

Grzegorz Sierpiński *Editor*

Smart and Green Solutions for Transport Systems

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Grzegorz Sierpiński
Editor

Smart and Green Solutions for Transport Systems

16th Scientific and Technical Conference
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Selected Papers

 Springer

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Grzegorz Sierpiński
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I would like to express my deepest gratitude to all authors, for reflecting the key problems of contemporary transport systems in a concise manner, as well as to reviewers, in recognition of their insightful remarks and suggestions without which this collection of papers would have never been published.

September 2019

Grzegorz Sierpiński

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Smart Cities Components in the Service of Sustainable Transport



How to Level the Playing Field for Ride-Hailing and Taxis

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Abstract. Introduction of ride-hailing services created many legal challenges in various countries because of their different features of operation and business model. Policy makers and regulators are pressured to define methods to handle these challenges. Today different countries has taken different approaches as policy and regulatory framework response to the entrance of ride-hailing companies but there is no common approach agreed. This research is meant to provide a system analysis and structured assessment regarding regulatory conflicts after introduction of ride-hailing services in different cities and also regulatory responses of these cities. This study presents an analysis and evaluation of developments to transportation policy and regulation since the proliferation of ride-hailing services with various examples and provide how to effectively approach “leveling the playing field” between traditional taxis and ride-hailing with set of principles to be considered while defining regulatory approach.

Keywords: Ride-hailing · Taxi · Regulation · Shared mobility · Governance · Technology

1 Introduction

One of the biggest changes in urban mobility during last 5 years is emergence of ride-hailing companies. They emerged during last 5 years and today completely shaping the urban mobility all over the world with many services in the spectrum of shared mobility modes. Ride-hailing companies are the platforms operated through mobile applications that match a customers demand for a ride with drivers. There are today different terminologies used for this type of services and platforms. Transport Network Companies, ride-selling and ride-sourcing are the other terminologies commonly used and today the best known example of such platforms is Uber, which launched its service in 2009. Since Uber’s launch, several other companies have copied its business model like Lyft in USA, Ola Cabs in India, Didi in China, Careem in Middle East and Grab in South East Asia are some of examples [1].

Ride-hailing companies are facing different challenges in different countries. They were protested in many countries by traditional taxi industry and main discussions were

about being against to fair competition rules, not paying taxes, driver qualifications and licenses, background check, passenger safety, insurance, non-compliance land passenger transport regulations. But they were appreciated by customers as experience and better service in comparison to traditional taxi operators. It is also important to consider impact of ride-hailing services to traffic congestion where there are different opinions claiming complementarity of ride-hailing services to mass transit or as opposite, Ride-hailing services impact for reducing mass transit ridership and increase of traffic congestion. Regulation of Ride-hailing services is very complex issue under the light of all points mentioned above. It is being discussed in some studies but not addressed in details until now. According to Geradini [2] taxis and ride-hailing should be regulated with separate framework as because the services proposed by taxi companies and online-enabled car transportation services are currently so far apart, it may be difficult to find a regulatory regime suiting them both. While incumbent taxi companies may wish to ensure that ride-hailing companies are forced to comply with the same regulatory requirements as applying to them, such an approach is a non-starter for ride-hailing as it would eviscerate their business model. McBride suggests in his thesis that the key aspects of the basic economic model, price and supply, should remain unregulated. As individuals familiarize themselves with the model, consumers will become more educated when making consumption choices. Therefore, it should not be necessary for legislative action to regulate ride-hailing pricing or supply as suggested by McBride [3]. Buckley [4] thinks the cities should follow the way of ‘self-regulation’ for ride-hailing services. Instead of applying taxi regulations to ride-hailing, a new form of regulations should be established for this market: self-regulation. As stated by Sundararajan self-regulation is not the same as deregulation or no regulation. Instead, public policy makers shift the onus from government and the public sector to the industry [5]. According to Merkert, since Uber simply assists in connecting drivers and riders, and does not own any vehicles that provide transportation; the company argues that it should not be governed by regulations concerning taxis. It is evident that imposing regulations on Uber is not only against the antitrust laws, but these regulations will hurt consumers the most [6]. According to Wagner [7] while the private sector is quickly adjusting to the proliferation of ride-hailing services, the public sector has been hesitant to adapt to the existence of Uber and its competitors. Compared to taxis, ride-hailing companies operate virtually unregulated, avoiding licensing costs, driver insurance requirements, standard employee training and background checks, state-controlled fares, and fleet size caps. Report of Pew Research Center asked the opinion of US citizens about regulation of ride-hailing services [8]. According to the report most of ride-hailing users are aware of the debate over how best to regulate these services – and these users feel strongly that ride-hailing services should not be required to follow the same rules and regulations as incumbent taxi operators.

As it can be predicted, this topic will remain as essential issue of debate in the future. Today different countries has taken different approaches as policy and regulatory framework response to the introduction of ride-hailing services but there is no common approach. This research is meant to provide a system analysis and structured assessment regarding regulatory conflicts after introduction of ride-hailing services in different cities and regulatory responses of these cities. This study presents an analysis and evaluation of developments to transportation policy and regulation since the

proliferation of ride-hailing services with various examples and provide how to effectively approach “leveling the playing field” between traditional taxis and ride-hailing with set of principles to be considered while defining regulatory approach.

2 Methodology

This paper will be mainly based on survey for urban transport authorities, focus group meeting and literature review for collection of information from different sources including press releases and secondary data sources.

2.1 Literature Review - Case Study Collection

The literature study aimed to give an up-to-date and structured overview of the literature in the field of ride-hailing and urban mobility. A systematic literature search was performed in a structured way based on screening and selection of relevant studies from databases available to the author (SCOPUS, Science Direct, Google Scholar, UITP) and accompanying snowballing as well as focus groups lead to the majority of usable literature. In addition, collection of information from different sources including press releases and newspapers conducted as ride-hailing is new concept and there is limited academic work in this area.

2.2 Survey for Urban Transport Authorities

Set of questions developed related regulation and impact of ride-hailing companies to urban transport and the survey was conducted to different cities with different size, geographical background, different mix of mode share. Survey was conducted via e-mail for the urban transport authorities of that cities which can present the full overview and the data was collected from that cities based on their own research and studies (e.g. travel survey, urban mobility master plans, other studies). Collected data went undergo internal (compatibility with other data from the same city) and external (compatibility with data from other cities) checks and adjustments.

20 cities from different regions of the world (Europe, Asia, North America and Middle East) were included into survey and 5 questions were asked are Abu Dhabi, Ankara, Brussels, Budapest, Dubai, Dublin, Frankfurt, Helsinki, Hong Kong, Kuala Lumpur, Lagos, Lisbon, Milan, Montreal, Moscow, Oslo, Phoenix, Prague, Singapore and Tehran.

Question 1: Did you launch any specific regulations for Ride-hailing or modify the existing regulation?

5 of 20 cities launched specific regulation or modified the existing regulation after for ride-hailing services. These cities includes Dubai, Kuala Lumpur, Montreal, Phoenix and Singapore.

Question 2: Do you regulate the fare level of ride-hailing services?

Only in Montreal there is specific regulatory approach to fare-levels of ride-hailing companies. In other cities either they don't regulate fare level of ride-hailing services or they are subject to same regulatory approach of traditional taxis.

Question 3: Do you measure the impact of ride-hailing services on Traditional Taxi Market?

Only Kuala Lumpur and Montreal are the cities expressed that they are measuring the impact of ride-hailing services on traditional taxi market.

Question 4: Do you measure the impact of Ride-hailing services on Public Transport (Metro, buses etc.)?

None of the cities joined the survey expressed that they are measuring the impact of ride-hailing services on public transportation.

Question 5: Did you see any impact of Ride-hailing services on traffic congestion in your city?

Oslo and Milan expressed that they noticed increase of traffic congestion because of introduction of ride-hailing services in their cities. Other cities didn't measure any change.

2.3 Focus Group Meeting

Focus Group meeting was organized at the occasion of UITP Training Programme on Transport Network Companies in Brussels in 3–5 September 2018. There were 20 participants from different countries and from different type of organizations including transport authorities, taxi operators, ride-hailing companies and international associations. Participants were given set of questions related ride-hailing regulation and taxis. They were provided a time to discuss among each other and make proper research. Group presented outcome of their discussions related questions and their findings were used as one of inputs to the assessment done in this research.

- How urban transport authorities should define their policies related to Ride-hailing companies?
- Please evaluate and discuss 4 categories (Innovators/adapters/protectors/Regulators) given above and discuss on their pros/cons from perspectives of:
 - Sustainable urban mobility and traffic congestion
 - Customer satisfaction
 - Impact on Traditional Taxis
- Please propose policy & regulatory framework for the future of Ride-hailing companies & Traditional Taxi Sector
- Please also consider new mobility services like MaaS, Autonomous Mobility and suggest role for Ride-hailing and Traditional Taxis in the tomorrow's Mobility Ecosystem.

3 Regulatory Conflicts Related Ride-Hailing Services

Most controversial issues discussed today related to ride-hailing services are using private vehicles for operation and unprofessional drivers, surge charging, sharing the taxis with others and data privacy.

3.1 Using Private Vehicles as Taxi and Unprofessional Drivers

Ride-hailing companies are using the private vehicles and unprofessional drivers for the operation for most of their service types. UberPoP is the most well known in this area but this is the case also for many other ride-hailing companies as well. Of course using unprofessional driver and regular private vehicles for such services decrease the cost of service and brings planning efficiency but there are concerns from many aspects of safety, security and quality. In addition, the impact of such service from perspective of fair playing ground with the heavily regulated other traditional taxi operators is also crucial point to consider [9].

3.2 Selling Available Seats in Vehicles During the Same Trip

Sharing the taxi trips with other passengers are not legal in many countries. There are different reasons behind the decisions taken by authorities for that position but today with applications like UberPool, Olashare this became commonly practiced in cities.

3.3 Surge Pricing

Of course surge pricing was at everyone's lips when it was first introduced by ride-hailing companies. Surge Pricing is a tool to match demand and supply for taxi rides when there is high demand. Technology allows changes in fare in dynamic environment based on complex algorithm. It is like pricing model of airline companies during peak seasons and off peak seasons by applying this to daily taxi trips was not usual initially. Surge pricing increases the fare by a given multiple. Lyft's peak time pricing algorithm will increase fares from 25 to 200% according to changes in supply and demand. Similarly, Uber's surge pricing can increase fares anywhere from a 1.2 times multiple to 7 times. Both firms' pricing algorithms automatically go into effect when potential consumers outpace potential drivers. Off-duty drivers receive real time updates regarding surge pricing as means to incentivize them onto the road or into certain neighborhoods [3]. According to Matthew Daus one result of Ride-hailing "surge pricing" is that communities with limited or no ride-hailing access, such as low-income and minority communities, may be "redlined" since drivers may choose not to operate in those areas [10].

3.4 Data Privacy

Tracking the users after the end of the journey by ride-hailing companies is also an important discussion mainly from the privacy perspective. Tracking generally happens from the moment customer requests a trip and after five minutes the journey had ended. Claimed that the change would improve the app by allowing for more reliable pick-ups, improving customer service, and enhancing safety. Apps are also tracking commuters social behaviors and to understand the purpose of journeys.

3.5 Taxation

Another area of discussion related ride-hailing companies is the place and the amount of tax paid by them. For example, It is claimed that Uber paid only 411.000 Sterlin as tax in UK in 2016 although the total turnover in this country was 23.3 million Sterlin and net profit was 1.3 million Sterlin. It is claimed that Uber established companies in countries where there is no or very less tax ratios applied and most of the revenues of the company is recorded in that countries [11]. According to Kuneshegaran Uber transfers the commission income from different countries to Uber BV which is established in Netherlands which is linked to Uber International BV established in Bermuda. This helps Uber to keep the amount of tax paid low in different countries [12]. Such tax optimization approaches are being used by many multinational companies as well.

3.6 Contractual Relationships with Drivers

Ride-hailing companies establish subcontractor relationship with their drivers via service contract signed between parties instead employing them as staff in their companies. This created discussion in many countries. In UK Labor Court decided in 26 October 2016 that Uber drivers have rights of minimum salary and annual paid leave [13]. In March 2018, It was decided by Swiss State Economic Affairs Secretariat that Uber drivers should be treated as employees [14].

4 Examples of Regulatory Practices

Practical approach in different countries for regulation of ride-hailing services also varies and they were analyzed for 25 countries below. Countries were selected to have balance between them in terms of different type of regulatory framework, geography and income level.

4.1 USA, Canada and United Kingdom

USA is the birth place of Ride-hailing disruption and it is of course where the most discussion happened until now. Regulatory response was different in different states of USA and also it has changed during last years as some states changed their policy and regulatory position on this issue. As of January 2017, 34 states and more than 69 cities have passed legislation governing ride-hailing companies (transportation network companies). Another six states have enacted legislation mandating minimum insurance requirements [10]. In New York, Taxi and Limousine Commission created Licensing & Rules for Providers of E-Hail Applications to regulate the service. In San Francisco, the authorities passed a bill regulating insurance coverage [15]. In Texas, the authority requires state-controlled fingerprint checks of drivers - performed by a vendor. Ride-hailing companies do not agree with the condition [16]. In Las Vegas, the city council requires each ride-hailing company to pay a flat annual US\$17,500 license fee. Earlier, the council was charging per-driver fee [17]. Four cities In Missouri

(Springfield, St. Louis, Kansas City and Columbia) has legalized Ride-hailing services. Springfield City Council cleared the bill in November 2016, which requires Ride-hailing companies to do background checks. In Maryland, City Public Service Commission announced new guidelines for Ride-hailing services, which require fingerprint background checks of drivers [18]. As of mid-2016, Ride-hailing services were available in 14 cities in Canada – Calgary, Edmonton, Toronto/GTA, Ottawa, Montreal, Quebec City, London, Guelph, Waterloo, Kitchener, Niagara, Windsor, Hamilton, Kingston, covering 50% population of the country [19]. Edmonton became the first city to legalize Private Transport Providers and has passed bylaw. From March 1, 2016 ride-hailing companies must have provincially approved insurance, annual vehicle inspection, criminal record check and charge a minimum of \$3.25 per ride, but there is no price cap. Only taxis are permitted to pick up street hails or use taxi stands [20]. Hamilton passed a bylaws in January 2017 which requires ride-hailing companies, with more than 100 vehicles, to pay \$50,000 annual fee plus six cents per trip. Drivers are not allowed to pick up roadside clients [21]. London is the capital and biggest city of UK and also important benchmark always for taxi services. Transport for London (TfL) released new regulation for private-hire drives in June 2016. The key condition includes - English language requirement for drivers, accurate fare estimates, Panic response, Driver & vehicle details before the journey, and ‘Hire and reward’ insurance requirements. London City Council passed the proposal which will require drivers to install cameras in ride-sharing vehicles. Further, it has proposed to charge 26 cent per ride fee to drivers. An employment tribunal in London ruled its licensed drivers should be classed as workers with access to the minimum wage, sick pay and paid holidays. TfL also didn’t renew the license of Uber with the decision end of 2017 [22]. United Kingdom was grouped together with USA and Canada but not together with other EU Countries with considering Brexit process.

4.2 Brazil and Mexico

In Brazil, The federal government is working on national guidelines for Transport Network Companies but there are different initiatives of cities already taken in this regard. In Sao Paulo, the mayor passed the regulation to allow the use of Transport Network Companies. As per the regulation, the city shall charge an average fee of 10 centavos (\$0.03) a kilometre for drivers working with TNCs. The fund are collected into a municipal fund. Mayor of Rio de Janeiro signed a law forbidding private cars to transport passengers in November 2016. Only registered taxis are allowed in the city. However, this not impact Uber operation as federal guidelines are awaited [17]. In Mexico city, the city council issue regulation for taxi companies, which includes a 1.5% ride levy on the cost of each trips, an annual permit fee and the establishment of a minimum value for each vehicle. The levy is deposited into a new fund for Taxis, Transportation and Pedestrians and will be used for investments in better mobility options for the city. The city council of Tijuana declared legal in July 2016. The operators will require to pay 1.5% of gross annual turnover. Further, vehicles must not be longer than six years old and a minimum value of US\$8,000, having insurance for US\$ 150,000 to cover damage to third parties and passengers [23].

4.3 United Arab Emirates and South Africa

Dubai become the first city to regulate ride-hailing services by entering into agreement with Careem and Uber. Ride-hailing apps will offer luxurious transport services (limousines) via online and smart Apps channels. All cars used by them must belong to accredited companies. The laws requires that ride-hailing apps must charge at least 30% higher fares than taxi fares. Both Careem and Uber stopped service in Abu Dhabi in August 2016 owing to regulatory issues. However, Careem has resumed service in February 2017 under the regulations for limo services [1]. South Africa's National Land Transport Act (NLTA) only recognizes six categories of private transport services: buses, minibus taxis, metered-taxis, chartered vehicles, lift clubs and tuk-tuks (motorized rickshaws). South Africa has no regulations governing e-hailing services. The government amended NLTA and included a sub-category to accommodate e-hailing services. As per the amendment, e-hailing service operators are classified as metered taxi operators. The drivers require to have metered licences as part of the law. The legislation allows the use of a smartphone in lieu of a taximeter, and requires the operators to estimate distance and fare in advance, as well as, provides driver details [24].

4.4 Australia and New Zealand

Australian Capital Territory (ACT) legalized ride-hailing services in October 2015 and issued new regulation, which include background checks, vehicle inspections and insurance requirements for drivers. New South Wales legalized ride-hailing services in December 2015. The law requires criminal and car-safety checks. The authority established A\$250 million "industry adjustment package" to compensate taxi drivers [24]. South Australia legalized Uber like services in July 2016. Ride-selling apps requires to follow safety standards prescribed in Passenger Transport Act. Taxi services were offered compensation including A\$30,000 per licence and all metro taxi trips will have a A\$1 levy to fund this assistance [25]. Queensland legalized ride-booking services in September 2016. Initially, there will be no license requirement for the operator. However, the authority will introduce new license system in 2017. As part of the regulatory changes, there will be a A\$100 million assistance package for the taxi industry, which includes A\$20,000 one-off payments for taxi licence holders and A \$10,000 per limousine licence. Western Australia is looking to overhaul and deregulate taxi industry. The plan includes a A\$27.5 million "transition assistance package", including compensation payments of A\$20,000 for taxi plate owners [26]. New Zealand The Ministry of Transport issued guidelines for Small Passenger Services (SPS) Regulations. The revised bill proposed to bring taxis, private hire services such as limousines, shuttles, ridesharing, and dial-a-driver services into a single category. Taxis will continue to be defined as a SPS and will operate in much the same way as they were doing earlier. A technology or app based operator is also defined as a SPS, and therefore will be required to become an approved transport operator (ATO). The bill proposes many concession for ridesharing companies including allowing drivers to get the required background and compliance checks easily, as well as, not required to pass area knowledge and English language tests. Further, it scrapped safety requirements such as in-taxi cameras for ridesharing services. The bill requires ridesharing

companies to present vehicles for inspection “at a moment’s notice”, and to keep fuel receipts and collect logbooks from its drivers [27].

4.5 Philippines, Singapore and Malaysia

Philippines was the first country in South-east Asia to legalize TNCs in May 2015. Department of Transportation and Communications (DOTC) created new categories of Transportation Network Vehicle Service (TNVS) to allow app-based services offered by TNCs to exist within our regulatory framework. Under the new classification, a TNC is defined as an organization that provides pre-arranged transportation services for compensation using an internet-based technology application or a digital platform technology to connect passengers with drivers using their personal vehicles. TNCs will provide the public with online-enabled transportation services known as a TNVS, which will connect drivers with ride-seekers through an app [28]. Singapore is one of the most important cities when we are talking about taxi services because of its unique model of taxi regulation and efficient taxi operations. Land Transport Authority of Singapore has introduced “Third Party Taxi Booking Service Providers Act” with effect from 1 September 2015. All third party taxi service providers with more than 20 participating taxis are required to be registered with LTA in order to operate the booking service [29]. SPAD, Nationwide Land Transport Authority of Malaysia, has issued Taxi Industry Transformation Programme (TITP) to reform taxi industry, including legalizing e-hailing operators which are mainly Uber and Grab in the country [30].

4.6 Japan, South Korea and Taiwan

There is no separate regulation for ride-hailing companies in Japan. The operators need to follow the same rules and regulations, applicable for conventional taxis [31]. In Seoul, the government banned Uber and other App based companies. Seoul Metropolitan Government launched its own taxi app for registered cabs. It has currently allow KakaoTaxi to provide taxi booking service [32]. As per Taiwanese Laws, taxi companies must be domestically owned and operated. The government has refused to propose a separate act for technology firms. Uber is facing lots of problem in Taiwan since the commencement of operation in 2013. Uber is registered in Taiwan as an information management company as it allows an foreign company to operate in Taiwan, but the government sees it as a transportation services company. The company stopped the operation in February 2017 [33].

4.7 Russia, China, India and Vietnam

There is a federal law in Russia which is very liberal and permissive for taxis. Actually, any person or company can become a taxi driver or operator. There is no restriction at all except the age of the driver (min 21 years old), no test, no medical control, no criminal record, no license fee, no restriction on the type or age of the car, no obligation to have a taxi meter, no regulation of fares, etc. Anyone can make a request online and will get the license. There is no ceiling on the numbers of taxis in the city. The only condition is to paint the car in yellow and put a taxi sign. Currently, 72% of taxis are

yellow colors. The drivers have to pay a tax equal to 6% of their theoretical revenue to the department of transport. Taxi-hailing apps can only work with license drivers and require sharing data with the authorities. In July 2016, the government has imposed 8% value-added tax on electronic goods and services provided by global internet giants including Uber starting in 2017. Foreign companies have no obligation to create a legal entity in Russia and can pay the tax via local partners. Uber has directed its Russian drivers be registered as legal entities or individual entrepreneurs, and that the responsibility for the settlement of the tax be specified in their contract with Uber N.V., which is registered in the Netherlands [34]. The Chinese government released the Interim Measures for the Administration of Online Car-hailing Operations and Services in July 2016. The policy was released by the Ministry of Transport and six other ministries jointly. This is the first national measures that legitimize online car-hailing service. The new regulations became effective on 1 November 2016. As per the guidelines, transport authorities under the State Council is responsible for guiding the national network about car management [17]. Indian Ministry of Transport issued the new policy for taxis on 15 December 2016 and circulated the same to all cities/states [17]. In April 2014, Vietnam government released the guidelines for ride-selling application. As per the guidelines, technology companies required to sign contracts exclusively with local commercial transport companies that comply with regulations such as identifying cars with official registrations and logos, and equipping them with tracking devices. However, the implementation of the rules are still pending. The government is considering to revamp the policy [35].

4.8 EU Countries (Germany, France, Spain, Belgium, Denmark, Italy)

In Germany, local laws require taxi drivers to hold commercial licenses in order to pick-up passengers and adhere to a set fare structure. There is no separate regulation, so on-demand transport services need to comply with existing taxi laws [36]. French authorities earlier imposed the rule forcing Car services to wait for 15 min between reservation and pick-up. The government has merged “Collective Transport Permit” with “Chauffeurs License” to make it difficult to obtain license [37]. In Spain, On-demand transport services companies can only work with drivers who carry a valid professional VTC license, as required by all professional drivers [38]. In Belgium, On-demand transport service is banned in the country for using private cars. Only license taxis service is allowed, for example Uber drivers may be fined 10000 Euro for any pick-up [39]. Denmark has introduced new taxi laws in February 2017 that includes requirements such as mandatory fare meters, video surveillance and seat occupancy detectors to activate the airbags [40]. The Italian government has deferred the introduction of norms to control car-hire and car-share services till the end of 2017. The ride-hailing companies buy licenses in smaller towns where it cost less and use them to work in cities. A taxi license in Rome is worth EUR 150,000 but the NCC (cars rented with a driver) license just one-tenth [41]. For European countries, it is also important to mentioned European Court of Justice took a decision at the end of 2017 and ruled that Uber is a transport services company, requiring it to accept stricter regulation and licensing within the EU as a taxi operator [42].

5 Categorization of Regulatory Approaches

When we analyze the different legal and policy responses we can categorize them into 4 as ‘Innovators’ who are creating new regulation to integrate TNCs to urban mobility offer, ‘Adapters’ mainly following other countries and adapting themselves to new environment, ‘Protectors’ who are protecting existing legal approach and ‘Regulators’ that allow ride-hailing companies to work but with very stringent conditions. Comparison could be better seen in Regulatory Matrix provided in Fig. 1. Of course there could be different ways and parameters of categorization but is a simplified approach. Also it is not easy to put all into a single structure as of very different situation among countries. Each country should be analyzed carefully.

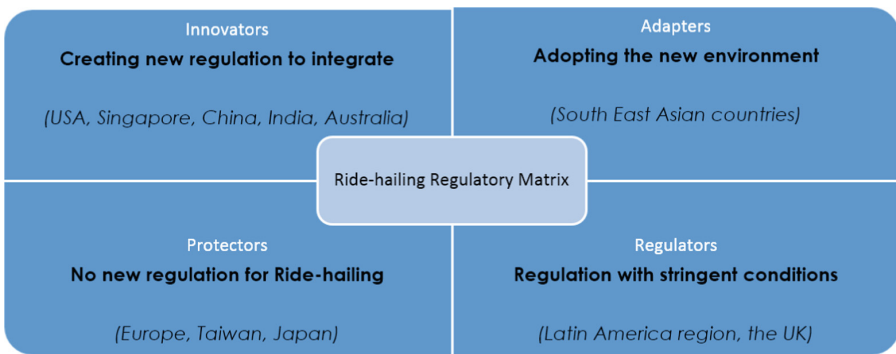


Fig. 1. Comparison and categorisation of regulatory approaches.

6 Recommendations

Introduction of ride-hailing services created many legal challenges because of their different features of operation and business model. Today different countries has taken different approaches as policy and regulatory framework response to the entrance of ride-hailing companies but there is no common approach. With considering current practices in various countries, impact of ride-hailing to urban mobility and under the light of future considerations below could be provided as set of key recommendations for regulators to consider when they are defining their policies and regulatory framework related to ride-hailing services:

- Authorities should not prioritise ride-hailing or taxi services over public transport as high quality public transport is the only alternative able to fulfil the lion’s share of trips by using a minimum of space.
- It is important to promote integration of ride-hailing and taxi services to public transport. Without public transport, other sustainable & innovative mobility services cannot offer an affordable alternative to car ownership
- Regulatory Framework should not have the aim of protecting any certain group but should be designed as a tool to implement public policies,

- Regulatory Framework for Taxis and Ride-hailing services should be developed together to make sure fair conditions,
- Advanced technology can be used to develop advanced regulatory and enforcement schemes,
- Integrate policies and regulation related ride-hailing into larger efforts to implement wider usage of new technologies and innovative applications. Cities can use technology revolution and ride-hailing companies for better implementation of demand management practices with tools like UBER POOL or OLA SHARE
- Regulatory Framework should less concentrate on Price and Quantity Regulation but concentrate more on Quality Regulation in terms of road usage, environmental issues, safety and availability.
- Regulatory Scheme based on Road Charging should be considered to avoid extra vehicle miles and congestion of ride-hailing services like the model Brazil. Road Charging could be applied as an incentive, for instance, there could be different pricing in terms of passenger occupancy in ride-hailing cars. Incentivized pricing could be applied to promote shared vehicles, if rides are shared no pricing implemented
- Authorities should promote partnerships between ride-hailing and traditional taxi actors. This option could bring benefit to both parties and they can act complementary other than competing each other and losing sources for this competition for the midterm.
- Cities mainly in emerging countries should consider using ride-hailing companies to help regarding rationalization and formalization of individually owned/operated taxis
- Regulation should not only concentrate competition between ride-hailing and taxis/public transport but also potential competition may take place soon in the future between Ride-hailing companies

7 Conclusion

Implementation of above mentioned recommendations will require more detailed guidance and understanding of local conditions and capacities, which is outside the scope of this study. Next steps could include developing this guidance, particularly for more comprehensive analyses and detailed guidelines. While not covered in the scope of this study, deeper analysis and understanding is needed of the impacts of ride-hailing services on employment market, especially in developing countries where driving for ride-hailing has made it easier for people to access the job market. It is also quite essential that evaluation of the results and impact of different policy actions and regulatory responses is needed to better understand which tools are effective and which are not. Finally, it is important to work related potential role of ride-hailing in the future of urban mobility with considering latest developments especially related autonomous vehicles and other shared mobility and technology innovations like MaaS-Mobility as a Service. This study didn't suggest an ecosystem and organizational structure related tomorrow's Sustainable Mobility Ecosystem with considering emergence of Transport Network Companies, Autonomous Vehicles and Mobility as a Service.

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