

CHANGING CITIES AND MINDS FOR ACTIVE MOBILITY

Today, half of the world's population live in cities, and that proportion is expected to increase to two-thirds by 2050.¹ As more people move to and live in cities, city planners have to devise ways to accommodate population growth and expand economic opportunities while also improving environmental sustainability, public health, equity and quality of life.

One area of policy that affects these outcomes is transport. Historically, city planners had equated transport with motorised vehicles, and developed infrastructure to move them efficiently. But, a growing number of cities in Europe, North America and Australia were shifting away from this paradigm. They were encouraging greater use of public transport, and promoting cycling and walking as feasible transport options. Their reasons for doing so included concerns about land scarcity, environmental sustainability, public health, social inclusion, and good urban design. In these cities, on-road bicycle lanes, brightly-coloured bicycle-sharing systems, and pedestrianised streets were becoming common sights.

Exhibit 1: On-road bicycle lanes in downtown Vancouver (left), and New York City's Citi Bike Bicycle-Sharing System (right)



Image Credits: (left) Paul Krueger, <https://tinyurl.com/yc4uqrnt>, CC BY 2.0., and (right) Shinya Suzuki, <https://tinyurl.com/yaxn2o3p>, CC BY-ND 2.0.

Transport planning in Singapore had also followed a similar trajectory. In the past, infrastructure plans for roads prioritised the movement of motorised vehicles. Until 2008, the Transport Ministry did not even consider cycling a legitimate mode of transport.² Yet, a decade later, bicycles and other active mobility devices were not only ubiquitous, but were also creating new challenges for Singapore's transport planners. The government had had to repeatedly defend the

¹ United Nations, "World's population increasingly urban with more than half living in urban areas," last modified 10 July 2014, <http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html>.

² Singapore Parliamentary Debates, Official Report, 27 August 2008, Vol. 84, Col. 3320 (Teo Ser Luck).

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bicycle's right to space, and appeal for patience from members of parliament (MPs) and the public, who were frustrated with reckless riders and indiscriminately parked shared bicycles.

How did such a significant policy shift happen in just ten years?

In this case study, we examine how attitudes and policies towards cycling have evolved in Singapore, with the objective of addressing three broad issues: how significant policy shifts happened; defensible ways for allocating scarce land to different groups of commuters, and the tactics that policymakers can use to change the status quo and manage the unintended consequences.

BICYCLE POLICY IN SINGAPORE

Once upon a time, cycling was the main mode of transport in Singapore. In 1960, there were 268,000 registered bicycles compared to 63,000 cars and 19,000 motorcycles.³ Several major roads also had cycling tracks next to footways. But, as disposable incomes increased in the 1970s, these trends reversed: car and motorcycle ownership soared, while cycling came to be viewed as an inferior form of transport. Reflecting this shift in commuter preference, transport planners focused on building a comprehensive road network for motor vehicles. The cycling tracks of earlier years were removed to make way for wider roads.⁴

For decades after that, Singapore's transport planners paid little attention to cycling. This was evident in their high-level planning documents and the remarks made by successive Transport Ministers. For example, the first white paper on land transport that was published in 1996 made no mention of cycling.⁵ Even though three MPs pointed out the omission⁶, and urged the Ministry to provide cycling tracks in public housing estates, the then Minister, Mah Bow Tan, did not acknowledge their suggestions.⁷

On several occasions, he and his successors rejected appeals for dedicated on-road bicycle lanes.⁸ They reasoned that in land-constrained Singapore, road lanes could only be set aside for space-efficient mass transport like buses, and even then, only during peak hours. The Transport Ministry also considered cycling impractical given Singapore's tropical climate, dense public transport

³ Koh Puay Ping, and Wong Yiik Diew, "The Evolution of Cycling in Singapore," *Journeys*, November 2012, <https://www.scribd.com/document/305277000/The-Evolution-of-Cycling-in-Singapore>.

⁴ Ibid.

⁵ Land Transport Authority, "White Paper: A World Class Land Transport System," last modified 2 January 1996, <https://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/ReportNewsletter/White-Paper.pdf>.

⁶ They include Chiam See Tong (Member for Potong Pasir), Chew Heng Ching (Member for Eunos GRC), and Imran bin Muhammad (Nominated Member of Parliament). Refer to Singapore Parliamentary Debates, Official Report, 18 January 1996, Vol. 65, Col. 516 (Chiam See Tong); Singapore Parliamentary Debates, Official Report, 19 January 1996, Vol. 65, Col. 564 (Chew Heng Ching), and Singapore Parliamentary Debates, Official Report, 19 January 1996, Vol. 65, Col. 603 (Imran bin Muhammad).

⁷ Singapore Parliamentary Debates, Official Report, 19 January 1996, Vol. 65, Col. 621-657 (Mah Bow Tan)

⁸ See Singapore Parliamentary Debates, Official Report, 1 June 1998, Vol. 69, Col. 171 (Mah Bow Tan); Singapore Parliamentary Debates, Official Report, 25 September 2001, Vol. 73, Col. 2111-2115 (Yeo Cheow Tong), and Singapore Parliamentary Debates, Official Report, 20 July 2005, Vol. 80, Col. 1107 (Yeo Cheow Tong).

system, and low cycling mode share of only 1 per cent.⁹ So, very little was done to make roads conducive to cycling¹⁰ even though the legal expectation was that cycling would happen on roads.¹¹ But, in 1998, this was true not just of Singapore but also many other cities. The common perception was that cycling was for recreation, and not a serious transport option.

In Singapore, it was the non-transport-related agencies that did the most to develop cycling infrastructure. From 1992 onwards, the National Parks Board (NParks) began developing an island-wide network of park connectors for recreational cycling and jogging (see **Box 1**). Some Town Councils also collaborated with the Urban Redevelopment Authority (URA) to develop cycling tracks in public housing estates. But, without a lead agency promoting cycling as a mode of transport, issues like connecting these cycling tracks to each other, public transport nodes, and other popular destinations were not prioritised.¹²

So when cycling began to enjoy a revival in cities around the world in the 2000s, Singapore found itself lagging behind. By 2008, global cities like London and New York had already committed themselves to expanding cycling's mode share, and were developing on-road bicycle lanes to encourage cycling. In contrast, Singapore's transport planners were only just recognising cycling as a bona fide mode of transport. Their support for cycling was measured, focusing primarily on facilitating first-and-last-mile journeys between homes and public transport nodes.¹³ They continued to reject appeals for a comprehensive network of on-road bicycle lanes or off-road cycling tracks. During the Budget Debate that year, the Minister of State for Transport said:

"We have to recognise that given our land constraints, it is not feasible to provide a comprehensive set of dedicated cycling tracks or cycle lanes island-wide... We have to ask ourselves if this is the best way to make full use of our very limited road space. The issue is not whether cyclists have a place in our public transport system, but how do we allocate space amongst competing users that will best make use of our very limited land."¹⁴

In other words, the core policy issue facing transport planners was how to allocate Singapore's scarce roads, and (as we shall soon see) footways¹⁵ to motorists, cyclists, and pedestrians.¹⁵

⁹ Ibid.

¹⁰ Paul Barter, "The Status of Bicycles in Singapore," last updated June 2008, <http://lkyspp2.nus.edu.sg/wp-content/uploads/2013/04/Singapore-bicycle-situation-Barter-June-2008.pdf>.

¹¹ Cycling on footways was prohibited under Rule 28 of the Road Traffic Rule. Like any other vehicles, bicycles were to be ridden on the roads, and cyclists were required to abide by all the relevant traffic rules and regulations.

¹² See Kiat W. Tan, "A greenway network for Singapore," *Landscape and Urban Planning* 76, no.1-4 (April 2006): 59.

¹³ Land Transport Authority, "LTM Masterplan: A People-Centred Land Transport System," last updated 18 February 2008, <https://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/ReportNewsletter/LTMP-Report.pdf>.

¹⁴ Singapore Parliamentary Debates, Official Report, 6 March 2008, Vol. 84, Col. 2407 (Lim Hwee Hua).

¹⁵ A further confirmation of this was provided at the 2009 Budget Debate (a year later) when the then Senior Parliamentary Secretary to the Transport Ministry said, "The key dilemma in facilitating cycling is about space – how do we share space amongst competing users in such a way that will make better use of our very limited land, as well as ensuring the safety of pedestrians, cyclists and motorists?" See Singapore Parliamentary Debates, Official Report, 12 February 2009, Vol. 85, Col. 3069-3070 (Teo Ser Luck).

Box 1: Building the Park Connector Network in land-constrained Singapore¹⁶

The Park Connector Network (PCN) refers to landscaped pathways that link major parks, nature reserves, and places of interest in Singapore. It was originally intended as a recreational space for cycling and jogging. But, as the network expanded, cyclists began using it as an off-road track for their commutes.

Exhibit 2: Jurong Park Connector: (left) Along the Jurong Lake, and (right) under a train viaduct



Image Credit: Author's own

It took strategic planning to develop the PCN because it was difficult to acquire land for park development in land-constrained Singapore. The key difficulties that NParks faced were:

- **Finding the land on which to develop park connectors.** NParks had to borrow land from other government agencies. It developed the earliest park connectors on drainage buffers, or lands that provided access for the de-silting of monsoon canals. These lands were spacious, under-utilised and of little economic value. NParks borrowed them from the Public Utilities Board (PUB). The two agencies agreed that the shared path for cyclists and joggers on these lands would be at least four metres wide. This minimum width would provide ample space to both cyclists and joggers and also allow access to vehicles for repair works to the canal and maintenance of the greenery.
- **Finding land to connect the various stretches of park connectors.** To achieve this, NParks had to find a way of converting other public lands, such as road reserves, to park connectors. To facilitate this process, a committee comprising the government agencies that managed these public lands was established. But, progress was slow. It took two years of negotiations before NParks received approval to develop the first park connector on road reserve land. It accommodated a 1.5 metres wide pedestrian path, and a two metres wide cycling track.

¹⁶ Unless otherwise stated, the information for this box story came from Kiat W. Tan, "A greenway network for Singapore," 45-66.

- **Integrating park connectors with the land transport system** The utilisation rates of the PCN depended in part on whether it brought people where they wanted to go. This required an understanding of travel patterns, and the development of seamless routes – both of which were transport planning matters. In 2016, the government announced that it would be filling some gaps in the PCN to create seamless routes that connected a few residential towns to the city centre.¹⁷

ALLOCATING SPACE TO CYCLISTS

Deciding on the amount of space to allocate to cyclists was neither straightforward nor politically easy. It involved answering several other questions: Why should cycling even be promoted as a mode of transport, and in a tropical country? How to accommodate it in an already built-up city where cycling had not featured in land transport planning? Which commuter groups should bear the burden of sharing with cyclists? And, more fundamentally, who should shape the answers to these questions?

In the mid-2000s, the search for answers initially centred on Tampines, a public housing town in eastern Singapore. But, soon enough, planners had to confront the dramatic expansions in cycling infrastructure that were happening in other cities, and the growing calls for Singapore to make similar investments.

(i) Accommodate domestic realities, but how and at whose expense?

Tampines was Singapore's first cycling town, and it had its MP, Irene Ng, to thank for that. She was a vocal advocate of safe cycling, and in 2005 called for a review of the ban on footway cycling:

"There are currently many [public housing residents] using bicycles as a mode of transport from their home to school, market, [train] stations, etc. Many use the footpaths along the public road to commute responsibly as they felt that the roads are presently too dangerous, especially for students cycling to school. However, it is now an offence to cycle along a footway. Could this rule be reviewed, while making sure that the safety of the pedestrians is not compromised? ... The blanket ban signals that cyclists have no business being on footways, even though the roads might be dangerous."¹⁸

And, indeed Singapore's roads could be dangerous for cyclists (see **Exhibit 3**). Barely three months before Ng's speech, Sylvester Ang, a 37-year-old avid cyclist, died after he was hit by a bus while cycling.¹⁹ His death enraged the local cycling community,²⁰ and resulted in substantial media

¹⁷ Ministry of National Development, "COS 2016: Speech by Minister Lawrence Wong "Building a Better Home Together", last updated 11 April 2016, <https://www.mnd.gov.sg/newsroom/news-page/cos-2016-speech-by-minister-lawrence-wong-building-a-better-home-together>.

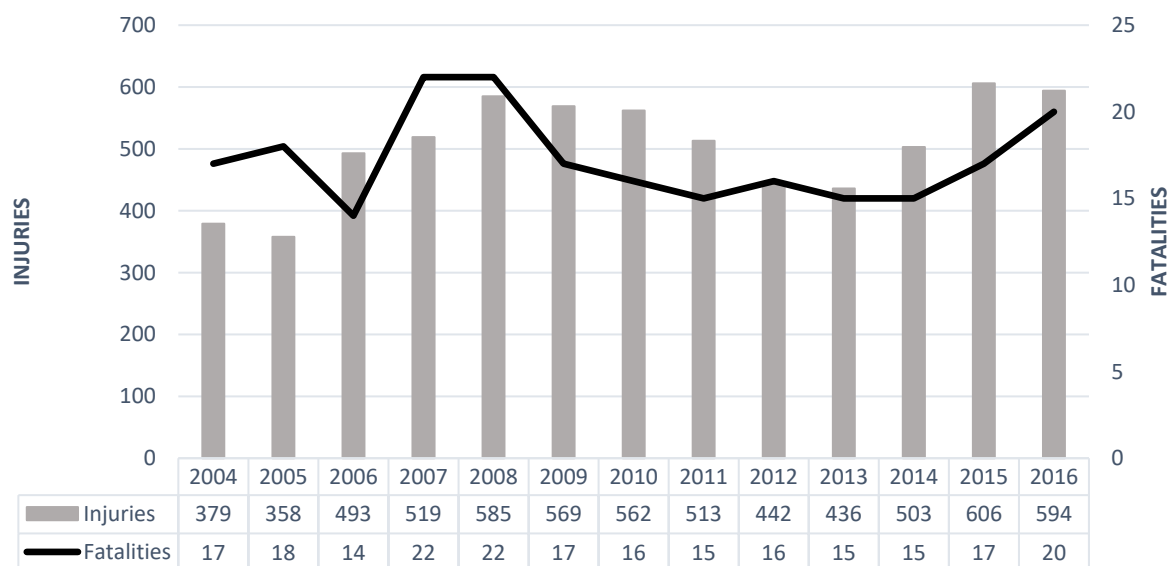
¹⁸ Singapore Parliamentary Debates, Official Report, 3 March 2005, Vol. 79, Col. 1392 (Irene Ng Phek Hoong).

¹⁹ "Died on Xmas Eve from severe injuries," *The Straits Times*, 3 January 2005, www.factiva.com.

²⁰ "Cyclist begin movement to lobby for rights," *The Straits Times*, 3 January 2005, www.factiva.com.

coverage about the lack of safe cycling infrastructure on Singapore’s roads.²¹ At the time, cycling was expected to take place on roads, and was prohibited on footways.²² But, in reality, footway cycling was common, and the Traffic Police did not enforce against it except where cyclists were reckless.²³

Exhibit 3: Injuries and fatalities involving cyclists and their pillion riders, 2004-2016



Source: Singapore Police Force

Following Ng’s speech, the then Senior Minister of State for Home Affairs agreed to review the ban on footway cycling.²⁴ Two years later, in 2007, an inter-agency committee comprising the Traffic Police, LTA and the Tampines Grassroots Organisations announced a one-year trial of legalising footway cycling in Tampines.²⁵ The idea behind this was not to introduce footway cycling per se – that was already happening island-wide – but to test out interventions that would enable pedestrians and cyclists to share footways safely (see **Exhibit 4**).

²¹ Examples include “Bike ride in memory of dead friend,” *The Straits Times*, 3 January 2005, www.factiva.com; “Cycling commitment is needed”, *Today*, 11 January 2005, www.factiva.com; “Mind the toads! Cycling is great fun in Singapore, but...”, *Today*, 15 January 2005, www.factiva.com; “Vote for pedal power,” *Today*, 17 January 2005, www.factiva.com; “A few rules for sidewalk cyclists,” *Today*, 18 January 2005, www.factiva.com; “Wheels of indifference?,” *Today*, 20 January 2005, www.factiva.com; “Cycling in Singapore getting riskier by the day,” *Today*, 21 January 2005, www.factiva.com; and “City layout makes S’pore less livable,” *Today*, 7 February 2005, www.factiva.com.

²² Joint Tripartite Committee of Land Transport Authority, Traffic Police and the Tampines Grassroots Organisations, “The Cycling on Footways Study in Tampines Town from 27 May 2007 to 30 May 2008,” last updated 14 May 2007, http://www.getforme.com/previous2007/140507_pilotprojectallowingcyclingonallfootpathsintampines.htm.

²³ “Cyclists take to footpaths: Tampines trial to assess safety of bikers and pedestrians,” *Today*, 15 May 2007, www.factiva.com, and Paul Barter, “The Status of Bicycles in Singapore.”

²⁴ The Traffic Police, a department in the Home Affairs Ministry, enforces traffic offences, including ones committed by cyclists.

²⁵ Joint Tripartite Committee, “The Cycling on Footways Study in Tampines Town from 27 May 2007 to 30 May 2008.”

Exhibit 4: Some features of the “Cycling on Footways” trial in Tampines Town

Features	What About It?
1. Infrastructure	Tampines was chosen because it was a compact town with some broad footways and well-used park connectors. It also had a large cycling population.
2. Safe Cycling Guidelines	A set of guidelines on safe cycling was developed in consultation with grassroots organisations in Tampines, and cycling advocacy groups.
3. Education	Two weeks before the launch of the trial, a series of public education programmes were organised to promote safe cycling on footways.
4. Enforcement	In addition to the Traffic Police, 120 cycling wardens were recruited, trained and deployed along the footways to educate and advise pedestrians and cyclists to share the footways in a safe and gracious manner.
5. Culture	Residents were reminded that the sharing of narrow footways required both pedestrians and cyclists to exercise social graciousness and responsibility, with cyclists giving way to pedestrians.

With few exceptions, the initial public reaction to the trial was negative.²⁶ Island-wide, Singaporeans were concerned that footways were too narrow for safe sharing, and there might be accidents.²⁷ One member of public said she doubted that “cyclists will give way to pedestrians, keep to riding on the left side of the footpath and get off when there are too many people using the same space.”²⁸ She called for separate paths for cyclists and pedestrians. Another was concerned that pedestrians would not be compensated if they were injured by cyclists as most cyclists did not have third-party insurance.²⁹ Popular local blogger, mrbrown, asked, “Who came up with this dumb idea of those bike lanes alongside pedestrian walkways? Bikes belong on the road, not pavement...if you want to give cyclists their space, do it on the road, with bike lanes, instead of footpaths.”³⁰

Residents in Tampines also had mixed views, with 53 per cent supporting the sharing of footways.³¹ Those who were unsupportive cited reasons such as the increased hazards to pedestrians, and footways that were not designed for cycling.³² Based on the feedback received, the inter-agency committee hypothesised that the sharing of footways would be feasible and sustainable only if three key issues were addressed together: better infrastructure, education for all and enforcement for the errant few (see **Exhibit 5**).³³ To test this formula, the trial was

²⁶ Local broadsheet, *The Straits Times*, reported that of the 70 readers who wrote to the *Sunday Times* about the trial, 60 were against it. See “Enough space for all along footpaths,” *The Straits Times*, 2 January 2009, www.factiva.com.

²⁷ “Cycling wardens to patrol Tampines,” *The Straits Times*, 31 May 2007, www.factiva.com.

²⁸ “Have clear lane marking for cyclists, pedestrians,” *Today*, 17 May 2007, www.factiva.com.

²⁹ “Cars versus cyclists versus pedestrians,” *Today*, 17 May 2007, www.factiva.com.

³⁰ mrbrown, “My New Ride II: Specialized Hardrock Comp,” last updated on 1 October 2007, <http://www.mrbrown.com/blog/2007/10/my-new-ride-ii.html>.

³¹ Land Transport Authority, “Background on ‘Cycling on Footways’ Study in Tampines Town (May 2007 to May 2008 & August 2008 to January 2009),” last updated on 13 December 2009, https://www.lta.gov.sg/data/apps/news/press/2009/13122009_AnnexA_TampinesCyclingTown.pdf.

³² Tripartite Committee of Singapore Police Force, The Land Transport Authority & Tampines Grassroots Organisations, “Key Findings of Independent Study,” last updated on 1 July 2008, https://www.lta.gov.sg/data/apps/news/press/2008/2008-07-01_Cycling-Annex-A.pdf.

³³ Tripartite Committee Of Singapore Police Force, The Land Transport Authority & Tampines Grassroots Organisations, “Outcome of the Cycling on Footways Study in Tampines Town,” 1 Jul 2008, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=1971>; and “Tampines considers extending trial to let cyclists share footpath with pedestrians,” *Channel NewsAsia*, 9 June 08, www.factiva.com.

extended for another six months. At the end of this second trial, 65 per cent of residents supported footway cycling, and it was legalised in Tampines in 2010.³⁴

Exhibit 5: Key issues that had to be addressed for the sharing of footways to be feasible and sustainable

Features	What About It?
1. Infrastructure	Widen footways and demarcate cycling and walking paths. Build segregated cycling tracks where feasible.
2. Education	Educate and encourage cyclists and pedestrians to share footways safely and responsibly, especially high risks groups like foreign workers and youths.
3. Enforcement	Take action against reckless and errant cyclists on footways by conducting enforcement blitzes.

For the rest of Singapore, footway cycling continued as a mostly unenforced ban. The Transport Ministry's position was that it had to move "at a pace that people [were] reasonably comfortable with."³⁵ As things stood after the Tampines trial, Singaporeans had divergent views about the sharing of footways. So, instead of legalising footway cycling island-wide, the Transport Ministry launched a \$43 million programme to design and construct dedicated cycling tracks in public housing towns. The first five towns to benefit from this programme were Tampines, Yishun, Sembawang, Pasir Ris and Taman Jurong. They were chosen for their favourable local characteristics, including the strong community support for cycling.³⁶ Between 2009 and 2012, LTA constructed 6.4 kilometres of off-road cycling tracks.³⁷

On-road bicycle lanes remained a no-go even though the Transport Ministry understood the dangers of on-road cycling. "I cycle frequently, so I understand the dangers, and I pray before I cycle every day. We know that the road space is scarce, so we cannot be drawing lanes," the Senior Parliamentary Secretary for the Transport Ministry told Parliament in 2008.³⁸ But, planners were willing to consider other measures. That same year, LTA began installing road signs to alert motorists to the presence of cyclists along popular cycling routes such as those in Changi, West Coast and Thomson.³⁹

(ii) Urban liveability as an economic strategy, but how quickly should we proceed?

Apart from accommodating the reality of footway cycling, transport planners had to grapple with the more fundamental question of whether cycling should even be promoted as a mode of transport in tropical Singapore.

³⁴ Tripartite Committee of Tampines Grassroots Organisations, Land Transport Authority & Traffic Police, "Regulatory Framework for Cycling on Footways in Tampines Town," last updated on 13 December 2009, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=itc7k8d9e4bbb2cie9409o5lqah9e1q4p8j29m0ify377tbxne>.

³⁵ Singapore Parliamentary Debates, Official Report, 12 February 2009, Vol. 85, Col. 3076 (Teo Ser Luck).

³⁶ Singapore Parliamentary Debates, Official Report, 12 February 2009, Vol. 85, Col. 3074 (Teo Ser Luck).

³⁷ Land Transport Authority, "Land Transport Master Plan 2013," last updated on 31 October 2013, <https://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/ReportNewsletter/LTMP2013Report.pdf>.

³⁸ Singapore Parliamentary Debates, Official Report, 27 August 2008, Vol. 84, Col. 3320 (Teo Ser Luck).

³⁹ Land Transport Authority, "LTM Masterplan: A People-Centred Land Transport System."

The late 2000s brought with it the realisation that cities were increasingly being judged on a new set of paradigms, such as their liveability, environmental sustainability and quality of life.⁴⁰ The perception was that a thriving economy, and ample jobs were not enough.⁴¹ Cities had to be great places to live in if they wanted to succeed in the race for investments and talents. And, it was very much a race with cities like London, Vancouver, Sydney, Copenhagen, New York, and Paris competing to be the cleanest and greenest by 2020. Most of them had set targets to reduce their reliance on motorised transport by making walking, cycling and public transport preferred alternatives.⁴²

In Singapore, many cyclists including expatriates saw this global trend. They began challenging the planner's assumption that cycling was only for recreation, and that Singapore's tropical climate made it impractical to cycle.⁴³ They argued that Singapore had many characteristics that made cycling an attractive transport option, including its compactness, flat terrain, clean air, and year-round warm weather.⁴⁴

It was against this backdrop that cycling was accepted as a mode of transport in 2008. The Land Transport Master Plan positioned cycling as one of several "transport choices" that would enable Singapore "to realise its aspirations to be a thriving global city."⁴⁵ A year later, the Sustainable Singapore Blueprint – the first-ever planning document focusing on sustainable development – positioned cycling as a cleaner form of commuting that would improve the quality of life for all and keep Singapore attractive to investments and talents.⁴⁶

But, when it came to implementation, the Transport Ministry's preference was to learn from its experience building off-road cycling tracks in the five public housing towns before considering an island-wide implementation. Some disagreed with this approach. MP Irene Ng reflected the sentiments of this group when she said:

⁴⁰ See, for example, the Land Transport Authority, "LTM Masterplan: A People-Centred Land Transport System.", and Ministry of Environment and Water Resources and Ministry of National Development, "A Lively and Liveable Singapore: Strategies for Sustainable Growth," last updated on 9 April 2009, https://www.mnd.gov.sg/docs/default-source/default-document-library/other-publications/sustainableblueprint_forweb.pdf.

⁴¹ The Sustainable Singapore Blueprint asserts, "Singapore cannot stand still. We are in a continual race to attract investments and talents against stiff global competition. A thriving economy, able to provide ample good jobs for its people, is our starting point... We want to build Singapore into one of the most liveable cities in Asia – clean, green, safe and efficient, for Singaporeans now and in the future." See "A Lively and Liveable Singapore: Strategies for Sustainable Growth."

⁴² Greenest City Action Team, "Vancouver 2020: A bright green future," last updated 2009, <http://vancouver.ca/files/cov/bright-green-future.pdf>.

⁴³ See for example, "Vote for pedal power," *The Straits Times*, 17 January 2005, www.factiva.com; "Wheels of indifference," *The Straits Times*, 20 January 2005, www.factiva.com; "Cycling in Singapore getting riskier by the day," *The Straits Times*, 21 January 2005, www.factiva.com; "City's layout makes S'pore less livable," *The Straits Times*, 7 February 2005, www.factiva.com; "Get on your bike," *Today*, 19 May 2007, www.factiva.com; "Anti-green mall bans bicycles from parking there," *The Straits Times*, 11 June 2007, www.factiva.com; mrbrown, "mrbrown's Quick Guide to Bicycle Commuting in Singapore," last updated on 14 July 2008, <http://www.mrbrown.com/blog/2008/07/mrbrowns-quick.html>; and tk, "Cycling must be a key part of Singapore's future," last updated on 14 September 2011, <https://yawningbread.wordpress.com/2011/09/14/cycling-must-be-a-key-part-of-singapores-future/>.

⁴⁴ Ibid.

⁴⁵ Land Transport Authority, "LTM Masterplan: A People-Centred Land Transport System."

⁴⁶ "A Lively and Liveable Singapore: Strategies for Sustainable Growth."

“Can I urge the [Transport Ministry] not to look at the five demonstration cycling towns as models for the rest of the island but rather to look at the congested cities in the world, such as Paris, London, Geneva, Chicago, Edinburgh, who have managed to incorporate cycling into their urban transport systems with bike lanes on roads, with clear signs that indicate that cyclists have a right to be on the roads? ... The emphasis on Tampines or the other towns in Singapore is a red herring and might lead us in the wrong direction because what we need is a clear national policy.”⁴⁷

On July 2010, some two months after Ng’s appeal in Parliament, the Transport Ministry launched its National Cycling Plan. But, the Plan did not articulate a national policy. Instead, it reiterated the Transport Ministry’s commitment to develop intra-town cycling networks in a handful of public housing estates.⁴⁸

Box 2: A hard compromise?: Intra-town cycling networks

Intra-town cycling networks facilitate short-distance travel within housing towns, usually from homes to public transport nodes and other popular destinations such as food centres and schools.⁴⁹ The development of these networks is ongoing and has not been without its challenges:

- **Most public housing towns were not planned to accommodate cycling tracks.** Therefore, constructing them in these towns has been costly, and sometimes requires the cooperation of several government agencies as construction works affect existing roadside greenery, drainage, and building setbacks.⁵⁰ Since 2012, the government has been including basic cycling provisions such as bicycle parking racks and wider footways in its plans for new HDB towns.⁵¹
- **Infrastructure has to be complemented with education and enforcement efforts.** In most towns, cycling tracks are not comprehensive due to space constraints. So, cyclists and pedestrians still have to share footways, some of which are less than 1.5 metres wide.⁵² To ensure that this happens safely, Singapore’s planners have had to engage in resource-intensive activities like investing in public education efforts, developing rules for the safe sharing of footways, and committing resources to the enforcement of these rules.

⁴⁷ Singapore Parliamentary Debates, Official Report, 26 April 2010, Vol. 87, Col. 41 (Irene Ng Phek Hoong).

⁴⁸ Land Transport Authority, “Changi-Simei, Bedok and Marina Bay to have cycling infrastructure by 2014,” last updated 15 July 2010,

<https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=sq32hwy66b3qe00c8vl5ct320065zasq53mmxle5hirjv3b8fd>.

⁴⁹ Centre for Liveable Cities, *Walkable and Bikeable Cities: Lessons from Seoul and Singapore* (Singapore: Centre for Liveable Cities, 2016), 103, <https://www.clc.gov.sg/documents/publications/urban-system-studies/walkable-and-bikeable-cities.pdf>.

⁵⁰ Centre for Liveable Cities, *Walkable and Bikeable Cities*, 106.

⁵¹ Ministry of Transport, “Speech (Part 2 – Private Transport) by Mr Lui Tuck Yew, Minister for Transport, for COS 2012,” last updated on 7 March 2012, [https://www.mot.gov.sg/news-centre/news/Detail/Speech%20\(Part%20%20-%20Private%20Transport\)%20by%20Mr%20Lui%20Tuck%20Yew,%20Minister%20for%20Transport,%20for%20COS%202012/](https://www.mot.gov.sg/news-centre/news/Detail/Speech%20(Part%20%20-%20Private%20Transport)%20by%20Mr%20Lui%20Tuck%20Yew,%20Minister%20for%20Transport,%20for%20COS%202012/).

⁵² Singapore Parliamentary Debates, Official Report, 15 August 2016, Vol. 94, *Written Answers to Questions*, No. 9 (Khai Boon Wan).

- **Off-road cycling tracks have not removed the need for cyclists to go onto roads.** Cyclists still have to use access roads and pedestrian crossings. When they do so, they sometimes antagonise pedestrians by taking up too much space in pedestrian crossing areas. More dangerously, cyclists also risk getting into accidents at access roads because motorists do not always anticipate encountering fast-moving persons at these roads, and so may not give way to cyclists. Local planners have had to find practical solutions to address these conflicts and dangers.

Exhibit 6: (left) Demarcated and (right) segregated intra-town cycling tracks



Image Credits: Author's own

- **People still need to learn to share.** Intra-town cycling networks have merely shifted the burden of sharing with cyclists from motorists to pedestrians.

(iii) Listen to cyclists, but when and how much?

Local cycling advocates also had a role in shaping land allocation decisions. One thing the advocates did religiously was participate in public consultation exercises. In 2007, when the Transport Ministry was consulting the public on the Land Transport Master Plan, cyclists appealed to policymakers to recognise cycling as a mode of transport.⁵⁵ They succeeded. But, the government continued to reject their appeals for a comprehensive network of on-road bicycle lanes.⁵⁶

The next major consultation exercise was for the Sustainable Singapore Blueprint. Of the 675 online suggestions submitted, 120 (or 18 per cent)⁵⁷ urged the government to promote cycling as a form of green transport by establishing segregated on-road bicycle lanes, clear rules for cyclists, and amenities such as showers and lockers. But, by then, the Transport Ministry had already committed itself to developing off-road cycling networks in public housing towns. It was also unwilling to legalise footway cycling before people were ready for such a move. So, none of the

⁵⁵ "Ideas to move into the future," *The Straits Times*, 27 April 2007, www.factiva.com.

⁵⁶ Land Transport Authority, "LTM Masterplan: A People-Centred Land Transport System."

⁵⁷ Chu Wa, "Bicycle lane is the way to go?," last updated 7 November 2008, <http://cyclinginsingapore.blogspot.sg/2008/11/120-out-of-the675-public-feedback.html>.

public's suggestions were accepted. Instead, LTA pledged to implement intra-town cycling networks in new areas such as Marina Bay and a new public housing development in Punggol.⁵⁸

Cycling advocates persisted and provided feedback to URA when it reviewed its Concept Plan, Singapore's long-term land use and transport plan. By this time, the wish list for cycling was predictable. The items were the same ones that the government had been rejecting for years, including developing a dedicated on-road bicycle lane network, and regulations for the safe sharing of spaces by motorists, pedestrians and cyclists.⁵⁹ The public also appealed for an island-wide bicycle-sharing scheme.

In 2013, cyclists finally won an important victory. LTA and URA launched an updated and ambitious National Cycling Plan. It aimed to build "a cyclist-friendly, well-connected network providing safe and healthy cycling for all" by 2030. The 700 kilometres off-road network included the PCN, the intra-town cycling networks in all public housing towns, and a new cycling route -- the Round Island Route (see **Annex A**).⁶⁰ For perspective, 700 kilometres is about 14 times the length of Singapore, and about a fifth of Singapore's total road length.⁶¹ LTA also announced that it would be piloting a bicycle-sharing scheme in the Jurong Lake District.

A year later, cycling's role in the land transport system was further strengthened when Singapore's Prime Minister, Lee Hsien Loong, announced that Singapore will aim for a "car-lite" future by promoting other modes of transport, such as cycling. He said,

*"I visited Copenhagen one year for the Climate Change Conference. It was in December 2009. Deep December it gets dark at about 3 o'clock in the afternoon and at night at 7 o'clock it is dark, snowing, below freezing and people are going around, going about their business riding bicycles, wrapped up warmly but cycling on the roads. It is just their way of life. So if the Danes can do that in winter, I think we can do that in the tropics."*⁶²

It appeared that even the climate argument had been laid to rest.

⁵⁸ "A Lively and Liveable Singapore: Strategies for Sustainable Growth."

⁵⁹ Urban Redevelopment Authority, "Final Report of Focus Group on Sustainability and Identity," last updated on 10 August 2010, https://sunrise.ura.gov.sg/uol/publications/research-resources/plans-reports/Concept%20Plan%202011/~media/User%20Defined/URA%20Online/publications/research-resources/plans-reports/cpr_2011_sustainability.ashx.

⁶⁰ Urban Redevelopment Authority, "Cycling for All," last updated 7 March 2018, <https://www.ura.gov.sg/Corporate/Planning/Master-Plan/Key-Focuses/Transport/Cycling%20for%20All>.

⁶¹ Land Transport Authority, "Road Length In Kilometre (end-of-the-year)," last updated on 25 January 2018, <https://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/FactsandFigures/Road%20Length-km.pdf>.

⁶² Prime Minister's Office, "Transcript of Prime Minister Lee Hsien Loong's Speech at Clean & Green Singapore 2015 Launch on 8 November," last updated on 8 November 2014, <http://www.pmo.gov.sg/newsroom/transcript-prime-minister-lee-hsien-loongs-speech-clean-green-singapore-2015-launch-8>.

Box 3: Copenhagen – Policies of a dedicated bicycling city⁶³

Copenhagen is one of the best cycling cities in the world. But, this has not always been the case. In the 1950s and 1960s, motor vehicles were the dominant mode of transport. But, when the oil crisis hit in the 1970s, things changed. Danes had an impetus to cycle more. Today, bicycles account for a considerable part of Copenhagen's traffic. About 24 per cent of all trips and 41 per cent of work commutes are made on bicycles.⁶⁴

What are some features of Copenhagen's highly successful bicycle policy?

- **A comprehensive bicycle network** has been gradually developed, connecting all parts of the city. Most roads have bicycle paths that are separated from vehicular traffic by curb stones, or a row of parked cars. Like Singapore, Copenhagen also has a greenway network that provides a scenic, off-road route to cyclists. But, unlike Singapore, the main principle guiding Copenhagen's bicycle policy is providing room to bicycles on roads, not just off them.
- **Bicycles are integrated in land transport planning.** They are accommodated on trains, buses and taxis. There are also secure bicycle parking areas at transport hubs, schools, offices and residential areas. New offices and industrial buildings are required to incorporate bicycle parking facilities as well as changing rooms and showers for cyclists in their building plans.
- **A safe network, especially at road intersections.** In Copenhagen, large intersections have blue bicycle lanes and icons to remind drivers to look out for cyclists. Special light signals also give cyclists a six seconds head start over motor vehicles. To minimise collisions, trucks and buses are fitted with bicycle mirrors.
- **A comfortable network** that has bicycle paths that are between 1.7 metres and four metres wide, with 2.5 metres being the recommended minimum width. For perspective, the recommended minimum width for *shared* footways in Singapore was 1.8 metres in 2017.⁶⁵ To minimise interruptions to cyclists, bicycle paths in Copenhagen continue along small access roads uninterrupted, giving cyclists the right of way when crossing these roads. Snow is always cleared off the bicycle lanes before the driving lanes because of the greater priority given to cyclists.
- **A bicycle-sharing system that reinforces bicycle policy rather than spearheads it.** Copenhagen has a bicycle-sharing programme that caters primarily to tourists. It allows inexperienced cyclists to ride around in a safe and well-developed cycling network. This is unlike other cities, such as Paris, where bicycle-sharing systems had developed way in advance of safe cycling infrastructure, thereby exposing shared bicycle users to risks.

⁶³ Jan Gehl, *Cities for People* (Washington, DC: Island Press, 2010), 182-191.

⁶⁴ "In Copenhagen, Bike Commuting Gets a Little Less Popular," *Citylab*, 16 October 2017, <https://www.citylab.com/transportation/2017/10/why-have-copenhagens-bike-commuters-dropped-in-number/542859/>.

⁶⁵ Singapore Parliamentary Debates, Official Report, 10 January 2017, Vol. 94, 6.16 pm (Josephine Teo).

A FRAMEWORK FOR ACTIVE MOBILITY

By the start of 2015, it was clear that cycling would be accommodated off the roads of Singapore. But, where exactly was still unclear. The reality on the ground was that new personal mobility devices (PMDs) such as electronic scooters (e-scooters) and kick scooters were joining bicycles on footways, shared paths, and cycling tracks. As these public paths grew more crowded, conflicts began arising between the different user groups⁶⁶. Importantly, the rules governing the use of these paths grew increasingly incongruent with how they were actually being used. Strictly speaking, cycling was only allowed on shared paths and cycling tracks. Footway cycling was still prohibited everywhere but in Tampines. And, motorised PMDs (such as e-scooters) were prohibited on all public paths and on roads too.⁶⁷

What the government needed was a clear set of rules for off-road riding that applied not only to bicycles, but to these newer PMDs too. In January 2017, Parliament passed the Active Mobility Bill⁶⁸ to regulate the sale of mobility devices and their use on public paths. It sought to strike a balance between the diverse needs of the different user groups. Among other things, the Bill specified where the mobility devices could be used, the physical criteria they had to meet, and speed limits (see **Exhibit 7**). It also prescribed penalties for offences such as reckless riding, hit-and-run accidents, and the illegal modification of devices.

Exhibit 7: Where mobility devices can be used, speed limits, and physical criteria of the devices



Conventional bicycles & motorised and non-motorised PMDs	Maximum Weight: 20 kg Maximum width: 70 cm Maximum motorised device speed: 25km/h
Electric Bicycles	Maximum Weight: 20 kg Maximum motorised device speed: 25km/h Must be registered, with number plates installed

Source: Land Transport Authority, "Rules and Code of Conduct," last modified on 10 August 2017, <https://www.lta.gov.sg/content/ltaweb/en/walk-cycle-ride/rules-and-code-of-conduct.html>.

⁶⁶ Ibid.

⁶⁷ Land Transport Authority, "Recommendations on Rules and Code Of Conduct for Cycling and the Use of Personal Mobility Devices," last updated on 17 March 2016, [https://www.lta.gov.sg/data/apps/news/press/2016/20160317_AMAPPPanelReport\(final\).pdf](https://www.lta.gov.sg/data/apps/news/press/2016/20160317_AMAPPPanelReport(final).pdf).

⁶⁸ The Active Mobility Bill was based on the recommendations of the Active Mobility Advisory Panel. The Panel was convened by the Transport Ministry to consult the public, and recommend rules for the safe sharing of public paths. For more details, see "Recommendations on Rules and Code Of Conduct for Cycling and the Use of Personal Mobility Devices."

Significantly, the Bill legalised the use of bicycles, PMDs and personal mobility aids (like the mobility scooters used by the elderly) on all public paths as long as they met the specified physical criteria. It also obliged power-assisted bike (or e-bike) owners to register their devices with LTA, and install number plates. This step was taken because there was significant public concern about the illegal modification of e-bikes that allowed some of them to travel at motorcycle speeds. Registration, though onerous, would make it easier to identify users who illegally modified their e-bikes post-registration.⁶⁹

The regulatory framework was complemented by enforcement and public education efforts. The Bill empowered public officers from LTA and its partner agencies like NParks to enforce its various provisions. LTA could also appoint volunteers as public path wardens – similar to the cycling wardens appointed during the Tampines trial – to educate the public on safe riding and deter reckless behaviour. These wardens had some enforcement powers -- they could obtain the personal particulars of individuals suspected of committing an offence.⁷⁰

The Active Mobility Bill did not contain provisions for regulating operators of bicycle-sharing services. Instead, LTA took that up separately by calling for a tender in July 2016 for an operator to build, own, operate, and maintain a bicycle-sharing system in the Jurong Lake District. To cover part of their cost, operators could bid for grants from LTA.

But, even before LTA could announce the winning bid, three private bicycle-sharing services had begun operating in Singapore.⁷¹ These services were fully privately-funded, highly affordable for users, dockless, and operated island-wide. LTA decided not to award the tender as these new businesses had “obviated the need for a government-run system backed by government grants.”⁷² Instead, it decided to “monitor the developments in the bicycle-sharing landscape, and introduce new plans if necessary.”⁷³

Box 4: Sharing Scarce Spaces in Tokyo

In Tokyo, 14 per cent of daily trips are made by bicycles, compared to just 2 per cent in New York City and 1 per cent in London. Yet, for a city that has millions of daily cyclists, Tokyo’s cycling infrastructure is hardly world-class. It has 11.6 kilometres of on-road bicycle lanes, and 126 kilometres of cycling tracks.⁷⁴ Curiously, few Tokyo residents appeal for better infrastructure.⁷⁵

⁶⁹ “Recommendations on Rules and Code Of Conduct for Cycling and the Use of Personal Mobility Devices.”

⁷⁰ Land Transport Authority, “Factsheet: Active Mobility Bill,” last updated 10 January 2017, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=2e0d9c1a-55ab-4647-9b08-4cd4ff6d44cb>.

⁷¹ Julienne Chen, “Are cities responsive or experimental? The case of bike share in Singapore,” n.d., <https://lkycic.sutd.edu.sg/blog/experimental-city-responsive-city/>.

⁷² Land Transport Authority, “Non-Award of Bicycle-Sharing Tender,” last updated 24 March 2017, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=ea2e677b-262f-48f6-9a54-50e7494eb161>.

⁷³ Ibid.

⁷⁴ “Reinventing the wheel: the future of cycling in Tokyo”, *Japan Times*, 5 April 2014, <https://www.japantimes.co.jp/life/2014/04/05/lifestyle/reinventing-the-wheel/#.Wl7s45P1XVo>.

⁷⁵ Tokyo By Bike, “What Tokyo’s Cycling Infrastructure Can Learn From Rail,” last updated 28 June 2017, <http://www.tokyobybike.com/2017/06/what-tokyos-cycling-infrastructure-can.html>.

Several observers, including Singapore's transport planners, have wondered how cycling took off in Tokyo despite official neglect. Observers usually attribute Tokyo's success to:

- **Compact and self-contained suburban neighbourhoods**, with everything a resident might need located within one to two kilometres. Cycling is therefore convenient. Suburban traffic is also naturally calmed by narrow streets with numerous blind corners, so cyclists can safely share road space with motorists.
- **Cycling laws in Tokyo are unenforced unless there is an accident.** Under the law, adult cyclists can only cycle on pavements that are designated for shared use or are wider than three metres, and to avoid obstacles on the road. But, few cyclists obey this rule. Instead, they ride wherever is most convenient and safe, including on roads, and most usually on pavements.
- **Cycling complements Tokyo's excellent public transport system**, which is well-used because owning a car is very expensive. About 20 per cent of rail commuters cycle to train stations,⁷⁶ where they take the train to their final destinations.
- **Patient, polite and tolerant residents**, who have made the sharing of scarce space less fraught. It bears noting though that Tokyo's cyclists do complain about drivers who are unwilling to yield to them.⁷⁷ Cycling blogs also report that the Japanese were more likely than not to have an extremely negative opinion about cyclists⁷⁸.

ACTIVE MOBILITY AND ITS DISCONTENTS

Singapore's transport planners believed that it would take several years for the various users of public paths to peacefully coexist.⁷⁹ But, that proved to be cold comfort for the public and their MPs living in the present.

(a) The problems with sharing, especially with motorised PMDs, and without insurance

Even before the Active Mobility Bill was passed, the public was against sharing footways – the narrowest of public paths – with motorised devices. A 2015 survey conducted by LTA revealed that while 55 per cent of respondents were open to sharing footways with bicycles and non-motorised PMDs, almost the same proportion opposed doing so with e-bikes and motorised PMDs (see **Exhibit 8**).

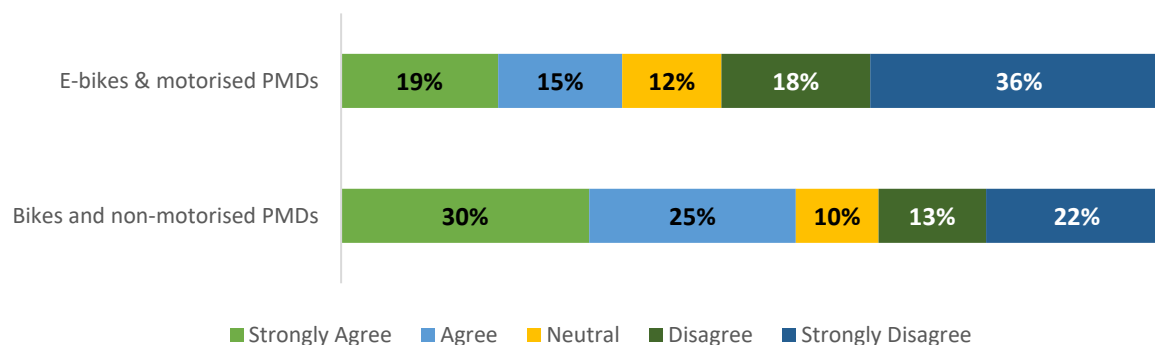
Exhibit 8: More than 5,000 respondents indicated their openness to sharing footpaths with various user groups

⁷⁶ Copenhagenize Design Co., "Tokyo, Japan 9 (new)," last updated 2017, http://copenhagenizeindex.eu/09_tokyo.html.

⁷⁷ "On Your Bike – Tokyo," *Monocle*, 14 May 2015, <https://monocle.com/monocolumn/affairs/on-your-bike/>.

⁷⁸ Tokyo By Bike, "Common Complaints about Japanese Cyclists Refuted," last updated 17 October 2014, <http://www.tokyobybike.com/2014/10/common-complaints-about-japanese.html>.

⁷⁹ Singapore Parliamentary Debates, Official Report, 10 January 2017, Vol. 94, 4.30 pm (Josephine Teo).



Source: "Recommendations on Rules and Code Of Conduct for Cycling and the Use of Personal Mobility Devices."

After the passage of the Bill, concerns about motorised PMDs intensified, with the local press regularly publishing letters about reckless PMD users. "It used to be that I could walk safely on footpaths as a pedestrian but now, I do so in fear because any moment, I could be hit by a PMD," wrote a senior citizen in one of these letters.⁸⁰ Another member of public concluded that "active mobility is fast becoming a privilege at the expense of the pedestrians' safety, especially that of young children and the elderly."⁸¹ Yet another called on the authorities to do more to regulate shared paths after his wife was hit by an e-scooter user, and blamed for not getting out of the way.⁸²

The issue went beyond people's subjective feelings about safety. Between January 2017 and September 2017, there were 30 reported accidents involving pedestrians and PMD users on public paths⁸³, or about one case each week. A key concern when accidents happened was financial compensation. As third-party insurance was not mandatory for active mobility devices, there was a risk that victims might not receive any financial compensation even after suing the rider. MPs raised this concern in Parliament repeatedly. Each time, the Transport Ministry said that compulsory third-party insurance was an onerous and costly requirement to impose on mostly responsible users.⁸⁴

The authorities were concerned too. The Singapore Civil Defence Force expressed concerns about the increase in the number of fires involving e-scooters. Between 2016 and 2017, the number of such fires increased from nine to 40. These fires were attributed to faulty electrical circuitry and the overcharging of the highly flammable lithium ion batteries used in e-scooters.⁸⁵

LTA was concerned about PMD users riding illegally on roads. In the first nine months of 2017 alone, LTA and the Traffic Police issued 330 warnings and summonses to PMD users for illegally

⁸⁰ "The fear of being hit by PMDs is real," *Today*, 15 January 2018, <http://www.todayonline.com/voices/fear-being-hit-pmds-real>.

⁸¹ "Active mobility at the expense of pedestrians' safety," *The Straits Times*, 16 December 2017, <http://www.straitstimes.com/forum/letters-in-print/active-mobility-at-the-expense-of-pedestrians-safety>.

⁸² "E-scooter accident a sign that pavements must be safer," *Today*, 6 September 2017, <https://www.todayonline.com/voices/e-scooter-accident-sign-pavements-must-be-made-safer>.

⁸³ Singapore Parliamentary Debates, Official Report, 8 January 2018, Vol. 94, *Oral Answers to Questions*, Nos 14-15 (Khaw Boon Wan).

⁸⁴ Singapore Parliamentary Debates, Official Report, 10 January 2017, Vol 94, 6.16 pm (Josephine Teo).

⁸⁵ "E-scooter fires soar 300% in 2017 even as fire cases hit 40-year low: SCDF," *Today*, 9 February 2018, <https://www.todayonline.com/singapore/e-scooter-fires-soar-300-2017-even-fire-cases-hit-40-year-low-scdf>.

riding on roads⁸⁶. The issue was problematic enough for LTA to strengthen its penalty regime (see **Exhibit 9**).

Exhibit 9: Composition fines for riding PMDs on roads

(a) *Old Penalty Regime*

	First Incident	Second Incident	Subsequent Incidents
All Roads	\$100	\$200	\$500

(b) *New Penalty Regime*

	First Incident	Second Incident	Subsequent Incidents
Local Roads	\$300	\$500	\$800
Major Roads	\$500	\$800	\$1,000
Expressways	Fine of up to \$2,000 and/or up to 3 months in jail	Fine of up to \$5,000 and/or up to 6 months in jail	

In response to these concerns, the Transport Ministry announced that it would require mandatory registration of e-scooters by the second half of 2018.⁸⁷ In practical terms, this might mean registering as many as 100,000 e-scooters.⁸⁸ This step was taken to deter reckless behaviour, foster greater rider responsibility, and make it easier for enforcement officers to track down errant users. The Ministry also announced that it was studying if any new safety requirements had to be imposed on e-scooters given the recent spate of fires.⁸⁹

(b) The problems with dockless, privately-operated bicycle-sharing systems

Another source of discontent was bicycle-sharing. Until recently, cities usually developed docked bicycle-sharing systems. These systems were expensive to set up and maintain, and were usually sustained by public subsidies. Trips began when a bicycle was removed from a dock, and ended when the bicycle was returned to a dock. Because docking stations could only be built at significant cost, the service area tended to expand gradually. In New York City, for example, it took more than four years for the Citi Bike fleet to double to 12,000. Even then, its service area did not include all five boroughs.⁹⁰

In contrast, the bicycle-sharing services in Singapore were privately-funded, dockless, and operated island-wide within a few months. In just seven months, there were about 30,000 shared

⁸⁶ Singapore Parliamentary Debates, Official Report, 8 January 2018, Vol. 94, *Written Answers to Questions*, No 8 (Khaw Boon Wan).

⁸⁷ Land Transport Authority, "Factsheet: Mandatory Registration of Electric Scooters", last updated on 7 March 2018, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=be68c021-09cc-48ff-92ed-c1e6088dbf7c>.

⁸⁸ "Registering all e-scooters too blunt a move, say interest groups and retailers," *The Straits Times*, 23 February 2018, <http://www.straitstimes.com/singapore/registering-all-e-scooters-too-blunt-a-move-say-interest-groups-and-retailers>.

⁸⁹ Ministry of Transport, "Speech by Senior Minister of State for Transport and Health, Dr Lam Pin Min, at the Ministry of Transport's Committee of Supply Debate 2018," last updated on 7 March 2018, <https://www.mot.gov.sg/News-Centre/news/detail/speech-by-senior-minister-of-state-for-transport-and-health-dr-lam-pin-min-at-the-ministry-of-transport-s-committee-of-supply-debate-2018>.

⁹⁰ Sarah M. Kaufman and Jenny O'Connell, "Citi Bike: What Current Use and Activity Suggests for the Future of the Program," last updated February 2017, https://wagner.nyu.edu/files/faculty/publications/CitiBikeUsage_Mar2017.pdf.

bicycles in Singapore provided by three bicycle-sharing operators.⁹¹ Within a year, there were 100,000.⁹² The dockless bicycle-sharing businesses were loss-making as well, but had access to venture capital funding. Trips began when a shared bicycle was unlocked with a smartphone, and ended when a smart lock was manually engaged by a user. Freed from the constraints of docking stations, shared bicycles were parked indiscriminately from the very beginning. They were left on public paths, grass verges, and in canals.⁹³ Some were even tossed from high-rise buildings.⁹⁴ Indiscriminate parking caused significant public unhappiness; the Transport Minister admitted that his wife often gave him an earful about it.⁹⁵

Exhibit 10: Indiscriminately Parked Shared Bicycles



Image Credits: Author's Own

LTA tackled this problem in two ways. First, it worked with other government agencies and the bicycle-sharing operators to increase bicycle parking spaces to as many as 174,000. Second, LTA took enforcement action against the operators. From May 2017 onwards, enforcement officers started issuing removal notices on illegally parked shared bicycles. Operators had to remove these bicycles within half a day, or LTA would impound them, and levy an impound fee (\$140) and fine (\$500) on the operators. Between May 2017 and January 2018, LTA issued about 2,171 removal notices, impounded 341 shared bicycles, and collected about \$180,000 in impound fees and fines from the operators.⁹⁶ But, the problem of indiscriminate parking persisted.

Broadly speaking, indiscriminate parking was an indicator of what transport planners lacked: a framework for regulating bicycle-sharing operators. These businesses presented several regulatory issues, including how to manage the safety and growth rate of their fleets; gain access to their proprietary data for infrastructure planning and enforcement; ensure that they had the financial ability to manage accidents involving their users or caused by their users, and that they

⁹¹ Singapore Parliamentary Debates, Official Report, 3 July 2017, Vol. 94, *Oral Answers to Questions*, Nos 1-2 (Lam Pin Min).

⁹² Singapore Parliamentary Debates, Official Report, 20 March 2018, Vol. 94, 12.35pm (Lam Pin Min).

⁹³ "Ugly side of bicycle sharing: LTA moves against badly parked bikes," *The Straits Times*, 18 June 2017, <http://www.straitstimes.com/singapore/ugly-side-of-bicycle-sharing-lta-moves-against-badly-parked-bikes>.

⁹⁴ "Man, 47, arrested for throwing ofo bike off 15th floor of Boon Keng flat," *Today*, 22 June 2017, <https://www.todayonline.com/singapore/man-47-arrested-throwing-ofo-bike-15th-floor-boon-keng-flat>.

⁹⁵ Singapore Parliamentary Debates, Official Report, 6 March 2018, Vol. 94, 6.45pm (Er Dr Lee Bee Wah).

⁹⁶ Ministry of Transport, "Speech by Senior Minister of State for Transport and Health, Dr Lam Pin Min, at the Ministry of Transport's Committee of Supply Debate 2018," 7 Mar 2018, <https://www.mot.gov.sg/News-Centre/news/detail/speech-by-senior-minister-of-state-for-transport-and-health-dr-lam-pin-min-at-the-ministry-of-transport-s-committee-of-supply-debate-2018>.

exited the market in an orderly manner if they went bust.⁹⁷ Singapore’s planners also wanted these fleets to be used efficiently, and issued a research grant call for solutions that could optimise the distribution of these shared bicycles.⁹⁸

An early light-touch framework for addressing some of these issues emerged in October 2017 when LTA, NParks and the 16 Town Councils signed a Memorandum of Understanding (MOU) with the bicycle-sharing operators. The MOU set out mutually agreed guidelines for the responsible operation of bicycle-sharing services in public spaces. But, the operators failed to perform at the standards the government wanted them to. So, four months later, the Transport Ministry announced that it will be introducing a licensing regime in the second half of 2018 so that it had stronger levers for ensuring compliance.⁹⁹

Exhibit 11: Comparing the guidelines in the MOU with the proposed provisions of the Licensing Regime

Challenges	Guidelines in the MOU	Proposed provisions in the licensing regime
Indiscriminate parking	<ul style="list-style-type: none"> Remove bicycles within half a day Implement geo-fencing technologies 	<ul style="list-style-type: none"> Operators to implement QR-code enabled geo-fencing, to improve parking Collectively ban users who repeatedly park indiscriminately Hefty fines or suspension of licence if operators do not remove illegally parked bicycles Operators to provide parking places
Safety and growth of fleet	<ul style="list-style-type: none"> Remove faulty bicycles within a day 	<ul style="list-style-type: none"> Set a maximum fleet size for each operator Safety of fleet is taken into account before granting licence, and included as a performance standard in the licence
Access to proprietary data	<ul style="list-style-type: none"> Share anonymised trip data for infrastructure planning Share user data in the event of accidents resulting in injury, death or property damage 	<ul style="list-style-type: none"> Share trip data in a manner prescribed by LTA Share user data in the event of improper parking
Financial responsibility in the event of accidents	<ul style="list-style-type: none"> Purchase public liability insurance for users and victims of accidents caused by users 	<ul style="list-style-type: none"> Not explicitly stated, but there is scope for LTA to require this as a licensing condition or a standard of performance
Orderly exit from market	NA	<ul style="list-style-type: none"> Collect a security deposit to defray the cost of removing bicycles if an operator goes bust

⁹⁷ Julienne Chen, “Are cities responsive or experimental? The case of bike share in Singapore,” n.d., <https://lkycic.sutd.edu.sg/blog/experimental-city-responsive-city/>.

⁹⁸ Land Transport Authority, “Grant Call for Active Mobility Solution,” 13 Jul 2017, <https://www.lta.gov.sg/content/dam/ltaweb/corp/industry/files/AO4%20Grant%20Call%20Factsheet%2014%20Aug.pdf>.

⁹⁹ Ministry of Transport, “Oral Reply by Senior Minister of State for Transport Dr Lam Pin Min to Parliamentary Question on Bike-Sharing Operators and Bicycles,” 5 Feb 2018, <https://www.mot.gov.sg/news-centre/news/Detail/oral-reply-by-senior-minister-of-state-for-transport-dr-lam-pin-min-to-parliamentary-question-on-bike-sharing-operators-and-bicycles/>.

Distribution of bicycles	NA	<ul style="list-style-type: none">• LTA may give direction on the distribution of bicycles
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Source: Land Transport Authority, "MOU with Bicycle Sharing Operators to Reduce Public Disamenities and Improve Safety," last updated 5 October 2017, https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=cfebb3c1-a765-4d70-a9af-7cbe79648c4e#_ftn2, and Land Transport Authority, "First Reading of the Parking Places (Amendment) Bill," last updated 5 March 2018, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=d35fdfa6-6cfb-477d-ac12-c93aa5a6a78f>.

(c) Race between infrastructure, enforcement, and errant users

Unmet expectations were another source of public unhappiness. When the Transport Ministry's budget was debated in Parliament in 2018, many MPs appealed to the government to build cycling infrastructure at a faster rate, and to step up its enforcement action against errant users.¹⁰⁰

But, LTA faced some formidable constraints. The first was the length of time needed to develop cycling infrastructure. From as early as 2013, LTA had informed the public that the comprehensive island-wide cycling network would only be completed in 2030. Similarly, it had said that it would gradually develop intra-town cycling networks in public housing towns. So, different user groups were going to have to share narrow footways for at least a few years.

The second constraint was limited enforcement powers and capacity. Although the Active Mobility Bill was passed in Parliament in January 2017, it still had not come into force at the time of writing (14 months later).¹⁰¹ This meant that LTA's enforcement officers could not take action against errant users based on the provisions of the Bill, as it was not yet law. In addition to that, the enforcement team had about 50 people,¹⁰² so they could not be everywhere at all times. Instead, they were deployed to hotspot locations based on feedback about reckless riders and illegally parked shared bicycles. Enforcing against the latter was a manpower-intensive task. Enforcement officers had to issue removal notices, and then return to the same location to impound the bicycles if they were not removed.¹⁰³

Given these constraints, it was unclear if, and how, LTA could heed MPs calls to build infrastructure faster, and step up its enforcement efforts. Nevertheless, in July 2017, LTA issued a research grant call for research that will develop tools and platforms to improve the resource-efficiency of active mobility planning, infrastructure, engagement and enforcement.¹⁰⁴

WHEN YOU LEGALISE THE STATUS QUO, IT CAN STILL PUSH BACK, HARD

¹⁰⁰ See Singapore Parliamentary Debates, Official Report, 7 March 2018, Vol. 94, 10.00am (Khaw Boon Wan).

¹⁰¹ "Towards safer e-scooter use," *The Straits Times*, 1 March 2018, <http://www.straitstimes.com/singapore/towards-safer-e-scooter-use>.

¹⁰² "More PMD users caught riding on the roads," *The Straits Times*, 13 December 2017, <http://www.straitstimes.com/singapore/transport/more-pmd-users-caught-riding-on-the-roads>.

¹⁰³ Land Transport Authority, "Grant Call for Active Mobility Solution," last updated 13 July 2017, <https://www.lta.gov.sg/content/dam/ltaweb/corp/industry/files/AO4%20Grant%20Call%20Factsheet%2014%20Aug.pdf>.

¹⁰⁴ *Ibid.*

For more than twenty years now, Singapore's transport planners have been thinking about cycling. They have answered the whole gamut of questions including whether to accept cycling as a mode of transport, where to accommodate it, and how to manage the social costs of bicycle-sharing services. In the process, Singapore's transport planners have learnt that giving cyclists and PMD users a clear right to be on public paths can be politically difficult. As one MP reminded the government, "[f]or [some] pedestrians, the dream of car-lite Singapore has become a nightmare."¹⁰⁵

How has the experience been for other cities? Difficult too. Unlike Singapore, many cities reallocated roads to cyclists by developing a network of on-road bicycle lanes. In London and New York City, planners enraged not only motorists, but also businesses that feared that the curb-side bicycle lanes would disrupt deliveries and customer access. It did not help that prominent figures and the media were relentlessly critical about bicycle lanes.

The lesson these cities learnt was when planners pushed against the status quo, it pushed back, hard.¹⁰⁶ Yet, Singapore's experience suggested that even when planners legalised the status quo, it could still push back, hard. Despite these difficulties, active mobility appears to be an idea whose time has come. As cities strive to be more liveable, both for its own sake and as an economic strategy, cycling looks set to enjoy a secure position as a transport option.

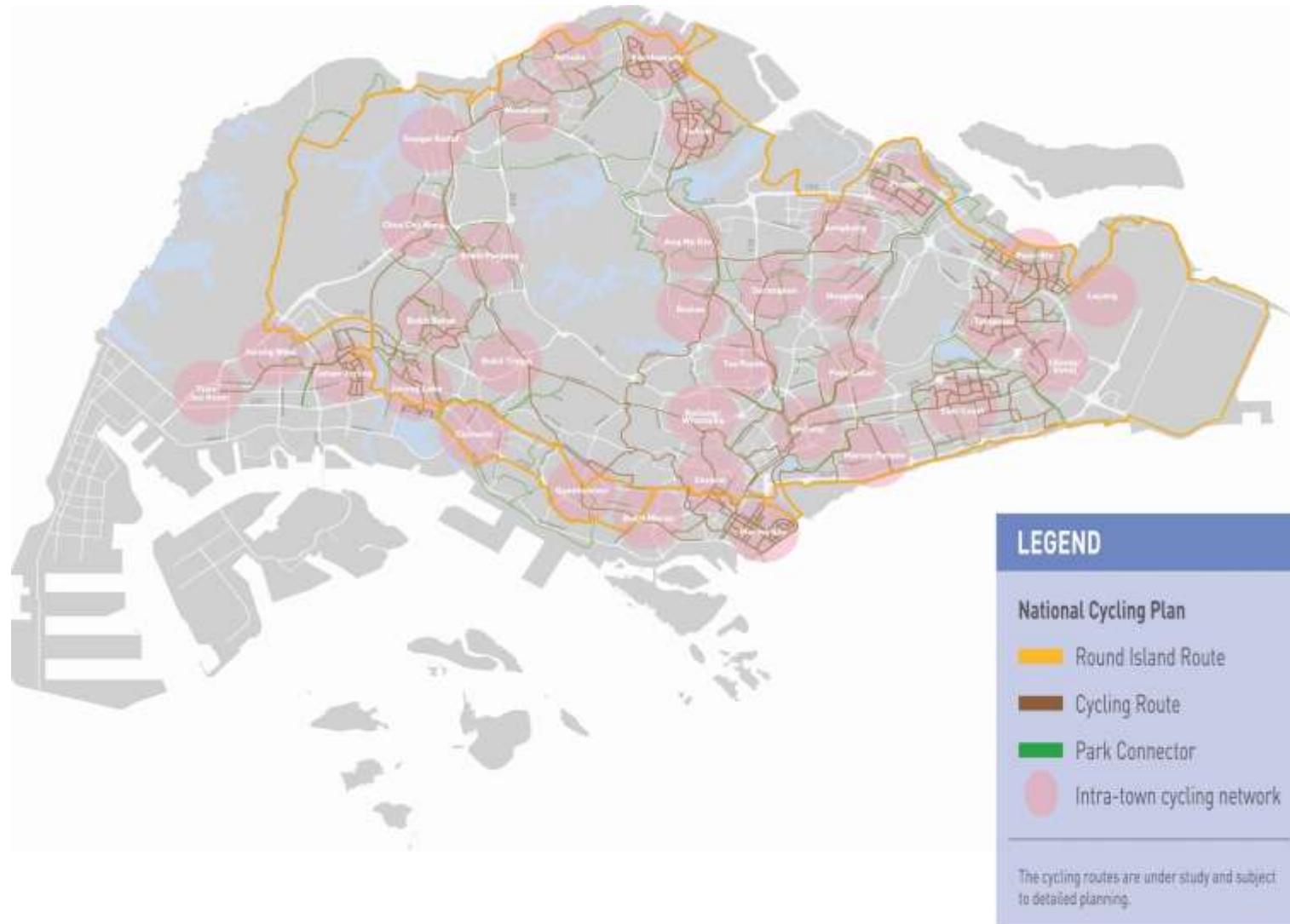
¹⁰⁵ Singapore Parliamentary Debates, Official Report, 6 March 2018, Vol. 94, 6.45pm (Er Dr Lee Bee Wah).

¹⁰⁶ Janette Sadik-Khan, and Seth Solomonow, *Streetfight: Handbook for an Urban Revolution*, (New York: Viking, 2016), 5.

DISCUSSION QUESTIONS

1. How has the Singapore government's policy stance on cycling shifted? What were the concerns and objectives of different public sector agencies? How does your description compare with frameworks on policy change that you have learnt in this course, or other courses?
2. What principles should policymakers use when deciding how to allocate space between different commuter groups? What are the pros and cons of accommodating cycling on public paths instead of on roads? Would you encourage other city planners to emulate Singapore's approach? State your reasons.
3. What should a 'car-lite' future mean? What do you think should influence and constrain the definition of this vision and the initiatives implemented to achieve this vision? How would you sequence your initiatives? How would you manage the expectations of diehard supporters, while also getting buy-in from diehard sceptics?
4. Given the public dissatisfaction with active mobility, what do you think Singapore's transport planners should have done differently? What practical steps would you suggest for solving the problems associated with reckless riding and bicycle-sharing systems?

Annex A: National Cycling Plan



Source: Urban Redevelopment Authority, "Cycling for All," last updated 7 March 2018, <https://www.urc.gov.sg/Corporate/Planning/Master-Plan/Key-Focuses/Transport/Cycling%20for%20All>.