



Creating Healthy Places through

# ACTIVE MOBILITY

CENTRE for  
**LiveableCities**  
SINGAPORE

 **Urban Land  
Institute**  
Asia Pacific



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The e-book can be accessed at  
[http://clc.gov.sg/documents/books/active\\_mobility/index.html](http://clc.gov.sg/documents/books/active_mobility/index.html)



# FOREWORD

Cities are for people to live and enjoy. But some cities are more liveable than others, as a result of forward planning and sound implementation.

In Singapore, we focused on liveability long before the word was coined. We have to, as this is our only city. We have no hinterland to retreat to, away from any city smog, crime or slums.

City residents are realising that a major aspect of liveability is how friendly the city is to pedestrians and cyclists. Is it safe to walk, to cycle? Is it convenient?

We are proud that our city is quite walkable, with good footpaths along almost every road, pedestrian priority at traffic junctions, and sheltered walkways. We are mindful of pedestrians' needs and we invest in their safety.

We have also supported our cyclists and invested in our Park Connector Network to promote cycling as a leisure activity. Our Park Connector Network is excellent and we have an ambitious plan to make it even more extensive. We are now beginning to focus on how to support cyclists who want to cycle to work, to school, and to the neighbourhood shops. In other words, we want to make cycling a viable transport option for our daily activities. We want to make Singapore a safe and conducive city for cycling.

As a first big step, we are making our new residential precincts walkable and bikeable, as a planning requirement. We are reviewing bicycle parking norms and will provide them. In parallel, we are studying how this planning requirement can be extended to existing precincts in a practical way.

A bolder plan is to support inter-town cycling. This will be more challenging. Amsterdam took decades to wean off their attachment to private cars and acquire a wonderful culture of walking and cycling. Singaporeans too will have to find its own balance among the competing demand for limited road space by motorists, cyclists and pedestrians. As our public transport infrastructure of trains and buses expands and improves, it will make it easier for Singaporeans to achieve the optimal balance.

I hope this book will help further the conversation among our people, as we re-imagine our future and forge a consensus on the way forward, preferably on foot and bicycles.

## **Khaw Boon Wan**

*Minister for National Development  
Singapore*

From the pressures on physical infrastructure such as transport, housing and public space through to intangible challenges such as securing economic competitiveness and ensuring the health and well-being of their residents, the challenges that cities face around the world are often similar in nature.

However, the solutions to these problems can be inter-linked. This is certainly the case with transport provision and the health of our urban populations. By enabling the people who live and work in our cities to use walking, running or cycling as a viable form of transport, we reduce the reliance on cars, ease the pressure on public transit systems and in turn encourage the people in our cities to be more fit and active.

Creating Healthy Places through Active Mobility argues that making active transportation a priority has multiple benefits, including: effective and convenient mobility, an enriched urban experience, economic and environmental dividends, and improved cohesiveness and connectivity between neighbourhoods.

The report brings together best practices in active mobility from cities around the world including Amsterdam, New York, Seoul, Copenhagen and Taipei, but specifically addresses the challenges which Singapore faces as a tropical city. The result is a report whose findings will inform future active mobility programs in Singapore, and will act as valuable guidance to other cities around the world.

The works forms part of ULI's Building Healthy Places initiative, a multifaceted program including research and publications, events, and advisory activities—to leverage the power

of the Institute's global networks to shape projects and places in ways that improve the health of people and communities.

Creating Healthy Places through Active Mobility represents the latest collaboration between ULI and the CLC and builds on previous joint projects including the Ten Principles for Liveable High-Density Cities report published last year. Our partnership with CLC continues to grow and develop and we are proud to work with an organization which shares our commitment to creating and sustaining thriving, liveable communities. We look forward to continuing this partnership into the future.

## **Patrick L. Phillips**

*Chief Executive Officer  
Urban Land Institute*

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## ABOUT CENTRE FOR LIVEABLE CITIES

The Centre for Liveable Cities (CLC) was set up in 2008 based on a strategic blueprint developed by Singapore's Inter-Ministerial Committee on Sustainable Development. The Centre's mission is to distil, create and share knowledge on liveable and sustainable cities. CLC distils key learning points from Singapore's experiences over the last half century, while creating knowledge to address emerging challenges. It also shares knowledge with, and learns from, other cities and experts.

CLC receives guidance from its Advisory Board, comprising senior figures from academia, industry and the public sector. A high-level panel of Distinguished Advisors - comprising prominent former politicians and senior civil servants - contributes to the intellectual development of the Centre. CLC works closely with its Stakeholder Agencies - representing Singapore's urban planning, governance and development expertise - to integrate their knowledge. CLC Experts are domain experts with technical knowledge and expertise that CLC will tap for future consultancy projects. The Centre operates as part of the Ministry of National Development, and comprises a dynamic CLC Team of officers from diverse disciplines and backgrounds. Guided by the CLC Framework for Liveable and Sustainable Cities, the Centre works across three main areas - Research, Training, and Promotions.

Research is central to the Centre's work, and is conducted in close collaboration with local and international partners. CLC's research activities include its Integrated Urban Solutions Research, and Research Workshops, as well as Urban Systems Studies. The Centre

develops print and digital Publications for global audiences, to share its research as well as the knowledge of its partners, through such titles as the Singapore Urban Systems Studies booklet series, the biannual Urban Solutions magazine, as well as the monthly CLC e-Newsletter.

Training is a key arm of the Centre's activities, as it aims to draw on its research to become a leading academy for cities. CLC's flagship training initiative is its Leaders in Urban Governance Programme for local public servants, as well as the Temasek Foundation Leaders in Urban Governance Programme, which is aimed at international city leaders.

Promotion refers to the Centre's efforts to collaborate with partners to share knowledge, particularly through Events. CLC is a co-organiser of the World Cities Summit - the global platform for government leaders and industry experts to address liveable and sustainable city challenges, share innovative urban projects and forge partnerships. CLC also co-organises the World Cities Summit Mayors Forum, and the Lee Kuan Yew World City Prize. The regular CLC Lecture Series is another platform for thought leaders and experts to exchange ideas and share knowledge. Supporting these efforts, CLC forges strategic Partnerships with local and international experts.

## ABOUT URBAN LAND INSTITUTE

The Urban Land Institute is a 501(c) (3) nonprofit research and education organization supported by its members. Founded in 1936, the Institute now has nearly 30,000 members worldwide representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. As the preeminent, multidisciplinary real estate forum, ULI facilitates the open exchange of ideas, information, and experience among local, national, and international industry leaders and policy makers dedicated to creating better places.

The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is committed to bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs by:

- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem-solving.
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development.
- Advancing land use policies and design practices that respect the uniqueness of both built and natural environments.
- Sharing knowledge through education, applied research, publishing, and electronic media.
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges.

### About the ULI Foundation

The ULI Foundation is the philanthropic partner of the Urban Land Institute, providing an assured source of funding for ULI's core research, education, and public service activities. Through its various giving programs, the Foundation helps strengthen ULI's ability to provide leadership in the responsible use of land to enhance the total environment.

Under the Urban Innovation fund, the ULI Singapore District Council and CLC were awarded an Urban Innovations Grant to undertake a joint research initiative focused on "Creating Healthy Places through Active Mobility".

### About ULI Asia Pacific

Across Asia Pacific and Japan, the Institute has nearly 1,500 members, with a particularly strong presence in Japan, Greater China, Southeast Asia, and Australia. The regional office is headquartered in Hong Kong, with satellite offices in Tokyo and Singapore. ULI Asia Pacific brings together industry leaders with a common commitment to improving professional standards, seeking the best use of land, and following excellent practices. By engaging experts from various disciplines, the Institute can arrive at responsible answers to problems that would be difficult to achieve independently.

ULI Asia Pacific shares its knowledge through various discussion forums, research, publications, and electronic media. ULI's activities in the region are aimed at providing information that is practical, down-to-earth, and useful so that on-the-ground changes can be made. By building and sustaining a diverse network of local experts in the region, the Institute is able to address the current and future challenges facing Asia's cities.

# BUILDING HEALTHY CITIES THROUGH ACTIVE MOBILITY

## *Why should we be talking more about active mobility?*

*Active mobility is one key element in creating great places that encourage healthy lifestyles and maximise the capacity of residents and visitors to live fuller lives of higher quality in a city. Never has the need been greater to examine the current stresses on mobility in urban environments.*

### I. URBAN CAPACITY FOR MOTORIZED TRANSPORT IS REACHING ITS CAPACITY

In the United States of America (US), commuters spend 38 hours per person on average a year stuck in traffic, and even more in congested cities such as in the US capital of Washington and Los Angeles. Slow traffic also means an additional 2.9 billion gallons of fuel consumed, and 25 billion kilograms of carbon dioxide being unnecessarily produced.<sup>1</sup> The same problem exists in Asia as well – in Jakarta, Indonesia, traffic moves at a mere average speed of 13km/h during rush hour<sup>2</sup>, while traffic congestion is estimated to cost Manila, in the Philippines, an equivalent of \$3 billion a year due to lost productivity, illness, extra fuel costs and vehicle maintenance.<sup>3</sup>

### II. ACTIVE MOBILITY IS NECESSARY FOR BUILDING HEALTHY AND LIVEABLE CITIES

Many studies have revealed that the lowest obesity rates can be found in developed countries in Europe, North America and Australia, where active mobility is common. Conversely, those countries that are highly reliant on cars have the highest obesity rates.

Copenhagen, Denmark, was named the most liveable city in 2013 by Monocle magazine<sup>4</sup>, and this is in no small part due to its commitment to providing a good environment and the necessary infrastructure for pedestrians and cyclists. Placing a greater

emphasis on walking and cycling continues to play an essential role for Copenhagen's high quality of life for the city's residents and visitors.

Cycling and walking are space-efficient, socially equitable and environmentally friendly ways to travel. They help make up an effective mobility system which may deliver solutions for many urban issues that many cities face today.

### III. ACTIVE MOBILITY IS GAINING GLOBAL PROMINENCE

A good walking and cycling urban environment for everyday mobility is gaining prominence internationally against the backdrop of greater concerns and awareness about the quality of life, social equity, and environmental concerns. Cities such as Vancouver, Canada, with its Healthy Solutions action plan; Melbourne, Australia, with its Sustainable Solutions Framework; and London, United Kingdom (UK), with its Carbon Solutions, have all incorporated active mobility as a key factor in creating a more sustainable city.

<sup>1</sup> Werbach, A. 2013. "The American Commuter Spends 38 Hours a Year Stuck in Traffic." The Atlantic, February 6. <http://www.theatlantic.com/business/archive/2013/02/the-american-commuter-spends-38-hours-a-year-stuck-in-traffic/272905>

<sup>2</sup> The Jakarta Post. 2010. "Time, money, health lost to Jakarta gridlocks." October 11.

<sup>3</sup> Liguica, C. "Manila traffic: the agony, without the ecstasy." Latitude News. <http://www.latitudenews.com/story/manila-traffic-the-agony-without-the-ecstasy/>

<sup>4</sup> In Monocle's annual Quality of Life Survey Copenhagen ranked first and was named the most liveable city in 2013

#### IV. TROPICAL CITIES CAN BE WALKABLE AND BIKEABLE TOO

While many of the more liveable cities with high active mobility today are in temperate regions, tropical climates can easily support active travel in tropical cities too. Leading walking and cycling cities such as Amsterdam, in the Netherlands, and Copenhagen in Denmark had concerns that their cold climates could not support active transport modes when promotion efforts for active mobility were first initiated, but climate was found to be neither a “deal-breaker” nor a definite “clincher”.

Singapore, a high-density city in the tropics, is a potential location for the demonstration of forward-looking ideas for walkable and bikeable environments in tropical climates. This can be achieved through appropriate design measures to address the heat and humidity, and providing adequate end-of-trip amenities such as showers and drop-and-go laundries.



*Cyclists biking through park connector routes in Bishan that connects them to other towns.*

## WALKING AND CYCLING – TRAVELLING IN, NOT THROUGH, THE CITY

### *Why should we promote walking and cycling?*

#### MEETING MOBILITY NEEDS FOR ALL

Walking and cycling are not only highly effective and convenient forms of mobility, but also encompass a wide spectrum of benefits for all stakeholders in the city. These benefits range from health and liveability benefits to economic and environmental contributions.

The affordability of walking and cycling also makes it highly inclusive and accessible to all sectors of society. With adequate investment and good design, cycling and walking can provide attractive mobility options for all.

#### I. EFFECTIVE AND CONVENIENT MOBILITY

Since walking and cycling puts much less strain on existing land resources as compared to motorised transport, more land could be freed up for other functions such as housing, community spaces and commercial

developments. As an alternative mobility option, cycling or walking for short-distance trips also provide an effective and quick alleviation of road and public transport congestion.

In the long run, active mobility also improves the safety of the entire mobility system. Cities with higher levels of cycling have been shown to have fewer traffic accidents due to higher levels of precaution exercised by all road-users.

#### II. ENRICHING URBAN LIFE

Walking and cycling automatically provides added dimensions to one's journey and offers unique opportunities for interaction with the spaces and people along the journey. Greater engagement with our public space makes for a more active street life and a more liveable city.

With fewer vehicles on the road, urban air and noise pollution are also addressed at



## CHAPTER 2

the source, contributing to a healthier living environment.

As a regular physical activity, active mobility can be beneficial to people whose lives would otherwise be more sedentary. The risk of chronic disease associated with obesity and inactivity may be reduced.



Community cycling event in Singapore

### III. REAPING ECONOMIC DIVIDENDS

Maintaining a cycling and walking infrastructure requires less public investment than providing for private motorised transport for the same number of people, thus creating cost savings for the government. Users also benefit from greater affordability by spending less on transport.

In the long term, a higher percentage of the population achieving regular physical activity through active mobility may lead to a lower level of chronic illness across society. This expected health boost benefits both governments and businesses through reduced healthcare expenditure and greater work productivity.

With a more vibrant street life, roadside retailers benefit from higher human traffic. Studies have also demonstrated that residential districts that are friendlier for cycling enjoy higher property values.<sup>5</sup>

### IV. BUILDING MORE COHESIVE COMMUNITIES

The comparative affordability of walking and cycling offers mobility at a lower cost. This also creates scope for promoting bonding among people of different social groups as they cycle and walk in the same city.



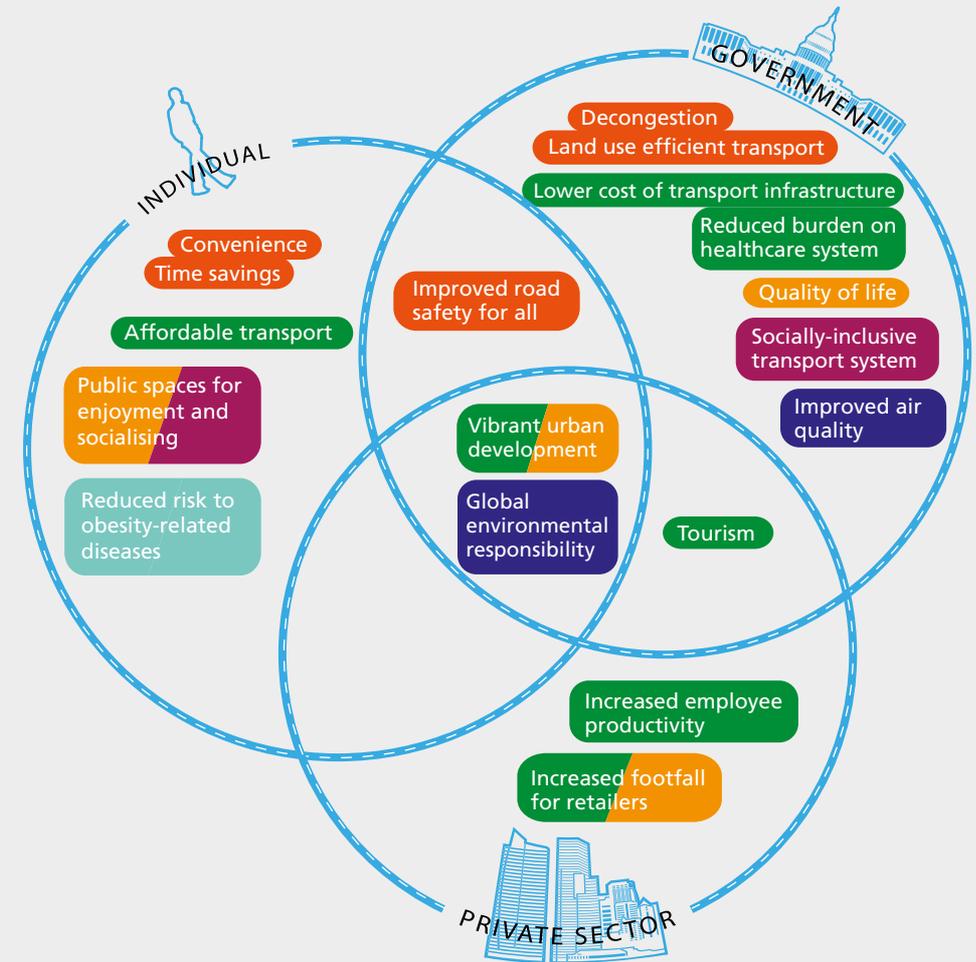
Pedestrianized street in Chinatown, Singapore

### V. DOING YOUR PART FOR A SUSTAINABLE ENVIRONMENT

Active mobility is much less carbon-intensive than motorised transportation. On average, a journey on a bicycle saves 250g of carbon dioxide emissions per km for every passenger. Manufacturing of bicycles is also less resource-intensive than cars.

With lower space demands, conflicts between the preservation of biodiversity and infrastructural needs are also less contentious.

# ACTIVE MOBILITY BENEFITS FOR ALL



Mobility

Urban Lifestyle

Health

Economic Dividends

Social Benefits

Environmental Sustainability

<sup>5</sup> Flusche, D. 2012. *Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure*. Advocacy Advance. [http://www.advocacyadvance.org/site\\_images/content/Final\\_Econ\\_Update\(smaller\).pdf](http://www.advocacyadvance.org/site_images/content/Final_Econ_Update(smaller).pdf)

# ACTIVE MOBILITY IN SINGAPORE

## *The Singapore context*

### I. HISTORICAL EVOLUTION

A cycling culture in Singapore was well established in the 1960s, but started to decline as a form of transport from the 1970s as the pace of economic development increased. Mobility preferences then switched to privately owned cars and public transport with transport planning focused mainly on catering for motorised traffic. By 1981, the Registry of Vehicles had even stopped registering bicycles.<sup>6</sup>

But with the completion of the first phase of the Mass Rapid Transit (MRT) rail line in 1987, cyclists were observed cycling to and from the stations. In response, the government started constructing public bicycle parking at the MRT stations in 1991. Singapore also started developing off-road dedicated cycling tracks with the launch of the Park Connector Network programme in 1992, although these were primarily for recreational needs. To date, more than 200 km of park connectors have been constructed for cycling, jogging, walking and other recreational activities.

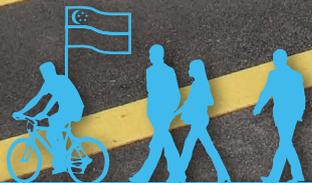
Subsequent cycling infrastructure development was concentrated mostly in residential towns where there was significant demand for short cycling trips within these towns. Tampines New Town, was dubbed the inaugural 'cycling town' in 2010, following a successful trial of dedicated cycling paths between 2007 and 2008. Today, intra-town cycling networks are being implemented in several new towns, including Taman Jurong, Pasir Ris, Yishun and Sembawang.



*Bike parking facilities at train stations in Singapore*

Much emphasis was also given to improving walkability in Singapore. While the new towns had already incorporated greater provision of footpaths, more effort was required in the more heavily built-up city centre to improve the walking experience and pedestrian safety. Since the mid-1970s, several initiatives have contributed towards making Singapore a more walkable city. While not commonplace, the traffic-calmed residential area of Emerald Hill provides a local example of a shared street, modelled after the Dutch 'woonerf' concept.

Some initiatives to improve walkability include the construction of more pedestrian walkways by the then Public Works Department in the city centre,



## CHAPTER 3

<sup>6</sup> Koh, P.P. and Wong, Y.D. 2012. *The Evolution of Cycling in Singapore: Journeys* (Nov), LTA Academy, Land Transport Authority, Singapore, pp. 39-50.

pedestrianisation of selected streets, and construction of waterfront promenades along the Singapore River and around Marina Bay. Together with the extensive street planting programme by the National Parks Board (NParks) to plant more trees along the roadside, the urban walking environment in Singapore has been greatly enhanced.

## II. AN INTEGRATED APPROACH TO LAND USE AND TRANSPORT

An integrated approach to land use and transport planning was first adopted in the Concept Plan 1971 which mapped out both the framework for physical planning, as well as road and rail networks. This concept plan also sparked policy development studies which resulted in infrastructural investment in a mass rapid transit system for the island. Today, complimented by the public bus network, the public transport system serves as a good base to promote cycling and walking.

Due to a rise in car population and road network constraints, it was apparent in the early 1960s that an unfettered growth in car population would pose heavy costs on the city in terms of traffic congestion and land use. From 1971 onwards, policies to restrain car ownership and usage were put in place, and congestion pricing in the central business district was implemented from



Typical cycling path in Singapore

1975 onwards. The combined strategies to improve public transport and restrain car population growth have resulted in a public transport mode share of 63% during peak hours.

## III. CYCLING CULTURE IN SINGAPORE

Cycling in Singapore generally happens on paths shared with pedestrians. Even where there is dedicated cycling infrastructure – such as on the recreational Park Connector Network and intra-town cycling networks in residential towns such as Tampines – cycling paths are integrated with pedestrian sidewalks. On-road vehicular cycling is seldom practised by everyday cyclists because roads are often dominated by heavy and fast-moving motorised traffic. However, in recent years, cycling on the road has become increasingly popular again. This time, at opposite ends of the socio-economic spectrum with expatriate hobbyists cycling for recreation and low-income foreign workers cycling as a means of affordable transport.

Most cycling activity in Singapore is recreational, particularly during weekends. However, with cycling fast becoming part of healthier lifestyles, more people are cycling for their daily commutes, especially for short distances within the residential towns outside of the city centre. As such, much of the current effort in encouraging active mobility is focused on improving the cycling infrastructure in residential towns like Ang Mo Kio, a typical mature residential town in Singapore.

# FACTS & FIGURES



\* See Land Transport Master Plan 2013 (<http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/ReportNewsletter/LTMP2013Report.pdf>)  
# See ([http://www.singstat.gov.sg/statistics/latest\\_data.html](http://www.singstat.gov.sg/statistics/latest_data.html)) and ([http://www.spf.gov.sg/mic/2014/02/20140210\\_others\\_TP\\_stats.html](http://www.spf.gov.sg/mic/2014/02/20140210_others_TP_stats.html))  
^ See LTA Stats in Brief ([http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/FactsandFigures/Stats\\_in\\_Brief\\_2013.pdf](http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/FactsandFigures/Stats_in_Brief_2013.pdf))

#### IV. CURRENT ISSUES

With dedicated cycling infrastructure still limited in Singapore, conflicts between pedestrians and cyclists on sidewalks do arise. On-street cycling, which is becoming more common, has also resulted in an increase in conflicts between drivers of motorised vehicles and cyclists. Bicycle theft is another major problem in Singapore and highlights the need for adequate and secure bicycle parking facilities to be provided at key destinations such as transit nodes.

#### V. CURRENT INITIATIVES

Several current initiatives are in place to further promote walking and cycling in Singapore. Both the Draft Master Plan 2013 which guides Singapore's development over the next 10 to 15 years, by the Urban Redevelopment Authority (URA), and the Land Transport Master Plan 2013 by the Land Transport Authority (LTA), highlight walking and cycling as part of an overall strategy to enhance mobility in Singapore. The transport authority has also called for proposals on implementing a public bicycle-sharing system, with plans for pilot schemes by end 2015.<sup>7</sup>

#### NATIONAL CYCLING PLAN

An initiative under the URA Draft Master Plan 2013, this plan recognises that cycling is becoming increasingly popular in Singapore, and that there is a need to make cycling safer and more convenient for everyone.

The plan aims to build the cycling network from 230km today to more than 700km by 2030, and focuses on a combination of intra-town routes, inter-town routes, and the park connector and round-island

networks. This works out to be about 12km per 100,000 people by 2030, an increase from today's 4 km per 100,000 people. The plan also incorporates feedback on routes and facilities from the community and interest groups.<sup>8</sup>

Supporting infrastructure and facilities, such as bicycle racks, bicycle crossings, signage and lighting, will be implemented to improve safety and convenience for cyclists. The plan also covers the 'software' aspects of cycling, such as a code of conduct for cyclists, and easier access to information on routes and amenities.

- Creating Walkable Places

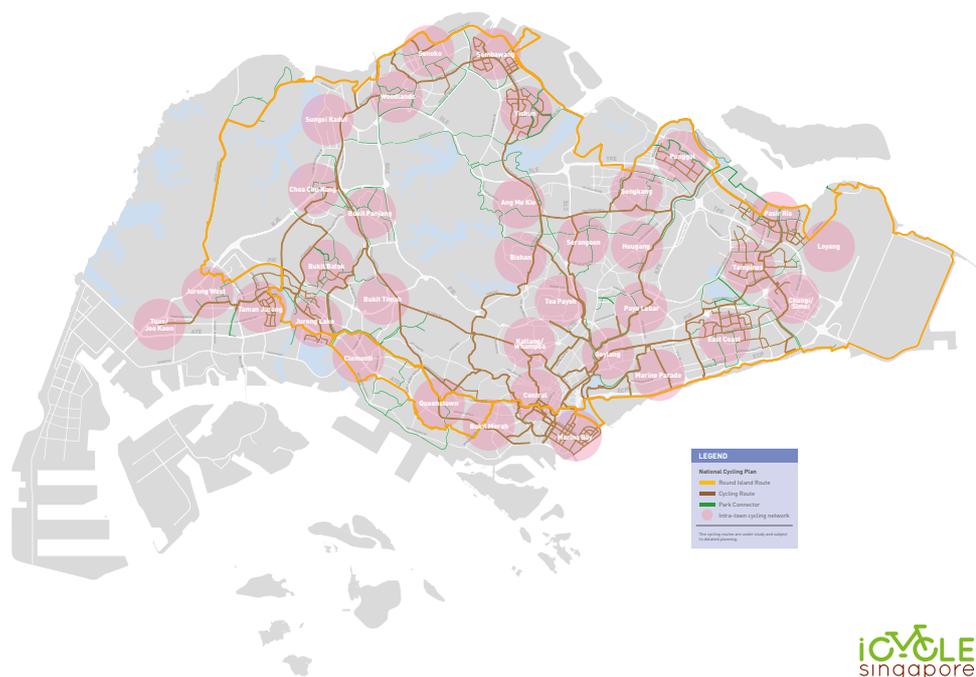
The Draft Master Plan recognises the need to enhance the walking experience in Singapore to improve the accessibility of public transport hubs and amenities. A multi-level approach is taken to enhance ground level, underground and aboveground connections to enhance walkability in Singapore.



Recreational cyclists enjoying a weekend ride along a park connector

<sup>7</sup> Land Transport Authority, 2014. *Share a Bicycle by 2015*. News Release, 2 July. <http://app.lta.gov.sg/apps/news/page.aspx?c=28&id=8d332453-27e8-48bc-9dc5-36c39bfc8773>

<sup>8</sup> Ministry of National Development, Singapore. *Boost for Cycling in Singapore*. MND Link, Mar/Apr 2014 issue. [http://www.mnd.gov.sg/mndlink/2014/2014\\_Mar-April/BoostforCyclinginSingapore.htm](http://www.mnd.gov.sg/mndlink/2014/2014_Mar-April/BoostforCyclinginSingapore.htm)



National Cycling Plan. Image courtesy of URA.

**LTA LAND TRANSPORT MASTER PLAN 2013<sup>9</sup>**

- Walk2Ride Programme

LTA today provides sheltered walkways between MRT stations and bus stops to schools and healthcare amenities within 200m of transit nodes as part of the previously announced Walk2Ride programme. To address public feedback that the tropical climate is a concern for walking to and from public transit nodes, the new \$330 million Walk2Ride programme will extend the sheltered walkway network to connect:

- MRT stations to trip-generating hubs, such as schools, healthcare facilities and residential developments within 400m of the stations;
- Bus interchanges and Light Rail Transit (LRT) stations to developments within a 200m radius;
- Selected bus stops with very high usage to trip-generating hubs within a 200m radius.

<sup>9</sup> Land Transport Authority, 2013. *Land Transport Master Plan 2013*. <http://www.lta.gov.sg/content/dam/lta/web/corp/PublicationsResearch/files/ReportNewsletter/LTMP2013Report.pdf>



Pedestrians on a sheltered walkway linking towards train station



Pedestrian-friendly crossing at Bugis, Singapore

## LET'S TALK ABOUT ACTIVE MOBILITY

### *Initiating the research and workshop process*

#### I. ENGAGING STAKEHOLDERS

Multi-stakeholder engagement and participation in research on active mobility draws out new ideas and creates more informed and effective solutions. This collaborative research seeks to create a platform for conversation and draws from engagement with stakeholders in Singapore through focus group discussions and a site study. The different groups engaged include:

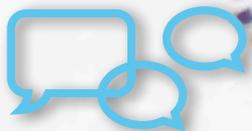
- Civil society (cycling enthusiasts, community stakeholders and leaders, students)
- Private sector business (real estate, design and engineering practitioners, developers, building managers)

- Government agencies involved in cycling efforts (Urban Redevelopment Authority (URA), Land Transport Authority (LTA), National Parks Board (NParks), and Housing and Development Board (HDB))
- Academics (transport and environment design-related disciplines)

Two workshops were organised as part of the research process to engage the various stakeholder groups for input on research. The first workshop – the 'Preshop' – introduced the concept of building healthy living environments and how cities need to shape projects and spaces in ways that improve the health of residents and communities. This took the form of focused



*Participants at the Preshop discussing safe junctions for cycling and walking.*



## CHAPTER 4

group discussions and touched on general issues on walking and cycling in Singapore. It also provided participants with an overview of the current initiatives in place as well as active mobility efforts in other cities.

Presentations were made by participants on the following topics:

- 10 Principles for Building Healthy Places, by Scott Dunn, ULI
- International Scans on Active Mobility, by Yong Rui Yan, CLC
- National Cycling Plan, by Alice Lieu, URA
- Walkability in Singapore by Mieko Otsuki and Lin Zixin, Ministry of National Development (MND)

## II. WORKSHOP ON CYCLING

To achieve a better appreciation of the issues faced every day by pedestrians and cyclists, the second workshop – the 'Bikeshop' – took the participants to the selected study area, Ang Mo Kio, a typical mature residential town in Singapore with a population of 220,000. The Bikeshop was led by Danish architect Jan Gehl, renowned for his expertise in walkable and bikeable urban environments.

Participants cycled around Ang Mo Kio and experienced the daily walking and cycling commutes of residents. Discussion points highlighted the key issues faced by pedestrians and cyclists in the study area, including:

- Existing cycling paths and sidewalks
- Traffic junctions
- Crowded areas such as bus stops

- Existing bicycle parking facilities
- Pedestrian and cyclist interface with developments such as schools and commercial centres

The Bikeshop site discussions provided an opportunity for participants representing various interest groups to discuss issues on the ground and contribute solutions to improve active mobility in Singapore.





Jan Gehl experiencing cycling in Ang Mo Kio, a residential new town in Singapore



Bikeshop participants discussing the integration of cycling with public transit.



Participants discussing a stretch of the Park Connector Network (PCN), Singapore's best existing standard of bicycle paths.

### III. WHAT WE HEARD

Some perspectives and ideas shared by the participants during the workshops are as follows:

"In Singapore we have no choice (but to encourage walking and cycling for mobility). Because 12% of our land – and that's almost as much land as what we use for housing – is used for roads. We just simply cannot afford to keep on widening our roads."

— **Khoo Teng Chye**, *Executive Director, CLC*

"If you are always sitting in a car, then you don't really see your neighbourhood. Over time, if you do that every day, you lose touch with your neighbourhood. But if you are on a bicycle or if you are walking in the neighbourhood area, then you have a much better sense of where you live."

— **Francis Chu**, *Cycling enthusiast*

"(The design approach for places) has to be people-friendly – no matter if it is for cars, pedestrians or cyclists. It has to take into consideration who are we designing for."

— **Mizah Rahman**, *founder of the civic group Participate in Design*



Please see the video below for more information on the research and workshop processes.





Professor Jan Gehl (left) and Mayor of Bandung, H.E. Ridwan Kamil (right) at the panel discussion

#### IV. CITY LEADERS WEIGH IN

Lord Mayor of Melbourne, Robert Doyle, and Mayor of Bandung, H.E. Ridwan Kamil, and urban design experts, Professor Marilyn Taylor and Professor Jan Gehl, in conjunction with the World Cities Summit 2014 in Singapore, shared their views on the promoting active mobility. Dr. Limin Hee (CLC) and Scott Dunn (ULI) led a lively panel discussion with the speakers sharing their approaches to creating good walking and cycling environments.

There are initiatives to promote active mobility further in place in both Melbourne and Bandung. Melbourne, currently with an extensive network of off-road bicycle paths and designated bicycle lanes now aims to transition into a 'cycling city' by 2020. Sharing his views, Lord Mayor Robert Doyle said public support and community discourse were important factors in Melbourne's paradigm shift. He added:

**"We have to deal with the much wider population and therefore the importance of explaining to people why [we] are doing this; that they feel**

**comfortable with the changes to their city is particularly important."**

**"Even when great research is done, and there is political will to do it, and there are demonstrable benefits that will flow, don't underestimate the importance of the political conversation that you need to have with the wider community, so that that is not just accepted, but is supported."**

In the case of Bandung, it was clear that cycling was a potential solution for the city's traffic congestion problems. Mayor Ridwan Kamil shared his view on the importance of clear leadership and proper implementation of policies and campaigns in prompting the change in approach towards implementing active mobility in Bandung. He highlighted the need to be sensitive to the community's existing mobility culture and the use of innovative initiatives to incentivise change. He said:

**"When it comes to education, it's hard for us to change the mindset [of people] because it's been there for years that mobility is [synonymous**



Professor Marilyn Taylor (left) and Lord Mayor of Melbourne, Robert Doyle at the panel discussion

**with] private cars and motorbikes. So I'm using a cultural approach. We call it ethnographic marketing.**

**"If I ask my people, say, 'Hey, please walk and bike to work for the sake of city civilisation,' they will not do [it]. But when I say, 'Hey, ... at the end of the year, the [walking and cycling competition] prize is going to Europe,' for example, they will [act]. So I think it comes to understanding the locality, to educate and be persistent ... my goal [will be] to achieve this."**

The panel session also provided additional perspectives which supplemented ideas from the workshops. It was acknowledged that the transformation for active mobility goes beyond infrastructure changes. Mayor Ridwan Kamil acknowledged the oversight in city planning and data collection for pedestrians and cyclists was common. He noted:

**"We learned that we don't have departments in my administration to deal with [data collection on] people**

**walking or cycling. [They are concerned] mostly about traffic, about cars."**

Discussing climatic issues concerned with active mobility, Professor Marilyn Taylor said that while weather may pose challenges in achieving active mobility, she was convinced that tropical climate should not be a limiting factor in Singapore.

Professor Jan Gehl described Singapore's dense urban environment and established public transport system as strengths which provide an optimal environment for active mobility. He said this should be the focus of the journey in achieving a paradigm change.

## ROADBLOCKS TO ACTIVE MOBILITY

### *What are the key challenges in promoting walking and cycling?*

In the late 20th century, roads and motorised transport were closely and conventionally associated with the notion of development. This priority permeates policy and infrastructural design, reinforcing mindsets and defining culture. Effectively, consideration of other mobility options has been often overlooked.

The various challenges for active mobility are embedded in the current transport paradigm which creates urban environments that often prioritise motorised vehicles over other means of transportation. This then often leads to an unsafe and inconvenient environment for pedestrians and cyclists.

Consequently, active mobility options are less studied and their comparative effectiveness and benefits to the whole society are less apparent. With less focus, negative aspects such as deficient safety standards are also neglected. Collision rates for pedestrians and cyclists are much less accurately measured than those for motorised vehicles. The lack of visibility in policy and institutional frameworks also leads to an almost systemic exclusion from planning. In turn, making improvements for the safety and convenience of active mobility is difficult.

### *Is there sufficient legislative support?*

Traffic accident liability laws often do not provide commensurate protection for pedestrians and cyclists even if they are more vulnerable road-users compared to motorists. Relatively light punitive measures severely undermine the importance of all road-users' responsibility in ensuring safety for fellow road-users, with vulnerable road-users often having to suffer the damages

### *Does your city have champions?*

Champions are needed in taking the first steps of introducing policies and measures

### **I. INSTITUTIONAL FRAMEWORKS AND DEVELOPMENT POLICIES**

#### *Is your city built for cars or for people?*

The car has enabled people to move across long distances with minimal time and little physical effort. However, as urban populations grow and population densities of land-scarce cities rise, the greater demands on mobility are increasingly unmet by systems focused on private motorised transport. In spite of this, motorised transport continues to be viewed as a fundamental and key development indicator.

The prioritising of road infrastructure building in overall city development is reflected in public funding evaluations, road transport authorities' core visions, policy analysis criteria and measurement-indicators of mobility. There is much less focus on other mobility options such as walking and cycling. For example, route connectivity of paths for pedestrians and cyclists are usually not well planned for or monitored to the same standards as for roads.



to improve the conditions for active mobility. The demonstration of commitment through initiatives by these champions can create momentum and help gain support from the wider public and institutions such as schools and private companies.

Implementing active mobility involves many different stakeholders, from policy and place-making through to implementation, maintenance and enforcement. This requires leadership with the ability to organise a high level of coordination. A champion can provide a macro view of the trade-offs involved, space constraints and other competing infrastructural needs that need to be factored in to achieve community-wide benefits.

## II. INFRASTRUCTURE DEVELOPMENT AND DESIGN

### ***Does the planning framework support active mobility?***

Urban planning plays as important a role as transport planning in factoring in active mobility options from the start. Without development control to prevent urban sprawl or promote compact and mix-used developments, towns and districts risk being built to suit only motorised transport that can cater to longer journeys, reducing the convenience and viability of active modes of travel. Many modern western cities built in the mid-20th century now face problems of low density and a high urban sprawl, necessitating motorised transport. Reconfiguring routes at a later stage for connectivity and safety will involve much higher costs.

### ***Is the infrastructure designed for cars or for people?***

- Transport infrastructure that prioritises motorised transport

Road systems that are planned and managed primarily for the convenience of motorised

vehicles create many challenges for pedestrians and cyclists. Such problematic design features include narrow slip roads, non-grade crossings, long waiting times for pedestrian crossings, and low-visibility zones. These greatly affect the safety and convenience of pedestrians and cyclists.

- Lack of seamless multi-mode journeys

As walking and cycling are most viable if trips are kept to mostly under 20 minutes for persons of average fitness, the lack of a good public transport system for longer journeys also poses a challenge to developing a seamless system which involves active mobility requiring more than one mode of transport.

- Complementary facilities

Insufficient, inconvenient and insecure parking facilities pose significant disincentives for the adoption of cycling, due to the risk of theft.

The lack of end-user facilities such as showers, lockers and a laundry at or near workplaces also makes it more inconvenient for work commuters to cycle to work.



*Lack of protected cycling lanes*

## BLOOD ON THE STREETS: PEDESTRIAN AND CYCLIST ACCIDENTS



*Roads designed only for cars neglect cyclists as equal road users*

Accidents involving pedestrians and cyclists provide an indication of how safe city streets are for walking and cycling. Road accidents not only cause loss of lives but can also create significant economic burden, costing almost 4% of a country's gross domestic product<sup>10</sup> if left unchecked.

Vulnerable road-users, i.e. pedestrians, cyclists and even motorcyclists are especially at risk in accidents, and typically constitute almost half of total traffic accident fatalities.<sup>11</sup> And pedestrians are 10 times more likely to die in a road accident compared to motor vehicle occupants.<sup>12</sup> Not surprisingly, safety with regard to traffic accidents is one of the most important factors when people choose a mode of travel.<sup>13</sup>

With the odds of survival in accidents very much tilted in motorists' favour, laws and policies need to address this fundamental inequality among pedestrians, cyclists and

drivers. In the Netherlands, for example, greater liability is placed on the driver in the event of an accident involving pedestrians or cyclists. Urban speed limits are also capped at 50km/h or less, with speeds for certain areas within the city centre limited to 30km/h.

### TOWARDS SAFER STREETS

Accidents, in particular those with child casualties, can spur positive action by generating greater community awareness of the importance of road safety. For example, the "Stop de Kindermoord" (Stop the Child Murder) campaign in the Netherlands was critical in gathering wide public support for safer streets. Similarly in New York, road safety was the driving force behind the pedestrian- and cyclist-friendly policies implemented in recent years as part of its Vision Zero campaign.<sup>14</sup>

<sup>10</sup> Mitis, F. and Sethi, D. 2013. *European Facts and Global Status Report on Road Safety Factsheet*. World Health Organisation (WHO), Regional Office for Europe. [http://www.euro.who.int/\\_data/assets/pdf\\_file/0010/185572/e96811.pdf](http://www.euro.who.int/_data/assets/pdf_file/0010/185572/e96811.pdf)

<sup>11</sup> Ibid. Also refer to statistics for 2011 and 2012 in the *Annual Road Traffic Situation Release 2013*, retrieved from [http://driving-in-singapore.spf.gov.sg/services/driving\\_in\\_singapore/services/statistics.html](http://driving-in-singapore.spf.gov.sg/services/driving_in_singapore/services/statistics.html)

<sup>12</sup> New York City Department of Transportation, 2010. *The New York City Pedestrian Safety Study and Action Plan*. [http://www.nyc.gov/html/dot/downloads/pdf/nyc\\_ped\\_safety\\_study\\_action\\_plan.pdf](http://www.nyc.gov/html/dot/downloads/pdf/nyc_ped_safety_study_action_plan.pdf)

<sup>13</sup> Koh, P. P., & Wong, Y. D. (2013). *Influence of infrastructural compatibility factors on walking and cycling route choices*. *Journal of Environmental Psychology*, 36, 202-213.

<sup>14</sup> Flegenheimer, M. 2014. "A City Plan with Swedish logic and city smarts." *The New York Times*, May 13. <http://www.nytimes.com/2014/05/14/nyregion/a-safety-plan-with-swedish-logic-and-city-smarts.html>

## WALKING AND BIKING THE GROUNDS: CHALLENGES OBSERVED IN THE BIKESHOP

The Bikeshop, led by Gehl Architects gathered participants from diverse backgrounds for a site discussion on bicycles covering the study area of Ang Mo Kio. A typical public housing town in Singapore, the planning and design of Ang Mo Kio was largely based on Modernist principles in the early 1980s. The town currently does not have dedicated cycling infrastructure network, other than one recreational park connector route linking the town with neighbouring parks. Road and junction designs within the town generally prioritise cars and can impact pedestrians and cyclists adversely. However certain development characteristics such as planning of basic daily amenities based on walkable distances and extensive street planting have helped facilitate the convenience of walking within each neighbourhood.

Some observations on the key challenges to active mobility made during the Bikeshop were noted:

### MINI-HIGHWAYS

The carriageways on the roads are generally quite wide, facilitating car

movement within the town. Most cyclists prefer not to cycle on the roads alongside fast moving traffic, and were observed to share paths with pedestrians instead. This could, however, create conflicts between cyclists and pedestrians, especially where paths are narrow.

At one of the neighbourhood locations observed during the Bikeshop, pedestrians were seen taking an overhead bridge in order to cross the non-arterial road as railings had been erected along the road. This effectively created a "mini-highway" within the neighbourhood which allowed cars to move faster but made the environment unpleasant for walking and cycling.

"If the junctions are not safe, the network is incomplete"

Junction design was one of the key discussion points during the Bikeshop as this could significantly affect the safety of the pedestrian and cycling network. Slip lanes at arterial road junctions to facilitate the turning of cars were commonly found. These can affect the safety of pedestrians and cyclists. Bikeshop participants also felt



*Pedestrian overhead bridges and railings impede direct at-grade crossing by pedestrians*



*Slip lanes are commonly found at major junctions*

that the combination of potential blind spots and unregulated turning speeds at slip lanes creates unnecessary risks for pedestrians and cyclists, especially for more vulnerable groups like children and the elderly. Furthermore, slip lanes reduce the efficiency of walking and cycling by requiring pedestrians and cyclists to make more traffic crossings.

### INADEQUATE BIKE PARKING FACILITIES

Participants also observed that more bicycle parking facilities are required within the town as current provisions are

inadequate at key destinations such as train stations and the town centre. Many residents were observed locking their bicycles to railings or columns of sheltered walkways. This not only adds clutter to walkways but will also be unsustainable if cycling rates increase. Although plans have been put in place by agencies to improve bicycle parking provisions at public locations like train stations, more can be done to encourage key private stakeholders such as mall operators to provide parking facilities as well.



*Bicycles chained onto railings next to the town centre*

### III. CULTURE, BEHAVIOUR AND PERCEPTIONS

#### What are some perceptions and behaviours that discourage active mobility?

*"I want my Ferraris and Lamborghinis! Why should we change?"*

Cars are a status symbol in most societies and many still aspire to own one. By contrast, walking and cycling are stigmatised by a cultural bias and are usually seen as poorer forms of mobility. Stemming from such perceptions, many drivers have developed a lack of consideration for other road-users. Road infrastructure which prioritise motorised transport, space constraints and the absence of an established code of conduct for space-sharing contributes to the number of conflicts between user groups.

Pedestrians and cyclists are also sometimes viewed by drivers as annoying encumbrances on the roads. This sentiment poses a formidable challenge to changing the status quo.

*"I would never let my child ride their bike to school – it's too dangerous!"*

While lacking safety standards are a concern, inaccurate perceptions of safety also further stigmatise cycling as a highly dangerous form of commuting. Safety is often compromised by car-centric road designs that affect a driver's visibility of cyclists and pedestrians. Furthermore, cyclists in cities with low cycling rates tend to be less visible amidst motorised traffic. This also perpetuates the notion of a lack in safety standards. Such perceptions are therefore attributable to external factors particularly infrastructural design, rather than the nature of walking and cycling as forms of commuting.

*"It's too cold/hot/rainy/humid!"*

The perception that the weather is not conducive to walking or cycling as a mode of transport often deters people from even taking the first step towards active mobility. In a survey on perceptions of cycling in Singapore conducted by Nanyang Technological University, almost half of the respondents consisting of cyclists and non-cyclists agreed that cycling is hot and tiring<sup>15</sup>. As highlighted by Professor Marilyn Taylor, tropical weather should not be taken as a limiting factor for promoting cycling in Singapore; active measures can be taken to enhance cyclist and pedestrian comfort in the tropics.

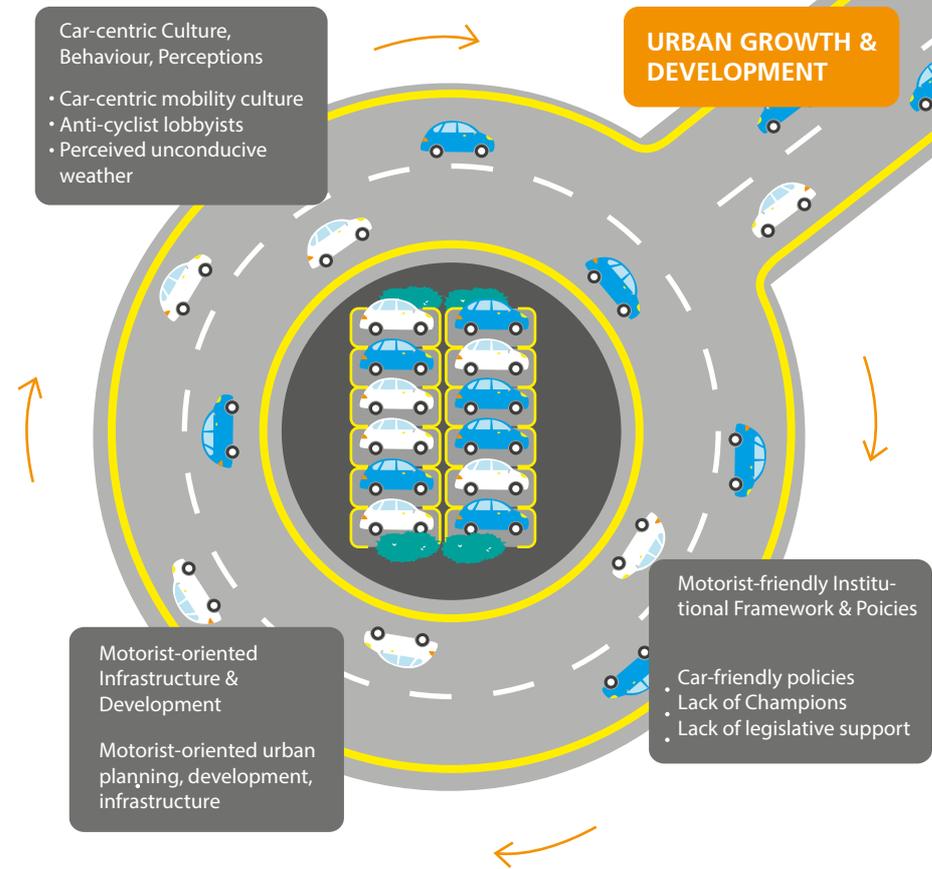


Getting around the strong sunshine with an umbrella to provide shade

## CHASING CARS: A VICIOUS CYCLE

Motorized transport is an effective means of mobility; however motorist-friendly developments form vicious cycles in urban growth trajectories which can exclude other forms of mobility in particular walking and cycling.

Motorist-friendly policies that give rise to car-oriented urban infrastructure and developments also contribute to auto-centric culture and behaviour whereby motorists tend to be more defensive about road space and are less receptive towards other forms of road users. This in turn create expectations among the people for further car-friendly policies to be put in place to boost vehicle infrastructure capacity and efficiency to fuel urban growth and development.



<sup>15</sup> Koh, P.P. and Wong, Y.D. 2012. "The Evolution of Cycling in Singapore." Journeys (Nov), LTA Academy, Land Transport Authority, Singapore, pp. 39-50.

## FOUR WHEELS GOOD; TWO WHEELS BAD? – ADDRESSING ANTI-CYCLING SENTIMENT

The resurgent interest in urban cycling in some countries recently has been accompanied by an increase in anti-cycling lobbyists. Such groups are especially vocal in cities where infrastructure and/or road users' behaviour are still trying to come to terms with the growing popularity of cycling. This can create pressure on governments to review or even scale down cycling initiatives.

Anti-cyclist sentiment was especially heated in the city of New York when the mayor at the time Michael Bloomberg and Department of Transportation Commissioner Janette Sadik-Khan rolled out an ambitious pro-cycling programme (2002–2013). Opposing lobbyists cried foul

over errant cyclists flouting traffic rules, endangering drivers and pedestrians alike. The benefits of the newly constructed bicycle lanes were challenged as detractors decried the reduction of road space for cars and even went to the extent of filing a lawsuit for the removal of a stretch of bicycle paths.<sup>16</sup>

In other cities such as Taipei, where an emergent cycling culture is based mostly on shared paths, anti-cycling sentiments often focused on conflicts between pedestrians and cyclists<sup>17</sup>. Similar grievances are also commonly found on public discussion forums in Singapore, with some suggesting that cycling activities be restricted in pedestrian areas.<sup>18</sup>



Road warriors on two wheels in New York

## MISGUIDED ANGST

While there is a need for cyclists to be educated on road safety rules to discourage aggressive cycling, cyclists are far too vulnerable a group to be of significant threat to other road-users. To put this in perspective, a study on cyclists' safety by Monash University in Australia found that more than 80% of accidents in Melbourne were the fault of vehicle drivers and that 90% of cyclists in accidents were cycling according to traffic rules.<sup>19</sup>

As for pedestrian-cyclist conflicts, pro-pedestrian groups should recognise that cyclists are often forced onto pedestrian paths by aggressive road traffic. Instead

of more cycling restrictions, policymakers and urban planners should recognise the need for more road space dedicated to cycling lanes

## MORE CYCLING = SAFER CYCLING

If cycling initiatives are maintained, cultural acceptance of cycling as a form of commute should improve with an increase in cycling rates. With cycling, the dictum of 'safety in numbers' applies: People pay more attention to, and get used to the presence of cyclists as a group of road-users when there are more cyclists; cyclists are also more inclined to follow traffic rules as part of a group.



Anti-cyclist sentiments in New York City made it challenging to introduce a cycling-friendly environment

<sup>16</sup> Grynbaum, M.M. 2011. "Lawsuit seeks to erase bike lane in New York City." The New York Times, March 7. [http://www.nytimes.com/2011/03/08/nyregion/08bike.html?\\_r=0](http://www.nytimes.com/2011/03/08/nyregion/08bike.html?_r=0)  
Hu, L. 2013. "Pedestrians have right of way too." Taipei Times, December 5. <http://www.taipetimes.com/News/editorials/archives/2013/12/05/2003578325>

<sup>17</sup> Public letters posted on the Forum Online section of The Straits Times newspaper regarding issues such as "Stop cyclists riding through bus stops" (23 April 2014, <http://www.straitstimes.com/premium/forum-letters/story/stop-cyclists-riding-through-bus-stops-20140423>) and "Problem of cycling on walkways has worsened" (25 April 2014, <http://www.straitstimes.com/premium/forum-letters/story/problem-cycling-walkways-has-worsened-20140423>) reflect some sentiments.

<sup>19</sup> Johnson, Marilyn, Cyclist safety: an investigation of how cyclists and drivers interact on the roads, Monash University, 2011

## TRANSFORMATIVE CHANGE

### *Working towards a people oriented city*

Creating walkable and bikeable cities requires a strong level of commitment to shift away from existing policies and infrastructure development that prioritise motorised transport. It is a process that is usually propelled by important catalysts and compelling motivations. At the core of this, however, must be the desire to meet the needs of people first.

### I. CATALYSTS FOR ACTIVE MOBILITY: WHY DID CITIES BEGIN EMBRACING WALKING AND CYCLING?

Different motivations to embrace active mobility have shaped the development of active mobility in cities around the world in terms of policymaking, urban planning, infrastructure design and enforcement. While these vary with each city, it is important to address the different dynamics, urban contexts and attributes of each city individually in order to identify a compelling starting point for change.

#### SAFETY

Road safety remains one of the most powerful reasons to advocate active mobility policies. Safety can be a unifying fundamental concern which impacts the whole community and can even bring it closer together rather than polarise different user groups. For example, when New York mayor, Bill de Blasio, introduced a programme aimed at ending traffic deaths and injuries<sup>20</sup> by implementing road safety policies prescribing 'arterial slow zones' to reduce speed limits to 25 m/h from 30 m/h in designated areas, there was relatively little resistance from residents. While the policies were no less extensive compared to earlier pro-active mobility initiatives under

previous Mayor Bloomberg which did attract significant resistance, Mr de Blasio believes the new policies can be, "less politically divisive when framed in the context of public safety."<sup>21</sup>

New York City's approach takes inspiration from Sweden's adoption of a 'Vision Zero' plan, first legislated in 1997. With this approach, safety is built into road and urban design, and this has led to reduction in accident fatalities by more than 50%. With this planning principle in place, dedicated space has been provided for cyclists and pedestrians.<sup>22</sup>

The success stories of Amsterdam and Copenhagen as bikeable and walkable cities also feature safety as the key catalyst that triggered the shift towards people-centric cities in the 1970s. It was the popular demand for better road safety standards, especially for children, that led to the reversal of the dominance of motorised transport there.

#### URBAN LIVEABILITY AND TRAFFIC CONGESTION

Competing needs for housing and transportation have created much pressure on limited land resources within the city. Building more roads to cater to car populations has proven unfeasible with traffic congestion persisting, leaving mobility standards stagnating and even deteriorating.<sup>23</sup> It has also been found that beyond basic road networks, more roads neither generate more economic benefits nor deliver long term solutions for mobility.<sup>24</sup>

Recognising this, initiatives to reclaim the city for its inhabitants have been



## CHAPTER 6

<sup>20</sup> Vision Zero Action Plan, City of New York Mayor Bill de Blasio, 2014

<sup>21</sup> Flegenheimer, M. 2014. "De Blasio looks toward Sweden for Road Safety" The New York Times, 12 May. [http://www.nytimes.com/2014/05/13/nyregion/de-blasio-looks-toward-sweden-for-road-safety.html?\\_r=0](http://www.nytimes.com/2014/05/13/nyregion/de-blasio-looks-toward-sweden-for-road-safety.html?_r=0)

<sup>22</sup> Pollack, K.M. et al. 2012. *Toward environments and policies that promote injury-free active living – it wouldn't hurt*. Health & Place. 18.1 (2012): 106-114.

<sup>23</sup> Duranton G. and Turner M.A. 2009. *The fundamental law of road congestion: Evidence from US Cities*. National Bureau of Economic Research working paper series, no. 15376.

<sup>24</sup> Litman, T. 2013. *Smarter Congestion Relief in Asian Cities*. Transport Bulletin from Asia and the Pacific. [http://www.unescap.org/sites/default/files/b82\\_Chapter1.pdf](http://www.unescap.org/sites/default/files/b82_Chapter1.pdf)



successful in many cities around the world. In the US, where more land is used for roads than housing<sup>25</sup>, a programme called PlaNYC 2030 initiated in the city of New York to improve the quality of life for city residents, communities and businesses

led to bold initiatives under the strategic transport master plan, 'Sustainable Streets', to revive public spaces through pedestrianisation and the building of a comprehensive network of bicycle lanes.

**"The city is growing more and more dense, and that density makes the city creative and innovative. But building more roads is not the answer to that development. We need to focus on other investments and strategies."** – Jannette Sadik-Khan (NYC DOT commissioner 2007-2013)

Other cities are also seeing the value in promoting active mobility along with public transport to improve liveability and local economic development.<sup>26</sup> In Seoul, the busy Cheonggye Elevated Highway was removed and replaced with a project to restore the historic Cheonggyecheon stream. This not only improved urban liveability, but also encouraged the use



*Union Square in Manhattan, NYC, is a lively public space for all to enjoy*



*Citi Bike Launch by New York City Department of Transportation.*

of public transport and active modes of commuting without causing more traffic congestion. There are now more plans to invest in public transport, pedestrianisation and cycling in Seoul.

## II. MAKING IT HAPPEN: HOW CITIES TOOK STEPS TOWARDS ACTIVE MOBILITY

Not all cities are created equal; some cities have advantageous pedestrian-friendly urban fabric retained from history, while others begin from a starting line of more motorist centric infrastructure and urban sprawl. Some cities leverage on strong civic cultures which support space sharing and while

others face strong anti-cyclist sentiments. Nevertheless, active mobility success stories share certain similarities: tough decisions by governments have to be made to effect sustained paradigm shifts. To oil the gears of change, involved communities being part of public conversations can support the process of assessing trade-offs and calibrating public expectations.

<sup>25</sup> Rodrigue, J.P. 2013. *The Geography of Transport Systems*, 6(1). Accessed online via: <http://people.hofstra.edu/geotrans/eng/ch6en/conc6en/ch6c1en.html>

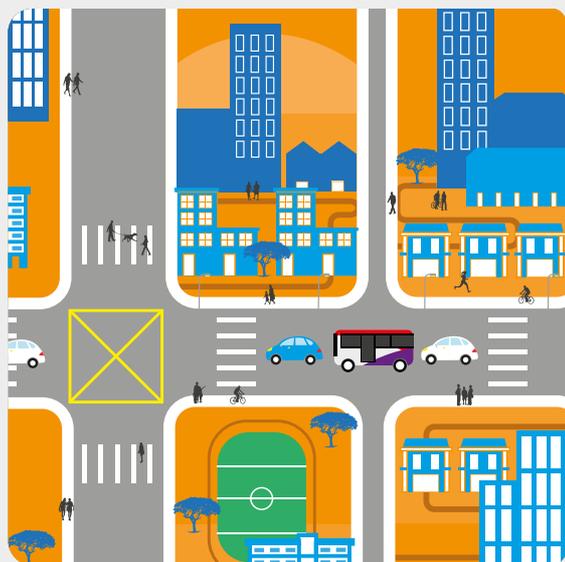
<sup>26</sup> Flegenheimer, M., 2012. "Transit initiatives are giving a boost to businesses, a report says." City Room Blog, The New York Times, 24 October. <http://cityroom.blogs.nytimes.com/2012/10/24/transit-initiatives-are-giving-a-boost-to-businesses-a-report-says/>

## THE GOOD, THE BAD AND THE UGLY

Not all cities are created equal. Some cities have advantageous pedestrian friendly urban fabric retained from history, while others begin from a starting line of more motorist centric infrastructure and urban sprawl. Some cities leverage on strong civic cultures which support space sharing, while others face strong anti-cycling sentiments.

Here's a look at some factors in cities that support or hinder Active Mobility.

### GOOD



#### 1 High density, compact, fine grained urban form

An example is Amsterdam, whose 17<sup>th</sup> century city grid is compact, with amenities and buildings close to each other. This makes it practical to commute by walking and cycling.

#### 2 Mixed use environment

Mixed uses environments reduce commuting distances allowing access to essential goods and services. The variety of services and activities also make the journey more interesting and engaging.

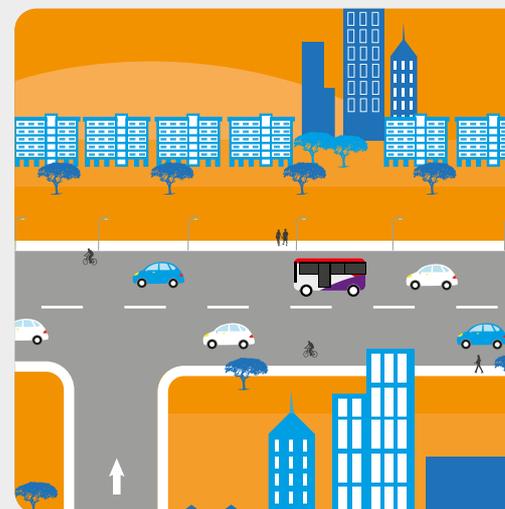
#### 3 Strong civic and sharing culture

In Taipei, the culture of sharing and mutual respect sees cyclists giving priority to pedestrians on sidewalks and motorists giving way to pedestrians on shared streets.

#### 4 Good public transit

In cities like Tokyo, the rail and subway network are able to serve as a backbone of active mobility for longer distance journeys. Walking and cycling can be used to complete these multi-modal journeys.

### BAD



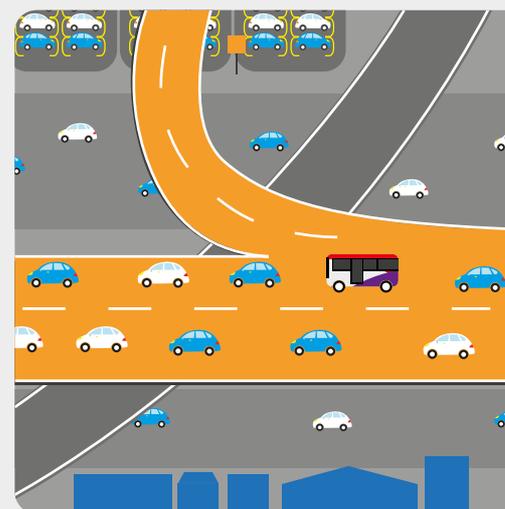
#### 1 Car-centric/anti-cyclist culture

Car-centric culture slows down policy changes to promote walking and cycling. Pro-active mobility initiatives in New York City (NYC) met with heated responses of anti-cyclist lobbies. In the Prospect Park West bike lane case, conflicts led to lawsuits filed at the State Supreme Court.

#### 2 Car-oriented infrastructure design (eg. junctions, road design)

New York City has launched its Vision Zero campaign to address its car-oriented infrastructure which poses safety problems for pedestrians and cyclists. Some of these include measures such as arterial slow zones, high visibility crosswalks and widened medians.

### UGLY



#### 1 Urban sprawl and mono-functional land use

Cities face longer trip distances which make cycling less practical. In Australia, most transport, housing and land use policies do not combat sprawl, and suburban cities which are less dense face difficulties in promoting active mobility.

#### 2 Car-oriented transport network

Car-oriented transport networks typically feature low rail connectivity and little subway or bus provision. In lieu of people-centric development strategies, cities sometimes rely heavily on highway and road construction to fuel urban growth.

## AMSTERDAM

*Incremental changes through public sector and civic group collaboration*

### SIMILAR CHALLENGES, DIFFERENT ERA

In the 1970s, Amsterdam was not the city of bicycles that it is today. The car had become a popular mode of transport while the use of bicycles as a percentage of overall mobility options fell from 75% in 1955 to just 25% by 1970.<sup>27</sup> To support the growth in the number of cars, roads had to be widened and re-designed to facilitate motorised travel. Consequently, road conditions became unsafe and challenging for pedestrians and cyclists. In 1971, there were 3,300 road fatalities recorded, even higher than the rate of fatalities in the US in 1975<sup>28</sup>. It was apparent that Amsterdam's 17th century pedestrian scale city grid posed a constraint to the unlimited growth of motorised transport infrastructure since it was never meant to support motorized traffic.<sup>29</sup>

### STANDING UP FOR SAFETY

In response to the rise in traffic fatalities, Amsterdam's residents became increasingly disenchanted with the increase in vehicular traffic in the city and dangers posed. This gave rise to the 'Stop de Kindermoord' ('Stop the Child Murders') campaign, precipitated by an article written by the respected journalist, Vic Langenhoff, on the lack in road safety standards that led to the death of his child. The campaign quickly gained widespread support from both mainstream and anti-motorist supporters.

The campaign eventually grew into a major organisation that galvanised society and the government to stand together to tackle the issue of road safety. In 1974, the Stop de Kindermoord campaign even strategically targeted the Prime Minister in his capacity as a parent and challenged him to find a common ground between opposing stakeholders without polarizing motorists and cyclists. At the same time,



Steven Schepel, a respected urban planner, with the Dutch Minister of Transport



Cycling protest posters in 1970s Amsterdam

other movements such as Provos and non-governmental organisations (NGOs) such as the Dutch Cyclists Union (Fietzersbond) helped to promote the bicycle as an instrument of liveability and sustainability.

### RECEPTIVE AND PROGRESSIVE AUTHORITIES

The Dutch government responded positively to the public campaigns and worked together with the Stop de Kindermoord campaign organisers to address transport and road safety issues. Recognising the organisation's strength in gathering community support, the government took steps to provide assistance and cooperation that went beyond simply paying lip service. The national transport officials engaged respected urban planners like Steven Schepel as technical advisor to Stop de Kindermoord. This helped the organisation to promote concrete solutions for safer streets, such as the concept of 'woonerf' or 'living streets', throughout the country.

Led by the Transport Ministry, the Dutch government also invested in influential cycling projects in Tilburg and The Hague to encourage cycling. These projects served as exemplars for other municipalities and added to the research on the positive effects of bicycle infrastructure interventions.<sup>30</sup>

### FOUR DECADES OF PROGRESS

Over the next few decades, cycling lanes and safer street junction designs were implemented across the Netherlands together with legislative reviews for stricter accident liability and speed limits for drivers. By 2008, the rate of fatalities was 60% lower compared to the US, demonstrating that a progressive government and proactive community involvement can lead to success in improving road safety and encouraging active mobility. As Schepel, who was also president of the Stop de Kindermoord campaign in 1976 noted:

**"One of the important things was that we came with feasible ideas. We not only made noise at the right moment, but we demonstrated that it would be possible to make streets better places. And we never said don't drive a car; we fought the bad consequences of too much car traffic"**

<sup>27</sup> Jason, 2010. "Amsterdam: Bike Riding Capital of the World" Global Sherpa blog, 9 December. <http://www.globalsherpa.org/amsterdam-bike-riding-capital-world>

<sup>28</sup> Fried, B., 2013. "The Origins of Holland's 'Stop Murdering Children' Street Safety Movement" Streetsblog network, 20 February. <http://streetsblog.net/2013/02/20/the-origins-of-hollands-stop-murdering-children-street>

<sup>29</sup> Pelzer, P. 2010. *Bicycling as a Way of Life: A Comparative Case Study of Bicycle Culture in Portland, OR and Amsterdam*. 7th Cycling and Society Symposium, 6 September. <http://www.tsu.ox.ac.uk/events/100906/css-pelzer-paper.pdf>

<sup>30</sup> Van Goeverden, K., & Godefrooij, T. 2011. *The Dutch Reference Study – Cases of interventions in bicycle infrastructure reviewed in the framework of Bikeability*. Delft University of Technology & Interface for Cycling Expertise.

## NEW YORK

*Pro-active civic group, Visionary leadership, Overnight transformation*

### A COMPACT URBAN FORM AND A HISTORY OF PUBLIC TRANSPORT

While the car represents independence and freedom to many Americans, there is some evidence that this trend may be on the wane.<sup>31</sup> In cities like New York, there has always been a greater dependence on public transportation. This high usage of the subway system and the city's dense urban form cultivated mobility culture which recognises the merits of walking. This has also laid the foundations for widespread support for active mobility and public space activation in the 2000s.

### EARLY CHALLENGES TO WALKING AND CYCLING

New York experimented with pedestrianisation as early as 1966 in spite of opposition by the city traffic authorities of that time; however, the support for pedestrianisation was not sustained.<sup>32</sup> Cycling also saw a similar progression with a temporary boost provided by a spike in oil prices in 1973. But this nascent bicycle movement lost its momentum when a subsequent fall in fuel prices made driving popular again. The cyclist demographic



*Congestion in midtown New York city in the 1970s*

was reduced to mainly working bicycle messengers and cycling increasingly became perceived as dangerous to both motorists and pedestrians.<sup>33</sup>

### ALLYING PEDESTRIANS AND CYCLISTS

By the 1980s, city planning catered for motorised traffic, leaving bicycle infrastructure neglected. A ban on cycling in the heart of the city was even planned in 1987.<sup>34</sup> Interestingly, this proved to be the catalyst that cyclists needed to make a demand for their own rights. In organised protests, cyclists decided to address the myth that they endanger other road users. Through campaigns that communicated their solidarity with pedestrians in their shared vulnerability to car collisions, they were able to improve public opinion of towards cycling.<sup>35</sup> Subsequently, cycling gained a small but strong support base. In the process, cycling advocacy was also revitalised and later provided valuable support for initiatives to improve cycling conditions.

### BICYCLE LANES AND PEDESTRIAN PLAZAS BLOOMING OVERNIGHT

The “fire-starter” for the recent active mobility efforts was however, the NGO, Transportation Alternatives (TA). By cleverly harnessing the power of Internet to spread the benefits of safer streets, and bringing in international experts like Jan Gehl for workshops and pep talks, TA was able to gather popular support for its advocacy work<sup>36</sup>. This eventually pressured the New York Department of Transportation to rethink its transport strategies and led to the appointment of the new pro-walking and cycling commissioner, Jeanette Sadik-Khan, in 2007. With her new management team brought in from the advocacy community,



*Former NYCDOT Commissioner, Janette Sadik-Khan*

as well as Bloomberg's political support, Sadik-Khan boldly transformed the mobility paradigm of New York during her six-year term<sup>37</sup>.

Over the course of a six-month pilot project, 10,000m<sup>2</sup> of pedestrian space was created through pedestrianisation of streets at Times Square, from 42<sup>nd</sup> Street to 47<sup>th</sup> Street on Broadway. Similarly, the Citi Bike bikeshare system took two years to implement and only one month to put in place. More than 350 miles of bicycle lanes were created under the Bloomberg administration, making major headway in city plans such as the NYC Bicycle Master Plan previously launched almost ten years prior 1997. The success can be partly attributed to the use of experimental, cheap and easy-to-implement pilot projects that allowed new ideas to be tested while securing public support by quickly demonstrating the benefits at the same time.<sup>38</sup>

### WHEELS SET IN MOTION FOR BICYCLE LANES

The process of implementing new policies involved managing and addressing vocal detractors.<sup>39</sup> For example, the pilot projects were also often couched as “temporary”, helping to mitigate pushback from the anti-cycling camp. Yet, the initiatives did eventually receive mainstream support with surveys showing that 72% of New York residents approved of the pedestrianised street projects.<sup>40</sup> Under the Bloomberg administration great strides were made in infrastructure provision. Tracked cyclist counts at selected commuter locations have since grown to more than four times what it was in 2000.<sup>41</sup> Today, the active mobility infrastructure that is in place serves as an example for the rest of society with the demand for further extension of such facilities increasing.<sup>42</sup>

<sup>31</sup> Lev-Ram, M. 2014. “Then end of driving (as we know it).” *Fortune*, 12 June. <http://fortune.com/2014/06/12/end-of-driving/>

<sup>32</sup> Under Mayor John Lindsay's charge, New York City, Central Park Drive was pedestrianized on summer weekends.

<sup>33</sup> Johnson, K. 1987. “Bicycle Ban on 3 Midtown Avenues Is Delayed for a Week by Judge.” *The New York Times Archives*, 1 September. <http://www.nytimes.com/1987/09/01/nyregion/bicycle-ban-on-3-midtown-avenues-is-delayed-for-a-week-by-judge-by-kirk-johnson.html>

<sup>34</sup> Farley, J. 2013. “25 Years After Ed Koch's Proposed Bicycle Ban, Cyclists Have Gained Much Ground.” *MetroFocus*, September 28. <http://www.thirteen.org/metrofocus/2012/09/25-years-after-ed-kochs-proposed-bicycle-ban-cyclists-have-gained-much-ground/>

<sup>35</sup> Komanoff, C. 2012. “The Bicycle Uprising: Remembering the Midtown Bike Ban 25 Years Later.” *Streetsblog*, 7 August. [http://www.komanoff.net/bicycle/Bicycle\\_Uprising.pdf](http://www.komanoff.net/bicycle/Bicycle_Uprising.pdf)

<sup>36</sup> Naparstek, A. 2014. “The Evolution of an Advocate from Honku to Streetsblog and Beyond (Part 1)” *The Bicycle Story*, 2 April. <http://www.thebicyclestory.com/2014/04/aaron-naparstek-part-1/>

<sup>37</sup> Naparstek, A. 2014. “The Evolution of an Advocate from Honku to Streetsblog and Beyond (Part 2)” *The Bicycle Story*, 8 April. <http://www.thebicyclestory.com/2014/04/aaron-naparstek-part-2/>

<sup>38</sup> Chen, D.W. and Crynbaum, M.M. 2011. “Pilot label lets Mayors' Projects Skip City Review.” *The New York Times*, 26 June. [http://www.nytimes.com/2011/06/27/nyregion/bloomberg-pilot-programs-avoid-red-tape-and-public-review.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2011/06/27/nyregion/bloomberg-pilot-programs-avoid-red-tape-and-public-review.html?pagewanted=all&_r=0)

<sup>39</sup> To great media attention, residents at Prospect Park West protested against the highly popular separated bicycle lane, regarding the large influx of users as negative impacts to their daily lives. Eventual resolution necessitated due process up to the level of the Supreme Court, which also demonstrates the presence of a governance structure to regulate public disputes.

<sup>40</sup> Janette Sadik-Khan (2013). *New York's streets? Not so mean any more*. Retrieved on 19 February 2014 from [http://www.ted.com/talks/janette\\_sadik\\_khan\\_new\\_york\\_s\\_streets\\_not\\_so\\_mean\\_any\\_more.html](http://www.ted.com/talks/janette_sadik_khan_new_york_s_streets_not_so_mean_any_more.html)

<sup>41</sup> New York City Department of Transport. 2013. *NYC In-Season Cycling Indicator*. <http://www.nyc.gov/html/dot/downloads/pdf/2013-isci-2-25-14.pdf>

<sup>42</sup> Hinds, K. 2014. “NYC DOT: Public Plazas Should be Everywhere – Not Just Manhattan.” *WNYC Blog*, 17 June. [www.wnyc.org/story/nyc-dot-public-plazas/](http://www.wnyc.org/story/nyc-dot-public-plazas/)

## SEOUL

*Shifting the mobility paradigm with major public projects*

### CAR CENTRIC DEVELOPMENT AND CONGESTION

The South Korean capital of Seoul underwent rapid economic development since the 1960s with car ownership rising in tandem with income growth in the 1970s and 1980s. Urban transport infrastructure was overwhelmingly car-oriented and elevated highways were introduced to tackle traffic congestion. Pedestrians were generally redirected to bridges and underpasses. However, as with many metropolitan cities, the road capacity could not meet the rapid growth in the car population.<sup>43</sup>

### BUILDING UP PUBLIC TRANSPORT

With the recognition of the need for more mobility options, the first subway line was introduced in 1974; it was further expanded in the 1990s and early 2000s. It was this focus on public transport that would subsequently support the city's bid to improve walkability and bikeability. While improving public transport facilities, the South Korean government also introduced policies to restrict car growth. These include the implementation of increased fuel taxes, road use charges, parking fees, and restrictions on parking provision in new commercial buildings.<sup>44</sup>

### AN OPPORTUNITY FOR A PARADIGM SHIFT

The bold decision to demolish the ailing Cheonggye Elevated Highway and restore the historical Cheonggyecheon stream marked a major turning point in decades of car-oriented urban development in Seoul. A major arterial road built in the

1970s; the Cheonggye Elevated Highway supported a daily traffic volume of more than 160,000 vehicles. But by the early 2000s, repeated assessments revealed that the highway was structurally unsound despite constant repairs since the early 1990s. Continued investment to repair the highway was impractical and furthermore, restoring the stream was a much more attractive option, promising to enliven and revitalize the district.

Carried out between 2001 to 2005 and led by then Mayor Lee Myung Bak, the Cheonggyecheon Restoration Project initially faced public concerns on an intensification of traffic due to the removal of the highway. However, the opposite proved to be true.<sup>45</sup> The restoration project also provided the opportunity to test new initiatives such as one-way streets, exclusive bus lanes, increased subway capacity, raised parking charges, campaigns for reduced car usage, and downtown shuttle buses. As a result, some traffic de-congestion in the city centre had been achieved. This led to many of the initiatives being comprehensively adopted elsewhere in the city.

While the Cheonggyecheon Restoration Project was spearheaded by the government, community engagement was also a key factor in its success. Significant efforts were made by the authorities to engage and involve the local communities in the planning of the project. A Citizens' Committee was set up to represent public opinion and facilitate engagement. Local concerns about flood control, economic impact and most importantly, traffic congestion, were addressed through about 4,200 community meetings, involving an estimated total of 2,543 participants.<sup>46</sup> The iconic project best represents a concerted effort by the government to reduce the city's reliance on cars and enhance liveability.



*The restored Cheonggyecheon stream*

### RESOLUTIONS TOWARDS A GREENER MOBILITY SYSTEM

Emboldened by the success of the Cheonggyecheon Restoration Project, Seoul has been sustaining its efforts in creating a people-friendly city through other major public projects, including Gwanghwamun Pedestrian Belt. A new project that would transform 1 km of elevated highway in the city centre into a grassy elevated park similar to New York's High Line Park, was also announced. Moving forward, Seoul aims to double its sidewalks in downtown areas by reclaiming road space, enhancing road safety by setting a 30km/h speed limit in residential areas and increasing

the combined take-up of public transport, walking, cycling, and green vehicles to 80% by 2030<sup>47</sup>.

<sup>43</sup> Rii, H.U. & Ahn, J. (2001). *Urbanisation and its Impact on Seoul, Korea*. Forum on Urbanizing World and UN Human Habitat II, Conference Proceedings. <http://ngo.cier.edu.tw/policy2.3.pdf>

<sup>44</sup> Kim, Y.P. 2011. "Beijing needs to learn from Seoul to ease traffic jams". Yonhap News Agency, 1 November. <http://english.yonhapnews.co.kr/national/2011/01/11/3/0302000000AEN20110111003100320F.HTML>

<sup>45</sup> Cheong Gye Cheon Museum (2011). *Cheong Gye Cheon Restoration*.

<sup>46</sup> Rowe, P. ed., 2010, *The Cheonggyecheon restoration project – a City and its stream*, Harvard University Graduate School of Design, pp.100.

<sup>47</sup> Seoul Transport Vision 2030, extracted from <http://english.seoul.go.kr/policy-informaton/traffic/seoul-traffic-vision-2030/>

## COPENHAGEN

*Planning for all stakeholders of mobility through systematic data collection*

### A CYCLING HISTORY WITH UPS AND DOWNS

The bicycle has been a mode of transport in Copenhagen, Denmark since the early 1900s and was highly popular until the 1960s. Even at its lowest point in 1970, 10% of the population still commuted by bicycle. But the popularity of motorised transport saw the city's 130km of bicycle paths, which had existed since the early 1930s increasingly being encroached upon.<sup>48</sup>

### PUBLIC PROTESTS AGAINST CAR-CENTRIC DEVELOPMENT

The growth in traffic volume could not be supported by Copenhagen's 17<sup>th</sup> century network of streets. As new roads were built at the expense of public spaces, public outcry grew. One of the defining protests challenged the authorities' plans to build roads across the city's lakes, destroying the quality of public open spaces in the process.<sup>49</sup> By the late 1970s, such protests became annual occurrences. Wider community support to save public spaces and the city's heritage also began to grow.

### A CULTURE OF PUBLIC DIALOGUE

As early as 1962, a 2-year trial pedestrianisation of the main shopping street, the Strøget had been implemented. Although there was initial resistance from some business owners and the public, the pedestrianised Strøget soon attracted a vibrant pedestrian street culture that paved the way for wider public support. A culture of dialogue was established and inclusive planning between the community and the government resulted with reforms in



*Strøget in the 1960s*



*Strøget today*

urban planning during the 1970s. Specific measures to increase public participation in the planning process also created a platform for the public to voice concerns and provide input on urban development and transport planning directions for the city.

### GATHERING EMPIRICAL EVIDENCE FOR PEOPLE-ORIENTED PLANNING

Beginning in the mid-1960s, eminent urban designer Jan Gehl studied public life in detail, examining the conditions, patterns and rhythms of life in the city centre of Copenhagen. Gehl's findings and the pragmatic solutions he devised to improve liveability proved to be a significant influence on government authorities and city planners and provided a fresh perspective on urban design.



Leveraging on research projects conducted in collaboration with the School of Architecture in Copenhagen also benefitted the government and stakeholders. Building on these insights and armed with comprehensive data on vehicular traffic, cyclist traffic and public life, Copenhagen's city planners were able to formulate a robust planning process and make people-centric decisions in designing the city.<sup>50</sup>

### COORDINATED POLICIES AND GRADUAL CHANGE

In Copenhagen, policies to support the development of bicycles as a viable mode of transport include the gradual removal of car parking space in the city centre by 2-3% a year, increasing the cost of parking as well as restricting parking to residents

only. Roads have been gradually narrowed to create space for more bicycle lanes, and car purchases are heavily taxed at 180%. The pioneering spirit of engagement and experimentation has seen Copenhagen conscientiously work towards becoming one of the world's most liveable cities.

<sup>48</sup> Some of these bicycle paths evolved from horse riding tracks. Refer to [www.greenfutures.washington.edu/pdf/Livable\\_Copenhagen\\_reduced.pdf](http://www.greenfutures.washington.edu/pdf/Livable_Copenhagen_reduced.pdf)

<sup>49</sup> Ruby, L. (n.d.). *How Denmark became a cycling nation*. Retrieved January 23, 2014, from The Official Website of Denmark: <http://denmark.dk/en/green-living/bicycle-culture/how-denmark-became-a-cycling-nation/>

<sup>50</sup> Gemzøe, L. *Are Pedestrians Invisible in the Planning Process? Copenhagen as a Case Study*. <http://walk21.com/papers/perth01arepedestriansinvisible.pdf>

**TAIPEI**

*Sharing the way towards a greener, bikeable city*

**THE ADVENT OF MOTORISED TRANSPORT**

Cycling rates in Taipei decreased rapidly with the rise in incomes and the growing popularity of motorised transport since the 1970s. Between the 1970s and the 1990s the percentage of cycling as a primary mode of transport fell from 18% to between 1–2%.<sup>51</sup> This dramatic drop was attributed to the increased dependence on cars, motorcycles and scooters as the preferred mode of transport. However, the explosion in the population of motorised transport resulted in traffic congestion, air pollution and declining road safety in the city.

**FROM MOTORISED TO GREEN TRANSPORTATION**

To counter the ill-effects of motorised transport, the Taipei City Government started promoting more sustainable modes of transport in 2008. One initiative was the public commuter bikeshare system called YouBike. Implemented in 2009 under the auspices of the Taipei City Department of Transportation, the aim of the project was to encourage people to cycle on inter-city commutes, particularly for the first and last miles of journeys.

Initially, the YouBike system was unsuccessful due to the inconvenient registration and payment system as well as the project's small scale – there were only 500 bicycles located at 11 stations. Unfazed by the disappointing public reception, the city government overhauled and expanded the system in 2013 by increasing the number of bicycles to 4,545 and the number of rental stations across the city to 136.<sup>52</sup> Registration was also



*Women make up 50% of all cyclists in Taipei*

simplified by using mobile phones and payment could be made using stored-value smartcards. The improvements proved to be a huge success with more than 40% of Taipei's population registering in the programme.<sup>53</sup> Youbike also scored a user satisfaction rate of 90%.<sup>54</sup> Boosted by the success of the bikeshare system, the percentage of people opting for bicycles as a mode of transport in Taipei increased to 5.5% by 2014.<sup>55</sup>

**SHARED BICYCLES, SHARED PATHS, SHARED CIVIC ETHOS**

The success of Taipei's Youbike project is particularly significant as there is little infrastructure to support cycling. The city only has about 250km of dedicated cycling



*Youbike, Taipei's bikes hare system*

paths and most of this is for recreational use and not for inter-city commutes.

What worked in Taipei's favour, however, was its culture of sharing and mutual respect. For instance, cyclists will usually give priority to pedestrians on the sidewalks while motorists generally give way to pedestrians and cyclists on shared streets.

This established culture of sharing spaces has contributed to the perception of road safety for pedestrians and cyclists. A survey by the Ministry of Transportation and Communications in 2010 revealed that 70 percent of the respondents did not feel the need to wear helmets when cycling.<sup>56</sup> The gender profile for cycling in Taipei is

also well balanced with women making up 50% of all cyclists.<sup>57</sup>

Lauding the strong sense of civic responsibility of its residents, Taipei's mayor, Dr Hau Lung Bin, also noted that only 12 of its YouBike bicycles have been reported missing in the previous three years with none requiring major repairs. A strong civic ethos has certainly contributed to the success of Taipei's bikeshare programme.

<sup>51</sup> Tiwari, G., Arora, A., Jain, H. 2008. *Cycling in Asia – An Overview*. Clean Air Institute. <http://www.cleanairinstitute.org/cops/bd/file/tnm25-bicycling-in-asia.pdf>

<sup>52</sup> The China Post Editorial. "YouBike's Continued Growth needs Goodwill of City Government" The China Post, 4 March. <http://www.chinapost.com.tw/editorial/taiwan-issues/2014/03/04/401887/YouBikes-continued.htm>

<sup>53</sup> Chung, L. 2013. "Flexibility helped Taipei's Bike-Share Scheme Pedal Past 10m Rental Mark." The South China Morning Post, 16 December. <http://www.scmp.com/news/china/article/1381436/flexibility-helped-taipeis-bike-share-scheme-pedal-past-10m-rental-mark>

<sup>54</sup> Department of Information and Tourism Taipei City Government. "DOT to Strengthen Maintenance of YouBikes" <http://english.tpeidot.taipei.gov.tw/ct.asp?xItem=74931372&ctNode=388138&mp=112002>

<sup>55</sup> Mayne, K. 2014. *Velo-city Global Series: Taipei on the Rise*. European Cyclists' Federation, 11 March. <http://www.ecf.com/news/velo-city-global-series-taipei-on-the-rise/>

<sup>56</sup> Shan, S. 2010. "Most Cyclists Go Without Helmets." Taipei Times, 26 March. <http://www.taipeitimes.com/News/taiwan/archives/2010/03/26/2003468965>

<sup>57</sup> Mayne, K. 2014. *Velo-city Global Series: Taipei on the Rise*. European Cyclists' Federation, 11 March. <http://www.ecf.com/news/velo-city-global-series-taipei-on-the-rise/>

# FROM FOUR WHEELS TO TWO

## Success Factors for City Transformation



**Amsterdam**

Effective collaboration between government and civic society

ROAD FATALITIES IN 2008  
**60%** lower than that of USA

Stop de Kindermoord and other civic campaigns were backed by parents, anti-motorists and the wider society to address the lack of road safety.

NGOs such as the Fietserbond provide information and promote the bicycle as an instrument of liveability and sustainability.

**New York City**

Visionary leadership: transformation in a snap

The Bloomberg administration led many pilot projects which could be implemented quickly and cheaply to demonstrate the positive impacts of pedestrianisation and bicycle infrastructure.

more than **350** miles of bicycle lanes were installed in the city

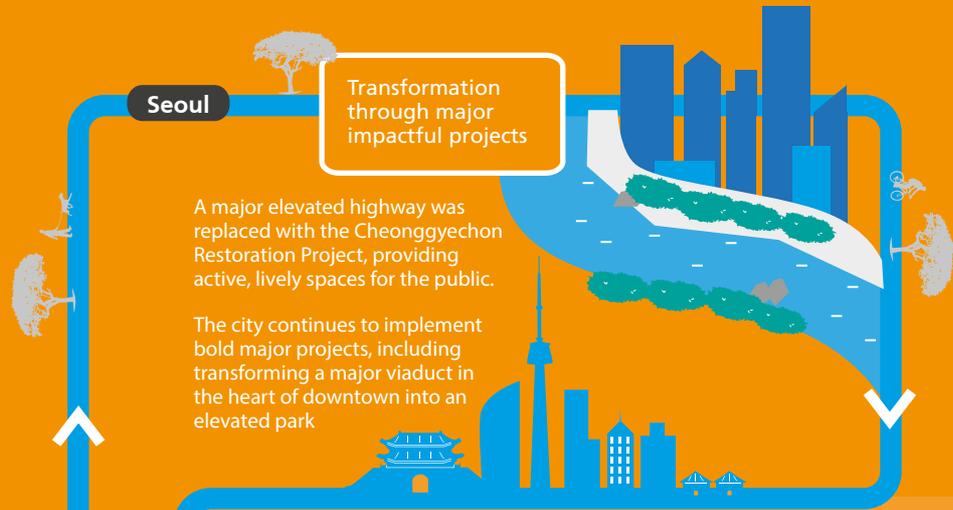


**Seoul**

Transformation through major impactful projects

A major elevated highway was replaced with the Cheonggyecheon Restoration Project, providing active, lively spaces for the public.

The city continues to implement bold major projects, including transforming a major viaduct in the heart of downtown into an elevated park



**Copenhagen**

People-oriented planning

Copenhagen adopts a people-centric approach to planning through public life studies and robust data collection on people and public space activities. Regular 'urban life accounts' also track the performance of their walking and cycling initiatives, supporting policy-making and review with concrete pedestrian and cyclist traffic counts.\*



**Taipei**

Without large-scale provision of dedicated infrastructure for cycling, Taipei's success is based on a strong civic culture of sharing and mutual respect which facilitates space sharing. Bike theft, a problem with plagues many cities, is also negligible in Taipei thanks to strong civic culture among its people.



Strong civic culture

\*See [http://www.dansklys.dk/fileadmin/user\\_upload/Materials\\_CLC/A\\_metropolis\\_for\\_people.pdf](http://www.dansklys.dk/fileadmin/user_upload/Materials_CLC/A_metropolis_for_people.pdf)

### III. KEY PIECES OF THE PUZZLE: WHAT MUST THE GOVERNMENT, THE PEOPLE AND THE PRIVATE SECTORS DO?

#### POLICYMAKERS – KEEP THE BIG PICTURE IN MIND

##### *Champion an integrated transport policy*

To establish active mobility effectively, a holistic approach to designing integrated mobility policies is required.<sup>58</sup> In Amsterdam during the 1980s and 1990s a parking policy was strictly enforced with time restrictions introduced within a broad radius around the inner city. Street parking rates were also increased and parking spaces were gradually removed at a rate of 2-3% every year.<sup>59</sup> Research has since suggested that Amsterdam's investment in bicycle infrastructure alone would not have accounted for the current success of active mobility without the strict policies implemented to control vehicular traffic in the city.

##### *Keep the city compact*

Apart from transport policy, land use planning can also be a factor in supporting the ideal mobility mix. In Denmark, the Urban and Rural Zones Act guides development to ensure that urban sprawl is contained to provide a suitable urban density that supports active modes of transport.<sup>60</sup>

##### *Maintain funding for pedestrian and cycling infrastructure*

Public investment must also be consistent. In London, up to US\$21 per resident is spent annually to improve the infrastructure for cycling and recommendations are currently being made to raise this amount to a further US\$33 per person.<sup>61</sup> The Dutch government invests considerably more, spending up to US\$40 per person annually to improve and maintain cycling infrastructure in its cities. And in Denmark, the government allocated

a third of its road transport budget to cycling infrastructure and programmes between 1982 and 2001.<sup>62</sup>

With the wide-ranging benefits of active mobility, funding sources need not fall strictly within the purview of transport authorities either. Recognising the health benefits of active mobility, the city of Copenhagen has even adopted improvements to cycling facilities as part of its official public health policy.<sup>63</sup>

##### *Gather the necessary data*

To deliver the best mobility options for the whole city, accurate data on all modes of transport and user groups, without a selective bias, is necessary to inform decision-making. An example of comprehensive data gathering is Copenhagen's Bicycle Account which surveys cyclists every two years on pertinent issues.<sup>64</sup> Indeed, Copenhagen's practice of systematic data collection on the use of public spaces by residents spans

35 years.<sup>65</sup> This has provided its authorities with relevant information to better formulate and even support policy.

Policy makers and stakeholders may also seek quantitative data with respect to the benefits and costs associated with active modes of transport. In New York, the Department of Transport is noted for undertaking such research and data gathering in their drive towards better mobility solutions. With this information, the department is able to publicly account for the economic benefits of various initiatives like its Sustainable Streets programme and study the 'green dividend' accrued from active mobility for the local economy.<sup>66</sup>

##### *Establish legislative support*

Legislative support is critical in managing the transition towards an active mobility system by defining the use of infrastructure, enforcement of codes and conflict resolution between different road users. Specific accident liability laws that acknowledge the greater vulnerability of pedestrians and cyclists can prompt greater caution on the part of motorists. In Amsterdam, laws provide strong incentives for drivers to drive defensively and consider safety for all road-users by placing the responsibility on motorists under all circumstances of accidents involving children and the elderly. In the event of a collision involving a car and a cyclist, the driver will usually be expected to cover at least half of the costs of damages awarded to the cyclist.<sup>67</sup>

##### *Educate all road users*

Educating all road users on safety codes and preventive measures is one way to prevent road accidents from occurring at all. It is important that part of all drivers'



Lively public space in New York City



Real-time speed limit information

<sup>58</sup> UNEP. 2010. *Mobilizing Investments in Share the Road: Investment in Walking and Cycling Road Infrastructure*. <http://www.unep.org/transport/sharetheroad/PDF/SharetheRoadReportweb.pdf>

<sup>59</sup> Makovsky, P. (n.d.). *Pedestrian Cities*. Retrieved January 9, 2014, from Cartage: <http://www.cartage.org.lb/en/themes/arts/civictats/AreaPlanning/pedestrianstreets/pedestrianstreets/pedestrianstreets.htm>

<sup>60</sup> Attwell, K. and Jensen, O.M. 2002. *The Danish Planning System*. European Cooperation in the field of Scientific and Technical Research, Progress Report 2002, WG2, Planning Systems and Greenspace. <http://www.greenstructureplanning.eu/COSTC11/dk-planning.htm#A2>

<sup>61</sup> All Party Parliamentary Cycling Group, Apr 2013. *Get Britain Cycling: Summary and Recommendations*. <http://allpartycycling.files.wordpress.com/2013/04/get-britain-cycling1.pdf>

<sup>62</sup> Pucher and Buehler. 2007. *At the Frontiers of Cycling*. Retrieved from <http://policy.rutgers.edu/faculty/pucher/Frontiers.pdf>

<sup>63</sup> Copenhagen Technical and Environmental Administration Traffic Department, 2011. *The City of Copenhagen's Bicycle Strategy 2011-2025*. [http://kk.sites.itera.dk/apps/kk\\_pub2/pdf/823\\_Bg65v7UH2t.pdf](http://kk.sites.itera.dk/apps/kk_pub2/pdf/823_Bg65v7UH2t.pdf)

<sup>64</sup> Pucher and Buehler. 2007. *At the Frontiers of Cycling*. Retrieved from <http://policy.rutgers.edu/faculty/pucher/Frontiers.pdf>

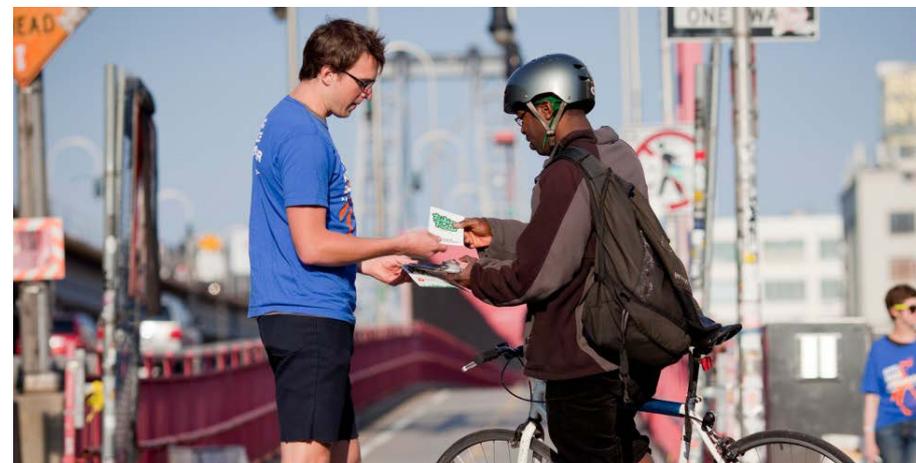
<sup>65</sup> Gemzøe, L. *Are Pedestrians Invisible in the Planning Process? Copenhagen as a Case Study*. Accessed from: <http://walk21.com/papers/perth01arepedestriansinvisible.pdf>

<sup>66</sup> See NYC DOT's website for examples of reports: [www.nyc.gov/html/dot/html/about/dotlibrary.shtml](http://www.nyc.gov/html/dot/html/about/dotlibrary.shtml)

<sup>67</sup> Bicycle Dutch. (2013, February 21). *Strict liability in the Netherlands*. Retrieved January 9, 2014, from Bicycle Dutch: <http://bicycledutch.wordpress.com/2013/02/21/strict-liability-in-the-netherlands/>



*Cycling lessons for children at schools in Copenhagen*



*NGOs support increasing awareness to support better active mobility environments*

education curriculum and assessment tests ensures that drivers know how to share the road with pedestrians and cyclists. Studies have shown that drivers who are also cyclists practice safer driving standards.<sup>68</sup> As such, a greater understanding of cyclists' behaviour through practical training could contribute to higher safety standards.

Education on active mobility can also start at an early age. Surveys show that those who cycled in their youth are more likely to cycle as adults. In this respect, day-care centres and schools could be the platform from which to launch a bicycle culture. In Denmark, youth education is exemplified in its 'Bike to School' campaign which was implemented in 2002. The campaign targets children between the ages 5 to 15. In 2012, the campaign reached out to more than 140,000 Danish children. Bike to School not only enhanced the lifestyles of youths by increasing their mobility, it also created more incentive for adults, especially parents, to cycle instead of drive. This led to a reduction in traffic congestion recorded during the run of the campaign.

A large number of participants also continued cycling after the campaign ended.

## **PEOPLE SECTOR – THE IMPORTANCE OF STAYING ENGAGED**

### ***Setting the stage for a cultural shift***

Community-led initiatives are an important agent of change with regard to promoting active mobility. A strong sense of civil society can galvanise the broader community in supporting comprehensive road-user and driver safety education, youth education, as well as codes for space sharing. NGOs such as Transportation Alternatives (TA) and Stop the Child Murder helped to mediate between the concerns of policymakers and the people, and were fundamental in initiating change in New York and Amsterdam respectively.

### ***Tapping resources from the ground***

Aside from playing a facilitative role, civic groups are important sources of user specific information which can be helpful when designing infrastructure for active mobility.

<sup>68</sup> Johnson, M. 2011. Doctoral Thesis submitted to Monash University. Cyclist Safety: an investigation of how cyclists and drivers interact on the roads. <http://arrow.monash.edu.au/vital/access/manager/Repository/monash:80938>.



The Dutch Cyclists Union, *Fietsersbond*, played an instrumental role in early collaborative research in the Netherlands by developing methods to assess local cycling conditions. These were later implemented in many Dutch cities.<sup>69</sup> Today, the *Fietsersbond* continues to play a central role in Dutch cycling culture by developing public information tools such as a cycling route planner.

The cycling movement in Denmark has similarly benefitted greatly from the active

and highly organised nature of NGOs that champion the need for more public spaces. The Danish Cyclists' Federation has long been an advocate of active mobility and has supported infrastructure development, most recently with its publication of a manual for bicycle parking.<sup>70</sup> The manual has since been endorsed by the Cycling Embassy of Denmark, a representative national network for the promotion.

### ***Promoting active mobility fun***

The value of fun is often underestimated when implementing active mobility. The Danish Cyclists' Federation was innovative in their training methods for children and developed fun and efficient alternatives to conventional bicycle training. Bicycle playgrounds and activities were created for children to encourage early adoption of active mobility and instil cycling skills. The effectiveness of these cycling activities led to the introduction of the Cycle Summer School in the City of Odense in 2011, a school camp aimed at helping children master the bicycle and increase the popularity of cycling.

Cycling can also be promoted as a fun family activity to reach out to adults and their children who may not otherwise take up cycling. As part of the annual Sydney Rides Festival, the Pirrama Park Family Fun Bike Day (organised since 2011) encourages whole families to cycle. The family bike day also presents the city with an opportunity to promote the use of bicycles as well as provide an incentive for children and parents to cycle.

### **PRIVATE SECTOR – GETTING INVOLVED AND PROVIDING SUPPORT**

#### ***Working together in partnership***

Private sector business organisations can play a role in supporting civic and government initiatives by encouraging awareness and coordinating the various bodies involved in promoting active mobility. For example, private sector organisations have taken the initiative to fulfil green transport criteria that promote non-motorised transport under voluntary environmental assessment schemes such as the Building Research Establishment Environmental Assessment

Method (BREEAM) and Singapore's Green Mark Scheme. This has indirectly boosted branding for private sector businesses as well as created value for end-users and customers.

Progressive provision of end-user facilities by supportive private sector organisations can go a long way in supporting active mobility for work commuting. Private sector organisations taking the initiative to adopt more flexible attitudes towards formal business attire for employees can help to address convenience issues, especially in tropical cities where the heat and humidity is often cited as factor for not adopting active mobility.

Private sector business organisations can also make active mobility more attractive by incentivising it. In Denmark, the Danish 'Bike to Work' campaign reaches out to private organisations and businesses across the country and asks employers to encourage their employees to form bicycle teams and reward them with incentives such as lottery tickets. With the support of companies as well as local authorities and the media, the campaign has resulted in 35% of its participants reporting a greater inclination to cycle.

Bikeshare programmes are another area where the private sector can encourage active mobility by providing corporate sponsorship as in the case of Taipei's YouBike (supported by Giant Bicycles) and New York's Citi Bike (supported by Citigroup). In Paris and Brisbane, support from advertising firms like JC Decaux in the operations of the bikeshare system allows advertising revenue to be generated to help to keep costs to the end-user low.

<sup>69</sup> Van Goeverden, K., & Godefrooij, T. 2011. The Dutch Reference Study – Cases of interventions in bicycle infrastructure reviewed in the framework of Bikeability. Delft University of Technology & Interface for Cycling Expertise.

<sup>70</sup> Bolling-Ladegaard, E. and Celis, P. *Bicycle Parking Manual*. The Danish Cyclists Federation. [http://ssuu.com/cyclingembassy/docs/bicycle\\_parking\\_manual?e=1862343/3459650#search](http://ssuu.com/cyclingembassy/docs/bicycle_parking_manual?e=1862343/3459650#search)



100% Natural Juice

# 3Brothers

 Tropical Smoothie	 Orange Smoothie	 Berry Smoothie	 Mango Smoothie
 Apple Cinnamon Smoothie	 Carrot Smoothie	 Banana Smoothie	 Mango Smoothie
 Pineapple Smoothie	 Mango Smoothie	 Banana Smoothie	 Mango Smoothie
 Tropical Smoothie	 Orange Smoothie	 Berry Smoothie	 Mango Smoothie

citi bike

02659

citi bike

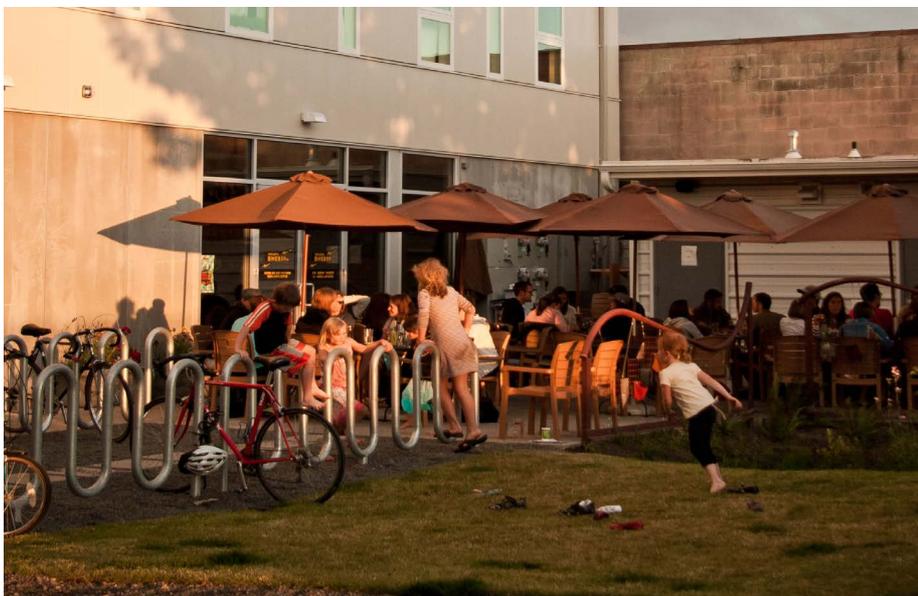
37

citi bike

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Citibike in New York City

citi bike



**The growing business of active mobility**

With more governments acting to initiate active modes of transport, the rising trend of active mobility has not been lost on entrepreneurs. Indeed, private sector businesses usually have the flexibility to react faster to new demands in the market. One such example is the BikePark set up in Melbourne which addresses the demand for convenient and secure bicycle parking facilities. Set up in 2009, the facility is located in Melbourne’s central business district (CBD) and provides a full suite of end-user facilities such as showers, lockers, hot drinks, laundry services and convenient access to bicycle mechanics.<sup>71</sup> Although the facility only serves a capacity of 150 bicycles, it is a service that is wholly privately owned and financially-feasible.

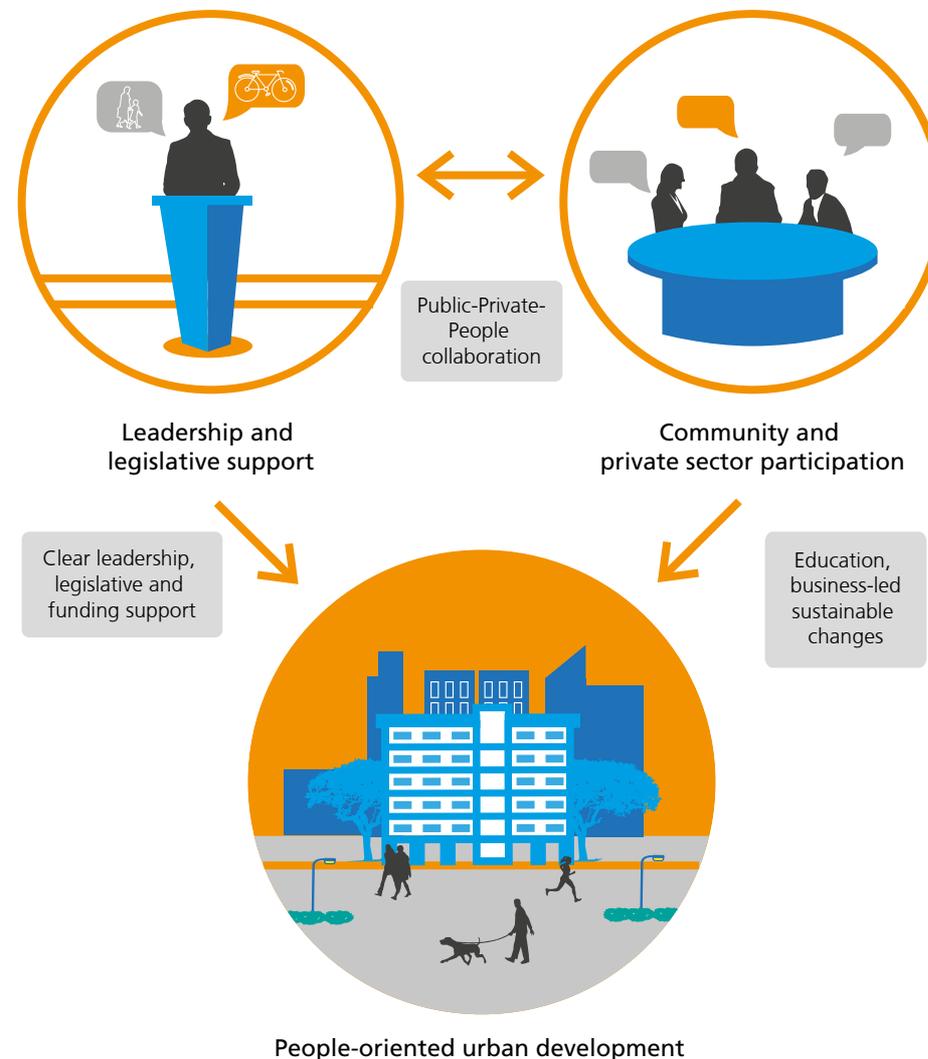
Another new market segment that reflects growing business confidence in the active

mobility movement is the development of bicycle-friendly accommodation. In Portland, EcoFLATS<sup>72</sup> is a residential development that was built in 2011. Strategically located near bicycle routes, it provides secure parking facilities for its tenants and fully tenanted within a month of its launch.<sup>73</sup> EcoFLATS has since sparked a new trend for sustainable and bicycle-friendly accommodation and is part of a new ecosystem of support services that is expected to reinforce the sustainability of active mobility.<sup>74</sup>

**IV. CHANGE TAKES TIME**

The shifts towards active mobility cannot be undertaken overnight, especially in the absence of popular support. It will require a change in the collective mindset of whole communities and a long-term commitment from policymakers, civic and private sector organisations.

**PUBLIC-PRIVATE-PEOPLE COLLABORATION FOR ACTIVE MOBILITY**



<sup>71</sup> Refer to <http://www.bikepark.com.au/>  
<sup>72</sup> Refer to ecoFLATS website: <http://ecoflatspdx.com/>  
<sup>73</sup> O’ Brien, L. 2012. “One year later, ecoFLATS almost lives up to the hype” DJC Oregon, 19 June. <http://djcOregon.com/news/2012/06/19/one-year-later-ecoflats-almost-lives-up-to-the-hype/>  
<sup>74</sup> Baker, L. 2011. “Developers Cater to Two-Wheeled Traffic in Portland, Ore.” The New York Times, 20 September. [http://www.nytimes.com/2011/09/21/business/portland-ore-developments-cater-to-bicycle-riders.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2011/09/21/business/portland-ore-developments-cater-to-bicycle-riders.html?pagewanted=all&_r=0)

## MOVING FORWARD – DESIGN CONSIDERATIONS FOR ACTIVE MOBILITY

### A PARADIGM SHIFT TOWARDS CREATING CITIES FOR PEOPLE

Creating walkable and bikeable cities requires a fundamental change in how we design our cities. This involves nothing less than a paradigm shift away from motorist-centric urban planning prevalent in the last century. A new design ethos that prioritises the safety and needs of more vulnerable groups of road-users – pedestrians and cyclists – needs to be established.

But giving greater priority to more vulnerable road-users does not mean that drivers should be subjugated by the needs of pedestrians and cyclists throughout the city. The level of priority for road-users should be varied according to the context of the street. The ‘soft traffic’ created by pedestrians and cyclists on residential or downtown streets should, for example, be given priority over motorised traffic. In situations of fast moving traffic on highways, motorised traffic can take

precedence. This will allow for a greater diversity of mobility options.

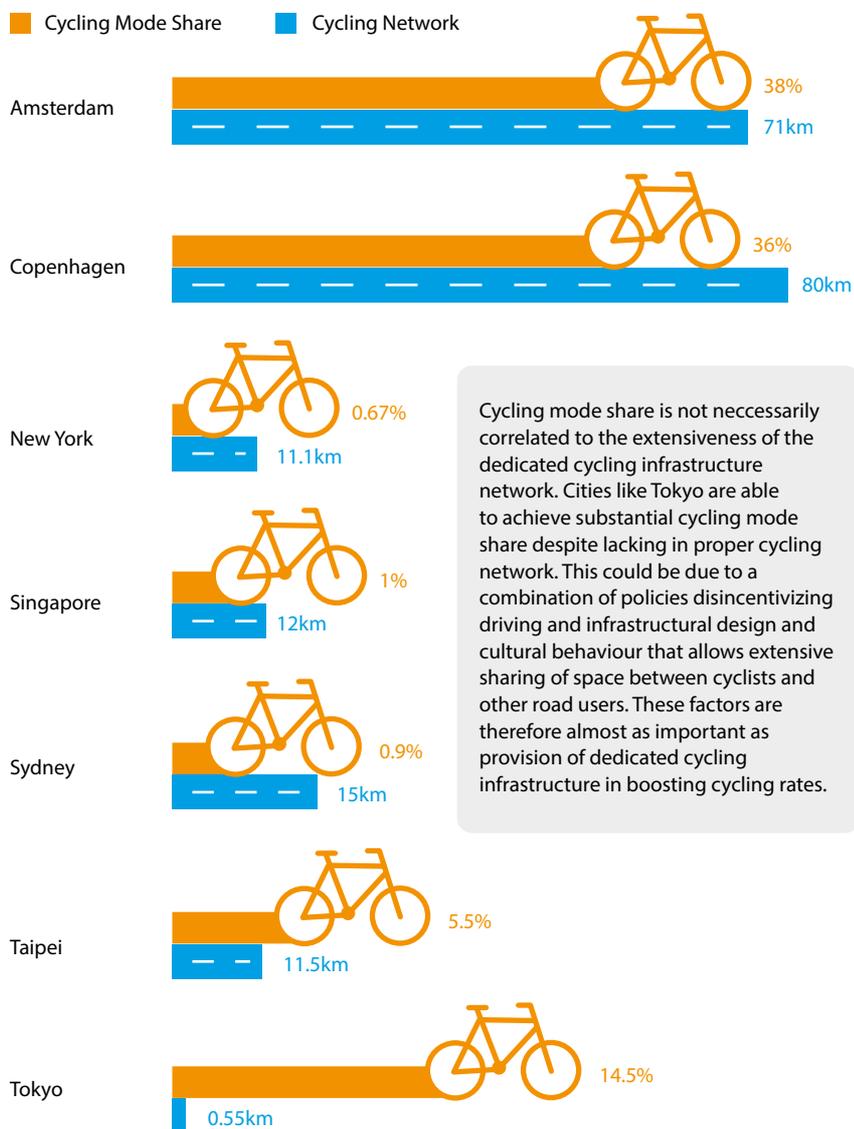
### WALKABLE AND BIKEABLE CITIES ARE MORE THAN JUST BICYCLE LANES AND FOOTPATHS

Most people would equate the notion of walkable and bikeable cities with the provision of ample bicycle lanes and wider sidewalks. However, a comparison of cycling rates and total cycling network in cities across the world shows that the provision of infrastructure does not always result in a higher incidence of active mobility. For instance, while the leading cycling cities of the world, Copenhagen and Amsterdam, do enjoy a generous provision of dedicated cycling infrastructure and high cycling rates, the popularity of cycling despite the lack of infrastructure in cities such as Tokyo suggests that there are other factors just as important in contributing to a successful cycling culture.



# CYCLING MODE SHARE VERSUS CYCLING NETWORK\*

\*Cycling network per 100,000 people



## 10 IDEAS IDENTIFIED FROM PRESHOP AND BIKESHOP TO MAKE CITIES MORE WALKABLE AND BIKEABLE:

### 1. MAKE IT CONVENIENT AND EFFICIENT

A comprehensive and well-connected network of footpaths and bicycle lanes for pedestrians and cyclists will make door-to-door travel on foot or by bicycle more convenient and efficient. Fenced developments should be discouraged to minimise the length of journeys by pedestrians and cyclists. In Singapore, through-block links are stipulated in certain land sales conditions for development. This ensures 24-hour pedestrian corridors through these developments and promotes connectivity within the city.

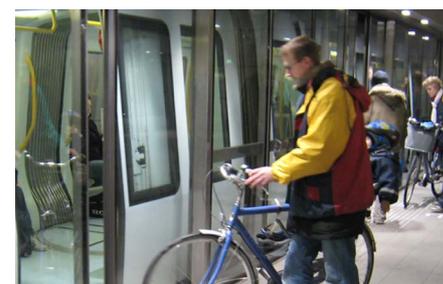
Public transit systems should make it as convenient as possible for people to complete their journeys on foot or bicycle. Effective cycling connections can be a viable alternative to “last mile” challenges and can help alleviate the need for bus feeders at rail transit stations. This is especially important in promoting active mobility for tropical cities like Singapore, as transit integration allows people to cycle for the first or last legs of longer commutes, which may otherwise be

unfeasible for most people to complete on bike due to the hot and wet weather.

Bikeshare programmes are effective for cities that are starting to promote active mobility. A well-conceived and designed bicycle sharing system provides convenient access to bicycles for short distance trips and serves as a good alternative to other motorised modes of transport.



*Youbike, Taipei's bicycle sharing system*



*Cyclist friendly transit system in Copenhagen*



*Ease and flexibility in transferring between different modes encourage active mobility*



Through-block link in Bugis, Singapore provides 24-hour pedestrian corridors through developments and conveniences people

## 2. PROVIDE DEDICATED SPACES FOR ALL

Dedicated infrastructure is essential for most areas within the city to encourage more people to adopt active mobility and enhance travel efficiency for all road-users. The provision of dedicated infrastructure has also been proven to generate tangible results in increasing walking and cycling rates and if implemented correctly, it can enhance safety for all road-users. In New York, the five-fold increase in its cycling network from 119 miles to 561 miles between 1997 and 2009 corresponded with a 221% increase in commuter cycling rates. The popularity of cycling later increased by another 29% following a further 42% increase in the cycling network.

## 3. ENSURE VISIBILITY AT JUNCTIONS

Accidents often occur when pedestrians and cyclists are caught in the blind spot of a driver's peripheral vision. Junctions are particularly problematic because drivers have to look out for oncoming vehicles in addition to pedestrians and cyclists before proceeding. In the Netherlands, this is addressed by designing junctions and roundabouts with ample space to allow drivers to stop if necessary to avoid pedestrians and cyclists.

Cyclists generally travel at higher speeds than pedestrians and this means drivers have less reaction time if they encounter a cyclist unexpectedly. Painted cycling lanes can help to direct a driver's attention to the presence of cyclists. Still, painted cycling lanes to enhance cycling infrastructure are best limited to danger areas like junctions in order to maintain its intended efficacy.



Painted cycling paths at junction in Copenhagen increase visibility



A cyclist-friendly junction in Copenhagen



*Continuous sidewalk in Copenhagen*

#### 4. MAINTAIN CONTINUITY OF MOVEMENT

Pedestrians and cyclists often find their journeys interrupted by various types of traffic junctions. This reduces travel efficiency and can also make a journey an irksome experience particularly in the tropics.

In the Netherlands, junction designs provide a high degree of continuous movement for cyclists. This is achieved by continuing the cycling lanes through junctions in the form of bicycle crossings, and also by consciously creating gentle bends on the cycling lanes around junctions. Sharp bends that require cyclists to stop or slow down are avoided. Protected cycling lanes and junction designs also allow cyclists to cycle through red lights safely, minimising the number of stops a cyclist has to make.

Continuous sidewalks in cities like Copenhagen and Amsterdam challenge the typical hierarchy between cars, pedestrians and cyclists at minor intersections. Instead of pedestrians and cyclists having to

stop and watch out for cars, continuous sidewalks require cars to stop and watch out for pedestrians or cyclists before moving through an intersection. This prioritises the right-of-way for pedestrians and cyclists at minor intersections and slip lanes, allowing for greater continuity of movement.

#### 5. KEEP IT SLOW

To make comfort and safety a priority for pedestrians and cyclists, motorised traffic speeds have to be kept low, especially in zones of high pedestrian and cyclist traffic. In Tokyo, speed limits are heavily regulated. On smaller neighbourhood roads the speed limit is capped at 20km/h to 30km/h. This allows pedestrians and cyclists to share the same space, despite the lack of dedicated cycling lanes or pedestrian paths. Speed limits are also prominently painted on the road, prompting drivers to slow down, giving them more time to react if necessary.

The benefits of slower street traffic are best exemplified by the Netherlands' 'woonerf', or living streets, where traffic-moderating design interventions are cleverly integrated



*Shared street in Taipei*



*Shared street in Copenhagen*

to cut traffic speeds in residential areas to a pace of 12m/h. This allows cars, cyclists and pedestrians to share the streets safely.

Shared streets are also common in Asian cities where traditional street markets and retailers are dominant. The constant volume of pedestrian and cycling traffic through such streets forces cars to slow down despite the lack of traffic-moderating design interventions. The absence of street kerbs in such high-pedestrian traffic areas also allows for pedestrians and cars to negotiate for space in a flexible manner without compromising on safety as motorised speeds are kept low.

## 6. PRIORITISE AT-GRADE CROSSINGS

People are generally “energy-efficient” creatures; making crossings simple and direct minimises the effort required for pedestrians and cyclists to complete their journeys and enhances the continuity of movement. Overhead bridges and underpasses, especially at non-arterial roads, can create ‘mini-highways’ that inconvenience pedestrians and cyclists.

In Seoul, several efforts have been made in recent years to create a more pedestrian-friendly city. One of the key initiatives includes the Gwanghwamun Pedestrian Belt where underpasses have been replaced by at-grade crossings to create direct connections for people. Doubly wide pedestrian crossings are also commonly found in Seoul, allowing crowds to cross the road comfortably.



*Scramblewalk in Shibuya, Tokyo*



*Diagonal crosswalk in Taipei*

Many high-density cities such as Tokyo and Taipei have diagonal crosswalks that bring all motorised traffic to a stop at junctions with high pedestrian volumes during peak periods. This enables safe and direct crossings for pedestrians and cyclists alike.

### 7. ENSURE CONSISTENCY IN DESIGN STANDARDS

Consistent design standards and traffic codes throughout the city will provide road-users with the information to anticipate traffic conditions in the city. For example, locating the bicycle lane on a consistent side of the road allows for easy recognition of designated paths by pedestrians and cyclists. Drivers will also be able to anticipate the direction in which cyclists will be coming from, thereby helping to reduce road accidents. Consistency should also be extended to signage systems to enhance user-friendliness and improve the communication of traffic conditions.



*Consistent design standards in Copenhagen make the system intuitive*

### 8. MAKE IT COMFORTABLE AND APPEALING

As pedestrians and cyclists are exposed to the elements, addressing climatic conditions is the first step towards creating a more comfortable and appealing environment for active mobility. In Copenhagen, snow clearance of cycling tracks in winter is prioritised over clearance of roads to ensure that cyclists can ride comfortably even during inclement weather.

Countries with hot and humid weather face a different set of climatic challenges. In Singapore, an extensive street planting programme has contributed significantly to enhancing the comfort and appeal of walking and cycling with large trees providing much needed visual relief as well as shade from the sun and some shelter from the rain.





*Shaded paths in Singapore help to shade pedestrians and cyclists*



*Snow clearance for cycling lanes in Copenhagen ensure that cycling is possible in winter*

## 9. MIXING UP THE USES

Studies have proven that compact, mixed-use urban environments can encourage people to walk and cycle.<sup>75</sup> Mixed-use developments can reduce the distances for daily commutes and provide convenient access to essential goods and services. With a greater variety of activities and services, such environments can create a more engaging journey for walking and cycling. This also opens up more opportunities for social interaction and increases traffic for local businesses, helping to reinforce the positive attributes of walking and cycling within a community.

## 10. CLOSE THE LOOP WITH END-OF-TRIP AMENITIES

End-of-trip amenities contribute significantly to the convenience and comfort of active mobility. Research on the commuting behaviour of residents in the US capital of Washington has shown that the provision of showers, lockers and bicycle parking at work can increase the likelihood of people cycling to work by almost five times.<sup>76</sup> In tropical cities, the heat and humidity makes providing shower facilities and drop-and-go laundries at workplaces even more crucial to ensure comfort for active mobility as a form of commute.

As most end-of-trip amenities are typically best integrated with destination developments, building and planning guidelines as well as green building incentives such as LEED or Greenmark in Singapore can encourage developers to provide adequate bicycle facilities. In Australia, Brisbane is one of the more proactive city governments when it comes to providing such amenities. Cycle2City, Australia's first and only commuter cycle centre in Brisbane's CBD was completed in 2008 and offers secure bicycle parking spaces, lockers, showers, fresh towels and spare bicycle parts for a fee of between AUD\$5 – \$7 per day.<sup>77</sup>

Bicycle parking is more commonly provided as a public amenity. In Tokyo, innovative underground public parking carousels can be found at train stations. Called the Eco Cycle system, this underground bicycle parking system lets cyclists deposit their bicycles at ground level. The bicycles are then taken underground by mechanical lifts and stored to protect bicycles from the elements and theft. This system also serves the dual purpose of eliminating bicycle clutter from the street level and frees up more space for pedestrians and public activities, a boon for high-density cities facing the shortage of space.



Underground bike parking carousel in Tokyo

<sup>75</sup> Koh, P.P. and Wong, Y.D., 2013. *Comparing pedestrians' needs and behaviours in different land use environments*. Journal of Transport Geography, Vol. 26 (2013), pp. 43-50.

<sup>76</sup> Buehler, R. 2012. *Determinants of bicycle commuting in the Washington, DC region: The role of bicycle parking, cyclist showers, and free car parking at work*. Transport Research Part D: Transport and Environment, Vol 17 Issue 7 (2012) pp. 525-231.

<sup>77</sup> See [www.cycle2city.com.au](http://www.cycle2city.com.au)



Participants studying the two-tier bike parking system at a train station during the "Bikeshop"

# 10 IDEAS FOR PEOPLE-FRIENDLY

## WALKING & CYCLING CITIES

2

### PROVIDE DEDICATED SPACE FOR ALL

Protected **bike lanes & cycle tracks** alongside pedestrian sidewalks and vehicular carriageways

1

### MAKE IT CONVENIENT & EFFICIENT

Integrate cycling and walking infrastructure with **public transit**

**Bike share** systems for cities starting to promote cycling

3

### ENSURE VISIBILITY AT JUNCTIONS

**Safe junction** designs that allow drivers to look out for pedestrians and cyclists when turning

**Painted cycling lanes** at junctions maximise and hold onto drivers' attention

4

### MAINTAIN CONTINUITY OF MOVEMENT

**Cyclist friendly junction designs** with gentle bends to facilitate continuous cycling

**Continuous sidewalks** that require cars to stop and allow pedestrians and cyclists to continue through intersection without stopping

5

### KEEP IT SLOW

**Stringent speed limits and slow speed zones** at high pedestrian traffic areas

**Shared streets** with design interventions to slow vehicles and allow co-existence of road users

8

### MAKE IT COMFORTABLE & ATTRACTIVE

**Street planting** to provide shade and visual relief for all road users

**Sheltered walkways for pedestrians**

**Prioritize maintenance** for pedestrian and cycling infrastructure

9

### MIX UP THE USES

**Mixed use developments** to make walking and cycling more convenient for daily commutes

10

### CLOSE THE LOOP WITH END-OF-TRIP AMENITIES

**Adequate public bike parking** facilities at destinations

**Showers and laundromats** at workplaces

6

### PRIORITIZE AT-GRADE CROSSINGS

**At grade crossings** to facilitate continuous movement by pedestrians and cyclists

**Above/sub-grade crossings only for direct connections** between destinations

**Diagonal crosswalks** at high pedestrian traffic areas

7

### ENSURE CONSISTENCY IN DESIGN STANDARDS

**Standard infrastructure design** for the whole network for user friendliness

**Consistent signage**

**CHECKLIST FOR TROPICAL CITIES**  
Factors that will enhance comfort of active travel in the tropics

## CONCLUSION

### ACTIVE MOBILITY FOR TROPICAL CITIES

Although the heat and humidity in tropical zones present challenges for active mobility, this should not necessarily exclude cities in the tropics from reaping the same benefits that cities in temperate zones enjoy.

Tropical cities need to focus on the means to enhance comfort for pedestrians and cyclists. These include facilitating continuous movement, integration with transit nodes to enable walking or cycling for the first and last miles of a journey, planning for ample shade and shelter, and providing end-of-trip amenities.

Enhancing comfort for active mobility is not limited to infrastructural design solutions. Cultural factors such as the social norms that dictate office attire can play a part as well. Lighter tropical clothing should be encouraged to make it more comfortable and convenient for people to walk and cycle in tropical weather for their daily commutes.





Please scan the QR code above to view the interview with Jan Gehl from the Bikeshop.

#### FROM SUNDAY CYCLING TO MONDAY CYCLING

The road towards active mobility can also start with the promotion of the fun factor in walking and cycling. During the Bikeshop discussion session, Danish architect Jan Gehl suggested recreational events such as Car-free Sundays. Low traffic volumes on Sundays can allow streets to be closed for public activities that let people experience the benefits of active mobility. This could eventually encourage more people to commute by bicycle.

#### A PEOPLE-FIRST APPROACH FOR OUR CITIES

Every person – be it drivers, public transport commuters, or cyclists - will eventually

become a pedestrian at some point of his/her journey. While some reprioritisation of road use will be needed to implement active mobility initiatives successfully, the ultimate objective of creating a safer and more liveable environment will benefit everyone.

Creating walkable and bikeable cities is therefore not about putting the needs of one group above another. As the CLC-ULI workshop discussions and the experiences of other cities reveal, promoting active mobility requires the whole community to focus on reclaiming the city to improve the lives of all its residents. It is only by putting people first that active mobility can become a preferred choice for the people.



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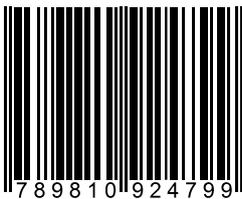
# Creating Healthy Places through Active Mobility

The importance of building healthy places has become increasingly apparent, with new awareness of the social and health dimensions of cities. This publication is a joint initiative by Urban Land Institute (ULI) and the Centre for Liveable Cities (CLC) that encapsulates the importance of healthy places, with walkability and bikeability as important constituents of the initiative.

A large element to driving urban form is about how people move around cities. It is critical to understand some of the key issues cities are facing and give some ideas for creating people friendly walking and cycling cities. Walking and biking are active mobility options with healthful and social dimensions, and engage people physically in moving through their environments.

As a follow up from the ULI-CLC collaborative publication on '10 Principles for Liveable High Density Cities: Lessons from Singapore' this project engaged a diverse group of individuals and organizations passionate about our cities on how to make them great places that are easy to move around. This publication is a result of research workshops, a local site study and international city case studies cities on Amsterdam, New York City, Seoul, Copenhagen and Taipei.

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