Emerging Transport Technologies

Critical Policy Brief

This briefing draws upon the expertise of RMIT's transport research community to inform policy makers and the wider community on critical challenges presented by the emergence of new transport technologies.

Victoria's transport sector is on the cusp of a major transition driven by new technologies such as dynamic data systems and driverless vehicles. These innovations provide opportunities for a higher capacity transport system that is more flexible and responsive to commuters' needs. The introduction of new technologies also presents challenges in planning to ensure a safe and effective transition for our community.

Overview

New and emerging technologies offer the promise of a more efficient and effective transport system that can respond to increasing demand across our road and rail networks, as well as providing more sustainable transport solutions. This policy brief focuses upon three key areas in which technologies will influence future transport in Victoria: applications of data-driven technology; planning for the emergence of driverless vehicles; and promoting the development and uptake of more fuel-efficient vehicles.

Data-Driven Technology

The recent growth in location-based data services, estimated to have generated $700 billion in value globally[1], signals a transition towards more personalised transport provision in which services can be aligned with individual commuter demand. Increased use of data analytics would likely see a shift from a one-size-fits-all approach to transport infrastructure planning to more targeted and individualised transport services. This trend is already signalled by the growth of on-demand, personalised transport services like Uber, particularly in areas where there are limited or infrequent travel connections close to home.

Key Messages

- As new and emerging transport-related technologies are likely to have a significant impact upon the future functioning of Victoria's transport system, the Victorian Government needs to anticipate and actively plan for the emergence of these technologies.
- Data-driven technologies offer significant opportunities to provide more targeted transport services that respond to individual commuter demand and manage congestion.
- Driverless road vehicles are still some years from deployment. While this technology provides promise of a safer, higher capacity transport system, government oversight is required to avoid potentially negative outcomes.
- In the near term, carbon emissions can be significantly reduced through policies designed to improve energy efficient standards for motor vehicles and to promote uptake of electric vehicles.

Through data analytics, commuter journeys can be predicted from early commencement based on previous travel patterns and influences such as the weather.[2] [3] With this type of information, transport providers will be able to access up-to-the-minute feedback on congestion and customer demand. Commuters will benefit from much smoother, better connected transport services to and from their doorstep. Data analytics can also inform demand-based pricing for transport to address congestion and provide more inclusive services. Governments can facilitate better use of data analytics by promoting a data-driven shared economy in which open sourced data can be readily accessed.[4]

Driverless Vehicles

Driverless vehicle technology has been introduced in several metropolitan passenger rail systems. If driverless vehicle technology can be made safe for road-based transport, there may be similar potential for use in fixed route buses.

The future deployment of driverless cars is less certain. Anticipated benefits include the potential to accommodate more vehicles on existing roads within narrower lanes, and improved road safety. Driverless cars are currently being trialled for road use, although the technology has yet to be proven safe for widespread deployment. Some manufacturers are hoping to have driverless vehicles for freeway-only use by 2020, with broader urban capability between 2025 and 2030.[5]

The introduction of driverless cars will require significant transitional planning. If configured to support and strengthen high-capacity public transport, shared autonomous vehicles could result in a significant reduction of the size of the car fleet. Driverless vehicles, supported by data-driven technology, could potentially stimulate a widespread transition to shared vehicle ownership and vehicle hire on a per-trip basis.

There is some reason for apprehension should driverless vehicles be introduced as a competitor to public transport, or substitute for active transport modes such as walking or cycling. This would increase car travel, including solo and even empty journeys, resulting in further congestion and exacerbating the negative impacts of urban sprawl. There is evidence that app-based ride-sourcing services have heightened congestion in cities such as New York.[6] If not managed through government policy settings, driverless vehicles could accelerate this trend.

Fuel Efficient Vehicles

The introduction of more fuel-efficient vehicles would make a significant contribution to Victoria's legislated target of net zero greenhouse gas emissions by 2050.[7] Climateworks research indicates that setting a higher fuel economy target in Australia for 2020 could result in total fuel savings of A$7.9 billion and reduce CO2 emissions by 8.7 million tonnes each year.[8] Australian strategies for promoting energy efficient vehicles rely on voluntary targets, incentive programmes and awareness campaigns. The fuel efficiency of Australia's motor vehicle fleets falls behind European countries and the United States, which have mandated national fuel economy standards.[9]

Victoria has more fuel-efficient vehicles in its fleet than other Australian states, and this proportion is increasing.[10] However, a reliance on market-led improvements in fuel economy is unlikely to bring about significant reductions in CO2 emissions and government leadership is needed in introducing a fuel economy target for vehicles. Government initiatives to promote uptake of electric vehicles would further support achievement of the net zero greenhouse gas emissions target.

For further information contact Dr Chris De Gruyter
chris.degruyter@rmit.edu.au

Authors: Dr Chris De Gruyter, Dr Flora Salim, Dr Ian Woodcock, Dr Jan Scheurer and Dr Tiebei Li

[1] The age of analytics: Competing in a data-driven world, McKinsey Global Institute, December 2016.
[2] Rahaman, M. S., Hamilton, M., Salim, F. D. (2017), "Predicting Imbalanced Taxi and Passenger Queue Contexts in Airport", Twenty First Pacific Asia Conference on Information Systems (PACIS) 2017.
[3] Sadri, A., Salim, F.D. and Ren, Y. (2017) 'Full trajectory prediction: What will you do the rest of the day?', in UbiComp '17, pp. 189–192.
[4] Zambonelli, F. Salim, F., Loke, S. De Meuter, W. and Kanhere, S. 2018, 'Algorithmic Governance in Smart Cities: The Conundrum and the Potential of Pervasive Computing Solutions', in IEEE Technology and Society Magazine, IEEE, United States, vol. 37, no. 2, pp. 80-87 ISSN: 0278-0097.
[5] Walker, J. (2018) 'The Self-Driving Car Timeline – Predictions from the Top 11 Global Automakers', Techemergence, 17 July, accessed 2 August 2018.
[6] Komanoff, C. (2017) 'It's Settled: Uber Is Making NYC Gridlock Worse', Streetsblog NYC, 27 February 2017, accessed online 2 August, 2018.
[7] Climate Change Act 2017.
[8] ClimateWorks (2014) Improving Australia's Light Vehicle Fuel Efficiency. Melbourne: Climateworks, Briefing Paper.
[9] Van Dender, K., Clever, M., (2013) 'Recent Trends in Car Usage in Advanced Economies–Slower Growth Ahead?', Discussion paper 2013-09. OECD International Transport Forum.
[10] Australian Bureau of Statistics (2018) Motor Vehicle Census (cat. no. 9309.0). Canberra: Australian Bureau of Statistics.

Produced by RMIT UNIVERSITY | Centre for Urban Research

Funded by **Urban Futures** Enabling Capability Platform