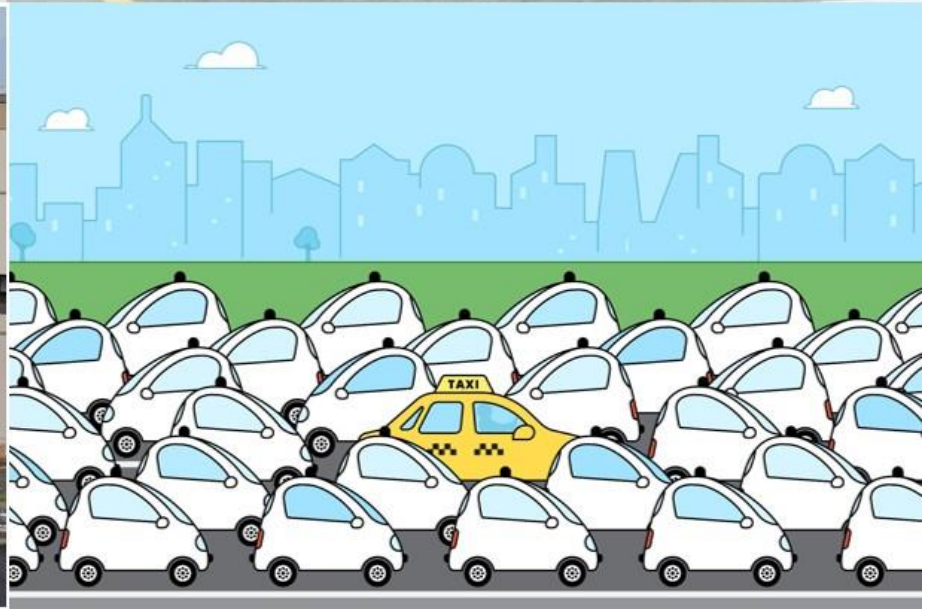


# Autonomous Vehicles and transport outcomes

23 May 2019

Angela Curl<sup>1</sup> & Helen Fitt<sup>2</sup>

<sup>1</sup> University of Otago Christchurch / <sup>2</sup> Lincoln University



**image credits, from left to right:**

1. 'Driverless Autonomous Car in the City' by jesussanz.
2. Shops, Cafes & Main Street of Devonport, Auckland by Nigel Spiers.
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## THINK PIECE

### Autonomous vehicles and future urban environments:

Exploring implications for wellbeing in an ageing society

(Second Edition)



Helen Fitt, Angela Curl, Rita Dionisio-McHugh, Amy Fletcher, Bob Frame, Annabel Ahuriri-Driscoll

14 May 2018





Estimating potential increases in vehicles for the non-driving, elderly travel-restrictive medical condition

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#### ARTICLE INFO

#### ABSTRACT

##### Article history:

##### Automated

“Automated vehicle that promises to increase mobility for groups, including the elderly and people with disabilities.”

elderly (the population aged 65 and older) who are unable to drive without more travel-restriction than is a fully licensed driver. We present a driving effort to inform the

#### 1. Introduction

Many seniors (those over age 65) and people with disabilities independently and must rely on family, friends, or

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<http://dx.doi.org/10.1016/j.tran.2016.09.003>

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5/20/2017

Self-Driving Cars: Transforming Mobility



THE BLOG 10/24/2016 03:15 pm ET

## Self-Driving Cars: Transforming Mobility For The Elderly And People With Disabilities



By Jules Polonetsky

By Jules Polonetsky and Henry Claypool

“Autonomous driving has the potential to transform mobility for groups that are not able to get around today.”

Sensor and autonomous technologies can transform the lives of preexisting American drivers, but they can do more for Americans with disabilities who may be constrained by their

As most people take having transportation options for granted, it may benefit most from these new developments for populations that are not able to drive. For example, blind and blind people are constantly managing the logistics of their lives: groceries, taking the kids to school or going out to work. The employment rate for people with disabilities continued to decline from the great recession. Game changing technologies



[http://www.huffingtonpost.com/jules-polonetsky/self-driving-cars-transforming\\_mob\\_1254](http://www.huffingtonpost.com/jules-polonetsky/self-driving-cars-transforming_mob_1254)



TRANSPORT AND INFRASTRUCTURE COUNCIL

## NATIONAL POLICY FRAMEWORK FOR LAND TRANSPORT TECHNOLOGY

ACTION PLAN: 2016–2019

“Automated vehicles [have] significant potential to improve the safety, efficiency and convenience of transport (especially for seniors and the disabled).”





Image by Rita Dionisio in: Fitt et al (forthcoming)

# Problematic assumptions

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- Trips – or vehicles - will be shared
- Demand will stay [reasonably] static – or at least is predictable
- AV will be a direct replacement – we'll do the same things, just in driverless cars
- Change happens fast

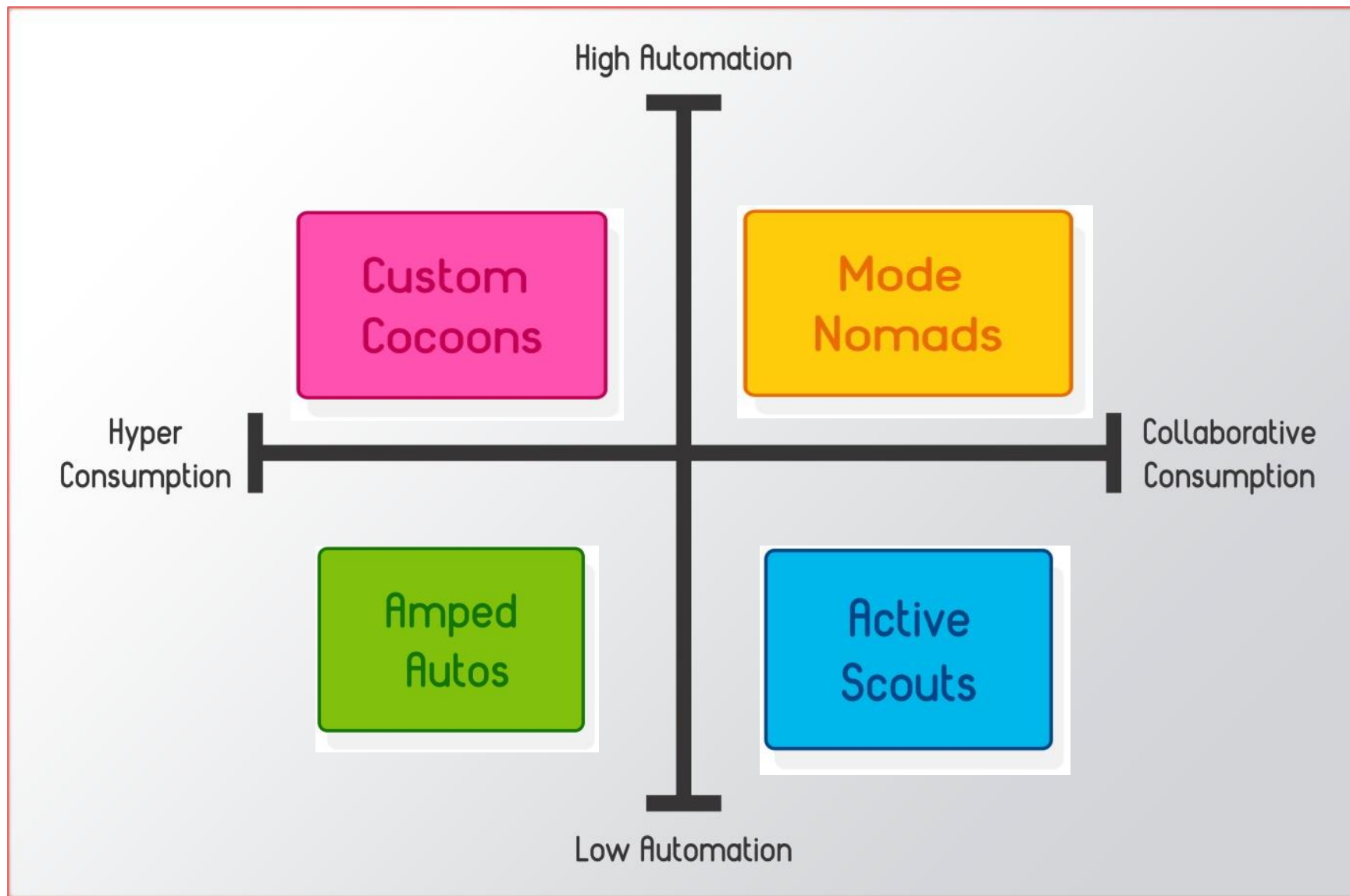


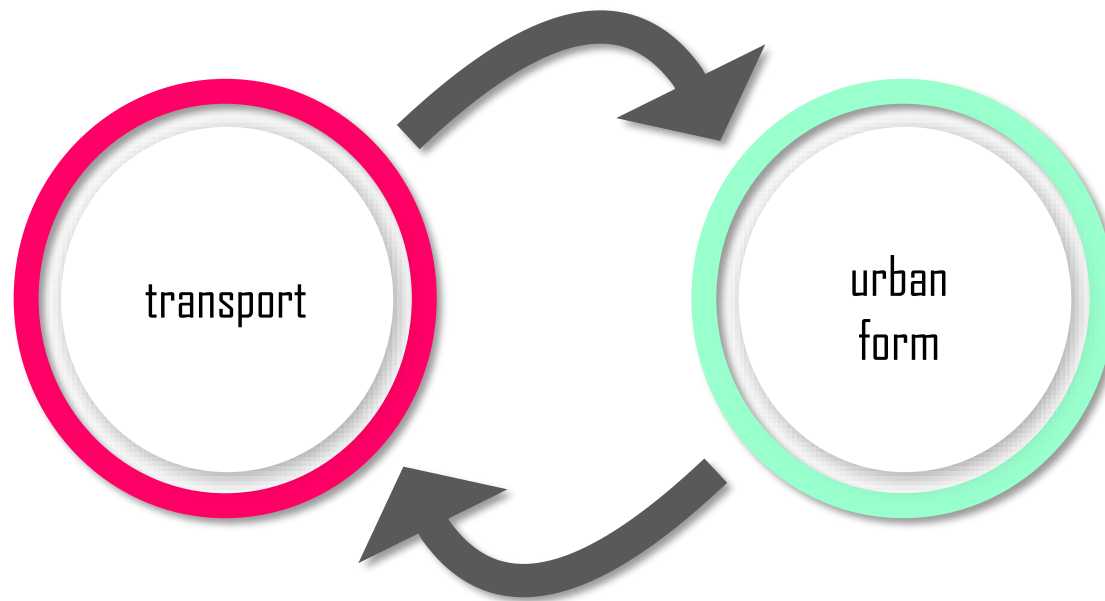
Image: Fitt, H., Curl, A., Dionisio-McHugh, R., Fletcher, A., Frame, B., & Ahuriri-Driscoll, A. (2018). Think Piece: Autonomous vehicles and future urban environments: Exploring implications for wellbeing in an ageing society (Second ed.). Christchurch, NZ: National Science Challenge 11: Building Better Homes, Towns and Cities. [http://www.buildingbetter.nz/publications/contestable\\_research\\_projects/Autonomous\\_vehicles\\_think\\_piece\\_2018.pdf](http://www.buildingbetter.nz/publications/contestable_research_projects/Autonomous_vehicles_think_piece_2018.pdf)

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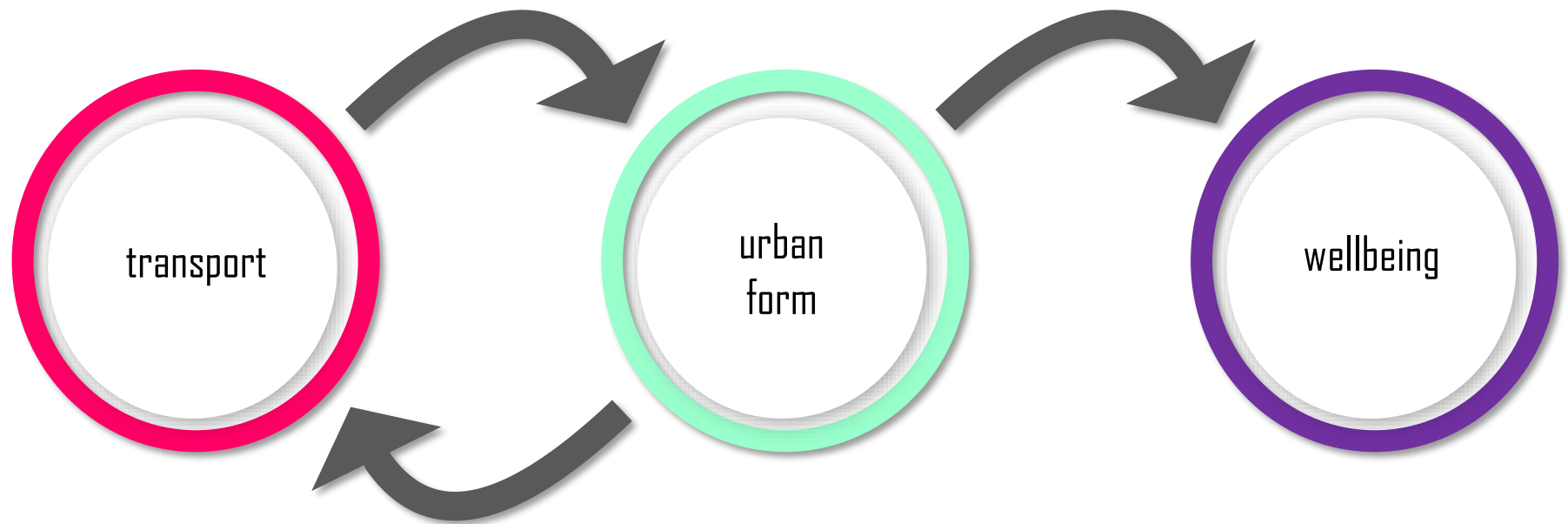
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# Complex relationships





# Complex relationships



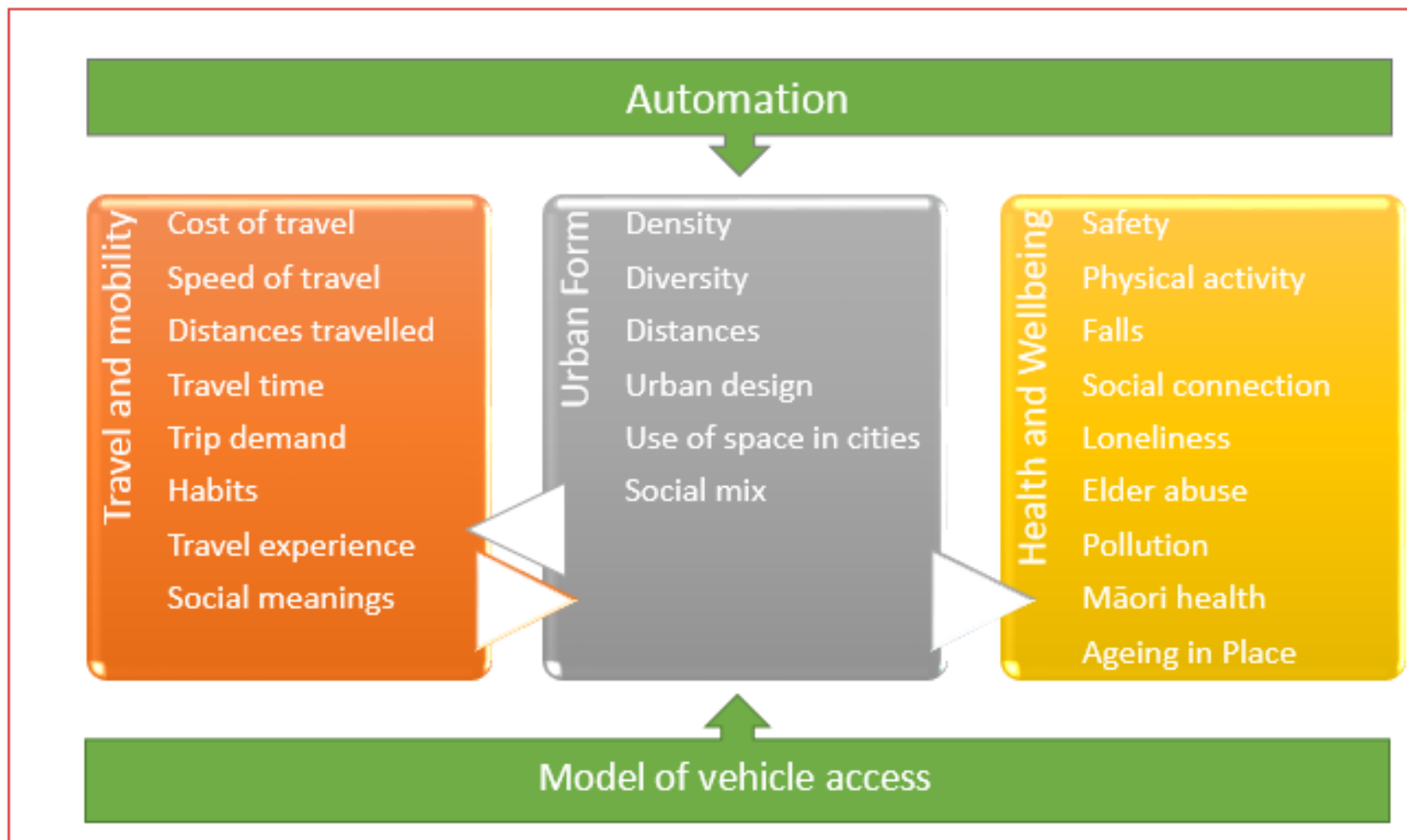


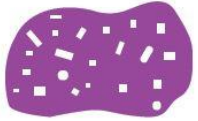
Image: Fitt, H., Curl, A., Dionisio-McHugh, R., Fletcher, A., Frame, B., & Ahuriri-Driscoll, A. (2018). Think Piece: Autonomous vehicles and future urban environments: Exploring implications for wellbeing in an ageing society (Second ed.). Christchurch, NZ: National Science Challenge 11: Building Better Homes, Towns and Cities. [http://www.buildingbetter.nz/publications/contestable\\_research\\_projects/Autonomous\\_vehicles\\_think\\_piece\\_2018.pdf](http://www.buildingbetter.nz/publications/contestable_research_projects/Autonomous_vehicles_think_piece_2018.pdf)

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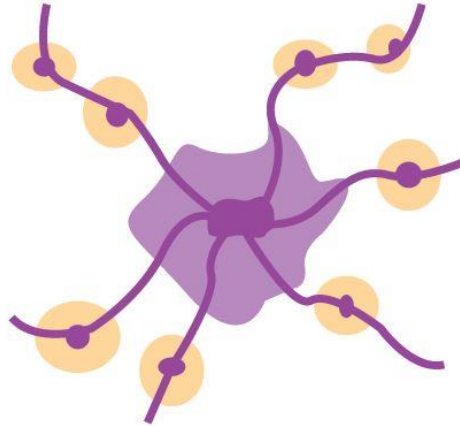
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The traditional walking city



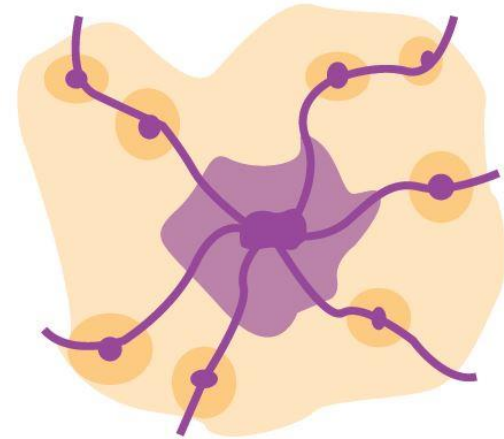
- high density
- mixed use
- organic structure

The transcity city



- medium density
- mixed use
- multiple urban centres

The automobile city



- Low density
- separated uses (monofunctionalism)
- arterial structure

Adapted from: Newman, P. W. G., & Kenworthy, J. R. (1996).  
The land use—transport connection: An overview. *Land Use Policy*, 13(1), 1-22.



The driverless city

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Myth: Self-dri

Fact: Self-driv

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# Misconception 8: Self-driving cars will increase congestion in cities











Fleets of self-driving cars will reduce the cost of individual motorized mobility and increase its accessibility to people without driver's license. Many city planners fear that this will induce additional demand and significantly increase miles traveled with the result of even more congestion in our already heavily congested cities.

Fortunately, there are many reasons why an increase in person-miles traveled with self-driving cars will not lead to an increase in congestion. The opposite may be true: we may find that self-driving cars, while certainly increasing person-miles traveled will actually reduce the congestion in our cities. Congestion is not a direct function of the number of vehicles on a road; it depends on driver actions, routes taken, road utilization per vehicle and systems for flow optimization (traffic management systems etc.). If we increase the number of miles driven and keep all other parameters constant, then congestion will certainly increase. But with fleets of self-driving cars, all of these parameters will change, some significantly.











In the following we will first look the reasons why self-driving cars are likely to reduce conaestion compared to human-driven cars. Items 1 and 2 show that there is significant



# What might change?

Components of travel behaviour		
	Consumption	Automation
Travel costs	 	
Travel times	 	
Travel speeds		
Travel distances		

# Changes to urban form

Components of urban form	What might change according to our axes?	
	Consumption	Automation
Density		 
Diversity	 	
Design		
Distance to PT	 	 

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*“In 50 years, every street in London will be buried under nine feet of manure.”*











# Online gaming addiction a mental health condition says UN health body

9:44pm

Share



Source: BBC

Online gaming addiction a mental health condition says UN health body



### Inclusive access

Enabling all people to participate in society through access to social and economic opportunities, such as work, education, and healthcare.

### Healthy and safe people

Protecting people from transport-related injuries and harmful pollution, and making active travel an attractive option.

### Economic prosperity

Supporting economic activity via local, regional, and international connections, with efficient movements of people and products.

A transport system that improves wellbeing and liveability

### Environmental sustainability

Transitioning to net zero carbon emissions, and maintaining or improving biodiversity, water quality, and air quality.

### Resilience and security

Minimising and managing the risks from natural and human-made hazards, anticipating and adapting to emerging threats, and recovering effectively from disruptive events.



<https://www.transport.govt.nz/multi-modal/keystrategiesandplans/transport-outcomes-framework/>

AV (and other transport innovations) *might* lead to reduced reliance on privately owned vehicles, improve road safety and broaden access for those who can't currently drive – addressing many of these outcomes BUT they won't *necessarily* do so.

# Where to from here?

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- Outcome uncertainty presents an opportunity
- Proactive and adaptive planning
- Flexible interventions
- Addressing diverse needs
- Cross-sector planning



# Which questions are we asking?

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- How can we adapt to autonomous vehicles / e-scooters / uber?

OR

- What can this technology do for us?  
[Outcomes focussed]
- How else might those outcomes be achieved?

# THE VEHICLE OF THE FUTURE HAS TWO WHEELS, HANDLEBARS, AND IS A BIKE









Photo credit: Jay Budd, Facebook

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