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Insights

Gauging NZ's readiness for the Future of Mobility

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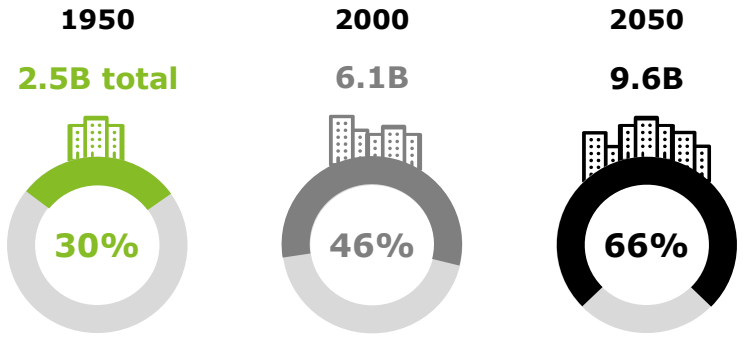
NZ Risk Conference - 18 June 2019

On the road to the Future of Mobility

Cities are straining to keep pace with rapid urbanization and population growth

Global Population Relative Urbanization (%)

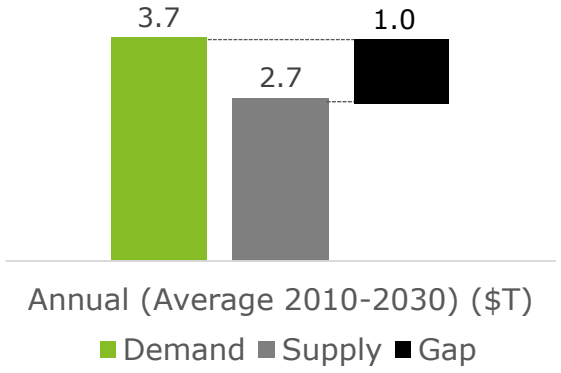


500 cities with populations over 1 million now exist around the world

41 mega-cities with populations over 10 million are expected by 2030

3.4B additional residents will be living in cities by the middle of the century

Shortfalls in Global Infrastructure Investments

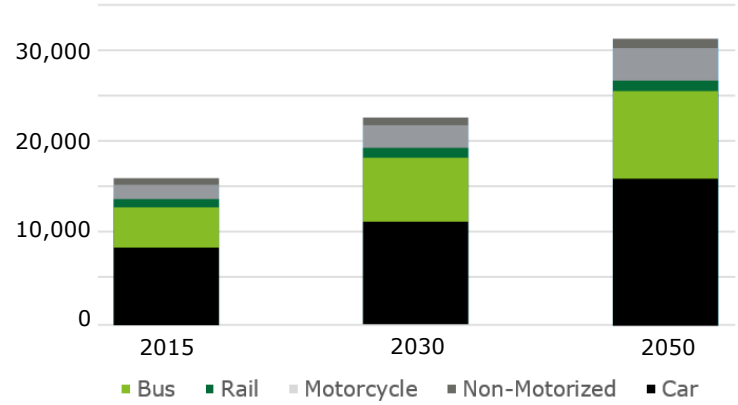


$836B of total US infrastructure backlog accounted for by roads and transit

1.1% long-term increase in traffic for every 1% increase in road capacity

$1.2T could be lost in US GDP by 2025 due to infrastructure deficiencies

Global Urban Passenger-Miles Forecast by Mode (Billions)



$305B in congestion costs across the US in 2017, up $10B from 2016

$30B in annual health costs due to congestion (e.g. pollution)

30% of traffic in urban areas is caused by cars looking for parking

Existing transportation systems fall short of meeting current and future demand

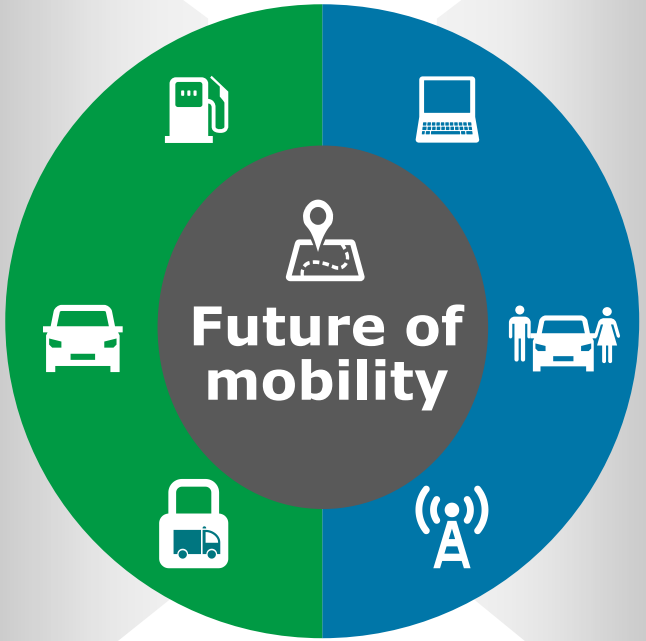
There are two profoundly different visions about how the future could evolve

Insider view

The industry will **evolve naturally** and **incrementally** toward a future mobility system that **retains its roots** in what exists today

The key players, major assets, and overall structure of the **current ecosystem can remain intact** while change progresses in an **orderly, linear fashion**

The incumbent mindset appears **dually focused** on sustaining the current model while **testing change in small ways**



Disrupter view

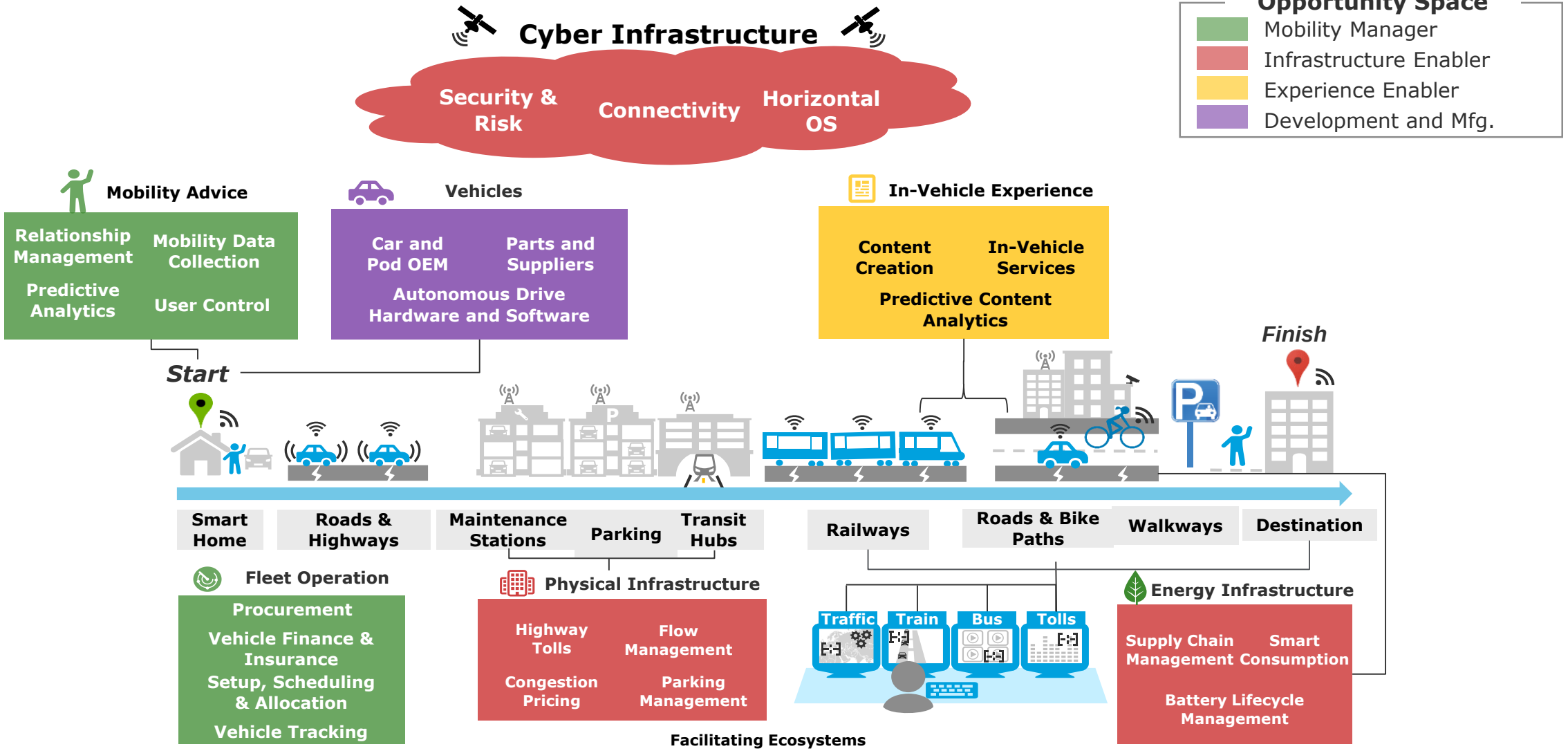
A **whole new age** is dawning featuring **fully autonomous** cars accessible on demand

Before long, a **tipping point** will occur, after which the **momentum of change will become unstoppable**

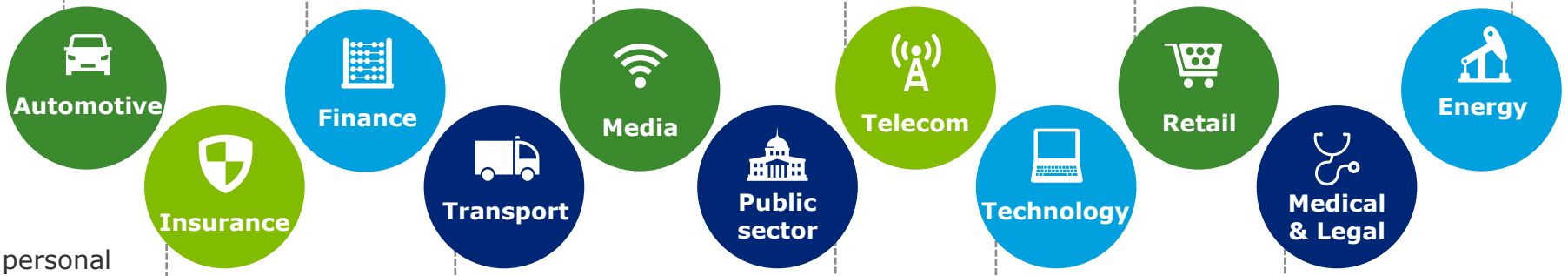
New entrants, notably Google and Uber among others, **are catalysts** for transformation

Unlike the stakeholders in today's system, they **do not have vested stakes** to protect

New and different capabilities will be required to compete in this ecosystem, depending on the opportunity space



The disruptive nature of this transformation will result in massive shifts in economic value



Decrease in personally-owned vehicle sales and profound mix shifts. **Value shifts to managing end-to-end mobility experience**

Shared mobility funding rises but may not offset lower levels of personal loans and leasing

Increased consumption of multimedia/ information and **value derived from curating holistic in-transit experience**

Bandwidth greatly expands to meet increased demand for connectivity & reliability

More efficient last mile delivery lowers costs and **accelerates shift away from physical stores**

Lower energy consumed due to rise of electric vehicles

Shifts from personal liability to **catastrophic systems-failure insurance**

Rise of seamless intermodal transportation and **significant increases in efficiency of LH trucking/cargo delivery**

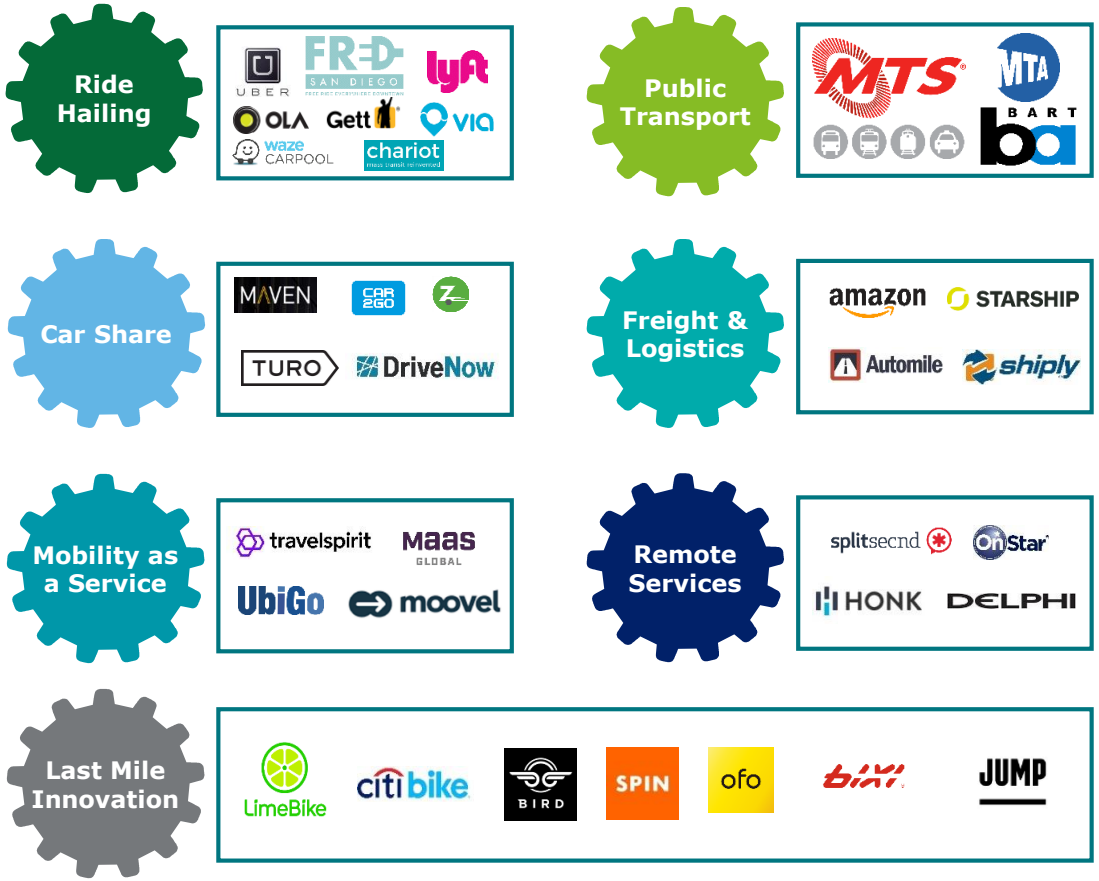
Erosion of tax revenues related to sales/ registration and fuel taxes, parking and traffic citations and **shift to dynamic pricing models**

Rapid growth of **AD operating system and mobility management technology & services providers**

Significant reduction in EMS and legal costs as accidents plummet

While numerous mobility innovations are being introduced, they are largely uncoordinated and are exacerbating current urban challenges

EXISTING DISPARATE SOLUTIONS



Source: Deloitte analysis

IMPACTS

- Increases vehicle miles traveled and adds more vehicles to already overcrowded city streets
- Services are not universally accessible for all socio-demographics and regions, creating further division and inequity
- Does not significantly improve sustainability
- Leads to sub-optimal and uncoordinated networks
- Data is generally limited to single-mode transportation inhibiting system wide gains

If not coordinated within a more integrated system across all modes of transportation, low-cost and high-convenience mobility services will exacerbate existing urban challenges

Deloitte City Mobility Index (DCMI)

Across the world we are seeing rapid transformation in the way people travel and a much greater role for cities in generating growth and prosperity

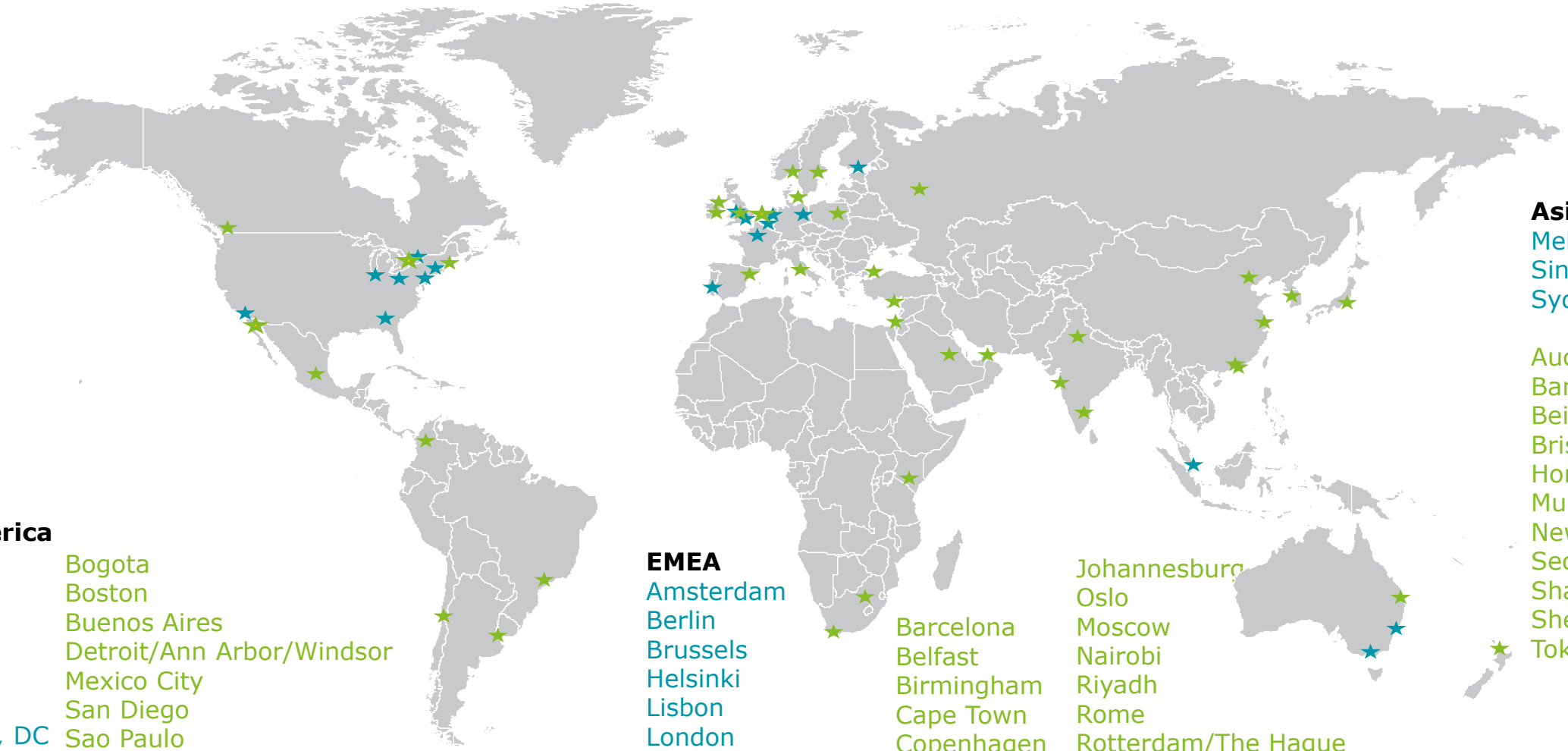
The Future of Mobility

Smart Cities

Our goal is to link these two super-themes together to answer a number of critical questions on how cities can successfully adapt to these trends

A global initiative covering a wide range of locations—55 Cities in DCMI 2019

This year explores larger, integrated regional analysis using DCMI methodology



North and South America

Atlanta
Bogota
Boston
Buenos Aires
Chicago
Columbus
Detroit/Ann Arbor/Windsor
Los Angeles
Mexico City
New York
San Diego
Sao Paulo
Santiago
Toronto
Vancouver
Washington, DC

EMEA

Amsterdam
Barcelona
Belfast
Berlin
Birmingham
Brussels
Cape Town
Copenhagen
Dubai
Dublin
Helsinki
Istanbul
Johannesburg
Lisbon
London
Manchester
Moscow
Nairobi
Oslo
Paris
Riyadh
Rome
Rotterdam/The Hague
Stockholm
Tel Aviv
Warsaw

Asia Pacific

Auckland
Bangalore
Beijing
Brisbane
Hong Kong
Melbourne
Mumbai
New Delhi
Seoul
Shanghai
Shenzhen
Singapore
Sydney
Tokyo

https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/deloitte-urban-mobility-index-for-cities.html

The city analysis is a synthesis of a wide variety of data sets

[City]

Analysis area

Definition of analysis area

Population

Population density

Key Mobility Statistics

Journey Modal Split

Future of Mobility Analysis

Mobility Analysis

Performance and resilience

Vision and leadership

Service and inclusion

Key focus areas to improve city mobility and realize the Future of Mobility

Strengths

Challenges

FoM global leader

https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/deloitte-urban-mobility-index-for-cities.html

Cities were assessed on three key themes that highlight what a city could be in a truly smart, livable and economically vibrant city

Performance and resilience

The main metrics for this theme are:

- Congestion
- Public transit reliability
- Transit safety
- Integrated and shared mobility
- Air quality

Service and inclusion

The main metrics for this theme are:

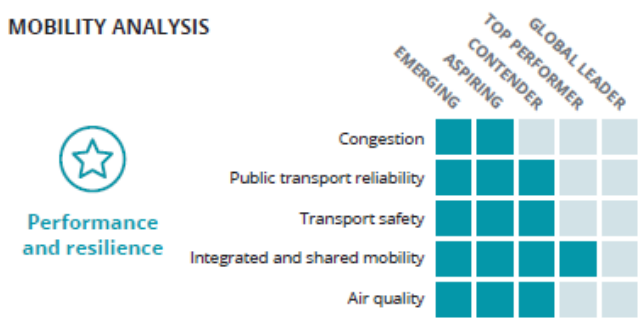
- Public transit coverage
- Affordability
- Versatility
- Customer satisfaction
- Ease of use

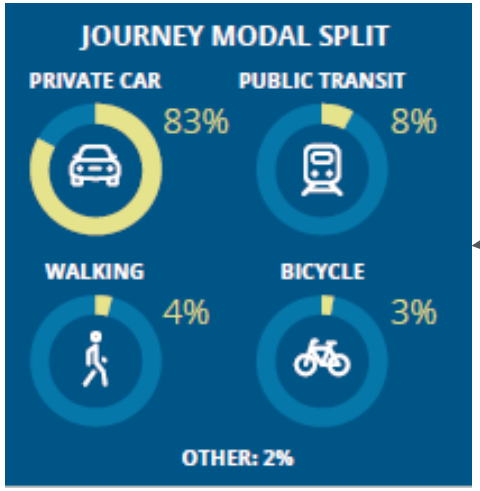
Vision and leadership

The main metrics for this theme are:

- Vision and strategy
- Investment
- Innovation
- Regulatory environment
- Environmental sustainability

We have developed an urban mobility index and released summaries for each city around the world including Auckland





Key focus areas to improve city mobility and realize the Future of Mobility:

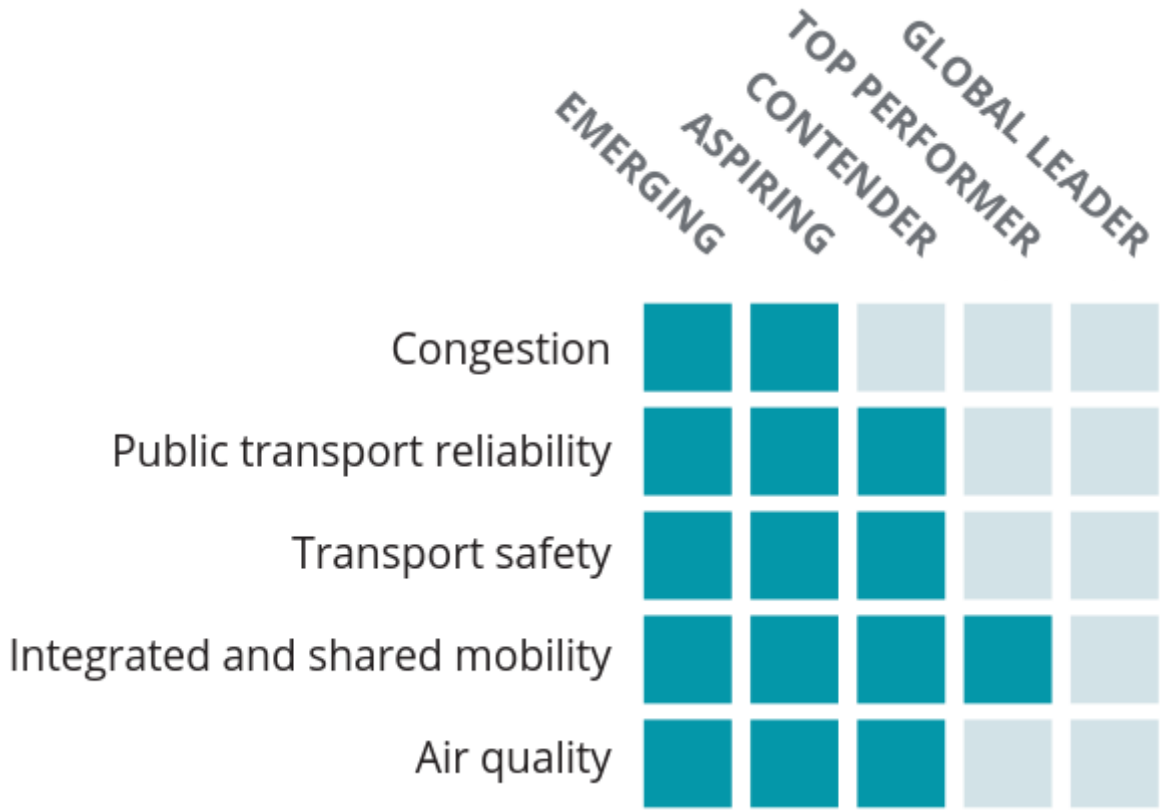
- Explore alternative transport pricing arrangements and data-driven solutions
- Develop more access points for the public transport system and expand the reach of rapid transit schemes
- Develop infrastructure for active mobility and promote uptake of low-emission renewable energy-powered vehicles

https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/deloitte-urban-mobility-index-for-cities.html

How does NZ stack up?

There is still room to improve with regard to congestion, reliability and safety to become a high performing and resilient city

Performance and resilience



Global Leaders

- Stockholm
- Shanghai
- Singapore

The Good and the Bad for NZ

- Concepts for levying congestion charges have been floated but congestion levels in Auckland and Wellington are still high
- Road safety programs are comprehensive but fatalities have started to increase in last 3 years
- Ridesharing and car sharing is limited and there are opportunities to improve incentives for increased use of shared and sustainable mobility

Auckland faces high traffic congestion, costing almost NZD 2 billion annually to the city's economy.

Private vehicles

- Augmenting private ownership with car-sharing and ride sharing works best in cities that rely heavily on private vehicles

Last mile solution

- Cars are often the fall-back option when fist/last mile problems are unresolved
- People will drive if access to public transport is a problem

Car culture and 'bus stigma'

- The role of culture is more important than many would assume, i.e. owning a car is a status symbol, or there is a 'bus stigma'

Sydney, Auckland and Wellington are the worst performing cities in their respective groups

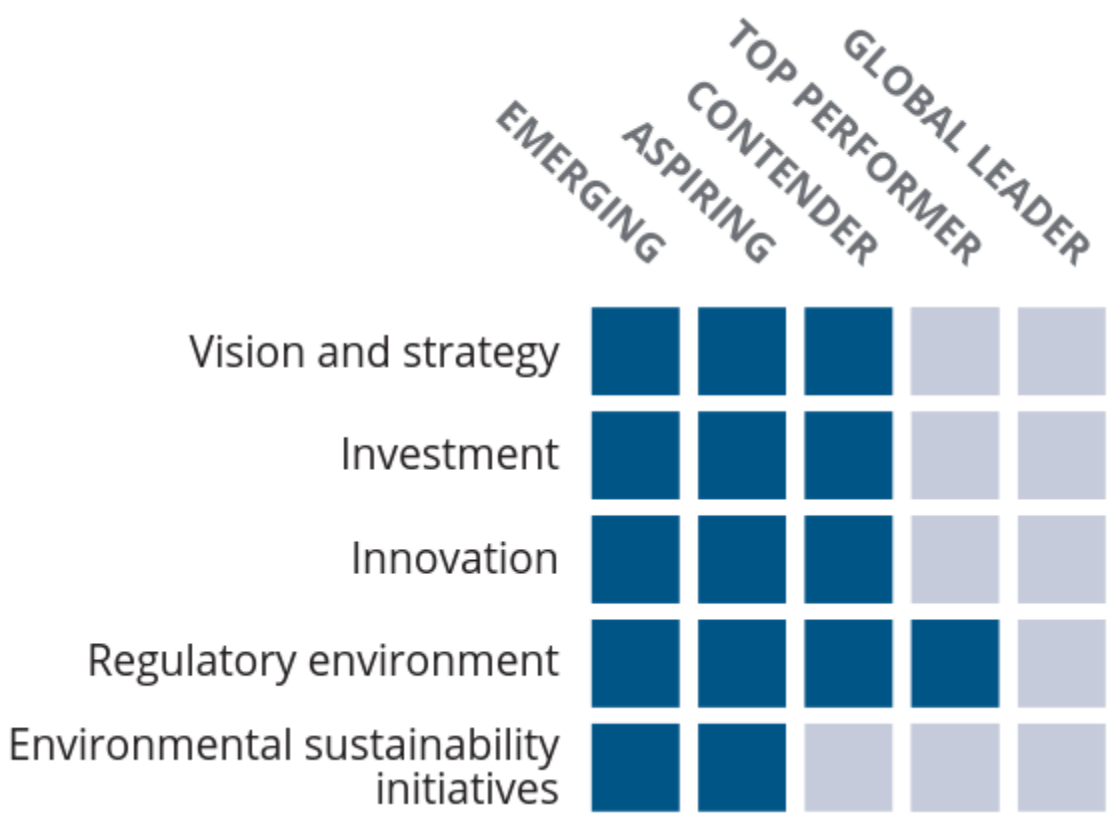
Key Congestion Measures – By City, Weekdays

City	Average Speed (Km / Hr)	Travel Time Delay (%)	Reliability (%)		Scheduling (%)	
			Morning Peak (6am to 10am)	Afternoon Peak (3pm to 7pm)	Morning Peak (6am to 10am)	Afternoon Peak (3pm to 7pm)
	How fast does traffic in the city travel?	*How much is traffic delayed from free-flow conditions?*	*What is the statistical reliability of travel times in the morning peak period?*	*What is the statistical reliability of travel times in the afternoon peak period?*	*How much time does a consumer need to budget during the morning peak period, relative to free-flow?*	*How much time does a consumer need to budget during the afternoon peak period, relative to free-flow?*
Sydney	29	31%	14%	9%	49%	50%
Melbourne	34	23%	11%	8%	34%	41%
Brisbane	52	12%	8%	6%	23%	23%
Perth	58	14%	7%	6%	22%	25%
Auckland	42	22%	12%	10%	37%	45%
Adelaide	28	11%	7%	3%	16%	17%
Canberra	61	9%	7%	4%	15%	14%
Hobart	42	8%	6%	4%	12%	15%
Wellington	55	10%	9%	9%	21%	20%
Darwin	36	4%	1%	2%	5%	6%

City Group: Group 1 Group 2 Group 3

Source: Austroads Research Report AP-R533-16, "Congestion and Reliability Review Summary"

New Zealand’s regulatory environment is ahead of most other global cities



Vision and leadership

Global Leaders

- Seoul
- Singapore

The Good and the Bad for NZ

- Transport agencies are planning rapid transit system expansion and infrastructure for bicycles and pedestrians
- Joint central and local government investment in infrastructure
- Regulatory environment that has been agile and enabled future of mobility initiatives

NZ’s regulatory environment

- ✓ Less prescriptive regulatory environment
- ✓ National harmonised regulation
- ✓ Ability to test on-road is attractive to industry

- ✗ Reliance on existing legislation and vehicle standards that are not fit-for-purpose
- ✗ Testing of new technology falls within the remit of NZ Police to enforce safety requirements-reactive not proactive

Ohmio develops 5G-connected diverless car

March 19, 2019 *Tags: autonomous vehicles, driverless vehicles, Ohmio*

Share this story...

Sustainable mobility innovator Ohm connected driverless car.

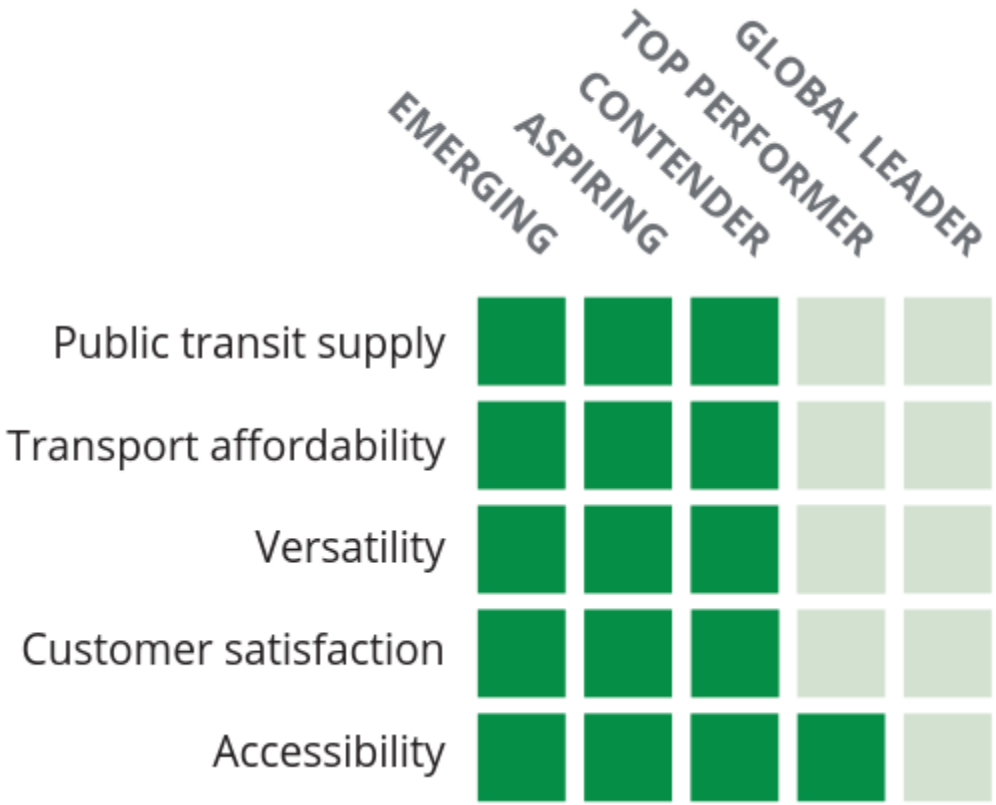
NEW ZEALAND

ACC forks out $700,000 in e-scooter head injury claims

4 Jun, 2019 12:03pm 4 minutes to read

People aged in their 20s made the most claims for head injuries, with a total of 184. Photo / Stephen Jaquiery

The initiatives around accessibility and affordability for the elderly and are leading the way



Service and inclusion

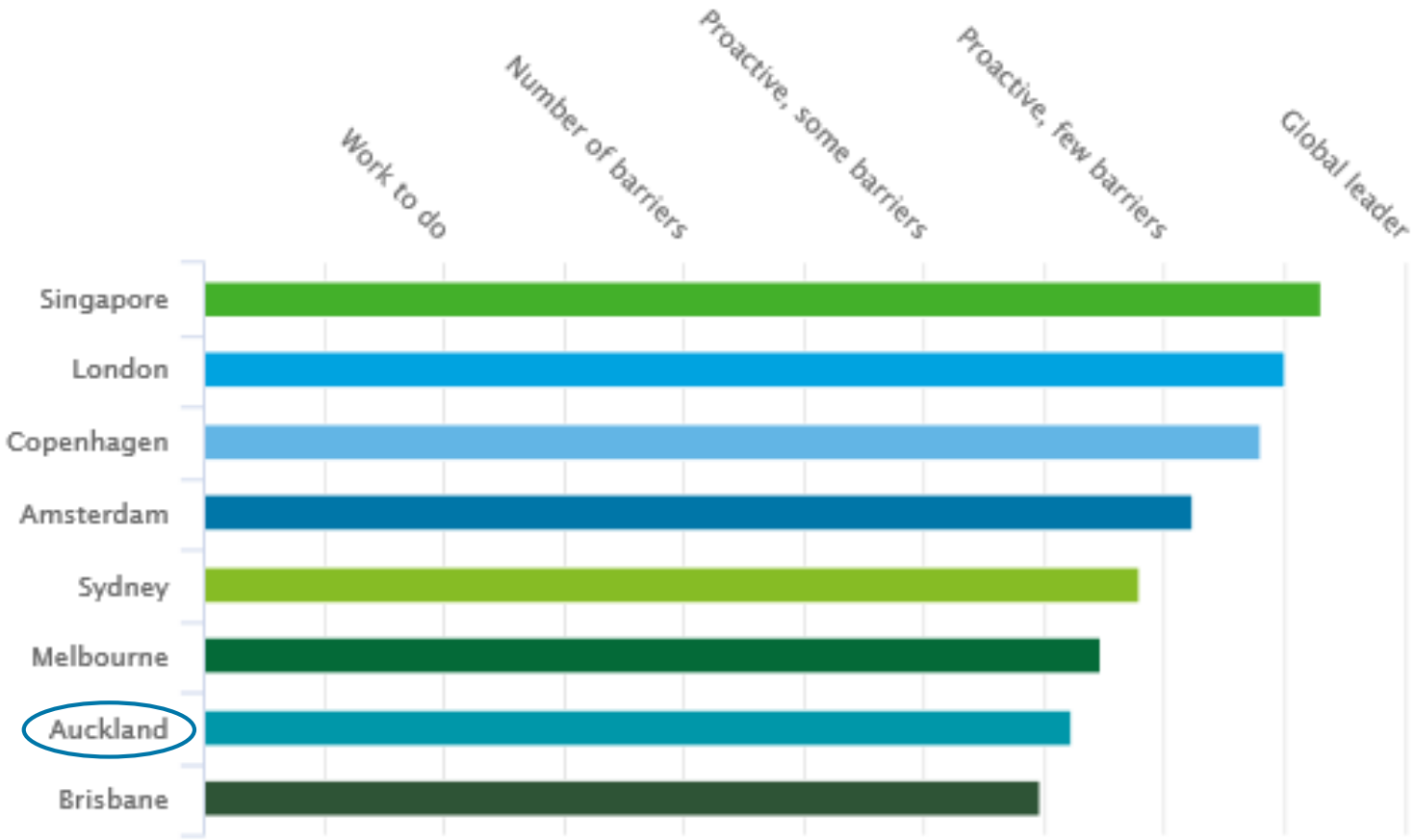
Global Leaders

- Stockholm
- Shanghai

The Good and the Bad for NZ

- Accessible transport for disabled and elderly
- Mixed coverage of region with public transport system (Auckland 83% car use)
- Integrated electronic payment systems that are multi modal

Where does NZ sit against other global cities for future of mobility readiness?



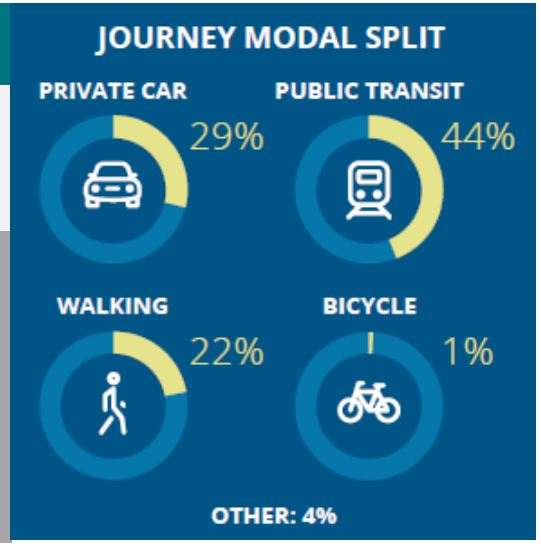
Future of Mobility readiness

- Parameters that deal with 'smart' or 'digital' elements of transportation
- Integrated and shared mobility, vision and strategy, innovation, regulatory readiness for the Future of Mobility and ease of use scores were averaged.

A closer look at the leaders and the cities that are lagging in Future of Mobility readiness

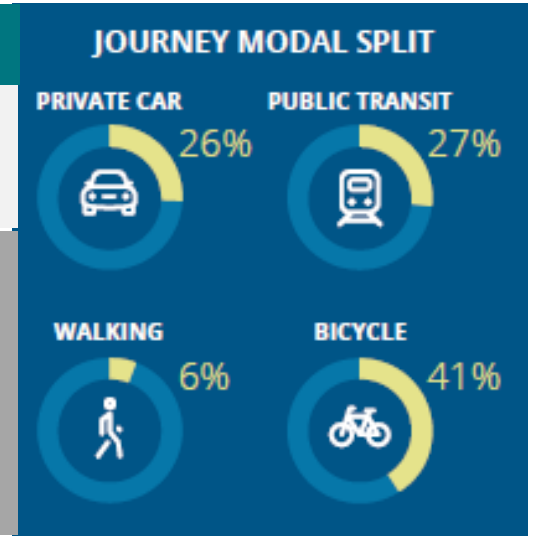
Singapore

- Strong focus on using technological advancements and integrated ticketing
- High adoption of zero-emission vehicles
- Comprehensive and affordable rail and bus network



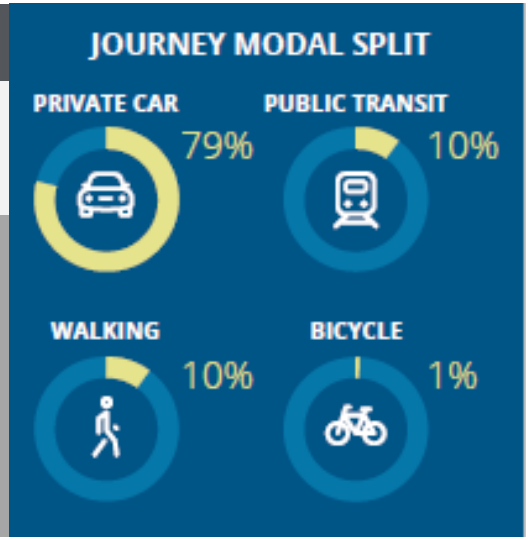
Copenhagen

- One of the world's most bicycle-friendly cities
- Extensive public transport system
- Supports open data and promotes digital solutions to tackle traffic, the environment and urban planning



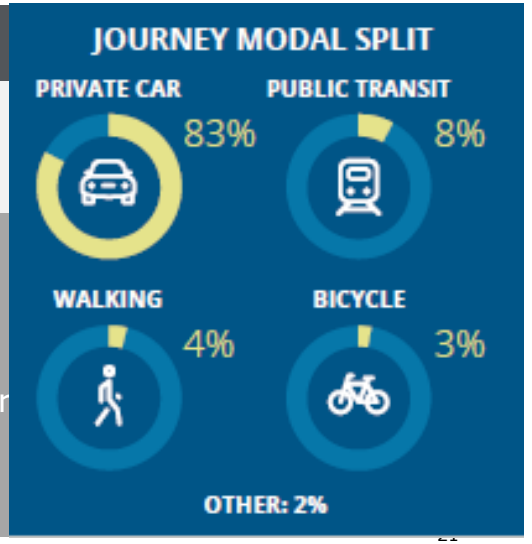
Brisbane

- Existing public transport supply inadequate to serve growing population and urban sprawl
- Persistent congestion on major motorways and arterial roads coming into CBD



Auckland

- Increasing capacity of the existing public transport network
- Managing heavy congestion during peak hrs
- Managing the implementation of major transport projects



The road ahead and managing the risks

Across our 55 cities, six key points stood out in the initial findings

1.What's past is prologue

History plays a role—but is not destiny

2. Governments need to get the basics right

Start with the basics, then build out

3. Integration is key

Include a wide range of players

4. Congestion is a problem *everywhere*

But not always caused by high vehicle use

5. Cars do have a role

But they must be managed

6: Work with local culture

Harness it to improve outcomes

There are a number of forces that will influence the rate at which the new mobility ecosystem takes shape

Forces of Delay or Acceleration

Regulation & Government

Federal, state and local policies

Public Attitudes

Human-machine interface, safety, shared economy

Technology Development

Early experiments, pilot programs

Privacy and Security

Cyber-security, communication protocols

Corporate Valuations

Technology investments, cost-of-capital projections

Employment Changes

Dislocation effects, reactions, job retraining

Public uncertainty raises significant societal questions about safety, infrastructure spending, regulations, insurance law and more.

1 Understand your community

- Social
- Cultural
- Historical
- Political

2 Social aims - be clear

- ↑ choice
- ↑ mobility
- ↑ safety
- ↑ engagement

3 Improve trust in technology

- User-centred design
- Sufficient information about the technology
- Experience (first-hand and use cases)
- Assurance

4 Governance frameworks

- Ethical risk assessments that mitigate unintended consequences and promote social wellbeing
- Ethical data inputs that are transparent, unbiased and secure
- Oversight and accountability measures

Two-way communication
Socio-technical impacts need to reflect values and institutions and technology should foster two-way conversation with the community

Evaluation criteria
Understanding the social aims should help evaluate technology use cases and prioritise deployments which will help achieve social aims

Use cases
Understanding the community and social aims can be used to develop specific technology applications according to the community's needs

The role of regulators and must be part of the solution to manage key risks

AV Safety and Functionality

Data Security and Privacy

Safeguarding the public good

Regulatory principles

to address emerging Future of Mobility technologies

Source: William D. Eggers, Mike Turley, and Pankaj Kishnani, *The future of regulation*, Deloitte Insights, June 19, 2018.

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