Congestion charging – Cities and Systems

Rupert Brown
Consultant, CTS Product Management

CONTENTS

- Road congestion – What it is and consequences
- Why does it happen?
- Possible solutions
- Getting to success
- Thinking about systems to help achieve success
- Cubic’s vision

ROAD CONGESTION

- Demand for physical space
- Lower average speeds
  - *Longer trip times*
  - *Greater unpredictability*
  - *Periods of no movement*
- Time
- Fuel
- Health
- Amenity

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WHY DOES IT HAPPEN?

- Cities with relatively static amounts of space for vehicles
- Cities with growing populations – housing being built further and further away from the CBD
- Public transport taking too long to catch up with new housing leaving the car as the only transport alternative
- City centres remaining the place for well paid job opportunities
- Unchecked access to road networks – no “throttling” of vehicle access
- A traffic light based system that has to stop half the cars moving half of the time
- People just assuming that they can travel!

WHY DON'T WE ALL USE PUBLIC TRANSPORT?

- Some people love their cars – the personal space
- For some public transport just doesn't work – it isn't accessible or takes too long
- For some it doesn't feel like a safe option
- If not well maintained it can become unreliable due to failures
- If not looked after, it can be an "unpleasant space" to be in
- It too (buses) can suffer from the same congestion

SOLUTIONS TO CONGESTION

Long Term

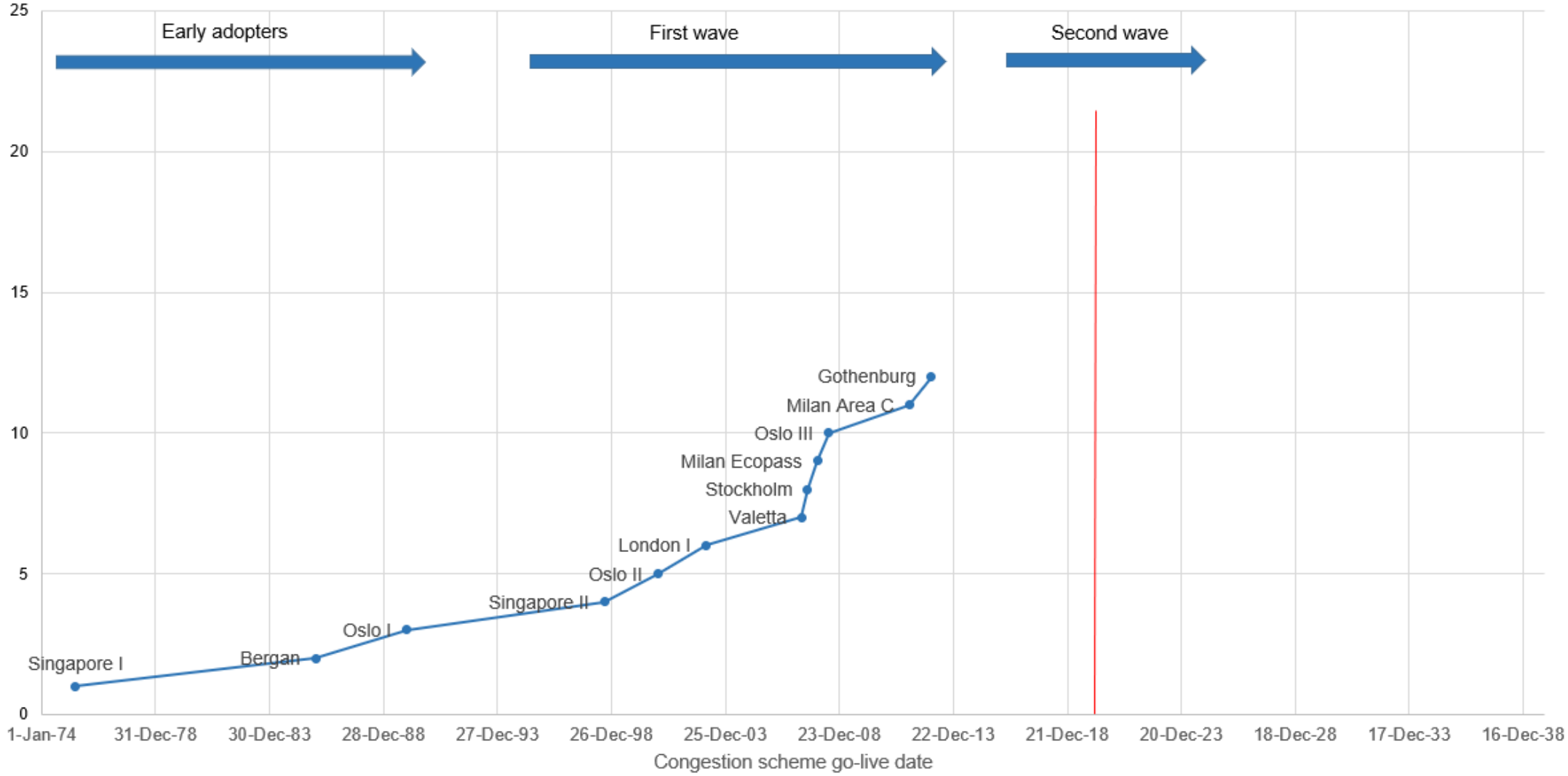
- Spread the jobs and shops to ‘city hubs’
- Where possible, build new rail and bus infrastructure
- Focus on ‘high density’ corridors

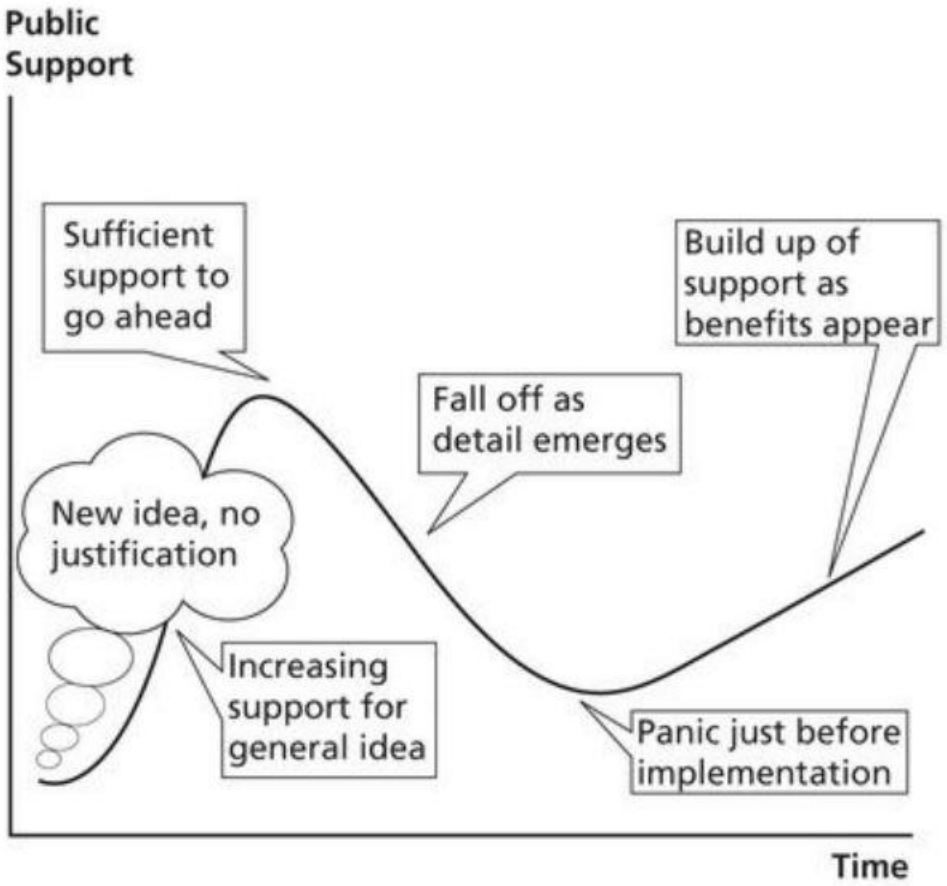
Short to medium term:

- Legislate for flexible and home working
- Invest in existing public transport services – services, access, information, ticketing.
- Give roads in the city a value through charging
- Restrict parking spaces in the city

CONGESTION CHARGING SCHEMES

History and prediction





Goodwin, P. (2006). The gestation process for road pricing schemes. Local Transport Today, 444.

SUCCESS FACTORS

- There is a problem
- The problem can be articulated
- The solution addresses the problem, comes with reasonable costs, is not in isolation
- Political will
- Popular support

POLLUTION AND CONGESTION

IN 2 - INRIX Congestion Index: The seven congestion rates:

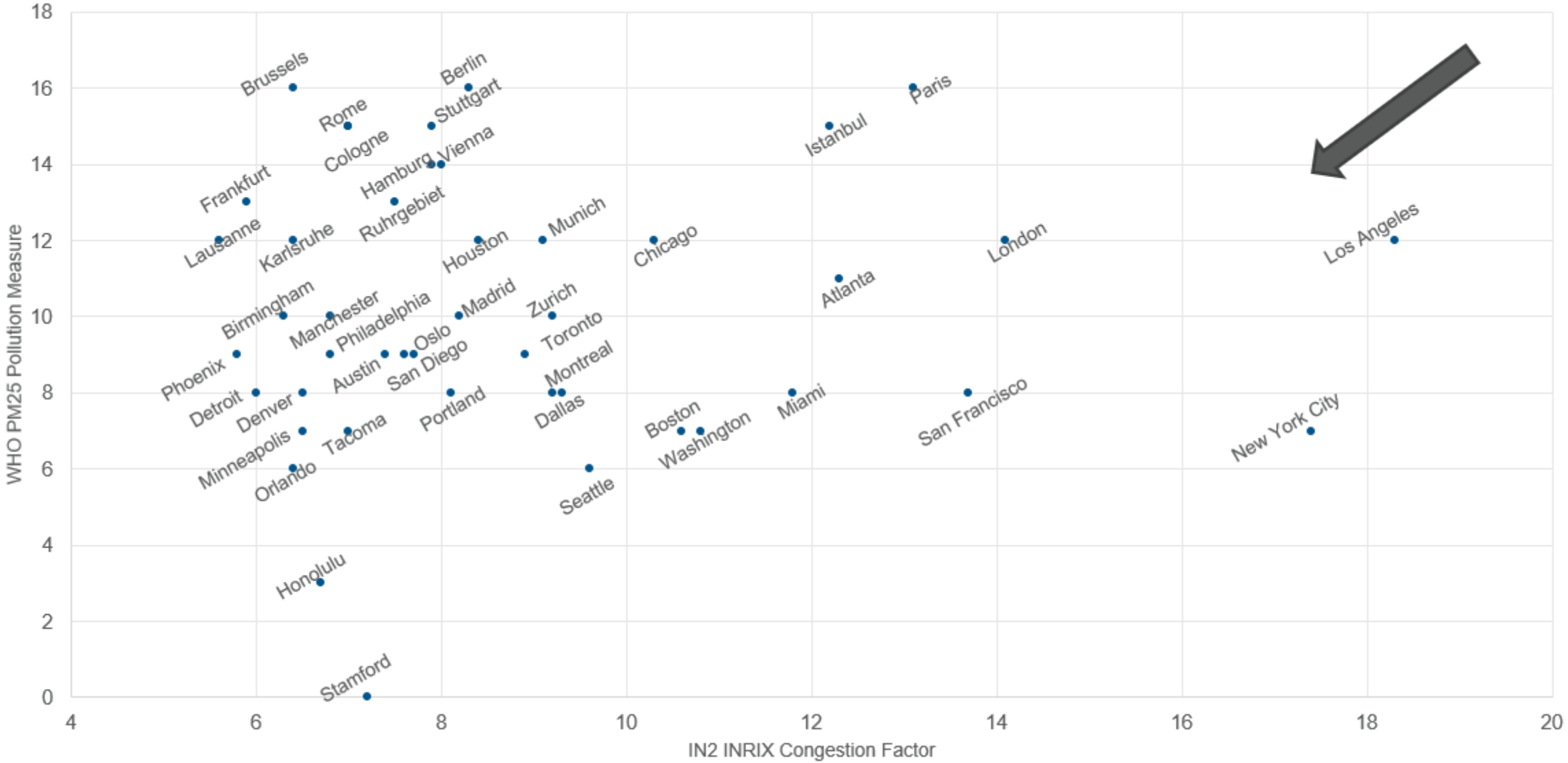
- Peak periods on highways in and out of the city
- Peak periods within a city
- Day time travel on highways in and out of a city
- Day time travel within a city
- Late night on highways in and out of a city
- Late night within a city
- Weekend travel on all roads

are weighted by relative volumes to provide a more realistic average congestion rate that reflects typical driving patterns, which is then weighted by the Median Travel Time. This, in effect, adjusts the congestion rate by the city's size and associated average journey times. This is the metric for transportation officials.

EU Air Quality Directive

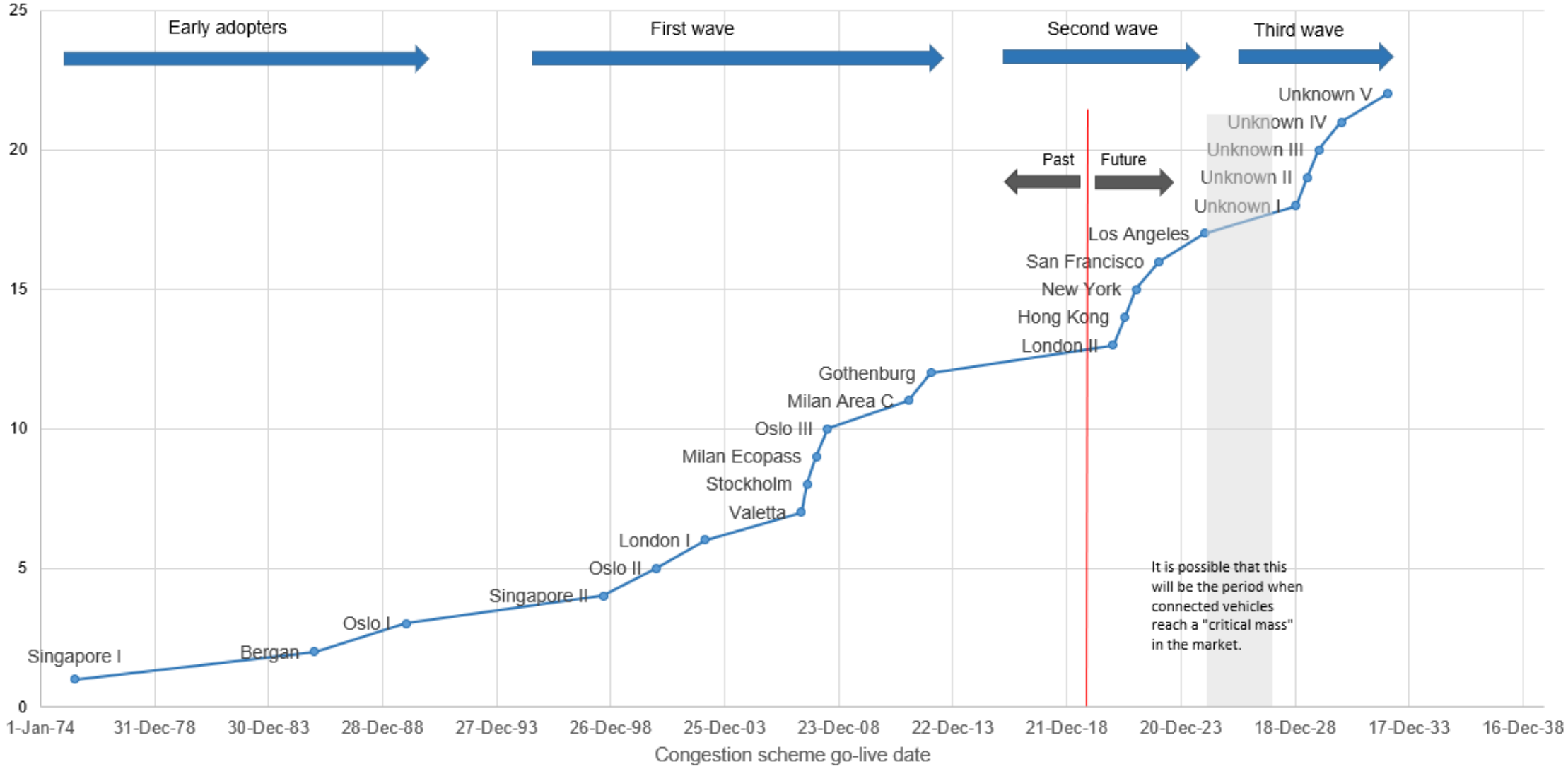
Pollutant	Averaging period	Objective and legal nature and concentration	Comments	Concentration	Comments
$PM_{2.5}$	Daily			25 µg/m³	99th percentile (3 days/year)
$PM_{2.5}$	Annual	Limit value, 25 µg/m³		10 µg/m³	
PM_{10}	Daily	Limit value, 50 µg/m³	Not to be exceeded on more than 35 days per year	50 µg/m³	99th percentile (3 days/year)
PM_{10}	Annual	Limit value, 40 µg/m³		20 µg/m³	
O_3	Maximum daily 8-hour mean	Limit value, 120 µg/m³	Not to be exceeded on more than 25 days per year, averaged over three year	100 µg/m³	
NO_2	Daily	Limit value, 200 µg/m³	Not to be exceeded on more than 18 times a calendar year	200 µg/m³	
NO_2	Annual	Limit value, 40 µg/m³		40 µg/m³	

CONGESTION VS POLLUTION



CONGESTION CHARGING SCHEMES

History and prediction



CHARGING FLEXIBILITY

- The time of day, day of week and special days such as public holidays
- Whether a charge is suspended or to be applied
- Vehicle class
- Vehicle powertrain type
- Vehicle use
- Address where the owner of the vehicle resides
- The status of the vehicle owner (special needs)
- The journey taken in the context of a geographic area, corridor or charging points
- The journey taken in the context of a network of tolled roads (network pricing)
- The level of congestion present on any given route
- The type of account or pass

BUSINESS CAPABILITY MODEL

- Accounts creation and maintenance
- Responding to customer queries
- Taking payments
- Managing complaints and disputes
- Fulfilment
- Managing commercial accounts
- Manage exceptions

- Credit management
- Logistics
- Financial management
- Communications management
- Prosecution support
- Audit and reporting
- Analytics

- Manage roadside equipment
- Trip reconstruction
- Trip checking
- Manage image processing
- Charging engine
- Trip allocation
- Future vehicle technology
- Manage tags
- Geographic awareness services
- Vehicle services

- Interoperability data exchange
- Manage data standards
- MaaS data exchange
- Manage data agreements

- IT operations
- Governance and system development
- User help services

- Traffic model and simulator (Digital Twin)

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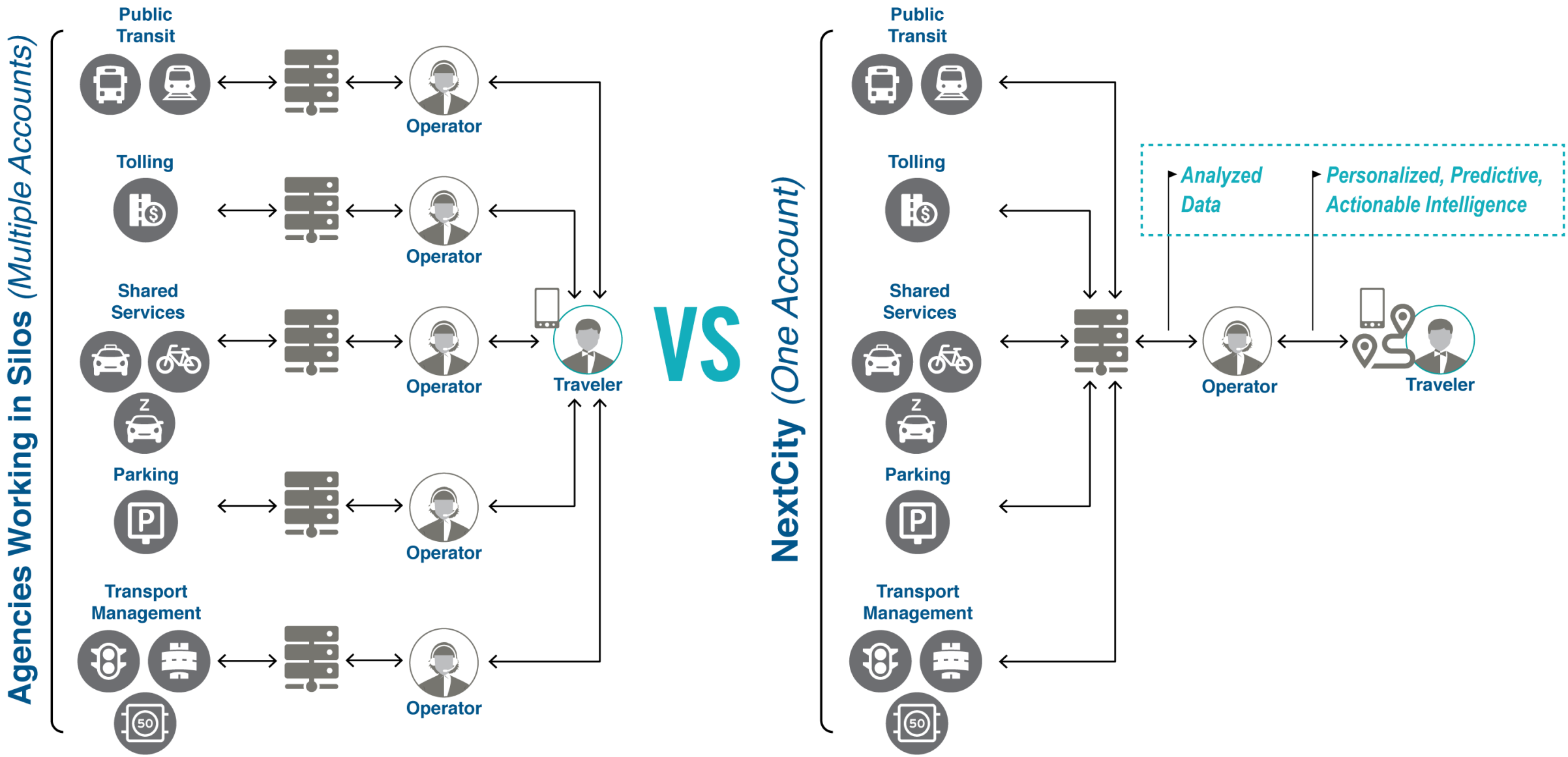
NextCity® INTEGRATED TRANSPORTATION



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CUBIC INTELLIGENT TRANSPORTATION SOLUTIONS

BUSINESS CAPABILITY MODEL (ENHANCED)

- Accounts creation and maintenance
- Servicing customer's needs to travel
- Taking payments
- Managing complaints and disputes
- Fulfilment
- Managing commercial accounts
- Manage exceptions
- Credit management
- Logistics
- Financial management
- Communications management
- Prosecution support
- Audit and reporting
- Analytics
- Manage transit equipment
- Manage roadside equipment
- Trip reconstruction
- Trip checking
- Traffic & Transit data fusion
- Manage image processing
- Charging engine (dynamic pricing)
- Trip allocation
- Manage traffic movements
- Future vehicle technology
- Manage tokens
- Geographic awareness services
- Vehicle services
- Interoperability data exchange
- Manage data standards
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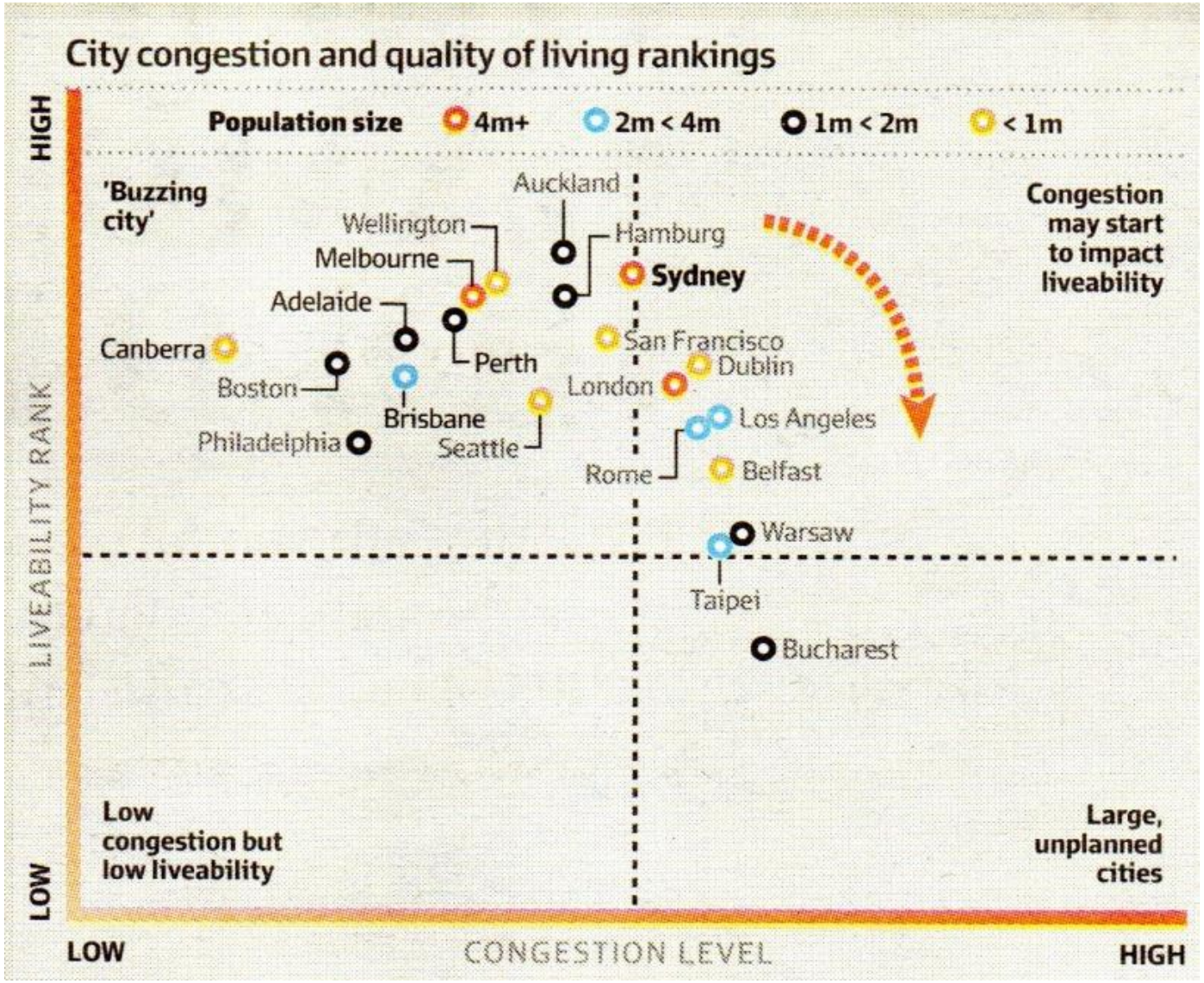
Thank You!

Rupert Brown
Consultant, CTS Product Management
Rupert.Brown@Cubic.com

CONGESTION VS LIVEABILITY



From the Australian Financial Review 1st June 2019.
Includes Australian cities not included as part of the INRIX data.