Fuel for thought

The Future of Transport and Mobilities

Driven by technological advancement, population growth and increased urban density, transport is undergoing a radical transformation, placing the industry under the national spotlight.

Traditionally operator-centric, transportation and mobility are shifting towards a shared, personalised and multimodal model. In Australia, investment into transport is currently being backed by the Federal government's $70 billion spend into infrastructure to build the necessary foundations for liveable and sustainable cities of the future. In turn, private organisations are developing innovative transport solutions to improve the mobility of commuters by cutting journey times and improving productivity.

URBAN GROWTH AND ACCESSIBILITY

The world's population growth at an exponential rate coupled with a trend towards urbanisation creates an urgency for organisations to rethink transport models. Currently, urban centres are growing at a rate of two people per second or 172,800 new city-dwellers around the world each day. By 2061, over two-thirds of Australians (30 million) are expected to live in four super-cities comprising Sydney, Melbourne, Brisbane and Perth.

Federal and State governments are under immense pressure to improve the capacity, frequency and flexibility of transport. Current initiatves include Melbourne's High Capacity Metro Trains (HCMT) and the driverless Sydney Metro trains.

PriestmanGoode, a British based engineering consulting company, has developed a concept of 'moving platforms' to reduce dwell time – the time a bus or train remains stationary at a stop – and reduce overcrowding. The concept involves running two trains in parallel for a period of time and interlocking the doors. Commuters can change trains to complete their journey therefore eliminating the need for a permanent platform.

A similar idea was developed by Chinese designer, Chen Jianjun, who designed a pod which ran above trains for a certain distance to allow passengers to board and disembark without stopping the train itself.

By integrating smarter transport designs, commuters will be able to reach their destinations more effectively and efficiently.

Moreover, there remains an ongoing need to service the existing generation of commuters. Australia's aging population plays an integral part in transport planning, and subsequently calls for more accessible and flexible transport options. The implementation of the Disability Standards for Public Transport (DSAPT) involves a series of upgrades to existing and new infrastructure and rollingstock. This initiative will be completed by 2022 and greatly expand the coverage of public transport to provide mobility to a range of demographics across the country.

TECHNOLOGICAL ADVANCEMENT

Technology continues to transform the way people live and travel across Australia. In Sydney, more than 80% of commuters on public transport own and use a smartphone every day. Commuters are informed as ever with access to transport information real-time using only their smartphones. The shift to electronic ticketing systems has allowed operators to better predict consumer demand.

Like other industries, transport has adopted the Anything-as-a-Service (XaaS) model underpinned by cloud computing. New markets such as autonomous vehicles, car/bike sharing and On Demand transport have started to rise to complement the existing transport network. Keolis Downer is currently exploring new mobilities and have commenced On Demand trials with Transport for New South Wales (TfNSW) as shown below.

As commuter expectations become increasingly sophisticated, transport journeys are becoming more personalised. In several parts of the world, such as San Francisco, car ownership is at an all-time low as people use Mobility-as-a-Service (MaaS) models such as car sharing. Individuals can book a driver to commence their journey from the comfort of their own home.

These initiatives are backed by government deregulation and will overcome the political, safety and regulatory challenges leading transport companies face.

For example, there is high resistance to Uber due to controversies around driver qualifications, passenger safety and a lack of liability frameworks.

Consequently, advertising companies have also moved to digital platforms with examples such as 'geofencing' to better connect to their target market. Geofencing uses GPS and/or RFID technologies to create a virtual geographic boundary for software to trigger a response when a mobile device enters or leaves the area. This digitalisation not only provides an additional revenue stream but allows commuters to access information that is most relevant to them. Smart bus shelters, interactive dashboards and smartphone applications are a result of these advancing technologies.

EXISTING INFRASTRUCTURE LAYERS

Infrastructure spend requires extensive urban and transport planning to accommodate dense populations. In 2020, congestion is expected to cost the Australian economy up to $9 billion in lost productivity. For major cities, there are complex, multi-dimensional infrastructure layers formed over an extensive period of time making it difficult to change. As such, transport planners have modelled around urban sprawl as individuals are encouraged to live and work away from the central hub. Future transport infrastructure is also being developed above and below ground, such as with the emergence of metro trains and skytrains in Sydney and Melbourne.

The Transit Elevated Bus (TEB) is a concept that was presented at the 19th China Beijing International High-Tech Expo which proposes an alternative transport solution without altering existing infrastructure. The TEB will move along a fixed track above cars on the road and will have a capacity for 1,200 passengers. With the introduction of autonomous vehicles to remove human error, this solution could one day become a reality.

KEOLIS DOWNER ON DEMAND TRANSPORT

Keolis Downer (KD), a joint venture between Downer and Keolis, is also delving into emerging transport technologies through its new mobilities business. KD has launched projects for autonomous vehicles and On Demand transport drawing on their experience in European markets.

Operating as Keoride, the On Demand trials are delivered as part of TfNSW's pilot program and allow passengers to book vehicles to pick them up from their homes and drop them off at the nearest transport hub. KD has launched its first trial at the Northern Beaches with five vehicles initially (GoGet cars) to transfer passengers from their homes to the B-Line. A similar trial will be launched at Macquarie Park using a combination of vans and mini-buses.

For more information please visit **www.keoride.com.au**.

Keoride drivers at the launch of the Northern Beaches On Demand trial

Downer
Relationships creating success

Case Study: **Autonomous Vehicles**

> "Your benefit from a service that meets your needs precisely: flexible and scalable, innovative and efficient, at controlled cost for your authority."
>
> Jean-Pierre Farandou
> President of the Keolis Group

The global market for autonomous vehicles (AV) is growing at an exponentially rate providing significant opportunities for a number of industries.

PASSENGER AV

Research by Intel and Strategy Analytics has predicted by 2050, the passenger economy (economic and social value generated by fully autonomous and pilotless vehicles) will be valued at $9.1 trillion; comprising $4.9 trillion for consumers, $3.9 trillion for businesses and $268 billion for new and emerging services. Some of the world's biggest automotive companies such as General Motors, Ford and Daimier are at the forefront of this growth.

Research by PwC has found AV have the potential to prevent more than 90% of all vehicle incidents, or $31.9bn per annum in associated costs, by eliminating human errors. AV will also improve mobility for the young, elderly and disabled while creating more efficient traffic flows and reducing fuel usage due by reducing headway.

Another study by CISCO estimates that 30% of all traffic congestion in urban areas is caused by drivers looking for available parking spaces. With the help of smarter traffic management systems, autonomous vehicles have the potential to eradicate the need for parking spaces altogether.

AUTOMOTIVE COMPANIES BY AV EXECUTION AND STRATEGY
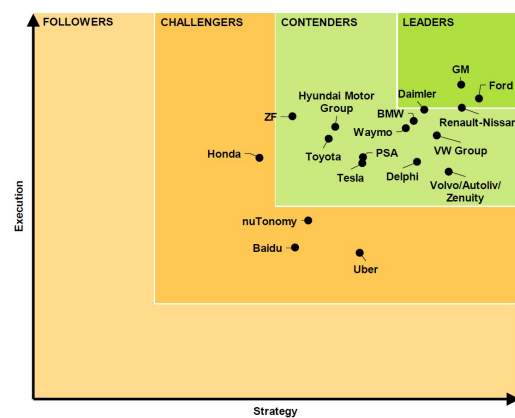
Source: Navigant Research

FREIGHT AV

AV has the potential to displace up to 173,000 truck drivers in Australia, with a ripple effect on filling stations, roadhouses and businesses that are dependent on the road transportation industry.

Daimler Trucks has developed an 18-wheel truck to drive on American roadways using auto-pilot controls for speed and distance. Swedish-based company, Einride has created a remote-controlled cables truck that can drive autonomously without human control. Uber has made its first delivery of 50,000 beers over 120 miles using a self-driving truck to reduce emissions and improve efficiencies. These developments apply further pressure for truck companies to invest in new technologies to survive rising operational costs in a shrinking market.

However as vehicles are equipped with higher levels of automation, concerns over security, liability and regulation are being raised. Like other new developments, there is also an element of trust that AV will need to build with humans, with concerns surrounding the fear of system failures and the safety and reliability of automated vehicles. In the long term, data will also be continually collected by an on-board computer prompting privacy and security concerns as well.

Consequently, Governments around the world are gradually building the right framework to manage this new market. In Australia, the National Transport Commission (NTC) has identified four different approaches in establishing a regulatory framework to support the rollout of AV:

- Continuing the current approach – complete deregulation with no new changes, costs, time constraints or barriers to entry
- Self-certification – voluntary/mandatory compliance for manufacturers, suppliers and entities with a set of safety standards
- Pre-market approval – mandatory approvals required prior to introducing an automated system on road with ongoing reporting of safety-critical events
- Accreditation – minimum standards required to be met from an appropriate agency

The level of regulation will greatly depend on the size and volume of the AV industry. Higher regulation will require a larger investment of time and resources may inhibit the industry's growth.

AV will also provide significant opportunities and economies of scale for other Australian industries. Mobile service providers can benefit by building vehicle-to-vehicle and vehicle-to-infrastructure connections for a smarter transport network. Telecommunications can build greater capacity and coverage for new and existing networks. Software companies would have a direct effect including application development, big data and analytics, cloud computing and security software. Energy companies can generate power, innovative service stations and in-road charging systems. New financial products will be created to cater for shared vehicle ownership including financing and insurance.

Keolis Downer
Autonomous Vehicle Trials

> "Autonomous vehicles constitute a technological revolution, taking urban mobility to a new level. Used to complement traditional transport modes, autonomous vehicles offer a mobility solution that is accessible, environmentally friendly, flexible and cost-efficient."

In June 2017, a consortium comprising HMI Technologies, La Trobe University, Royal Automobile Club of Victoria (RACV), Australian Road Research Group (ARRB) and Keolis Downer launched the first AV trial in Victoria.

The trial is among the first of its kind in the country and aims to support the development of a requisite regulation and/or framework under real operating conditions. Similar trials have been conducted in Auckland and Sydney.

Under this trial, AV will seamlessly integrate into the current transport network and will begin taking passengers from April 2018.

The project is backed by the Victorian Government's $13.3 million Smarter Journeys Programme announced as part of the 2015-16 State budget. The consortium has received up to $375,000 in funding for this project.

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