ the most direct route to a destination unless detours are expressly approved by the passenger. TNVS vehicles can carry no more than seven passengers, must be of approved vehicle types and cannot be older than seven years. TNVS drivers can only accept app-mediated ride requests and are prohibited from picking up street hails. Smoking and the presence of opened alcoholic beverages are prohibited in TNVS vehicles.

Many participants pointed out that specific rules for registering and licensing CTAs were only truly helpful if the specificities of CTA operations were taken into account – that is, CTAs should not, as a principle, be licensed under regulatory frameworks that were designed specifically for other types of services like taxis. Some participants pointed out that rules should be set according to the functional specification of the service performed and the similarity in service outcomes. Thus licensing rules for app-based platforms, generally, should not make a distinction between taxi apps and CTA platform services.

In some instances (e.g. New York City and the Federal District of Mexico City) licensing of CTA companies is linked to revenue-raising instruments. Because local authorities may wish to ensure that CTA or other for-hire transport services do not detract from public policy objectives in support of public transport, revenue from CTA fees or taxation has in some instances been allocated to public transport. In Mexico City, for example, CTAs must pay into a "Fund for Taxis, Transportation and Pedestrians" that serves to support public transport investment and operations (see Box 4).

Box 4: Mexico City Fund for Taxis, Transportation and Pedestrians

Mexico City was one of the first cities in Latin America to regulate CTAs. The Federal District's Department for Mobility (SEMOVI) issued a decree defining rules for the operation of CTAs in Mexico City in July 2015. One of the more notable solutions was a 1.5% fee levied on the cost of each trip that goes into a new Fund for Taxis, Transportation and Pedestrians. Revenue from this fund will be used for investments in better mobility options for the city. Other provisions of the law include registration requirements for CTAs, a yearly permit fee for drivers, minimum vehicle value limits (MEX 200 000 or approximately EUR 10 000) and required equipment (four doors, airbags, seatbelts for all occupants and air conditioning).

Innovative regulatory approaches governing for-hire transport

An important part of the workshop discussions centred on mapping out innovative regulatory approaches enabled by technology change. The emergence of digital connectivity and wireless communications has opened the possibility of new types of instruments that could allow operating companies a better control of the efficiency in the provision of their services as well as giving the authorities a completely new way of pursuing their policy objectives.

Though many taxi and other for-hire transport companies are collecting more and more data regarding trips, drivers and clients, this data is rarely exploited by authorities to deliver better and more targeted regulation that enables public policy objectives to be met with the lightest regulatory touch. Taxi and traditional for-hire regulation is still the domain of very blunt instruments such as market access and geographic restrictions that purport to deliver benefits but whose immediate impact is rarely tested and long-term **impacts rarely adjusted. However, it isn't immediately obvious** that given the current state of affairs in many cities, this data can be used at present to better guide regulation. One reason is that in many cases, regulators lack the technical expertise or the time to exploit such data.

Another of the reasons this data is not better exploited by authorities is that it is often housed in silos for each taxi or CTA operator and is often in incompatible formats that stymie broader exploitation by authorities.

A clear concern of app-based platforms is that their data is a core part of their value proposition and thus releasing the data into the public domain – even if restricted to public authorities – raises real issues regarding commercially sensitive information and individual privacy. This concern is especially acute for

businesses operating in countries where there are legal obligations to release publicly-held data to those **who request it (e.g. in the United States under the "Freedom of Information Act")**.

There are strategies to help ensure data protection while allowing the extraction of useful information that can be used by authorities to carry out innovative and real-time regulatory interventions. One example is **the "Safe Answer" framework pioneered by the Massachusetts Institute of Technology (MIT)** that would allow authorities to query operator data under a vetted and trusted framework and to use the query results for regulatory purposes without ever releasing proprietary data. See ITF (2015) for a description of this approach.

Operators themselves may be reluctant to provide such data because it could putatively pose competition risks if the data were to become publicly available (as is mandated for publicly held data in some countries) or simply because it could be used to strip advantages that certain operators currently enjoy. Additionally, access by, or the inadvertent release of data by, authorities holds serious consumer privacy implications. However, it should be noted that no such effects have been claimed, nor documented, in New York City or Portland, Oregon, both of which published (and in New York's case, released) trip-level data.

App-based platforms, generally, are very data-intensive operations. The breadth and variety of data collected could potentially be used to deliver much more targeted outcomes with much fewer regulatory "losses" or inefficiencies. This is because app-based platform data is collected for the entire fleet irrespective of where and in which jurisdiction drivers operate. It also results from the granularity and completeness of the data collected that could be used to control for very specific public policy outcomes, as in the case of variable insurance regimes outlined in the previous section. In addition, many CTAs are entering or have recently entered mature markets.

All of the above suggests that it may be worth pursuing new, more flexible performance-based regulatory frameworks that are conditioned on access to data that provides regulators with certainty that public policy objectives are being met. Already several cities have put in place or are exploring data-led regulatory deals with CTAs (e.g. Boston, Sao Paulo). **In Sao Paulo, the "data-deal" being considered calls for authorities to receive sufficient data from CTAs such that the former can charge per-kilometre fees based on time of day, location and whether there is a passenger on board (see Box 5)**. These arrangements could be provided on a temporary and flexible basis and under a regulatory exemption regime where operators seeking to avoid the current heavy taxi regulation could be exempted from these if they provide sufficient data to control for the delivery of public policy objectives.

Box 5: Proposed credit-based commercial transport app regulations for Sao Paulo

The Sao Paulo Municipal Government has proposed a draft decree regulating the use of public infrastructure that in so doing will incidentally regulate how CTAs are allowed to operate (Prefeitura de São Paulo, 2015). These rules were up for public comment until the end of January, 2016 and are not in their final form but they already prefigure one of the most innovative data-led approaches for CTA regulation. Under the proposed decree, CTAs would be charged an ex-post payment calculated on the basis of an estimate of vehicle kilometres travelled during the period with excess travel being subject to a sur-charge. CTAs will pay (or compensate) a posteriori for kilometres travelled. No restrictions are to apply - companies being free to buy as many kilometres as they wish subject to the price to be set by public authorities.

In essence, the proposed decree sets up a market for credits that could be priced dynamically by the city to better guide CTA operations in support of public policy objectives. Conceptually, the fee is a payment in exchange for commercial access and use of public road space but is set up in such a way as to allow the municipality to dynamically charge for this use according to the real-time impacts CTA operation may impose or for other public purposes. For instance, the municipality could exempt ride-sharing services that can be shown to reduce overall vehicle kilometres travelled. The municipality could also design price incentives to encourage co-ordination between CTAs and public transport and taxis in off-peak periods, in underserved areas and for traditionally underserved populations. Already, the draft decree calls for 15% of "service providers" or "driver-partners" to be reserved for women. In order to help incentivise the provision of vehicles equipped for those with mobility impairments, plans call for kilometres travelled by such vehicles to be charged a reduced per-kilometre fee.

In order to support the proposed system, the municipality would require CTAs to provide anonymised data on trip origins and destinations, times, travel routes and distances, price and service evaluation. This data would be **processed by the city's data centre for urban mobility (MobiLab) and would serve as the basis for the dynamic pricing of CTA credits.** This kind of data-led real-time regulation of CTA services prefigures the broader application of data-led regulation for all for-hire operators and, ultimately, all users of urban road space.

Flexibility in the face of uncertainty

Such a flexible, reversible and data-led approach has two principal advantages in dealing with uncertain impacts stemming from transport service innovation. The potentially reversible and temporary aspect allows authorities to buy time and experiment with new services and regulatory approaches that otherwise might be misguided or hard to reverse. Experimental policy-making in this context reduces the risk of getting policies wrong in the face of uncertainty. Of course, this approach requires a heavier, traditional policy to remain in place as a default guarantor of public policy outcomes.

The second aspect is that access to fine-scaled data or the insights it can provide allows regulators to avoid regulatory inefficiency by over-specifying measures. Real-time adjustable regulatory frameworks would allow regulators to deliver much more effectively on policy outcomes. For instance, automatic regulatory control systems could modulate zone pricing or distance pricing for CTAs and other operators in areas and times where too many drivers are congregating, such as airports. Finer access to data decreases the risk of negative outcomes by controlling for these directly via data. However, it should be pointed out that applying such pricing measures to CTAs only will likely have adverse effects by pushing riders to other services or to use their private vehicles. Furthermore, it remains to be seen if such control exercised by authorities would be more effective at delivering on public policy objectives than dynamic pricing implemented by some CTAs.

The key concept in delivering these new regulatory approaches is traceability, meaning that it becomes possible to require that all vehicles licensed for these operations are permanently geo-located and connected to the web, so that it in turn becomes technically possible to obtain statistical data about their performance and, in case of complaint by one client, to fully recover the footprint of that particular service.

Additional elements of service rating (driver, vehicle, booking system, etc.) can also be considered as instrumental in the pursuit of the public policy objectives of consumer protection and social inclusion.

Much of this experience is new, and not yet subject to real world experience, and as such will require some dialogue among the stakeholders (authorities, operators, consumer associations, trade unions). Specifically, part of the traditional regulatory instruments based on initial screening of providers to reduce the risk of misconduct could be replaced by much lower initial screening effort followed by monitoring and much easier evaluation of actual behaviour in case of complaints. For instance, detailed knowledge of the street network by the driver could easily be replaced by the availability on-board of one of multiple easily available GPS-based navigation systems. Similarly, some of the formal training and qualification requirements could be made significantly lighter and complemented by a system of systematic driver rating by the clients. In both cases, not only is the investment lower, but the actual capacity for delivery of good service much improved on a permanent basis.

5. Summary: Policy principles for a changing for-hire transport market

Below we summarise some of the high-level principles that emerged from the discussion that can serve to guide further discussion in this area.

Policy should allow or steer the development of innovative services towards public policy objectives to equitably improve mobility, safety, consumer welfare and sustainability. This principle will likely entail lightening the regulatory controls on entry and fares for dispatched taxi service (while controlling for public policy objectives for taxi services obtained via hail/rank, which are marked by information asymmetries and lack effective consumer choice) and introducing new types of regulation on CTAs than have currently been deployed in most markets.

Regulators and regulation should, as much as possible, not differentiate among different categories of service providers. If exemptions are required (e.g. correcting for specific failures inherent with some markets like the street hail taxi market) these should be explicitly substantiated and regularly and frequently reviewed.

To the extent that technology or other alternative approaches can deliver on public policy objectives, including consumer protection, in the place of traditional and currently required regulatory frameworks, regulations should be adapted, streamlined, replaced or removed based on an open, evidence-based analysis.

Regulators should increasingly seek to leverage data-led regulation as a way of providing a lighter and more flexible approach to achieving public policy objectives. Operators and platforms should be able to choose lighter and more flexible regulatory approaches versus wider-spectrum and more burdensome regulatory frameworks as long as they provide regulators with information that allows the authorities to ensure the delivery of public policy outcomes.

This control can be based on access to data, reception of data or access to vetted third-party data reporting systems that allow regulators to seek specific insight into the manner in which for-hire operations are impacting public policy objectives, e.g. preventing market power abuse or disproportionately contributing to congestion, again, based on an open, evidence-based analysis. Policy-makers, regulators and planners should identify the minimum data inputs from operators necessary to carry out the above and, in particular, to plan for and regulate mobility services in line with public policy objectives. The provision of these should be mandatory for operators applying for an exemption to the current regulatory regime

Drivers should have a unique and portable ID number from first registration at any platform or with any operator. This allows for the control of driver identity (and security vetting) as well as working hours across multiple platforms or services. Drivers should be vetted regarding their security profile and driving history. Vetting results should be portable and linked to the above ID number. Driver training should be mandatory for safety and knowledge of rules. Driver training or other alternative mechanisms should ensure the delivery of high levels of customer service. Driver training requirements should be regularly reviewed to ensure that they deliver on wanted outcomes or do not, alternatively, represent unreasonable or unsubstantiated barriers to entry. Vehicles should be safe, roadworthy and in standing with existing regulations regarding emissions.

Rapid, transparent and targeted feedback mechanisms should be in place to ensure continued customer and driver protection. These mechanisms should be put in place for app-based and traditional dispatch services.

Reputational data on passengers and drivers should serve to ensure a secure driving experience. In case of emergencies, easy-to-use mechanisms should allow for the transmission of this data directly to relevant security or public safety services.

Requirements for operators to carry out public service obligations should be flexible and performance-driven rather than prescriptive. But they should also be robust and include both incentives and penalties sufficient to deliver wanted outcomes. Compensation to operators for carrying out public service obligations may be necessary but these should be regularly evaluated against other options.

Multiple and duplicative regulatory regimes should be eliminated or streamlined except where their retention can be explicitly substantiated. Where permit or medallions represent retirement or pension investments by individuals, and where these lose value or are eliminated, alternative arrangements should allow for a similar or adequate level of social protection.

Policy should seek to integrate taxi, CTA and micro-transit services into the broader offer of mobility services including public transport, car- and bike-sharing, including through consolidation of modes in trip planning apps and unification of fare payment.

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Notes

¹ All taxi mode shares from LTA, 2015.

² The primary innovation that CTAs provide to for-hire transport is the efficient, technology-enabled real-time matching of demand and supply – described as "ride-sourcing" (Rayle, Dai, Chan, Cervero, & Shaheen, 2016).

³ Though not necessarily so since in markets where taxi quality is perceived as high, CTAs have experienced difficulty in gaining market share despite fixed taxi fleet size, as in the case of Tokyo (Hornyak, 2015).

⁴ For example, in November 2015, both Lyft and Uber agreed to make some of their trip data for two US cities available to researchers at UC Berkeley and the US National Resource Defense Council.

⁵ See: <http://bgr.com/2016/01/04/new-years-eve-uber-surge-pricing-reactions/> and <https://hbr.org/2015/12/everyone-hates-ubers-surge-pricing-heres-how-to-fix-it>.

⁶ <https://medium.com/@loukerner/a-look-at-the-data-uber-is-losing-share-to-lyft-across-the-u-s-and-via-in-nyc-703703f3fbc6#.ahbqd1lql>

App-Based Ride and Taxi Services

Principles for Regulation

App-based transport services are rapidly gaining popularity. They are easy to use and allocate spare transport capacity more efficiently than traditional for-hire providers. But their success challenges established regulatory frameworks and has caught authorities off guard. Regulatory responses have attempted to block such services or incrementally tweak rules to include them. This report, based on a workshop with app-based operators, the taxi industry, regulators and academics, seeks to identify the points of consensus on regulating for-hire passenger transport services as well as persistent points of tension that need focused attention to resolve.

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