MONASH University

2018 Australasia Bus Conference
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Queensland
Monday 8th October 2018

Public Transport Fightback
- attacking tech lies and hype for city futures

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PTRG PUBLIC TRANSPORT RESEARCH GROUP
GROUP OF EIGHT AUSTRALIA
MONASH INSTITUTE OF TRANSPORT STUDIES

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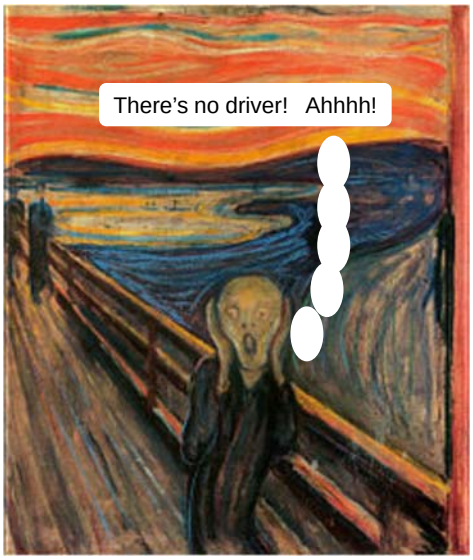
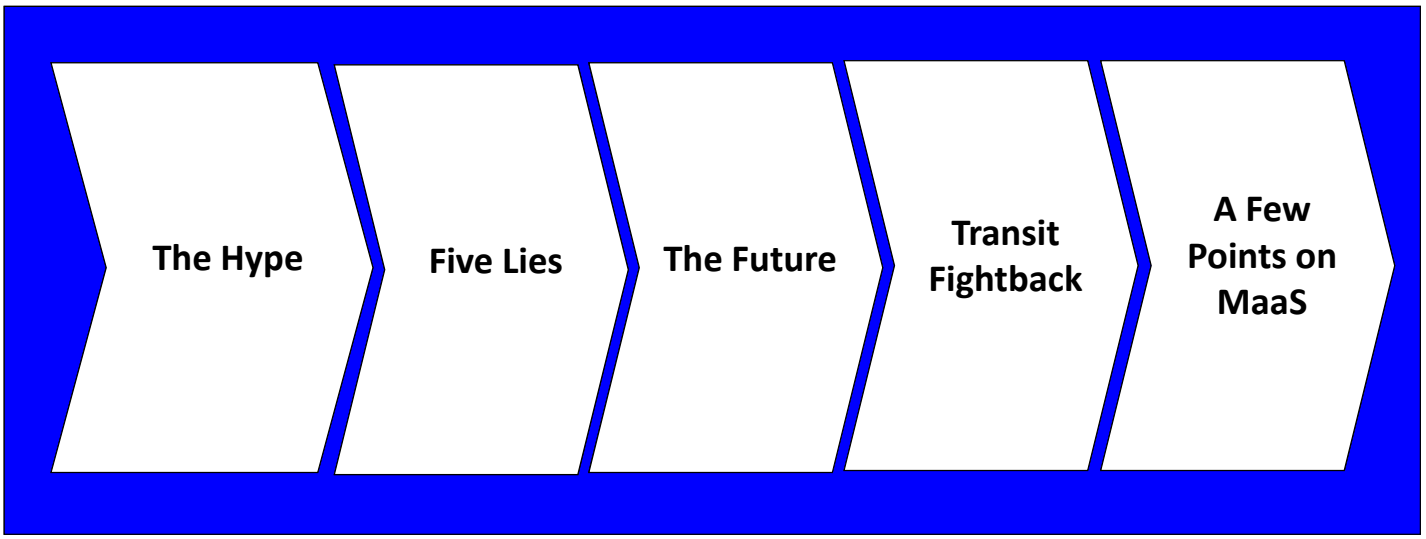
This session pushes back on the endless hype and lies being spread about future mobility to rebase the future around public transport for cities

- 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 field[1]
- Includes some commentary on ‘Mobility as a Service’



Source: [1]*Currie G (2018) ‘LIES, DAMN LIES, AV’S, SHARED MOBILITY AND URBAN TRANSIT FUTURES’ Journal of Public Transportation Special Issue on the Future of Public Transport.*

...and is structured as follows



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Introduction

The Hype

Five Lies

The Future

Transit Fightback

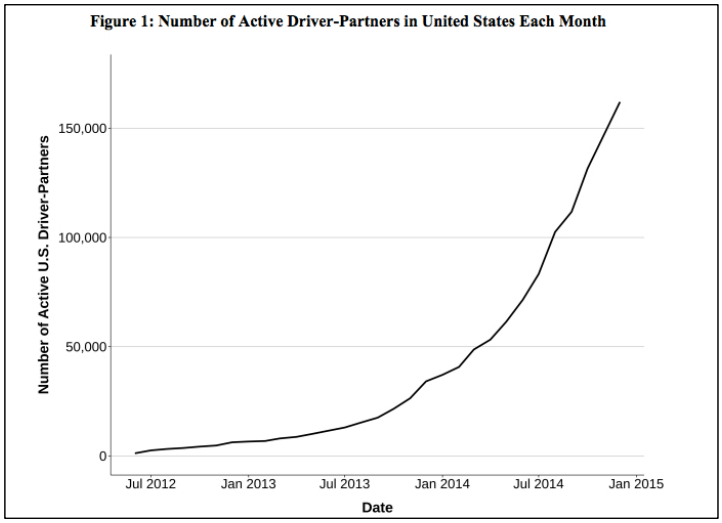
A Few Points on MaaS

That amazing future we dreamed of…

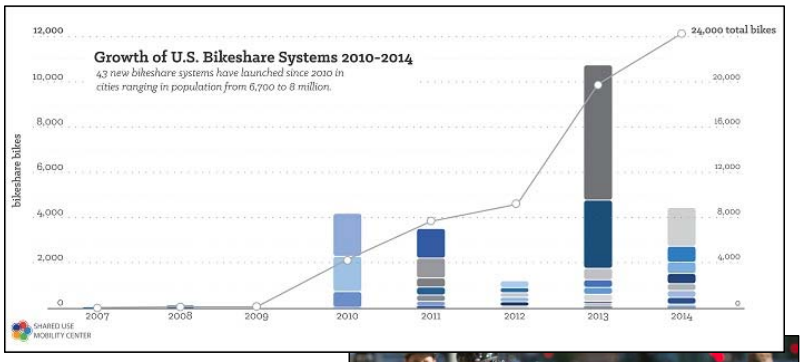
..they say its going to happen with driverless cars.

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



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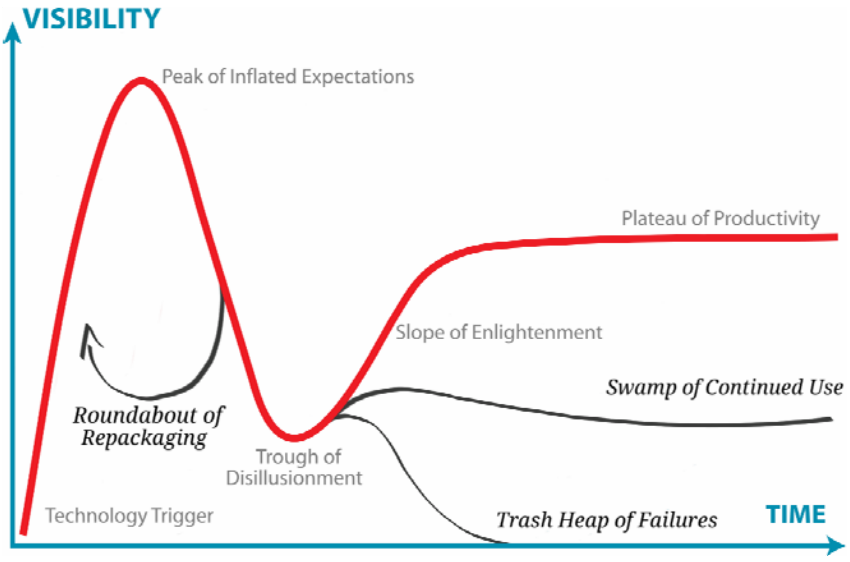
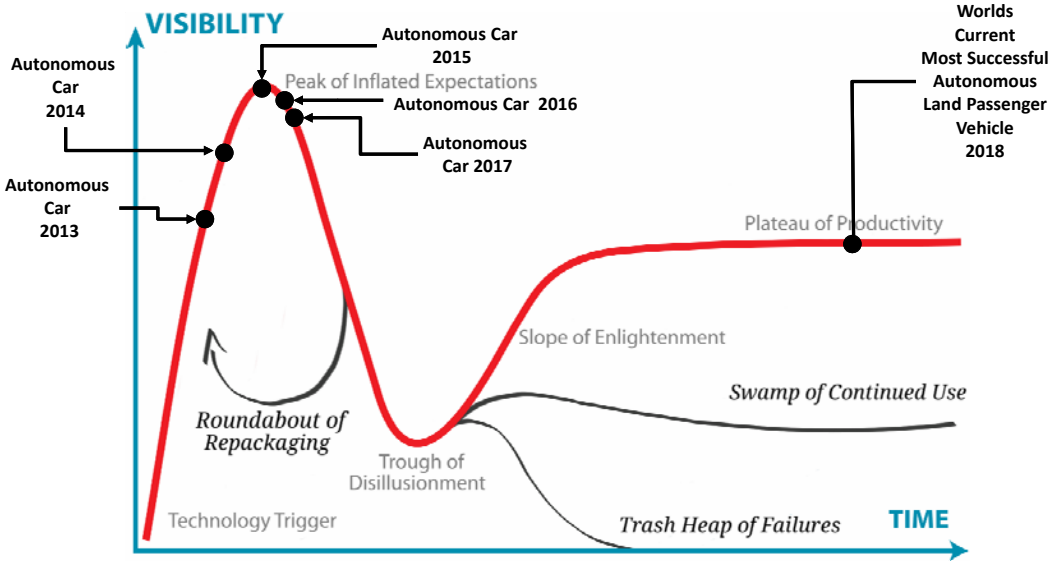
Technology development in practice always follows the HYPE CURVE



Source: Gartner; https://www.gartner.com/newsroom/id/3784363

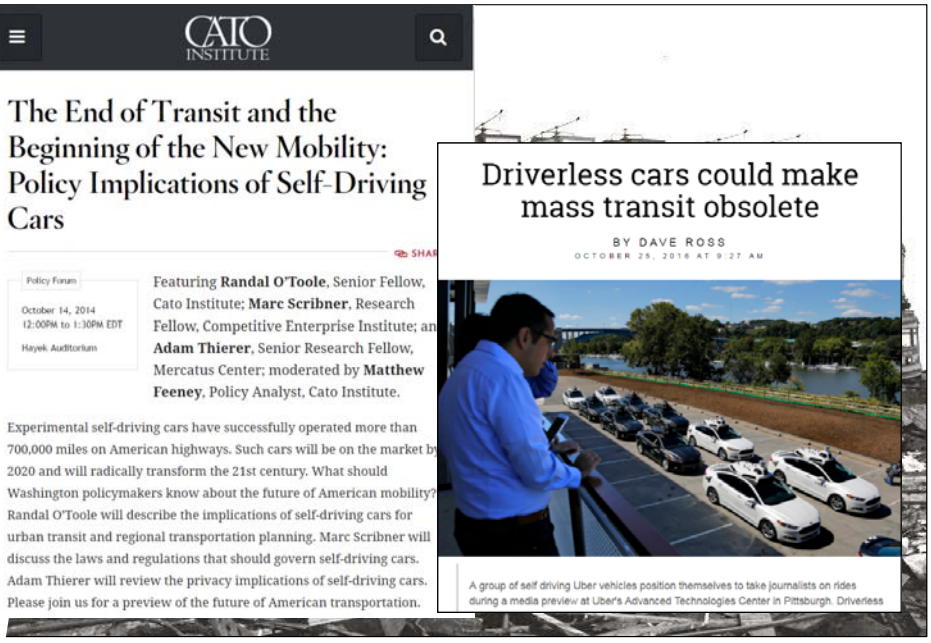
Plenty of new tech ideas said to 'revolutionise the world are proven impractical – but they were all 'over sold' at the beginning

The Autonomous Car – Contemporary Progress

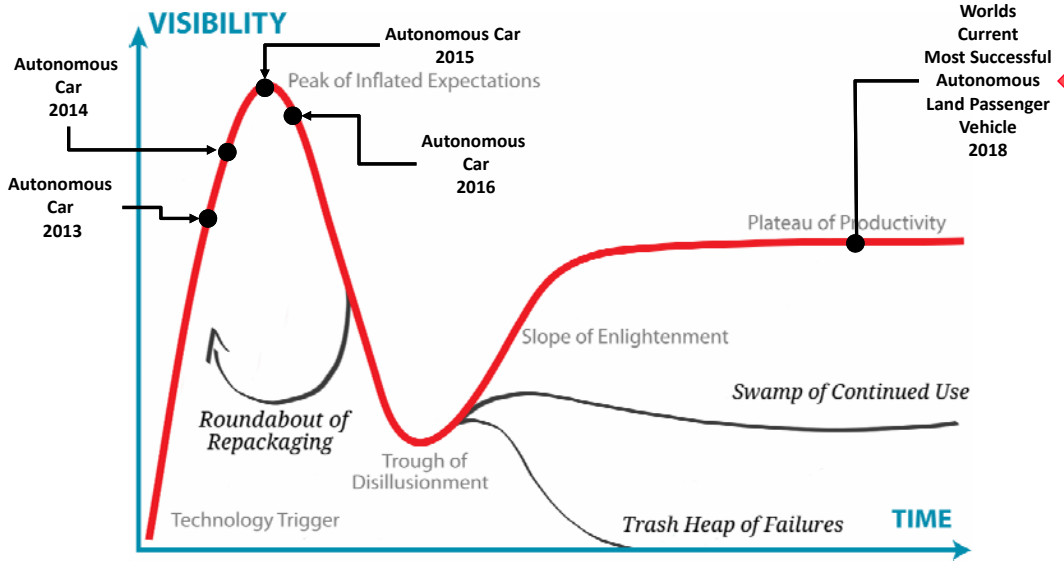


Source: Gartner; https://www.gartner.com/newsroom/id/3784363

Lie 1 – Autonomous Cars are the END of Transit

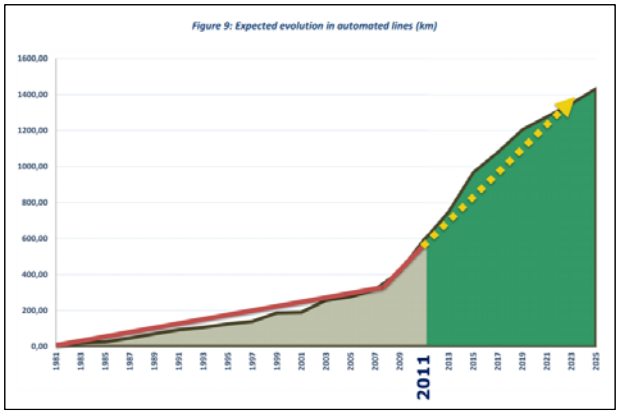


The Autonomous Car – Contemporary Progress



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



Progress in Driverless Train Development (UITP)

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

SITCE Conference, 2018

Lie 1 – Autonomous Cars are the END of Transit – Truth 1 – Los Angeles the biggest global investment in urban transit in world history

Los Angeles – Measure M Approved 2016

- $US 120B ($Aust 166B) on new Transit Projects
- 11 new rail lines and line extensions
- 6 new BRT lines and upgrades

TRANSIT PROJECTS

Airport Rail Connector and Green Line Rail Extension
Connects Metro Green Line Rail, Crenshaw/LAX Line Rail, and Metro and municipal bus service to the Los Angeles International Airport (LAX) via the LAX Automated People Mover.

East San Fernando Valley Transit Corridor
9.2-mile high-capacity transit project, 14 stations, connecting the Orange Line Van Nuys station to the Sylmar/San Fernando Metrolink Station.

Orange Line BRT Connector to Gold Line Rail
15.3-mile Bus Rapid Transit line from North Hollywood Orange/Red Line Rail Station to the Gold Line Rail in Pasadena. The project could be converted to a rail service at a later date if ridership demand outgrows the bus rapid service capacity.

Gold Line Rail Extension: Foothill to Claremont
Extends Gold Line Rail 11 miles and adds five stations, from Citrus College Station to the Claremont Metrolink Station; linking Claremont, Glendora, La Verne, Pomona and San Dimas.

Purple Line Rail Subway Extension: Century City West to Westwood/VA Hospital
Extends Purple Line Rail Subway 2.5 miles along Wilshire Bl, two stations, from Century City West to Westwood/VA Hospital; connects the Sepulveda Pass underground via the Westwood/UCLA Station.

West Santa Ana Light Rail Corridor: Union Station to City of Artesia
New 20-mile light rail line from the City of Artesia to Union Station.

Orange Line BRT Improvements
Enables Orange Line Bus Rapid Transit buses to bypass several key intersections to improve bus speeds and passenger travel times.

Gold Line Eastside Rail Extension
Extends Gold Line Rail east from Atlantic Station. Two alignments are planned for construction, one along SR-60 to South El Monte, and the other along Washington Bl to Whittier.

Green Line Rail Extension: Redondo Beach to Torrance Transit Center
Extends Green Line Rail 4.7 miles, four stations, from Redondo Beach to the Torrance Transit Center.

Vermont BRT Corridor: Hollywood Bl to 120th St
Adds a 12.5-mile high capacity Bus Rapid Transit corridor from Hollywood Bl to 120th St. The project could be converted to a rail service at a later date if ridership demand outgrows the bus rapid service capacity.

Sepulveda Pass Underground Transit Corridor
Creates a 10-mile high-capacity transit corridor underneath the Sepulveda Pass. The project connects the San Fernando Valley to UCLA and the Westside by providing a link between the Orange Line in Van Nuys and the future planned Purple Line Rail stop.

Crenshaw Line Rail Northern Extension to West Hollywood
Extends Crenshaw Line Rail north from the Expo/Crenshaw Station to the Red Line Rail Hollywood/Highland Station.

Orange Line BRT Conversion to Light Rail
Converts 14.5 miles of existing Orange Line busway to light rail transit, 14 stations, from Warner Center to North Hollywood.

LAX BRT Connector to Santa Monica
Links Airport Metro Connector to Expo Line Rail via a Bus Rapid Transit corridor along Lincoln Bl. The project could be converted to a rail service at a later date if ridership demand outgrows the bus rapid service capacity.

Green Line Rail Extension to Norwalk Metrolink Station
Extends Metro Green Line Rail 2.8 miles from Norwalk to the Norwalk/Santa Fe Springs Metrolink Station.

Metro Rail and Express Bus Extension from Westwood to LAX Metro Connector
Ten-mile high-capacity transit and rail extension from Wilshire/Westwood Station to the Airport Metro Connector. Project could also add ExpressLanes along the I-405 that provides express bus service connecting Westwood to LAX.

Regional Commuter Rail (Metrolink and Amtrak) Improvements
Various capital improvements to enhance travel times, service reliability and speed on Metrolink and Amtrak.

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 – Humans Cannot Deal with Platooning and Intersection Weaving is Absurd in cities

Rush Hour (2015) Black Sheep Productions, Livschitz, F 2015, viewed 5 July 2018, https://www.bsfilms.me/

Lie 2 – Autonomous Cars will Reduce Congestion – Truth 2 – Humans Cannot Deal with Platooning and Intersection Weaving is Absurd in cities

ILLUSTRATION: DOUG CHAYKA

Lie 3 – Autonomous Cars will Vastly Improve Car Safety

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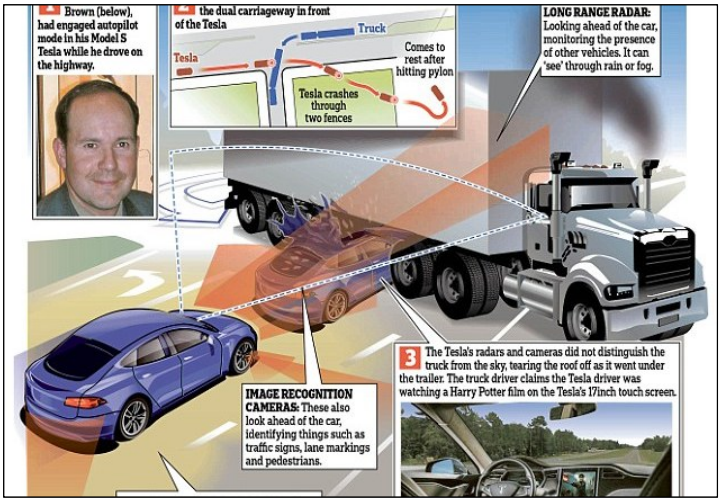
The AV Car Safety Hype

- 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 3 – no evidence of safety improvement – quite the contrary



The Death of Joshua Brown – May 2016
(JDA Journal – Sandy Murdock Sep 2018)

The Debate

- Elon Musk
  - Tesla has run 130M miles and this was their 1st death
  - 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'

Lie 3 – Autonomous Cars will Vastly Improve Car Safety – Truth 3 – no evidence of safety improvement – quite the contrary

The Death of Elaine Herzberg – March 2018

The Debate

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  - In the US human driven cars have road deaths of 1/100M miles
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Lie 3 – Autonomous Cars will Vastly Improve Car Safety – Truth 3 – no evidence of safety improvement – quite the contrary

Tempe Florida

Mountain View California

Lie 4 – Shared Mobility is Shared Mobility

- Sharing:

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

Lie 4 – Shared Mobility is Shared Mobility – 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 – Shared Mobility Has VERY LOW occupancy – its NOT really shared

This is not called 'Ride Sharing'

This is called 'Ride Sharing'

Lie 5 – Shared Mobility is Increasing Improving Cities

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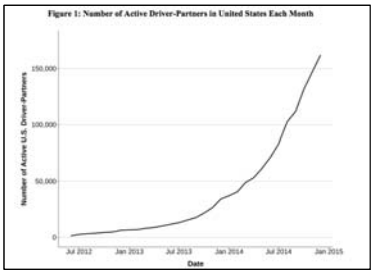
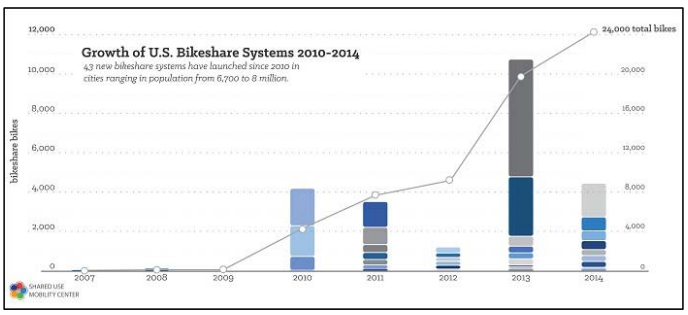
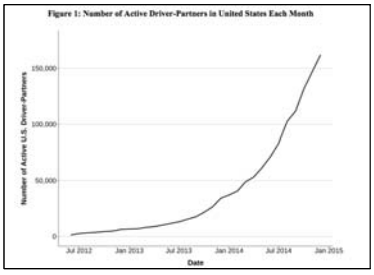
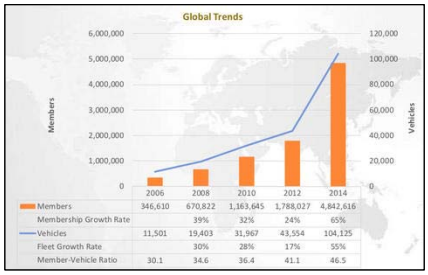
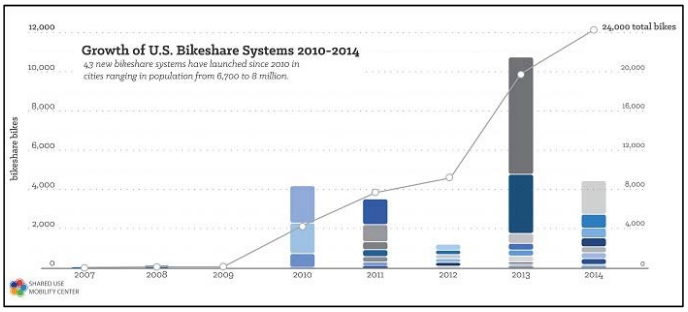




Lie 5 – Shared Mobility is Increasing Improving Cities – Truth 5 – Sharing of Occupancy in cities is falling making cities much worse



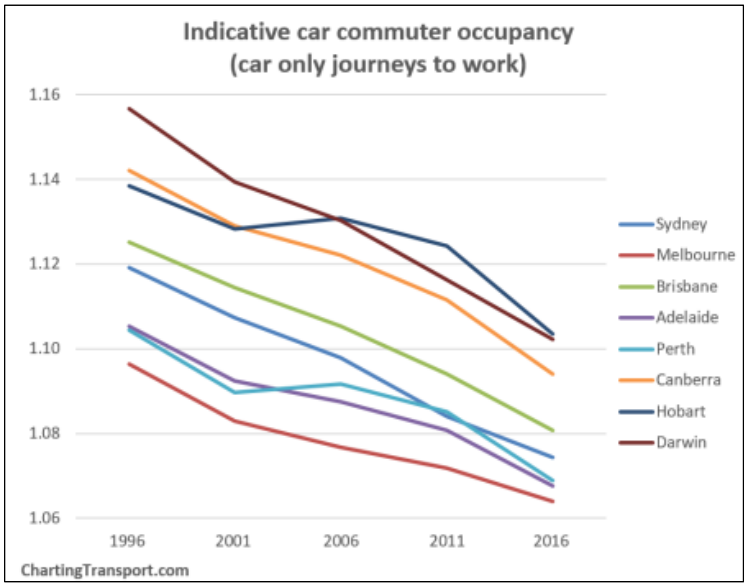




The Evidence

- 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 5 – Sharing of Occupancy in cities is falling not increasing



Source: Charting Transport (2017)

The Evidence

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  - Bikeshare carshare and uber represent less than **2-3%** of all trips
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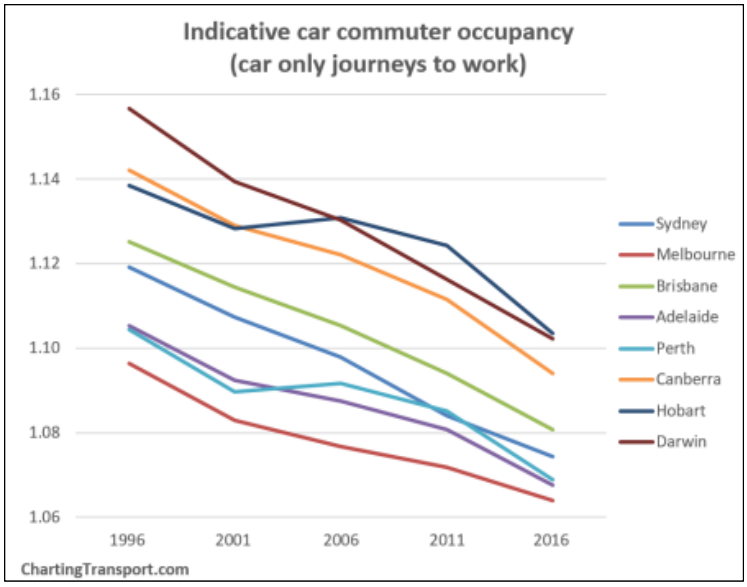
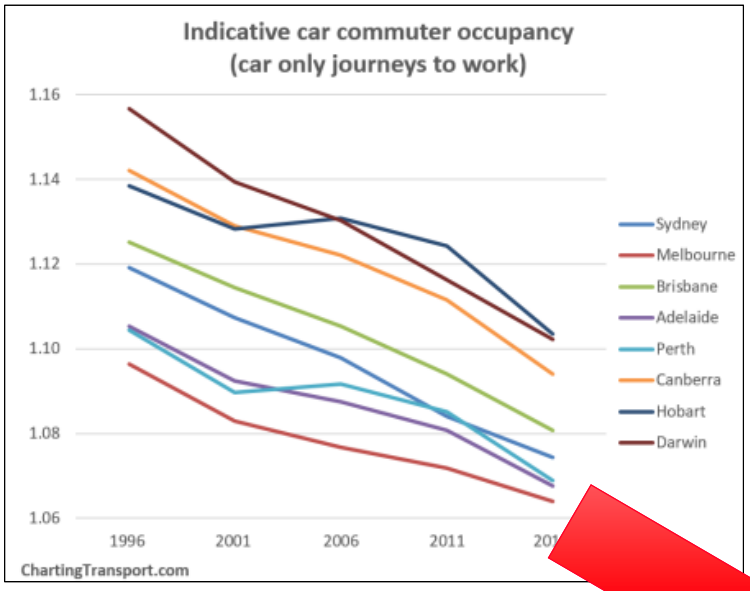
Lie 5 – Shared Mobility is Increasing Improving Cities – Truth 5 – Sharing of Occupancy in cities is falling not increasing – Making cities far more congested and far worse



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!



Source: Charting Transport (2017)

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A Few Points on MaaS

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2007

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Cities; humanities future

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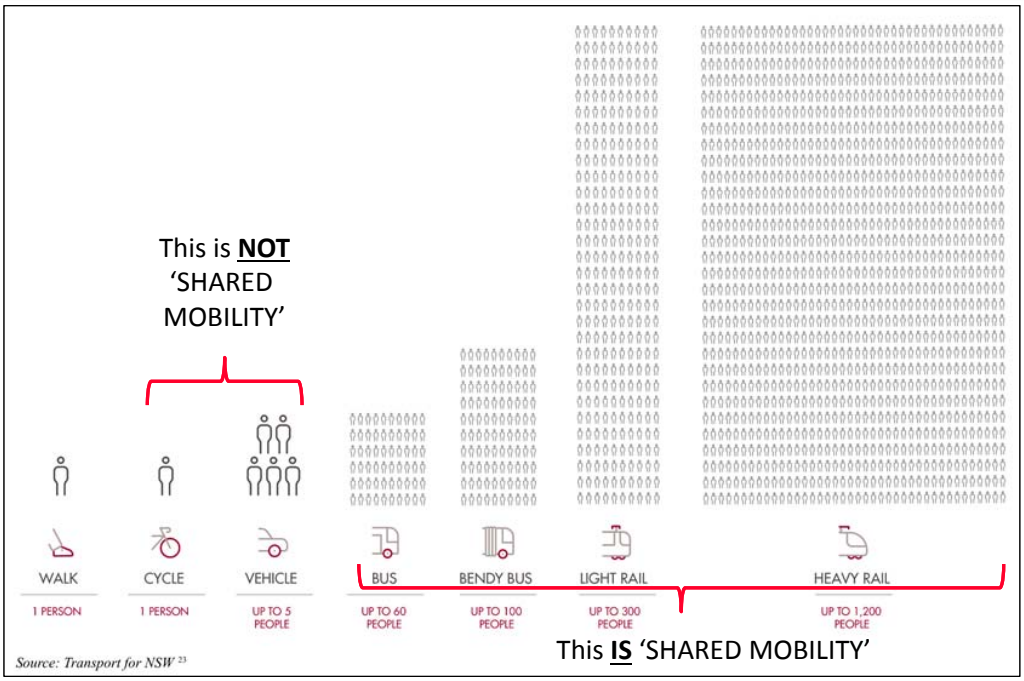
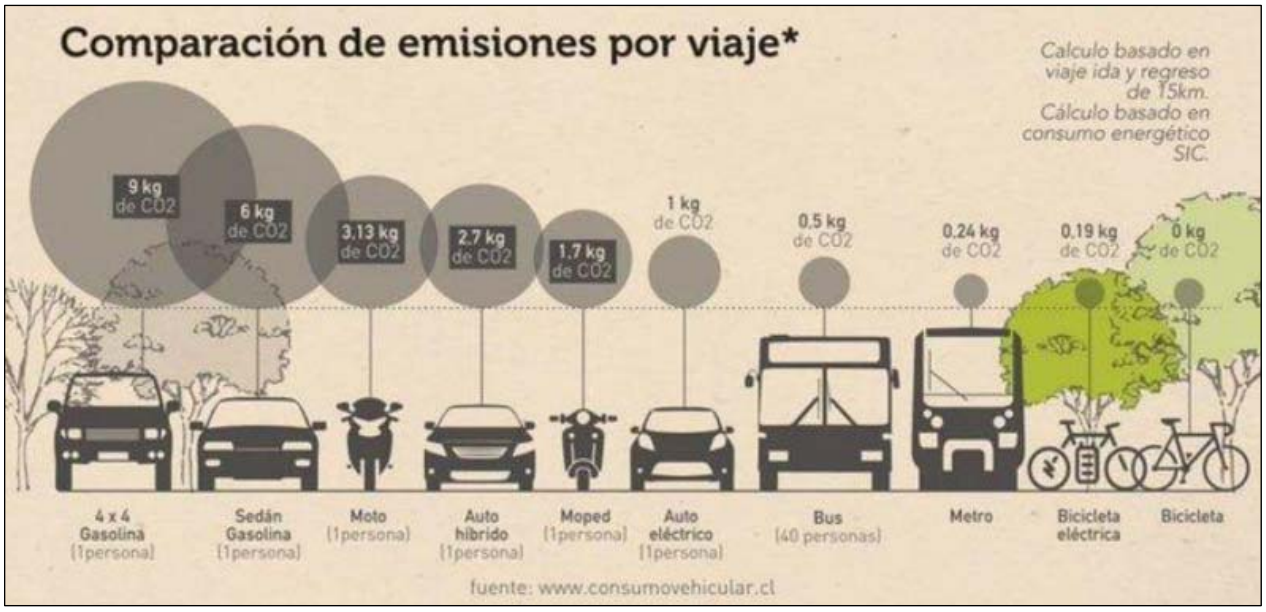
Public Transport is the most efficient form of SHARED MOBILITY



Cities need modes with shared occupancy that are SPACE EFFICIENT…

…and ENVIRONMENTALLY EFFICIENT



Transit Fightback involved TRANSIT FUSION – adoption of new tech to improve service and modes

Transit runs the Car Share Scheme

First-Last Mile Tech to Transit Nodes

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 that 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

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A MaaS critique - McCabe – is MaaS a Fraud?

MaaS – is it a Fraud?

- "The MaaS pitch is as simple as FREEDOM. Go where you want, when you want cheaply - cheaper than public transport (some estimates). Does this sound familiar? It should. This is the mantra of the car industry in the 1940's onwards to now."
- "MaaS is a more of Business As Usual being perpetrated on governments and transport agencies under the guise of freedom to move where you want when you want."
- -aMaaS – autonomous cars and MaaS
  - "aMaaS is destructive without Road User Charging"

Much of the critique is about AV's and wasteful shared mobility modes

Source: Graham McCabe (2017) "Why Mobility as a Service is a "fraud" and autonomous vehicles are not a panacea" AITPM working paper

EU Polis Review – Some Warnings

MaaS – Disincentivising Sustainable Trips

- Many NEW mobility services emphasise single occupancy car travel over PT use
- General POOR VISIBILITY of Public Transport in MaaS Applications
  - Example: One MaaS subscriber service sets number of taxi/car share trips a month; if you haven't used them you pay anyway – so users make travel by SOV because they paid for it anyway

MaaS – Higher Costs, Unequal Service

- Commercial imperatives – where do PT fare subsidies fit? Do concession fares apply?

MaaS – Lost Authority to User Links

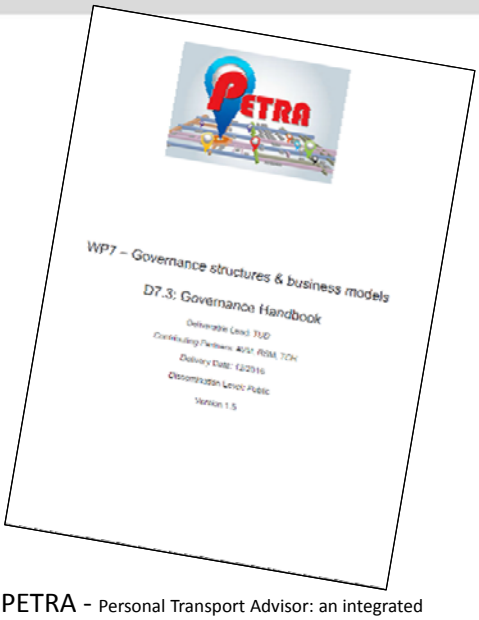
- Does user interact more with MaaS provider or Transport planning authority?

it may happen that MaaS increases inequality where premium levels of service are on offer to those who pay more

The EU PETRA review – interesting points

PETRA – Selected Points

- Tension – Global players and local interests
- Giving customers choice requires trade-offs – WHO should make those trade-offs?
- The Frankenstein Trap – proper operationalization of public values – who makes these and why isn't the public involved; it's a governance risk
- Nudging in the Public Interest – needs strong political support and cant be done by commercial players; its about transport policy not flogging an ap
- Outsourcing MaaS is the norm; risks are keeping control when you don't have it; accountability on trade-offs and values like privacy, sustainability and efficiency
- "Optimism Bias" Tech developments have optimism; will new systems solve old problems without effort? There is no such thing as a free lunch



PETRA - Personal Transport Advisor: an integrated platform of mobility patterns for Smart Cities to enable demand-adaptive transportation systems

Source: Wijnand Veeneman, TU Delft

What I think

MaaS – What I think

- Much potential; too much hype; not much realistic understanding and appraisal of the problems
- A clear Conclusion from the evidence: Governance is a big problem; the solution is NOT less governance; its putting in place protections for the public purpose whilst encouraging innovation
- The aim is to SOLVE the urban transport problem not create new ones - Need to protect, nurture and enhance mass transit use
- Whats the DEAL? – danger of public authorities "outsourcing their brains" to commercial interests
- In practice – Australian urban environments are not strong places to adopt MaaS due to lack of transport choice and dominant car ownership culture

"Change is Certain, Progress is Not" E.H. Carr (1980)

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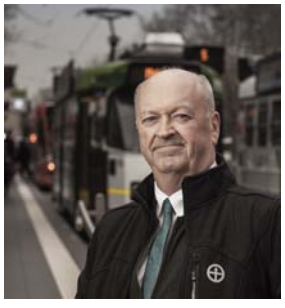

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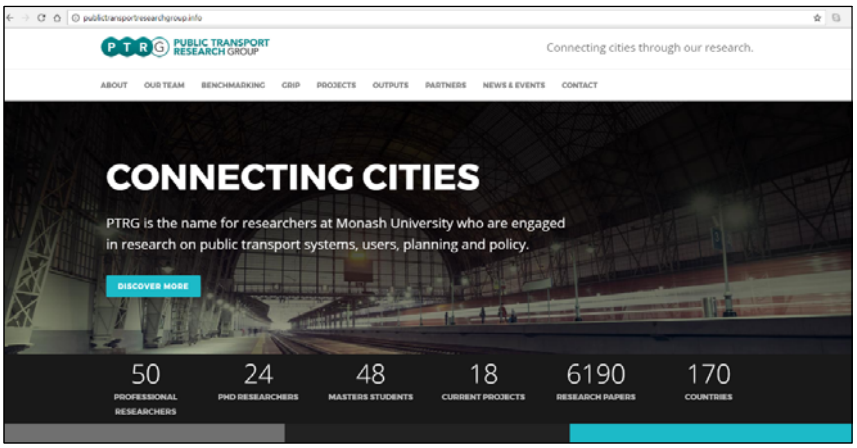

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