Will Driverless Cars Produce Walkable Cities for Australia?

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**Abstract:** Discourse about future Australian cities has changed focus driven by new forms of mobility such as ride-hailing, carsharing and ultimately, driverless cars organised multi-modally through ‘mobility as a service’ providers. A major benefit of these innovations is claimed to be dramatic improvements to the amenity of the public realm. This is said to arise from two key shifts: firstly, a dramatic reduction in the fleet of private cars required to meet future travel demand; secondly, removal of the need for parking, due to smaller vehicle fleets in almost constant circulation. Imagery associated with research, planning and commercial advocacy for driverless cities accentuates re-imagined urban precincts as places where pedestrians and cyclists flourish in vibrant places shared seamlessly with driverless cars and other autonomous vehicles. There is an implication that the path to walkable cities is via driverless cars.

After reviewing the literature on AV scenario modelling and its implications, we draw on design research exploring detailed scenarios for driverless cars as primary access to suburban rail stations in Melbourne. The findings question the extent to which walkable urbanism is likely to result in a driverless future. The space required for pick up and drop off arrangements to meet projected future demand scenarios indicate far more land could be required than would be freed up for non-transport uses in station precincts, often the heart of activity centres. Furthermore, international experience shows that vibrant public spaces have been created in contemporary cities without being driven by the needs of driverless cars.

**Key words:** autonomous vehicles; design research; walkability; transport planning; station precincts

**Introduction**

The idea of driverless cars can be dated back to a General Motors exhibit at the New York World’s Fair in 1939. However, while there are many driverless train systems globally, following on from the first scalable operational example on London’s Victoria Line in 1968, the world has yet to witness a similarly historic deployment of a sufficiently reliable driverless car for mass market take up. However, quantum leaps in the technological innovations required to make driverless cars viable, and billions invested in their development by governments and major players in the automobile and technology sectors have led many to predict that they will become widespread sometime in the 2020s, though exact dates vary widely.

Following these global trends, discourse about future Australian cities has in recent years been driven by new forms of mobility such as ride-hailing, carsharing and ultimately, driverless cars organised multi-modally through ‘mobility as a service’ providers. In addition to claims of enhanced road safety, a major benefit of these innovations is claimed to be dramatic improvements to the amenity of the public realm. This is said to arise from two key shifts: firstly, a dramatic reduction in the fleet of private cars required to meet future travel demand; secondly, removal of the need for parking, due to smaller vehicle fleets in almost constant circulation. Imagery associated with research, planning and commercial advocacy for driverless cities accentuates re-imagined urban precincts as places where pedestrians and cyclists flourish in vibrant, green places shared seamlessly with driverless cars and other autonomous vehicles. There is an implication that the path to healthier, vibrant, environmentally sustainable walkable cities is via driverless cars.

After reviewing the literature on AV scenario modelling and its implications, we draw on design research exploring detailed scenarios for driverless cars as primary access to suburban rail stations in Melbourne. Rail stations in suburbia are some of primary places where aspirations for walkable cities are to be realised through the compact city policy and transit-oriented design policies that have long been at the
heart of metropolitan planning policy for Australian cities. Effective accessible station access and inter-modal transfer environments must first and foremost cater to pedestrians as significant nodes within a broader metropolitan urbanism of walkability. However, the findings from our design research question the extent to which walkable urbanism is likely to result from a driverless future. The space required for pick up and drop off arrangements to meet projected future demand scenarios indicate far more land could be required than would be freed up for non-transport uses in station precincts, often the heart of walkable activity centres. Furthermore, international experience shows that vibrant walkable public spaces have been created in contemporary cities without being driven by the needs of driverless cars. It is more likely that for driverless cars to succeed, Australian cities should prioritise urban planning and design for public and active transport first.

Modelling uncertain futures
The spatial implications of AVs remain a contested area of research. We will now provide an overview of the literature that looks at modelling scenarios for the possible broadscale impacts of AVs. We are particularly interested in the potentials of AV scenarios to increase or decrease the total amount of urban travel (VKT) and the relative size of the urban vehicle fleet, in relation to assumptions about the supply of public transport.

Henderson and Spencer (2016) and Ma, Kockelman, Segal, and Global (2018) modelled that road capacity would increase under AVs. They suggest this may allow portions of road space to be re-allocated to other uses without decreasing existing road capacity. Milakis, Snelder, van Arem, van Wee, and Correia (2017) and Zakharenko (2016) suggest that parking may be able to be re-located from inner city areas. This would similarly allow the reallocation of on street parking to other uses, whilst urban densities may also increase through redevelopment of off-street parking. An ITF (2015, p. 5) agent-based simulation model for Lisbon, Portugal predicted a 20% increase in the available on street space for other uses merely through the removal of on street parking.

Other research has undertaken modelling which incorporates altered assumptions around the value of time (VoT). These revised values (compared to standard traffic demand modelling) assume that travellers within AVs, relieved of the task of driving, will be able to use travel time more productively. In turn, it is assumed longer travel times may be more palatable. Using such assumptions, Kim, Yook, Ko, and Kim (2015), Meyer, Becker, Bösch, and Axhausen (2017) and Anderson et al. (2014) produced modelling results which predict a significant trend to low density and ex-urban development. Meyer et al. (2017) and O'Toole (2014) go as far as to suggest efficiency gains through AVs (via increased road capacities and more efficient use of time) may render public transport services redundant in all but the densest cores of large cities.

A further body of research modelling has assessed the impact of differing AV operating arrangements on Vehicle Kilometres/Miles Travelled (VKT/VMT). Studying Lisbon, Portugal, the OECD/ITF (2015) found each fleet AV would remove about 6 private vehicles but increase overall VKT by 44%, likely overwhelming road capacity. Similarly Fagnant and Kockelman (2014) used an agent-based model to predict a 10% increase in VMT for a New Jersey sample, and Fagnant, Kockelman, and Bansal (2015) 8% for an Austin, Texas sample. A challenge with this body of developing literature is an inconsistent (or unstated) application of terminology. The term Shared Autonomous Vehicles (‘SAVs’) is interchangeably applied to AVs which operate in fleets but serve individual discrete customers (similar to taxis or Uber today), or as shared occupancy vehicles (similar to Uber Pool). The road capacity implications are significant, with shared occupancy fleets reducing the VKT increase in the OECD/ITF (2015) model from 44% to 6% when operating in tandem with high quality fixed route public transport. A lack of clarity in this area impacts on how policy makers can confidently plan for urban spatial implications, or advocate for specific approaches.

Central to all these modelling exercises is an assumption (often unstated or un-defined) that AVs will have lower operating costs than the private self-driven vehicles of today. This assumption is apparent in a range of literature, and significantly influences their results and conclusions (see for example Johnson, 2015; McKerracher et al., 2016; Arbib & Seba, 2017; Sperling, 2018). Cost advantages prompt an increase in predicted VKT, exacerbated by empty vehicle movements. In contrast, an emerging literature suggests that the management and maintenance burden of AV fleets, even under shared occupancy arrangements, may not achieve per mile costs below those of human driven vehicles (see Litman, 2019;
Nunes & Hernandez, 2019). Such an outcome would logically produce very different spatial urban outcomes through differing (presumably slower) AV adoption rates.

Ma et al (2018), modelling kerb space allocation in Austin, Texas make a conclusion which reflects the shortcomings of much AV modelling. They conclude that ‘if one SAV can replace 9 conventional vehicles, it seems reasonable to expect that 90% or more of Austin’s current downtown curb spaces may be easily liberated’. This fails to consider the kerb space demand imposed by the pick-up and drop off movements of mass movement by SAVs. They may well be liberated from parking, but not necessarily from use as pick up and drop off zones.

Soteropoulos, Berger, and Ciari (2019)'s comprehensive review of modelling literature on AV spatial and land use impacts found that overall, models predict an increase in VMT and a decrease in public and active transport usage. These results dominate where a high proportion of private AVs are assumed. Conversely, they identify different model trends where assumptions of higher rates of shared occupancy AV use are made. Overall, they identify that model outputs are particularly sensitive to input assumptions, such as VoT and cost per mile (Soteropoulos et al., 2019).

In a similar collective review, McLeod and Curtis (2019) found that AVs are likely to apply themselves to much urban travel demand and will influence how space is used in cities. However, they note that the benefits of the technology will depend significantly on what form of AV technology becomes dominant, an outcome which will be influenced by public policy decisions. These findings are consistent with those of Docherty, Marsden, and Anable (2018), Legacy, Ashmore, Scheurer, Stone, and Curtis (2018) and Marsden and Reardon (2018) who emphasize the critical role of public policy in achieving outcomes in the public interest; AVs will not autonomously create great public space.

Overall, the rapidly emerging literature remains uncertain on a range of key impacts. VMT may increase or decrease, depending on approach taken. Kerb space may be liberated for active transport or passive recreation, re-employed as additional traffic lanes, or re-used as pick up-drop off zones. Cities may densify through new development on former car parks, or atomise through low VoT perceptions where the stress of driving is relieved. Soteropoulos et al. (2019, p. 45) identify the sensitivity of model results to input assumptions. We might further emphasise the importance of critically reviewing conclusions in the context of their input assumptions. Given the uncertainty it is very easy to mismatch the positive visual tropes of AVs in attractive streetscapes (see figures 2-5 below) with the policy approaches needed to bring those about.

The view from Melbourne

In late 2018, the Victorian Government’s independent infrastructure advisor, Infrastructure Victoria (IV) published a comprehensive package of advice on automated and zero emissions vehicles to the Victorian Government. Their advice built up an evidence base around the impacts of seven different scenarios. At the extremes, IV assessed an outcome where by 2046, 100% of the Victorian vehicle fleet comprised privately owned AVs. At the opposite end of their AV analysis spectrum, IV considered a ‘Fleet Street’ scenario. In this approach, the entire vehicle fleet would be comprised of electric autonomous taxis. Although they identify this structure as a ‘shared autonomous vehicle’ fleet, their analysis did not assume any actual sharing of the fleet with strangers (‘Uber Pool’ style). Other scenarios tested extremes of differing fuel regimes, from electric to hydrogen as well as continuation of fossil fuel propulsion. Further scenarios considered outcomes where AV technology failed to develop a market or did so very slowly. Their ‘Slow Lane’ scenario modelled a gradual transition, with a long period of mixed AV and traditional private vehicle fleets in operation.

In IVs ‘Fleet Street’ scenario, total VKTs are expected to fall by 15% compared to a base case (Infrastructure Victoria, 2018a, p. 149). This is caused by a shift to public transport under their primary modelling approach where AVs would operate under a ‘pay as you go’ model. IV’s model appears sensitive to perceptions of per trip costs, with a ‘pay as you go’ creating a perception of higher cost. Under an alternative subscription-based payment approach IV’s model indicates public transport ridership would drop significantly from 28% of motorised trips to 18% (caused by each individual trip cost being hidden from users through the subscription approach) (Infrastructure Victoria, 2018a, p. 152). IV’s ‘pay as you go’ forecast of a fall in VKTs conflicts with other academic modelling which predict VKTs will rise under fleet approaches (see Fagnant & Kockelman, 2014; Fagnant et al., 2015; OECD/ITF, 2015; Soteropoulos
et al., 2019 as discussed above). These works suggest higher total VKTs is likely, caused in part by a proportion of empty re-positioning trips and expanded markets of those currently unable to drive. It is thus debateable whether IV’s ‘Fleet Street’ assumptions are rational in a real-world scenario where a competitive nexus of perceived costs would also exist between public transport, autonomous vehicle fleets and status quo traditional vehicles. Mode shift to public transport due to a high perceived cost of ‘pay as you go’ shared AV fleets may just as likely shift towards traditional vehicles.

High public transport mode shares and lower total VKTs form two core assumptions underpinning IV’s range of conclusions over the potential to re-imagine the public realm. (Infrastructure Victoria, 2018a, pp. 152,149,131). A third core assumption is that AVs will enable a 75% improvement in vehicle throughput rates. This figure was adopted by IV’s agent-based modellers, KMPG with the results suggesting that higher throughput levels substantially resolve urban congestion issues (KPMG, 2018, pp. 7, 21). Such improvement in vehicle throughput rates are not explicitly identified in IV’s separate review of literature document (Infrastructure Victoria, 2018b), however two sources are cited in support in their main advice volume (Infrastructure Victoria, 2018a, p. 18). Research published since IV’s advice was completed suggests a mix of connected autonomous vehicles and human driven vehicles may in fact produce unstable traffic flows, reducing any theoretical throughput improvement of AVs (see Chen, Srivastava, Ahn, & Li, 2019; Gu & Saberi, 2019).

A new paradox?
Nevertheless, if IV’s (and KPMG’s) assumptions are correct and AVs do enable an improvement in vehicle flow rates of around 75%, it is conceivable a trend toward lower congestion might emerge early in the AV uptake cycle. IV (2018a, p202) consider such congestion relief may be experienced even with small number of AVs in the vehicle fleet. This trend may however have two significant implications not explored in IV’s work.

Firstly, if congestion begins to be relieved, even modestly, it may act to reinforce use of private traditionally driven vehicles. As congestion eases, conditions for private traditional vehicles will tend to improve; travel times would reduce and/or become more predictable, whilst parking may become less scarce and potentially cheaper as a proportion of trips begin to occur on shared AV fleets. With substantial sunk costs combining with habitual attachment to the traditional vehicle fleet, early barriers to mass AV uptake may be significant. In time, congestion may rise again, prompting incremental further mode shift to AVs. Such dynamic trends in traffic patterns are consistent with long established research concerning the relationship between traffic volume, congestion and mode shares (Downs, 1962; Metz, 2008; Mogridge, 1990; Thomson, 1972).

Secondly, the AV/private vehicle uptake dynamic may negatively impact public transport patronage. If AVs reduce congestion along most routes, and can provide door to door service to those who might be currently classed as transit ‘captive’ (see Walker, 2012, p. 43), a decline in the competitiveness and mode share of public transport could be expected. Ultimately, a new equilibrium of traffic density may emerge from the sensitive balance of costs, travel times and convenience between traditional vehicles, AVs and public transport services. In this sense a three-dimensional version of the ‘Downs-Thomson paradox’ (see Mogridge, Holden, Bird, & Terzis, 1987) may arise.

Therefore, without strong policy settings to continue mode shift towards AVs and/or public transport, initial mode shifts toward shared autonomous vehicles may be relatively modest. If the more pessimistic forecasts on cost competitiveness of fleet AVs (as suggested by Litman, 2019; and Nunes & Hernandez, 2019) are accurate, and/or the road capacity improvements are less clear (Chen et al., 2019; Gu & Saberi, 2019), mode shift could be marginal. In this context, the timing of public intervention in road space reallocation is likely to be significant in influencing the rate of uptake of AVs and the preservation of mode share for efficient mass movements by public transport. Should the existing supply of on street parking remain, traditional private self-driven vehicles are likely to restrict the uptake of AVs. A policy of active intervention to progressively restrict parking supply is likely therefore to be necessary if there is a desire to sustain mode shift towards SAVs.

IV argues that AVs create the opportunity to re-allocate road space through their higher throughput potential (Infrastructure Victoria, 2018a, p. 49). In contrast, we argue that AVs may not arise in significant
numbers unless the public realm (and parking space in particular) is first recrafted to assist them. The end design outcome may be similar. The rationale and timing for delivery is entirely different.

**Researching the market in kerbside futures**

In 2018, the authors\(^1\) ran a cross disciplinary design-research studio with students in the University of Melbourne’s Master of Urban Planning and Master of Architecture programs. The studio required students to consider how AVs might operate around the often spatially constrained environments of Melbourne’s suburban railway stations. What, for example, are the challenges if all feeder buses to the rail stations were removed and replaced with fleets of SAVs? Can they fit? To what extent might surface car parking be able to be re-purposed, as suggested by many researchers (see Maciejewski & Bischof, 2018; Milakis, Kroesen, & van Wee, 2018; Zhang, Guhathakurta, Fang, & Zhang, 2015). A key input in understanding how AVs might operate in these environments was to establish some expected space and time requirements for pick up and drop off movements. These could then be applied to the existing site constraints and to the future travel demand expectations at stations.

To establish an empirical understanding of the pick-up and drop-off process, students observed movements at Melbourne’s Tullamarine Airport kerbside. Since there is nowhere that AV operations at the scale anticipated can be observed at this point in time, it was felt that Melbourne’s main airport would be the best correlate, Tullamarine prioritises airport pick and drop off via taxi and private car at the closest point to the terminals and is poorly served by other modes of transport. Although observations were taken at each of Tullamarine’s four terminals, the most relevant figures were gathered from Terminals 2 and 3, where on the day of observations passenger throughput appeared to be operating at capacity. Table 1 below shows the results from drop off activity observed.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Linear metres of kerb for cars/taxis/ride-share pick up</th>
<th>Passengers observed in busiest hour</th>
<th>Inferred passenger drop off per linear metre per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>164</td>
<td>1526</td>
<td>9.3</td>
</tr>
<tr>
<td>T3</td>
<td>120</td>
<td>1072</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Observations taken Monday 5 March 2018.

The above figures are slightly higher than the established literature of Whitlock and Cleary (1969) who established 7.9 passengers per linear metre as a design specification for private vehicle and taxi drop offs at new US airport terminals. Similarly, the figures observed are also slightly higher than those of Mandle, Whitlock, and LaMagna (1982) whose design standard was 6.3 passengers per linear metre for a more desirable ‘LOS B’ (relatively free flowing) condition. They are however comparable to a ‘LOS D’ where vehicle movements are somewhat restricted. We argue that with a proportion of ride-share drop offs (which have negligible transaction time and presumably little emotional connection between driver and rider) combined with the presence of staffed traffic management, Tullamarine’s drop off throughputs are able to function well at a higher rate than standard assumptions within the established literature.

Applying these drop off efficiency figures against Public Transport Victoria’s station patronage data set (PTV, 2017) for Essendon, Virgato (2018) assessed a range of future AV scenarios. Where feeder buses were replaced by AV fleets, it was calculated that scale of the passenger drop off demand would overwhelm the spatial capacity of existing bus stops. Much of Essendon’s commuter car park would need to be transitioned to a drop off zone. Further, Virgato (2018) explored the hypothesis put to the studio that congestion, combined with the routing flexibility of AVs, would likely result in a re-distribution of demand to adjacent stations (since buses don’t serve all stations equally). In turn, this may have significant social and

\(^1\) With additional assistance from Leyla Beiglari from Hassell Studio
urban design implications in those locations, where a sustained rise in vehicle traffic may conflict with community expectations.

Similarly, Tardini (2018) and Broadway (2018) found that low occupancy AVs undertaking drop off manoeuvres to meet contemporary (let alone projected) station AM peak demands would require space in excess of the existing kerbside capacity. Assessing a range of suburban station typologies, Broadway (2018) concluded that in a low occupancy AV scenario, much existing park and ride space would need to be re-modelled as pick up and drop off space. Similar to Virgato’s analysis, Broadway’s conclusions suggest the spatially constrained road networks around stations, combined with peak demands of station access on a commuter-oriented railway mean wholesale redevelopment of car parking space in an AV future is unrealistic. This observation conflicts with the bulk of literature on the impact of parking of a transition to shared AV fleets. This is an important finding of the research design studio work.

**Figure 1 Oakleigh Station: shared occupancy AV scenario**

Under alternate scenarios, where AVs dominantly operated as shared occupancy fleets, kerb space use becomes more efficiently used. Tardini (2018)’s analysis of mid-suburban Oakleigh conceived dramatic changes to the public realm may be possible in such a scenario. In this arrangement, re-appropriation of car park areas to form an improved public realm may be possible; it is not under lower occupancy AV approaches.

Tardini’s visualisation is consistent with imagery prepared by NACTO (2017) and the UITP (2017). As shown in figures 2 and 3, both envisage streetscapes where AV technology has enabled both overall traffic volumes to be reduced and the public realm transformed in favour of active transport and passive recreation. These images have a rational consistency with their preferred approach to future AV deployment. Both NACTO and the UITP, as peak bodies for the public transport industry, strongly advocate for AV deployment where AVs operate as shared occupancy vehicles providing efficient first and last mile links to quality, fixed route transit. In their future world view, AVs will be the enabler for a major re-crafting of the public realm towards improved public open space. NACTO (2017, p. 51) in particular provide a evidentiary basis for the ability to redesign the public realm through the spatial efficiency of public and active transport.

**Figure 2. ‘Which future will you choose?’**

Source: UITP, 2017, p.1
**What do Infrastructure Victoria’s images suggest?**

IV identify a need to re-think how kerbs are managed (see Infrastructure Victoria, 2018a, p. 164 for example). However, absent from their work is any attempt to explicitly measure the spatial and temporal implications of a broad shift from parking to pick up and drop off movements. This is a shortcoming of their otherwise comprehensive analysis. It undermines confidence in commentary and imagery used to reimagine road space toward greater pedestrian, cyclist and active uses.

To illustrate the above, figures 4 and 5 below show a couple of IV’s commissioned representation of future public realm under their ‘Slow Lane’ and ‘Fleet Street’ scenarios (images prepared by UrbanCircus & Ethos Urban, 2018 for IV). Several locations are shown to provide representation of differing ‘typical’ street types. UrbanCircus & Ethos Urban (2018) have used a subtle but significant adjustment of renderings to influence the viewer towards more positive interpretation of the ‘Fleet Street’ scenario. In each case, the ‘Fleet Street’ images have greater and more luxuriant foliage. These changes are justified throughout with reference to AVs operating in a fleet arrangement as enabling more efficient use of road space.
Figure 4: ‘Slow Lane’ (Top) and ‘Fleet Street’ (Bottom), Ringwood,

‘Public Transport big and small continues to mingle with other vehicles on the station side’

‘Efficient use of road space allows the train station side of the boulevard to be used as a public transport hub…’

Source: Urban Circus & Ethos Urban, 2018, pp. 22, 23

Figure 5: ‘Slow Lane’ (Top) and ‘Fleet Street’ (Bottom), Sturt St, Ballarat

‘Both sides of the boulevard remain open to accommodate increased traffic and parking’
However, a problem with these images and the associated captioning is that most, if not all of the design interventions proposed could be achieved now – they are not dependent on AV technology. Barriers to implementation are not a lack of AVs - it is a lack of policy commitment to provision of priority to active and public transport. The spatial efficiencies enabled through a ‘Fleet Street’ AV scenario are at least as able to be captured today through commitment to road space re-allocation under contemporary technologies. Although many examples, particularly in European cities (some German or Swiss Cities perhaps), demonstrate such outcomes with current (non-AV) technology, many of the most celebrated spaces in Australian cities demonstrate these now. Policy commitment to public and active transport over spatially inefficient private cars is what created these spaces- they did not require AVs.

Conclusion
This is an evolving and contested area of research. A significant volume of design focused work has emerged which seeks to capitalise on the spatial changes AVs may enable. Much of this work has emerged within the grey literature, reflecting the interests of their respective sector or commercial interests (see for example NACTO, 2017; Sasaki Associates, 2018; SeattleDOT, 2017; UITP, 2017). Reports from peak bodies representing public transport officials (NACTO in the USA) and the public transport industry globally (UITP) are replete with renderings of congestion free, active streets served by a mix of higher and low capacity autonomous transport modes. These images support those groups’ arguments in support of AV operating approaches which involve low capacity AVs feeding to a trunk network of high capacity, high frequency public transport. In this sense there is a consistency between the imagery and the argument.

Key questions remain, however about which AV operating regime is associated with the models that have been advocated to solve congestion. The conundrum here is that the AV modelling suggestive of lower VKTs relies on several key changes that have so far proved difficult to implement on anything other than a very limited scale in Australian cities. These key changes involve reallocating road space as well as pedestrian space in order to facilitate unencumbered passage of and access to AVs (whether shared or low occupancy), along with significant investments in public transport.

Much of the imagery associated with the research and advocacy for a driverless urban future has depicted a public realm with higher levels of amenity – more greenery, wider and more seamless pedestrian realms and streets with no or fewer parked cars. Modelling that has suggested a massive reduction in road vehicle fleet sizes and a concomitant reduction in the need for parking has been used to advocate that AV futures will enable the intensification and re-vitalisation of streets and station precincts with car parking being re-purposed for a variety of more socially, culturally and economically productive uses.

In this context, our design research looked at the spatial implications for Australian cities of an AV future at some of the key nodes within the multi-modal urban transport systems they could become part of suburban railway stations in Melbourne. Using actual data for spatio-temporal utilisation of kerb space for
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pick-up and drop-off at one of Australia’s most intensively used transfer locations – Tullamarine airport – we found higher rates of utilisation than set out in the literature. These actual rates were applied to a series of future scenarios at case study stations with currently high bus-rail transfer rates. It was found that the space required to meet projected future demand for transfers to rail using AVs would consume all of the available station parking and immediately adjacent kerb space associated with these stations. Furthermore, a significant uncertainty was identified around future access to stations with currently low patronage, usually with low parking provision and street frontage. These stations could experience a dramatic rise in demand, with resultant demands to significantly expand pick-up and drop-off facilities. It is only in the shared-use AV scenarios (not to be confused with low-occupancy ‘ride-sharing’) that we see some possibilities for higher amenity public realms emerge more conducive to walkable cities.

These scenarios all point to the potential for very different kinds of places from those depicted by any of the images of the future of the urban public realm associated with AVs in the broadly available literature. However, perhaps the most salient take away from these investigations when read alongside the modelling literature is that whatever the public realm becomes will be due to how the transition is managed. There are clear indications that for the potentials for AVs to be optimised, great attention will need to be given to creating places that enable that to occur. The future dynamic between AVs, public transport and private conventional cars is unpredictable, but potentially there are several mechanisms which could act against the swift adoption of AVs, with the urban design of the public realm a key component.

We advocate that adoption of AVs may therefore be assisted by pro-active (rather than re-active) efforts to re-imagine the public realm – particularly through reduction in parking capacity for private vehicles. Part of this must include re-imagining railway station precincts with great care to ensure they are not dominated by pick-up and drop-off facilities that foreclose higher and better amenity as walkable, vibrant urban realms providing universal access to retail, commercial, educational and recreational services. Fortunately, many if not most of the desirable urban design outcomes suggested by IV and others can be achieved now. In fact, our most celebrated urban spaces are great examples of them. We do not need AVs to deliver better urban design. But we might need better urban design to deliver AVs.

References


