Lies, Damned Lies, AV’s, Shared Mobility and Urban Transit Futures

Prof Graham Currie FTSE
Public Transport Research Group
Monash Institute of Transport Studies
Monash University, Australia
Introduction

The Hype

Five Lies

The Future

Transit Fightback
This session pushes back on the endless hype and lies being spread about future mobility to rebase the future around public transport for cities

- It aims to:
  - consider how “new mobility”, “autonomous vehicles”, “shared mobility” and “ride sharing” is going to impact cities in the future transit
  - Explore the future case for Urban Public Transport systems
  - Look at some new and interesting developments in the field

- It is going to debunk fallacies being promoted about new mobility and transit
- Based on recent research in the field¹

...and is structured as follows

- The Hype
- Five Lies
- The Future
- Transit Fightback
Introduction

The Hype

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The Future

Transit Fightback
That amazing future we dreamed of…
they say it's going to happen with driverless cars.
We can make good use of our time while [not] driving.
New shared mobility modes have disrupted the ‘bad old’ transport guys.
Car sharing and bike sharing join a sharing economy transforming city life for the future
Is it the end of transit? Hasn’t this happened before?
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Transit Fightback
Technology development in practice always follows the HYPE CURVE

Source: Gartner; https://www.gartner.com/newsroom/id/3784363
Plenty of new tech ideas said to ‘revolutionise the world are proven impractical – but they were all ‘over sold’ at the beginning.
The Autonomous Car – Contemporary Progress

Source: Gartner; https://www.gartner.com/newsroom/id/3784363
Lie 1 – Autonomous Cars are the END of Transit
Lie 1 – Autonomous Cars are the END of Transit

The End of Transit and the Beginning of the New Mobility: Policy Implications of Self-Driving Cars

Experimental self-driving cars have successfully operated more than 700,000 miles on American highways. Such cars will be on the market by 2020 and will radically transform the 21st century. What should Washington policymakers know about the future of American mobility? Randal O'Toole will describe the implications of self-driving cars for urban transit and regional transportation planning. Marc Schriner will discuss the laws and regulations that should govern self-driving cars. Adam Thierer will review the privacy implications of self-driving cars. Please join us for a preview of the future of American transportation.
The Autonomous Car – Contemporary Progress

VISIBILITY

- Autonomous Car 2013
- Autonomous Car 2014
- Autonomous Car 2015
- Autonomous Car 2016

- Peak of Inflated Expectations
- Plateau of Productivity
- Swamp of Continued Use
- Trash Heap of Failures
- Technology Trigger
- Roundabout of Repackaging
- Slope of Enlightenment
- Trough of Disillusionment
- Worlds Current Most Successful Autonomous Land Passenger Vehicle 2018

Source: Gartner; https://www.gartner.com/newsroom/id/3784363
Lie 1 – Autonomous Cars are the END of Transit – **Truth 1** - Most travel by AV’s is on Driverless Trains which is booming – Transit dominates Autonomous Vehicle travel

Progress in Driverless Train Development (UITP)

40% of all urban passenger trains in Asia have no driver

SITCE Conference, Singapore, 2018
Lie 2 – Autonomous Cars will Reduce Congestion
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Autonomous Cars will Reduce Congestion - Evidence

- Kanaris et al (1997) - +200% on freeways due to zero traffic conflicts
- Kesting et al (2008) – eliminate all delays with intersection with autonomic weaving in all directions
- Li et al (2013) – Intersection remote control – 31-37% capacity improvement

They are ALL maths/simulation studies – ALL THEORY - no actual human trials where this is proven
Lie 2 – Autonomous Cars will Reduce Congestion – **Truth 2** – Human life in cities is not possible or desirable with the Platooning and Intersection Weaving required for AV cars to work in city streets

Lie 2 – Autonomous Cars will Reduce Congestion – **Truth 2** – Humans life in cities is not possible or desirable with the Platooning and Intersection Weaving required for AV cars to work in city streets

ILLUSTRATION: DOUG CHAYKA
Truth 3 - recent research suggests AV cars might actually slow traffic flow and increase traffic volume – this is not a solution to urban traffic congestion

- Finding a of a recent review of AV futures research:
  - AV car operation “may increase congestion, energy, pollution and roadway costs”
    - By increasing total vehicle travel (generated trips from non-drivers [10-14%], empty positioning trips)
    - By increase vehicle size (need space for mobile offices, bedrooms)
    - By being personalised [sharing is unlikely – see lie 4] occupancy will decline, suggesting more vehicles on the road
    - If they follow speed, safety and traffic laws vehicles may reduce speeds
    - Some passenger may want to rest, have lower speed to help them work – some vehicles may need to wait for human instructions

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Forecast Trip Generation from ‘Transport Disadvantaged’ Groups Resulting from Widespread Driverless Vehicle Availability (at low cost)


Lie 3 – Autonomous Cars will Vastly Improve Car Safety
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The AV Car Safety Hype

- 90%/95% of all car crashes are caused by Human Error (Treat, 1977)
- Remove Humans = Remove Crashes
Lie 3 – Autonomous Cars will Vastly Improve Car Safety – **Truth 4** – Autonomous cars are LESS safe than human driven cars

The Debate

- Elon Musk statement (May 2016):
  - Tesla has run 130M miles and this was their 1st death (**1 death per 130M Miles**)
  - In the US human driven cars have road deaths of 1/100M miles
  - There – AC’s safer
- BUT: Rand Corporation (2016) says: threshold for AV’s to be safer than human cars is **1 death per 250M miles**

Source: Christian Wolmar ‘Driverless cars : on a road to nowhere’

The Death of Joshua Brown – May 2016

(JDA Journal – Sandy Murdock Sep 2018)
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The Death of Elaine Herzberg – March 2018
Finding a of a recent review of AV futures research:

- “Autonomous vehicles may be no safer per mile than an average driver, and may increase total crashes when self- and human driven vehicles mix” Sivak and Schoettle (2015a)

- Any potential “net safety gains are significantly reduced if this technology increases total vehicle travel” Groves and Kalra (2017)
Lie 4 – Shared Mobility is Shared Mobility
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• Sharing:
  “to Use, **Occupy** or Enjoy Something with Another or Other Persons”

![Image of sharing concepts]
Lie 4 – Shared Mobility is Shared Mobility – **Truth 5** - Shared Mobility Has VERY LOW occupancy – its NOT really shared

**• Sharing:**

“to Use, **Occupy** or Enjoy Something with Another or Other Persons”

**The Evidence**

- Uber assumed to have the same occupancy of 1.66 per vehicle (including the driver)
  - Source: San Francisco County Transportation Authority (2017) ‘TNC’s Today’
- CarShare – average vehicle occupancy is 1.44 (including the driver)
  - Source: Cervero, R Golub A and Nee B (2007) ‘San Francisco City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts’ Institute of Urban and Regional Development University of California at Berkeley
- Bike Share – Vehicle Occupancy = 1
Lie 4 – Shared Mobility is Shared Mobility – **Truth 5** - Shared Mobility Has VERY LOW occupancy – its NOT really shared

This is called ‘Ride Sharing’

This is not called ‘Ride Sharing’
Lie 5 – Shared Mobility is Increasing Improving Cities
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Lie 5 – Shared Mobility is Increasing Improving Cities – **Truth 6** – Urban shared vehicle occupancy is in significant DECLINE making cities worse not better

The Evidence – Shared Mobility modes represent very small amounts of travel – the private car **DOMINATES**

- Melbourne:
  - Bikeshare carshare and uber represent less than **2-3%** of all trips
  - Travel by private car represents **74%**
Lie 5 – Shared Mobility is Increasing Improving Cities – **Truth 6** – Urban shared vehicle occupancy is in significant DECLINE making cities worse not better

- Private Car occupancy is in free fall decline – occupancy is falling not increasing – cities are sharing desserts

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*Source: Charting Transport (2017)*
Lie 5 – Shared Mobility is Increasing Improving Cities – Truth 6 – Urban shared vehicle occupancy is in significant DECLINE making cities worse not better

So our congested traffic carries less and less people each year

Source: Charting Transport (2017)
...but with Autonomous cars repositioning without passengers – Occupancy can fall BELOW 1 – just what congested cities need; more cars carrying nobody!

So our congested traffic carries less and less people each year

AV cars can be empty on repositioning trips which means occupancy can fall BELOW one

Source: Charting Transport (2017)
Cities; humanities future
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Transit Fightback
Public Transport is the most efficient form of SHARED MOBILITY

This is **NOT**
‘SHARED MOBILITY’

This **IS** ‘SHARED MOBILITY’

Source: Transport for NSW
Cities need modes with shared occupancy that are SPACE EFFICIENT…

To carry 50,000 people per hour per direction, you need:

- a 175m wide road used only by car
- a 35m wide road used only by buses
- a 9m wide railway track bed for metro
...and ENVIRONMENTALLY EFFICIENT

Comparación de emisiones por viaje*

- 9 kg de CO2
- 6 kg de CO2
- 3.13 kg de CO2
- 2.7 kg de CO2
- 1 kg de CO2
- 0.5 kg de CO2
- 0.24 kg de CO2
- 0.19 kg de CO2
- 0 kg de CO2

*Calculo basado en viaje ida y regreso de 15km. Cálculo basado en consumo energético SIC.

4 x 4 Gasolina (1 persona)
Sedán Gasolina (1 persona)
Moto (1 persona)
Auto híbrido (1 persona)
Moped (1 persona)
Auto eléctrico (1 persona)
Bus (40 personas)
Metro
Bicicleta eléctrica
Bicicleta

fuente: www.consumovehicular.cl
Transit Fightback involves a new concept: TRANSIT FUSION – adoption of new tech to improve service and modes by integration of transport and customer experience infrastructure.

Transit runs the Car Share Scheme

First-Last Mile Tech to Transit Nodes

Go further. GoPass.™
Simplify your commute with the FREE GoPass app.
Autonomous Trains are a great example of Transit Fusion with considerable benefits for passengers and operators.

**Benefits of AV Rail:**

- **Lower operating costs**
  - Paris Metro 30% reduction Ossent T (2010)

- **Increased capacity:**
  - shorter headways (half length twice frequency; Wang et al, 2016)
  - higher speed (shorter terminus turnaround, meticulous speed adherence)
  - tighter dwell time

- **Increased vehicle capacity** (no driver cabins and associated space, 6% increase; Ossent T 2010)

- **More reliable/robust** (33% of 5-min delay incidents removed; Melo PC et al 2011, availability 99-99.9% vs 96-98%, Mohan S, Morrison S, 2013)

- **Lower energy use** (30% reduction, Cox CJ, 2011)

- **Increased ridership due to higher frequency** Graham DJ et al (2009)

- **General safety improvement**
Bus Rapid Transit IS Transit Fusion; Rubber Tired Railways; cost effective adaptation of new technologies
The ‘Trackless Tram’ is a new innovation in Transit Fusion with very positive potential for growth of transit in future cities.

**The Evidence**

- Much less cost than Light Rail
  - No tracks, no removal of below ground utilities
  - No overheads (batteries)
- Lighter than buses of same size
- LRT ride quality, performance & capacity
- 15km range on a 10 min terminus recharge
- $2-3M per vehicle (LRV=$6-9M)
- Deliver a new transit system in **3 months**

Source: Prof Peter Newman – October 2018
Overall recognise the five lies about urban transit futures – FIGHTBACK with the six truths to improve cities into the future

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Contact us via our website PTRG.INFO, LinkedIn or Twitter

Professor Graham Currie
FTSE
Director, SEPT-GRIP, PTRG

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