International Transport Forum

Regulating App-based Mobility Services in ASEAN

Case-Specific Policy Analysis

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The International Transport Forum

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Case-Specific Policy Analysis Reports

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Cite this work as: ITF (2023), "Regulating App-based Mobility Services in ASEAN", *International Transport Forum Policy Papers*, No. 112 OECD Publishing, Paris.

Acknowledgements

Asuka Ito (International Transport Forum, ITF), Jai Malik (University of California - Davis) and Wei-Shiuen Ng (ITF) authored this report, which benefited from substantive inputs from Philippe Crist (ITF) and Rex Deighton-Smith (ITF). Jai Malik designed and managed the survey for the Association of Southeast Asian Nations (ASEAN) member states. He and Asuka Ito conducted the interviews with them. Jai Malik compiled and authored the results, which appear in this report. The report was reviewed by Philippe Crist and Elisabeth Windisch and copy-edited by Hilary Gaboriau at the ITF.

This report is the result of an ITF-ASEAN Transport Research initiative on the regulation of app-based mobility services in ASEAN cities. The initiative was jointly developed by the ITF and the ASEAN Land Transport Working Group (LTWG), led by the Philippines. The initiative was also included in the ASEAN Land Transport Working Group's 2020 Work Programme. Representatives from Brunei Darussalam, Cambodia, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam, the ITF and the ASEAN Secretariat met during a virtual workshop held in December 2020. The workshop was organised by Asuka Ito and Wei-Shiuen Ng from the ITF and Beny Irzanto and Rasyid Indra Pratama with the ASEAN Secretariat.

The authors thank external reviewers Dr. S.K. Jason CHANG (Professor, Department of Civil Engineering, National Taiwan University; Director, Advanced Public Transport Research Center, National Taiwan University; and Visiting Professor, China Academy of Transportation Sciences) and Dr. Ghim Ping Raymond ONG (Associate Professor and Associate Head for Research, Department of Civil and Environmental Engineering, National University of Singapore) for their valuable inputs.

Wei-Shiuen Ng and Asuka Ito managed the project, which was funded by the Ministry of Foreign Affairs of the Republic of Korea under the Permanent Delegation of the Republic of Korea to the OECD's initiative.

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Glossary

App-based services	Services provided through a smartphone application interface, geo-localisation technologies and WiFi or cellular connectivity.
Bicycle sharing	Provides users with on-demand access to bicycles at a variety of docks or zone-based pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bicycle-sharing fleets are commonly deployed in a network within a designated area whether it be a metropolitan region, city, neighbourhood, employment centre, or university campus, sometimes including them all. (Shaheen et al., 2019)
For-hire vehicles (FHV)	Vehicles (e.g. cars, motorised two- or three-wheelers, cycle rickshaws) providing private transport or shared transport for a fee. Passengers are generally free to choose their points or approximate points of origin and destination, unlike public transport, and to which they do not drive themselves, unlike car rental and carsharing. Services may be offered via a ridesourcing or taxi company or via informal services. (Wikipedia, 2022b)
Micromobility	Personal transportation that uses devices and vehicles weighing up to 350 kg and whose power supply, if any, is gradually reduced and cut off at a given speed limit that is no higher than 45 km/h. Micromobility includes but is not limited to the use of exclusively human-powered vehicles, such as bicycles, skates, skateboards and kick-scooters. (ITF, 2020a)
Mobility as a Service (MaaS)	A distribution model for mobility services that uses shared data and a digital interface to efficiently source and manage the provision of transport related services into a seamless offer which improves the ease of planning, booking and making journeys. (ITF, 2021c)
Rank-and-hail	Refers to the two principle methods of securing taxi services on the street. Rank refers to accessing a taxi at a designated street taxi rank located at the kerb. Hail refers to the act of signalling or waving to a taxi ion the street in order to request a ride. Not all cities allow this type of taxi access. (Aarhaug and Skollerud, 2014)
Ridesourcing (or ride-hailing)	Paid, prearranged and on-demand transportation services in which drivers and passengers connect via digital applications. Typically, digital applications allow for booking, electronic payment and ratings. (Shaheen et al., 2019)
Super apps	Mobile or web applications that provide multiple services, including payment and financial transaction processing. As such, they effectively become all-encompassing, self-contained online commerce and

	communication platforms covering many personal and commercial aspects of life. Notable examples of super-apps include WeChat in the People's Republic of China, Grab in Southeast Asia and Gojek in Indonesia. (Wikipedia, 2022a)
Unbanked	Adults who do not have a formal account at a financial institution and rely on cash or alternative financial arrangements where available. (Demirgüç-Kunt et al., 2022)

Executive summary

What we did

New app-based mobility services have transformed urban passenger transport and goods delivery services. As elsewhere, they have boomed in Southeast Asia, where they have gone largely unregulated. This report investigates regulatory approaches to balance consumer and societal welfare. It looks at how to address safety issues and negative externalities without dissuading innovative business models. It also addresses the impact of Covid-19 on these mobility services to help countries develop their pandemic recovery strategies. This report presents a set of principles for the regulation of both passenger transport and delivery services in ASEAN member states.

The project included a workshop in December 2020 followed by a questionnaire. The survey was administered online and was taken by 17 regulators across ten ASEAN member states (AMS). Follow-up interviews with representatives from all AMS were also conducted to clarify survey responses, and to better understand the perspective of the regulators regarding these services.

What we found

App-based mobility services have rapidly grown and evolved in the ASEAN region over the past few years. The rise of "Super Apps", combining mobility, delivery and ancillary services in one smartphone app, has been particularly rapid. In contrast, the development of regulations has been slow, and the fact that many of these services are formally illegal, or at least operating in a regulatory "grey area" in many ASEAN member states represents a significant risk to their future development.

Singapore has been an outlier in the ASEAN region when regulating app-based services. The regulations in the country cover almost all the aspects of app-based mobility, including market entry, operational requirements, data reporting and fare transparency.

The Philippines and Indonesia have taken several steps towards regulating app-based services on an iterative basis – that is, the regulatory framework for app-based mobility has evolved based on experiences of these countries and successive regulatory initiatives.

Brunei Darussalam, Cambodia, Malaysia, Thailand and Viet Nam have a few ad-hoc regulations for app-based services, but these countries are still in the process of developing a more detailed framework.

Myanmar and Lao PDR have not yet developed a comprehensive framework for regulating app-based services. These countries have the opportunity of learning from the experiences of other countries in the ASEAN region.

Well-designed regulations can help maximise the benefits from the development of these services while minimising potential harms to users and other negative impacts.

App-based mobility services present a unique challenge for regulators. The wide range of app-based services provided typically fall under the purview of more than one ministry. Efficient regulation requires synchronisation between all ministries with oversight responsibilities. Singapore has addressed this issue by creating one land transport statutory board. Other countries (e.g., Brunei Darussalam and Malaysia) have started the process of co-ordination among ministries by creating inter-ministry task forces and committees.

Implementing data reporting requirements allowing regulators to monitor developments in the sector and intervene if necessary would be helpful. To do so, most AMS will need to develop infrastructure and capacity to properly store, handle and analyse this data.

What we recommend

Welcome app-based mobility but adjust regulation as necessary

The significant welfare benefits from app-based mobility services have driven their very rapid growth. This suggests that regulatory restrictions should not unnecessarily act as an impediment to their deployment. Minimising regulatory barriers is particularly important for new modes and business models. Governments should consider bearing initial regulatory costs in such circumstances rather than seeking to recover them from new businesses.

Treat incumbents and entrants equally

Regulation should facilitate the welfare gains that app-based mobility services bring, while ensuring safety and other necessary consumer protections are maintained and that other public policy objectives are not undermined. A key principle is that of equal regulatory treatment of incumbents and entrants. Where governments seek to cushion the impact of disruption on former incumbents, this should be done through other policy instruments.

Revise outdated and fragmented regulatory frameworks

Existing regulations should be reviewed to ensure they do not unreasonably constrain incumbents from competing. Scheduled reviews, based on transparent and rigorous methodologies, are needed to ensure that regulation is refined, improved and adapted to new realities over time. This will require collecting and analysing system performance data.

Focus regulation on addressing clearly-identified market failures

A clear understanding of the dynamics of the relevant market and the identification of significant market failure(s) and/or equity issues must support regulation. While governments may wish to regulate up front in order to address foreseeable harms, care must be taken to avoid imposing misguided regulation and generating unanticipated costs.

Take the broader urban policy environment into account when designing regulations

App-based mobility options have numerous implications for key urban policy objectives including addressing congestion and pollution, enhancing accessibility and connectivity and encouraging active travel. Regulatory design should distinguish between objectives that are appropriately pursued through sector-specific regulation and those that can only be effectively addressed through broader regulatory interventions.

Improve public authority digital skills and access to data

Public authorities must improve their capacity to oversee digital platforms and services. This requires upskilling staff and establishing purposive data reporting from app-based services. Care must be taken to not impose over-broad data reporting requirements on app-based services. Data requests should be directly linked to identified public policy outcomes, should be minimised only to the data necessary to achieve those outcomes and should only be retained for the time necessary to do so.

Streamline the regulatory framework for app-based mobility services

AMS would benefit from establishing a national vision of how the transport sector can benefit from the adoption of new technologies and how it might navigate disruptive changes. This would facilitate alignment between relevant ministries and sub-national authorities.

Monitor and enforce regulations

AMS would benefit from requiring service providers to report data relevant to the regulation of the sector. Reporting mandates should avoid the collection of personal data or data that could be used to re-identify natural persons unless doing so is necessary for carrying out the specified regulatory task.

Build regulatory capacity within AMS

AMS should designate a dedicated department capable of receiving, storing, processing and analysing data reported to public authorities from app-based mobility service operators. Alternatively, this could be contracted out to a trusted external data processor, but even in this case, public authorities should have trained staff sufficiently capable of specifying the tasks for these contractors and monitoring their performance.

App-based mobility services

Developments in information and communication technologies (ICT) and widespread digital connectivity have paved the way for an ever-expanding range of new mobility services. These services enable the real-time exchange of data that allows users to share rides, vehicles and services. Perhaps the first and most significant example of these services is ridesourcing. Uber, Ola and DiDi were among the first companies to offer the real-time matching of passengers with drivers willing to provide the service in exchange for monetary compensation.

Most of these services share a common set of features. They are account-based, with payments processed automatically via the subscriber's credit card or another form of digital payment or in cash at the end of the trip; they leverage ride-matching algorithms that seek to optimise the use of available assets; these services typically depend on independent contractors to carry out driving tasks, and they are generally funded through significant initial venture capital investments and share difficulties in finding stable and profitable business models thereafter (ITF, 2021b).

Ridesourcing services have boomed in the last decade. As of early 2020, ridesourcing services were available in more than 500 Southeast Asian cities. Didi, a global ridesourcing company founded in Beijing in 2012, completed 9 billion ridesourcing rides in the People's Republic of China and an additional 1.8 ridesourcing rides and food deliveries internationally in 2021 (DiDi Global Inc., 2022). Other ridesourcing companies around the world have experienced similar patterns of growth (Tirachini, 2019). Also similarly, they have diversified their core offering to include other services, like food delivery, in light of the Covid-19 pandemic.

Throughout the 2010s, other major ICT-enabled business models emerged in the transport sector, including shared cars (e.g., Zipcar, Share Now), shared e-scooters (e.g., Via, Dott, Lime, Bird) and free-floating shared bicycles (e.g., Mobike, Lime, Dott). All can be reserved through mobile device apps.

Multi-channel mobility services led to the development of "super apps" such as GoJek and Grab. These apps, prevalent in Southeast Asian countries, provide single-point, real-time access to ridesourcing services, goods delivery and vehicle reservations, as well as other services, including house cleaning or haircuts, hotel bookings and stays, and online payment options. Super apps have seen a remarkable uptake in the region: Grab reported a monthly average of 29.2 million transacting customers in 2019 though the Covid-19 pandemic contributed to an overall decrease of 16% of transacting users in 2021 compared to 2019 (USSEC, 2022).

Non-ride or mobility components of Super Apps' bouquet of services are significant and have grown during the Covid-19 pandemic. For instance, Grab reports that 22% and 68% of its 2021 revenues came from deliveries and mobility services, respectfully. In 2019, those figures were 1% and 93%, respectfully (USSEC, 2022). In terms of customers, Grab reports that a monthly average of 17.3 million unique consumers successfully paid for a ridesourcing offering in 2021. In the same year, a monthly average of 17.3 million unique customers successfully paid for a delivery offering. In 2019, those figures were 24.7 million and 10.7 million, respectively – underscoring how the Covid-19 pandemic depressed ridesourcing activity and boosted app-based deliveries (USSEC, 2022).

In the short term, the Covid-19 pandemic significantly impacted the growth path for passenger-based ridesourcing. Travel activity, in general, plummeted in ASEAN countries during the pandemic, and a return to pre-Covid-19 trajectories is uncertain (ASEAN, 2021b). Ridesourcing saw a steep drop in capacity and demand due to infection risks; many drivers pivoted to food, grocery or medicine delivery and other services. ASEAN member state representatives noted that this shift was facilitated in Southeast Asian countries by the pre-existing integration of mobility of other services by major ridesourcing actors.

It is unclear what the post-Covid-19 landscape of new mobility looks like, but it will be linked to the persistence of significant contagion risks. Telework has reduced trips, and many travellers have been slow to return to public transport. The knock-on effects of the Covid-19-induced economic downturn are not clear yet. A likely outcome is that business models that were already struggling to find profitability will come under even greater pressure, and some actors may leave the market or merge with others.

Ultimately, app-based services are dependent on shared mobility services. ITF (2019a) suggests that the combination of widespread use of shared mobility services and existing public transport services could result in an almost 51% reduction of the total vehicle kilometres travelled (vkt) and a 34% reduction of CO_2 emissions by 2050 globally, compared with current levels (ITF, 2019a). However, this would require clear regulations and vision. Vkt and CO_2 emissions could increase by 5% and 18%, respectively, on current levels by 2050 if well-considered regulations are not implemented and a strong vision of integrating shared mobility services is not communicated (ITF, 2019a).

Despite the significant increase in the market penetration of app-based mobility services over the past few years in Southeast Asia, most countries in the region have yet to develop sector-specific regulatory frameworks. Governments should adopt a broadly facilitative approach to app-based mobility services, except where doing so may exacerbate negative outcomes. In particular, they should avoid seeking to protect the interests of taxi companies, informal transport operators, public transport services or other incumbent market actors unless doing so is aligned with a clear public policy outcome. Instead, they should create a level playing field and review or revise existing regulations that may no longer be appropriate in the new marketplace.

Regulatory frameworks should recognise that flexibility in business models, as witnessed during the Covid-19 pandemic, can improve outcomes if allowed to do so. Regulations should also address important safety, environmental and consumer protection concerns. However, they should avoid imposing unnecessary restrictions that would deny citizens the benefits of innovative services that may also contribute to a more sustainable transport system.

Efficient and effective regulations will play a crucial role in ensuring that app-based mobility services contribute to overall welfare gains and sustainability outcomes. That said, the novelty of these services presents three significant regulatory challenges. First, these services are developing and changing faster than their impacts are fully understood. The sector's rapidly evolving nature highlights the need for adapted and appropriate regulatory frameworks to deliver on public policy objectives. The uncertainty associated with the services also requires an agile regulatory framework, which adapts to evolving technologies. Second, regulatory arrangements must recognise that these services extend to regulated sectors beyond transport (e.g., communication, labour, health and sanitation) and ensure coordinated regulatory responses. Third, policy makers and regulators must now plan for once-unimaginable disruptions to transport, like those caused by the Covid-19 pandemic, and regulate accordingly (ITF, 2016; Pike and Pilatwosky Gruner, 2020).

How ITF countries respond to app-based mobility services

The potential impacts of new mobility services became apparent in the mid-2010s. While some governments took a proactive approach in accommodating and regulating these services, others took a more reactive stance, largely responding to complaints raised by incumbents and other stakeholders in the transport sector (Puche, 2019; Smith et al., 2019; Pike and Pilatwosky Gruner, 2020). The regulation of app-based services has been a topic of discussion worldwide. Recent ITF work documented and analysed governments' attempts to regulate these services, analysed the economic and social arguments for various kinds of regulation within the sector and recommended good practice approaches (ITF 2019b, ITF 2021a). Though there are contextual differences between many ITF and ASEAN member states, the regulatory principles outlined in the ITF's work are robust and broadly applicable across many contexts. The ITF studies could provide starting points for the ASEAN member states in early development stages of a cohesive regulatory response to new mobility services.

This section presents policy issues and regulatory responses discussed during the 2019 ITF (2019b) Roundtable on Regulating App-based Mobility Services and other related ITF work. The Roundtable considered how to regulate innovative app-based mobility services efficiently. High-quality regulations are required to ensure that ridesourcing, dockless bicycle share, e-scooters, and other innovative forms of urban mobility offer maximum advantages to society. Regulations are also necessary for ensuring safety, addressing environmental concerns and protecting consumers. Inappropriate regulation, on the other hand, will deny citizens welfare benefits and impede the development of services that could help transportation become more sustainable (ITF, 2019b).

Many studies have argued that the benefits of app-based services will increase if they are successfully integrated with other transport services (e.g., through mobility as a service, known commonly as MaaS) (ITF, 2021a; ITF, 2021b; ITF, 2021c). Initial MaaS pilots in Europe offer insights into the kinds of approaches which could create a collaborative atmosphere for integrating these services. For instance, in Finland and France, the integration of app-based services with other modes is recognised at the national level and reflected in legislation. Doing so creates a national vision for new mobility services at all levels of transport governance (ITF, 2021c). It also attracts entrepreneurs and investors interested in further developing business models around these services (Smith et al., 2019).

However, there are several barriers to integrating app-based services. One common barrier is the lack of a collaborative environment between different governmental and non-governmental entities responsible for operating various transport services (e.g., public transport, ridesourcing, bicycle sharing). This is exacerbated by the lack of a national vision or guidance regarding regulatory roles and principles for app-based mobility services. For example, the US state of California's Public Utilities Commission regulates ridesourcing as an economic activity. At the same time, Californian cities and municipalities regulate the deployment of ridesourcing services according to the potential impacts on local or regional travel volumes, emissions, and congestion. As a result, the same service is regulated differently throughout the state. Not

only that, but California's ridesourcing regulations differ from other US states and jurisdictions. (Pike and Pilatwosky Gruner, 2020)

App-based services' heterogeneity further complicates their regulation: ridesourcing may be regulated by one authority while an entirely different authority or government department regulates app-based shared micromobility services. The problem is multifaceted. There is no clear vision of desired public policy outcomes; it is uncertain what impact these services may have, and governance is poorly co-ordinated. These factors create ineffective or sometimes a complete absence of regulation, despite governments' desire to steer the services towards meeting overall transport outcomes. In several instances, local governments play a passive role, preferring to wait for public authorities elsewhere to introduce regulations in their jurisdiction and learning from their experience.

Sustainable Urban Mobility Plans (SUMP) were established as a mobility planning process in Europe. SUMP's development was born out of a broad exchange between stakeholders and planning experts across the European Union. The goal of the SUMP process is to improve accessibility in urban areas and provide "high-quality and sustainable mobility and transport to, through and within the urban area. It regards the needs of the "functioning city" and its hinterland rather than a municipal administrative region" (EC, 2013). Public authorities can measure progress towards attaining their SUMP's objectives through a regular evaluation of the program using specific, quantifiable indicators. To do so, localities must take appropriate steps to guarantee that relevant data and statistics are available in a timely manner. A monitoring report should serve as the foundation for an evaluation of the implementation of the SUMPs.

Regulatory measures can improve the success of app-based mobility services in several ways. They can address market failures commonly associated with these services by setting the right market entry conditions. For example, governments can condition market entry to the acquisition of permits or licences by app-based mobility providers. Among other things, this would ensure that only competent service providers enter the market, providing a minimum level of service quality to consumers. Other regulatory tools include mandates for training and driver background checks, and vehicle quality and safety requirements, including regular vehicle inspections (WSJTC, 2019; ITF, 2016).

However, regulations must be implemented with caution. Many measures designed to limit market failures could also unduly restrict the market to favour incumbents. Regulatory impact assessments should be undertaken to avoid the unfair – and perhaps unintentional – exclusion of new market entrants.

Micromobility services (e-scooter sharing and bicycle sharing) also present a new set of challenges. Some popular public spaces in cities may be cluttered with poorly parked shared e-scooters and bikes (ITF, 2019b). However, micromobility offers cities an opportunity to address congestion, emissions and air quality. If appropriately managed, it could enhance sustainable mobility while optimising the use of space.

Authorities can implement targeted policies according to the speed and weight of each type of micromobility vehicle. ITF (2020) categorises the types of micromobility vehicles using these parameters. Uptake of light and low-speed micromobility (unpowered or powered up to 25 km/h and weighing less than 35 kg) could reduce the number of automobile and motorcycle trips in a city. In addition, in densely populated areas, trips by this type of micro-vehicle are far less likely to result in the death of a road user, including pedestrians, than trips by automobile or motorcycle (ITF, 2020a). As a result, a modal shift from motor vehicles towards micromobility could make a city safer (ITF, 2020a).

Another advantage of micromobility is that it can enlarge the public transport catchment area by improving access to public transport stations. Micromobility can also serve as a convenient door-to-door service. Not least, the increased uptake of micromobility may help generate demand for a safe and connected light mobility or cycling network, thus broadening support for more active and sustainable transport.

A common complaint about shared e-scooters and bikes is the cluttering of public spaces. Some authorities have responded by establishing designated parking bays for these vehicles, sometimes re-allocating on-street car parking spaces to do so, as in Paris and elsewhere (ITF, 2021b). Another approach has been to require the regular redistribution of vehicles across different parts of the city. This also ensures fair and equitable coverage of micromobility services. Concerns for riders' and pedestrians' safety have led to regulations that cap the speed of shared micromobility or restrict the riding of these vehicles to dedicated lanes (NACTO, 2019).

Regulatory challenges of app-based mobility services: The case of ridesourcing

Until recently, regulations in many jurisdictions prohibited taxis from taking bookings through apps. While this competitive disadvantage with ridesourcing services has been removed in many cases, most jurisdictions continue to prohibit taxis from adopting the variable pricing strategies used by ridesourcing (ITF 2019b). Regulation continues to specify exact taxi fares in many jurisdictions, including in major cities in France, Germany and Spain. This handicaps taxis in two ways: 1) they are unable to compete with new, low-fare ridesourcing entrants, and 2) they cannot benefit from dynamic (or surge) pricing to adapt to demand peaks as most ridesourcing companies do.

There have been some efforts to level the playing field. In several Australian states, for example, taxi regulation has been substantially modified and now sets maximum fares (e.g. Transport for Victoria, 2018). This allows taxis to discount fares, but regulation continues to prevent them from charging higher prices during peak demand periods. Some regulators appear to be moving towards further flexibility. For example, New York City's Flex Fare Pilot allows taxis to offer a fixed price quote for a journey (New York Taxi and Limousine Commission, n.d.). However, given the typically rapid response times of ridesourcing vehicles, effective competition now exists in traditional rank-and-hail markets in most situations where ridesourcing companies operate. In these contexts, regulators should consider the continued need for price regulation of the taxi sector.

Other, more stringent regulatory requirements are becoming increasingly costly in an environment where ridesourcing is often exempt from such restrictions and the costs they impose. Maintenance of underfunded public service commitments, particularly in connection to the provision of services to those with limited mobility, is also a common cause of complaint, given that ridesourcing has not been subjected to similar regulations.

Several factors must be carefully evaluated to ensure that the regulatory structure does not distort competition between sectors or undermine the significant economic efficiency and customer-service benefits that ridesourcing has delivered. The ITF report on "Regulating App-based Mobility Services" (ITF, 2019b) identified the following five areas where significant additions have been proposed or are being implemented into existing ridesourcing regulation:

- rider and driver safety
- service provision equity
- drivers' economic situations and working circumstances
- environmental concerns (e.g., congestion and pollution)
- effects on incumbents, and sector-specific taxes and levies.

In Singapore, taxi drivers can offer app-based ridesourcing services in parallel with their taxi services. Singapore regulates their point-to-point passenger transport operators by the service they provide. A taxi operator, for instance, can hold both the Street-hail Service Operator Licence and the Ride-hail Service Operator Licence. The latter will allow the taxi operator to offer app-booking services for their taxi fleet (Singapore Ministry of Transport, n.d.).

Rider and driver safety

Commercial ridesourcing platforms have widely promoted three components of the ridesourcing business model as providing considerable safety benefits and decreasing the need for traditional taxi safety regulations (ITF 2019b). They are:

- The removal of anonymity for both the driver and the passenger due to the transaction's app-based nature: The lack of anonymity acts as a deterrent to illegal and inappropriate behaviour as both parties may be held accountable.
- The noncash payment mechanism: App-based payment greatly reduces the danger of robbery for drivers. Nonetheless, cash-based payment is a feature of many ridesourcing offers in emerging economies. For example, 32% of Grab's ridesourcing transactions were cash-based in 2021 (USSEC, 2022).
- The rating system: After each ride, passengers and drivers score each other in a bilateral rating system. While MacEachen et al. (2018) suggest that the rating process's dynamics are problematic, the method is largely regarded as an incentive for both passengers and drivers to behave responsibly.

Many countries have adopted relatively lenient approaches to ridesourcing safety regulation. This appears to be due, at least in part, to acceptance of the risk-reducing impacts of the aspects of the ridesourcing business model noted above. It also likely reflects the fact that ridesourcing vehicles operate exclusively in the "pre-booked" segment of the market and do not engage in the historically taxi-based rank-and-hail market, which entails additional consumer risks that are not encountered (or are less significant) in the pre-booked market. For-hire vehicles (FHV), by definition, do not operate in these industries and have been less heavily regulated than taxis in many jurisdictions. Many public authorities have either grouped ridesourcing in the FHV category and regulated it as such or kept it separate but regulated it similarly to traditional FHVs (Deighton-Smith 2018).

Technological advancements are also changing safety regulations. Some ridesourcing operators, for example, use telematics to evaluate driver behaviour, tracking data such as quick acceleration and braking, speeding, and unsafe turning (Bogage, 2016). This is or can be, used for a variety of purposes: providing drivers with direct feedback, tracking and analysing location-specific patterns, and removing hazardous drivers from the ridesourcing platform. These measures show how GPS-enabled apps have opened new possibilities for improving safety in the ridesharing or taxi sectors, whether led by operators or backed by regulators.

The ITF Roundtable on Regulating App-based Mobility Services noted that many have called for more stringent safety-based regulation of the ridesourcing industry. These calls may be due in part to ridesourcing's quick transformation from a niche business to a mass-market offering. However, they also appear to reflect a lack of understanding of the impact of differences between the ridesourcing and taxi models in terms of risk profiles. In addition, calls for more stringent regulation of ridesourcing have often come from the taxi sector itself and been motivated by concerns about unfair competition (ITF, 2019b).

Nonetheless, the OECD has noted that a number of competition authorities have acknowledged that, while the digital features of ridesourcing services mitigate several consumer risks, they do not address some information asymmetries related to the mechanical condition of the vehicle or its insurance coverage. Moreover, while many countries initially allowed ridesourcing platforms to do their own driver verification, this strategy is increasingly being replaced by regulatory vetting, as concerns have arisen as to the quality of these "self-vetting" processes (ITF, 2019b). A key consideration is that moves to improve safety outcomes "must be proportionate to the market failure in question and non-discriminatory between different types of market participants" (OECD, 2018).

Accessibility considerations

Taxis are frequently considered part of the public transport system, despite the fact that the service is supplied by private companies. Arguably, there has been an implicit linkage between the regulatory protections accorded to incumbent taxi medallion owners and the regulatory obligations to provide universal service (ITF, 2019b). The universal service obligation comprises two parts. First, taxis are required to provide travel for anyone who requests their service. Second, a combination of legislation and implicit and explicit subsidy schemes has more recently been used to ensure that a percentage of the taxi fleet is accessible to individuals with restricted mobility (including wheelchair users).

The equity impact of ridesourcing services has been a point of contention. On the one hand, some evidence suggests that ridesourcing has expanded geographical access to taxi-like services beyond areas traditionally served by taxis, while the lower average-prices of ridesourcing (particularly during its establishment phase) have increased access for lower-income groups. Conversely, because the ridesourcing model is based on payment by smartphones or credit cards, thereby excluding people who do not have access to either, it has been criticised as having lower levels of accessibility than traditional taxi services (ITF, 2019b). However, in most OECD countries, the share of the population without access to smartphones is low and declining. Smartphone penetration rates are highest in the metropolitan regions where ridesharing is most prevalent. Importantly, studies reveal that age has a greater influence on smartphone ownership than income, with greater uptake among younger people.

Ridesourcing companies have increasingly responded to these concerns by establishing additional access mechanisms for those without smartphones and debit/credit cards. For example, in California, Uber has partnered with a third-party provider that books by phone. Uber also allows account holders to book rides for non-subscribers. Both initiatives aim to provide transport for elderly users (ITF, 2019b). Thus, the level of exclusion due to lack of access to smartphones is very limited in OECD countries and will decline further as smartphone use continues to rise. These issues may, however, warrant greater consideration by policy makers in the ASEAN context.

Drivers' economic situation and working conditions

Ridesourcing businesses have been widely criticised for their employment practices, both by disgruntled drivers and the general public. Much of this concern relates to their treatment of drivers as independent contractors rather than employees. Ridesourcing firms have consistently argued that they are merely a platform that connects service providers and customers rather than themselves being service providers and employers (Domurath, 2018). The drivers' status as "independent contractors" restricts them from receiving employment-related benefits like sick leave and paid holidays, even if they work full-time on a single platform.

Given that ridesourcing drivers own or lease their vehicles, it is possible to compare their job status with that of self-employed truck drivers. In most jurisdictions, self-employed truck drivers are treated as independent contractors, even if they are financially dependent on a single contractor. In many situations, they have fought proposals to treat them as employees. When governments have attempted to intervene to ameliorate self-employed truck drivers' economic situation, they have often done so in a light-handed manner by providing information on the relationship between gross payments and net income (ITF, 2019b). A similar approach may be helpful for ridesourcing.

Taxi medallion owners often do not drive taxis themselves. This group have long-opposed arguments that drivers are or should be employees, citing incentive effects as a fundamental justification. Similar considerations would undoubtedly apply to ridesourcing. Despite the fact that taxi drivers continue to earn low wages in many, if not all, countries, regulators have mostly resisted enacting minimum wage standards. Judicial challenges based on conventional employment law have largely failed in the past, although a number of recent rulings (e.g. in France and the United States) have accepted ridesourcing drivers' claims to employee status, and Uber announced in 2021 that it would accord its UK drivers employee status (France 24, 2022; L & E Global, 2021).

The overall context is one of growing concern about increased employment insecurity across much of the cities' economies. Job insecurity is a public policy concern that, in some cases, requires an economy-wide policy solution. However, the principle of equal treatment suggests that, to the degree that a sector-specific solution is seen as suitable, it should be adopted throughout both the taxi and ridesourcing sectors (ITF, 2019b).

Environmental concerns: Congestion and pollution

The rise of ridesourcing coincided with an increased focus on cities' "livability" and the possibility for urban policy to improve it. The challenges of congestion and pollution, and ridesourcing's impact on both, have been increasingly prominent in regulatory discussions with public authorities (ITF, 2019b). The research on ridesourcing's influence on congestion is inconclusive, and regulations of ridesourcing services targeting congestion are too recent to allow for a thorough examination of their actual effects. However, from a regulatory policy standpoint, the potential role of sector-specific measures in reducing congestion and pollution can be explored.

ITF (2020b) indicates that, in terms of life-cycle energy use and CO_2 emissions, ridesourcing (as it is commonly configured and operated in OECD countries) performs poorly compared to other new mobility services, with the exception of taxis. Taxis and car-based ridesourcing have the highest life-cycle energy requirements and greenhouse gas-emission impacts per passenger kilometre compared to public transport, shared and owned micromobility, bicycles and mopeds. This is due to vehicle kilometres (vkm) that are comparable with private cars (see Figure 1) and the increased emissions on a per-passenger basis that result from empty kilometres travelled (e.g. cruising for passengers and dead-heading from where the vehicle may be when the ride is booked to where the passenger is picked up). Another contributing factor is the additional emissions generated as drivers commute from/to their residence to/from the area of demand for taxis and ridesourcing services.

Figure 1. Central estimates of life-cycle greenhouse gas emissions of urban transport modes per passenger kilometre of travel

Notes: BEV = battery electric vehicle; HEV = hybrid electric vehicle; ICE = internal combustion engine; FCEV = fuel cell electric vehicle; PHEV = plug-in hybrid electric vehicle. These estimates have been developed using key inputs (such as average number of passengers, the electricity mix and the ratio of operational km per active km) defined by global averages (see Annex A for further details and source used) observed prior to the Covid-19 pandemic. Specific circumstances occurring in different world regions, changes in operational practices and the Covid-19 pandemic should, therefore, be modelled as individual specific cases, modifying input data accordingly. Source: ITF (2020b).

App-based mobility's effects on incumbents and sector-specific taxes and levies

App-based technologies have resulted in innovative business models and significant efficiency gains in various industries. However, ridesourcing developed out of a need for reliable transport. Many countries' governments failed for years to effectively regulate the taxi industry, and customers were dissatisfied with taxi services (OECD, 2018).

The biggest operators in the ridesourcing sector continue to post considerable operating losses more than a decade after their initial appearance. Their continued survival and expansion are backed by successive

injections of venture capital despite the high values of initial public offerings. This, in turn, begs the question of whether the current business model – and pricing – is viable over the long-term.

While ridesourcing businesses' ability to sustain loss-making operations in the short term definitely adds to the taxi industry's competitive challenge, the issues at hand appear to be covered by general competition legislation in most ITF countries. Furthermore, given the adoption of similar business models in other areas of the economy, a revision of general competition legislation would appear to be the most appropriate reaction to the extent that competitive protections are deemed insufficient.

Puche (2019) compared the regulation of ridesourcing in two cities in Latin America – Mexico City and Bogotá. Both cities regulated ridesourcing companies' operations following protests from traditional taxi operators. However, the cities followed different approaches. While Mexico City viewed ridesourcing companies as mobility service providers and regulated them accordingly, Bogotá viewed ridesourcing companies as "luxury taxis". In other words, Bogotá set the vehicle-type and fare requirements for ridesourcing companies at par with luxury taxis. Bogotá sought to exclude ridesourcing companies from competing in the mainstream mobility market, authorising them to operate only on equivalent terms to those previously established for luxury taxis. As a result, while ridesourcing companies in Mexico readily complied with the new regulations, those in Bogotá largely refused to register. There is still a demand for ridesourcing services in Bogotá; thus, they operate in a grey area. This highlights the importance of recognising the innovation aspect of app-based services when establishing regulatory measures for them.

Many countries are concerned that regulations that accommodate ridesourcing fail to establish a level playing field among taxis, ridesourcing services and other private-hire vehicles. Many countries' regulations establish or recognise a separation between taxis and other for-hire vehicles (FHVs) with authorised pick-up points and FHVs that operate solely through pre-booked services. Most legislation is specific to the rank-and-hail markets or more acute in those situations than in the pre-booked market. As a result, FHVs in the pre-book market are often subject to softer regulations. However, the justification for tighter regulation of the street-hail sector stems from taxis' limited geographical monopoly (i.e., the consumer has no idea when the next cab choice will come, let alone its price or quality), and there are several informational asymmetries.

Jurisdictions that choose to accommodate ridesourcing services will often regulate ridesourcing vehicles in a more lenient manner than taxis. However, there have been notable disparities in the approach between tiers of government. In the United States, some attempts by local governments to implement stricter regulations on ridesourcing services have failed because state regulations– often by significant ridesourcing lobbyists, as in the case of California – limit what they can do.

The taxi industry frequently criticises the regulation disparity between taxis and ridesourcing vehicles, claiming that it makes it difficult for the taxi industry to compete with ridesourcing. These criticisms have grown as ridesourcing has developed to the point that it is considered an existential threat to the taxi business in many markets. One major difficulty is that efforts to accept ridesourcing expressly within the regulatory framework have not always been supported by a thorough examination and change of taxi regulations. In many jurisdictions, the haphazard accumulation of regulatory requirements over time makes a compelling case for reform, while the significant changes in the market environment brought on by the introduction of ridesourcing create another.

Regulating app-based mobility services in ASEAN member states

The ASEAN region is home to about 650 million people and consists of ten member states: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. The region displays considerable diversity of income, population, skills and contexts that impact the uptake of app-based services.

Digitalisation in ASEAN member states

Recent studies focusing on Southeast Asia have shown that different user preferences determine the use of app-based mobility services: travel distance, characteristics (e.g. income), access to smartphones, and the affordability of mobile data subscriptions, for example (Medeiros et al., 2018). The use of super apps fundamentally depends on three factors: access to mobile internet (including its affordability), digital literacy, and access to banking.

Income and app-based mobility services

Many contributing factors to the uptake of app-based mobility services are linked to income. For instance, the affordability of a smartphone is linked to income (even though the relative affordability of smartphones has decreased as their costs have lowered and the general population's incomes have risen). Likewise, the ability to pay for a data plan – especially one linked to 4G and greater mobile data is also linked to income. Table 1 illustrates the disparity of per capita income among ASEAN member states, with Brunei Darussalam, Malaysia and Singapore all representing an upper bound and Cambodia, Lao PDR, Myanmar and Viet Nam representing the lower bound.

The cost of data plans seems to play a larger role than the cost of smartphones in the discrepancies of access to mobile internet within ASEAN member states. Member states boast uniformly high levels of mobile telephone access. Some lower-income members, like Viet Nam, maintain equivalent rates of mobile telephony subscription (a proxy for access to smartphones) to that of some of the highest-income member states, like Singapore. The exception to such access is in Lao PDR, a significant and low outlier at only 56.4 mobile cellular telephone subscriptions per 100 people.

More pronounced discrepancies emerge when comparing mobile broadband data subscriptions. These data subscriptions enable the use of app-based mobility services – especially geo-localisation and real-time tracking functions necessary for the services to function. High-income member states consistently display higher broadband subscription rates than lower-income member states. That said, some low-income member states display higher data access rates than other low-income member states with higher relative income per capita, as is the case of Cambodia compared to Viet Nam. Overall, however, data access costs seem to be a greater barrier to the use of app-based mobility services than access to smartphones. The cost of mobile data subscriptions as a share of per capita gross national income (GNI) also varies across

the region, with the wealthiest countries displaying the lowest relative cost (e.g. Brunei Darussalam and Singapore) and the lowest-income countries showing the highest relative share (e.g. Cambodia and Lao PDR). Another factor to consider is the striking discrepancies between urban and rural populations; urban populations are generally higher-income, have more mobile phones and display higher rates of mobile broadband subscriptions.

Table 1. Contributing factors to the use of app-based mobility in ASEAN countries

	GDP per capita (purchasing power parity, current USD international)	Mobile-cellular subscriptions (per 100 inhabitants)	Active mobile broadband subscriptions (per 100 inhabitants)	Access to a bank account or mobile money service (% population aged 15+)	Mobile data subscription cost (% per capita gross national income)	Internet users (% of adult population)	Digital skills among active population Scale of 1 - 7 (low - high)
Brunei Darussalam	64 847.7	122.7	124.6	n/d	0.3%	95%	4.9
Cambodia	4 583.0	126.1	98.8	22%	1.6%	40%	3.6
Indonesia	12 334.9	130.0	104.2	49%	1.3%	40%	4.5
Lao PDR	8 172.7	56.4	45.0	29%	2.4%	26%	4.1
Malaysia	29 619.7	135.1	120.0	85%	0.9%	81%	5.4
Myanmar	1 467.6	107.0	96.5	n/d	1.0%	65%	n/d
Philippines	9 302.4	136.5	64.3	34%	1.4%	60%	5.1
Singapore	101 649.1	144.3	144.3	98%	0.4%	88%	5.6
Thailand	19 276.9	166.6	90.3	82%	1.2%	57%	4.3
Viet Nam	8 397.0	142.7	80.2	31%	1.0%	70%	3.8

Source: ITU for GDP, Mobile-cellular telephone subscriptions, Active mobile broadband subscriptions, Mobile data subscription cost and Internet users, except for Myanmar (self-reported) (ITU, n.d.). WEF for Digital skills among active population from (WEF, 2019) – no data for Myanmar. World Bank for Access to a bank account or mobile money service (World Bank, 2022) – no data for Brunei Darussalam or Myanmar.

Digital literacy and app-based mobility services

Countries in the ASEAN region understand the need to digitalise their economies and societies to help achieve sustainability and economic development outcomes. The ASEAN Digital Masterplan 2025 (ASEAN, 2021a) highlights the importance of investment in telecommunication infrastructure to increase quality coverage of fixed and mobile broadband services cost-effectively to both rural and urban parts of the ASEAN member states. The Masterplan also stresses the importance of engagement with schools, communities and charitable organisations to increase digital literacy. The lack of digital literacy in the region is a major barrier preventing the widespread digitalisation of societies in the ASEAN region. In a recent survey conducted by the ASEAN Secretariat in institutions across member states, a majority of the respondents reported that a lack of knowledge and skills is the main reason behind the slow uptake of digital services (ASEAN, 2021a).

Measuring a country's digital literacy is not straightforward. One way to capture digital literacy is to calculate the number of internet users. This combines the user's experience and ease with computers or

mobile devices and the digital services to which the devices provide access. Similarly to smartphone access, high relative income per capita is linked to high rates of internet use. However, the link between per-capita GDP and internet use is weaker at lower-income ranges. For example, Thailand displays lower rates of internet use than Viet Nam, even though the latter has a lower per capita income.

Another way to capture digital literacy is to undertake surveys within each country. The World Economic Forum's Global Competitiveness Report (WEF, 2019) tries to capture digital literacy in establishing country competitiveness benchmarks and rankings. WEF does this by asking key stakeholders the following question: "In your country, to what extent does the active population possess sufficient digital skills (e.g. computer skills, basic coding, digital reading)?" (WEF, 2019). The stakeholders rate their country on a scale of one to seven: one meaning "not at all" and seven meaning "to a great extent". Responses regarding digital literacy in ASEAN member states are also correlated to income. However, the Philippines stand out by displaying relatively elevated levels of digital literacy despite lower per capita income. Digital literacy rates are the lowest in Cambodia and Viet Nam.

App-based mobility services and access to banking

Access to banking is not uniform across ASEAN member states: Cambodia, Lao PDR, the Philippines and Viet Nam show low levels of access to banking or mobile money services. There are great disparities in access to banking services between urban and rural populations. Urban areas have relatively higher rates of access to banking than rural areas. Ridesourcing providers such as Grab have responded to this accessibility gap by offering unbanked customers the ability to make payments through online payment networks, such as GrabPay. Unbanked customers can use alternative data, including e-commerce transactions, to verify creditworthiness (Lee and Lingad, 13 May 2021). Grab's PayLater service, which lets loyal app users delay payment on goods and services, could also expand payment options (Grab, nd). In addition, commercial banks and super app companies have started to collaborate. For example, in 2018, Thailand's Kasikorn Bank teamed with Grab to develop GrabPay by KBank, an e-wallet for unbanked customers (Leesa-Nguansuk, 2019). After obtaining financing from Gojek in 2021, Indonesia-based bank Jago rose to become one of the country's most valuable publicly traded companies. It plans to co-operate with Gojek to incorporate its financial services on the super app's platform (Guild, 2022).

Not all ASEAN member states are equally positioned for the mass adoption of app-based mobility services. The services' widespread adoption will clearly be easier in member states with higher per capita incomes, higher mobile telephony rates and mobile broadband access, higher internet use and elevated digital literacy rates, and high rates of banking access. Other member states are either challenged by lower mobile broadband access, lower digital literacy or lower rates of access to banking services often, but not always strongly linked to lower per capita incomes. Cambodia, Lao PDR and Viet Nam are all on the lower bound of ASEAN member states with respect to the framework conditions for the uptake of app-based mobility. In all cases, rural areas are likely to be less prepared for the uptake of these services than urban areas. This may need to be addressed in policy – even for those member states otherwise displaying a high predisposition for the uptake of app-based mobility.

Surveys and interviews on app-based mobility in ASEAN

The data in this study were collected via a survey and follow-up interviews with each ASEAN member state. A questionnaire was designed as part of this study and was sent to relevant ministries in each member state by the ASEAN Secretariat in February 2021. The goal was to gather background information from each of the responding ministries on the following:

- the app-based mobility services landscape in each country
- existing regulations relating to app-based services
- inter-ministry collaboration on regulating app-based services
- the impact of the Covid-19 pandemic on app-based services
- expectations for the future regulation of app-based services.

By the end of June 2021, the ASEAN Secretariat received a total of 17 complete responses from all ten ASEAN member states. Most questionnaires were completed by the country's Ministry of Transport, though a few were complemented by other relevant public authorities at the national and sub-national levels.

The ASEAN Secretariat conducted follow-up interviews between March and June 2021 to clarify questions that arose from survey responses. It asked further questions on the benefits and challenges associated with app-based mobility services, challenges associated with the services' regulation, challenges presented by the Covid-19 pandemic in the transport sector and the role of app-based mobility, and future regulations for app-based mobility.

App-based services in the ASEAN member states: State of play

Today, super apps (i.e. Grab and GoJek) offer most app-based mobility services in the ASEAN region. However, some app-based services, such as on-demand buses and app-based moving services, are offered by other service providers (i.e. SWAT, Transpotify and Skootar). Indonesia, the Philippines, and Singapore have almost all these services operating legally in their countries. On the other hand, far fewer services operate in Brunei Darussalam, Cambodia and Lao PDR. Interviews with these countries suggest that these services are hindered by limited internet coverage and access to smartphone apps and banking. A wide range of app-based mobility services operate in Malaysia, Thailand and Myanmar, but many are not yet legally recognised. Discussions with those countries indicated that regulators recognise the benefits these services offer to the economy and the transport sector. As a result, they allow the services to operate in an unregulated manner as they consider the appropriate regulatory response. Table 2 shows the regulatory status of app-based services in each ASEAN member state.

Table 1. Regulatory status of app-based services in the ten ASEAN member states

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Ridesourcing (car) (e.g. Grab Car, gocar)	OL	OL	OL	OIL	OL	OIL	OL	OL	OL	OL
Ridesourcing (moped/motorcycle) (e.g. Go-Jek, Grab Bike, goride, Dego Ride)	NA	NA	OL	OIL	NA	OIL	OL	NA	OIL	OL
Ridesourcing (three-wheeled) (e.g. ThoneBane)	NA	OL	OL	OL	NA	OIL	OL	NA	OIL	NA
Peer-to-peer ridesharing (e.g. Grab, Hitch)	NA	NA	OL	NA	NA	NA	OIL[1]	OL	NA	NA
On-demand buses (e.g. SWAT)	NA	NA	OL	NA	NA	NA	NA	OL	NA	NA
Bicycle sharing (e.g. SG Bike)	NA	NA	OL	NA	OIL	NA	OL	OL	NA	OL
E-push scooter sharing (e.g. Grab Wheels)	NA	NA	NA	NA	NA	NA	OL	Discontinued	NA	NA
Motor scooter sharing (e.g. Go Share, WeMo)	NA	NA	OL	NA	NA	NA	NA	OL	NA	NA
Carsharing (e.g. BlueSg)	NA	NA	OL	NA	NA	NA	OIL	OL	OIL	NA
Point-to-point delivery of sensitive documents/cheques/cash (e.g. Skootar)	NA	NA	OL	NA	NA	NA	OL	OL	OIL	NA
Point-to-point delivery of parcels (e.g. Grab Express, gosend)	OL	OL	OL	OL	OIL	OIL	OL	OL	OIL	OL
Food delivery services (e.g. Foodpanda, Grab Food, gofood)	OL	OIL	OL	OIL	OIL	OIL	OL	OL	OIL	OL
Grocery delivery (e.g. Grab Mart, gomart)	NA	OIL	OL	OIL	OIL	OIL	OL	OL	OIL	OL
App-based moving services (e.g. Transpotify)	NA	NA	OL	NA	OIL	NA	OL	OL	NA	OL

Notes: OL: Operating legally; OIL: Operating, but not legally recognised by the regulatory framework; NA: Not available.

[1] Peer-to-peer ridesharing was operating legally before the pandemic. However, during the time of the survey, which took place during the pandemic, ridesharing was temporarily suspended. Ridesourcing operators have requested that the suspension be lifted. The Philippines' Land Transportation Franchising and Regulatory Board is currently considering whether or not to do so.

This table reflects the responses provided by ASEAN member countries in the survey and interviews conducted by the ITF.

In most cases, app-based mobility services are offered by private companies. However, there are a few public undertakings or public-private partnerships that offer app-based services. This is especially the case

in Viet Nam, where both state and private enterprises provide ridesourcing services. For example, MyGo, one of the ridesourcing service providers in Viet Nam, is owned and operated by the state-run Viettel Post. Table 3 indicates which services are operated as a private, public or public-private partnership undertaking in ASEAN member states.

Table 2. Business model of app-based services in each of the ten ASEAN member states

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Ridesourcing (car) (e.g. Grab Car, gocar)	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt, Pub
Ridesourcing (moped/motorcycle) (e.g. Go-Jek, Grab Bike, goride, Dego Ride)	NA	NA	Pvt	Pvt	NA	Pvt	Pvt	NA	Pvt	Pvt, Pub
Ridesourcing (three-wheeled) (e.g. ThoneBane)	NA	Pvt	Pvt	Pvt	NA	Pvt	Pvt, PPP	NA	Pvt	NA
Peer-to-peer ridesharing (e.g. Grab Hitch)	NA	NA	Pvt	NA	NA	NA	Pvt	Pvt	NA	NA
On-demand buses (e.g. SWAT)	NA	NA	Pvt	NA	NA	NA	NA	Pvt	NA	NA
Bicycle sharing (e.g. SG Bike)	NA	NA	Pvt	NA	Pvt	NA	Pvt, PPP	Pvt	NA	Pvt, PPP
E-push scooter sharing (e.g. Grab Wheels)	NA	NA	NA	NA	NA	NA	Pvt	NA	NA	NA
Motor scooter sharing (e.g. Go Share, WeMo)	NA	NA	Pvt	NA	NA	NA	NA	Pvt	NA	NA
Car-sharing (e.g. BlueSg)	NA	NA	Pvt	NA	NA	NA	Pvt	Pvt	Pvt	NA
Point-to-point delivery of sensitive documents/cheques/cash (e.g. Skootar)	NA	NA	Pvt	NA	NA	NA	Pvt	Pvt	Pvt	NA
Point-to-point delivery of parcels (e.g. Grab Express, gosend)	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt, Pub
Food delivery services (e.g. Foodpanda, Grab Food, gofood)	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt
Grocery delivery (e.g. Grab Mart, gomart)	NA	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt	Pvt
App-based moving services (e.g. Transpotify)	NA	NA	Pvt	NA	Pvt	NA	Pvt	Pvt	NA	Pvt, Pub

Notes: Pvt: private; Pub: public; PPP: public-private partnership; NA: not available.
This table reflects the responses provided by ASEAN member countries in the survey and interviews conducted by the ITF.

How regulators in ASEAN member states react to app-based mobility services

ASEAN member states identified several benefits of app-based mobility services in their survey responses and interviews. Among the most agreed-upon benefits were the alternatives they offer to traditional transport, most notably during the Covid-19 pandemic. However, member states' responses also showed how aware the region is of the regulatory challenges app-based mobility services pose.

Table 4. Benefits of app-based mobility services and the regulatory challenges they pose in the ASEAN member states

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Benefits										
Consumer benefit, pricing and integration into public transportation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
National vision with digital technologies								✓		
Alternative modes of transport during Covid-19	✓	✓	✓		✓	✓	✓	✓	✓	✓
Job opportunities and contribution to the economy			✓	✓	✓	✓	✓	✓	✓	
Challenges										
Unequal access to app-based services	✓			✓		✓		✓		
Threat to incumbent services	✓	✓	✓		✓	✓	✓	✓	✓	
Rider and driver safety		✓	✓	✓	✓	✓	✓	✓	✓	
Environmental concerns		✓		✓	✓	✓	✓	✓	✓	
Regulators spread over ministries	✓	✓	✓		✓	✓	✓	✓	✓	✓
Privacy and data analysis for regulation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Need to modify regulations with the evolution in technologies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Impacts of Covid-19 pandemic	✓	✓	✓		✓	✓	✓	✓	✓	✓

Notes: Checkmarks correspond to *potential* benefits or challenges as identified by respondents and interviewees. They do not necessarily represent *actual* benefits and challenges in ASEAN member states. This table reflects the responses provided by ASEAN member statesin the survey and interviews conducted by the ITF.

Benefits of app-based mobility services

There was a common view across all ten ASEAN member states that app-based mobility services increase consumer welfare by providing a more convenient travel option than incumbent services in many instances. As a representative from Malaysia put it, "App-based services are borne out of necessity in Malaysia. Despite several initiatives by the government, the quality of service provided by the regular taxi services has been on a decline in Malaysia. App-based services provided a technological solution to that problem."

In some cases, app-based mobility services are viewed as an instrument for achieving national goals. In Singapore, for example, where app-based mobility services could complement the public bus and train networks, they help the country meet the national goal of developing a well-connected land transport network. Representatives from Singapore stated that "app-based services bring greater convenience to commuters with more point-to-point options, and they get to enjoy better service standards than before. With the better matching of demand and supply enabled by technology and a flexible driver pool, commuters also enjoy shorter waiting times for both street-hail and ride-hail journeys. All these have resulted in a more connected land transport network that complements our public bus and train network. App-based bicycle sharing will help Singapore progress towards being a car-lite and sustainable city as such services provide convenient commuting options to cover the first and last mile".

Singapore has a well-established vision for the future of transport in the country and a plan to integrate digital transport technologies into its transport system. However, other countries in the region are still in the process of developing that vision.

Representatives from Myanmar explained in their interview that the Ministry of Transport and Communications is responsible for introducing an Intelligent Transport System (ITS) in Myanmar and is still seeking external support to develop its ITS masterplan. The objective of the ITS masterplan is to leverage whatever digital technologies may improve the country's transport system. The ITS masterplan already encompasses using digital technologies for traffic management and road safety, and the Myanmar interviewees recognise the importance of adding app-based services to the ITS masterplan. However, they are unsure how to do so. This should be a priority area for capacity building and training, in which Myanmar could benefit from a dialogue with countries that have made better progress towards these goals.

Many countries view app-based services as an important source of employment. The contribution of ridesourcing services was especially important before the Covid-19 pandemic. This became apparent when countries had to issue relief packages to supplement the reduced incomes of "gig economy" drivers. In Singapore, for example, the government introduced a series of relief funds (i.e. Point-to-Point Support Package and Covid-19 Driver Relief Fund) to provide targeted assistance to the Point-to-Point transport service sector and its drivers from February 2020 to February 2022 (LTA, n.d. a, n.d. b).

Policy makers in the Philippines noted many benefits of app-based mobility. In addition to expanding the mobility options available to the country's residents, app-based mobility services seemed safer than public transport during the Covid-19 crisis.

In Cambodia, public authorities view the popular three-wheeled ridesourcing services and app-based delivery services as additional modes in the transport system. They are perceived to improve consumer welfare by providing more convenient and higher-quality travel options than incumbent services.

Almost every country indicated the importance of app-based mobility services during the pandemic. App-based delivery services provided people access to food, groceries, medicine, and parcels during home-

confinement orders. App-based services helped small businesses stay afloat and provided alternative employment to people who lost their jobs because of the pandemic

During the pandemic, as the perception of contagion risk rose, most public transport services operated on a reduced schedule and at limited capacity. Ridesourcing services were seen as convenient and safer modes of transport. During the acute phases of the pandemic, almost every ASEAN member state adopted some form of Covid-19-related restrictions on ridesourcing services, including limiting the number of passengers per ride and requiring passengers and drivers to wear face masks.

Challenges of app-based mobility services

ASEAN member state representatives and interviewees noted that app-based mobility services in the ASEAN region face a multitude of challenges. These are addressed below.

Bridging a gap or creating a divide? Unequal access to app-based services

Representatives from Myanmar, Lao PDR and Brunei Darussalam underscored the issue of unequal access to app-based services among the population in their countries. Accessing such services requires internet bandwidth, banking services and a certain level of digital literacy. In some of these countries, internet access is only available in major cities. Even the peri-urban areas of major cities sometimes lack internet access. Moreover, individuals with poor digital literacy also tend to be among the most vulnerable: less educated, lower-income or older individuals.

Societies' increased reliance on app-based services could further exacerbate social inequities by creating unequal access to even basic transport services. Those with easy access to app-based services may benefit from enhanced access to jobs, health care, education and other critical services, while those without will be excluded even further. As a representative from Myanmar explained, "The Covid-19 pandemic led to the shutdown of public transport systems, such as bus services**.** Consequently, there was a large uptake in the use of app-based services to order food and door-to-door mobility services offered by motorbikes. However, many people do not know how to use such applications and lack internet access. There are no educational programmes to enhance digital literacy." Myanmar's forthcoming ITS masterplan may include action items to improve digital literacy and widen internet access in the country.

Brunei Darussalam also indicated that some of the existing app-based mobility services are not user-friendly. This ends up excluding those who may be literate but not technologically savvy enough to use these services easily.

Are app-based mobility services a threat to incumbent services?

Some interviewees expressed concerns about competition between app-based mobility services and incumbent transport services like conventional taxis and informal transport services. Representatives from Cambodia noted that the arrival of the app-based mobility services decimated local cycle rickshaw-based services. Interviewees from Brunei Darussalam said, "app-based hailing services also face resistance from traditional taxi services. The problem is that many traditional taxi drivers are left with no option but to join the app as drivers due to market competition." The interviewee continued by saying that the former taxi drivers then had "to pay a hefty fee to the service providers, leading to reduced wages for the drivers".

Interviewees from the Philippines also perceived unequal competition between app-based services and conventional taxi services. Indonesia has attempted to address such concerns. The regulatory framework developed in Indonesia has sought to ensure fair competition between app-based and non-app-based mobility services through consultations with the private sector. The result was a set of minimum and maximum fares that may be charged. The minimum fare putatively protects drivers, while the maximum

protects riders. The minimum value corresponds to the minimum wage the driver must earn after accounting for the costs incurred by providing the service. This fare is set by the local governments. However, fixed fare minimums (e.g. non-indexed to the number of trips) do not necessarily result in a guaranteed minimum wage since they depend on the number of trips taken at or above that fare. Fare-setting can only guarantee a minimum income if the post-fare increase utilisation rate is known (and thus monitored).

Rider and driver safety

Almost all interviewees noted that road safety is a major issue. As motorcycle ridesourcing services grew in popularity, so did the number of motorised two-wheeler crashes and their severity. This concern was highlighted, for example, by representatives from Cambodia and Malaysia, as both countries have experienced an increase in road crashes involving ridesourcing services using these vehicles.

App-based mobility services can also represent a counter-balancing source of improvement in road safety because they increase driver accountability, given that their name and vehicle registration is known to the passengers and the platforms. Teo, Mustaffa and Rozi (2018) find that both women and men choose app-based ridesourcing services based first and foremost on the services' perceived safety. The convenience and price of these services, though important, carried less weight than safety. Congestion is also an issue, not just for safety but also for the environment. The Thai government has identified the contribution of large numbers of ridesourcing vehicles to traffic congestion as a concern, especially in Bangkok and its vicinity. Representatives from Cambodia, the Philippines and Malaysia expressed the same concern.

Regulatory authority falls under a variety of ministries

Super apps combine mobility, non-mobility and delivery services. As such, a common challenge in regulating app-based mobility services is knowing which regulatory body should do so. Many countries have a hard time determining which ministry should take the lead in regulating these services. A comment from Brunei Darussalam during their interview addressed this conundrum: "The main challenge in regulating app-based services is the confusion regarding which ministry should lead the task. The Land Transport Department is only in charge of passenger mobility, whereas freight mobility comes under the purview of AITI [Authority for Info-communication and Technology Industry]".

The Philippines experience a similar situation. There, app-based services are subject to two regulatory agencies. The Land Transportation Franchising and Regulatory Board, attached to the Department of Transportation (DOTr), issues franchises or Certificates of Public Convenience (CPC) for public transport conveyances. The Department of Information, Communication and Technology (DICT) gives authority to operate to app-based services engaged in the business of parcel messenger services or the transport of property similar to mail or parcels.

Ministries in most countries regulate the aspect of these services that falls under their purview. For instance, operational aspects of passenger mobility services are regulated by a ministry responsible for transport policies. In contrast, the ministry responsible for telecommunications regulates the aspects related to digital markets, apps and data-sharing requirements. Delivery services go largely unnoticed as most countries have not yet identified if they should be regulated, how and by whom.

In Cambodia, for example, the regulation of app-based services falls under the purview of the Ministry of Commerce, the Ministry of Telecommunication, and the Ministry of Public Works and Transport. The Ministry of Commerce is the first point of contact for the new service providers. They issue permits, register new businesses, and forward the documents to taxation departments. The Ministry of Telecommunication is responsible for regulations of smartphone apps associated with app-based mobility services. The Department of Land Transport, Ministry of Public Works and Transport is primarily

responsible for the regulation of passenger mobility services and, in particular, has the primary responsibility for issuing business licences for "digital technology services for domestic road transport" (MPWT, 2021). Cambodia has no designated ministry for regulating app-based delivery services. This same pattern of different ministries regulating app-based services also holds true in the Philippines, Brunei Darussalam, Myanmar, Indonesia, and Viet Nam.

Many of these countries explicitly mentioned that the lack of co-ordination among concerned ministries inhibits them from efficiently regulating app-based mobility services. The representatives from Myanmar explained that no governmental body had been assigned the responsibility of taking the lead on introducing and regulating app-based mobility services. They said, "There is a need for negotiations among relevant ministries and stakeholders in the country. A higher political commitment is critically important to develop app-based mobility services in Myanmar."

Even at the sub-national or regional levels, restrictions that could be introduced on app-based mobility do not come under the responsability of one authority. For instance, Myanmar explained that regional governments issue permission to operate transport services, not the national government. However, in some cases, traffic police and other national regulatory bodies issue separate guidelines for app-based mobility service providers.

Several ASEAN member states have successfully managed to circumvent this lack of co-ordination among regulatory authorities. Singapore, for example, is the only country that has managed to streamline the regulation of app-based services by concentrating almost all regulating responsibilities in one agency, the Land Transport Authority (LTA), a statutory board under the Singapore Ministry of Transport. LTA regulates ridesourcing and bicycle sharing through different departments, each of which addresses specific aspects of app-based mobility services. As of early 2022, delivery services were out of the regulations' scope. Nonetheless, some ridesourcing services (labelled point-to-point (P2P) services in Singapore) also use their vehicles for delivery services. In March 2020, LTA temporarily liberalised P2P regulations to allow taxis and private-hire vehicles to be used for delivery services. Data on vehicle use for delivery by licensed ride-hail operators is collected by LTA. Such data include the number of trips completed and the average income earned per driver. LTA does not collect data from companies that do not engage P2P vehicles for delivery services (e.g. FoodPanda).

Malaysia follows a unique approach regarding the regulation of app-based mobility services. The responsibility for regulatory design is delegated to a special task force, the Malaysia Digital Economic Operation Committee (MDEC). The MDEC comprises representatives from a variety of ministries that regulate different aspects of app-based mobility services. The task force allows for co-ordination between the relevant ministries and helps in designing efficient regulations.

Some countries have developed a vision regarding the potential contribution of digitalisation to broader social welfare but have not yet acted to address efficient regulation of app-based services within that context. For example, Myanmar is currently seeking the ASEAN's Development Partners' assistance to develop a national intelligent transportation system (ITS) masterplan that would provide guidance on how new digital technologies should be used in the transport system. Myanmar interviewees believe that app-based mobility services could be integrated into this masterplan. They expect that the common vision outlined in the masterplan will pave the way for a co-ordinated effort to regulate app-based mobility services among all relevant stakeholders. Similarly, Brunei Darussalam wishes to regulate app-based mobility services under the vision laid out in its Digital Economic Masterplan.

Gathering, analysing and sharing data analysis for better regulation

Governments need regular access to data on app-based mobility services. Without it, they cannot understand how app-based mobility services are operating, the impacts they have on society, how to design appropriate regulations or monitor the implementation of the prescribed regulations. Using data on app-based mobility services will present different challenges in each ASEAN member state, depending on the level of development of the member state's regulatory framework. Some of those challenges are:

- Developing the necessary infrastructure for data collection and analysis: A few countries in the ASEAN region need to develop the infrastructure required to meaningfully analyse operational data from app-based mobility services. For instance, Myanmar indicated that they have no integrated geographic information system (GIS) database. In addition, some urban areas in Myanmar have no zip code or other form of harmonised spatial coding. It would be critical to create a base spatial context to analyse app-based mobility service data. Without it, there is no way to understand the spatial characteristics and impacts of app-based mobility services, complicating the task of developing appropriate and efficient regulations. Cambodia expressed the need for a digital infrastructure to access and store app-based mobility service data. But digital infrastructure alone is not enough: there must be technically trained staff with the ability to manage and process data. Interviewees from Malaysia recognised that when they stated, "One challenge that remains regarding the regulation of app-based services is the management of big data, which is associated with these services. There is a need for analysts in ministries who can manage this data and use it for regulatory purposes." There is also a need to create proper channels that would allow ministries to share the data they collect.
- Accessing operational datasets from the service providers: Data sharing and data reporting are two fundamental and complementary pillars of mobility data governance frameworks. Data sharing refers to sharing information among market actors and other stakeholders that facilitate the delivery of mobility and other services, as well as the smooth operation of transport markets (ITF, 2022). Data reporting refers to information provided to public authorities by stakeholders and market participants that allows the authorities to monitor, direct, or intervene in the implementation of public policy (ITF, 2022). Some types of data sharing may aid in the implementation of broader public policy goals. Data exchange between mobility operators and mobility service integrators can improve intermodal efficiency by potentially reducing inefficient car use. Travellers can be better informed and nudged to support agreed policy outcomes by receiving a timetable and real-time system performance and service availability data. These sorts of data sharing do not need direct reporting to government agencies but may require reporting on how well and transparently data is shared to assess the impact of such efforts or regulations (ITF, forthcoming). Despite its benefits, data sharing is still not widely adopted. The interviewees from Indonesia noted that a major challenge in their country was service providers not reporting data. Without the most basic data, it is hard to know even how many drivers and delivery personnel are providing the app-based services and to estimate if the supply is sufficient to meet the travel demand. Interviewees expect that forthcoming laws and regulations in Indonesia will allow them to access this information from service providers.
- Validating statistics provided by service providers: Representatives from Brunei Darussalam and the Philippines noted that they receive regular information about the operation of app-based services (e.g., operating time, number of vehicles and drivers) in the form of reports and infographics. However, they are concerned about how to validate the information's accuracy. The interviewees from the Philippines would prefer to have their own data sources and capacity to

analyse and monitor the performances of app-based services. Directly accessing and analysing operator data is one way to monitor service performance (ITF, 2021c). The interviewees described pilot initiatives that monitor bus operation via automatic and geo-localised fare collection systems. Similar monitoring could be applied to other commercial services. The Philippines also noted that the data collected and analysed in this way can be used for general transport planning purposes (e.g. creating origin-destination matrices or identifying high-activity zones).

Singapore seemed to have the most well-defined data reporting requirements for service providers among the countries surveyed. For ridesourcing services, licensed operators are required to submit monthly trip data (e.g. the number of trips, distance travelled, pick-up and drop-off points, fare, date and time of trips) and driver and vehicle data (e.g. the profile of the safety operator and vehicle, the hours engaged with the passenger versus the number of hours active on the ride-hailing platform). The Point-to-Point (P2P) Transport Division uses the data to monitor the sector and ensure operators' compliance with the safety and service quality standards set by the LTA. The collected data are also used for other transport planning purposes. Operators of bicycle-sharing services are required to provide bicycle location and trip data to the LTA regularly. The data are used to track operators' compliance and guide enforcement. Data collected from bicycle-sharing operators also provide insights for transport planning. The LTA in Singapore does not collect data from food- and goods-delivery service providers (but for those delivery services using regulated P2P vehicles).

Create flexible regulations that evolve with technology

ASEAN member states that have already begun regulating app-based mobility services share the view that regulations must be flexible enough to be modified as technologies evolve. Interviewees from Indonesia noted that they have already modified their app-based mobility service regulations three times. Such regulatory flexibility has allowed the country to adapt as the technology has changed and the services' impacts have become better understood. Singapore closely follows the changes in apps to re-evaluate their regulations as necessary. The Philippines, which has a cap on the number of ridesourcing vehicles that can operate in each jurisdiction, has considered – but not yet implemented – updating the caps periodically based on fluctuating demand.

Impact of the Covid-19 pandemic on regulations

The Covid-19 pandemic had a significant impact on the transport sector across the world, including in ASEAN member states. Changes in transport demand and supply due to lockdowns and social distancing measures have resulted in changes in regulation for both conventional transport and app-based mobility services. For example, in Brunei Darussalam, where the Covid-19-induced drop in tourism severely affected the economy, regulations restricted both the capacity and frequency of buses. In addition, there were social distancing and sanitary guidelines for public transport services: the Bru-health app identified individuals recovering from Covid and restricted their movement in public transport vehicles. In Malaysia, special restrictions were also enforced for ridesourcing services. For instance, only two individuals (the driver and one passenger) were allowed in a ridesourcing vehicle.

The majority of ASEAN member states highlighted that app-based delivery services provided resilience in the transport sector during the Covid-19 crisis, despite the pandemic's evident disruption. In Malaysia, app-based delivery services allowed users to access food and other goods from their homes while the frequency and capacity of transport services were sharply reduced.

In Thailand, the government collected data on travel behaviour during the pandemic through several initiatives, including its Covid-19 Management Center, which was charged with raising public awareness of transport services during the pandemic and provided a 24-hour hotline for complaints and questions. The

information and communication technology centre of Thailand's Ministry of Transport created a database and mobile application to share information on public transport routes and services. While public transport operators started to reduce the frequency of services, the use of app-based mobility services, including delivery services, increased compared to pre-pandemic periods. The number of users rose for all of the ten most popular Thai app-based delivery services (LINE MAN, foodpanda, GET Food, Grab Food, Lalamove, honestbee, SKOOTAR, HappyFresh, 7-Delivery, and EATDER).

In Viet Nam, in response to the Covid-19 pandemic, the Ministry of Transport implemented new measures on transport services in collaboration with other related ministries and agencies. These measures included compulsory requirements for drivers, service staff and passengers to comply with the guidelines implemented by the Ministry of Health (e.g. facemask wearing, disinfection, social distancing, no gathering, and filling out a health declaration). In addition, in a few stages of the Covid-19 pandemic, app-based mobility services filled transport service gaps and supported the local economy by ensuring that small businesses were able to operate through app-based delivery services.

Classifying regulations for app-based mobility services

The ITF collected the information provided by ASEAN member states in their surveys and interviews. It then categorised the current regulations of app-based mobility services in the ASEAN member states. Table 5 provides the different category types, a brief explanation of each, and shows in which countries they have been implemented.

Market-entry regulations

Market-entry regulations define the conditions services providers must meet to operate legally. These regulations ensure that service providers are competent to provide quality services and maintain fair market competition. Market-entry regulations generally require would-be service providers to obtain a licence or permit from the respective legal authorities in order to operate. Where the regulatory frameworks for app-based mobility services are in early development phases, incumbent services (e.g., street-hail taxis) can apply pressure so that app-based mobility services be subject to similar requirements as traditional taxi services.

For instance, Brunei Darussalam and Cambodia have licensing requirements for traditional street-hail and ridesourcing vehicles. Even in the Philippines, where the regulatory framework for app-based mobility is slightly more developed, the overall perception is to ensure that app-based services are subject to the same level of regulation as the incumbent taxi services. Both the Philippines and Indonesia have caps on the number of vehicles that can operate as ridesourcing vehicles. Indonesia periodically reviews its caps, assessing different factors such as the demand for ridesourcing. It then revises the maximum number of ridesourcing vehicles allowed in operation if necessary.

In other cases, service providers must meet certain prerequisites before entering the market (e.g. including having a minimum bank balance). These prerequisites are intended to ensure the capability of the service providers and the quality of the service they will provide. Malaysia, which is in the process of drafting more detailed regulations for app-based services, has applied such prerequisites. In Singapore, ridesourcing operators with a fleet size of 800 or more vehicles must apply for a Ride-hail Service Operator License with the Land Transport Authority (LTA). Under the license, ridesourcing service providers are held to higher standards of safety and quality of service.

Table 5. Regulations of app-based mobility services in the ASEAN member states as of 2022

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Market entry regulations (licensing, insurance, caps on number of vehicles, minimum bank balance, specific locations)	✓	✓	✓		✓	✓	✓	✓	✓	✓
Operational requirements for passenger mobility services to protect incumbent industries			✓				✓		✓	✓
Operational requirements for food delivery services to protect incumbent industries			✓				✓			✓
Safety requirements (driver training, specific restrictions for vehicle types)		✓	✓		✓	✓	✓	✓	✓	
Environmental requirements (types of vehicles, caps on the number of vehicles, congestion charges)			✓		✓	✓	✓			
Minimum wage requirements for drivers			✓				✓			
Pricing requirements (fees controlled by the government, private sector consultations)			✓				✓	✓*	✓	
Data-related requirements (reporting, sharing, storing, electronic transactions)	✓						✓	✓	✓	✓
Covid-19-related restrictions (zoning, operational hours and rules)		✓	✓		✓	✓	✓		✓	

*Singapore does not regulate fare levels, leaving those to market forces. However, they require fare transparency and, in particular, flat fares must be made clear to commuters at the point of booking for ride-hail trips. This table reflects the responses provided by ASEAN member states in the survey and interviews conducted by the ITF.

Authorities may also choose regulation that limits the licensed service provider's area of operation. Specifying the geographical range in which service providers may operate ensures that service levels are similar across a given region and not concentrated in city centres or high-business areas. In Viet Nam, ridesourcing vehicles must have a "locality badge" and provide service in the relevant area for 70% of their operating time. The same regulation applies to both state-owned and private ridesourcing companies.

In Myanmar, the regional government controls the entry of new mobility service businesses. The Department of Transport Planning under the Ministry of Transport and Communications publishes the necessary licenses and permits that allow operators to run their businesses.

Operational requirements for ridesourcing and food delivery services

The surveys asked regulators in the ten ASEAN member countries to report on which regulations affect the day-to-day operations of ridesourcing and food delivery services. Such regulations are typically intended to ensure consumers' and drivers' safety, reduce the negative environmental impacts of these services and protect the labour rights of the employees or freelancers engaged in providing such services.

In most countries, ridesourcing services have more restrictions than goods- or food-delivery services. Most countries indicated in their follow-up interviews that they leverage the existing regulatory framework for incumbent passenger mobility services to regulate new app-based mobility services. That said, many of the new app-based goods- and food-delivery services do not have equivalent incumbent services operating in these countries and go largely unregulated. However, this is not the case for Indonesia and the Philippines, where both delivery and mobility services are regulated.

Safety requirements for app-based mobility services

To ensure passenger safety and minimise crashes, seven out of ten ASEAN member countries have background check requirements for drivers of ridesourcing vehicles and require that the drivers be properly trained. The representatives from Cambodia expressed concern that many drivers currently providing three-wheel ridesourcing services never received formal training to operate these vehicles. The issue of driver training extends beyond ridesourcing to the entire population of drivers. Where training is generally poor and licensing un-rigorous, drivers of all vehicles pose safety risks. It may be necessary to impose supplementary background checks and training for ridesourcing drivers given that they will drive further and longer than other drivers, thus posing a proportionally higher safety risk.

Regulations in Cambodia require app-based service providers to report the number of vehicles and the vehicle and driver details for their operational fleet on a monthly basis (MPWT, 2021). There are also plans to issue guidelines regarding the training of drivers.

Thailand implemented safety-related requirements that should be reported and compliant with Thailand's transport regulations. Such requirements include safety equipment, the type of vehicles, driver information and the operator's delivery routes.

In Malaysia, two-wheeled ridesourcing services have been discontinued due to the high number of road crashes involving motorcycles. Malaysian policy makers believe that motorcycle ridesourcing services are a major innovation but require a solid regulatory and enforcement programme to include them in the transport system safely. They have plans to revisit the regulations for two-wheeled ridesourcing to include proper training and background checks for drivers.

In Singapore, the Land Transport Authority cancelled plans to offer e-scooter-sharing licences following the prohibition of e-kick scooters on all footpaths in 2019. This was done to address public safety concerns arising from the use of such devices.

Environmental requirements

A common restriction in app-based services is applied to the type of vehicles (year, make and model) that can be used to provide the services. The deteriorating air quality in some major cities is a considerable concern in ASEAN member countries. Regulating the type of vehicle used to provide app-based services ensures that highly pollutive vehicles are not part of the operating fleet.

The Thai and Philippine governments are concerned about ridesourcing's contributions to traffic congestion. In the Philippines, the ridesourcing regulator capped the number of vehicles that can operate

on ridesourcing platforms. While the cap addresses the congestion problem, it also creates a de facto barrier to competition, making it impossible for new ridesourcing services to enter the Philippine market.

Myanmar has introduced price-based regulations to battle congestion in some regions. They can take the form of charging fees on ridesourcing services, for example.

Minimum wage requirements for drivers

Only four of the ten ASEAN member countries have a minimum wage requirement for drivers providing app-based mobility and delivery services. In Indonesia, for example, ridesourcing services in each province have a minimum and maximum fare based on the province's minimum wage.

Requirements for pricing app-based mobility services

Some ASEAN countries have established regulations on pricing app-based mobility services. The representatives from the Philippines, for example, believe that effective regulation can magnify the positive benefits of app-based mobility. They noted that a level playing field between the app-based services and incumbents (e.g. taxis) is crucial. For this reason, the Philippines set pricing and fares for services provided by ridesourcing vehicles (locally called transport network vehicles) at a rate comparable to those for traditional taxis. Local governments in Indonesia have made a similar move, establishing a minimum and a maximum fare for app-based services.

Representatives from Thailand's Ministry of Transport noted that drafting the regulations was a bigger challenge than operationally implementing them on the ground. Nonetheless, Thailand issued its Ministerial Regulation on Ride-Hailing Service by Electronic Platforms (B.E. 2564 – 2021), which includes the following components, both of which came into force in late 2021: A Ministry of Transportation Notification on fares and other service fees for digital platform-mediated ride-hailing services and; a Department of Land Transport notification on system specification and approval criteria for electronic ride-hailing platforms and service providers (Bunruangthaworn and Suppakrucha, 2022).

Data-related requirements: Reporting, sharing and storing

One of the major challenges to regulating new mobility services is the lack of specialised public authority staff with the skill and equipment to manage, analyse and act on data from app-based mobility services. Representatives from the Philippines said they currently receive operations reports from app-based service providers with information on the number of vehicles operating, waiting times, and more. However, authorities lack the capability to audit and assess the accuracy and veracity of this information. Some interviewees noted that they felt they would benefit from having access to mobility operator data and the technical skills necessary to monitor the performance of these services. They added that automatic fare collection systems utilising vehicle telemetry and GPS were being trialled in buses in the Philippines. They also noted that the data collected could be used for general transportation planning purposes (e.g. creating origin-destination matrices and identifying high-activity zones).

The Vietnamese government issued a decree regulating ridesourcing and other automobile-based passenger transport services (Decree No. 10/2020/ND-CP dated 17 January 2020 on auto transport business and conditions for auto transport business, effective from 1 April 2020. Unofficial transcription available at LawNet (2020)). The decree classifies app-based mobility service providers into two categories:

- Purely digital service providers that only provide software and platforms for drivers and clients to match travel requests with available vehicles. These providers do not directly operate vehicles, nor employ or effectively control drivers, nor do they determine transport fares.
- Other digital service providers that provide ride-matching software and platforms and perform at least one of the three stages of transport service provision (operating vehicles, effectively exerting direct or indirect control of drivers, or setting fares).

According to Article 35 of the decree, the first type of provider must comply with legislation on electronic transactions and other relevant regulations. The second type of provider must comply with regulations on business and business conditions for transport by automobile, legislation on electronic transactions, and other relevant regulations and requirements (for an unofficial transcription, see LawNet, 2020).

Covid-19-related restrictions

The Covid-19 crisis has had a profound impact on ASEAN member countries' transport systems, challenging their resilience and sustainability. During the crisis, public transport operation was significantly reduced by restricting the hours of operations and limiting the seating capacity in almost all member countries.

Many ASM implemented specific restrictions on the operation of app-based mobility services during the pandemic. For example, major cities in Cambodia implemented zone-based restrictions, dividing cities into yellow, orange and red zones based on the number of Covid-19 infections. Each zone had a different level of restriction, red being the strictest. In all zones, the movement of people was highly restricted, as were city bus services. App-based three-wheeled services were completely shut down. App-based food- and goods-delivery services were allowed to operate in orange and yellow zones, however. In the Philippines, public authorities reduced the service hours and seating capacity in public transport and app-based mobility services. An Inter-Agency Task Force for the Management of Infectious Diseases in the Philippines also limited the hours in which delivery services for non-essential goods and services could operate. Shared ridesourcing (e.g., Grab Share) was suspended during the acute phases of the pandemic. In addition, for a brief period, a physical barrier was introduced between the rider and passenger on two-wheeled ridesourcing services. Malaysia, too, introduced special restrictions for ridesourcing services. For instance, only the driver and one passenger were allowed to be seated in a ridesourcing vehicle during the pandemic.

Country-specific recommendations for ASEAN member states

The Executive Summary of this report provides recommendations for building regulatory systems for app-based services that can be applied throughout the ASEAN region. However, some countries are poised for more case-specific actions. Below are recommendations for specific ASEAN member states.

Brunei Darussalam: Interviews with representatives from Brunei Darussalam revealed that app-based ridesourcing service providers provide operational information (e.g. number of trips, number of vehicles operating) to the Land Transport Department (LTD) in the form of infographics. This is not an optimal approach. The LTD may wish to validate this information or access underlying data to understand user and driver behaviour trends in order to draft effective regulations. To do so, Brunei Darussalam could establish a legal framework requiring app-based mobility service providers to report data in a way that can be used to gain deeper insights into the use of these services. The relevant regulatory institutions would need to build the capacity to collect, store, process and analyse the data supplied by the app-based mobility service providers.

The various aspects of app-based mobility services are regulated by different ministries in Brunei Darussalam. These ministries need to co-ordinate to support the implementation of effective regulations. The Digital Economic Masterplan currently under development could serve as a starting point in this co-ordination. Not only can it outline a long-term vision for the role of app-based mobility services, but it can also address aspects of app-based mobility services that do not fall under the purview of the Ministry of Transport and Infocommunications (MTIC). For instance, freight delivery services and passenger mobility services currently fall under the authority of different ministries. The Masterplan could include a broader vision of how the two types of services could be integrated to create a more efficient transport system.

Cambodia: In 2021, Cambodia issued regulations regarding the registration of operators providing app-based road transport services (MPWT, 2021). These were the first legal instruments developed in the country to regulate app-based services. In their survey responses and interviews, Cambodia highlighted that the rise in app-based services in the country was accompanied by an increase in road crashes and the deteriorating service quality of app-based operators. Such challenges were addressed in the decree by establishing market entry requirements for app-based mobility service providers to ensure that they can provide safe services. Beyond setting out registration requirements, the decree on "Terms and procedures for issuing business licenses for companies to provide digital technology services for domestic road transport" (MPWT, 2021) specifies that operators must (Article 9):

- train drivers to "understand road traffic laws, etiquette and driving ethics"
- provide vehicle identification and vehicle road-worthiness technical certification
- issue photo identification to drivers and display drivers' photos in the app

- allow app users to communicate their location to third parties (e.g. friends, family or public authorities) directly from the app
- take action against drivers operating under the influence of alcohol or drugs or who commit violence, including sexual harassment.

App-based road transport service operators must also provide detailed monthly inventories of the fleets operating via their services. Operators must also address and align their services according to national road safety, congestion management and environment plans (MPWT, 2021: Article 10).

Cambodian ridesourcing services are in direct competition with more traditional and often less environmentally polluting transport services, which are generally pedal cycle-based and informal. It may be helpful to assess to what extent the traditional transport services can be maintained or adapted to improve their competitiveness within a more ridesourcing-heavy context.

Indonesia: The main challenge for the regulators in Indonesia is the lack of access to data from app-based mobility service providers. Here and in other contexts where this data is lacking, licensure could be made conditional to operators reporting minimum and purposive data necessary for public authorities to carry out their mandates, including the regulation of app-based mobility services themselves.

Malaysia: A major challenge in Malaysia seems to be the lack of capacity to manage data reported by app-based services. This can lead to less efficient regulations. As previously mentioned, motorcycle ridesourcing services in Malaysia were banned because they were associated with an increase in road crashes. This possibly could have been avoided if the regulatory agencies in the country had the capacity to access and monitor data, such as the number of drivers enrolled on app-based mobility services, the validity of their driver licenses, and the results of their background checks. One strategy to cover the current capacity gap is for public authorities to contract data collection and processing tasks to trusted third parties that can manage and analyse data for the regulators and provide insights as needed. Regulators could then draft regulations for app-based mobility services based on those data. Nonetheless, public authorities should invest in upskilling their own staff so that they may be positioned to evaluate and manage these contracts. At the same time, the longer-term goal should be to enhance public authorities' ability to carry out these tasks themselves.

Myanmar: Myanmar is still seeking assistance from dialogue partners to develop its National Intelligent Transport System Masterplan. Myanmar also faces the hurdle of various aspects of app-based mobility services (passenger mobility, freight movement, data sharing, labour etc.) being regulated by different ministries. To date, there are no national regulatory bodies to regulate app-based mobility services. In particular, Myanmar is still lacking the legal instruments that cover the whole area of app-based mobility services in the country. A masterplan should be developed to communicate to various ministries the common objectives applicable to driver training, employees' minimum wage, service quality assurance, integration with other modes of transport, and all other aspects of app-based services.

Myanmar could also build the necessary digital infrastructure to manage app-based services effectively. A first step can be developing robust contextual GIS data of urban and peri-urban areas. This would facilitate the monitoring and regulation of app-based mobility services. In addition, Myanmar needs to build the capacity to store, manage and handle data generated by app-based mobility services. Better inter-ministerial data sharing could also help regulate these services more effectively. For instance, the Ministry of Transport and Communications could use the data to monitor app-based services, but the same dataset could also be valuable to city or regional planning agencies that could use it to understand travel demand in their region and plan for infrastructure and investments.

In addition, most app-based mobility services are undertaken by the private sector, and so the development of technology, infrastructure and human capacity of the private sector plays a key role in improving the utilisation of app-based mobility services in Myanmar. The public sector has a role to play in enabling this capacity via education and training, just as it must increase its own capacity to regulate digital services.

The Philippines: There have been many regulatory developments related to app-based mobility services in the Philippines. However, these have been spread over various ministries at the national level. As of yet, there is no discussion on co-ordinating the efforts between the ministries. Co-operation among relevant ministries could help develop a national masterplan or a similar document to co-ordinate efforts across regulatory bodies. This plan could include a discussion on all relevant aspects of app-based mobility services, including labour issues, data sharing requirements, and the linkages with public transport and informal services.

Thailand: The Thai Ministry of Transport issued the Ministerial Regulation on Ride-Hailing Service by Electronic Platform in 2021 (Bunruangthaworn and Suppakrucha, 2022). This long-awaited regulatory framework aims to regulate mobile applications for taxi or ridesourcing services and address the illegality of mobile applications for passenger vehicles in Thailand. This is a positive first step to enabling app-based services to operate legally in the country.

Guidelines need to be established for the quality of services. There have been incidences where a customer has booked a service (either a ride or delivery) but the driver or the delivery personnel failed to deliver the service. The principal motivation for regulating app-based mobility services in Thailand is the increase in service providers and the problems this poses due to users and public authorities due to a lack of rules. In particular, Thai representatives stressed the need to account for the contribution ridesourcing services make to traffic congestion and the need to mitigate the resulting adverse environmental impacts.

Thailand could also create an inter-ministry task force to co-ordinate approaches among various ministries with some responsibility for app-based mobility services. A Department of Transport-led task force in Thailand, including the Ministry of Commerce and the Ministry of Telecommunications, would be an efficient and effective way to draft regulations covering all the crucial aspects of app-based mobility services. Thailand could also strengthen its capacity to store and analyse data that it will start receiving from app-based mobility service providers once all the regulations have been implemented.

Viet Nam: The Vietnamese government issued a decree (Decree No. 10/2020/ND-CP dated 17 January 2020, on auto transport business and conditions for auto transport business, effective from 1 April 2020 – unofficial transcription available at LawNet, 2020)) to largely define the operation of app-based services. The focus, however, is on mobility services. Similar attention could be given to the operation of delivery services offered by app-based mobility service providers.

Further recommendations are not offered for Singapore and Lao PDR. Singapore has already established a relatively complete regulatory framework for app-based mobility services that covers market entry, operational requirements, data reporting and pricing. In contrast, the relatively few responses from Lao PDR were insufficient to determine a robust diagnosis and suggest a need for enhanced engagement with public authorities to establish the current state of the country's app-based mobility services.

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Regulating App-based Mobility Services in ASEAN

New app-based mobility services have transformed urban passenger transport and goods delivery services. As elsewhere, they have boomed in Southeast Asia, where they have gone largely unregulated. This report investigates regulatory approaches to balance consumer and societal welfare. It looks at how to address safety issues and negative externalities without dissuading innovative business models. It also addresses the impact of Covid-19 on these mobility services to help countries develop their pandemic recovery strategies. This report presents a set of principles for the regulation of both passenger transport and delivery services in ASEAN member states.

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Published: 04/2023 | Photo credit: Nirat/Shutterstock