RPS

INNOVATION IN THE QUEENSLAND TAXI INDUSTRY

TCQ - Response to the OPT Innovation paper

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SUMMARY

Introduction

- RPS has been engaged by Taxi Council Queensland (TCQ) to undertake comprehensive research on the Queensland Taxi Industry. This research forms the basis of TCQ's submission to the Opportunities for Personalised Transport Review ("OPT Review").
- In March 2016, the OPT Review released a draft Innovation Paper. This Paper addresses issues of technological innovation – namely the emergence of app-based booking and dispatch platforms global and the long-term potential for autonomous vehicles.
- This Report forms the full response of TCQ to the OPT Review's draft Innovation Paper and the Technical Research Report on the subject of innovation for TCQ's submission to the OPT Review.
- This Research Report draws upon extensive information and evidence derived from consultation with industry across the State and representatives of international taxi jurisdictions in the US, UK and Singapore, data provided by Queensland taxi booking companies, market research and desktop research.

Defining Innovation

- A principal shortcoming of the draft OPT Innovation Paper is the lack of definition, exploration and examination of what constitutes "innovation".
- Innovation is critical and essential driver of the driver of long-term, sustainable economic growth and prosperity. There are a range of definitions for "innovation" which vary depending on the context and perspective. In order for something to be innovative it must be "new" and must be "better" than all alternatives.
- The draft OPT Innovation Paper assessed the issue of innovation from a very broad perspective and did not take into consideration Queensland's unique history, customer-expectations and regulatory framework. The Paper also fails to acknowledge the important and central role that non-technological innovations play in the community and the economy.
- The key questions left unanswered by the Innovation Paper is whether app-based dispatch booking platforms can genuinely be classified as innovative within the Queensland context and what other technological and non-technological innovation must be considered as part of the broader review.

The "Sharing Economy"

- The Innovation Paper affords considerable focus on the "sharing economy" with the introduction and Topic Papers 1 and 2 covering the subject almost exclusively. However, RPS questions the accuracy and validity of this analysis and has concerns regarding the relevance of the content of the Innovation Paper to the Queensland context.
- The phrase "sharing economy" is increasingly utilised by the media, academic and commentators. However, just as is the case for "innovation" there remains considerable confusion as to what the phrase actually represents.
- The sharing economy is characterised by the use of personal and non-commercial assets by individuals for commercial purposes on a part-time casual or temporary basis where buyers and sellers are connected through a separate platform.
- Rather than being a new and innovative process, RPS argues that the "sharing economy" is nothing more than the modern equivalent of informal economic activity that has been present in economies around the world for centuries.
- The informal economy can be distinguished from other types of non-formal activity (such as illegal,

unreported and unrecorded activity), in that its principal focus is to bypass both the cost of and the protections afforded by the compliance with the laws of the State, particularly labour and property laws.

- In many cases, the business models surrounding informal economic activity are unviable in a formal or regulated environment, as the margins are often very small such that they would be fully extinguished by compliance costs.
- A major variable in the level of take up or growth in the informal sector is the relative health and strength of the formal sector. When the formal economy experiences a downturn or recession, households are often forced by necessity (i.e. to fund basic living costs), particularly in countries with limited social safety nets, to seek informal employment.
- The informal economy is generally viewed negatively by policy makers, as it is considered a form of underemployment and sub-optimal labour utilisation and an outcome resulting from the failure of the formal economy to meeting the employment needs of the population.
- It is also commonly associated with very low incomes (often below the poverty line), high levels of income variability and uncertainty, particularly among those who are self-employed, temporary, casual or working inconsistent hours with minimal labour protections and a general lack of quality and safety regulations.
- Worker protections are of particular concern, because workers in informal sectors often enter such employment due to financial hardship or desperation. Such motivations mean that these workers are easy targets for abuse and exploitation, driving down wages and conditions further. A recent example of this was the unilateral reduction in fares by uber in Melbourne and Los Angeles.

The Queensland Perspective

- The OPT Innovation Paper asserts that app-based booking and dispatch platforms that allow dormant personal resources to be utilised to extract economic value is innovative. However, innovation is a matter of perspective and context and little consideration appears to have been afforded Queensland unique context.
- The universality of availability and similarity in appearance of taxis around the world means that policy makers and researchers often assume that the regulatory framework and structures of taxi industries globally are equally homogenous and uniform. This could not be further from the truth.
- During our recent study tour of the San Francisco, New York, London and Singapore, RPS confirmed from discussions with regulators in those jurisdictions that there is considerable variation in the nature, form, extent and content of taxi regulations around the world.
- RPS has summarised the key characteristics of the Queensland Taxi Industry and in the table below are provided an overview of whether these characteristics are shared by other major taxi jurisdictions.
- Overall, RPS regards the characteristics of the Queensland Taxi Industry as unique. They have evolved over time in response to our unique geography and decentralised population.
- Instead of Queensland learning lessons from other jurisdictions, Queensland has lessons it can teach other parts of Australia and the world on how best to regulate an efficiency, cost-effective and highly accessible taxi industry that meets the needs of all groups in the community (including the disabled and those in wheelchairs).

Figure 1 Key Characteristics of Taxi Industries in Queensland and Select International Locations

Characteristic/ Attribute	QLD	NSW	San Francisco	New York	London	Singapore
Population	**4.8 million**	7.5 million	7 million (Bay Area)	8.4 million (State only)	8.5 million (Greater London)	5.4 million
Segmented Market	**No**	Yes (Taxis and "Ride sharing"	Yes (Taxis and TNCs)	Yes (Yellow Cabs and Livery Vehicles)	Yes (Black Cabs and Private Hire cars /Minicabs)	No
Share of Taxi Trips Booked	**65%**	20%	Minimal	Minimal	Minimal	20%
Regulated Fares	**Yes**	Licenced Taxis Only	Licenced Taxis Only	Yellow and Green Cabs Only	Black Cabs only	No
Existence of Service Contracts	**Yes**	No	No	No	No	No
Minimum Service Levels	**Yes**	No	No	No	No	Yes – though only relating to high level indicators
Universal Service Obligations	**Yes**	No	No	No	No	No
Regulated Supply of Wheelchair Accessible Vehicles	**Yes**	No	No	No	No	No
Share of WAT Vehicles	**21%**	12%	3.8% of Taxis	4.2% of Yellow Cabs	58% of Black Cabs only	NA
Booking and Dispatch Companies	**Yes**	Yes	Yes (TNCs)	Yes (Minicabs and Private Hire Vehicles)	Yes (Livery Vehicles)	No (Operators Only)
Accepts Cashless Payments	**Yes**	Yes	Yes (TNCs only)	Yes	Yes (Livery Only)	Yes
Maximum Standard Taxi Age	**6 Years**	6.5 Years	Not in Force	15 years for Black Cabs, 10 years for minincabs	Not in Force	

- The history of the Queensland Taxi Industry is one of pioneering innovation and serving the community. Major world-leading innovations include:

Figure 2 World Leading Innovations, Queensland Taxi Industry

INNOVATION	PIONEERED IN QLD	WHEN
Company-managed customer feedback and enquiries	✓	1975
State-of-the-art computer dispatch systems	✓	1988
Universal EFTPOS Facilities	✓	1990
Premium Taxi Services	✓	1990
Mandatory Wheelchair Training for All Drivers	✓	2004
Wholesale Adoption of Hybrid Vehicles (70% of the Fleet)	✓	2005
Universal Camera Systems	✓	2005
Fully Integrated Meters with back-to-dispatch systems	✓	2008
Taxi Smartphone Booking Apps	✓	2011
Audio Recording	✓	2018

- Based on this performance, implications and inferences in the Paper that the Queensland Taxi Industry lacks innovation are unfounded and not supported by the evidence. Not only has Queensland been the world leader in the development and adoption of new innovative taxi technologies and services, in some cases it remains at least 20 years ahead of other jurisdictions.
- Queensland's history of innovation has been supported by a stable regulatory environment in Queensland with the flexibility to predict and accommodate these innovations. In fact, arguably one of Queensland's greatest taxi-related innovations is the current regulatory framework itself.
- Many of the core components of the current regulatory framework in Queensland are regarded as genuinely innovative by other jurisdictions. Consultation with stakeholders in international jurisdictions during the RPS study tour confirmed this and there was great interest from regulators to learn from the lessons that Queensland had to teach in the establishment of a flexible, stable and long-term regulatory framework. This is despite the fact the legislation at the core of the framework is now over 20 years old. This confirms the fact that most jurisdictions in the world are at least 20 years and sometimes almost 50 years behind Queensland in terms of taxi industry regulations.
- Even the manner in which the 1994 legislation was developed was innovative. The collaborative process undertaken by the then State Government and the high level of engagement with the taxi industry and key stakeholder and user groups was critical to the successful establishment of a flexible regulatory framework for over 20 years. This approach, which is similar to the Lead User Method identified in section 2.4, represents a best practice approach to the development of long-term, sustainable and flexible regulatory frameworks.

What Does "Ride sharing" Offer Queenslanders?

- In order for app-based booking and dispatch platforms to be innovative form the Queensland perspective, they must be "new and better".
- In terms of whether the apps are new, the analysis in this report demonstrates that both centralised computer-based booking and dispatch systems and app-based platforms are not new and that Queensland has actually been a pioneer in both of these technologies in the past 20 years. While such platforms are could be categorised as *new* to many international jurisdictions, this reflects the fact that such jurisdictions are more than 20 years behind Queensland in terms of innovation and regulation.
- ***Therefore, in the Queensland context, app-based booking and dispatch platforms are not a new or novel technology.***
- In terms of being better, the sole reliance on app-based platforms for booking and dispatch means that this lacks the comparative sophistication, capacity and capabilities of the centralised booking and dispatch systems currently employed by Queensland booking companies.
- ***As such, RPS does not believe that app-based booking and dispatch platforms are "better" than the current technologies, systems and processes employed by Queensland booking companies and in fact likely lag behind Queensland best practice by at least a decade.***
- ***Overall, the fact that these apps are neither new nor better means they cannot be classified as innovative in the Queensland context.***
- The claim that "ride sharing" provides benefits to the community is also questionable when the unique Queensland context is considered. As an essential form of public transport, the policy and regulatory reform options to be developed by the Review Taskforce and considered by Government should be assessed based on maximising the net benefit to the community.
- RPS has undertaken a review of the key benefit claims of uber, the principal deliverer of non-complying taxi services in the State and assessed these claims against the Queensland context. This is summarised in the figure below.

Figure 3 Assessment of Claimed Benefits of "Ride sharing" to Queenslanders

Claimed Benefits	Relevance to Queensland	Explanation
Cheaper Fares	✗	This claim is central to the argument favouring "ride sharing". Preliminary analysis by RPS suggests that uber fares are 17% cheaper than taxis for an equivalent trip. However, uber currently does not charge passengers GST through their app (which is 10%) and taxi fees include a cashless payment fee of a further 10%. If this payment service fee is reduced to 5%, as is being implemented in Victoria, the cost difference would be only 2%. On an average fare, this represents less than 50c. This also assumes that there is no surge pricing by Uber for this trip.
More Accessible and Timely Services	✗	Queensland Booking companies consistently meet Minimum Service Level, while maintaining Universal Service Obligations. Similarly, waiting times at secure ranks during peak times was less than 90 seconds in the 2 years to 2015.
Higher Quality Services	✗	Queensland taxis have to comply with the most comprehensive and rigorous vehicle quality standards in the world. Vehicle age restrictions are comparatively young, while driver training standards are also high.
Job Opportunities	✗	The Queensland Taxi Industry employs over 16,000 people, with a high proportion of full-time work. Ride sharing is recognised internationally as a low income, part-time/casual employment opportunity used by workers to supplement incomes during depressed economic conditions.

- RPS appreciates, from our recent study tour to major international taxi jurisdictions, that many of the claims made by uber and other "ride sharing" proponents are potentially valid in those jurisdictions, particularly in the US. However, this reflects a comparative deficit of quality and innovation in those markets, both in terms of service delivery and regulations.
- ***From the Queensland perspective, however, the unregulated informal activity of "ride sharing", provides no net advantages to Queenslanders over the State's taxi industry and instead potentially undermines a world leading industry and lead to a significant regression in the quality and innovation of the Queensland regulatory framework.***
- RPS does not consider app-based booking and dispatch platforms as a true technological disruption of the Queensland Taxi Industry. As highlighted in section 5.1, such apps do not meet the threshold to be regarded as innovation in the Queensland context as the existing technologies and processes far exceed the capabilities of the apps.
- Instead, RPS classifies the impact of illegal and non-complying taxi services in the State as a form of regulatory disruption. This aligns with the true nature of "ride sharing" as a form of informal economic activity, the continuation of which is traditionally contingent on non-compliance of regulations.
- In the long-term, the biggest loser of this form of regulatory disruption is not the industry or even the customer but is the State Government. The precedent set by the failure of Government to enforce and uphold sovereign laws of the State, coupled with the efforts of corporately-based illegal taxi service providers to evade enforcement and investigation activities of compliance officers undermines the confidence in the community in the sovereignty and applicability of the laws of the State.

The Future of Innovation in Taxi Services

- The Queensland Taxi Industry over the past three decades has not only adopted, but pioneered a wide range of technological and business model innovations to meet changing consumer and community needs. However, at the core of this innovation has been flexible, responsive and customer focus regulatory framework that has created an environment that fosters and encourages innovation by the industry.
- Reform is required to Queensland's regulatory framework to ensure its current premier position among international taxi jurisdictions is maintained. Examples of regulatory reform include to the structure of the regulation itself and the potential for a new enforcement mechanism modelled on a Taxi Service Commission.
- An example of business and service delivery model innovations includes the emergence of deviated fixed route and pre-booked share taxi services and the opportunity this presents for Queensland given its extensive fleet management capacity and a culture of booking taxis in the community.
- Additionally, our study tour to Singapore highlighted an opportunity to incorporate taxis into the current goCard system, in line with the use of ez-link cards – Singapore's equivalent – in taxis and the general view in the community that taxis are an integral part of the public transport system. The adoption of this innovation in Queensland would not only meet the expectations of the Queensland community for expanded payment options – 70% of Queenslanders are in favour of the integration of goCards into taxis – but will assist to further integrate taxis into the public transport system of the State.
- Finally, regulatory reform should look beyond the short-term novelty of app-based booking and dispatch platforms and instead accommodate emerging opportunities in Connected and Autonomous Vehicles ("CAVs") and broader Intelligent Transport System ("ITS") technologies.

Conclusions

- Innovation is something that is "new" and "better". Innovation is a broad concept that includes technological, process and system-based activities. When exploring the issue of innovation in personalised transport, consideration must be given to all types of innovation.

- Innovation has always played a central role in the development and evolution of taxi services, nowhere more so than in Queensland. Queensland has an established history of innovation, technological adoption and customer-led service and business model developments that have been facilitated by an innovative and world-class regulatory framework unlike any other system in the world.
- This response to the OPT Innovation Paper clearly demonstrates that app-based booking and dispatch platforms are neither new nor better than the current Queensland system. Further, apps cannot be regarded as transformational in nature as they do not fundamentally alter the core service – that of the physical movement of a person from one place to another.
- Queensland is therefore not experiencing digital disruption of its taxi industry. Instead, the Government is experiencing a regulatory or illegal disruption from the provision of non-complying taxi services by international “ride sharing” companies – a reality evident from the recent IPNRC report to Parliament. This reflects the fact that the “sharing economy” is itself not new but is instead a modern version of the informal (or grey) economy that has existed in the world for centuries.
- Future reform of Queensland’s best practice regulations must therefore extend beyond the short-term novelty with app-based booking and “ride sharing” and seek to establish a flexible and accommodating framework for major innovation over the next 20 years. This may include changes in the way the regulations themselves are structured and enforced, new services and business models to meet customer needs, and emerging, network and cloud-based CAVs and ITSs that could have a transformative effective on the taxi industry, transport sector, Government and the community.
- The Queensland Government should be commended for their previous efforts to establish a best practice regulatory framework for the Queensland Taxi Industry that has encouraged innovation, ensures and high service quality and universal access (including for people with disabilities) at no cost to Government taxpayers. The challenge now is to meet and exceed the high standards set in 1994 and chart a flexible course for personalised transport towards 2050.

1.0 Introduction

1.1 Research Context

RPS has been engaged by Taxi Council Queensland (TCQ) to undertake comprehensive research on the Queensland Taxi Industry. This research forms the basis of TCQ's submission to the Opportunities for Personalised Transport Review ("OPT Review").

It also represents the first comprehensive profiling and analysis of the Queensland Taxi Industry in more than twenty years and will form a key reference source of the characteristics, trends, challenges and opportunities facing the industry over the next several decades.

The research undertaken is comprised of a series of concise, interrelated technical research reports that cover all aspects of the Queensland Taxi Industry. Research topics covered by the reports include:

- Analysing the characteristics and drivers of demand for taxi services in Queensland;
- Profiling and analysing the supply of taxi services in Queensland, including the current characteristics and structure of the industry, comparisons with the way taxi services are delivered around Australia and overseas and opportunities for improvements in the way taxi supplies are regulated;
- Assessment of the way in which pricing and fares are regulated and set, the appropriateness of these settings based on both industry viability and community affordability concerns, the underlying cost structure of delivering taxi services and complying with regulations;
- Identifying and profiling recent and future innovations in the delivery of taxi services including digital and online dispatch services, in vehicle equipment and technology, business and service delivery models and in the regulations themselves;
- Assessment of the economic contribution of the taxi industry to the Queensland economy including direct and indirect impacts and support provided to industry, the economy and wider community.

These reports include a series of practical recommendations and insights into future development and growth of the industry, including business, service, technological and regulatory enhancements that would benefit all stakeholders in the industry and the wider community.

1.2 The Opportunities for Personalised Transport Review ("OPT Review")

In late 2015, the Queensland Government commissioned an independent review of taxi, limousine and rideshare services in Queensland. The purpose of the review is to:

"ensure Queenslanders are provided with safe and efficient personalised transport services and with a sustainable industry to deliver the services."

The terms of reference for the Review – referred to the Opportunities for Personalised Transport or OPT Review – are broad in nature and cover all aspects of the personalised transport services sector. The scope includes:

- The safety of the community and drivers;
- The delivery of a flexible legislative framework that supports competition and innovation for all participants;
- Customer opinions of rideshare services;
- Steps undertaken by the taxi industry in adapting to changing customer needs and expectations;

- Supporting a sustainable industry that is forward-looking and fosters innovation;
- Competition in the sector, including vertical integration, anti-competitive practices and incentives for innovation;
- The provision of affordable and customer-focused services;
- The needs of the community across Queensland, including those with disabilities or reduced mobility;
- The current and potential role of taxis, limousines and rideshare services in an integrated transport system, with a focus on the role of these services to foster social inclusion;
- Transitional arrangements from the current regulatory and service arrangements to the recommended model;
- Other models and new approaches to delivering personalised transport services both in Australia and overseas;
- Potential use of personalised transport services by participants of the National Disability Insurance Scheme ("NDIS");
- Operational procedures and practices within the sector; and
- Any other related matters.

TCQ, supported by RPS, has prepared a submission to the Review.

1.3 Innovation Paper Response Structure

Between 15 and 24 March 2016, Mark Wallace, Regional Technical Director – Economics at RPS, on behalf of TCQ, participated in Online Discussion Forums on two of the Paper's five topics. This included commentary and discussion by stakeholders on the disruptive impacts of the "sharing economy" and the potential role of "ride sharing" in Queensland. Mark participated in the forums and provided comments and responses on both topics and the questions raised in the Innovation Paper.

This report forms the full response of TCQ to the OPT Review's draft Innovation Paper. In particular, it includes:

- **What is Innovation:** An examination of what constitutes innovation and the different types of innovation in the Taxi Industry and personalised transport services
- **The "Sharing Economy"**: an analysis of the "sharing economy", its relationship with informal economic activity, lessons from the past and from other jurisdictions and assessment of the actual level of disruption and impact of app-based booking and dispatch platforms on the Queensland Taxi Industry and employment markets.
- **A Queensland Perspective**: a profile of the history of innovation in the Queensland Taxi Industry and the unique characteristics and attributes of the industry that have supported this innovation.
- **Future Innovations:** a profile of potential innovations in the Queensland Taxi Industry identified from consultation with the industry and research.
- **Conclusions:** summary of the response to the Innovation Paper and associated topics.

1.4 Sources of Evidence

This Technical Report, and the broader Submission, relies upon an extensive base of both quantitative and qualitative information and evidence. The sources of this evidence can be broken into four broad categories.

1.4.1 Consultation

RPS, in partnership with TCQ, undertook a series of consultation workshops and interviews in Queensland and around the world.

Between November 2015 and February 2016, RPS facilitated workshops with industry stakeholders in the following locations.

- Brisbane Metro North
- Brisbane Metro South
- Ipswich
- Gold Coast
- Sunshine Coast
- Toowoomba
- Hervey Bay/Maryborough
- Gympie
- Cairns
- Townsville
- Mackay
- Rockhampton
- Gladstone
- Mount Isa.

These workshops included representatives from the taxi industry – including drivers, licence owners, operators and booking companies.

Additionally, in March 2016, representatives of RPS, TCQ and the Australian Taxi Industry Association (ATIA) travelled to a series of overseas taxi jurisdictions to gain an insight into the regulatory, operational and market characteristics of each location. The jurisdictions visited included:

- San Francisco
- New York
- London
- Singapore

In each location, RPS met with representatives of local regulators, operators and politicians and gained an understanding of both the unique and shared attributes of the local taxi industry in each location and the lessons that could be learnt for the Queensland context.

1.4.2 Booking Company Data and Other Statistics

TCQ facilitated the delivery of a comprehensive set of taxi industry performance and operational data to RPS from a number of major booking companies in the State. These statistics included a full profile of the number, duration, cost, frequency and distribution of taxi jobs and trips, as well as information on the operational costs of delivery taxi services and the level of utilisation of the Taxi Subsidy Scheme (“TSS”).

Additionally, data sets and other information was made available to RPS by those overseas taxi jurisdictions with which RPS and TCQ consulted in February and March 2016. The nature and scope of this information varied depending on the jurisdiction and their capacity to collect, collate and analyse data.

In addition to this information, RPS drew on statistical information from a range of publicly available sources. This included the Australian Bureau of Statistics ("ABS"), Queensland Government Statistics Office ("QGSO"), ATIA and individual reports, surveys and other publicly available data sets from desktop research.

1.4.3 Market Research

TCQ engaged the public opinion and strategic market research firm, UMR, to undertake qualitative and quantitative market research on issues and attitudes affecting the Queensland Taxi Industry.

Research included a combination of facilitated workshops and interviews (via online survey) with representative samples of the Queensland population aged 18+. The surveys were conducted in late February and early March 2016 and covered a range of topics including:

- Classification of taxis as public transport and the level of integration of taxis into the Queensland public transport network
- Attitudes towards taxis and public understanding of the industry
- Service satisfaction levels and key areas of impacting satisfaction both positively and negatively
- Frequency of use of taxis
- Level of discretionary and non-discretionary usage
- The degree to which taxis provide a benefit to the community
- The role of Government regulation in the taxi industry
- the level of support for passengers with disabilities and the Taxi Subsidy Scheme
- level of familiarity with usage of and attitudes towards uber
- Socio-economic and demographic characteristics of uber supporters
- Classification of "ride sharing" as taxis
- Level and type of regulation of "ride sharing" services
- Attitudes towards a range of specific potential changes to the regulation of the Queensland Taxi Industry

1.4.4 Desktop Research

RPS has also undertaken desktop research on the issue of taxi industry regulation to complement other sources of information and evidence outlined above. The focus of desktop research has been on gaining further appreciation of national and international taxi jurisdictions and recent and past experiences with regulatory reforms. RPS has also undertaken extensive research on the role of "ride sharing" in overseas markets as well as the economic theory and practice around the causes and regulation of informal economic activity.

Research has been comprehensively cited throughout the Report.

1.5 Author Profile

1.5.1 RPS

RPS is an international consultancy providing world-class local solutions in infrastructure, urban growth, energy, mining and natural resource management.

RPS employs 5,000 people in the UK, Ireland, the Netherlands, the United States, Canada, Brazil, Africa, the Middle East, Australia and Asia and undertake projects in many other parts of the world. In the Australia and Asia Pacific region, our 1,000 professional and technical staff work from offices in 26 locations, including metropolitan and regional centres in high growth areas.

The geographic spread and experience in these strategic locations means our on-the-ground staff have a strong understanding of the local environment and can be mobilised quickly to respond to client's needs. RPS has a reputation for meeting the challenges posed by large, complex projects and for conducting business in an open and responsible manner.

1.5.2 Mark Wallace

Mark Wallace is the Regional Technical Director and head of Economics Advisory Services for RPS in Australia Asia Pacific.

He is one of Australia's leading economics consultants and strategic advisor, providing market research, project evaluation, policy development and reform and detailed economic analysis for a wide range of public and private sector clients across Australia. His career has included time with the Queensland Government, Brisbane City Council, the employment and training sector and economic consultancies.

Over the past decade as an economic consultant, Mark has developed nationally recognised expertise in a range of areas including:

- Innovation policy and implementation
- Regulatory reform in major public utilities
- Property development economics
- Major project evaluation and cost benefit analysis
- Health economics
- Regional and local economic development

Mark is the principal author of the submission by TCQ to the OPT Review and associated Technical Research Reports.

1.6 Glossary and Abbreviations

ABS	Australian Bureau of Statistics
ATIA	Australian Taxi Industry Association
CAV	Connected and autonomous vehicles
QGSO	Queensland Government Statistical Office
IPNRC	Infrastructure, Planning and Natural Resources Committee
ITS	Intelligent Transport Systems
MSL	Minimum Service Levels
OPT Review	Opportunities for Personalised Transport Review
TCQ	Taxi Council Queensland
WAT	Wheelchair Accessible Taxi
USO	Universal Service Obligations

2.0 Defining Innovation

A principal shortcoming of the draft OPT Innovation Paper is the lack of definition, exploration and examination of what constitutes "innovation". The Paper also fails to acknowledge the important and central role that non-technological innovations play in the community and the economy. Similarly, even within this narrow scope, the Paper considers a limited number of "innovations" including app-based dispatch and booking platforms, the emergence of the "sharing economy" (claimed to be a type of economic innovation), as well as autonomous and driverless vehicles and intelligent transport systems.

In this section, RPS comprehensively defines and examines the concept of innovation. This includes defining what constitutes innovation, the different degrees of innovation, the drivers of innovation and the importance of perspective and context in assessing a product or services' innovative qualities. Additionally, RPS defines the different categories of innovation as they relate to the delivery of taxi services.

This analysis of innovation provides important context for assessing the relative innovativeness of the processes and systems identified in the Innovation Paper – namely app-based booking and dispatch platforms and the sharing economy more generally.

2.1 What is Innovation?

Innovation is a critical and essential driver of the driver of long-term, sustainable economic growth and prosperity[1].

Given this importance, the term "innovation" is increasingly ubiquitous in modern commentary and policy and is regularly used to describe some new technology, process or system. However, there continues to exist a poor understanding of what is an innovation, what is required for something to be innovative and the different forms of innovation that can take place.

There are a range of definitions for "innovation" which vary depending on the context and perspective (e.g. business and economic, organisational, community). However, definitions of innovation generally share two common characteristics:

- ***New, original or novel*** – the innovation must not have previously existed;
- ***More-Effective or Improvement*** – the innovation must be better than the status quo, it must create additional value or provide better solutions to problems, challenges or needs.

In other words, in order for something to be innovative it must be "new" and must be "better" than all alternatives. This establishes a very high threshold for what can be truly classified as an innovation.

2.2 Degrees of Innovation

Just because something is new and better, also does not mean that the innovation is transformative. Major innovations fundamentally alter the status quo, change the social and economic fabric and challenge fundamental norms.

[1] Quote from MIT economist and Nobel laureate Robert Solow at the commencement of the MIT Innovation Initiative, cited in the Wall Street Journal (Dec 19 2014) article entitled *MIT to Pioneer Science of Innovation* accessed at http://blogs.wsj.com/cio/2014/12/19/mit-to-pioneer-science-of-innovation/

While what constitutes a major innovation is highly subjective, common examples noted include[2]:

- the printing press
- widespread transmission of electricity
- penicillin and vaccination
- the miniaturisation of the transistor and invention of semi-conductors
- the internet
- centralised sanitation
- personal computers
- automobile
- the telephone
- pasteurisation
- the assembly line.

In each case, the innovations fundamentally altered the status quo, whether in terms of human health, the way we communicate or the way we deliver goods or services.

While the focus of media coverage and policy is often solely on promoting and encouraging major innovations, incremental innovations are equally important. In many cases, incremental innovations involve translation and novel application of existing information and knowledge from one sector to another. It can also involve the adoption and use of technologies in new and novel ways[3]. These sorts of incremental innovations are arguably the most common in society, as they underpin ongoing productivity and efficiency growth and can yield significant benefits to the community and economy over time.

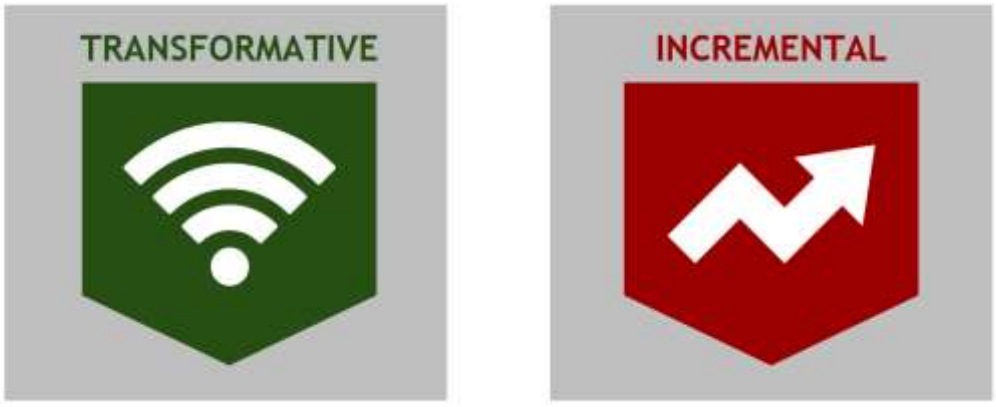


Figure 4 Major and Incremental Innovation

[2] Selection of innovations nominated by expert panels compiled by Time Magazine, Popular Science Australia and the Atlantic magazine in 2015. Refer to Appendix 1 for a complete list.
[3] University of Lethbridge, " Putting Innovation in Perspective", accessed at http://www.agility-ulethbridge.ca/2015/09/11/putting-innovation-in-context/

How policy makers, businesses and the community responds to, manages, regulates and/or encourages an innovation is therefore heavily influenced by whether the innovation is major or incremental in nature.

Major innovations can cause genuine disruption to society and the economy, catalysing fundamental and often dramatic shifts in the norms and structure of society. Incremental innovations are less transformative, providing more marginal, ongoing benefits to the community. Instead of wholesale structural transformation to society, incremental innovation instead requires a focus on regulatory and system flexibility to promote and encourage such innovation and ensure the benefits can be accrued.

2.3 A Matter of Perspective

One cannot appropriately classify something as innovative without due consideration as to the perspective or context from which the innovation is being viewed. In other words, what is innovative and potentially transformative for one group, may be standard practice or even regressive for another.

This reflects the fact that, despite increased globalisation, perspectives on innovation or are not uniform or homogenous. Each country and region around the world is different reflecting a range of factors including variations in:

- economic and industry structures
- cultural and ethnic factors
- demographic profiles
- geographical and climate differences
- skills and education levels

Similarly, this variation in perspective can exist between groups in the same community. These different perspectives reflect the fact that certain innovations can have more profound impacts on certain groups than others. This is an important fact to realise, as it means that uniform policy responses to an “innovation” must take into consideration of often-disparate perspectives, adding further to the complexity of policymaking.

2.4 Consumers as Drivers of Innovation

In his seminal research, American Economist and MIT Professor Eric von Hippel hypothesised that it is the end user and consumer of an innovative product or service, rather than manufacturers and service providers, who are responsible for the largest source of innovation in the community and economy[4].

This reflects the fact that sophisticated consumers are able to articulate their needs and demand from the economy new and novel ways for these needs to be meet in order maximise their utility and sustainability.

A critical type of consumer is the “lead user” – groups and individual consumers of products and services who have needs similar (but often not identical) to the rest of the community, but months and often years

[4] Von Hippel, E. (1986), "Lead Users: A Source of Novel Product Concepts", Management Science 32 (7): 791–806

before hand. This group is often positioned to receive the greatest benefit from the innovation, due to either their unique attributes or their ability to capture first-move advantages.

This research led to the establishment of the "lead user method" where policy makers, manufacturers or service providers consult and collaborate with their lead user clients and stakeholders to identify emerging needs and develop new and novel solutions[5]. The advantage of this collaborative and integrated model of innovation is that new products and services are identified and delivered to the community twice as fast as under traditional models and the end stakeholders generally receive better outcomes.

This method has been employed globally by major manufacturing and service delivery organisations to identify emerging needs and collaboratively develop innovative solutions.

2.5 Types of Innovation in the Taxi Services

A common shortcoming of academic analysis of the topic of innovation in any sector is the focus on embedded (i.e. product or technology-based) innovations. The physical nature of these innovations means they are often the easiest to identify and understand.

However, any analysis of innovation that focuses solely on product and technology-based innovations is too narrow and fails to consider the full spectrum of potential innovations in a specific sector or industry. Based on the definition in section 2.1, anything that is classified that is new, novel and better than the status quo is regarded as "innovative" and this is not limited to technological or product-based innovation.

RPS has identified three broad categories of innovation as they relate to taxi services and personalised transport in Queensland. These include:

- ***Regulatory (System) Innovations*** –innovations in the regulatory framework by which the capacity, quality and accessibility of taxi services in Queensland are governed, maintained and enhanced
- ***Business Model and Service Delivery (Process) Innovations*** – innovations in how taxi services are provided to the consumer and community and how changing consumer needs are met
- ***Technological (Embedded) Innovations*** – innovations in the form of new technologies incorporated into taxis and supporting fleet management, service engagement and payment systems

Figure 5 Categories of Innovation in the Queensland Taxi Industry

[5] Herstatt, C and Von Hippel, E (1991), "Developing New Product Concepts Via the Lead User Method:A Case Study in a "Low Tech" Field", Journal of Product Innovation Management, 1992;9: 213-221

These categories of innovation are not mutually exclusive and instead are highly interrelated. Embedded innovation, in the form of new technologies and products often yield the greatest benefit to industry and the community through process and system changes that they enable.

The use of Information and Communication Technology (ICT) in Australia is a prime example of this. The Productivity Commission in 2004 assessed the level of usage and adoption of ICT in Australia and found that it was comparatively high by international standards[6]. However, the benefits of this adoption was not necessarily in the technology itself but in the transformation of business models, the development of new communication channels between business and customers and the improved capacity to store, access and analyse information. These system and process innovations have been *enabled* by the embedded innovations of ICT.

2.6 Critical Review of the OPT Innovation Paper

RPS regards the analysis in the OPT Innovation Paper to be incomplete at best. The lack of clear understanding in the Paper of what constitutes innovation, the degrees and types of innovation and its drivers mean that the analysis in the OPT Paper covers only a narrow segment of the subject matter.

As highlighted in this section, innovation:

- ***must be "new" and better"***
- ***is critical to the growth and prosperity of the economy and the community***
- ***is driven by consumers, not suppliers***
- ***can be transformational or incremental***
- ***includes system, process and embedded changes***
- ***is dependent on the context and perspective of the local market, industry or community***

The lack of a comprehensive and holistic analysis means that the value of the Paper's contribution to the development of innovation-led policy and regulatory reforms for the Queensland Taxi Industry is limited. Instead, the Paper needed to ask a series of fundamental questions. These include:

- Are app-based dispatch and booking platforms "new and better" from the Queensland context?
- Do apps meet the threshold of being classified as major or incremental innovations?
- Do apps enable broader process and system innovations?
- What opportunities exist for other technological and non-technological (i.e. regulatory and business model/service delivery) innovations in the delivery of taxi services in the Queensland?

[6] PC (2004) CT Use and Productivity: A Synthesis from Studies of Australian Firms, Productivity Commission, Canberra

3.0 The "Sharing Economy"

The Innovation Paper affords considerable focus on the "sharing economy" with the introduction and Topic Papers 1 and 2 covering the subject almost exclusively. However, RPS questions the accuracy and validity of this analysis and has concerns regarding the relevance of the content of the Innovation Paper to the Queensland context.

In this section, RPS explores the issue of the "sharing economy" in greater detail; explores its relationship and similarities with informal economic activity and identifies lessons from the past in the historical emergence and subsequent extinguishing of such activities. It also considers the employment implications of the emergence of the "sharing economy" in Queensland and economic and social consequences of the reinforcement of the casualisation of the Queensland labour market.

3.1 What is the "Sharing Economy"?

The phrase "sharing economy" is increasingly used by the media, academic and commentators. However, just as is the case for "innovation" there remains considerable confusion as to what the phrase actually represents. This is confirmed in the Innovation Paper by reference to the Deloitte Access Economics report entitled *Sharing Economy and Competition and Consumer Act*[7]. This report highlighted that other terms for the "sharing economy" including the "collaborative economy" and the "peer-to-peer economy", though RPS questions the validity of these comparisons.

Deloitte also claims that defining characteristics of the "sharing economy" are:

- The existence of platforms that address that provide a framework for connective buyers and sellers at a reduced transaction cost
- The separation of the ownership of the platform from the ownership of the goods and services themselves

However, RPS believes these characteristics miss the mark and are not representative of the attributes that define the "sharing economy" as typically understood. Specifically, RPS believes that the current nature of the "sharing economy" is characterised by:

- the use of personal and non-commercial assets
- by individuals
- for commercial purposes
- on a part-time, casual or temporary basis
- where buyers and sellers are connected through a separate platform

Rather than being a new and innovative process, RPS argues that the "sharing economy" is nothing more than the modern equivalent of informal economic activity that has been present in economies around the world for centuries.

[7] Deloitte (2015) Sharing Economy and the Competition and Consumer Act, accessed at http://www2.deloitte.com/au/en/pages/economics/articles/sharing-economy-competition-consumer-act.html

3.2 The Resurgence of Informal Economic Activity

Informal economic activity, also referred to as the informal sector, informal economy or the grey market[8], is a part of the economy that is not taxed or regulated by Government. The informal economy has coexisted alongside the formal economy for the entirety of recorded human civilisation. The concept was born out of observations by economic anthropologists of economic activity in Least Development Countries in Africa and Latin America in the 1990s[9]. Its existence reflects a range of factors including:

- the natural human desire to evade regulation;
- the challenges in certain locations and in certain time periods for the formal economy to generate sufficient employment opportunities;
- the desire of households and individuals to supplement incomes by realising the economic value of personal assets;

The informal economy is larger than many commentators consider, accounting for almost 50% of activity in South and Central America and over 80% in Africa.

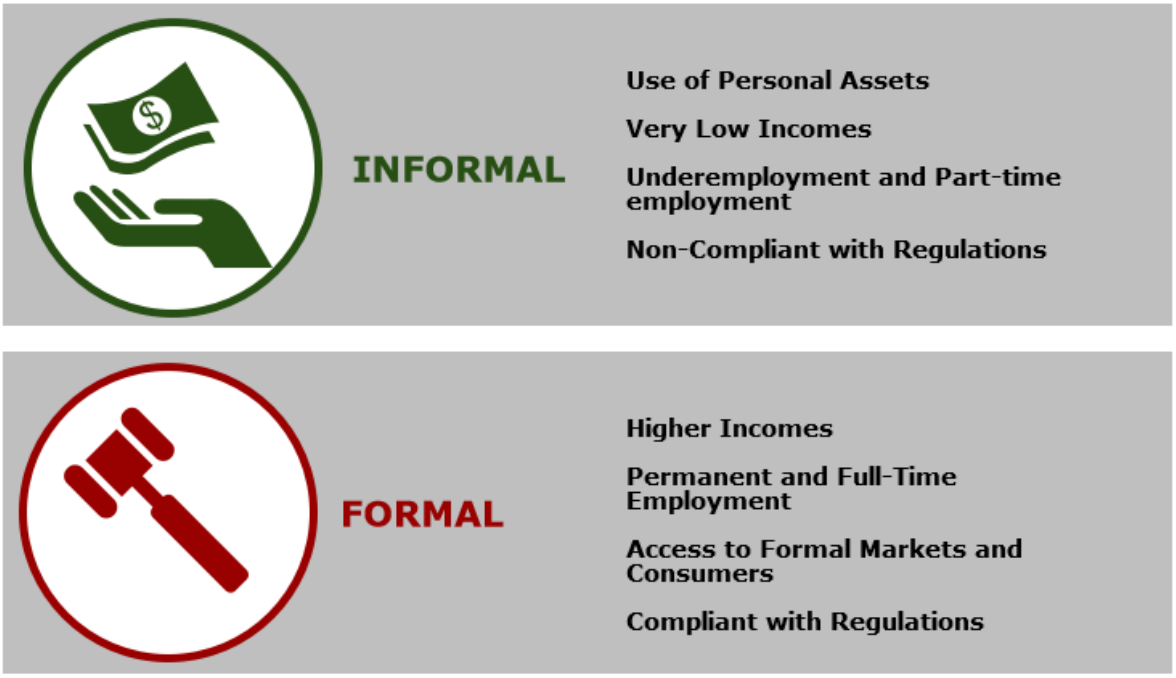


Figure 6 Informal vs Formal Sectors

The informal economy can be distinguished from other types of non-formal activity (such as illegal, unreported and unrecorded activity), in that its principal focus is to bypass both the cost of and the protections afforded by the compliance with the laws of the State, particularly labour and property laws.

[8] Referred to in Dean Calbreath. "Hidden economy a hidden danger". U-T San Diego. And "Economics focus: In the shadows - The Economist". The Economist. Retrieved 4 March 2015

[9] The concept of the informal economy is attributable to Kevin Hart, who saw it as a way of giving expression to "the gap between my experience there and anything my English education had taught me before"

In many cases, the business models surrounding informal economic activity are unviable in a formal or regulated environment, as the margins are often very small such that they would be fully extinguished by compliance costs[10].

3.3 The Informal Economy in Developed Countries

While informal economic activity is more prevalent in Least Developed and Developing Countries it has always existed in Developed Countries as well. Moreover, while economic theory suggests that as economies mature the share of activity accounted for by the informal sector falls, this does not necessarily always occur.

This reflects a combination of State and country specific demographic, cultural and structural differences. A common contrasting example given is the role of the informal economy in Northern European countries, (characterised by full employment and strong social security) which have historically had low levels of informal economic activity and the US, where informal activity has always been higher (between 10-20% of all economic activity)[11].

A major variable in the level of take up or growth in the informal sector is the relative health and strength of the formal sector. When the formal economy experiences a downturn or recession, households are often forced by necessity (i.e. to fund basic living costs), particularly in countries with limited social safety nets, to seek informal employment. As such, the current resurgence of informal economic activity in Developed Countries can be directly attributed to the impact of the Global Financial Crisis and the Sovereign Debt Crisis in the past decade on the health of the formal economy, particularly in the US and Europe.

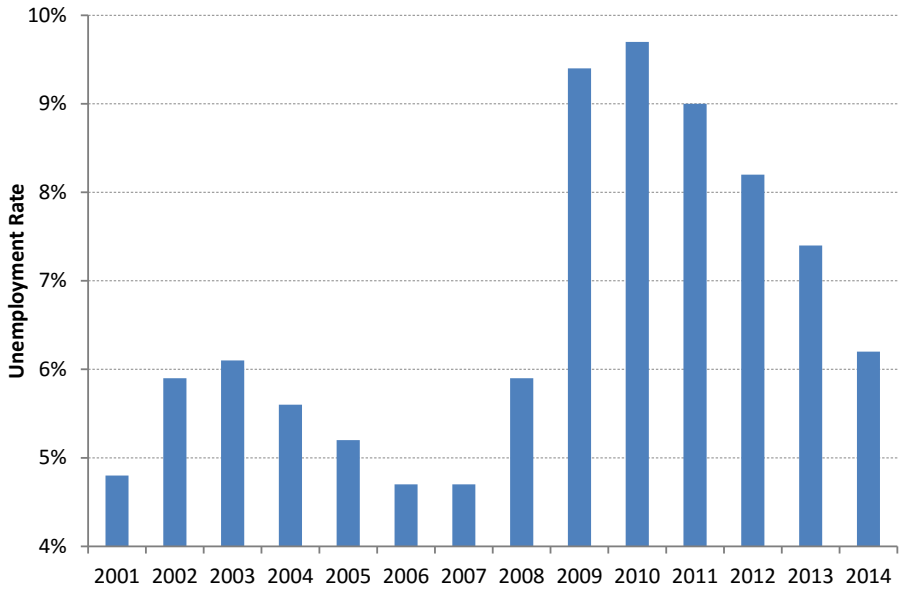


Figure 7 US Unemployment Rate, 2001 to 2014[12]

[10] Feige, Edgar L. (1990) "Defining and Estimating Underground and Informal Economies: The New Institutional Economics Approach." World Development 18:989–1002.
[11] Feige, Edgar L. (1990). "Defining and Estimating Underground and Informal Economies: The New Institutional Economics Approach." World Development 18:989–1002.
[12] World Bank (2015) Unemployment Rate by Select Country access at http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?page=2 Refer to Appendix 3 for data on other major countries and regions.

The fact that much of the increasingly globalised informal activity, enabled by affordable and accessible digital technologies, has originated out of the US over the past five years is unsurprising. The rapid growth in unemployment and joblessness in 2008/09 and 2009/10 and the slow nature of employment growth and recovery out to 2013/14, is symptomatic of a major deficit in employment opportunities in the formal economy. This represents an optimal environment for the resurgence in informal economic activity.

Given the labour intensity of much of the informal activity in the Developed World, then recent improvements in the economic conditions in the US are likely placing considerable strain on such operations. As more formal employment opportunities – with comparatively better income and worker conditions – become available, the incentive to engage in employment in the informal economy will fade.

3.4 Issues and Concerns with Informal Economic Activity

The informal economy is generally viewed negatively by policy makers, as it is considered a form of underemployment and sub-optimal labour utilisation and an outcome resulting from the failure of the formal economy to meeting the employment needs of the population[13]. It is also commonly associated with:

- very low incomes (often below the poverty line)
- high levels of income variability and uncertainty, particularly among those who are self-employed
- temporary, casual or inconsistent hours
- minimal labour protections and a general lack of quality and safety regulations

The very nature of informal activity is that it operates outside of the regulations of the State or country. Therefore, the Government lacks the ability to protect the community from any dangers that may be associated with the informal sector.

Worker protections are of particular concern, because workers in informal sectors often enter such employment due to financial hardship or desperation. Such motivations mean that these workers are easy targets for abuse and exploitation, driving down wages and conditions further. Recent example of this was the unilateral reduction in fares by uber in Melbourne[14] and the attempt to classify uber partners as employees in Los Angeles.

However, some commentators and researchers claim that the emergence of the informal economy in some countries over the past decades has been in response to rigid social and economic structures – such as Communism – and represented an entrepreneurial attempt to circumvent these constraints. However, this view is narrow in its application and less relevant in the current context.

Worryingly, the resurgence of informal economic activity is reinforcing and accelerating the wider trend of the casualisation of the Queensland workforce. Data from the ABS showed part-time and casual employment has now consistently exceeded 30% of total jobs for the past seven (7) months[15]. This is the longest period in the State's history and raises genuine concerns regarding the impact on households and the community of the growing casualisation of the economy and workforce.

[13] Portes, A and Haller, W (2005) The Informal Economy, The Handbook of Economic Sociology accessed at https://archivocienciassociales.files.wordpress.com/2012/09/neil_j-_smelser_richard_swedberg_the_handbook_of_economic_sociology_second_edition__2005.pdf
[14] The Age, (30 March 2016) uber Slashes Prices in Melbourne Again Drivers Threaten Strike Action accessed at http://www.theage.com.au/victoria/uber-slashes-prices-in-melbourne-again-drivers-threaten-strike-action-20160330-gnunz3.html
[15] ABS (2016) Labour Force, Australia, Cat No 6291.0, Australian Bureau of Statistics, Canberra

The Queensland Government's focus on job creation is admirable, but the type of job is critical. Queenslanders need full-time, high income, secure and sustainable employment opportunities, not business models that perpetuate the current casualisation trend.

3.5 The Role of Apps in Facilitating Informal Economic Activity

Arguably, the emergence of digital technologies has simply extended the scope and reach of the informal economy. In addition, supported by venture capital, digital platforms are sustaining this informal economic activity in the face of regulation and enforcement that would have traditionally brought the activity under control for the benefit of the community.

Informal activities have always been constrained by market access, as operating in a formal market would traditionally open upon the activity to regulatory compliance and enforcement by Government. Digital technologies have in effect created a parallel market, removed and separated from the rest of the formal economy so as to protect it from regulation, while offering many of the characteristics found in formal markets – namely the matching the supply and demand for goods or services for a price.

The sustainability of informal activity is contingent on non-compliance with regulation, due to the lack of sufficient margin to absorb the cost of regulatory compliance. As such efforts to bring informal activity into the formal fold usually results in either continued non-compliance or the extinguishment of the activity entirely.

Continued non-compliance is already evident in the ”ride sharing” sector internationally. Consultation with regulators in the US State of California highlighted the struggles that Governments can have after legalising informal activity, when the proponents continue to operate outside of the regulations. uber was recently fined US$7.3 million by the California Public Utilities Office for failing to provide information required monitor service performance[16].

Proponents of informal economic activity often promote self-regulatory or passive monitoring base regimes, as an attempt to circumvent full regulatory compliance and associated costs but such an outcome is sub-optimal to Government and potentially dangerous to the community.

3.6 Informal Economic Activity in the Queensland Taxi Industry

The Queensland Taxi Industry has been negatively impacted by informal economic activity for many years. Illegal taxis, particularly in regional Queensland, have been operating for several decades, though stakeholder consultation indicates the supply of these services has increased with the emergence of social media platforms such as Facebook.

Such illegal operations had always operated in the “grey market” broadly hidden from regulators. However, the introduction into Queensland of corporately backed illegal taxi operations – as confirmed by the recent Infrastructure, Planning and Natural Resources Committee (“IPNRC”) report[17] – and the intentional and active evasion of enforcement activities by the State Government have emboldened other illegal operators.

[16] CBS Local (14/01/2016), Regulators Find Rid Sharing uber 7.6 million, accessed at http://sanfrancisco.cbslocal.com/2016/01/14/regulators-fine-ride-sharing-uber-7-6-million/
[17] IPNRC (2016) Transport Legislation (Taxi Services) Amendment Bill 2015 Report No. 21, 55th Parliament Infrastructure, Planning and Natural Resources Committee

RPS therefore does not consider the emergence of “ride sharing” specifically and the “sharing economy” generally as a new occurrence. It is merely a modern manifestation of informal economic activity that emerged from the US in response to the desperation of unemployed workers and households, perceived and actual market failures in the US transport and accommodation sectors and the universal adoption of digital technologies.

4.0 The Queensland Perspective

The OPT Innovation Paper asserts that app-based booking and dispatch platforms that allow dormant personal resources to be utilised to extract economic value is innovative. However, as highlighted in section **Error! Reference source not found.**, the Paper fails to appropriately define what constitutes innovation and whether the subject apps meet the threshold to be regarded as innovative. As such, RPS questions whether this assertion of innovation is in fact valid.

In particular, little consideration (or even reference in the case of Topic Paper 5) appears to have been afforded to Queensland's unique context and perspective. As highlighted in section 2.3, perspective and context are critical to ascertaining whether something is "new and better". Academic literature and policy responses to the emergence of "ride sharing" considered in the Paper are overwhelmingly US-centric and the Paper has not undertaken sufficient analysis to determine whether this overseas perspective is relevant and applicable to Queensland.

In this section, RPS profiles the characteristics of the Queensland Taxi Industry that make it unique and different from its national and global peers. This profiling draws upon:

- detailed and comprehensive data and indicators of the current attributes of the industry
- commentary on the history of process, system and embedded innovations in Queensland, captured through desktop research and consultation with the industry across the State in late 2015 and early 2016
- the consultation and engagement with regulators, policy makers and taxi operators in major overseas jurisdictions (in the US, UK and South East Asia) during our recent study tour in March 2016

Using this information, RPS assesses the value and relevance of lessons from other jurisdictions.

4.1 Unique Characteristics of the Queensland Taxi Industry

Taxis are a universal and ubiquitous form of passenger transport available in almost every major population centre around the world. They are also generally easily recognisable, often sharing consistent characteristics such as:

- roof mounted lights or signs informing whether the taxi is available,
- consistent livery and colours (commonly white or yellow);
- A registration or licence number so the customer knows the vehicle is authorised by the government to provide taxi services;
- The word "Taxi" or "Cab" - often in English.

This universality of availability and similarity in appearance means that policy makers and researchers often assume that the regulatory framework and structures of taxi industries around the world are equally homogenous and uniform. This could not be further from the truth.

During our recent study tour of San Francisco, New York, London and Singapore, RPS confirmed from discussions with regulators in those jurisdictions that there is considerable variation in the nature, form, extent and content of taxi regulations around the world. Additionally, the structure of the industry varies, with differing levels of separation and demarcation between rank-and-hail and booked markets. Finally, the role that taxis play in the provision of personalised transport and their level of integration with the public transport system also vary greatly.

RPS has summarised the key characteristics of the Queensland Taxi Industry and in the table below are provided an overview of whether these characteristics are shared by other major taxi jurisdictions.

Figure 8 Key Characteristics of Taxi Industries in Queensland and Select International Locations

Characteristic/ Attribute	QLD	NSW	San Francisco	New York	London	Singapore
Population	**4.8 million**	7.5 million	7 million (Bay Area)	8.4 million (State only)	8.5 million (Greater London)	5.4 million
Segmented Market	**No**	Yes (Taxis and "Ride sharing"	Yes (Taxis and TNCs)	Yes (Yellow Cabs and Livery Vehicles)	Yes (Black Cabs and Private Hire cars/ Minicabs)	No
Share of Taxi Trips Booked	**65%**	20%	Minimal	Minimal	Minimal	20%
Regulated Fares	**Yes**	Licenced Taxis Only	Licenced Taxis Only	Yellow and Green Cabs Only	Black Cabs only	Partially re-regulated
Existence of Service Contracts	**Yes**	No	No	No	No	No
Minimum Service Levels	**Yes**	No	No	No	No	Yes – though only relating to high level indicators
Universal Service Obligations	**Yes**	No	No	No	No	No
Regulated Supply of Wheelchair Accessible Vehicles	**Yes**	No	No	No	No	No
Share of WAT Vehicles	**21%**	12%	3.8% of Taxis	4.2% of Yellow Cabs	58% of Black Cabs only	NA
Booking and Dispatch Companies	**Yes**	Yes	Yes (TNCs)	Yes (Minicabs and Private Hire Vehicles)	Yes (Livery Vehicles)	No (Operators Only)
Accepts Cashless Payments	**Yes**	Yes	Yes (TNCs only)	Yes	Yes (Livery Only)	Yes
Maximum Standard Taxi Age	**6 Years**	6.5 Years	Not in Force	15 years for Black Cabs, 10 years for minincabs	Not in Force	

Queensland's taxi industry has a unique set of characteristics compared to the other jurisdictions in Figure 3:

- Queensland has a comparatively small population, and the level of population density is much lower. Additionally, Queensland has the most decentralised population, with more people living outside of Greater Brisbane than inside the State capital. These population characteristics mean that the formal segmentation and separation of the taxi industry between rank-and-hail and booked trips in other larger jurisdictions is not viable in Queensland. Instead, Queensland operates a fully hybrid taxi service with taxis undertaking both rank-and-hail and booked jobs. In fact, ***it is questionable whether the historical***

segmentation of taxi services between rank-and-hail and booked markets in other jurisdictions remain viable in the face of changing consumer needs and the requirements for greater fleet efficiency. In New York, Boro taxis (which operate as licenced taxis but outside of Manhattan) operate as a more hybrid service offering both pre-booked and street hail services, in locations where both Yellow Cab and livery vehicle services are generally less accessible[18].

- ***Queensland has the highest share of taxi trips booked in the world, with 65% or two in every three trips booked by telephone, app or online***. This contrasts with other jurisdictions where taxi services have been principally secured at ranks or by hailing a cab (i.e. rank-and-hail). In fact, prior to the establishment of Transport Network Companies (or "TNCs"), minicabs and Livery Vehicles, consultation with international jurisdictions confirmed that San Francisco, London and New York all had very low shares of taxi trips booked in advance.
- ***The level of fare regulations across the jurisdictions analysed also varies. Queensland is the only jurisdiction with universally regulated fares.*** All other jurisdictions, with the partial exception of Singapore[19], have regulated fare structures for licenced taxis only. Fares for secondary taxis industries – such as minicabs in London, Livery vehicles in New York and TNCs in San Francisco – are limited or non-existent creating significant variation in pricing and fare structures for customers. This includes the use of surge pricing by "ride sharing" services.
- ***Queensland is the only jurisdiction in the world where the Government has a service contract with taxi booking companies (aka centralised dispatch)***. Full responsibility for regulation enforcement vests with the Government regulator. This unique contractual relationship also supports the implementation of Minimum Service Levels ("MSLs") in the State. Such levels are also unique, with the closest comparable market are where conditions placed on taxi operators is in Singapore to ensure jobs are dispatched to taxis within a certain timeframe of being received[20].
- ***Queensland is also the only jurisdiction to have Universal Service Obligations ("USOs"). In all other jurisdictions, the distribution of the fleet across the service area is at the discretion of the operators or the individual taxi drivers***. Singapore regulates the number of taxis that must be on the road at certain times as well as the minimum daily mileage of taxis, though both of these regulations are relatively soft compared to the regulatory and contractual requirements of Queensland taxi booking companies[21]. In contrast, the NSW Point-to-Point Transport Taskforce recent recommended the removal of USOs in that State as they had "failed to a significant degree" in meeting the needs of the consumers[22]. However, as demonstrated in Figure 8, the NSW taxi industry is not comparable with that of Queensland and lacked comprehensiveness and contractual enforceability. The lack of comparable obligations in most jurisdictions means many locations have historically suffered from poor levels of accessibility by customers to taxi services outside of core nodes (such as CBDs, entertainment precincts and airports) or by customers who require special support (such as the disabled). This market failure has been part of the justification in a number of jurisdictions for the creation of secondary taxi markets (such as minicabs, livery vehicles and TNCs).
- ***Queensland is unique in its share of the State fleet that must be WAT vehicles. No other jurisdiction has legislates that MSLs for persons with a disability must be equivalent to a person without a disability and is the only State in Australia with a taxi industry that has fully***

[18] NYC Taxi and Limousine Commission (2015) 2014 Taxicab Fact Book accessed at http://www.nyc.gov/html/tlc/downloads/pdf/2014_taxicab_fact_book.pdf (Refer to Appendix 7)
[19] Public Transport Council (Singapore 2016) Regulation: Taxi Fares accessed at https://www.ptc.gov.sg/regulation/taxiFares.htm
[20] Land Transport Authority (Singapore 2016) Taxi Companies Quality of Services (QoS) Standards For January 2016 accessed at http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicTransport/files/QoS.pdf (Refer to
[21] Land Transport Authority (Singapore 2016) http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicTransport/files/TA_Results.pdf
[22] NSW Government (2015) Point to Point Transport Taskforce Report to Minister accessed at http://www.transport.nsw.gov.au/sites/default/files/b2b/publications/point-to-point-transport-taskforce-report-to-minister.pdf

implemented and complies with the Disability Standards for Accessible Public Transport[23]. Instead, most jurisdictions seek to encourage the introduction of WATs through a combination of fare subsidy and financial support of acquisition. In New South Wales for example, the Government offers interest free loans for the fit out of WATs as well as a $15 "lift fee" payable to the driver, to encourage more WATs on the road[24]. This approach has yielded a lower share of WATs than in Queensland despite a higher cost impost to Government. In Singapore, WATs have only recently been introduced. SMRT current runs the largest WAT fleet with 30 vehicles, all of which are based on the London Cab with five co-funded by local a community care and transport group called Diamond Cabs. Finally, statistics for London suggest a high proportion of WATs due to the fact the traditional London Black Cab has WAT-specific design and fit out guidelines. However, this only includes fixed ramps, rather than lifts as in Queensland taxis, and does not cover private hire vehicles and minicabs, which comprise the vast majority of the UK taxi fleet.

- Many jurisdictions claim to have taxi booking companies, though in most cases these are not booking companies, as we know them in Queensland. It compulsory to be affiliated with a booking company in Queensland, which is not the case in any other jurisdiction. Similarly, the number of booking companies is restricted, often to only one in each service area (two in Brisbane). ***This reflects a policy objective in the current regulations to maximise the efficiency and therefore universal availability of the taxis fleet by placing all taxis under a small number of booking and dispatch companies who have contractual obligations to meet MSLs and USOs.*** Most "booking companies" in other jurisdictions are equivalent to operators in the Queensland Taxi Industry, principally responsible for operating cabs and providing a secondary dispatch service. ***The closest equivalent to the taxi booking company in Queensland would be Transport Network Companies in markets like San Francisco, though these companies lack the regulatory compliance, fleet management and distribution capabilities of Queensland companies.*** There is also the emergence of third party booking companies in a number of jurisdictions, including Singapore
- ***Queensland has one of the highest shares of wheelchair accessible taxis in the world.*** Only the Black Cabs in London have a higher rate, though these taxis only operate in the City of London and not in the greater urban area – further these vehicles only safely accommodate a very small number of makes and models of wheelchairs. San Francisco and New York have very low shares at only 3.8%[25] and 4.2%[26] respectively while NSW is only 12%[27]. ***Queensland is also the only jurisdiction where the purchase and/or operation of wheelchair accessible taxis are not supported by Government, either through subsidies or concessional loans.*** The level of wheelchair accessible "ride sharing" services is minimal and the increased dominance of "ride sharing" in some US markets is seeing the number of wheelchair accessible taxis available for customers fall significantly[28]. Singapore has recently introduced London-style taxi to provide wheelchair accessible services[29]. However, fares are generally fixed and are significantly more expensive than standard taxis. Finally, most US jurisdictions also fund forms of paratransit services. These services are akin to point-to-point public transport services tailored specifically for people with mobility issues in the community. In 2014, New York had approximately 2,000 paratransit vehicles owned and operated by about 200 organisations. However, the cost of such services to

[23] Australian Government (2016) Disability Standards for Accessible Public Transport accessed at https://www.legislation.gov.au/Details/F2005B01059
[24] Transport for NSW (2016) Wheelchair Accessible Taxis accessed at http://www.transport.nsw.gov.au/operators/taxis/wheelchair-accessible-taxis
[25] ATIA (2015) Taxi Statistics, accessed at http://www.atia.com.au/taxi-statistics/
[26] Australian Financial Review (25/01/2016) Wheelchair Users Hit Speed Bump in Age of uber taxis accessed at http://www.afr.com/technology/wheelchair-users-hit-speed-bump-in-age-of-uber-taxis-20160125-gmdb8p
[27] ATIA (2015) Taxi Statistics, accessed at http://www.atia.com.au/taxi-statistics/
[28] The Age (22/12/2015) Disability Groups Fear uber will kill off Wheelchair cabs accessed at http://www.theage.com.au/victoria/disability-groups-fear-uber-will-kill-off-wheelchair-cabs-20151222-glthji.html
[29] SMRT (2016) Wheelchair Accessible Taxis accessible at http://www.smrt.com.sg/Journey-with-Us/Taxis/Wheelchair-Accessible-Taxis

Government ranges between $30 and $60 per trip with limited capacity to recover costs (4% recover) from passengers[30]. In 2005, the budget of the program reached almost $240 million and moved only 4.6 million people[31].

Overall, RPS regards the characteristics of the Queensland Taxi Industry as unique. They have evolved over time in response to our unique geography and decentralised population.

No other taxi industry anywhere in the world shares a similar set of characteristics and attributes, raising questions as to the relevance of whether there are lessons to be learnt from other jurisdictions in their regulation and legalisation of "ride sharing" services. The structure and operations of the Queensland industry is even in stark contrast with that of NSW, where "ride sharing" services have recently been legalised.

Instead of Queensland learning lessons from other jurisdictions, Queensland has lessons it can teach other parts of Australia and the world on how best to regulate efficiency, cost effective and highly accessible taxi industry that meets the needs of all groups in the community (including the disabled and those in wheelchairs).

4.2 A History of Innovation

Of particular concern is the apparent contradiction that exists between the Innovation Paper's implication of a lack of innovation in the Queensland Taxi Industry and the statements made by the Review Taskforce Chair, Jim Varghese AM, during the release of the draft Guiding Principles. During his presentation, Mr Varghese noted the long history of regulatory, technological and business model innovation in the Queensland Taxi Industry and the fact the State has led the world in many advancements[32].

The history of the Queensland Taxi Industry is one of pioneering innovation and serving the community. Major world-leading innovations include:

INNOVATION	PIONEERED IN QLD	WHEN
Company-managed customer feedback and enquiries	✓	1975
State-of-the-art computer dispatch systems	✓	1988
Universal EFTPOS Facilities	✓	1990
Premium Taxi Services	✓	1990
Mandatory Wheelchair Training for All Drivers	✓	2004

[30] San Francisco Municipal Transit Agency (2015), Presentation on Paratransit services, accessed at https://www.sfmta.com/sites/default/files/agendaitems/2015/11-3-15%20Item%2011%20Presentation%20on%20SF%20Paratransit%20Services.pdf
[31] New York City Independent Budget Office (2006) Fiscal Brief – Access-a-Ride: With More Riders Costs are Rising Sharply, New York City, New York (Refer to Appendix 13)
[32] Department of transport and Main Roads (2010), Taxi Strategic Plan 2010 to 2015 accessed at www.tmr.qld.gov.au/.../Taxiandlimousine/Taxi%20strategic%20plan/Pdf

INNOVATION	PIONEERED IN QLD	WHEN
Wholesale Adoption of Hybrid Vehicles (70% of the Fleet)	✓	2005
Universal Camera Systems	✓	2005
Fully Integrated Meters with back-to-dispatch systems	✓	2008
Taxi Smartphone Booking Apps	✓	2011
Audio Recording	✓	2018

Figure 9 World Leading Innovations, Queensland Taxi Industry

Based on this performance, implications and inferences in the Paper that the Queensland Taxi Industry lacks innovation are unfounded and not supported by the evidence. Not only has Queensland been the world leader in the development and adoption of new innovative taxi technologies and services, in some cases it remains at least 20-50 years ahead of other jurisdictions.

4.3 Queensland's Innovative and Flexible Regulatory Framework

Queensland's history of innovation has been supported by a stable regulatory environment in Queensland with the flexibility to predict and accommodate these innovations. In fact, arguably one of Queensland's greatest taxi-related innovations is the current regulatory framework itself.

4.3.1 Summary of Current Regulatory Framework

The principal component of the current regulatory framework is the *Transport Operations (Passenger Transport) Act 1994* ("the Act"). This legislation, passed in 1994, was the product of extensive consultation and engagement by State Government with the taxi industry and produced a legislative framework that remains valid and applicable 22 years later.

The legislation deals with a wide range of aspects of the taxi (and limousine) industry including:

- operator accreditation
- driver accreditation
- driver authorisation
- taxi service bailment agreements
- market entry restrictions
- service area contracts
- taxi service licences
- peak demand taxi permits and
- standards and enforcement

While the Act includes specific provisions, many of the sections delegate power or authority to the Chief Executive Officer or Minister to make regulations under the Act.

The *Transport Operations (Passenger Transport) Regulations 2005* ("the Regulation") comprise the second component of the regulatory environment governing the Queensland Taxi Industry. The structure of the

regulations broadly mirrors that of the legislation, but provides greater detail, particularly where such detail is not included in the legislation itself.

Examples of specific issues dealt with by the Regulations include:

- R53 – limitation on the number of taxi licences that can be held by a single person or associates
- R54 – the transfer and lease of licences and associated notification to the Chief Executive
- R62 – establishing that drivers must not refuse “reasonable” hirings
- R62A – need for a taxi driver to be associated with a booking company
- R63 (4) – authorising taxi drivers to request a deposit from the passenger if there is reasonable suspicion the fare will not be payable
- R63 (4) – makes driving in a circuitous or indirect route to the passenger’s destination for the purpose of increasing the fare an offence under the regulations
- R63B – issues regarding electronic payments
- R66 – multiple hirings
- R67 – maximum taxi vehicle ages
- Div 3 – Substitute Taxis
- R83 – obligates the taxi operator to ensure all taxis are fitted with security cameras
- R96AH – obligates the taxi operator to ensure that manual card readers and restricted use slips are available in all cars
- Div 6 – taxi driver display cards

In most cases, the regulations establish standard penalties, in the form of penalty units, for non-compliance/adherence to the regulations. This reflects the fact the regulations function more broadly as the enforceable component of the regulatory framework.

The third component of the regulatory framework that is unique to Queensland is the service contracts. Any review of the Queensland Taxi Industry regulations must consider the role that Service Contracts play. Service contracts are contractual agreements between the Queensland Government and a Booking Company within one of the 20 Service Contract Areas in the State. In the absence of such a service contract, a Booking Company cannot operate in a Service Contract Area.

The existence of Service Contracts are highly favourable aspects of the regulatory framework for the Queensland Government as they allow much of the regulatory burden of taxi services to be contractually delegated to the Booking Companies. In this way, the introduction of Service Contracts under the 1994 effectively partially deregulated the taxi industry, shifting much of the regulatory monitoring, compliance and enforcement of standards to the industry under a coregulatory model.

The primary focus of service contracts is the establishment of Minimum Service Levels (“MSLs”) for the Booking Company to achieve in the designated Area. These MSLs are critical to the delivery of USOs, by ensuring that all Queenslanders, regardless of location, disability, ethnicity and gender have access to a taxi services. The Act also provides the flexibility for the Service Contracts to impose a wide range of responsibilities on the Booking Company. Section 41 of the Act states that Service Contracts can cover:

- performance outcomes for frequency, regularity, punctuality and accessibility
- performance outcomes for customer information and service

- principles for fare setting
- principles for fare collection
- performance levels for the quality and type of public passenger vehicles
- criteria for government payments under the contract
- require the company to provide or fund infrastructure associated with providing the public passenger service
- require the company to have or develop a business plan outlining how the performance levels are to be achieved
- require the company to establish a management information system to monitor, record and report periodically on performance
- require the company to provide improved levels of productivity
- provide for the payment of compensation by the holder if the holder contravenes a condition of the contract
- other terms required by the chief executive.

The exact terms of Service Contracts between the State Government and Booking companies are commercial in confidence. However, the terms of section 41 demonstrate the broad and wide ranging scope that Service Contracts can cover.

The fourth component of the current regulatory frameworks is Booking Company by-laws. Booking companies regularly impose by-laws on drivers that are associated with them. The purpose of these by-laws is to complement the legislation and regulations, fulfil the conditions under the Service Contract or, in some cases, require a standard of service delivery and performance from a driver that exceeds the regulated minimum. By-laws are company specific and therefore vary between Service Contract Areas. Failure to comply with by-laws can result in suspension or, in cases of grievous or continuous non-compliance by a driver, disaffiliation from the company.

4.3.2 Innovative Regulations

Many of the core components of the current regulatory framework in Queensland are regarded as genuinely innovative by other jurisdictions. Consultation with stakeholders in international jurisdictions during the RPS study tour confirmed this and there was great interest from regulators to learn from the lessons that Queensland had to teach in the establishment of a flexible, stable and long-term regulatory framework. This is despite the fact the legislation at the core of the framework is now over 20 years old. This confirms the fact that most jurisdictions in the world are at least 20 years and sometimes almost 50 years behind Queensland in terms of taxi industry regulations.

Areas of particular innovation in Queensland's regulations, raised by international jurisdictions during consultation included (but are not limited to):

- the existence of formal service contracts between Government and booking companies
- compulsory affiliation of licences with booking companies
- large share of WATs within the taxi fleet with no financial subsidy for vehicle purchase, fitout or operation
- exclusive use of WATs to transport disabled and wheelchair bound passengers and the absence of a major paratransit requirement
- comprehensive Minimum Service Levels

- comprehensive Universal Service Obligations
- a co-regulatory model with booking companies playing the major role in ensuring compliance
- universal security cameras
- vesting complaints management with booking companies
- universal electronic payments

It is also difficult therefore, to justify the claims in the Innovation Paper that the Queensland regulatory framework was not created with current innovations and changes in the needs of the community in mind. The Act and associated regulations provided a flexible, responsive and stable framework to allow Queensland to, not only, adopt new technologies and processes but to lead the world.

Even the manner in which the 1994 legislation was developed was innovative. The collaborative process undertaken by the then State Government and the high level of engagement with the taxi industry and key stakeholder and user groups was critical to the successful establishment of a flexible regulatory framework for over 20 years.

This approach, which is similar to the Lead User Method identified in section 2.4, represents a best practice approach to the development of long-term, sustainable and flexible regulatory frameworks.

5.0 What Does "Ride sharing" Offer Queenslanders?

"Ride sharing" proponents claim that such services will offer Queenslanders a range of benefits. These include:

- cheaper fares
- more accessible and timely services
- higher quality services
- job opportunities[33]

These claims are sometimes supported by commentators and academia, including those in the Innovation Paper, who declare app-based dispatch and booking platforms as innovative without contextualising the technology against Queensland's unique characteristics and its long, proud history of global leadership in taxi service innovation.

In this section, RPS critically assesses the degree of innovation represented by app-based booking and dispatch platforms in the Queensland context and evaluates the actual benefit and value proposition of the apps for Queenslanders. Finally, RPS addresses claims that these apps are causing technological disruption to the Queensland Taxi Industry.

5.1 Is App-Based Booking and Dispatch in Queensland Innovative?

In order for app-based booking and dispatch platforms to be innovative form the Queensland perspective, they must be "new and better".

In terms of whether the apps are new, the analysis in this report has demonstrated that both centralised computer-based booking and dispatch systems and app-based platforms are not new and that Queensland has actually been a pioneer in both of these technologies for more than 20 years. While such platforms could be categorised as *new* to many international jurisdictions, this reflects the fact that such jurisdictions are more than 20 years behind Queensland in terms of innovation and regulation.

Therefore, in the Queensland context, app-based booking and dispatch platforms are not a new or novel technology.

In terms of being better, the sole reliance on app-based platforms for booking and dispatch means that this lacks the comparative sophistication, capacity and capabilities of the centralised booking and dispatch systems currently employed by Queensland booking companies. Examples of where booking company systems exceed those of apps include:

- ***GPS Accuracy*** – booking company systems rely on commercial grade GPS systems compared to retail based GPS in the smart phones of illegal taxi drivers;
- ***Trip Recording and Real-Time Monitoring*** – booking companies not only can record the movement of all vehicles for all trips but can track the movements in real time. The extent of this capability is so great that the Queensland Police Service ("QPS") consistently relies on taxi booking companies to provide evidence for criminal cases.

[33] Uber Ride sharing

- ***Booking Company Apps Capabilities*** – the booking and dispatch apps employed by Queensland booking companies are directly linked to the base system, providing a greater degree of accuracy and reliability. Similarly, the user interface and functionality of ride sharing and taxi booking company apps are broadly similar;
- ***Reduced Capacity for Drivers to Exploit Customers*** – while there is increased evidence that "ride sharing" drivers are gaming ride share app platforms (e.g. reporting jobs as "no shows" but then taking the passenger as a rank and hail, or turning off their phones or going inactive in order to reduce perceived supply and trigger surge pricing), the opportunities for such customer and system exploitation by taxi drivers is limited. Integrated tamper proof meters are directly linked back to base and can be monitored in real time.

As such, RPS does not believe that app-based booking and dispatch platforms are "better" than the current technologies, systems and processes employed by Queensland booking companies and in fact likely lag behind Queensland best practice by at least a decade.

Overall, the fact that these apps are neither new nor better means they cannot be classified as innovative in the Queensland context.

5.2 Is there are Net Community Benefit from "Ride sharing"?

The claim that "ride sharing" provides benefits to the community is also questionable when the unique Queensland context is considered. As an essential form of public transport, the policy and regulatory reform options to be developed by the Review Taskforce and considered by Government should be assessed based on maximising the net benefit to the community.

RPS has undertaken a review of the key benefit claims of uber, the principal deliverer of non-complying taxi services in the State and assessed these claims against the Queensland context. This is summarised in the figure below.

Figure 10 Assessment of Claimed Benefits of "Ride sharing" to Queenslanders

Claimed Benefits	Relevance to Queensland	Explanation
Cheaper Fares	✗	This claim is central to the argument favouring "ride sharing". Preliminary analysis by RPS suggests that uber fares are 17% cheaper than taxis for an equivalent trip. However, uber currently does not charge passengers GST through their app (which is 10%) and taxi fees include a cashless payment fee of a further 10%. If this payment service fee is reduced to 5%, as is being implemented in Victoria, the cost difference would be only 2%. On an average fare, this represents less than 50c. This also assumes that there is no surge pricing by Uber for this trip.
More Accessible and Timely Services	✗	Queensland Booking companies consistently meet Minimum Service Level, while maintaining Universal Service Obligations. Similarly, waiting times at secure ranks during peak times was less than 90 seconds in the 2 years to 2015.
Higher Quality Services	✗	Queensland taxis have to comply with the most comprehensive and rigorous vehicle quality standards in the world. Vehicle age restrictions are comparatively young, while driver training standards are also high.
Job Opportunities	✗	The Queensland Taxi Industry employs over 16,000 people, with a high proportion of full-time work. Ride sharing is recognised internationally as a low income, part-time/casual employment opportunity used by workers to supplement incomes during depressed economic conditions.

RPS appreciates, from our recent study tour to major international taxi jurisdictions, that many of the claims made by uber and other "ride sharing" proponents are potentially valid in those jurisdictions, particularly in

the US. However, this reflects a comparative deficit of quality and innovation in those markets, both in terms of service delivery and regulations.

From the Queensland perspective, however, the unregulated informal activity of “ride sharing”, provides no net advantages to Queenslanders over the State’s taxi industry and instead potentially undermines a world leading industry and lead to a significant regression in the quality and innovation of the Queensland regulatory framework.

5.3 Are Apps Disruptive to the Queensland Taxi Industry?

Topic Paper 1 claims that the Queensland Taxi Industry is currently experiencing technological disruption caused by the emergence of app-based booking and dispatch platforms. Analogies are also drawn in the Paper to the music and hotel industries, where technological disruptions have occurred.

5.3.1 Relevance of Other Sectors

In terms of comparison with other sectors, RPS has concerns regarding the appropriateness of the comparison drawn in Topic Paper 1.

In terms of the comparison with music, RPS believes this example is irrelevant. Music is a non-physical, information-based discretionary product that is available in an open market environment. The disruption in that industry, and in photography and television, reflected new ways to store and "transport" the information.

In contrast, taxis physically move people from one location to another, providing an essential transport service. It is also a service that can involve risk of health to driver and passenger, because of the use of a motor vehicle. If, at some point in the future, a technology is discovered to digitally transport an individual, then that would be genuinely disruptive to the personalised transport sector and analogous with music. However, at this time the music example is not relevant.

In terms of hotels, the analogy here is much closer, but once again, the hotel and taxi industries are very different. Hotels are an important asset to the overall economy but lack the characteristics of an essential service like taxis. They remain discretionary. The emergence of digital booking platforms for accommodation visitors in residential accommodation (i.e. Airbnb) also reflects a high degree of market failure in the hotel sector, namely around a lack of flexibility of supply capacity during peak times, and an over concentration of supply at key nodes. However, rather than hotels being analogous with the Queensland Taxi Industry, this sector bears closer resemblance to de-regulated, rank-and-hail taxi markets in the US that lack the USOs and MSLs central to the Queensland system.

Instead, RPS considers sectors such as airlines and the contracting out by Government the provision of public transport as more representative of the Queensland Taxi Industry. In each case, the supply, quality, frequency and in the case of public transport, the price of the service is all regulated. This reflects a combination of a high risk of genuine market failure in the absence of regulations and the need to protect consumers.

5.3.2 Regulatory, Not Technological Disruption

RPS does not consider app-based booking and dispatch platforms as a true technological disruption of the Queensland Taxi Industry. As highlighted in section 5.1, such apps do not meet the threshold to be regarded as innovation in the Queensland context as the existing technologies and process far exceed the capabilities of the apps. As such, because of the regressive and retrograde nature of the technology, RPS does believe this meet the threshold of being classified as "disruptive” in the Queensland context. At best the apps provide

an incrementally new way to secure a taxi service (which already existed in the Queensland context) but does not change the fact that a vehicle picks up passengers and drops off at their destination.

This is supported by results of the UMR Strategic Research that found that 68% of Queenslanders, including 67% of regular uber and "ride sharing" users and supporters, consider "ride sharing" services as "basically a form of taxi service"[34].

Figure 11 Response to Question - How would you Classify uber and "Ride sharing"? Queenslanders 18+

Response	Everyone	Regular Taxi Users	Regular uber users and supporters
Is basically a form of taxi	**68%**	**68%**	**67%**
Is entirely different	22%	24%	33%
Unsure	10%	8%	0%

Instead, RPS classifies the impact of illegal and non-complying taxi services in the State as a form of regulatory disruption. This aligns with the true nature of "ride sharing" as a form of informal economic activity, the continuation of which is traditionally contingent on non-compliance of regulations.

In the long-term, the biggest loser of this form of regulatory disruption is not the industry or even the customer but the State Government. The precedent set by the failure of Government to enforce and uphold sovereign laws of the State, coupled with the efforts of corporately-based illegal taxi service providers to evade enforcement and investigation activities of compliance officers undermines the confidence in the community in the sovereignty and applicability of the laws of the State.

The risks to Government of this outcome is understood by the Queensland population, with the UMR Strategic Research indicating that more than half (53%) of Queenslanders believe that uber and other "ride sharing" drivers and services should be subject to the same Government regulation as the taxi industry.

[34] UMR (2016), Taxi Council Queensland - Issues affecting the taxi industry, UMR Strategic Research, Sydney

6.0 The Future of Innovation in Taxi Services

The Queensland Taxi Industry over the past three decades has not only adopted, by pioneered a wide range of technological and business model innovations to meet changing consumer and community needs. However, at the core of this innovation has been flexible, responsive and customer focus regulatory framework that has established the environment to foster and encourage innovation by the industry.

In order to maintain and enhance the benefits of the taxi industry for Queenslanders into the future, the all stakeholders – including the industry, Government and the community – must seek to embrace the opportunities the future holds for the personalised transport sector in the State. These opportunities extend far beyond the short-term and include genuine transformative innovations that could fundamentally alter the way in which taxi and personalised transport services are provided to the community in the future.

This section explores some of these potential innovations for consideration by the Queensland Taxi Industry in the future. Examples of innovations across regulatory, business model/service delivery and technological categories have been identified and explored. This section draws upon the feedback and insights of the industry captured during workshops as well as research into different innovation-led regulatory reform opportunities.

6.1 Regulatory Innovations

Reform is required to Queensland's regulatory framework to ensure its current premier position among international taxi jurisdictions is maintained. While reforms are required to address shortcomings, inefficiencies and perverse outcomes from the current framework, RPS recommends that the focus of reform should be to establish a framework that is defined by vision and flexibility. The rapidly changing nature of consumer expectations, technological innovations and service delivery models renders a static and fixed regulatory framework obsolete in the long-term.

6.1.1 Structure and Burden of Regulations

A potential incremental innovation for the Queensland Taxi Industry is the continued refinement of the structure of the regulations – namely reassessing the role and function of the Act, Regulations and Service Contracts in the overall framework.

Currently the Act and Regulations of the framework are comprehensive in nature and comprise the vast majority of the total regulatory environment. This is despite the existence of Service Contracts within the current framework structure and extensive flexibility afforded to the Minister in determining the terms and scope of those Contracts.

RPS believes that greater consideration should be given to reinforcing the current co-regulatory model and rebalancing the relationship between the Act, Regulations and Service Contracts to favour the latter over the prior. Best practice regulatory frameworks are anchored by a concise Act that is focused on establishing the core fundamentals of the regulatory framework and the powers and authority of the Minister and other parties under the Regulation and the Service Contracts.

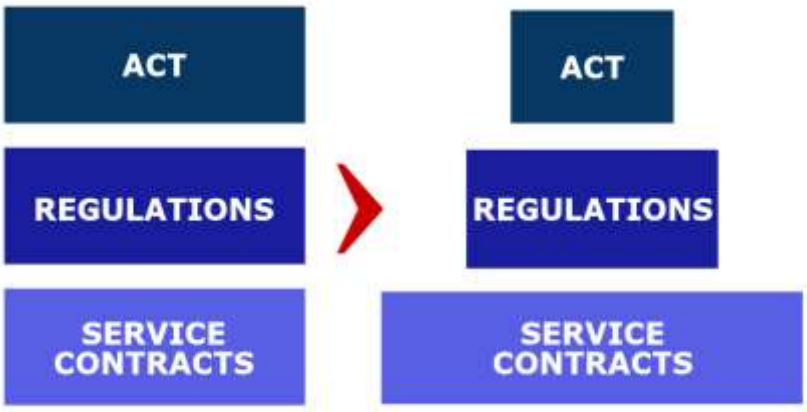


Figure 12 Rebalancing the Regulatory Framework Structure

RPS also believes that all future changes to the regulatory framework governing the taxi industries should be subject to the Commonwealth Regulatory Burden tool from the Office of Best Practice Regulations to ensure the cost impost of such changes are proportionate to the outcome desired[35]. This should include adherence to the principle under the Australian Government's Guide to Regulation that:

The cost burden of new regulation must be fully offset by reductions in existing regulatory burden[36].

Reductions in the cost burden of regulatory compliance does not necessarily mean a reduction in the scope, comprehensiveness or quality of the regulations. Instead, focus should be afforded to optimising how the regulations are monitored and enforced. Opportunities exist to draw upon existing capabilities in the community (e.g. independent mechanics could provide certification of the mechanical soundness of the taxi vehicle as required under the regulations), rather than rely on the establishment and/or maintenance of duplicate capabilities within Government.

Additionally, the use of Wi-Fi and cloud streaming technologies should be considered to allow Department and Police Services to access camera and audio recordings from taxis without the cost impost to the driver, the licence owners, operator and booking company of the vehicle needing to be taken off the road. This would meet the requirements of the Guide to Regulation and the Regulatory Burden Measurement Tool.

6.1.2 Innovations in Enforcement

According to the Minister for Transport and the recent IPNRC Report[37], "Ride sharing" services currently operating in the State of Queensland are illegal and non-complying taxi services operating outside of the current regulatory and legal framework. Such activities justify proactive and aggressive enforcement activities.

It is acknowledged that the Queensland Government had in place an aggressive enforcement strategy against non-complying and illegal taxi services in the State. This is reflected in fines being issued to illegal

[35] Australian Government (2016), Commonwealth Regulatory Burden Measure, accessed at https://rbm.obpr.gov.au/
[36] Australian Government (2016) Regulatory Burden Measurement Framework accessed at https://www.dpmc.gov.au/sites/default/files/publications/005_Regulatory_Burden_Measurement_Framework_4.pdf
[37] IPNRC (2016) Transport Legislation (Taxi Services) Amendment Bill 2015 Report No. 21, 55th Parliament Infrastructure, Planning and Natural Resources Committee

taxi drivers over several months. However, these efforts are currently being circumvented by the active and overt evasion of uber and other major "ride sharing" companies. As far as RPS is aware, this is the first time that a large international corporation has sought to actively evade the enforcement of the laws of the sovereign State of Queensland.

This failure of Government to enforce the laws and regulations governing taxi services calls into question the legitimacy and effectiveness of all laws of the State.

In the absence of effective enforcement, it also raises questions as to the relevance of any future regulatory reform. Without effective enforcement and compliance activities, any new regulations will lack legitimacy and relevance in the long-term.

Changes are therefore required to how enforcement activities are undertaken by the Government and the powers of enforcement officers to ensure the laws of the State are upheld universally.

One potential approach to enhancing the certainty and confidence of the taxi industry and Queenslanders more broadly in the laws of the State would be the establishment of an independent authority responsible for the enforcement and compliance of Queensland taxi laws and regulations. This may include the establishment of a Taxi Service Commission.

A Taxi Service Commission could take many forms. The Victorian Taxi Service Commission was established in July 2013 to regulate the take industry in that state and implement the reforms identified by Government as part of the Taxi Industry Inquiry initiated by the Victorian Government[38]. The Victorian Taxi Service Commission holds a range of powers including:

- taxi and hire vehicle licensing
- issuing taxi and hire vehicle driver accreditations
- issuing taxi industry accreditations
- administering the Multi-Purpose Taxi Program and country wheelchair accessible taxi subsidy scheme
- developing policy and reviewing regulations
- monitoring the industries it regulates to ensure compliance with relevant legislation and regulations
- liaising and consulting with these industries and with consumers
- providing business and information technology support to the industries it regulates
- implementation of the government supported reforms from the Taxi Industry Inquiry's final report

The Victorian Taxi Service Commission has extensive investigative and enforcement powers that allowed it to initiate successful conviction against Brenner and 12 other uber drivers in December 2015[39].

During our international study tour, representatives of RPS met with the Taxi and Limousine Commission in New York. The NYC Taxi and Limousine Commission (NYC TLC) was created in 1971. It licenses and regulates over 50,000 vehicles and approximately 100,000 drivers, and performs safety and emissions

[38] Victorian Taxi Services Commission (2016) About Us accessed at http://taxi.vic.gov.au/about-us/taxi-services-commission
[39] Herald Sun (05/12/2015) uber Melbourne Ride Sharing Service Effectively Illegal as Driver Guilty in Landmark Case accessed at http://www.heraldsun.com.au/news/law-order/uber-melbourne-ride-sharing-service-effectively-illegal-as-driver-guilty-in-landmark-case/news-story/d262aab399caab1fc8f9e24ff687dfb4

inspections of the 13,637 medallion taxicabs three times each year, as well as biennial inspections of all TLC-licensed For-Hire vehicles[40].

The powers and structure of any Taxi Service Commission in Queensland should build on this national and international best practice to reflect the unique regulatory and service delivery characteristics of the Queensland Taxi Industry.

For example, a Queensland Commission could be responsible for administering Service Contracts with Booking Companies, operating secure ranks and piloting new and emerging technologies.

6.2 Business Model and Service Delivery Innovation

The greatest opportunity for future innovation in the delivery of taxi and personalised transport services in Queensland is in the creation and implementation of new business and service delivery models. Queensland has a proud history of pioneering such service and business model changes, including maxi taxis, premium taxis and secure taxi ranks.

In some cases, these innovations have been dependent on enabling technological innovations. However, the real benefit to the community has not come from the technology itself but the emergence of new services and business models by the taxi industry in response to community demand.

6.2.1 Deviated Fixed Route and Pre-Booked Share Taxis

The Queensland Taxi Industry has one the greatest fleet management capacities in the world, owing to its comprehensive GPS and GIS-based booking and dispatch capabilities. Additionally, Queensland has one of the largest WAT fleets in the world, which it has successfully repurposed for multiple, and group bookings to make commercially viable in the absence of any Government support.

Both of these characteristics mean that Queensland has a genuine opportunity to fully incorporate deviated fix/semi-flexible routing and share taxi models as a form of taxi and personalised transport service in Queensland.

A share taxi trip is a hybrid bus-taxi service where the vehicle runs a semi-flexible route and picks up and drops off unrelated passengers. It is similar to the concept of multiple hirings[41], being demand responsive and moving multiple passengers at once, although shared taxis generally operate a more structured route.

The Queensland Taxi Industry has some experience in providing semi-flexible route based services. Mackay Taxis previous provided support to the local public transport network, with Maxi taxis operating under contract along bus routes, during times when taxi demand was low but USOs meant there was significant taxi service capacity available. Similarly, Black and White Cabs, Yellow Cabs and Gold Coast Cabs provide Council Cab services, under contract with the relevant Local Government Authority, to provide eligible passengers with a pre-booked shared taxi service to local destinations like shopping centres or medical centres[42]. Additionally, consultation with the industry revealed that many taxi booking companies offer fixed

[40] NYC TLC (2016) About Us accessed at http://www.nyc.gov/html/tlc/html/about/about.shtml
[41] NSW Taxi Council (2016) https://www.nswtaxi.org.au/passengers/multiple-hiring
[42] Daniels, R and Mulley, C (2010) Overcoming Barriers to Implementing Flexible Transport Services in NSW accessed at http://atrf.info/papers/2010/2010_Daniels_Mulley.pdf

and semi-fixed personalised transport services under contract with companies, including mining and gas industry workers in centres such as Gladstone during the recent construction boom.

There exists an opportunity to extend the current niche offering of shared taxi services in the State to the wider population. This service would be best suited for consistent and regular travel patterns to key destinations. This may include to and from the CBD during peak hours, to major hospital or health centres, shopping centres and tourism destinations.

If successful, this shared taxi service may benefit from the regulations allowing for larger vehicles (i.e. larger than current regulated size and capacity limits) to operate.

Ultimately the operation of a larger vehicle as a taxi is an issue of commercial viability for the industry and, outside of specific restrictions (such as rank usage), should not be expressly prohibited by regulations. Such prohibition has the effect of limiting business and service model innovation in the delivery of taxi services in the State and constraining the industry's capacity to respond to emerging and changing trends in consumer needs.

6.2.2 Additional Integrated Payment Options

The emergence of "ride sharing" globally has in part reflected the desire of taxi passengers in other jurisidictions to have greater choice about how they secure and pay for taxi services. Our consultation with jurisidictions in the US, UK and Singapore highlighted a serious limitation on the how a passenger can pay their fare, particularly when compared to the extensive options available to Queenslanders. EFTPOS and credit card payment options continue to be limited in a number of other jurisdictions, a gap increasingly filled by third party booking, dispatch and payment platforms.

In contrast, Queensland was an earlier adopter of EFTPOS payment technologies, being integrated in Queensland taxis from as early as 1990. Additionally, the use of Cabcharge payment services, concession and subsidy cards as well as traditional cash payments means that Queenslanders have the most choice anywhere in the world when paying for their fare.

However, our time in Singapore has illustrated that there remain significant opportunities to further expand the payment options available to Queenslanders, not only improving the accessibility of taxi services to the community but helping to realise the vision of an integrated public transport system accessible to all[43]. In Singapore, taxi passengers are able to pay for their fare using the ez-link card, the equivalent of Queensland's goCard[44]. Ez-link provides Singaporeans with the ability to seamlessly transition from traditional public transport modes to taxis without the need for changes in payment methods[45]. This is complemented by the strong physical integration of taxi ranks into major public transport nodes. Overall, the integration of taxis in terms of payment options and facilities reflects the prevailing view of policy makers and the community in that jurisdiction that taxis represent an integral component of the public transport system.

The concept of the formal integration of taxis into the Queensland public transport system has wide spread support in the Queensland community. Recent research by UMR not only confirmed that the

[43] Department of Transport and Main Roads (2016) Accessible bus stops in regional Queensland, accessed at http://www.tmr.qld.gov.au/travel-and-transport/disability-access-and-mobility/accessible-regional-bus-stops.aspx
[44] LTA (2016), Presentation entitled Taxi Industry in Sinagore, Visit by Taxi Council Queensland, land Transport Authority, Singapore
[45]

majority of Queenslanders regarded taxis as a form of public transport but there was overwhelming support for the inclusion of goCards as a payment option for taxi trips[46].

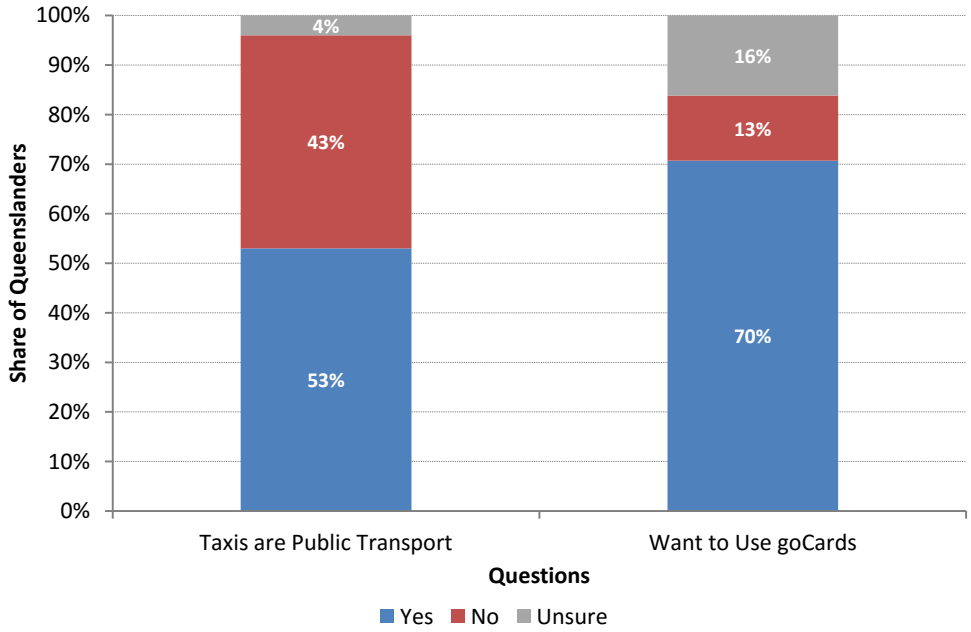


Figure 13 Responses to Public Transport and Payment Questions, Survey of Queenslanders aged 18+, 2016

Efforts to further integrated taxis into the public transport system through an expansion of payment options, would represent a best practice and innovative reform for the Queensland taxi industry. This aligns with the broader objective of the reforms which should always be to maximise the available of different booking and payment options, so as to minimise transaction costs, for Queenslanders.

Current app-based booking and dispatch platforms do not comply with this objective as both the way passengers must secure the service (e.g. can only be booked through the app, not by telephone or rank and hail) and pay for the service (e.g. by credit card through the app) are highly limited and constrained. The adoption of this model therefore represents a regression in Queensland's best practice personalised transport industry, rather than an innovation.

6.3 Technological Innovations

Technological innovation was the principal and primary focus of the discussion in the draft OPT Innovation Paper. And outside of the sharing economy and associated app-based booking platforms, the only other technological innovation considered was autonomous and driverless vehicles.

RPS considers such vehicles to be a genuinely transformational innovation and have the capacity of fundamentally alter the way in which people travel in the community and economy. However, opportunities also exist in the areas of Intelligent Transport Systems and also in the utilisation of public WIFI, delivered as part of Smart Connected Cities initiatives, to improve customer access to information and overall fleet efficiency and management.

[46] UMR (2016), Taxi Council Queensland - Issues affecting the taxi industry, UMR Strategic Research, Sydney

6.3.1 Connected or Automated Vehicles

Connected or Automated Vehicles ("CAVs"), also referred to as autonomous vehicles or driverless vehicles, were the subject of Topic Paper 3 in the draft OPT Innovation Paper. The Paper provided a summary of the potential benefits of CAVs – namely in terms of traffic congestion management and improved transport infrastructure utilisation – and its relationship with "ride sharing" services. However, the Paper does not comprehensively define what constitutes CAVs and the different stages of CAV development.

The US National Highway and Traffic Safety Administration has defined four broad categories of CAVs, reflecting the current and expected staged development and implementation of the technology. These stages categories include:

- ***Level 1 – Function-specific Automation***: Automation of specific control functions, such as cruise control, lane guidance and automated parallel parking. Drivers are fully engaged and responsible for overall vehicle control (hands on the steering wheel and foot on the pedal at all times).
- ***Level 2 - Combined Function Automation***: Automation of multiple and integrated control functions, such as adaptive cruise control with lane centering. Drivers are responsible for monitoring the roadway and are expected to be available for control at all times, but under certain conditions can disengage from vehicle operation (hands off the steering wheel and foot off pedal simultaneously).
- ***Level 3 - Limited Self-Driving Automation***: Drivers can cede all safety-critical functions under certain conditions and rely on the vehicle to monitor for changes in those conditions that will require transition back to driver control. Drivers are not expected to constantly monitor the roadway.
- ***Level 4 - Full Self-Driving Automation***: Vehicles can perform all driving functions and monitor roadway conditions for an entire trip and so may operate with occupants who cannot drive and without human occupants[47]

RPS broadly supports the research compiled in the Paper in relation to the potential positive impacts of the adoption and implementation of CAVs. The removal of human drivers – with associated higher risk of accidents and mistakes – would invariably provide a significant efficiency benefit to the transport network. Similarly, the displacement of underutilised private motor vehicles with more efficient and productive CAVs could have a significant benefit in terms of current congestion management and future congestion mitigation. It would also support improvements in transport infrastructure utilisation and therefore reduce the future capital expenditure profile of Government.

There is also a potential positive implication for the consumer in terms of vehicle insurance costs. Analysis by Lloyd's Exposure Management suggested that vehicle manufactures are likely to take on a greater liability responsibility for CAVs, particularly when Level 4 technologies have been fully implemented (i.e. the passenger is not expected to play an active role in traffic monitoring and emergency management)[48]. If this is the case, then the insurance burden on vehicle owners (including taxi licence owners) could be significantly reduced.

[47] NHTSA (2013), Preliminary Statement of Policy Concerning Automated Vehicles, National Highway Traffic Safety Administration (www.nhtsa.gov)
[48] Lloyds Exposure Management (2015) Emerging Risk Report – Autonomous Vehicles accessed at https://www.lloyds.com/~/media/lloyds/reports/emerging%20risk%20reports/autonomous%20vehicles%20final.pdf

However, like any new technology, there are also the potential for negative impacts and costs to be borne by the commuter, the Government and the community. These costs have were not covered by the Paper and have been summarised below for completeness.

Potential issues could include

- increased vehicle costs (due to greater equipment requirements)
- the possibility of integrated system failures impacting an entire CAV fleet
- cyber security and privacy concerns[49]
- social equity issues (including the impact on the safety and reliability of other transport modes)
- passenger health and safety issues (namely the lack of a person in the vehicle increases the chances of emergency health incidents going unnoticed and untreated)
- non-transport service quality issues (taxi drivers in particular often provide a range of additional supporting services for the passenger including assistance in and out of their home and loading and unloading of wheelchair and disabled passengers)
- reduced employment and business activity[50].

Similarly, the adoption of CAVs is not without its challenges in the Queensland context. Brisbane and Queensland have a low population density compared to other locations, which were the subject of traffic modelling, compiled in the Paper. This low level of population density raises challenges for the use of CAVs as ad hoc demand responsive share vehicles as travel times for passengers would likely be higher than normal (even adjusting for mitigated traffic congestion) due to the non-exclusive nature of the travel. It would also potentially see the amount of traffic to trip origins increase (potentially by up to 10-20% in low density urban areas)[51]. This would likely be addressed if services were provided on a pre-booked basis using semi-flexible routing (refer to section 6.2.1), though this would remove a significant advantage of CAVs against privately owned vehicles as modelled in the literature.

Topic Paper 3 also confirms that the transport efficiency and traffic congestion mitigation benefits only accrue when a critical mass of CAVs are in operation and have displaced private motor vehicle travel. A study by the Victorian Transport Policy Institute in December 2015 found that there was likely to be a 20 year delay between the introduction of fully autonomous vehicles (still expected in the late 2020s and early 2030s despite recent progress made by a number of automotive manufacturers[52]) and the realisation of transport congestion and infrastructure utilisation benefits[53]. This is partly a reflection of cultural changes required to support the widespread adoption of CAVs in place of privately owned vehicles as well as the staged development profile of the technology and the associated need for extensive testing. A 20-30 year timeframe for the development of CAVs in in with the development cycle of other vehicle technologies including air bags (25 year development cycle), automatic transmissions (50 years), navigation systems (30+ years) and hybrid vehicles (25+ years). It is also impacted by the comparatively slow turnover of modern vehicles, with

[49] The Guardian (12/11/2014) Driverless Cars Hacking Threat Road Trials January accessed at http://www.theguardian.com/technology/2014/nov/21/driverless-cars-hacking-threat-road-trials-january
[50] Victorian Transport Policy Institute (2015) Autonomous Vehicle Implementation Predictions Implications for Transport Planning accessed at www.vtpi.org/avip.pdf
[51] Victorian Transport Policy Institute (2015) Autonomous Vehicle Implementation Predictions Implications for Transport Planning accessed at www.vtpi.org/avip.pdf (Refer to Appendix 15)
[52] BBC (7/10/2015) Toyota promises driverless cars on roads by 2020 accessed at http://www.bbc.com/news/technology-34464450
[53] Victorian Transport Policy Institute (2015) Autonomous Vehicle Implementation Predictions Implications for Transport Planning accessed at www.vtpi.org/avip.pdf

Government intervention often required (e.g. placing restrictions on the maximum age of taxi vehicles in Queensland or the US Car Allowance Rebate System).

This analysis suggests that the emergence and adoption of CAVs over the next 20 year has the potential to have profound and transformative impacts on the way in which people and good a transported. However, the challenges and potential negative implications of this technology means its implementation must be carefully managed and a robust, albeit flexible, regulatory environment. In many ways, this is analogous with the issue of emerging electronic payments, which confronted the review of the Queensland Taxi Industry regulatory framework in 1994.

CAVs have the potential to play an earlier and more significant role in the Queensland Taxi Industry than in the wider community. The Queensland Taxi Industry is already characterised by a series of attributes that would support the adoption of CAVs as they emerge:

- centralised fleet management, booking and dispatch
- a strong culture of booking taxis in the community
- integrated GPS tracking
- high vehicle utilisation rates, compared with privately owned vehicles
- high vehicle turnover rate due to regulated proscriptions on vehicle age.
- strong history of early and rapid technological adoption.

In Australia, the principal source of trial activity and research on the adaption and introduction of CAVs is through the Australian Driverless Vehicle Initiative ("ADVI"). Led by independent road research agency, ARRB Group, the ADVI brings together Government, researchers, industry and automotive partners (Volvo) to trial different CAV technologies in Australian conditions. These conditions include uniquely Australian driving patterns, road rules, road surface quality and materials and climate and weather. Consideration of these conditions will ensure that CAVs are tailored to the Australian environment and road network and optimised for how and when the average Australian travels[54].

The adoption of Level 4 CAVS may also be prefaced by the incorporation of Level 1-3 technologies including adaptive cruise control and limited self-drive automation. Future taxi industry regulations must therefore be sufficiently accommodating and flexible to allow for the adoption and integration of these technologies where their introduction is needed to enhance customer service and improve the contribution of the industry to the community and economy.

It is also important to note that the introduction of CAVs in the Queensland Taxi Industry would not necessarily result in a reduction in employment. Vandalism and other intentional damage to the vehicle by the passenger is expected to increase in the absence of another individual in the car (i.e. the removal of the Hawthorne Effect) which will be of great concern to vehicle owners given the while emergency medical and health situations will likely continue to necessitate a "driver" being in the vehicle.

However, the skill sets and training required for a CAV "driver" in the future may be very different to that which is required at present by regulation. "Drivers" instead may play the role of a conductor or guide.

[54] ARRB Group (2015) Australian Driverless Initiatives accessed at https://www.arrb.com.au/home/news.aspx?newsID=178

Nevertheless the removal of the need for a physical driver is unlikely to remove the need for an individual, other than the passenger/s to be in the CAV when in operation.

6.3.2 Intelligent Transport Systems and Smart Connected Cities

It is also important to acknowledge that enabling technology will likely required to assist the emergence and universal of CAVs into the future. Additionally, CAVs represent only one part of a suite of ITS and technologies to that could emerge in coming decades.

Intelligent Transport Systems ("ITS") describe technology-applied to transport and infrastructure to transfer information between systems for improved safety, productivity and environmental performance.[55]

In Australia, ITS development and implementation is guided by *Policy Framework for Intelligent Transport Systems in Australia*[56] by the Standing Council of Transport and Infrastructure of Australia and New Zealand.

ITS can range from small incremental improvement in traffic data transmission and collation to holistic automatic and centralised management of vehicle movement. Austroads categorises ITS into a series of broad classifications including:

- Technologies to support safer driving – Smart Licence car key, drowsiness alerting systems, seatbelt reminder system, intelligent speed adaption, automatic collision detection and breaking
- Technologies to indicate action is needed – road departure warning, intersection safety management system, and wet weather speed limits
- Technologies to prevent a collision or reduce its impact – brake assistance systems and adaptive cruise control[57]

Wider definitions are also used. ITS can include network-wide traffic management systems, GPS-based centralised vehicle tracking systems, telematics, WI-FI and cloud-based distribution and storage of road transport and traffic information[58].

This review of ITS technologies highlights the large extent to which such technologies are already incorporated into the Queensland taxi fleet.

The industry already possesses a wide range of passenger protection and monitoring services and vehicles are required by legislation to include a range of technology and equipment that meet the definition of ITS. Additionally, the sophistication of centralised computer booking and dispatch (developed by MT Data) provides Queensland booking companies with a fleet management, tracking and monitoring capacity that rivals any other fleet management capability in public or private sectors in Australia.

Instead, the focus of future innovations in ITS should be on system wide opportunities to improve information availability and accessibility to customers and maximise fleet distribution and service efficiencies.

[55] Australian Government (2016) Intelligent Transport Systems accessed at https://infrastructure.gov.au/**transport**/its/
[56] Standing Council on Transport and Infrastructure (2012) Policy Framework for Intelligent Transport Systems in Australia http://transportinfrastructurecouncil.gov.au/publications/files/ITS_Framework.pdf (Refer to Appendix 17)
[57] Austroads (2010Reviewing ITS Technologies and Road Safety Opportunities, accessed at https://www.onlinepublications.austroads.com.au/items/AP-T157-10
[58] Standing Council on Transport and Infrastructure (2012) Policy Framework for Intelligent Transport Systems in Australia http://transportinfrastructurecouncil.gov.au/publications/files/ITS_Framework.pdf (Refer to Appendix 17)

Brisbane City Council recently established the vision of being a Smart Connected City, following its identification as an Emerging Smart City by Urban Strategist Boyd Cohen for the Smart City Council in late 2014[59]. Recently, Brisbane City Council expanded its free Wi-Fi internet across the CBD to South Bank and much of Fortitude Valley[60], as well as to major city parks and on public transport services like trains and CityCats.

This expansion represents an opportunity for the Queensland Taxi Industry and regulators to further improve and enhance the availability of information on taxi availability and distribution to customers. This could include the use of live taxi rank information, available via booking company smart phone app and on electronic signage on the number of taxis in each location and the current expected wait times. This information would be particularly useful for Queenslanders travel to and from entertainment precincts on a Friday and Saturday night as well as tourists visiting Brisbane.

This example highlights the importance of the regulations being sufficient flexible to accommodate the emergence and adoption of vehicle specific and network-wide ITS technologies. The history of success of the Queensland Taxi Industry and of the regulation in supporting ITS technology adoption and development over the past 20 years, must be maintained and continued into the future to ensure the industry retains its position as the most technological, innovative and customer response service in Australia.

[59] Co.Exist (20/11/2014) The Smartest Cities in the World accessed at http://www.fastcoexist.com/3038765/fast-cities/the-smartest-cities-in-the-world
[60] Digital Brisbane (02/09/2015) Free Wi-Fi for a Smart City, accessed at http://www.digitalbrisbane.com.au/news/free-wi-fi-for-a-smart-city

7.0 Conclusions

Innovation is something that is “new” and “better”. Innovation is a broad concept that includes technological, process and system-based activities. When exploring the issue of innovation in personalised transport, consideration must be given to all types of innovation. Only then will the regulatory framework of the Queensland Taxi Industry and personalised transport for the next 20 years by truly flexible and accommodating enough to ensure the longevity and certainty that industry has experienced since 1994.

Innovation has always played a central role in the development and evolution of taxi services, nowhere more so than in Queensland. Queensland has an established history of innovation, technological adoption and customer-led service and business model developments that have been facilitated by an innovative and world-class regulatory framework unlike any other system in the world. Understanding what is innovative and what is not is as much as matter of perspective and context as it is about the technology or process itself. What is innovative to one group may be standard or even regressive to another.

This response to the OPT Innovation Paper clearly demonstrates that app-based booking and dispatch platforms are neither new nor better than the current Queensland system. Queensland booking companies have had centralised computerised dispatch and booking systems in place since well before the emergence of smart phones apps and were an early adopter of such apps as part of their comprehensive suite of booking channels. Additionally, apps cannot be regarded as transformational in nature as they do not fundamentally alter the core service – that of the physical movement of a person from one place to another.

Queensland is therefore not experiencing digital disruption of its taxi industry. Instead, the Government is experiencing a regulatory or illegal disruption from the provision of non-complying taxi services by international “ride sharing” companies – a reality evident from the recent IPNRC report to Parliament. This reflects the fact that the “sharing economy” is itself not new but is instead a modern version of the informal (or grey) economy that has existed in the world for centuries. The emergence of informal activity in recent years has been in response to depressed and deteriorating economic conditions that has reduced formal employment opportunities and forced workers into informal jobs. This activity is marginally viable at best and is traditionally unable to survive if required to meet the standards and costs of compliance with regulation, including worker and customer safety regulations. The apparent continuation of informal economic activity in the current context therefore does not reflect a change in the overarching structure of the economy, but instead represents the impact of the both digital technologies providing market-like environments matching customers and suppliers with the investment of venture capital, which is maintaining the financial viability of otherwise insolvent and loss making corporations.

Future reform of Queensland’s best practice regulations must therefore extend beyond the short-term novelty with app-based booking and “ride sharing” and seek to establish a flexible and accommodating framework for major innovation over the next 20 years. This may include changes in the way the regulations themselves are structured and enforced, new services and business models to meet customer needs, and emerging, network and cloud-based Intelligent Transport Systems and CAVs that could have a transformative effective on the taxi industry, transport sector, Government and the community.

The Queensland Government should be commended for their previous efforts to establish a best practice regulatory framework for the Queensland Taxi Industry that has encouraged innovation and ensured high service quality and universal access (including for people with disabilities) at no cost to Government. The challenge now is to meet and exceed the high standards set in 1994 and chart a flexible course for personalised transport towards 2050.

Appendix 1 – List of Major Innovations in History

The following tis the list of top 50 inventions and innovations of human history, compiled by a panel of experts in science, history, anthropology and economics for the Atlantic Magazine in November 2013.

1. The printing press, 1430s

The printing press was nominated by 10 of our 12 panelists, five of whom ranked it in their top three. Dyson described its invention as the turning point at which "knowledge began freely replicating and quickly assumed a life of its own."

2. Electricity, late 19th century

And then there was light—and Nos. 4, 9, 16, 24, 28, 44, 45, and most of the rest of modern life.

3. Penicillin, 1928

Accidentally discovered in 1928, though antibiotics were not widely distributed until after World War II, when they became the silver bullet for any number of formerly deadly diseases

4. Semiconductor electronics, mid-20th century

The physical foundation of the virtual world

5. Optical lenses, 13th century

Refracting light through glass is one of those simple ideas that took a mysteriously long time to catch on. "The Romans had a glass industry, and there's even a passage in Seneca about the optical effects of a glass bowl of water," says Mokyr. But it was centuries before the invention of eyeglasses dramatically raised the collective human IQ, and eventually led to the creation of the microscope and the telescope.

6. Paper, second century

"The idea of stamping images is natural if you have paper, but until then, it's economically unaffordable." —Charles C. Mann

7. The internal combustion engine, late 19th century

Turned air and fuel into power, eventually replacing the steam engine (No. 10)

8. Vaccination, 1796

The British doctor Edward Jenner used the cowpox virus to protect against smallpox in 1796, but it was not until Louis Pasteur developed a rabies vaccine in 1885 that medicine—and government—began to accept the idea that making someone sick could prevent further sickness.

9. The Internet, 1960s

The infrastructure of the digital age

10. The steam engine, 1712

Powered the factories, trains, and ships that drove the Industrial Revolution

11. Nitrogen fixation, 1918

The German chemist Fritz Haber, also the father of chemical weapons, won a Nobel Prize for his development of the ammonia-synthesis process, which was used to create a new class of fertilizers central to the green revolution (No. 22).

12. Sanitation systems, mid-19th century

A major reason we live 40 years longer than we did in 1880 (see “Die Another Day”)

13. Refrigeration, 1850s

“Discovering how to make cold would change the way we eat—and live—almost as profoundly as discovering how to cook.” — George Dyson

14. Gunpowder, 10th century

Outsourced killing to a machine

15. The airplane, 1903

Transformed travel, warfare, and our view of the world (see No. 40)

16. The personal computer, 1970s

Like the lever (No. 48) and the abacus (No. 43), it augmented human capabilities.

17. The compass, 12th century

Oriented us, even at sea

18. The automobile, late 19th century

Transformed daily life, our culture, and our landscape

19. Industrial steelmaking, 1850s

Mass-produced steel, made possible by a method known as the Bessemer process, became the basis of modern industry.

20. The pill, 1960

Launched a social revolution

21. Nuclear fission, 1939

Gave humans new power for destruction, and creation

22. The green revolution, mid-20th century

Combining technologies like synthetic fertilizers (No. 11) and scientific plant breeding (No. 38) hugely increased the world’s food output. Norman Borlaug, the agricultural economist who devised this approach, has been credited with saving more than 1 billion people from starvation.

23. The sextant, 1757

It made maps out of stars.

24. The telephone, 1876

Allowed our voices to travel

25. Alphabetization, first millennium b.c.

Made knowledge accessible and searchable—and may have contributed to the rise of societies that used phonetic letters over those that used ideographic ones

26. The telegraph, 1837

Before it, Joel Mokyr says, “information could move no faster than a man on horseback.”

27. The mechanized clock, 15th century

It quantified time.

28. Radio, 1906

The first demonstration of electronic mass media’s power to spread ideas and homogenize culture

29. Photography, early 19th century

Changed journalism, art, culture, and how we see ourselves

30. The moldboard plow, 18th century

The first plow that not only dug soil up but turned it over, allowing for the cultivation of harder ground. Without it, agriculture as we know it would not exist in northern Europe or the American Midwest.

31. Archimedes’ screw, third century b.c.

The Greek scientist is believed to have designed one of the first water pumps, a rotating corkscrew that pushed water up a tube. It transformed irrigation and remains in use today at many sewage-treatment plants.

32. The cotton gin, 1793

Institutionalized the cotton industry—and slavery—in the American South

33. Pasteurization, 1863

One of the first practical applications of Louis Pasteur’s germ theory, this method for using heat to sterilize wine, beer, and milk is widely considered to be one of history’s most effective public-health interventions.

34. The Gregorian calendar, 1582

Debugged the Julian calendar, jumping ahead 10 days to synchronize the world with the seasons

35. Oil refining, mid-19th century

Without it, oil drilling (No. 39) would be pointless.

36. The steam turbine, 1884

A less heralded cousin of steam engines (No. 10), turbines are the backbone of today's energy infrastructure: they generate 80 percent of the world's power.

37. Cement, first millennium b.c.

The foundation of civilization. Literally.

38. Scientific plant breeding, 1920s

Humans have been manipulating plant species for nearly as long as we've grown them, but it wasn't until early-20th-century scientists discovered a forgotten 1866 paper by the Austrian botanist Gregor Mendel that we figured out how plant breeding—and, later on, human genetics—worked.

39. Oil drilling, 1859

Fueled the modern economy, established its geopolitics, and changed the climate

40. The sailboat, fourth millennium b.c.

Transformed travel, warfare, and our view of the world (see No. 15)

41. Rocketry, 1926

"Our only way off the planet—so far." — George Dyson

42. Paper money, 11th century

The abstraction at the core of the modern economy

43. The abacus, third millennium b.c.

One of the first devices to augment human intelligence

44. Air-conditioning, 1902

Would you start a business in Houston or Bangalore without it?

45. Television, early 20th century

Brought the world into people's homes

46. Anesthesia, 1846

In response to the first public demonstration of ether, Oliver Wendell Holmes Sr. wrote: "The fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed for ever."

47. The nail, second millennium b.c.

"Extended lives by enabling people to have shelter." — Leslie Berlin

48. The lever, third millennium b.c.

The Egyptians had not yet discovered the wheel when they built their pyramids; they are thought to have relied heavily on levers.

49. The assembly line, 1913

Turned a craft-based economy into a mass-market one

50. The combine harvester, 1930s

Mechanized the farm, freeing people to do new types of work

Appendix 2 –Different Types of Informal Economies

Definition of different types of informal economies in the Hand Booking of Economic Sociology Second Edition.

1. The illegal economy encompasses the production and distribution of legally prohibited goods and services. This includes such activities as drug trafficking, prostitution, and illegal gambling.

2. The unreported economy consists of actions that "circumvent or evade established fiscal rules as codified in the tax code". The amount of income that should be reported to the tax authorities but is not represents a summary measure of this form.

3. The unrecorded economy encompasses activities that circumvent reporting requirements of government statistical agencies. Its summary measure is the amount of income that should be recorded in national accounting systems but is not.

4. The informal economy comprises economic actions that bypass the costs of, and are excluded from the protection of, laws and administrative rules covering "property relationships, commercial licensing, labor contracts, torts, financial credit, and social security systems"

Appendix 3 – Unemployment Rate, by Select Countries and Regions

The following table includes a breakdown of the annual unemployment rate of select countries and regions from 2002 to 2014. Data collected by the World Bank.

Country Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Argentina	12.6%	10.6%	10.1%	8.5%	7.8%	8.6%	7.7%	7.2%	7.2%	7.1%	8.2%
Australia	5.4%	5.0%	4.8%	4.4%	4.2%	5.6%	5.2%	5.1%	5.2%	5.7%	6.0%
Brazil	8.9%	9.3%	8.4%	8.1%	7.1%	8.3%	7.9%	6.7%	6.1%	6.5%	6.8%
Canada	7.2%	6.7%	6.3%	6.0%	6.1%	8.3%	8.0%	7.4%	7.2%	7.1%	6.9%
Central Europe and the Baltics	12.9%	12.0%	10.1%	7.8%	6.6%	8.5%	9.9%	9.8%	10.0%	10.1%	9.1%
Chile	8.8%	8.0%	7.7%	7.1%	7.8%	9.7%	8.1%	7.1%	6.4%	6.0%	6.4%
China	4.3%	4.1%	4.0%	3.8%	4.4%	4.4%	4.2%	4.3%	4.5%	4.6%	4.7%
Colombia	14.3%	12.0%	11.7%	11.2%	11.1%	11.8%	12.0%	11.1%	10.6%	9.6%	10.1%
Congo, Dem. Rep.	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.0%
Denmark	5.5%	4.8%	3.9%	3.8%	3.4%	6.0%	7.5%	7.6%	7.5%	7.0%	6.6%
Estonia	10.0%	7.9%	5.9%	4.7%	5.5%	13.8%	16.9%	12.5%	10.1%	8.6%	7.7%
European Union	9.2%	8.9%	8.2%	7.2%	7.0%	9.0%	9.6%	9.6%	10.5%	10.9%	10.2%
Finland	8.8%	8.4%	7.6%	6.8%	6.3%	8.2%	8.4%	7.7%	7.6%	8.2%	8.6%
France	9.2%	8.9%	8.8%	8.0%	7.4%	9.1%	9.3%	9.2%	9.9%	10.4%	9.9%
Georgia	12.6%	13.8%	13.6%	13.3%	16.5%	16.9%	16.3%	15.1%	15.0%	14.6%	13.4%
Germany	10.3%	11.1%	10.3%	8.6%	7.5%	7.7%	7.1%	5.9%	5.4%	5.3%	5.0%
Greece	10.5%	9.8%	8.9%	8.3%	7.7%	9.5%	12.5%	17.7%	24.2%	27.2%	26.3%
Hungary	6.1%	7.2%	7.5%	7.4%	7.8%	10.0%	11.2%	10.9%	10.9%	10.2%	7.8%
Iceland	3.1%	2.6%	3.0%	2.3%	3.0%	7.2%	7.6%	7.1%	6.0%	5.6%	5.0%
India	3.9%	4.4%	4.3%	3.7%	4.1%	3.9%	3.5%	3.5%	3.6%	3.6%	3.6%
Indonesia	9.9%	11.2%	10.3%	9.1%	8.4%	7.9%	7.1%	6.6%	6.1%	6.3%	6.2%
Ireland	4.5%	4.3%	4.4%	4.6%	6.0%	12.0%	13.9%	14.6%	14.7%	13.1%	11.6%
Israel	10.4%	9.0%	8.4%	7.3%	6.1%	7.5%	6.6%	5.6%	6.9%	6.3%	6.1%
Italy	7.9%	7.7%	6.8%	6.1%	6.7%	7.8%	8.4%	8.4%	10.7%	12.2%	12.5%
Japan	4.7%	4.4%	4.1%	3.9%	4.0%	5.0%	5.0%	4.5%	4.3%	4.0%	3.7%
Mexico	3.7%	3.5%	3.2%	3.4%	3.5%	5.2%	5.2%	5.3%	4.9%	4.9%	4.9%
Netherlands	4.6%	4.7%	3.9%	3.2%	2.8%	3.4%	4.5%	4.4%	5.3%	6.7%	6.9%
New Zealand	4.0%	3.8%	3.9%	3.7%	4.2%	6.1%	6.5%	6.5%	6.9%	6.2%	5.6%
Norway	4.4%	4.6%	3.4%	2.5%	2.6%	3.2%	3.6%	3.3%	3.2%	3.5%	3.4%
Poland	19.0%	17.7%	13.8%	9.6%	7.1%	8.2%	9.6%	9.6%	10.1%	10.4%	9.2%
Portugal	6.7%	7.6%	7.7%	8.0%	7.6%	9.5%	10.8%	12.7%	15.6%	16.5%	14.2%
Russian Federation	7.8%	7.1%	7.1%	6.0%	6.2%	8.3%	7.3%	6.5%	5.5%	5.5%	5.1%
Spain	11.2%	9.3%	8.6%	8.4%	11.5%	18.1%	20.2%	21.7%	25.2%	26.3%	24.7%
Sweden	6.6%	7.8%	7.1%	6.2%	6.3%	8.4%	8.7%	7.8%	8.1%	8.1%	8.0%
Turkey	10.8%	10.6%	10.2%	10.3%	11.0%	14.0%	11.9%	9.8%	9.2%	8.7%	9.2%
United Kingdom	4.7%	4.8%	5.5%	5.4%	5.4%	7.8%	7.9%	7.8%	8.0%	7.5%	6.3%
United States	5.6%	5.2%	4.7%	4.7%	5.9%	9.4%	9.7%	9.0%	8.2%	7.4%	6.2%

Appendix 4 – Sources of Driver Revenue - uber and Taxis in Melbourne

Derived from an article in the Age newspaper in Melbourne comparing driver revenue sources (fare structures) of uber and taxi in Melbourne, following uber's fare reduction on 30 March 2016.

Driver Revenue Sources	uber (pre 30/03)	uber (post 30/03)	Taxis (Victoria)
Flagfall/Base Fare	$2.35	$2.00	$4.20 (daily rate)
Per KM	$1.15	$1.00	$1.62
Per Minute	$0.40	$0.32	$0.57

Appendix 5 – Part-Time Employment

Share of total jobs ('000s) in Queensland that is part-time. Data from the Australian Bureau of Statistics

Month	Total Jobs	Part-Time Jobs	Part-Time %	Month	Total Jobs	Part-Time Jobs	Part-Time %
Feb-1978	861.7	129.4	15%	Jul-1981	1199.9	155.5	13%
Mar-1978	872.0	137.8	16%	Aug-1981	1199.2	163.5	14%
Apr-1978	881.5	134.5	15%	Sep-1981	1228.4	170.0	14%
May-1978	888.5	135.7	15%	Oct-1981	1240.4	164.9	13%
Jun-1978	878.7	134.1	15%	Nov-1981	1280.3	169.8	13%
Jul-1978	900.3	134.4	15%	Dec-1981	1277.5	162.7	13%
Aug-1978	906.4	139.9	15%	Jan-1982	1317.6	141.7	11%
Sep-1978	914.5	134.8	15%	Feb-1982	1303.2	165.8	13%
Oct-1978	913.7	133.5	15%	Mar-1982	1323.1	162.8	12%
Nov-1978	931.2	135.1	15%	Apr-1982	1314.4	163.1	12%
Dec-1978	942.2	137.7	15%	May-1982	1316.4	165.6	13%
Jan-1979	961.0	114.0	12%	Jun-1982	1280.7	161.0	13%
Feb-1979	950.4	129.3	14%	Jul-1982	1289.1	162.8	13%
Mar-1979	967.1	129.7	13%	Aug-1982	1296.5	163.8	13%
Apr-1979	978.9	134.3	14%	Sep-1982	1309.6	172.4	13%
May-1979	988.6	135.8	14%	Oct-1982	1314.0	174.9	13%
Jun-1979	995.6	135.5	14%	Nov-1982	1319.7	173.6	13%
Jul-1979	997.0	137.4	14%	Dec-1982	1328.2	169.2	13%
Aug-1979	988.1	133.8	14%	Jan-1983	1339.4	148.5	11%
Sep-1979	1007.6	133.2	13%	Feb-1983	1330.6	161.5	12%
Oct-1979	963.4	138.8	14%	Mar-1983	1349.6	169.0	13%
Nov-1979	981.9	136.9	14%	Apr-1983	1348.5	165.7	12%
Dec-1979	980.3	140.4	14%	May-1983	1376.2	168.0	12%
Jan-1980	1008.5	127.0	13%	Jun-1983	1387.7	165.0	12%
Feb-1980	1008.4	139.6	14%	Jul-1983	1414.8	162.1	11%
Mar-1980	1022.7	146.5	14%	Aug-1983	1424.6	165.1	12%
Apr-1980	1008.1	152.8	15%	Sep-1983	1457.1	166.9	11%
May-1980	1011.5	149.3	15%	Oct-1983	1465.2	166.2	11%
Jun-1980	1012.5	151.8	15%	Nov-1983	1475.6	175.3	12%
Jul-1980	1041.9	156.4	15%	Dec-1983	1476.6	175.2	12%
Aug-1980	1058.7	153.1	14%	Jan-1984	1505.1	154.0	10%
Sep-1980	1091.1	158.1	14%	Feb-1984	1492.6	175.3	12%
Oct-1980	1077.3	147.1	14%	Mar-1984	1499.1	184.9	12%
Nov-1980	1102.9	165.4	15%	Apr-1984	1497.4	181.1	12%
Dec-1980	1111.0	147.2	13%	May-1984	1514.2	183.4	12%
Jan-1981	1137.6	136.8	12%	Jun-1984	1508.8	182.9	12%
Feb-1981	1125.4	149.3	13%	Jul-1984	1510.8	178.3	12%
Mar-1981	1129.5	150.7	13%	Aug-1984	1517.0	172.5	11%
Apr-1981	1129.6	151.7	13%	Sep-1984	1557.5	181.6	12%
May-1981	1144.8	167.7	15%	Oct-1984	1563.8	181.7	12%
Jun-1981	1148.6	158.3	14%	Nov-1984	1568.8	181.1	12%

Month	Total Jobs	Part-Time Jobs	Part-Time %	Month	Total Jobs	Part-Time Jobs	Part-Time %
Dec-1984	1558.9	172.8	11%	Dec-1988	2214.4	259.3	12%
Jan-1985	1595.2	157.5	10%	Jan-1989	2260.4	238.8	11%
Feb-1985	1590.3	176.3	11%	Feb-1989	2227.8	256.7	12%
Mar-1985	1599.9	188.8	12%	Mar-1989	2268.3	261.4	12%
Apr-1985	1598.7	189.3	12%	Apr-1989	2260.7	261.8	12%
May-1985	1633.2	198.1	12%	May-1989	2283.4	266.9	12%
Jun-1985	1618.8	198.0	12%	Jun-1989	2264.0	259.0	11%
Jul-1985	1639.5	197.4	12%	Jul-1989	2289.3	259.5	11%
Aug-1985	1647.2	204.8	12%	Aug-1989	2279.6	278.1	12%
Sep-1985	1641.6	211.3	13%	Sep-1989	2296.6	279.9	12%
Oct-1985	1628.8	200.9	12%	Oct-1989	2279.6	275.6	12%
Nov-1985	1656.3	207.2	13%	Nov-1989	2292.0	292.4	13%
Dec-1985	1663.1	203.4	12%	Dec-1989	2284.5	282.3	12%
Jan-1986	1677.6	178.9	11%	Jan-1990	2319.2	263.5	11%
Feb-1986	1692.4	195.2	12%	Feb-1990	2310.1	273.0	12%
Mar-1986	1710.4	210.8	12%	Mar-1990	2340.0	282.1	12%
Apr-1986	1728.8	216.1	12%	Apr-1990	2336.7	285.3	12%
May-1986	1752.9	220.3	13%	May-1990	2306.1	280.7	12%
Jun-1986	1760.6	220.9	13%	Jun-1990	2338.2	292.6	13%
Jul-1986	1785.5	212.7	12%	Jul-1990	2347.5	291.4	12%
Aug-1986	1784.7	214.7	12%	Aug-1990	2332.4	294.0	13%
Sep-1986	1813.0	223.4	12%	Sep-1990	2374.9	299.3	13%
Oct-1986	1807.5	214.7	12%	Oct-1990	2390.4	302.0	13%
Nov-1986	1844.3	225.8	12%	Nov-1990	1316.4	299.5	23%
Dec-1986	1850.7	228.5	12%	Dec-1990	1319.2	293.0	22%
Jan-1987	1892.5	203.2	11%	Jan-1991	1275.6	270.9	21%
Feb-1987	1914.0	226.0	12%	Feb-1991	1280.7	289.6	23%
Mar-1987	1945.5	232.0	12%	Mar-1991	1293.0	299.8	23%
Apr-1987	1962.4	237.0	12%	Apr-1991	1292.9	303.5	23%
May-1987	1975.1	228.6	12%	May-1991	1289.1	295.5	23%
Jun-1987	1974.0	229.1	12%	Jun-1991	1306.7	307.6	24%
Jul-1987	2007.1	226.8	11%	Jul-1991	1291.3	294.4	23%
Aug-1987	2036.2	233.6	11%	Aug-1991	1296.5	301.4	23%
Sep-1987	2061.6	234.0	11%	Sep-1991	1317.0	306.9	23%
Oct-1987	2082.9	233.6	11%	Oct-1991	1312.2	301.9	23%
Nov-1987	2109.8	256.5	12%	Nov-1991	1309.6	308.7	24%
Dec-1987	2110.5	239.1	11%	Dec-1991	1329.8	299.7	23%
Jan-1988	2140.5	219.5	10%	Jan-1992	1289.7	274.9	21%
Feb-1988	2135.3	232.7	11%	Feb-1992	1314.0	309.9	24%
Mar-1988	2166.4	249.0	11%	Mar-1992	1317.3	318.7	24%
Apr-1988	2197.0	246.8	11%	Apr-1992	1320.2	316.7	24%
May-1988	2207.3	246.7	11%	May-1992	1319.7	320.8	24%
Jun-1988	2213.1	249.4	11%	Jun-1992	1320.7	322.1	24%
Jul-1988	2206.0	242.7	11%	Jul-1992	1329.3	322.6	24%
Aug-1988	2193.7	253.8	12%	Aug-1992	1328.2	326.2	25%
Sep-1988	2193.4	264.6	12%	Sep-1992	1353.1	338.2	25%
Oct-1988	2203.5	249.5	11%	Oct-1992	1352.6	331.4	24%
Nov-1988	2239.1	252.3	11%	Nov-1992	1339.4	330.5	25%

Month	Total Jobs	Part-Time Jobs	Part-Time %	Month	Total Jobs	Part-Time Jobs	Part-Time %
Dec-1992	1359.0	323.9	24%	Dec-1996	1533.0	374.5	24%
Jan-1993	1328.8	303.6	23%	Jan-1997	1480.7	355.8	24%
Feb-1993	1330.6	311.3	23%	Feb-1997	1508.8	376.1	25%
Mar-1993	1357.9	321.2	24%	Mar-1997	1506.0	390.6	26%
Apr-1993	1345.0	319.1	24%	Apr-1997	1506.9	395.8	26%
May-1993	1349.6	320.1	24%	May-1997	1510.8	390.4	26%
Jun-1993	1354.1	314.9	23%	Jun-1997	1529.8	416.6	27%
Jul-1993	1359.7	310.4	23%	Jul-1997	1535.7	392.4	26%
Aug-1993	1348.5	322.3	24%	Aug-1997	1517.0	390.8	26%
Sep-1993	1379.4	335.0	24%	Sep-1997	1553.9	415.7	27%
Oct-1993	1384.9	331.8	24%	Oct-1997	1566.3	424.2	27%
Nov-1993	1376.2	322.9	23%	Nov-1997	1557.5	416.2	27%
Dec-1993	1404.1	323.8	23%	Dec-1997	1565.7	403.3	26%
Jan-1994	1376.5	312.2	23%	Jan-1998	1536.6	389.7	25%
Feb-1994	1387.7	334.2	24%	Feb-1998	1563.8	415.2	27%
Mar-1994	1403.1	341.5	24%	Mar-1998	1564.1	425.0	27%
Apr-1994	1399.6	338.6	24%	Apr-1998	1572.4	421.3	27%
May-1994	1414.8	342.3	24%	May-1998	1568.8	431.2	27%
Jun-1994	1425.5	330.5	23%	Jun-1998	1576.6	430.7	27%
Jul-1994	1428.6	338.9	24%	Jul-1998	1567.8	413.0	26%
Aug-1994	1424.6	331.8	23%	Aug-1998	1558.9	418.3	27%
Sep-1994	1460.2	351.2	24%	Sep-1998	1583.7	428.1	27%
Oct-1994	1452.3	347.1	24%	Oct-1998	1593.1	427.5	27%
Nov-1994	1457.1	354.1	24%	Nov-1998	1595.2	420.4	26%
Dec-1994	1475.6	358.7	24%	Dec-1998	1609.1	420.6	26%
Jan-1995	1431.2	337.9	24%	Jan-1999	1578.7	396.0	25%
Feb-1995	1465.2	360.3	25%	Feb-1999	1590.3	420.5	26%
Mar-1995	1475.9	369.8	25%	Mar-1999	1595.2	424.6	27%
Apr-1995	1487.3	365.3	25%	Apr-1999	1614.6	434.2	27%
May-1995	1475.6	360.4	24%	May-1999	1599.9	436.6	27%
Jun-1995	1493.1	361.6	24%	Jun-1999	1613.2	429.3	27%
Jul-1995	1491.7	360.3	24%	Jul-1999	1611.7	422.1	26%
Aug-1995	1476.6	361.2	24%	Aug-1999	1598.7	430.2	27%
Sep-1995	1506.5	371.1	25%	Sep-1999	1621.9	426.9	26%
Oct-1995	1490.8	365.8	25%	Oct-1999	1620.4	428.4	26%
Nov-1995	1505.1	374.7	25%	Nov-1999	1633.2	439.1	27%
Dec-1995	1523.5	377.0	25%	Dec-1999	1637.3	436.9	27%
Jan-1996	1474.5	335.5	23%	Jan-2000	1591.7	409.6	26%
Feb-1996	1492.6	352.0	24%	Feb-2000	1618.8	439.1	27%
Mar-1996	1495.5	369.2	25%	Mar-2000	1616.0	433.6	27%
Apr-1996	1496.4	370.0	25%	Apr-2000	1639.1	455.9	28%
May-1996	1499.1	368.9	25%	May-2000	1639.5	452.7	28%
Jun-1996	1507.5	378.2	25%	Jun-2000	1651.9	448.1	27%
Jul-1996	1513.0	374.5	25%	Jul-2000	1679.8	458.3	27%
Aug-1996	1497.4	366.9	25%	Aug-2000	1647.2	444.4	27%
Sep-1996	1531.2	379.7	25%	Sep-2000	1672.1	444.7	27%
Oct-1996	1510.8	366.0	24%	Oct-2000	1655.1	440.8	27%
Nov-1996	1514.2	379.7	25%	Nov-2000	1641.6	439.1	27%

Month	Total Jobs	Part-Time Jobs	Part-Time %	Month	Total Jobs	Part-Time Jobs	Part-Time %
Jan-2001	1615.5	434.3	27%	Jan-2005	1881.0	507.0	27%
Feb-2001	1628.8	440.4	27%	Feb-2005	1914.0	516.5	27%
Mar-2001	1642.2	449.9	27%	Mar-2005	1942.2	549.8	28%
Apr-2001	1652.4	471.7	29%	Apr-2005	1945.4	558.1	29%
May-2001	1656.3	474.2	29%	May-2005	1945.5	560.3	29%
Jun-2001	1665.3	485.7	29%	Jun-2005	1967.1	558.9	28%
Jul-2001	1679.5	492.1	29%	Jul-2005	1976.2	550.6	28%
Aug-2001	1663.1	482.1	29%	Aug-2005	1962.4	559.9	29%
Sep-2001	1681.3	468.4	28%	Sep-2005	1999.1	554.8	28%
Oct-2001	1678.5	476.2	28%	Oct-2005	1981.2	563.4	28%
Nov-2001	1677.6	480.1	29%	Nov-2005	1975.1	555.5	28%
Dec-2001	1704.8	481.6	28%	Dec-2005	1993.6	559.7	28%
Jan-2002	1658.2	458.3	28%	Jan-2006	1940.0	529.3	27%
Feb-2002	1692.4	479.7	28%	Feb-2006	1974.0	540.0	27%
Mar-2002	1701.0	486.9	29%	Mar-2006	1997.3	582.1	29%
Apr-2002	1699.7	487.7	29%	Apr-2006	1992.0	570.9	29%
May-2002	1710.4	491.7	29%	May-2006	2007.1	567.3	28%
Jun-2002	1725.5	501.1	29%	Jun-2006	2019.7	566.5	28%
Jul-2002	1722.9	487.9	28%	Jul-2006	2039.9	563.9	28%
Aug-2002	1728.8	500.4	29%	Aug-2006	2036.2	569.0	28%
Sep-2002	1756.6	502.2	29%	Sep-2006	2083.8	561.8	27%
Oct-2002	1756.2	501.2	29%	Oct-2006	2061.5	575.0	28%
Nov-2002	1752.9	507.9	29%	Nov-2006	2061.6	560.2	27%
Dec-2002	1772.1	515.6	29%	Dec-2006	2096.9	559.1	27%
Jan-2003	1747.6	481.9	28%	Jan-2007	2054.9	553.9	27%
Feb-2003	1760.6	509.4	29%	Feb-2007	2082.9	558.3	27%
Mar-2003	1758.3	515.3	29%	Mar-2007	2104.7	574.5	27%
Apr-2003	1761.9	525.2	30%	Apr-2007	2106.7	576.1	27%
May-2003	1785.5	533.9	30%	May-2007	2109.8	572.2	27%
Jun-2003	1783.8	540.8	30%	Jun-2007	2121.6	586.1	28%
Jul-2003	1788.1	521.4	29%	Jul-2007	2115.6	572.1	27%
Aug-2003	1784.7	523.2	29%	Aug-2007	2110.5	576.9	27%
Sep-2003	1819.0	513.5	28%	Sep-2007	2154.0	585.7	27%
Oct-2003	1813.9	531.2	29%	Oct-2007	2139.2	580.8	27%
Nov-2003	1813.0	525.5	29%	Nov-2007	2140.5	582.7	27%
Dec-2003	1836.3	509.6	28%	Dec-2007	2161.3	587.8	27%
Jan-2004	1791.2	481.9	27%	Jan-2008	2104.9	572.7	27%
Feb-2004	1807.5	505.2	28%	Feb-2008	2135.3	585.1	27%
Mar-2004	1806.9	502.3	28%	Mar-2008	2151.0	618.8	29%
Apr-2004	1823.7	524.5	29%	Apr-2008	2155.4	611.4	28%
May-2004	1844.3	533.5	29%	May-2008	2166.4	618.5	29%
Jun-2004	1851.0	535.9	29%	Jun-2008	2177.3	609.6	28%
Jul-2004	1854.0	502.4	27%	Jul-2008	2194.9	574.2	26%
Aug-2004	1850.7	516.3	28%	Aug-2008	2197.0	602.5	27%
Sep-2004	1895.0	513.8	27%	Sep-2008	2219.0	595.7	27%
Oct-2004	1913.7	529.0	28%	Oct-2008	2212.5	622.9	28%
Nov-2004	1892.5	512.4	27%	Nov-2008	2207.3	587.3	27%
Dec-2004	1918.0	525.5	27%	Dec-2008	2226.5	623.0	28%

Month	Total Jobs	Part-Time Jobs	Part-Time %	Month	Total Jobs	Part-Time Jobs	Part-Time %
Jan-2009	2178.1	588.8	27%	Jan-2013	2273.9	640.2	28%
Feb-2009	2213.1	610.7	28%	Feb-2013	2279.6	642.9	28%
Mar-2009	2213.3	629.1	28%	Mar-2013	2280.4	680.0	30%
Apr-2009	2209.4	612.2	28%	Apr-2013	2289.6	684.6	30%
May-2009	2206.0	627.6	28%	May-2013	2292.0	680.5	30%
Jun-2009	2197.9	614.5	28%	Jun-2013	2287.3	661.1	29%
Jul-2009	2204.8	613.4	28%	Jul-2013	2310.1	646.2	28%
Aug-2009	2193.7	629.5	29%	Aug-2013	2284.5	653.5	29%
Sep-2009	2225.0	620.1	28%	Sep-2013	2336.4	649.8	28%
Oct-2009	2213.2	629.1	28%	Oct-2013	2328.0	685.3	29%
Nov-2009	2193.4	617.7	28%	Nov-2013	2319.2	683.1	29%
Dec-2009	2234.5	644.7	29%	Dec-2013	2324.2	680.8	29%
Jan-2010	2174.2	617.0	28%	Jan-2014	2257.9	645.7	29%
Feb-2010	2203.5	617.5	28%	Feb-2014	2310.1	681.7	30%
Mar-2010	2220.3	655.0	30%	Mar-2014	2331.7	723.6	31%
Apr-2010	2228.2	650.4	29%	Apr-2014	2338.6	729.9	31%
May-2010	2239.1	638.9	29%	May-2014	2340.0	704.8	30%
Jun-2010	2254.0	655.8	29%	Jun-2014	2338.3	711.6	30%
Jul-2010	2246.9	645.3	29%	Jul-2014	2332.2	690.9	30%
Aug-2010	2214.4	636.4	29%	Aug-2014	2336.7	721.9	31%
Sep-2010	2265.8	634.0	28%	Sep-2014	2319.4	706.5	30%
Oct-2010	2269.1	676.2	30%	Oct-2014	2316.4	693.3	30%
Nov-2010	2260.4	643.3	28%	Nov-2014	2306.1	697.0	30%
Dec-2010	2286.8	658.3	29%	Dec-2014	2343.3	686.5	29%
Jan-2011	2221.1	636.8	29%	Jan-2015	2280.3	666.6	29%
Feb-2011	2227.8	619.6	28%	Feb-2015	2338.2	696.6	30%
Mar-2011	2248.9	640.0	28%	Mar-2015	2311.2	687.6	30%
Apr-2011	2271.1	663.7	29%	Apr-2015	2322.9	686.5	30%
May-2011	2268.3	663.8	29%	May-2015	2347.5	691.8	29%
Jun-2011	2277.5	662.6	29%	Jun-2015	2341.6	687.9	29%
Jul-2011	2275.9	636.2	28%	Jul-2015	2334.3	686.8	29%
Aug-2011	2260.7	643.6	28%	Aug-2015	2332.4	707.9	30%
Sep-2011	2301.1	636.8	28%	Sep-2015	2353.9	709.0	30%
Oct-2011	2314.4	668.3	29%	Oct-2015	2378.8	733.9	31%
Nov-2011	2283.4	647.2	28%	Nov-2015	2374.9	720.4	30%
Dec-2011	2301.4	646.6	28%	Dec-2015	2398.6	727.3	30%
Jan-2012	2261.5	633.5	28%	Jan-2016	2350.7	705.5	30%
Feb-2012	2264.0	633.4	28%	Feb-2016	2390.4	709.9	30%
Mar-2012	2285.6	651.4	29%				
Apr-2012	2288.3	657.0	29%				
May-2012	2289.3	652.6	29%				
Jun-2012	2286.0	658.8	29%				
Jul-2012	2289.7	637.4	28%				
Aug-2012	2279.6	640.4	28%				
Sep-2012	2293.5	622.3	27%				
Oct-2012	2286.8	644.7	28%				
Nov-2012	2296.6	644.2	28%				
Dec-2012	2295.1	643.8	28%				

Appendix 6 – IPNRC Report on the Transport Legislation (Taxi Services) Amendment Bill

Summary of discussion in the IPNRC Report on the Transport Legislation (Taxi Services) Amendment Bill regarding the illegality of “ride sharing” services in Queensland under current regulations.

Starting Page 14

The central argument for those in support and against the bill is the definition of ‘taxi service’ and whether ride sharing services can be defined as such. The definition of ‘taxi service’ under Schedule 3 of TOPTA states:

taxi service means a public passenger service, other than an excluded public passenger service, provided by a motor vehicle under which the vehicle —

(a) is able, when not hired, to be hailed for hire by members of the public; or

(b) provides a demand responsive service under which members of the public are able to hire the vehicle through electronic communication; or

(c) plies or stands for hire on a road.

The Taxi Council Queensland argued that (b) in the definition above “applies to vehicles operating using the uberX platform because passengers hire an uberX vehicle through the use of electronic communication in the form of the uber app on their mobile phones”

The department advised that under the Electronic Transactions (Queensland) Act 2001, schedule 2: electronic communication means —

(a) a communication of information in the form of data, text or images by guided or unguided electromagnetic energy; or

(b) a communication of information in the form of sound by guided or unguided electromagnetic energy, if the sound is processed at its destination by an automated voice recognition system.

Further, the Taxi Council Queensland argued that vehicles operating under uberX were operating illegally as they provide a taxi service without holding a taxi service licence or peak demand taxi permit, which is violation of section 70(1) of TOPTA.

Section 70(1) provides:

70 Requirement for taxi service licence or peak demand taxi permit

(1) A person must not provide a taxi service using a vehicle unless —

(a) The person has a taxi service licence to provide the service with the vehicle; or

(b) The person has a peak demand taxi permit to provide the service with the vehicle.

Maximum penalty — 160 penalty units.

(2) Subsection (1) does not apply to a person providing taxi services prescribed under a regulation as a taxi service to which this section does not apply.

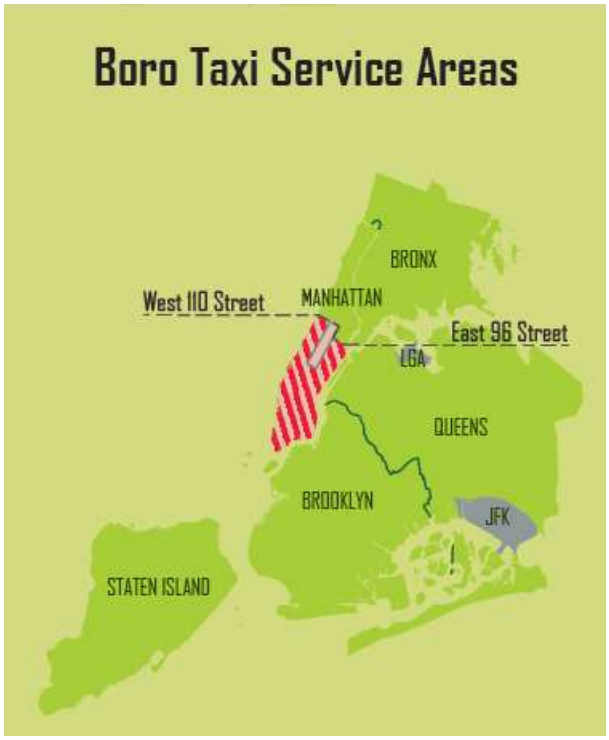
On a number of occasions the committee requested advice from the department on whether Uber style ride sharing services are operating illegally in Queensland with the following responses:

At the public briefing the department advised the committee that ride sharing services operate outside the regulations and that *"if they are not following the regulations set down by Queensland, it is illegal". They are operating outside the regulations. They do not follow the fare infrastructure in the regulation, they do not have cameras, they do not have meters. They are not following the legislation and the costs of operating..... They do not have a fare infrastructure that is agreed to.... They do not hold taxi licences.*

Appendix 7 – Profile of NYC Boro Taxis

Key facts on Boro Taxi services in NYC, taken from the NYC Taxi and Limousine Commission Taxi Fact Book 2014.

- Boro Taxis were created as a new class of license to provide legal, yellow-caliber taxi service to since 94% of yellow taxi pick-ups occur either or at one of the airports.
- Boro Taxis are a hybrid service, providing both and prearranged for-hire vehicle services.
- 18,000 Boro Taxi permits are being issued in 6,000. The first group of 6,000 has been sold, issuance planned for June 2014.
- Boro Taxis are not permitted to pick up passengers Manhattan below E 96th Street or W 110th Street serve airport taxi queues



Appendix 8 – Fare Regulation in Singapore

Media release by Public Transport Council of Singapore and the Land Transport Authority regarding the recent partial re-regulation of taxi fare structures in order to protect consumers from increased fare structure inconsistency and complexity.

Public Transport Council

Land Transport Authority
We Keep Your World Moving

JOINT MEDIA RELEASE

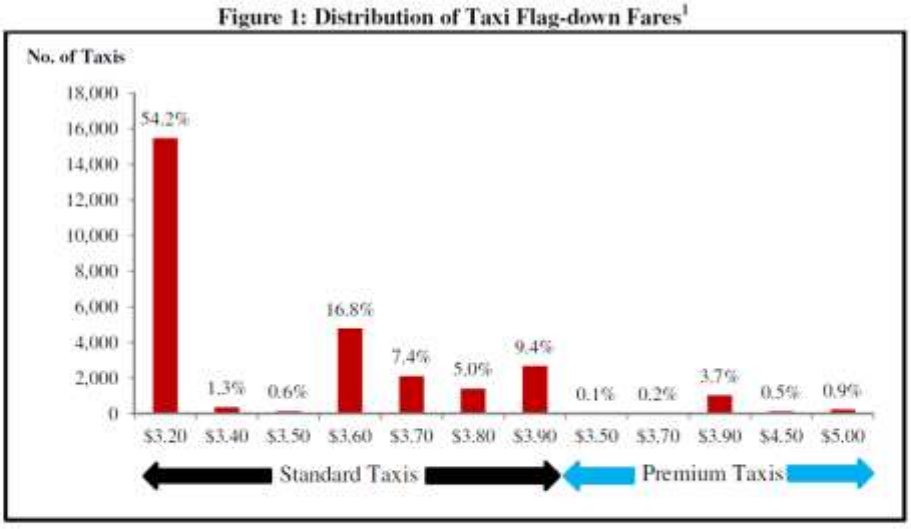
SOME PARTS OF TAXI FARE STRUCTURE TO BE STANDARDISED TO PREVENT FURTHER FARE COMPLEXITY

Singapore, 31 March 2015 – As announced at the 2015 Committee of Supply Debate, the Land Transport Authority (LTA) and the Public Transport Council (PTC), after having consulted commuters, taxi drivers and taxi companies, will standardise some parts of the taxi fare structure, to prevent taxi fares from becoming even more complex for commuters in the future. The proposed requirements are expected to be implemented in the second half of 2015 after the necessary legislative processes are completed.

Conflicting Interests amongst Stakeholders

2. The taxi fare structure today consists of four main components – the flag-down fare, unit fares, surcharges, and booking fees, with most of the variation occurring in the flag-down fare component. Standard taxis, which make up about 95% of the total taxi population, have a flag-down fare ranging from $3.20 to $3.90. More than half of standard taxis charge the lowest flag-down fare of $3.20. Premium taxis, on the other hand, charge a flag-down fare ranging from $3.50 to $5.00.

Figure 1: Distribution of Taxi Flag-down Fares[1]



3. During consultations, some commuters were not unhappy with the different flag-down fares, as this meant that they could pay lower fares some of the time. Others suggested standardising flag-

[1] As at February 2015, based on a total of 28,537 taxis.

Page 1 of 5

down fares to a single rate to minimise confusion. However, most commuters did not want flag-down fares to be levelled upwards in any fare harmonisation exercise.

4. On the other hand, taxi companies indicated that if they were required to harmonise flag-down fares, they would likely do so by levelling them upwards, in part to be fair to taxi drivers who currently charge higher flag-down fares. Similarly, taxi drivers preferred flag-down fares to be levelled up.

Balanced Approach to Manage Conflicting Interests

5. It will not be possible to fully satisfy these conflicting interests. LTA and PTC will adopt a balanced approach, which focuses on preventing taxi fares from becoming even more complex in the future.

6. As mandating the harmonisation of flag-down fares may lead to higher flag-down fares for commuters, we will leave them as they are for now. Over time, taxi companies may, on their own accord, adjust and harmonise flag-down fares within their own fleets in response to market conditions.

7. The PTC will, however, require taxi companies to standardise the other taxi fare components, namely, the unit fares, surcharges, booking fees and additional passenger fees. This will prevent taxi fares from becoming even more complex for commuters in the future, like what has happened for flag-down fares today, and facilitate comparison across taxi companies. As these fare components do not differ greatly within each taxi company today, taxi companies should not revise rentals or make significant adjustments to fares in order to comply with the new requirements.

Unit Fares

8. Unit fares are based on distance travelled and waiting time. Today, all standard taxis have the same unit fare of 22 cents, while most premium taxis charge a unit fare of 30 cents except for a few models belonging to some of the taxi companies.

9. The PTC will require the unit distance travelled and unit waiting time to remain the same across all taxi companies. The unit fares will be based on every 400 metres travelled after the first kilometre[2] to the tenth kilometre; every 350 metres travelled above 10 kilometres; and every 45 seconds of waiting time. Based on this, the PTC will require each taxi company to have only one set of unit fares for all its standard taxis; and one set of unit fares for all its premium taxis. To allow for competition, different taxi companies can charge different unit fares.

Surcharges

10. Taxi companies levy two types of surcharges today: time surcharges (peak-period and midnight surcharges) and location surcharges (city area surcharge and surcharges levied at specific locations such as the airport). Most commuters feel that surcharges play an important role in better matching supply and demand, for example, during peak periods and at locations where demand for

[2] The flag-down fare covers up to the first kilometre.

taxis is high, or at far-flung locations which are less attractive for taxi drivers to ply. Cities such as New York, London and Perth also use surcharges to better match taxi supply and demand. Removing surcharges will lead to longer waiting times during certain timings and at certain locations, and also affect the income of taxi drivers.

11. Hence, surcharges will not be removed, but taxi companies will be required to levy the same surcharge across all its taxi models and across all taxi companies. Taxi companies are already levying similar surcharges today, and the PTC will introduce regulations to ensure that this remains so:

a. For time surcharges, the PTC will mandate that they must be based on the same percentage of metered fare and have the same applicable timings across all taxi companies.

b. The city area surcharge amount, applicable timing and geographical boundary must be the same across all taxi companies.

c. For other location-based surcharges, the PTC will mandate that where a location surcharge is levied at a location by one or more taxi companies, they must all levy the same surcharge amount for a given time period. (Taxi companies can of course choose not to levy a location surcharge at that location. For example, not all taxi companies levy a location surcharge at Marina Bay Sands and Tanah Merah Ferry Terminal today.)

Booking Fees

12. The PTC will require the timings used for defining peak-period bookings and advance bookings to be the same across all taxi companies. Each taxi company will be required to have only one booking fee each for peak-period, off-peak and advance bookings for all its standard taxis; and likewise for all its premium taxis. The majority of taxi companies are already doing this today.

Additional Passenger Fees

13. Currently, some taxi companies levy an additional passenger fee when their larger taxis[3] carry more than four adult passengers or its equivalent. PTC will mandate that the additional passenger fee, if levied by a taxi company, be the same across all its selected taxi models.

Additional Regulations

14. If taxi companies wish to introduce new fare components, they must submit an application to the PTC for approval.

15. For any taxi fare components which are mandated to be the same across all taxi companies, such as the surcharges, or the unit distance travelled and unit waiting time of the unit fares, the PTC will require that any change to the fare components must be agreed upon and implemented by all taxi companies, to ensure that these components remain standardised. The PTC need only be

[3] These are SMRT's London Taxis and Ssangyong Rodius, Premier's Kia Carnival, and Prime's Toyota Wish, Honda Stream, Honda Freed, Toyota Estima and Toyota Vellfire.

informed in advance, and it will not be necessary to seek its approval. This is in line with our deregulated taxi fares policy, which has been in place since 1998, even as we try to ensure some standardisation of the taxi fare structure. Only if taxi companies cannot reach agreement amongst themselves, should they apply to the PTC to arbitrate.

16. The proposed requirements above are summarised in the Annex and will apply to taxis owned by taxi companies as well as individually-owned taxis. The regulations are expected to be implemented in the second half of 2015 after the necessary legislative processes are completed.

ANNEX

Summary of Proposed Requirements to Standardise Some Parts of Taxi Fare Structure

	Taxi Company A	Taxi Company B
Unit fares	Unit fares must be based on: (a) every 400 metres travelled after the first kilometre and up to the tenth kilometre; (b) every 350 metres travelled after the tenth kilometre; (c) every 45 seconds of waiting time.	
	Allowed only one set of unit fares for standard taxis; and one set of unit fares for premium taxis.	Allowed only one set of unit fares for standard taxis, and one set of unit fares for premium taxis.
Surcharges	Peak Period surcharge must be based on: (a) the same percentage of metered fare (currently 25%); (b) the same applicable timing*.	
	Midnight surcharge must be based on: (a) the same percentage of metered fare (currently 50%); (b) the same applicable timing (currently from 12 midnight to 6am).	
	City area surcharge must be based on: (a) the same amount (currently $3); (b) the same applicable timing (currently from 5pm to 12 midnight); (c) the same geographical boundary, i.e. the Central Business District.	
	Location surcharge must be the same at each location. Taxi companies can of course choose not to levy a location surcharge at that location.	
Booking fees	(a) Peak period booking fee must be based on Peak Period* timing; (b) Off-peak booking fee is for hours outside Peak Period*; (c) Advanced booking fee is for bookings made 30 minutes or more in advance.	
	Allowed only one set of booking fees for standard taxis; and one set of booking fees for premium taxis.	Allowed only one set of booking fees for standard taxis; and one set of booking fees for premium taxis.
Other fees	Allowed only one additional passenger fee, if levied, for all its selected taxi models.	Allowed only one additional passenger fee, if levied, for all its selected taxi models.

* Currently, all taxi companies have defined peak periods to be from 6am to 9:30am on Mondays to Fridays (except public holidays), and 6pm to 12 midnight on all days (including public holidays).

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Appendix 9 - Taxi "Quality of Service" Data (Singapore)

TAXI COMPANIES QUALITY OF SERVICE (QoS) STANDARDS FOR JAN 2016

Performance Indicators			Comfort	CityCab	Trans-Cab	SMRT	Premier	Prime *
1	**Taxi Booking**							
1-1	**Call Answer Rate**	0600-0700	P	P	P	P	P	P
	Percentage of calls answered by the taxi dispatch	0700-0800	P	P	P	P	P	P
	system	0800-0900	P	P	P	P	P	P
		0900-1000	P	P	P	P	P	P
	Standard	1000-1100	P	P	P	P	P	P
	At least 95% (90% for small companies)	1700-1800	P	P	P	P	P	P
		1800-1900	P	P	P	P	P	P
		1900-2000	P	P	P	P	P	P
		2000-2100	P	P	P	P	P	P
		2100-2200	P	P	P	P	P	P
		2200-2300	P	P	P	P	P	P
		2300-0000	P	P	P	P	P	P
1-2	**Waiting time for despatch system to answer**	0600-0700	P	P	P	P	P	P
	incoming telephone calls	0700-0800	P	P	P	P	P	P
		0800-0900	P	P	P	P	P	P
	Standard	0900-1000	P	P	P	P	P	P
	Within 20 secs, 90% of the time	1000-1100	P	P	P	P	P	P
		1700-1800	P	P	P	P	P	P
		1800-1900	P	P	P	P	P	P
		1900-2000	P	P	P	P	P	P
		2000-2100	P	P	P	P	P	P
		2100-2200	P	P	P	P	P	P
		2200-2300	P	P	P	P	P	P
		2300-0000	P	P	P	P	P	P
1-3	**Cater Rate**	0600-0700	P	P	P	P	P	F
	Percentage of calls despatched that are	0700-0800	P	P	P	P	P	F
	successfully matched with taxis	0800-0900	P	P	P	P	P	F
		0900-1000	P	P	P	P	P	F
	Standard	1000-1100	P	P	P	P	P	F
	At least 92% (80% for small companies)	1700-1800	P	P	P	P	P	F
		1800-1900	P	P	P	P	P	F
		1900-2000	P	P	P	P	P	F
		2000-2100	P	P	P	P	P	F
		2100-2200	P	P	P	P	P	F
		2200-2300	P	P	P	P	P	F
		2300-0000	P	P	P	P	P	F
1-4	**Waiting time for despatch centre to confirm**	0600-0700	P	P	P	P	P	P
	taxi from the time the call is answered	0700-0800	P	P	P	P	P	P
		0800-0900	P	P	P	P	P	P
	Standard	0900-1000	P	P	P	P	P	P
	Within 5 mins, 90% of the time	1000-1100	P	P	P	P	P	P
		1700-1800	P	P	P	P	P	P
		1800-1900	P	P	P	P	P	P
		1900-2000	P	P	P	P	P	P
		2000-2100	P	P	P	P	P	P
		2100-2200	P	P	P	P	P	P
		2200-2300	P	P	P	P	P	P
		2300-0000	P	P	P	P	P	P
1-5	**Passenger waiting time for taxi to arrive**	0600-0700	P	P	P	P	P	P
		0700-0800	P	P	P	P	P	P
	Standard	0800-0900	P	P	P	P	P	P
	Within 10 mins, 95% of the time (90% for small	0900-1000	P	P	P	P	P	P
	companies)	1000-1100	P	P	P	P	P	P
		1700-1800	P	P	P	P	P	P
		1800-1900	P	P	P	P	P	P
		1900-2000	P	P	P	P	P	P
		2000-2100	P	P	P	P	P	P
		2100-2200	P	P	P	P	P	P
		2200-2300	P	P	P	P	P	P
		2300-0000	P	P	P	P	P	P
2	**Safety**		**Comfort**	**CityCab**	**Trans-Cab**	**SMRT**	**Premier**	**Prime ***
2-1	**First Inspection Passing Rate**							
	Standard							
	At least 98%		P	P	P	P	P	P
2-2	**^Accident Rate**							
	Standard							
	Not more than 0.02 per 100,000 km		P	P	P	F	P	P
3	**Taxi Drivers' Conduct**		**Comfort**	**CityCab**	**Trans-Cab**	**SMRT**	**Premier**	**Prime ***
3-1	**Offence Rate**							
	Standard							
	Not more than 0.02 per 100,000 km		P	P	P	P	P	P

Footnote

* Refer to small companies, i.e. with taxi fleet of not more than 1,000 taxis

^ Accident rate based on results for May 2015
Accident statistics for June 2015 - January 2016 are pending updates from Traffic Police
Companies that fail the QoS standards are liable to a financial penalty.
P=Pass , F=Fail

Appendix 10 – WAT Share of Taxi Fleet

Data from the ATIA for 2014 and Australian Bureau of Statistics.

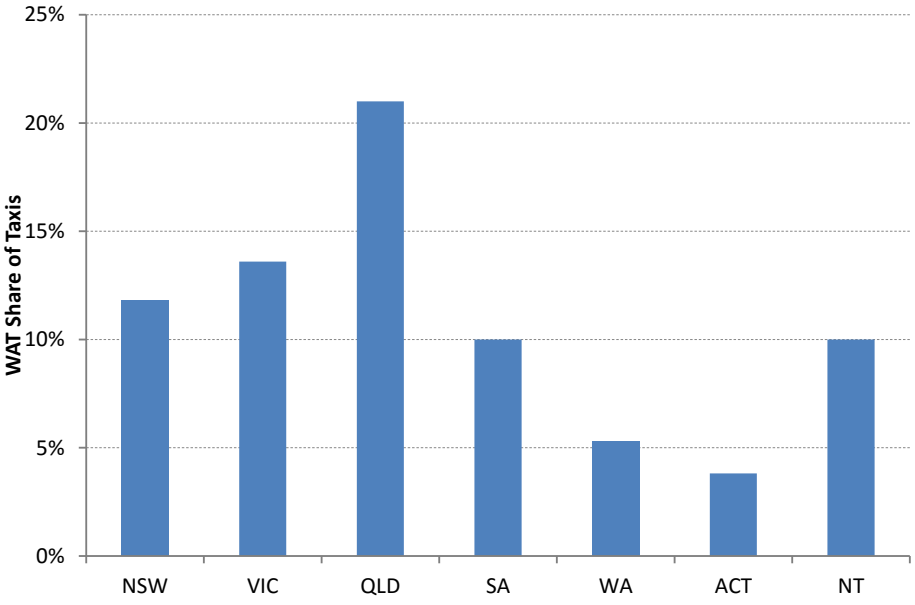

Figure 14 WATs share of Taxi Fleet by State, 2014

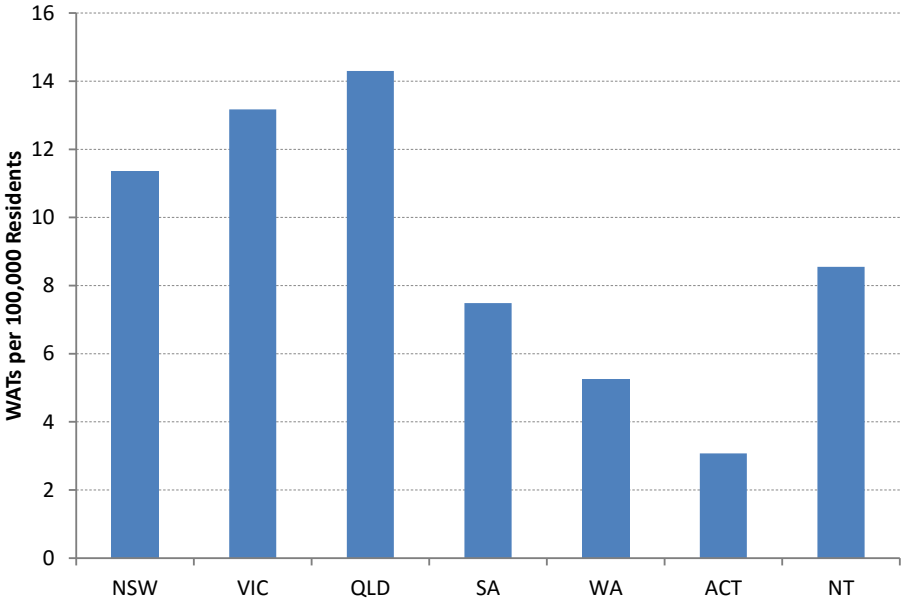

Figure 15 Number of WATs per 100,000 Population, by State, 2014

Appendix 11 – Disability Standards for Accessible Public Transport

The contents of the Australian Government's Disability Standards for Accessible Public Transport 2002.

Part 1	Preliminary	
Division 1.1	Purpose and application of Standards	
	1.1	Name of Standards
	1.2	Purpose of Standards
	1.3	Acknowledgment of rights of passengers, operators and providers
	1.4	Application of Standards
	1.5	Guidelines
	1.6	Incorporation of Australian Standards and Australian Design Rules
	1.7	Applicability of Standards
Division 1.2	Meaning of important terms	
	1.8	Purpose of Division 1.2
	1.9	Access path
	1.1	Airport that does not accept regular public transport services
	1.11	Allocated space
	1.12	Conveyance
	1.13	Dedicated school bus and dedicated school bus service
	1.14	Dial-a-ride service
	1.15	Direct assistance
	1.16	Equivalent access
	1.17	Hail-and-ride service
	1.18	Infrastructure
	1.19	Manoeuvring areas
	1.2	Operator
	1.21	Premises
	1.22	Provider
	1.23	Public transport service
	1.24	Small aircraft
Part 2	Access paths	
	2.1	Unhindered passage
	2.2	Continuous accessibility
	2.3	Path branching into 2 or more parallel tracks
	2.4	Minimum unobstructed width

	2.5	Poles and obstacles, etc
Part 3	Manoeuvring areas	
	3.1	Circulation space for wheelchairs to turn in
	3.2	Access for passengers in wheelchairs, etc
	3.3	Limited on-board manoeuvring
Part 4	Passing areas	
	4.1	Minimum width
	4.2	Two-way access paths and aerobridges
Part 5	Resting points	
	5.1	When resting points must be provided
Part 6	Ramps	
	6.1	Ramps on access paths
	6.2	Boarding ramps
	6.3	Minimum allowable width
	6.4	Slope of external boarding ramps
	6.5	Slope of ramps connected to pontoon wharves
Part 7	Waiting areas	
	7.1	Minimum number of seats to be provided
	7.2	Minimum number of allocated spaces to be provided
Part 8	Boarding	
	8.1	Boarding points and kerbs
	8.2	When boarding devices must be provided
	8.3	Use of boarding devices
	8.4	Hail-and-ride services
	8.5	Width and surface of boarding devices
	8.6	Maximum load to be supported by boarding device
	8.7	Signals requesting use of boarding device
	8.8	Notification by passenger of need for boarding device
Part 9	Allocated space	
	9.1	Minimum size for allocated space
	9.2	Minimum number of allocated spaces to be provided
	9.3	Minimum head room
	9.4	Number of allocated spaces to be provided — buses
	9.5	Number of allocated spaces to be provided — ferries
	9.6	Number of allocated spaces to be provided — train cars, etc
	9.7	Consolidation of allocated spaces
	9.8	Allocated spaces in aircraft and coaches
	9.9	Use of allocated space for other purposes
	9.1	International symbol of accessibility to be displayed
	9.11	Movement of mobility aid in allocated space
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	10.1	Compliance with Australian Standard

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	11.3	Handrails on steps
	11.4	Handrails above access paths
	11.5	Compliance with Australian Standard
	11.6	Grabrail to be provided where fares are to be paid
	11.7	Grabrails to be provided in allocated spaces
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	12.3	Weight activated doors and sensors
	12.4	Clear opening of doorways
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	17.6	Raised lettering or symbols or use of Braille
	17.7	Taxi registration numbers
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	18.2	Style and dimensions
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	20.1	Illumination levels
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	22.2	Information desks, check-in counters, etc — airports
	22.3	Accessible sleeping berths — ferries and trains
	22.4	Accessible sleeping berths — ferries
	22.5	Accessible sleeping berths — trains
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Part 23	Street furniture	
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Part 24	Gateways	
	24.1	Gateways and checkouts
Part 25	Payment of fares	
	25.1	Passengers to pay fares
	25.2	Fare payment and ticket validation systems
	25.3	Vending machines
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	26.1	Public address systems
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Appendix 12 – Cost of Paratransit Services

Paper on the cost of paratransit services funded by the New York City Taxi and Limousine Commission, in the absence of significant WATs.

IBO

New York City Independent Budget Office

Fiscal Brief

October 2006

Access-A-Ride: With More Riders, Costs Are Rising Sharply

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"Using Taxi Vouchers to Lower the Cost of Paratransit Service"

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SUMMARY

THE COST OF RUNNING ACCESS-A-RIDE, the transit authority's door-to-door transportation program for the city's disabled, has more than doubled between calendar years 2000 and 2005. Over this six-year span, operating expenses increased from $85.2 million to $189.8 million. This year, MTA New York City Transit expects costs to grow $50 million and reach $239.8 million. Though still a comparatively small portion of the transit authority's budget, Access-A-Ride has become one of the agency's fastest-growing costs.

Driving the increase in spending has been a surge in the number of passengers taking Access-A-Ride, not the cost per passenger. Since 2000, the number of people approved to use the service due to physical or mental disability has increased by more than 50 percent. At the same time, these registered users are taking more Access-A-Ride trips. Registered users took an average of 37 trips each in 2005, compared with 28 in 2000.

Among IBO's other findings in its review of the Access-A-Ride budget:

- Fares, which are the same as for subways and buses, cover a small fraction of the program's operating expenses—less than 4 percent in 2005.
- MTA New York City Transit covers about two-thirds of the program's costs, a subsidy that has grown from roughly $60 million in 2000 to a projected $160 million this year.
- If not for an annual cap on how much New York City's subsidy of the program can grow, the city's $29.6 million share in 2005 would have been $16.7 million higher.

Access-A-Ride receives 6.0 percent of two taxes levied on large commercial real estate transactions in New York City. Because of the city's booming real estate market, revenue from these taxes has been extremely strong in recent years. Revenue from these taxes dedicated to paratransit increased from $10.9 million in 2000 to $37.2 million in 2005, an average annual increase of 27.8 percent. MTA New York City Transit projects that revenues from these taxes will decline slightly in 2006, to $36.2 million.

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INTRODUCTION

The cost of running Access-A-Ride, the transit authority's door-to-door transportation program for the city's disabled, has increased sharply in recent years. Operating expenses more than doubled between calendar years 2000 and 2005, increasing from $85.2 million to $189.8 million. MTA New York City Transit (NYC Transit) projects costs to rise by $50 million in 2006 and reach $239.8 million.[1] Passenger fare revenues have increased at a somewhat faster rate than expenses, but by 2005 still only covered 3.7 percent of costs. New York City contributed approximately 15 percent of the cost, dedicated tax revenues provided another 20 percent, and the transit authority covered the balance—nearly two-thirds of total operating expenses.

The growth in the paratransit budget since 2000 is due primarily to an increase in the number of passengers carried, not the cost per passenger. The number of times Access-A-Ride vehicles were boarded by passengers registered to use the service, plus aides and guests, more than doubled between 2000 and 2005 (compared to a more modest 5.4 percent increase in subway and bus riders during the same period). In contrast, operating expenses per boarding increased 9.7 percent.

Two reasons explain the rise in paratransit riders. First, the number of registered users—persons who have been approved to use the service because physical or mental disability makes them occasionally or permanently unable to use public buses or subways—has increased by over 50 percent since 2000. Second, registered users are using Access-A-Ride more frequently. Registered users took an average of 37 trips each in 2005, compared with 28 in 2000. These numbers suggest that despite the dissatisfaction of some riders with the quality of service, paratransit has in recent years become a more feasible transportation option for individuals with disabilities.

The Legal Mandate for Paratransit. Paratransit is generally defined as a demand-responsive transportation service provided in sedans or lift-equipped vans or minibuses. The Americans with Disabilities Act (ADA) of 1990 mandates that transit agencies provide "comparable" paratransit service to individuals who are unable to use regular public transportation. In general, "comparable" service means that paratransit must be provided within three-fourths of a mile of existing bus routes and rail stations, during the same hours and days as conventional transit.

Access-A-Ride is the paratransit program in New York City. Access-A-Ride was originally managed by the city's Department of Transportation. In 1993 the program was taken over by NYC Transit, under an agreement between the transit agency and the city. NYC Transit contracts with private transportation companies to deliver the service.

REGISTRATION AND RIDERSHIP TRENDS

Total paratransit ridership in New York City more than doubled between 2000 and 2005, from 2.3 million to 4.7 million trips. In each of these years, registered users made up just under three-fourths of the passenger total. Aides (who do not pay) and guests (who do) made up the remainder. The sharp increase in ridership has been propelled by such factors as increases in service capacity, a reduction in the advance notice required for trip requests, and greater outreach by social service organizations, advocacy groups, and others.

Increased paratransit ridership results from growth in both the number of registered users, and in the number of trips taken per user. The number of registered paratransit users increased by over 50 percent between 2000 and 2005, to 91,953 from 59,721. Even with this recent growth, the number of registered paratransit users in New York City is quite small compared with the number of disabled city residents. Based on the American Community Survey conducted by the federal Bureau of the Census, IBO estimates that there were roughly 850,000 disabled adults residing in the city in 2005.[2] Some of these individuals are able to use public transit without limitations. At the other extreme, some disabled will never be able to use conventional transit, no matter how accessible it becomes. In the middle is a group that can use regular transit in some circumstances or with a certain amount of difficulty. They will make their modal choice based on factors such as travel time, relative convenience and accessibility, and their health condition on a particular travel day.

In addition to the increase in the number of users, the average number of trips taken by each user rose as well. The average

Trends in Access-A-Ride Registration and Ridership

	2000	2001	2002	2003	2004	2005
Ridership *(in millions)*						
Registered users	1.70	2.02	2.23	2.58	2.88	3.41
Aides and guests	0.60	0.69	0.8	0.99	1.11	1.26
Total Ridership	**2.30**	**2.71**	**3.03**	**3.56**	**3.98**	**4.66**
No. of registered users	59,721	64,902	73,411	80,647	83,844	91,953
Trips per registered user	28	31	30	32	34	37

SOURCES: IBO; MTA New York City Transit.

registered user took 37 trips in 2005, about one-third more than the 28 trips taken in 2000. Trips made by aides and guests increased by a similar proportion.

Access-A-Ride Costs

	2000	2001	2002	2003	2004	2005	2006[a]
Annual Operating Costs *(in thousands)*							
Carrier Contracts	$69,139	$86,910	$103,830	$109,228	$121,787	$143,957	$170,926
Vehicle Purchases[b]	4,179	5,620	376	260	171	0	4,740
Other Operating	8,043	12,129	19,858	28,780	31,316	39,251	55,651
Administrative	3,811	4,599	5,794	5,988	6,287	6,560	8,434
Total Operating Costs	**$85,172**	**$109,258**	**$129,858**	**$144,256**	**$159,561**	**$189,768**	**$239,750**
Capital Vehicle Purchases[b]	$0	$0	$0	$12,991	$14,385	$4,851	$0
Operating Costs							
per boarding	$50.21	$54.16	$58.29	$55.99	$55.45	$55.72	n.a.
per passenger	$37.11	$40.31	$42.86	$40.48	$40.06	$40.70	n.a.

SOURCES: IBO; MTA New York City Transit.
NOTES: [a] Calendar year actual spending through 2005; 2006 is budgeted spending. [b] Vehicles with a value greater than $50,000 are purchased through the transit authority's capital budget.

Changes in paratransit policy have made Access-A-Ride a more viable travel option for individuals with disabilities. Initially NYC Transit operated Access-A-Ride with a "planned denial rate" of 6 percent. This meant that the amount of service available was insufficient to meet peak periods of demand. In 1998 the Federal Transit Administration determined that ADA regulations require paratransit capacity be sufficient to meet all anticipated demand. NYC Transit achieved a 0 percent denial rate in March 2003, and has continued to increase the amount of service available. The agency has also reduced the amount of advance notice required for trip requests, from two to four days to one day.

FINANCIAL PROFILE

Total paratransit operating expenses increased from $85.2 million in 2000 to $189.8 million in 2005, an average annual increase of 17.4 percent. The operating expense per trip (boarding) was around $56 in 2005, and has been relatively stable over the six-year period. (A boarding consists of a registered paratransit user, plus any aides or guests who travel with him or her.) Operating expense per passenger carried (including aides and guests) was almost $41.

Although dedicated tax sources have grown rapidly to help fund the increase in costs, the growth rate in the city's contribution is capped, meaning that NYC Transit must provide the balance of funding for Access-A-Ride operations. In 2005 paratransit operating expenses represented about 4 percent of NYC Transit's total operating expenses, up from 2 percent in 2000.

Costs. The principal component of paratransit costs consists of service contracts with the private companies that actually provide the service. NYC Transit has long-standing contracts with eight companies: Atlantic Paratrans, American Paratransit, Maggies Paratransit, MV Transportation, PTM Management, TFM Paratransit, Star Cruiser Transportation, and RJR Paratransit.[3] Four additional carriers, TransCare New York, Progress Transit, ALL Transit, and Advance Transit Co. are expected to begin providing service by the end of this year. NYC Transit has negotiated a price per vehicle service hour for each one of these companies, based on the expected characteristics of that firm's trips. Actual payment for service takes place monthly, based on documentation that the companies submit to NYC Transit. The total value of the contracts was $144.0 million in 2005, more than twice the 2000 level. Due to cost of living adjustments and a projected increase in demand, NYC Transit expects contract costs to reach $170.9 million in 2006.

NYC Transit purchases the vehicles that are used by paratransit providers, generally minibuses or vans. Since 2003 almost all vehicle purchases have been classified as capital spending. Expenditures on paratransit vehicles vary greatly from year to year, but the overall trend has been upward. After two years of relatively large spending for new vehicles, expenditures fell in 2005. In 2003 the transit authority spent $13.0 million in capital funds on new vehicles and $14.4 million in 2004 (along with a small amount of operating funds in both years). Spending on new vehicles dropped to $4.9 million in 2005, and this year NYC Transit plans to spend $4.7 million in operating funds to purchase Crown Victoria sedans. These sedans, similar to the city's yellow taxis, will be used for passengers who do not require a wheelchair-accessible vehicle.

Other operating expenses include the cost of the centralized reservation, scheduling, and dispatching system (known as the "Command Center"), the cost of the Eligibility Determination Unit, and fuel. The Command Center is operated by First Transit, an Ohio-based company, with some additional support staff from NYC Transit. The Eligibility Determination Unit certifies individuals as qualifying for paratransit. The unit is operated by NYC Transit, although some applications are reviewed by a third party.

Access-A-Ride Funding							
	2000	2001	2002	2003	2004	2005	2006 [a]
Annual Revenues *(in thousands)*							
Fares	$2,549	$3,026	$3,709	$5,056	$6,024	$7,109	$8,393
Urban Tax	10,914	12,343	11,168	10,819	22,509	37,163	36,207
NYC reimbursement	11,915	14,298	17,158	20,589	24,706	29,648	35,580
Total Dedicated Revenue	*25,378*	*29,667*	*32,035*	*36,464*	*53,239*	*73,920*	*80,180*
NYC Transit contribution	59,794	79,591	97,823	107,792	106,322	115,848	159,570
Total Funding	**$85,172**	**$109,258**	**$129,858**	**$144,256**	**$159,561**	**$189,768**	**$239,750**
Funding as a Percent of Cost							
Farebox	3.0%	2.8%	2.9%	3.5%	3.8%	3.7%	3.5%
Urban Tax	12.8%	11.3%	8.6%	7.5%	14.1%	19.6%	15.1%
NYC reimbursement	14.0%	13.1%	13.2%	14.3%	15.5%	15.6%	14.8%
NYC Transit contribution	70.2%	72.8%	75.3%	74.7%	66.6%	61.0%	66.6%

SOURCES: IBO; MTA New York City Transit.
NOTES: [a]Calendar year actual spending through 2005; 2006 is budgeted.

Administrative expenses are the costs incurred directly by NYC Transit as the overseer of the Access-A-Ride program. These costs increased from $3.8 million in 2000 to $6.6 million in 2005.

Funding. The paratransit operating budget is funded from fares, dedicated tax revenues, and direct payments from the city pursuant to its agreement with NYC Transit. Because these sources are insufficient to cover all of the program's expenses, NYC Transit pays for the remaining balance—typically about two-thirds of total operating costs—out of its own budget.

Fares. Fares cover a small fraction of paratransit operating expenses—3.7 percent in 2005. NYC Transit collected $7.1 million in fares from paratransit users in 2005, up from $2.5 million in 2000. Under an agreement between the city and NYC Transit, registered paratransit customers and guests (family or friends who accompany them) pay the equivalent of the cash fare on NYC Transit subways and buses—currently $2 per ride. Personal care attendants who aid disabled passengers travel for free. (Individuals with a qualifying disability may ride conventional transit for half the normal fare, whether paying cash—on buses only—or using a pay-per-ride or unlimited-ride MetroCard.)

Urban Taxes. Access-A-Ride receives 6 percent of two taxes levied on large commercial real estate transactions in New York City. These taxes are referred to as the "urban taxes." They consist of a 0.625 percent tax on commercial mortgages of $500,000 or more, and a 1.0 percent tax on commercial property sales over $500,000. NYC Transit receives 96 percent of urban tax revenue: 90 percent for its subways and buses, and 6 percent for paratransit. (The remaining 4 percent of revenue is used to fund MTA Bus, the MTA subsidiary that completed a takeover of the private bus lines in the city in 2006.)

Because of the city's booming real estate market, urban tax revenues have been extremely strong in recent years. The urban tax revenues dedicated to paratransit increased from $10.9 million in 2000 to $37.2 million in 2005, an average annual increase of 27.8 percent. Revenues are projected to decline slightly in 2006, to $36.2 million. Based on its forecast of slower real estate activity, the transit authority projects that paratransit will receive $23.2 million from the urban taxes in 2007, down by more than one-third from this year.

City Subsidy Cap. Under its agreement with the transit authority, the city subsidizes paratransit with a payment equal to one-third of operating expenses, after deducting fare revenue, urban tax revenues, and the program's administrative expenses. There is an additional proviso that the year-to-year increase in the city's contribution cannot exceed 20 percent. This cap has been effective every year since New York City Transit took over the program in 1993, and as a result the increase in the city's contribution has been exactly 20 percent each year since 2000. The city provided $29.6 million in funding for Access-A-Ride in 2005, but without the cap, it would have been obligated to provide $46.3 million.

NYC Transit Contribution. Of the $189.8 million in total operating expenses for paratransit in 2005, $73.9 million (39 percent) was funded through fares, urban taxes, and the city contribution; there is no direct state or federal funding for the paratransit program. The remaining $115.8 million was paid through NYC Transit's operating budget, which is in turn funded by subway and bus fares, surplus bridge and tunnel tolls, state and local operating subsidies, and state and local dedicated taxes. Combining subsidies and dedicated taxes, around one-third of NYC Transit's contribution to paratransit can ultimately be attributed to state and local sources.

The NYC Transit capital program for 2005-2009 commits

$73.2 million for the purchase of 948 vehicles. Money for these vehicles comes from the transportation authority's own funding sources—principally bonds—rather than a dedicated federal or state grant.

ENABLING MORE TO RIDE CONVENTIONAL TRANSIT

Driven by the increase in demand, Access-A-Ride has become one of the fastest-growing parts of NYC Transit's operating budget. The subsidy paid by NYC Transit to support the program is expected to reach almost $160 million in 2006, compared with $60 million in 2000.

One way to reduce the cost of paratransit would be to enable as many users as possible to use conventional transit. The Americans with Disabilities Act mandates wheelchair accessibility on transit buses and at "key" rail stations. As part of an out-of-court settlement of a suit brought by the United Spinal Association (formerly Eastern Paralyzed Veterans), NYC Transit has agreed to make 100 key subway stations accessible by 2020. According to a recent statement by the MTA, 53 key stations and 15 non-key stations are now accessible.[6] Currently, all NYC Transit buses are wheelchair-accessible, and MTA Bus (the successor to the former private franchise bus routes) is moving toward complete accessibility.

Given that the number of disabled passengers is such a small fraction of total city subway and bus ridership, NYC Transit would not have to add service even if significant numbers of disabled riders switched to conventional transit service. If all of the 4.7 million passengers who used paratransit in 2005 had instead used city subways and buses, ridership on these modes would have increased an imperceptible 0.2 percent. An increase so small would not warrant more transit service.

Clearly, not all current paratransit users could make the switch to conventional transit, even if the system were made far more accessible than at present. When riders do shift from Access-A-Ride to conventional transit, there are net operating savings to NYC Transit as a whole. One obstacle to this happening is the lack of accessibility of the subway system. Barely more than one-tenth of all subway stations are wheelchair accessible, and disabled individuals who do not use wheelchairs often find that the amount of walking and climbing required to enter and leave stations is excessive.

The capital investment required to make subway stations accessible is very high. NYC Transit is committing $192.9 million in its 2005-2009 capital program to provide ADA accessibility at 15 key stations—an average of almost $13 million per station. Extrapolating from these numbers, making every subway station ADA accessible might cost $4 billion or more. Moreover, even with a totally accessible subway system, the need for paratransit would remain. Some registered Access-A-Ride users can never use conventional transit, while others can use it only under limited circumstances.

Written by Alan Treffeisen

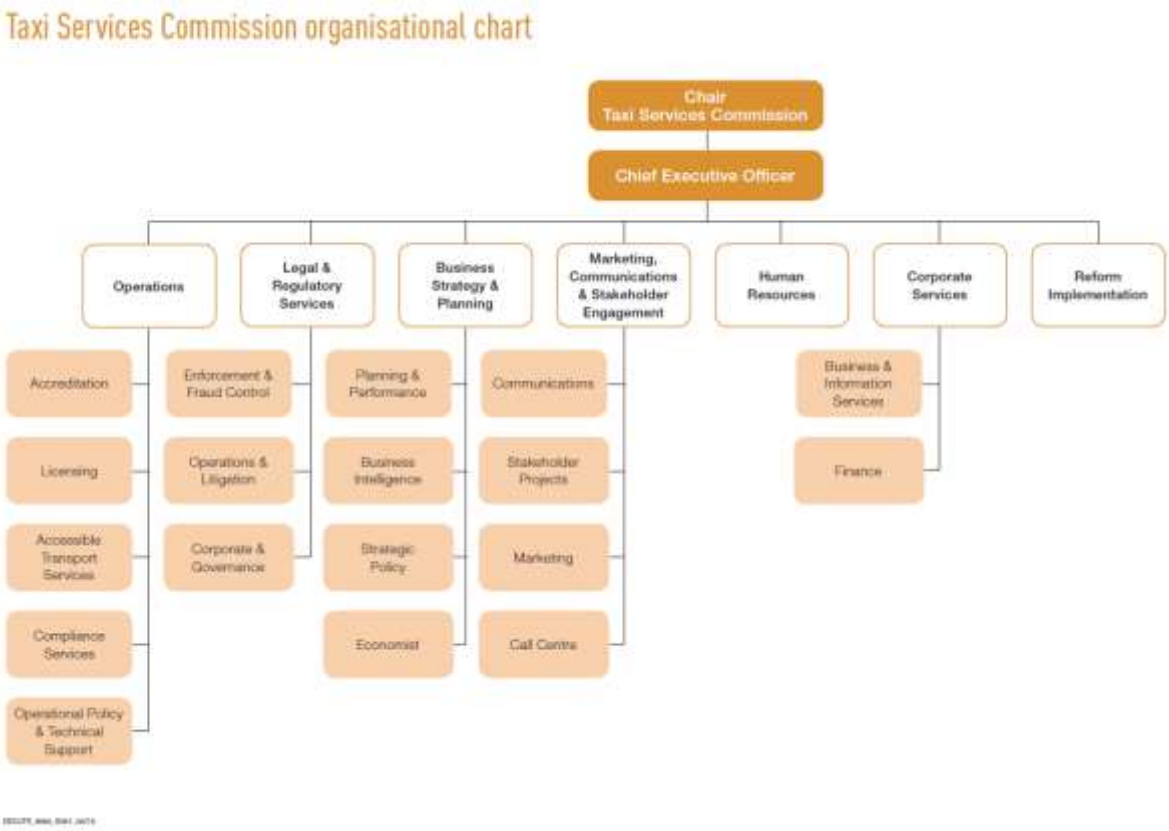
ENDNOTES

[1] In 2002 the Independent Budget Office released an analysis of the expenses and revenues of Acces-A-Ride based on data from the year 2000, "New York's Access-A-Ride Program: Costs and Funding Sources." This fiscal brief updates that report.
[2] Assuming that the age distribution of disabled New Yorkers mirrors the distribution of the population as a whole, then about five-sixths of the disabled population are adults age 18 or over. Because the survey does not include individuals who are institutionalized or otherwise living in group quarters, this estimate of the disabled population tends to be on the low side. The 2000 census reported a much higher number of disabled New Yorkers—1.8 million.
[3] The companies are listed by the size of their current contract, from largest to smallest.
[4] Alberts, Hana. "MTA responds to suggestions for change." *New York Newsday*, August 20, 2006.

Appendix 13 – Taxi Service Commission Structures

The organisational structures of the Victorian Taxi Service Commission and New York City Taxi and Limousine Commission.

Victorian Taxi Service Commission



NYC Taxi and Limousine Commission

Commission Board Structure

The Board of the Taxi and Limousine Commission is comprised of nine (9) members, eight (8) of whom are unsalaried. The salaried Chairman presides over the Board and acts as head of the agency, which carries out the Commission's day-to-day licensing, regulatory and enforcement functions, as well as functions associated with the adjudication of licensee rule violations. Members of the Commission are appointed by the Mayor of the City of New York, with the advice and consent of the City Council, each to serve a seven-year term. One representative of each of the city's five boroughs is recommended for appointment by a majority vote of each borough's respective City Council delegation.

Meera Joshi
Appointed by Mayor Bill de Blasio and confirmed unanimously by the New York City Council, Commissioner Joshi started serving the Taxi and Limousine Commission in this capacity in April 2014. Prior to becoming Commissioner/Chair of the TLC, Meera Joshi served the agency as its Deputy Commissioner of Legal Affairs and General Counsel. Commissioner Joshi's term expires on January 31, 2017.

Elias Arout
Commissioner Elias Arout has served on the TLC since 1988. Commissioner Arout is a past commander of the American Legion of Richmond County and a former commander of the Legion's Five Star Post. A retired City Housing Authority officer, he was a founder and past president of the board of directors of Project Hospitality. Commissioner Arout's term expires on January 31, 2015.

Frank Carone
Appointed by Mayor Bloomberg on the recommendation of the Brooklyn delegation of the New York City Council in March 2011, Commissioner Carone is a Partner at the law firm of Abrams Fensterman. Commissioner Carone's term expires on January 31, 2015.

LaShann DeArcy
LaShann DeArcy was appointed by Mayor Michael R. Bloomberg to serve on the TLC's Board in 2011. Commissioner DeArcy is a partner in Morrison & Foerster's Litigation group, focusing on complex commercial litigation representing Fortune 500 companies. She served our country as a member of the United States Air Force. Commissioner DeArcy's term will expire on January 31, 2019.

Edward Gonzales
Appointed in September 2005 by Mayor Michael R. Bloomberg, Commissioner Edward Gonzales is a mortgage specialist with Citigroup. Commissioner Gonzales's term will expire on January 31, 2019.

Nora Constance Marino
Appointed by the Mayor on the recommendation of the Queens delegation to the New York City Council in 2011, Commissioner Marino is a former JAG Officer in the United States Army Reserve and maintains her own law practice. Commissioner Marino's term expires on January 31, 2015.

Lauvienska Polanco
Lauvienska Polanco was appointed to the Manhattan seat of the TLC Board of Commissioners in 2007. Commissioner Polanco serves as Principal Law Clerk at the Bronx Supreme Court. Her term expires on January 31, 2015.

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Jacques Jiha
Commissioner Jiha was nominated by the Mayor de Blasio to the TLC's Board of Commissioners and subsequently confirmed by the New York City Council on August 21, 2014. Commissioner Jiha was also appointed Commissioner of the New York City Department of Finance by Mayor de Blasio on April 8, 2014. Prior to becoming Finance Commissioner, Mr. Jiha was the Executive Vice President/ Chief Operating Officer and Chief Financial Officer of Earl G. Graves, Ltd., a multi-media company with properties in print, digital media, television, events and the internet. Commissioner Jiha's term expires on January 31, 2017.

Commission Meetings

The TLC holds regularly scheduled public meetings where regulatory actions are discussed, public testimony is heard and action is taken by the Commission, base station license applications are approved, and agency staff delivers presentations on new and proposed policies, legislation, pilot programs and regulatory modifications. As a result of TLC rulemaking in 2014, 10 new rules have been promulgated and gone into effect. *(See chart below.)*

Rulemaking Actions – 2014

Commission Meeting Vote	Subject	Status
April 30, 2014	Accessibility Rules[1]	Effective July 7, 2014
May 15, 2014	Credit Card Surcharge	Effective June 22, 2014
June 19, 2014	Taxi School Exemption	Effective August 1, 2014
August 7, 2014	Adjudication Rule Amendments	Effective September 21, 2014
	Accessibility Fee Payment[2]	Effective September 18, 2014
September 18, 2014	Vision Zero Vehicle Markings	Effective October 26, 2014
	SHL Marking Sticker	Effective October 29, 2014
October 16, 2014	Vision Zero Rules	Effective November 26, 2014
	Improvement Fund Collection Rules	Effective November 23, 2014
November 20, 2014	FHV Dispatch Rules	Effective December 31, 2014

Some Regulatory Highlights

Vision Zero
Implementing the Mayor's Vision Zero goals has been a priority for the TLC. In 2014, the TLC Commissioners adopted numerous rules designed to reduce traffic fatalities in New York City. These rules increased TLC's ability to remove unsafe TLC-licensed drivers from the street quickly, while also promoting the safety of passengers, pedestrians, bicyclists, and other motorists. Specifically, TLC will now summarily suspend the license of any driver summonsed or charged with a traffic violation or crime following a crash in which a person has suffered a critical injury or death and, if the driver is convicted of the traffic violation or crime, the TLC driver's license will be revoked. Additionally, TLC will review the fitness of any driver involved in a crash resulting in death or critical injury separate and apart from any crash investigation conducted by the police. TLC will also now combine penalty points assessed against a driver's DMV license with penalty points relating to traffic safety assessed against the driver's TLC license in determining when a TLC-issued driver's license must be suspended or revoked. Finally, beginning on January 24, 2015, all TLC-licensed vehicles must display a safety

[1] Please see page eight for more information about the accessibility rules.
[2] The Commission adopted new rules to transfer the Taxi Accessibility Fee collection administration from the Accessible Dispatch vendor to the TLC.

Appendix 14 – Multiple Hiring

A summary of the concept of Multiple Hiring from the NSW Taxi Council.

What is multiple hiring?

Quite simply, multiple hiring is when two or more hirers use the same taxi at the same time. Multiple hiring can be used during the peak periods when demand for taxi services is high. It is an efficient way to get large numbers of people to their destination in the shortest possible time.

Because the hirers are giving up their exclusive use of the taxi-cab, the fare is discounted for each hirer. Regulation requires each hirer to agree to allow the driver to accept other hirings. Therefore, the hirer has the right to refuse to allow the driver to multiple hire if they would prefer not to share.

Multiple hiring is encouraged, but it should be noted that a driver cannot tout for any passengers. Of course during periods where cabs are readily available, Multiple Hiring may not be the best option.

Example: When friends and/or workmates are travelling together that is classed as one hiring, and the fare is paid at the end of the journey irrespective of how many drop off points there may be. This is called a shared ride, not a multiple hiring.

When does multiple hiring apply?

There is no rule about when multiple hiring applies but it should only be used when there are more passengers than there are taxi cabs available.

Multiple hirings must start at the same time and all hirers must be travelling to destinations in the same general directions.

Paying the fare for a multiple hiring

The maximum fare that can be charged to each hirer is 75% of the standard authorised fare for the hirer's section of the journey. For example a passenger and her friend hire a taxi from Terminal 2 at Sydney Airport and want to go to Circular Quay. The woman agrees to allow the taxi driver to multiple hire and a gentleman going to Central Railway gets into the cab. On arrival at Central Railway, the driver stops the meter. If the total fare is $30, the driver charges the man $22.50 which is 75% of $30. The driver restarts the meter and takes the woman and her friend to Circular Quay, whereupon the total fare is $44 and the woman is charged $33 which is 75% of $44.

*Note - fares used are for example only and do not represent actual fares.

BENEFITS OF MULTIPLE HIRING

Reduced waiting times for customers in peak periods.

More efficient utilisation of Sydney's taxi fleet.

Every hirer gets a discounted fare - the customer saves money.

The driver earns more for the trip.

For a cleaner, greener environment, share the kilometres

Appendix 15 – CAVs Benefits and Cost/Problems

Summary table from the Victorian Transport Policy Institute on the potential benefits and costs/problems of CAVs.

Table 1 **Autonomous Vehicle Potential Benefits and Costs**

Benefits	Costs/Problems
Reduced driver stress. Reduce the stress of driving and allow motorists to rest and work while traveling. *Reduced driver costs.* Reduce costs of paid drivers for taxis and commercial transport. *Mobility for non-drivers.* Provide independent mobility for non-drivers, and therefore reduce the need for motorists to chauffeur non-drivers, and to subsidize public transit. *Increased safety.* May reduce many common accident risks and therefore crash costs and insurance premiums. May reduce high-risk driving, such as when impaired. *Increased road capacity, reduced costs.* May allow platooning (vehicle groups traveling close together), narrower lanes, and reduced intersection stops, reducing congestion and roadway costs. *More efficient parking, reduced costs.* Can drop off passengers and find a parking space, increasing motorist convenience and reducing total parking costs. *Increase fuel efficiency and reduce pollution.* May increase fuel efficiency and reduce pollution emissions. *Supports shared vehicles.* Could facilitate carsharing (vehicle rental services that substitute for personal vehicle ownership), which can provide various savings.	*Increases costs.* Requires additional vehicle equipment, services and maintenance, and possibly roadway infrastructure. *Additional risks.* May introduce new risks, such as system failures, be less safe under certain conditions, and encourage road users to take additional risks (offsetting behavior). *Security and Privacy concerns.* May be used for criminal and terrorist activities (such as bomb delivery), vulnerable to information abuse (hacking), and features such as GPS tracking and data sharing may raise privacy concerns. *Induced vehicle travel and increased external costs.* By increasing travel convenience and affordability, autonomous vehicles may induce additional vehicle travel, increasing external costs of parking, crashes and pollution. *Social equity concerns.* May have unfair impacts, for example, by reducing other modes' convenience and safety. *Reduced employment and business activity.* Jobs for drivers should decline, and there may be less demand for vehicle repairs due to reduced crash rates. *Misplaced planning emphasis.* Focusing on autonomous vehicle solutions may discourage communities from implementing conventional but cost-effective transport projects such as pedestrian and transit improvements, pricing reforms and other demand management strategies.

Autonomous vehicles can provide various benefits and impose various costs.

Appendix 16 – CAVs Implementation Predictions

Summary of the historical development timeframes of other major automotive and transport innovations, identified by the Victorian Transport Policy Institute.

Autonomous Vehicle Implementation Predictions: Implications for Transport Planning
Victoria Transport Policy Institute

Implementation Projections

Autonomous vehicle implementation can be predicted based on the pattern of previous vehicle technologies, and vehicle fleet turnover rates.

- *Automatic Transmissions* (Healey 2012). First developed in the 1930s. It took until the 1980s to become reliable and affordable. Now standard on most U.S. medium and high-priced vehicles, although some models have manual mode. When optional they typically cost $1,000 to $2,000. Current new vehicle market shares are about 90% in North America and 50% in Europe and Asia.
- *Air Bags* (Dirksen 1997). First introduced in 1973. Initially an expensive and sometimes dangerous option (they could cause injuries and deaths), they became cheaper and safer, were standard on some models starting in 1988, and mandated by U.S. federal regulation in 1998.
- *Hybrid Vehicles* (Berman 2011). Became commercially available in 1997, but prices were high and performance poor. Their performance and usability has improved, but typically add about $5,000 to vehicle prices. In 2012 they represented about 3.3% of total vehicle sales.
- *Subscription Vehicle Services*. Navigation, remote lock/unlock, diagnostics and emergency services. OnStar became available in 1997, TomTom in 2002. They typically cost $200-400 annually. About 2% of U.S. motorists subscribe to the largest service, OnStar.
- *Vehicle Navigation Systems* (Lendion 2012). Vehicle navigation systems became available as expensive accessories in the mid-1980s. In the mid-1990s factory-installed systems became available on some models, for about $2,000. Performance and usability have since improved, and prices have declined to about $500 for factory-installed systems, and under $200 for portable systems. They are standard in many higher-priced models.

Table 6 summarizes the deployment cycles, from first commercial availability to market saturation, for these technologies. Most new technologies require decades of technical development and market growth to saturate their potential markets, and in many cases never become universal. Airbags had the shortest cycle and the most complete market share, due to federal mandates. Automatic transmissions required more than five decades for prices to decline and quality to improve, and are still not universal. Hybrid vehicles are still developing after 15 years on the market, have substantial price premiums and modest market share. This suggests that new vehicle technologies generally require two to five decades from commercial availability to market saturation, and without government mandates will not be universal.

Table 6 **Vehicle Technology Deployment Summary**

Name	Deployment Cycle	Typical Cost Premium	Market Saturation Share
Air bags	25 years (1973-98)	A few hundred dollars	100%, due to federal mandate
Automatic transmissions	50 years (1940s-90s)	$1,500	90% U.S., 50% worldwide
Navigation systems	30+ years (1985-2015+)	$500 and rapidly declining	Uncertain; probably over 80%.
Optional GPS services	15 years	$250 annual	2-5%
Hybrid vehicles	25+ years (1990s-2015+)	$5,000	Uncertain. Currently about 4%.

New technologies usually require several decades between commercial availability to market saturation.

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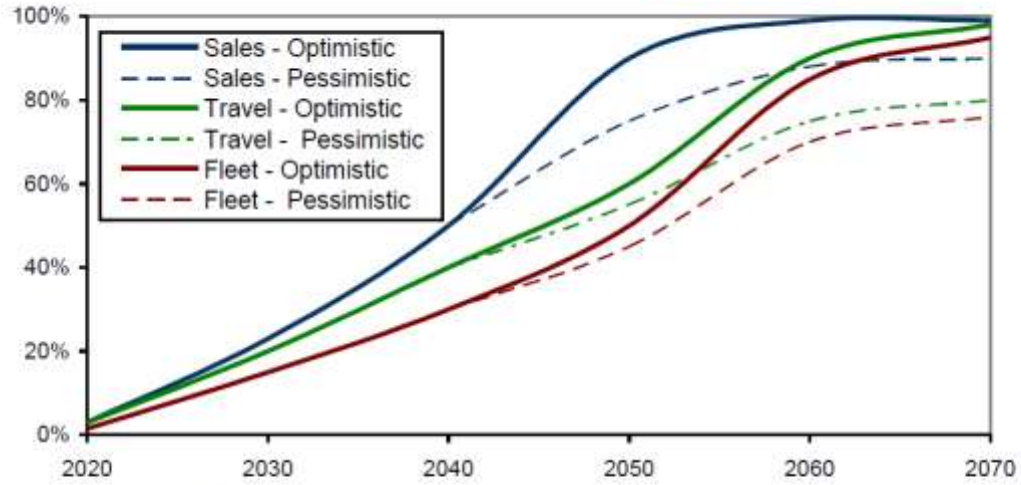
Figure 1 **Autonomous Vehicle Sales, Fleet and Travel Projections** (Based on Table 6)



If autonomous vehicle implementation follows the patterns of other vehicle technologies it will take one to three decades to dominate vehicle sales, plus one or two more decades to dominate vehicle travel, and even at market saturation it is possible that a significant portion of vehicles and vehicle travel will continue to be self-driven, indicated by the dashed lines.

Table 8 **Autonomous Vehicle Planning Impacts By Time Period**

Impact	Functional Requirements	Planning Impacts	Time Period
Become legal	Demonstrated functionality and safety	Define performance, testing and data collection requirements for automated driving on public roads.	2015-25
Increase traffic density by vehicle coordination	Road lanes dedicated to vehicles with coordinated platooning capability	Evaluate impacts. Define requirements. Identify lanes to be dedicated to vehicles capable of coordinated operation.	2020-40
Independent mobility for non-drivers	Fully autonomous vehicles available for sale	Allows affluent non-drivers to enjoy independent mobility.	2020-30s
Automated carsharing/taxi	Moderate price premium. Successful business model.	May provide demand response services in affluent areas. Supports carsharing.	2030-40s
Independent mobility for lower-income	Affordable autonomous vehicles for sale	Reduced need for conventional public transit services in some areas.	2040-50s
Reduced parking demand	Major share of vehicles are autonomous	Reduced parking requirements.	2040-50s
Reduced traffic congestion	Major share of urban peak vehicle travel is autonomous.	Reduced road supply.	2050-60s
Increased safety	Major share of vehicle travel is autonomous	Reduced traffic risk. Possibly increased walking and cycling activity.	2040-60s
Energy conservation and emission reductions	Major share of vehicle travel is autonomous. Walking and cycling become safer.	Supports energy conservation and emission reduction efforts.	2040-60s
Improved vehicle control	Most or all vehicles are autonomous	Allows narrower lanes and interactive traffic controls.	2050-70s
Need to plan for mixed traffic	Major share of vehicles are autonomous.	More complex traffic. May justify restrictions on human-driven vehicles.	2040-60s
Mandated autonomous vehicles	Most vehicles are autonomous and large benefits are proven.	Allows advanced traffic management.	2060-80s

Autonomous vehicles will have various impacts on transportation planning.

Appendix 17 - Examples of Prospective Uses of ITS

Summary of examples of potential co-operative intelligent transport systems, identified and profiled by the Standing Council for Transport and Infrastructure for Australia and New Zealand.

Examples of Current and Prospective Uses of ITS

ATTACHMENT 2

Co-operative ITS

Co-operative ITS (C-ITS), namely Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) applications hold many potential benefits including, but not limited to safety, traffic and productivity management. Potential benefits of C-ITS include a reduction in the number of crashes as vehicles can sense and communicate what is happening around them; road users have detailed information on travel options and so can make a more informed choice; and network operators have full knowledge of the status of the assets within the road network.

There are a range of applications that fall under the C-ITS banner. These include:

- Blind Spot Warning: issues a warning to a driver who is trying to change lanes when another vehicle is in its blind spot;
- Electronic Emergency Brake Lights: issues a warning to a driver when a vehicle ahead of them (that they cannot see) is braking hard;
- Improved Traffic Management Systems: managing the transportation system with knowledge of real-time location of every vehicle using the system including pre-emption at traffic signals for priority vehicles;
- Access to Information En-route: access to information such as weather en-route; and
- Improved Incident Response: improved response to incidents and traffic flow restoration times.

Managed Motorways

The development of managed motorways in urban areas is a major priority in most state capital cities. This has been driven by growing challenges to maximise efficiency and minimise congestion on existing infrastructure, and addressing increasing financial, space, and environmental constraints involved in building major new road infrastructure.

The operation of the motorway networks in major cities can be improved via the implementation and retrofitting of ITS technologies. Examples of these ITS technologies include loop detectors, motorway ramp signals, and lane use management systems including variable speed limits and variable message signs. Managed motorways technology aims to improve productivity and reduce accidents and vehicle emissions without costly investment and land use impacts. Proposals from a number of state governments for ITS managed motorways are among infrastructure priorities being considered by Infrastructure Australia.

Key challenges that will need to be addressed as this work progresses include:

- designing motorway specifications to avoid 'technological lock-in';
  - ITS developments will continue to rapidly evolve, and upgrade of ITS infrastructure should not be limited by motorway contracts
- providing adequately for maintenance of ITS infrastructure; and
- ensuring motorways are 5.9GHz compatible and do not incorporate technology that interferes with Austroad's proposal for use of that frequency.
  - There will be a need to integrate strategic approaches to managed motorways and co-operative ITS, as C-ITS applications have the potential to deliver functionality (relating to such areas as variable speed limits and lane controls) that would otherwise require specific managed motorway investments.

The Commonwealth Government's recently announced National Smart Managed Motorways Trial provides $61.4m for the development of a national smart managed motorways trial to improve congestion, lower urban emissions, and expand the capacity of existing outer city road infrastructure networks.

Provision of Driver Information

Provision of driver information is a form of ITS which, as the name suggests, provides information to the driver – a current example is in-vehicle satellite navigation systems which provide not only driving directions, but can also provide traffic updates. Either can be built into new vehicles as either optional or standard equipment (by Original Equipment Manufacturers (OEMs)), or purchased and installed later, which is a booming part of the aftermarket sector.

Currently, there is a proliferation of in-vehicle devices, from both OEMs and the aftermarket sector, being installed in vehicles, with the most noticeable examples being in freight vehicles and taxis. The issue that is currently under investigation is ensuring that drivers are not overloaded with information and are not distracted by a multitude of devices. Work is currently underway internationally, and especially in Europe, to ensure all devices are integrated through a single Human Machine Interface (HMI).

Australia may have to consider the introduction of rules and legislation which prevents or limits the addition of devices to vehicles and/or ensure all aftermarket applications are integrated into a vehicle's originally equipped HMI.

Telematics

Telematics is an ITS technology that allows monitoring of a vehicle's movements, including (depending on the application) attributes such as speed, location, and on-board mass. Telematics is finding increasing commercial uses, leading to more efficient private commercial freight operations. It can also be used as a regulatory tool, for purposes such as road charging and compliance and enforcement. The Intelligent Access Program, administered by Transport Certification Australia, is one of a number of telematics frameworks which use vehicle Global Positioning System (GPS) monitoring to deliver

greater productivity while managing increased wear on the road network. Australia's Transport Ministers recently approved a national strategy to drive the voluntary uptake of in-vehicle telematics in the road freight industry to improve road safety, reduce transport costs and cut emissions.

Electronic Work Diaries

New South Wales is leading an inter-jurisdictional pilot of Electronic Work Diaries (EWD). At present, drivers of fatigue-regulated heavy vehicles are required to record their hours of work and rest in a paper-based work diary to assist authorities manage fatigue. The EWD pilot will examine the feasibility of an approved electronic alternative. The pilot is being conducted from June 2010 to June 2013 and the Stage 1 in-field component commenced in July 2011 with 28 vehicles and 27 drivers. The goal of the pilot is to test and refine the national policy and technical specification for the approval of electronic systems and their use for enforcement and business purposes, while delivering safety, productivity and environmental outcomes.

Rail Management

ITS developments are also proceeding rapidly in the rail industry to achieve the modernisation and harmonisation of safety and operational communications nationally. Anticipated benefits for its train protection controls for both interstate and metropolitan networks are the improved network capacity, operational flexibility, service availability, transit times, safety and system reliability. Controllers will be able to schedule more trains on the same area of track and will also be able to 'fleet trains' heading in the same direction by spacing them behind each other at a safe stopping distance. Developments in this area highlight the need for interoperability with road based ITS technology, particularly at railway crossings.

Rail Crossing Safety

There is considerable work underway between governments on the use of ITS to improve rail level crossing safety. Low cost solutions that augment more traditional treatments for crossings, such as signs, flashing lights and boom gates, are being sought. The use of short-range communications between oncoming trains and vehicles or roadside installations to warn drivers may require integration with other ITS technologies.

The implementation of ITS technologies to drive productivity and efficiency gains and safety improvements needs to be in the context of moves to national approaches that avoid the traditional 'break of gauge' disconnects arising from localised solutions. Without restricting innovation, it is important that common interfaces in such areas as train protection controls and railway crossings are applied and that, through the Standing Council on Transport and Infrastructure, governments support general principles for and facilitate implementation of interoperable technologies by industry.

Road User Charging

The Council of Australian Governments (COAG) Road Reform Plan is currently undertaking a Feasibility Study of reform of heavy vehicle pricing and funding arrangements including work to develop more direct charging of heavy vehicles which better reflect the actual costs of each heavy vehicle's use of the road network. ITS will be a foundation element of any future heavy vehicle charging system that requires real time monitoring of mass distance and/or location of trucks.

Safety

Many in-vehicle ITS technologies are capable of delivering substantial crash reduction and injury prevention benefits. However the costs of these technologies at present mean that for the most part they would not be cost-effective. One possible exception is seatbelt reminder systems, which Austroads has recently observed are estimated to produce net benefits. That said, the costs of manufacture are continually falling and it is only a matter of time before more of these in-vehicle technologies become cost-effective.

In contrast there are a number of roadside ITS technologies that are already known to be cost effective in terms of these safety benefits. These include point-to-point speed enforcement, speed feedback signs, and in specific circumstances variable speed limits, weather alerts and wet weather speed limits. Such technologies are already in various stages of implementation by governments.

The National Road Safety Strategy 2011–2020 identifies the potential uses of ITS as an additional tool in improving road safety. Examples of this include the use of alcohol interlocks, Intelligent Speed Adaptation (ISA), as well as the mandating of lane departure warnings for heavy vehicles and brake assist for light passenger vehicles.

The In-Vehicle and At-Roadside Technologies (IVART) project was established under the auspices of the Australian Transport Council. IVART has the core purpose to manage, develop and regulate the evolving Information and Communication Technology (ICT), transport safety and security applications to facilitate appropriate adoption in Australia within a planned policy and technology framework and a high level business and system architecture. In recognising the potential safety benefits of ITS, IVART commissioned research to undertake a cost benefit analysis of Intelligent Speed Adaptation (ISA) within Australia, the results of which indicated that ISA offers positive benefits in reducing road trauma, especially when targeting specific user groups. Research has also been commissioned into the cost effectiveness of a number of technologies including Anti-lock braking systems for motorcycles, lane departure warning, forward collision avoidance with braking and stability control for heavy vehicles.

In August 2010, the Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr, launched the *Automotive Australia 2020* technology roadmap to identify opportunities for the industry in new and emerging technologies. The roadmap specifically identified data and communications as an opportunity are that will be important to many aspects of ITS technology, particularly vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communication.