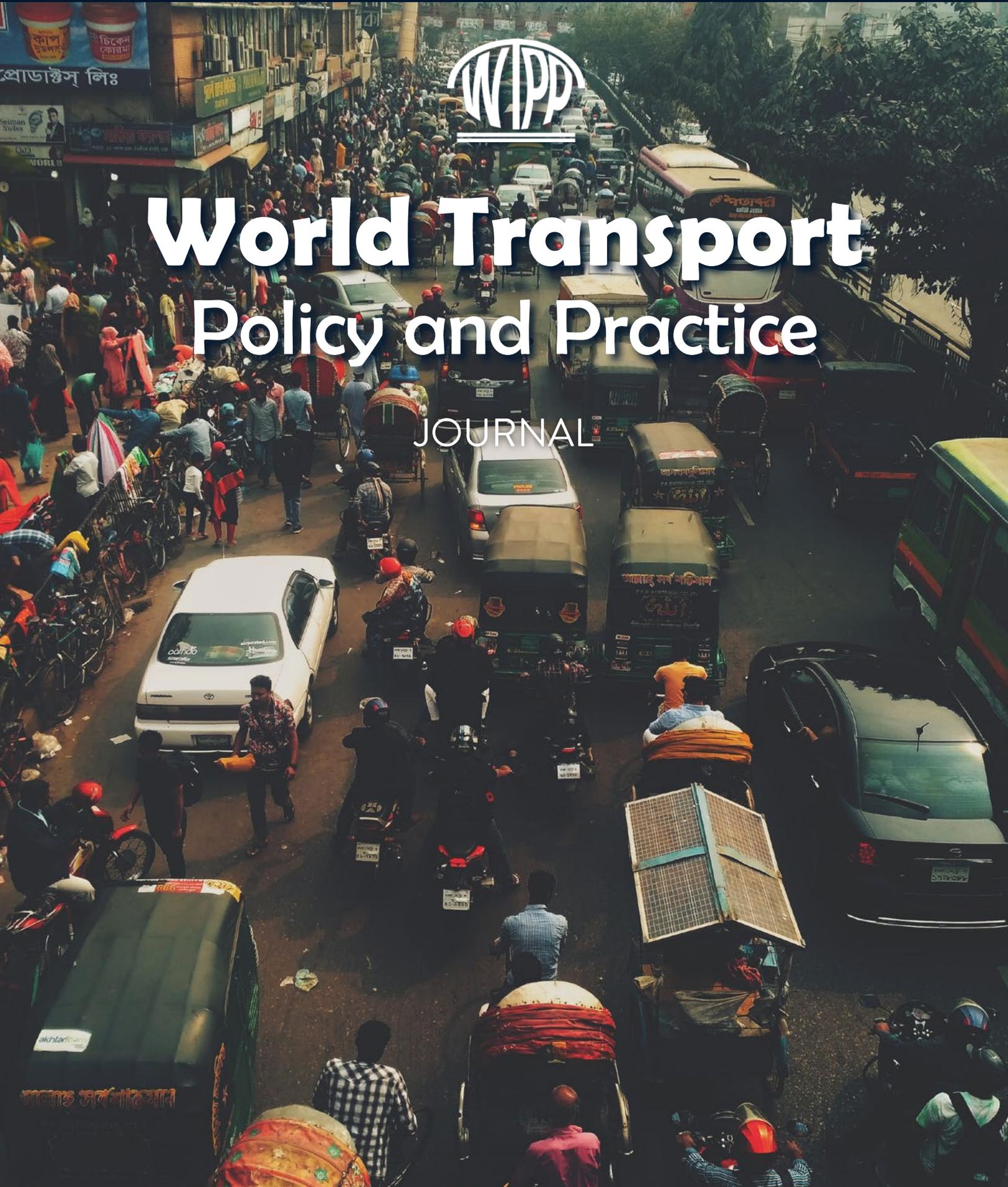




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Niloy Biswas, A very common picture of Dhaka every day,
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Simon Reza, Dhaka, Bangladesh, 2021.
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Photo credit: Michelle DeRobertis, Friburg, Germany, 2009.



Photo credit: Michelle DeRobertis, Friburg, Germany, 2009.

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DISCLAIMER: The opinions expressed herein are those of the authors and not necessarily those of WTPP, the WTPP Editorial Board or TCSC.



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Thanks to all who helped us revive the publication of this journal, especially to John Whitelegg, who trusted us with his vision, and to Marianna Grossman, vice president of Transportation Choices for Sustainable Communities (TCSC), without whose seed grant we could not have attempted such a daunting project.

Thanks to the many friends and colleagues who volunteered to do all kinds of tasks from helping us trademark the name, to designing the logo, to answering numerous questions about a variety of topics: **Dave Campbell**, **Carol Levine**, and **Marivic Montilla**.

Thanks also to the **Principals Working Group** — **Chris**, **Charles**, and **Rick** — who helped to steer among the many decisions that came with the re-start of the journal.

Of course, a journal of this kind is dependent on the dedication and expertise of an editorial board and a vast invisible team of peer reviewers; such a team is an essential component of a professional journal. There are expenses to ensure a high-quality graphically engaging journal on a free and open platform; thus funds are needed from donations.

Please consider making a tax-deductible (USA 501c3 nonprofit) donation here:
<https://www.worldtransportjournal.org/donate>

We are proud to continue the 27+ year tradition of a no-fee journal which enables us to publish practical solutions and analysis to promote sustainable transportation.

We thank all of you.

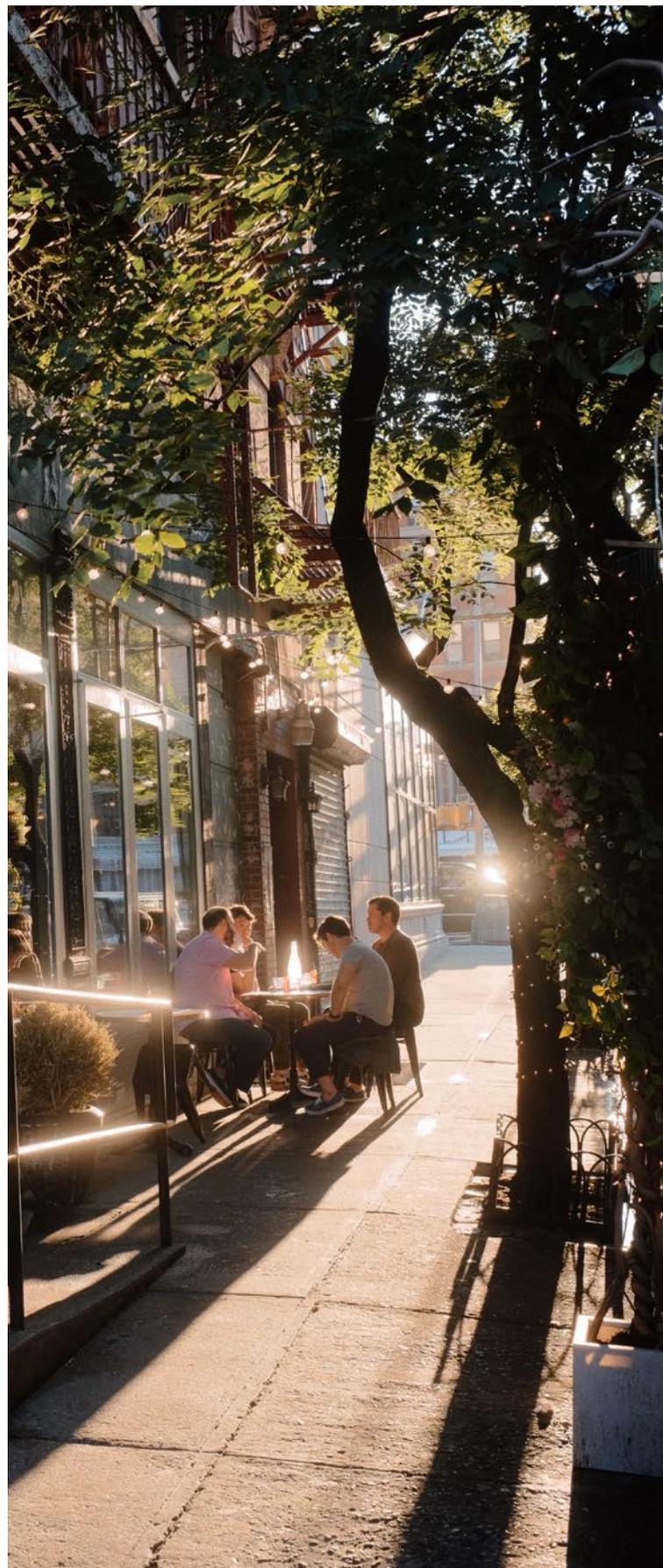


Photo credit: Alice Kotlyarenko, Lower East Side, Manhattan, 2021.
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EDITORIAL

In this issue, we are pleased to highlight the lives and works of Suzanne H. Crowhurst Lennard and Henry L. Lennard, co-founders of the International Making Cities Livable (IMCL) conferences.

The first IMCL Conference was held in Venice in 1985 where the former Dean and Professor of Urban Planning at Venice University welcomed delegates on behalf of the City of Venice, citing how Henry Lennard's recurring message throughout his work was to "understand how good urban public spaces—like the Venetian campo—generate community and create a high quality of social life for old and young." Many of the books the Lennards wrote specifically focus on public space and two in particular were about the European piazza. The first, in 2008, was **Genius Of The European Square: How Europe's Traditional Multi-Functional Squares Support Social Life And Civic Engagement: A Guide For City Officials**. Then in 2015, in a series of books about Venice, Suzanne Lennard wrote Book 24 of the "Eye on Venice" series called **The Venetian Campo: Ideal Setting for social life and Community**.

(Please see the list of their books following their profile as well as a list of upcoming fall conferences including the IMCL conference in Poundbury / Dorchester, England, 10-13 October 2023.)

"Give me six hours to chop down a tree and I will spend the first four sharpening the axe."

- Abraham Lincoln

Continuing on the theme of reduced cars in cities, we present Lucy Sadler's article on **Creating More Liveable, Attractive and Economically Effective Cities: A brief primer to Implementing Urban Vehicle Access Regulations**. This complements the two more detailed articles on strategies to reduce traffic that were presented in WTPP's two prior issues. Transit is also an essential component of reducing the need for cars in cities, and cities, especially U.S. cities, are sometimes clueless as to their role. Thus we present research from California on **How American Cities Help and Hinder The Provision of Surface Public Transit: A Transit Agency Perspective**.

In this issue, we are pleased to be able to continue our mission of presenting work by young researchers especially those outside western Europe and the USA. **Transforming Dhaka, Bangladesh into a Cycling City** by Nazia Nawrin Hossain explores how Dhaka can attract new bicyclists and why it is good for both the city and its residents. Unfortunately due to its growth in the last few decades, many residents turned to motorized transport, and Dhaka was named the "traffic capital of the world".

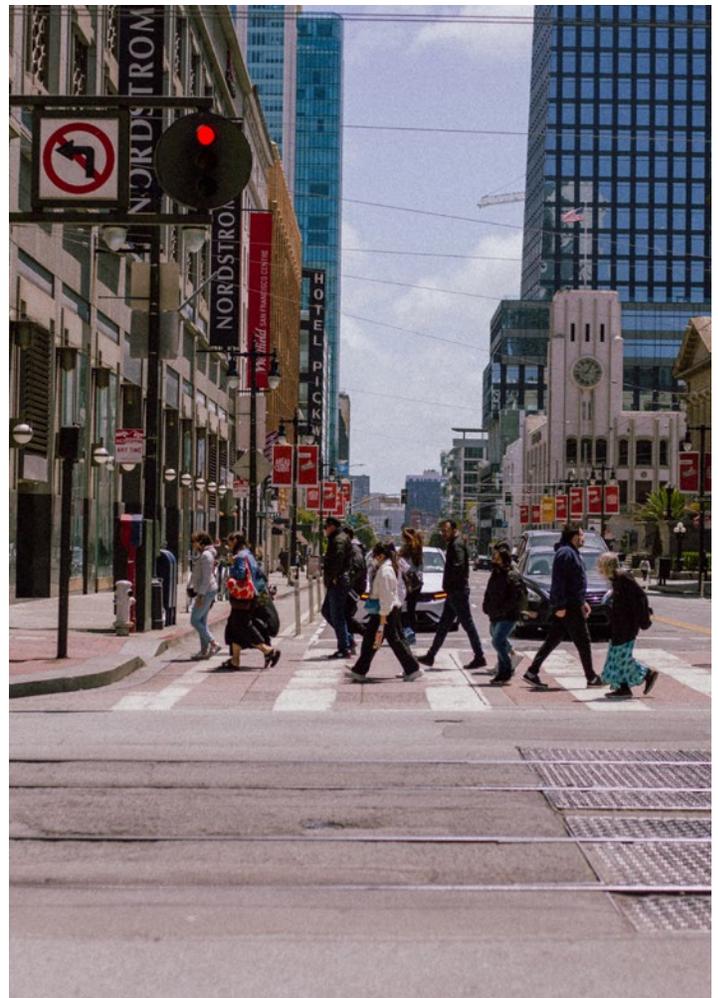


Photo credit: Josh Hild, San Francisco, CA, USA, 2022.
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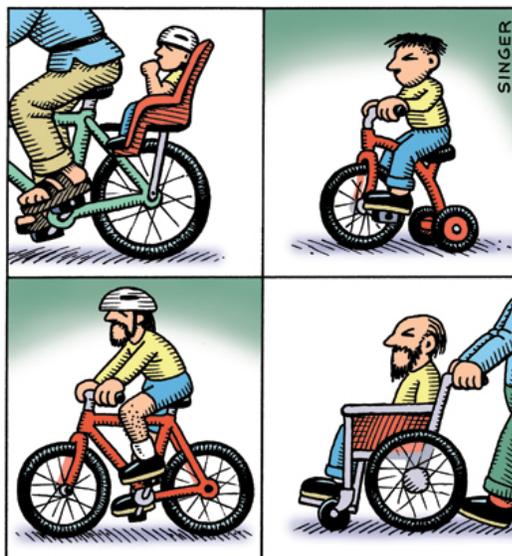
Photo credit: Callum Blacoe, Newport, Wales, UK, 2023. <https://unsplash.com/photos/nPrCY9OvTMQ>

Hossain explores how the economic and cultural situation in Dhaka provides so much potential for becoming a cycling city like Groningen and even Bogotá and Bangkok, which she explores as background. Dhaka’s mixed-use neighborhoods, dependence on non-motorized modes, relatively low car ownership, and rather expensive public transit compared to other megacities all create an opportunity to develop bicycling as a key component of the transport solution.

It is interesting to contrast Bangladesh with the Summary report that Prof. John Whitelegg presented to the Welsh government. In this report, Whitelegg also turns to proven solutions much closer to Wales and implores the Welsh government to learn from these international best practices and innovations. As Prof. Whitelegg concludes in his review of **Good to Go? Decarbonising travel after the pandemic**: “We (UK) are so very bad at doing the right things and so very good at making things worse.”

NO EXIT © Andy Singer

THE LIFE CYCLE



Prof. Whitelegg’s recommendations for Wales are followed by reviews of two recently published books: **Good to Go? Decarbonising travel after the pandemic** by David Metz and **Transport for Humans: Are we nearly there yet?** by Peter Dyson and Rory Sutherland. Both are recommended reading but, as Prof. Whitelegg explains, could have done a whole lot more to help move the needle towards more sustainable transport.

Happy reading.

Michelle DeRobertis

Editor



ABSTRACTS AND KEYWORDS

CREATING MORE LIVEABLE, ATTRACTIVE AND ECONOMICALLY EFFECTIVE CITIES (A BRIEF PRIMER TO IMPLEMENTING URBAN VEHICLE ACCESS REGULATIONS)

Lucy Sadler

ABSTRACT

There are many issues involved in implementing urban vehicle access regulations. This article addresses a few of the main issues and provides resources to help cities implement them.

KEYWORDS

Urban vehicle access regulations, pedestrian zone, limited traffic zone, low / zero emission zone, congestion charge zone, spatial interventions

HOW CITIES HELP AND HINDER THE PROVISION OF SURFACE PUBLIC TRANSIT: A TRANSIT AGENCY PERSPECTIVE

Michelle DeRobertis, Richard W. Lee, Charles R. Rivasplata, and Douglas J. Cross

ABSTRACT

Public, fixed-route transit services most commonly operate on public streets. Transit riders use sidewalks and other pedestrian features to access transit stops and stations. However, streets and sidewalks are the jurisdiction of municipalities, not transit agencies. Various municipal policies, practices, and decisions affect transit operations, rider convenience, and passenger safety. This paper highlights municipal policies and practices that can either help or hinder public transit operation from the perspectives of five local transit agencies in the United States. Interviews with transit agency staff described common municipal policies and practices for planning,

building, and regulating the “built” infrastructure that transit relies upon and related issues such as development review. Also gleaned from interviews were attitudes that municipalities may have in dealing with public transit or other “users” of roadway infrastructure.

Five topic areas of municipal policies and practices were identified that significantly affect the provision of public transport services. The understanding, acknowledgement, and implementation of policies and practices identified in this report can help municipalities proactively work with local transit providers to more efficiently and effectively operate service.

KEYWORDS

Transit operations, coordination, city practices,

TRANSFORMING DHAKA, BANGLADESH INTO A CYCLING CITY

Nazia Nawrin Hossain

ABSTRACT

Dhaka, the capital of Bangladesh, is a rapidly urbanising megacity with a growing population, inadequate infrastructure and poor urban planning, leading to traffic congestion, pollution and loss of resources. As an expanding metropolis, insufficient public transport and high dependence on non-motorised modes have failed to provide an effective transit system for this megacity. Although bicycles are efficient, sustainable, and affordable, they do not contribute significantly to the daily modal share of Dhaka. Despite the increase in bicycle sales, particularly during the Covid-19 pandemic, the absence of cycling-friendly infrastructure and regulations discourages people from bike riding. Mixed-use neighbourhoods, dependence on non-motorised modes and relatively low car ownership compared to other megacities create an opportunity to develop a sustainable approach to the current transport situation. This paper aims to analyse the growing urban fabric of Dhaka, with an emphasis on its current mobility trends

ABSTRACTS AND KEYWORDS

and identify the potential for an integrated cycling system for the city. The mobility analysis involves data collection on public and private vehicles, road networks, and the role of non-motorised modes. These data create a parameter to provide recommendations to increase cycling in the central districts through an integrated transport plan, bicycle-friendly infrastructures and services, and promote awareness and behavioural change among the population. The expected outcome of the rise of cycling in the modal share is to ensure a sustainable transport system in Dhaka.

KEYWORDS

Cycling, bicycle-inclusive planning, integrated

SUMMARY OF THE REPORT FOR THE NORTH WALES TRANSPORT COMMISSION: INTERNATIONAL BEST PRACTICE AND INNOVATION IN TRANSPORT OF DIRECT RELEVANCE TO POLICY DEVELOPMENT IN NORTH WALES

John Whitelegg

ABSTRACT

This summary of a report for Welsh policymakers identifies the 10 “transformational changes” needed to reduce car dependency. It describes evidence-based opportunities for transforming transport and how to apply them to the special geography of North Wales. It recognises that Wales (unlike England) has already moved significantly towards a more sustainable transport future and has a sound policy base in the 2021 transport strategy (Llwybr Newydd) to deliver its detailed policy interventions.

KEYWORDS

public policy, reduce traffic, reduce car use, human behavior, Wales

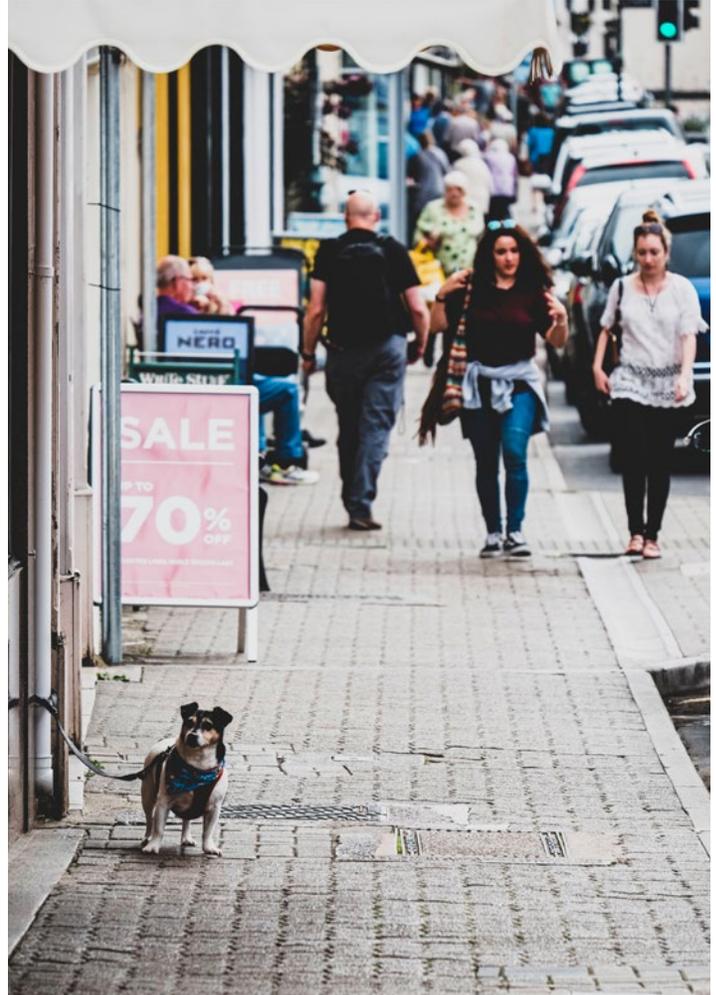


Photo credit: Krisztina Papp, Monmouth, Wales, 2019
<https://unsplash.com/photos/CrReXW9fFYg>

*"The value of an idea lies in the using of it."
 -Thomas A. Edison*

SUZANNE H. CROWHURST LENNARD AND HENRY L. LENNARD

By Michael Mehaffy

Editor's note: This issue's profile is of Suzanne H. Crowhurst Lennard Ph.D. (Arch.) (11 July, 1944 - 17 Sep, 2019) and Henry L. Lennard, Ph.D. (2 July, 1923 - 23 June, 2005), co-founders of the International Making Cities Livable (IMCL) conferences. They initiated this conference series in 1985 in order to provide a venue to share the best evidence-based lessons of great cities and towns that maximize the quality of life for all. Their different backgrounds and professional experience, she a British architectural and urban scholar and he a Viennese social psychologist and medical sociologist, overlapped in the area of promoting the benefits of creating viable urban public spaces and livable cities.



Dr. Suzanne Crowhurst Lennard's work addressed the social, cultural, and psychological aspects of architecture, urban design, and city-making, clarifying how the built environment affects social interaction, health and quality of everyday life. Her studies encompassed making cities "livable" for children, youth, and the elderly; relationship between physical health, social health, and the built environment; walkability, bikeability, and transit; small footprint, mixed-use urban fabric as essential for a livable city; the mixed use square as the "heart" of the city; city identity through regional architecture; balanced transportation planning to enhance health, social life, and community.

Through intensive case studies of numerous European cities that since the 1970s have been implementing innovative approaches to land use planning, transportation planning, housing, architecture, urban space design and sustainability, she identified strategies and successful solutions that contributed most to creating livable cities.

One research topic she devoted several publications to was the design and function of **public urban places** (See book list in this issue). The purpose was to understand how public places —particularly urban squares, plazas, and market places—can generate social life, community, and participatory self-government, and contribute to social equity and health.



International Making Cities Livable

A Conference of The Suzanne C. and Henry L. Lennard Institute for Livable Cities, Inc.

This work combined the study of social interaction patterns, history of the square and of democracy, building use analysis, effects of the architectural frame, influence of the surrounding built urban fabric, transportation planning, streetscape, and seating design. It also identified the influence and importance of public art, and management issues such as scheduled weekly events (farmers markets), street entertainment, and community festivals in the space.

Dr. Henry Lennard's field, for which he was already internationally acclaimed in the 1960s, was the study of social interaction. His early groundbreaking work, examining patterns of interaction in families and therapeutic settings, won him the coveted NIMH lifetime award "Career Research Scientist" in 1962. He worked at Columbia University, then at Langley Porter Neuropsychiatric Institute at the University of California, San Francisco, where as a Professor of Sociology and Psychiatry he established the Family Study Station and the Center for the Study of Drugs and Social Behavior. In the mid-1970s he returned to New York as a Senior Researcher at the Center for Policy Research where he organized conferences on **Ethics of Health Care** (1977, 1978); and to the Ackerman Institute for Family Therapy where he helped to establish a focus on chronic illness and family therapy.

It was at this point that Henry and Suzanne began to work together. Henry Lennard turned his attention more and more to studying patterns of social interaction in urban settings that created a sense of well-being, rather than the pathological interaction patterns he had studied before.

Suzanne Lennard's contribution, as an architect/urban designer, was to clarify how the built environment helped to account for the observed differences in quality of interaction.

The idea for the International Making Cities Livable (IMCL) conference came from Henry Lennard's successful experience organizing the 1977 and 1978 Ethics of Healthcare conferences in Venice, Italy which were interdisciplinary, international, and designed to stimulate dialogue and discussion. They both wanted a venue to draw attention to the issues of how the disciplines of urban design and planning overlap with those of mental and physical well-being and to influence priorities in urban planning.

Thus ICML as an interdisciplinary international gathering was born and was first held in 1985. For over 30 years, Suzanne Lennard directed the organization of the conferences and remained dedicated to fostering this

international interdisciplinary dialogue among outstanding international practitioners, scholars, and city officials on strategies and tools for increasing the livability of our cities. The almost four decades of IMCL

conferences has brought together many of the world's most innovative and successful mayors, economic development specialists, and NGO officials, as well as practitioners, researchers, and scholars in a wide range of fields including architects, urban design, and planning, urban geographers, transportation planners, public health scientists, social scientists, and artists.

"They both wanted a venue to draw attention to the issues of how the disciplines of urban design and planning overlap with those of mental and physical well-being and to influence priorities in urban planning."



Photo credit: Michelle DeRobertis, Freiburg, Germany, 2019.

These various leaders and practitioners come together to share expertise and experience on such issues as: “Reviving the Heart of the City,” “Planning Healthy Communities for All,” “Creating Community through Urban Design,” “Reshaping Suburbia into Healthy Communities,” and “From Suburb to City: A Livable City for ALL.”

[The IMCL is] “The most important continuous conference dialogue on making the world’s cities and towns more livable for all of their inhabitants”

- Governor Dr. Sven von Ungern-Sternberg, Freiburg, Germany

Susanne Crowhurst Lennard received her professional degree in architecture, B.Arch.(Hons.) from Bristol University, England (1968); and an M.Arch. and Ph.D.(Arch.) in “Human Aspects of Architecture and Urban Design” from the University of California, Berkeley (1974). She later held professorships and other academic positions at the University of California, Berkeley; Oxford Brookes University; Harvard University (Summer School); and the Universities of Ulm, Germany, and Venice, Italy.

Henry Lennard was born in Vienna and emigrated to New York at age 16 in 1939. He received a B.A. from City College of New York in 1945, an M.S. from New York University in 1949, and a Ph.D. from Columbia University, in 1955.

Over the years his work was supported by awards from the National Institute of Mental Health, the National Science Foundation, the Commonwealth Fund, the William T. Grant Foundation, and Russell Sage Foundation. In addition to founding IMCL, Suzanne and Henry Lennard wrote several books together, in addition to separately authoring other books. See list following this article.

About Public Life in Urban Places (1984)

“This is just the kind of book... I have been impatiently waiting for: concise, penetrating, stimulating, revealing”

- Lewis Mumford

In accordance with Suzanne' Lennard’s wishes following her death in 2019, a group of friends and IMCL stakeholders committed to continuing its important mission and legacy, founding the Suzanne C. and Henry L. Lennard Institute for Livable Cities in that year. The Lennard Institute is a 501(c)(3) Public Benefit Corporation registered in the USA; it intends to continue to organize the IMCL conferences and to develop other projects as appropriate to fulfill the mission of IMCL.

About The Forgotten Child. Cities For The Well-Being of Children. (2000)

“Challenges invested interests and accepted practices to speak out on behalf of a population unable to fight for themselves, children and young people.revealed the devastating effects of modern planning practices on the social, emotional, intellectual and physical development of children, and proposed planning principles for making child- and youth-friendly cities.”

Author details:

Michael Mehaffy is Executive Director of the Lennard Institute for Livable Cities, as well as the Sustasis Foundation. He is a researcher, educator, author, and consultant in urban development with an international practice.

He has held teaching and/or research appointments in architecture, urban planning and philosophy at eight graduate institutions in seven countries, and he is on the editorial boards of three international journals of urban design. After graduate studies in philosophy and architecture at the University of California, Berkeley and the University of Texas at Austin, he earned a Ph.D. in architecture from Delft University of Technology.

BOOKS BY SUZANNE H. CROWHURST LENNARD AND HENRY L. LENNARD

In honor of Suzanne Crowhurst Lennard and Henry Lennard, we would like to bring to your attention the following books that cover the same themes as this journal. If you cannot find them at a local bookstore or Amazon, some maybe available directly from the Lennard Institute at <https://www.imcl.online/contact>

BY SUZANNE H. CROWHURST LENNARD,

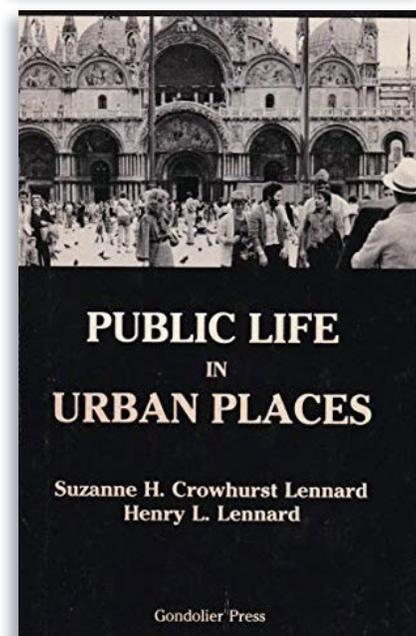
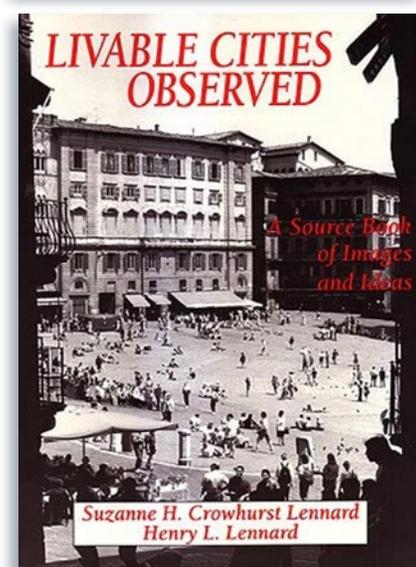
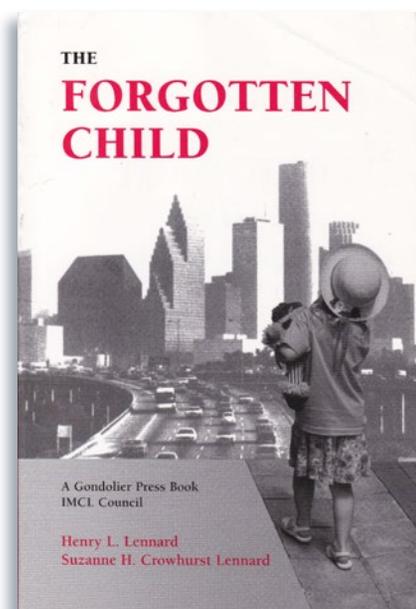
1. The Venetian Campo: Ideal Setting for Social Life and Community (2015). Corte del Fontego Editore (Book 24 of "Eye on Venice" series) Out of print but available on Kindle for \$2.99: <https://www.amazon.com/Venetian-Campo-setting-social-community-ebook/dp/B019AGM35O>.

BY S.H. CROWHURST LENNARD AND H. L. LENNARD,

1. Genius of The European Square: How Europe's Traditional Multi Functional Squares Support Social Life and Civic Engagement: A Guide For City Officials (2008) Portland: Gondolier Press. ISBN-10: 0935824111
2. The Forgotten Child. Cities For The Well-Being of Children. (2000); Portland: Gondolier Press.
3. Livable Cities Observed: A Source Book Of Images And Ideas For City Officials, Community Leaders, Architects, Planners and All Others Committed To Making Their Cities Livable. (1995). Portland: Gondolier Press (260 pages). ISBN-10: 0935824057
4. Livable Cities: People and Places: Social and Design Principles for the Future of the City (1987) Portland: Gondolier Press. ISBN-10: 0935824049
5. Public Life in Urban Places: Social and Architectural Characteristics Conducive to Public Life in European Cities (1984) Gondolier Press. Southampton, N.Y. ISBN-10: 0935824030

SUZANNE CROWHURST LENNARD ALSO CO-EDITED:

1. The Wisdom of Cities (2005)
2. Making Cities Liveable (1997)





Call for Papers

for Future WTPP Issues

By the Editor

While WTPP publishes articles within the general topic of sustainable transportation that address reducing adverse consequences of transportation on humans and the environment, we are particularly interested in papers that fit into one of the following themes. There are many aspects and issues that could be addressed within each of these themes and indeed, each theme merits a special issue. Given the lead time involved in preparing articles, we are announcing these themes in this first volume of the relaunch of the journal in the hope that potential authors are motivated to share their experiences with these concepts.

We welcome articles that describe the policies and practices within the following themes:

Evaluation Metrics

Papers that describe how cities are expanding their project evaluation metrics beyond vehicle movement to include consideration of other modes as well as environmental, social and economic benefits. Papers could focus on a single metric which has traditionally been overlooked (e.g. noise) or could focus on a single project type since different projects need a different array of performance indicators.

Project types include: congestion pricing, bus-only lanes, pedestrian streets, green streets, shared spaces, low-emission zones, traffic-restricted zones (ZTL), road diets, slow streets, bike boulevards, and woonerfs.

*"I can calculate the motion of heavenly bodies,
but not the madness of people."*

- Isaac Newton

Critique of Standards, Guidelines, Manuals, Textbooks

Papers that describe examples of standards, guidelines, manuals, or textbooks that thwart sustainable transportation. The papers would present examples of problems a specific standard or guideline has created in the past and how it should be (or has been) rectified. If indeed the problem standard or guideline has been changed, then the article would describe the resolution, discussion of benefits, as well as any unresolved issues.

Green Streets

Papers that present Green Streets case studies describing one or more of the many issues and challenges related to their design, implementation and the ensuing quantifiable environmental benefits.

Photo Credit: Markus Spiske, Bavarian Road Cycling Championship 2017 in Baiersdorf (Middle Franconia).

<https://unsplash.com/photos/WUehAggQ5hE>

These issues range from design options, needed or helpful ordinances or legislation, and obtaining public support or overcoming resistance. Papers could present a before and after evaluation of the quantifiable benefits or describe the process to engage decision-makers and/or the community.

Livability and Transportation

Papers that address the relationship of transportation decisions on the livability of streets and neighborhoods, or on specific populations such as children, elderly, disabled and socially-economic disadvantaged communities. Papers could address how to build residential streets so they don't need to be retrofitted with traffic calming measures; highlight case studies of retrofitting a woonerf on an existing residential street; successful changes to speed limits to improve livability safety and noise; the role of public spaces and plazas in larger and small communities; ensuring transportation improvement funds are spent equitably in a community, or the special needs of elderly, children or other "transit-dependent" populations.

Goods Movement

Papers that describe strategies and practices for goods movement that reduce air pollution and carbon emissions and/or reduce the incidence of collisions and other safety issues. Papers could address the environmental benefits of rail, wind (e.g. sailboats), electric vehicle or human-powered deliveries schemes, the legal and policy setting of implementing new practices such as ordinances and permits, the logistical elements implementing a new scheme or the impacts of the global economy on freight transport's greenhouse gas emissions. Specific examples range from last mile deliveries within a car-free area to using rail/ trams or sailboats/barges instead of trucks.



Photo credit: Jason Thompson, *Movement of Goods Outside the City*, 2022. <https://unsplash.com/photos/UWDU37A6NI>

Transportation and Housing

Papers that address the relationship of transportation decisions on housing supply, variety and density. Papers could address Transit-Oriented Development and its

relation to housing supply and affordability (a broad issue) or the effect of unbundling parking from housing (a more focused issue). In particular, is unbundling parking effective when transit service is below a certain level? Which comes first: better transit or unbundling parking? What is the relationship between housing density and transit service (both local and regional)? Updated research and data that expand on the works of Paul Mees would be welcome.



Photo credit: Bess Gaby, *Alcobaça, Portugal, Elderly Walkers*, 2022.



UPCOMING FALL 2023 CONFERENCES TO KNOW ABOUT

THE FOLLOWING CONFERENCES ARE BEING HELD IN THE FALL; REGISTRATION IS STILL OPEN.

SEPTEMBER 6-8, 2023 | MILAN ITALY

The European Transport Conference (ETC) is the annual conference of the **Association for European Transport**. The conference attracts transport practitioners and researchers from all over Europe and provides in-depth presentations on policy issues, best practices, and research findings across the broad spectrum of transport.

More information: <https://aetransport.org/etc>

OCTOBER 10-13, 2023 | POUNDBURY / DORCHESTER, ENGLAND, UK

IMCL: International Making Cities Livable Conference was begun in 1985 to provide a venue for sharing the best evidence-based lessons of great cities and towns to improve the quality of life for all. This year's theme is *The Ecology of Place: From Understanding to Action*. While recognizing that online education is an increasingly important professional development component, the IMCL believes there is no substitute for a component of face-to-face and on-the-ground immersive learning, personally sharing effective tools and strategies to drive positive change.

More information:
<https://www.imcl.online/2023-poundbury>

OCTOBER 16 - 19, 2023 | KIGALI, RWANDA

Walk 21 began in London in 2000 and has been holding annual conferences since. This year's theme is *Action for Walking – The Affordable and Essential Steps to Improve Walkability*.

More information:
<https://walk21.com/conference/kigali-2023/>

"The noblest pleasure is the joy of understanding."

- Leonardo da Vinci

KEEP IN MIND FOR 2024

VELO CITY was held in May in 2023. Should be a similar timeframe in 2024.

More information: <https://velo-city2023.com/>

Congress for the New Urbanism (CNU) held its 31st annual conference from May 31 - June 3, 2023. Should be a similar timeframe in 2024.

More information: <https://www.cnu.org/cnu31>

Photo credit: AET, ETC Conference 2022, Milan, Italy.

CREATING MORE LIVEABLE, ATTRACTIVE AND ECONOMICALLY EFFECTIVE CITIES

A BRIEF PRIMER TO IMPLEMENTING URBAN VEHICLE ACCESS REGULATIONS

By Lucy Sadler

Urban Vehicle Access Regulations (UVAR) are strategies that restrict or regulate motorised traffic access to an area, road, or portion of a road to all, or to specific vehicle categories of, motor vehicle traffic. This can be by banning or charging (certain types of) vehicles or behaviour, by taking space away from motorised vehicles to give to sustainable modes or by changing the road layout to ensure that drivers behave as desired. Sadler et al, (2022) describes them in more detail (see WTPP May 2022 issue); they include pedestrian streets, limited traffic zones, low / zero emission zones, and congestion charge zones.

Until recently, the motives to implement UVARs focused on improving air quality or protecting historic city centres, but now increasingly reasons are climate change. Cities are at the forefront of the move to decarbonize transport, thus cities are seeking increased use of public transport, active mobility, freight consolidation, cycle logistics etc. In addition, electric or fuel cell vehicles are being encouraged where these strategies are not possible. UVARs, by reducing vehicle traffic, are complementary with these strategies and indeed make alternate modes more attractive and thus more successful.



Photo credit: Artur Kornakov_Entry Totally Prohibited, Vladivostok, Russia, 2021. <https://unsplash.com/photos/qCxAc7lfsnU>

There currently are over 800 UVARs in Europe, and the vast variety in type and geographic location are documented at www.urbanaccessregulations.eu. (Figure 1).

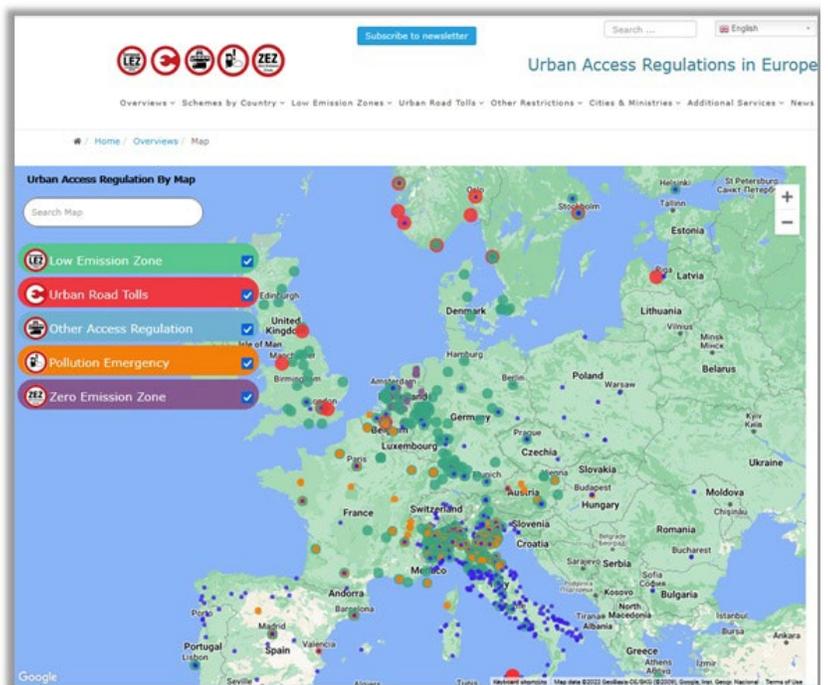


Figure 1: Map of UVARs in Europe, source <https://urbanaccessregulations.eu/home/>

Even once sustainable mobility options are available, convenient and cost effective, there is often a resistance to change habits. UVARs can help be the final ‘kick’ to ‘encourage people with a stick or boot’ to change their transport mode. (Figure 2). Charging schemes can, in addition, provide the funds to enable subsidised sustainable mobility.

**Because sometimes,
Carrots just simply aren't enough**





**The vast majority of people & companies
change when the alternative is**

- more convenient or attractive,
- ‘Visibly’ cheaper, or
- their current option is not possible or banned = UVAR



Picture sources: Pixabay, Sadler.

Figure 2: Sometimes carrots just simply aren't enough. Picture source Pixabay, Sadler Consultants.

Other Benefits of UVAR- Fairness and Attractiveness

Increasingly fairness is an issue: those travelling sustainably take less roadway and public space which are valuable and scarce resources. Why should space be granted automatically at low cost for those travelling unsustainably, subsidised by us all? Parking is also the least economically beneficial use of the kerbside (Figure 3).

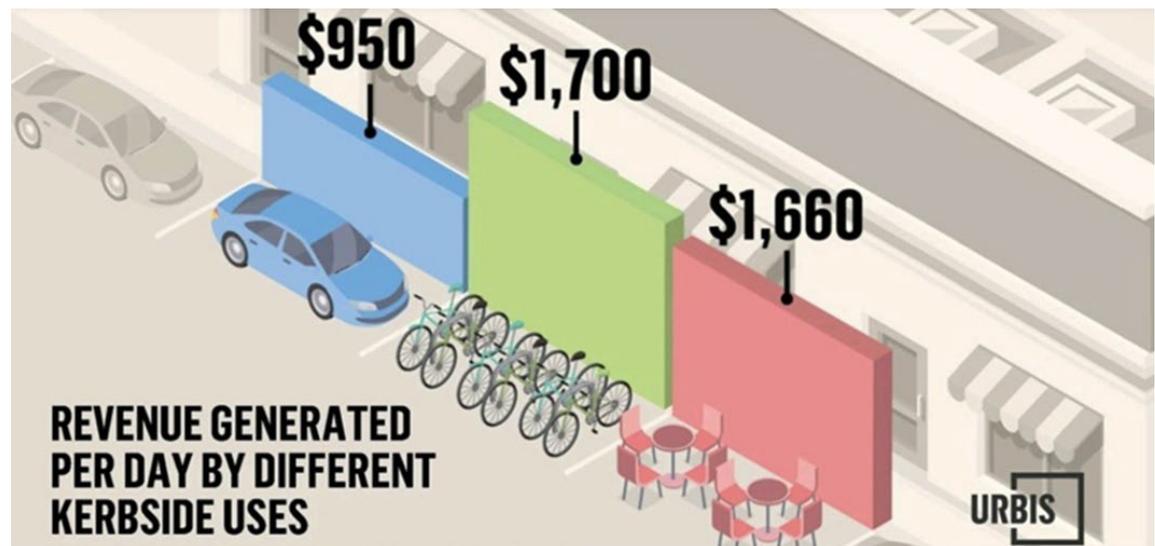


Figure 3: Revenue generated per day by different kerbside uses (Australia). Source [Urbis](#)

Ravensburg Centre (DE)



Ghent Braun Square (BE)



Figure 4: City centres previously as car parks, now as amenity areas.

UVARs are also about making cities more attractive. In the 1970's the town centre was accepted as a car park (parking lot); these days nobody would want to return to that, but the change (prohibiting parking in town squares) was very controversial at the time. (Figure 4).

UVARS AND LIVABLE CITIES

We are now at a new version of that radical change to cities: the assumption that roadspace is automatically given to the car is being questioned and the streets are now starting to be reclaimed for people.

City residents currently accept the reality that they need to spend much of their time travelling for their daily needs. However, this is one of the contributing factors that reduces the attractiveness of cities and make people move out of the city. Work-life balance is becoming increasingly important, and the cities with the best quality of life can attract the best people to live and work there. UVARs, as well as the 15-minute city concept (see e.g. [C40's 15-minute article](#)), of which UVARs are an essential part, will reduce traveling and improve life for city dwellers, as well as being more sustainable. The time that is not spent travelling can be used for more pleasant, or economically beneficial, purposes.

Not only the locals are affected by high traffic in a city. Tourists do not travel to cities to see traffic jams. They want to see the buildings, culture, and be able to enjoy their time in the city – and UVARs help to improve their experience. Travelling around central Paris today, for example, as a tourist is so much more pleasant on foot or bike than it was, since Anne Hidalgo (Mayor of Paris since 2014) has implemented many 15-minute city aspects. It is not to say everything is already perfect, but it is moving in the right direction. First, there needs to be the alternatives to enable people and goods to access the area, before schemes are implemented, and in Paris there have been, for example, issues with lack of alternatives from the poorer suburbs, which are usually by definition where there are fewer public transport options.

Picture sources: Ravensburg Blaserturm um 1970 Copyright Landesmedienzentrum Baden-Württemberg 01 08 1970, Lucy Sadler, Beeldbank from the city of Ghent; Databank Publieke Ruimte (Database Public Space).



Tactical Urbanism / Spatial Interventions

Streeteries and parklets - Regulation on Temporary Occupation of Public Space

Figure 5: Tactical Urbanism examples in Milan, Source: Valentino Sevino, Milan Agenzia Mobilita Ambiente e Territorio (AMAT)

Even in major cities, a large proportion of urban trips are short distance trips, and could be done by bike or foot. Tactical urbanism and spatial interventions (Figure 5) can often improve the use and experience of sustainable, and particularly active, modes, at relatively low cost and controversy (although taking parking spaces away can be tricky, and best with lots of work). European cities are increasingly taking a low-tech approach and ‘simply’ taking road and parking space away, and have implemented one or more of the following: large pedestrian zones, bus lanes and cycle paths, traffic blocks to prevent through traffic, Residential Areas/Encounter Zone/Superblock/Woonerfs, or circulation plans (where cars use the ring road but cyclists travel directly) etc. The numbers of Zero Emission Zones, limited traffic zones and neighbourhoods with 20-30 kph speed limits are also increasing.

Public Engagement

When implementing UVARs, it is important to include the public for several reasons. They will be aware of issues that the city authorities may not be. The more citizens are involved and understand the issues, and the

less they are presented with a ‘done deal’ the easier it is for them to influence and then accept the scheme. At the same time, cities need to balance the ‘I need an exemption too’ versus genuine need.

“Sometimes work is needed first for people to realise the problem”

Not only the public, but politicians also need to realise their role. Many cities have aims for “Net Zero” or “Climate Neutrality” but far fewer have actual plans to achieve them. Nice words won’t achieve these aims, and transport is one of the key sectors in which politicians need to take, or allow, action.

How schemes are communicated can make or break a scheme. Amongst other things people need to understand the scheme aims – which need to be clear, transparent, and tackling an accepted problem – and communicated as such. Sometimes work is needed first for people to realise the problem, perhaps involving non-government organizations (NGOs) or community groups.

Enforcement

An UVAR without enforcement is not an UVAR. Spatial interventions and tactical urbanism are often ‘self-enforcing’ and low tech. Cameras on buses (to enforce bus lanes, for example) can be really effective, (where permitted by local or national law). However, regulatory (prohibitions/banning) or charging (fee-based strategies) UVARs need active enforcement. Camera enforcement is the most commonly used and effective active enforcement method for UVARs.

New technology such as Intelligent Speed Assistance (ISA) can prevent vehicles speeding. These could be used as a permit requirement for Limited Traffic Zones, a requirement for taxi / bus licenses, or to help enforce school or 20 kph zones.

Resources to Implement UVARs

The purpose of the European Union (EU)-Funded project ReVeAL (Regulating Vehicle Access for Improved Liveability) was to add Urban Vehicle Access Regulations (UVAR) to the standard range of urban mobility transition approaches of cities across Europe. The [ReVeAL Guidance](#) was developed to help address the issues described in this article and other issues involved in implementing UVARs. If you are implementing, or considering implementing an UVAR, please do use the ReVeAL UVAR development toolkit, <https://civitas-reveal.eu> described also in WTPP’s December 2022 issue in an article by Sadler, Fenton and Pechin.

For information on UVARs around Europe, see the user-friendly European UVAR databank <https://urbanaccessregulations.eu>, and there is also a free newsletter for those working in public authorities who are interested in UVARs, register [here](#).

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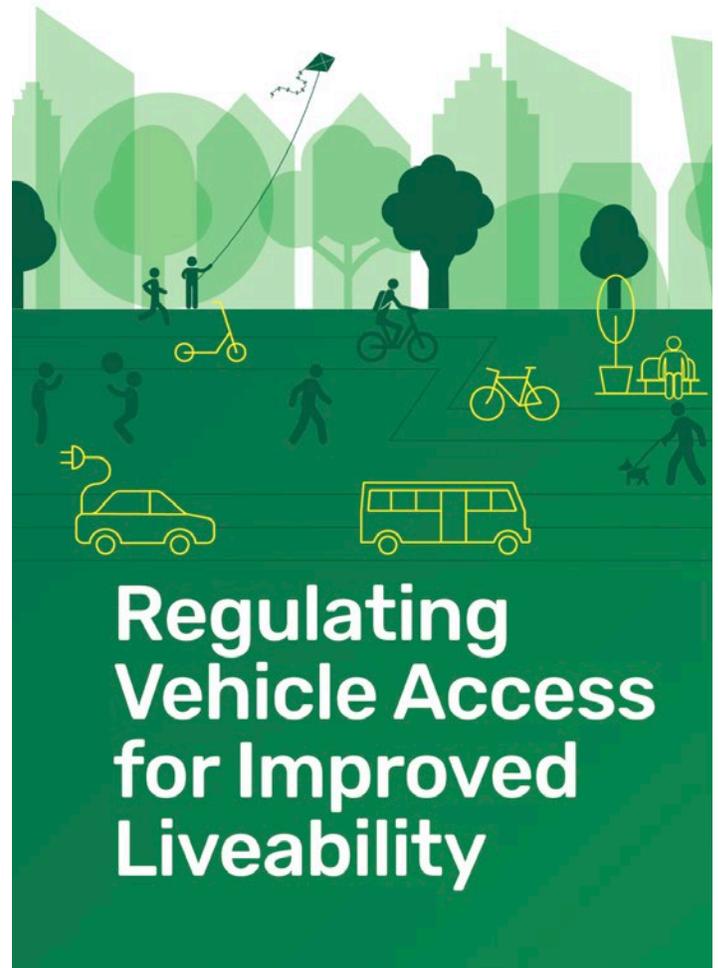
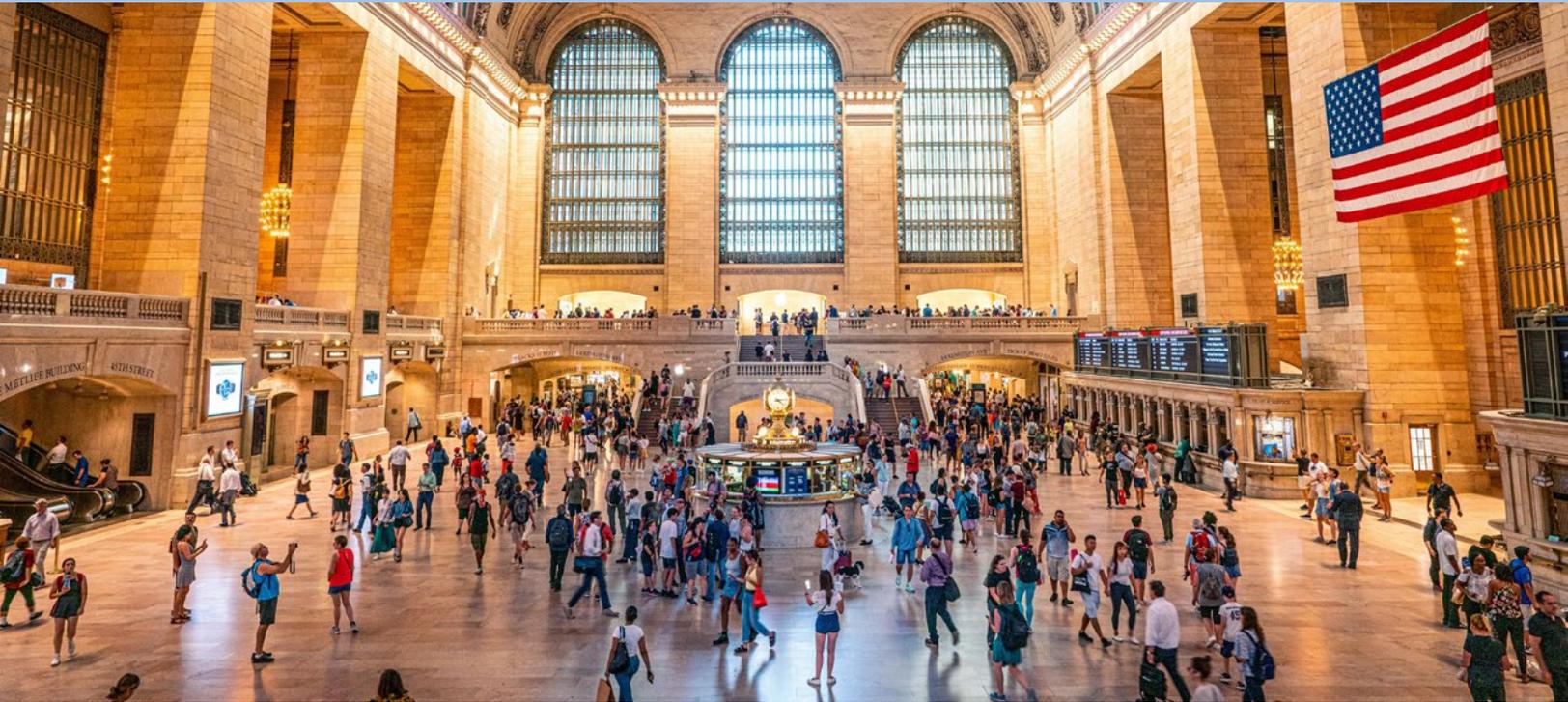


Image source: <https://civitas-reveal.eu/>

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HOW CITIES HELP AND HINDER THE PROVISION OF SURFACE PUBLIC TRANSIT: A TRANSIT AGENCY PERSPECTIVE

By Michelle DeRobertis, Richard W. Lee, Charles R. Rivasplata, and Douglas J. Cross

PREFACE

This paper is based on research conducted for Mineta Transportation Institute, San Jose State University, USA, (DeRobertis, Ferrell & Lee 2021). An earlier version of this paper was presented as a poster at the Transportation Research Board (TRB) Annual Meeting, Washington D.C. in January 2021, (TRBAM-21-03048), which was held virtually due to the COVID 19 pandemic.

This paper is based on practices in the USA. Comments regarding how other countries deal with these issues, or conversely don't have these issues, are welcome and could form the basis of a future article. Please contact the authors.

INTRODUCTION

In many urban areas in the USA, transit providers and roadway owners are separate entities, each with its own discrete governance and management structure. In such cases, transit agencies have no direct control over the built environment, particularly the street-oriented transportation infrastructure over which they operate surface fixed-route transit (bus, BRT, streetcar, and light rail). Hence, transit agencies are dependent on the cooperation of local municipalities to permit or enable their services.

The “built” infrastructure that municipalities control includes streets and roadways upon which transit service operates as well as sidewalks and street crossings used by transit patrons to access stops and stations. Specifically, cities control the lane widths where buses operate, whether to provide a bus-only lane, how well buses can access the curb to load /unload passengers, the bus stop environment where passengers wait, and the pedestrian infrastructure needed to access transit stops and stations.

Photo credit: Stephen H., Grand Central Station, New York City, New York, USA, 2019. https://unsplash.com/photos/dF4qSZKJw_g

This research explores these many ways in which transit agencies depend on collaboration from municipal roadway owners (e.g., cities, counties, states, hereafter referred to as “cities”). The goal of this research is to encourage cities to proactively work with local transit providers to foster efficient, effective, and safe transit services.

BACKGROUND

The aim of the research project was to understand and identify the municipal practices that are helpful, and those that are not, to the provision of public transportation. The methodology involved four steps. First was a review of the literature followed by interviews of staff at five transit agencies in five different states to identify an array of issues, policies and practices. Five experts in the field were then consulted to provide input and refine the identified issues. This research concluded with detailed interviews with staff from five California cities to further refine the list of identified policies and practices and to learn whether and how they are implemented by the city. The city staff were also asked to share any other ways that they cooperate with transit agency(s) serving their communities. The final product of this research was an array of best policies and practices for municipalities so that they can be full partners with the transit agencies serving their communities.

The purpose of this paper is to present city policies and practices from the perspective of transit agencies based on the interviews of transit agency staff, essentially the first part of the research. The interviews were not meant to be a statistically valid survey, but rather were intended to reveal the range of issues that transit agencies face but that are under the control of cities.

INTERVIEW OBJECTIVES

The objective of the interviews with transit agency staff was to inquire about these broad issues:

- What are the challenges that transit agencies face in their dealings with local municipal jurisdictions within their service area?
- What practices on the part of municipalities improve transit agencies’ ability to operate efficiently and effectively on public streets?
- What are issues faced by transit agencies with respect to municipal short- and long-range planning, both for public streets and for land development?

Answers that were offered for these questions revealed representative examples of the issues that transit agencies encounter in using public infrastructure to provide their services.



Photo credit: Circe Denyer, Muni Light Rail in the City of San Francisco, California, USA.

<https://www.publicdomainpictures.net/en/view-image.php?image=251646&picture=muni-bus-san-francisco>



Table 1: Characteristics of the Five Interviewed Transit Agencies

| Central City/ Cities | Transit Agency | Population of Area ⁽¹⁾ | Central City Population | No. of Counties | No. of Municipalities in Service Area |
|-----------------------------------|--------------------------------------|---------------------------------------|-------------------------|-----------------|---------------------------------------|
| Pittsburgh, Pennsylvania | Port Authority of Allegheny County | 1,415,000/ 1,734,000/ 2,300,000 | 300,000 | 1 | 130 |
| Minneapolis, Minnesota | Metro Transit | 1,837,000/ 2,650,000/ 3,600,000 | 430,000 | 7 | ~75. |
| Denver, and Boulder, Colorado | RTD-Regional Transportation District | 2,920,000/ 2,374,000/ 3,000,000 | 730,000 107,000 | 8 | ~55 |
| Oakland, and Berkeley, California | AC Transit | 1,425,000/ 3,281,000/ 4,700,000 | 435,000 120,000 | Parts of 2 | 13 |
| Bellingham, Washington | Whatcom Transportation Authority | 220,000/ 114,000/ 220,000 | 90,000 | 1 | 7 |

⁽¹⁾ xx/yy/zz: service area / urbanized area (UZA) /metropolitan statistical area. (Note UZA may be larger than service area.)
Source: National Transit Database Agency Info, 2018; MSA population from <https://www.statista.com/>

METHODOLOGY

Transit agencies selected to be interviewed represented small, mid-size and large metropolitan areas from different regions of the U.S. The five areas are: Pittsburgh (East), Minneapolis (Upper Midwest), Denver (Mountain), Oakland-Berkeley (California), and Whatcom County, Washington (Pacific Northwest). The number of local governments served ranged from seven to over a hundred; the number of counties in the service area ranged from one (Whatcom Transportation Authority, WTA) to eight (Denver Regional Transportation District, RTD). Four metropolitan areas have populations of between two and five million, with central city populations ranging from 300,000 to 700,000. The fifth, Whatcom County, has a population of 220,000, and its largest city, Bellingham, has 90,000 inhabitants. Table 1 outlines key information about each agency and the region it serves.

The project team developed a list of questions for transit agency staff to solicit their opinions on what cities currently do that help or hinder transit the provision of transit services. The interviews, which were conducted by telephone during the first half of 2020, included specific questions but also allowed respondents the flexibility to relate their own examples of things cities do, as well as things they wish cities would do, for transit.

The questions were organized under the following topics:

- Good practices by cities on infrastructure that affects transit operations or passengers, e.g., bus-only lanes; bus stop design; curb lane management
- Good practices with respect to routine planning activities, and cooperation / collaboration between cities and transit agencies
- Funding and developer conditions, e.g., do city-imposed development conditions and traffic impact fees ever fund improvements to transit or transit services?

FINDINGS

The following describes the policies and practices revealed by the interviews that either help or hinder the provision of transit. They fall into three categories: infrastructure, planning and funding.

INFRASTRUCTURE AFFECTING BUS OPERATIONS OR PASSENGERS

The interviews first focused on infrastructure that is owned by cities, counties, and states that helps—or indeed is essential to—operating buses, street cars, and light rail vehicles. This includes infrastructure that transit passengers use when walking to or waiting for the bus. The practices that emerged from the interviews fall into the following areas:

- Transit-only rights of way and dedicated bus-only lanes
- Traffic signal treatments that help transit vehicles
- Curbside access to bus stops
- Bus stop placement and relocation
- Bus stop design from perspective of the passenger waiting area
- Layover areas
- Pedestrian access to bus stops/stations

The specific policies and practices revealed by the interviews that help or hinder transit for each of these topics are briefly presented below. It should be noted that the purpose of this research was not to provide design guidance, but rather, to list the array of strategies under city purview that would maximize the effectiveness of transit.

Transit Rights of Way and Bus-Only Lanes

Dedicated bus lanes were cited as a significant way to improve transit operations. For example, the Allegheny Port Authority (Pittsburgh, Pennsylvania region) maintains that dedicated bus lanes represent the single biggest transit amenity that cities can provide. In addition to bus-only lanes, there are other types of transit-only guideways in our interviewed agencies' jurisdictions, which came about in a variety of ways. But each type, except separated rights-of-way, require the roadway owner's permission and cooperation to implement.



Photo credit: Michelle DeRobertis, Bus in mixed travel lane in Oakland, California, USA.

The variations in form include:

- Bus-only lanes, both same direction and contraflow
- **Bus Rapid Transit (BRT)**-only lanes (stricter separation requirements from general traffic lanes)¹
- Bus-only guideway (automobiles and pedestrians prohibited)
- Transit mall — a pedestrian and bus-only street (automobiles prohibited)
- Highway shoulder use by buses
- Freeway bus lanes, either HOV lane or BRT-type separation
- Peak-hour parking restrictions for a peak-hour-only bus lane

1. Bus Rapid Transit (BRT) Standards, Institute for Transportation and Development Policy (ITDP) provides a good description of the right of way requirements for true "BRT" operations. <https://www.itdp.org>



Photo credit: Michelle DeRobertis, Transit-only lane, San Francisco, California, USA.

Traffic Signal Treatments

Several practices with respect to signalized intersections were mentioned that reduce delay to transit vehicles; all need city action or participation for implementation.

Despite their clear benefits, the interviews revealed that these practices were present at only a few intersections, if at all, even on light rail corridors:

- Transit Signal Priority (TSP) for transit vehicles helps improve travel time and schedule maintenance. TSP equips transit vehicles (buses, street cars or light rail vehicles), with an “emitter,” which automatically requests a green phase extension.
- Queue jump lanes help reduce delay to buses. By allowing buses to bypass the queue of cars to go straight—such as through use of the right-turn only lane or in a dedicated bus-only space—bus delay at signalized intersections can be reduced substantially.
- Traffic signal timing and coordination plans are designed to consider transit travel speeds, or better yet, to be overtly designed for transit.

Curb Lanes and Bus Access to the Curbside

The curb is a space in heavy demand, particularly in urban areas, but also in suburban contexts. A Minneapolis transit planner noted that road owners (city, county, or state) have ultimate control over the curb lane and that, given the many and various types of curbside activities, the function of curbside space was quite different from the roadway lane. Whereas the purpose of the travel lane is to facilitate flow, the roadside curb space serves many functions—bus stops, on-street parking, deliveries, passenger loading

(official or unofficial), bicycle travel, driveway cuts, parklets and pedestrian bulb-outs, not to mention general traffic lanes, either through lanes or right-turn lanes, and occasionally, streetcar tracks or a bus-only lane. Thus, there is a substantial demand and competition for the space.

A common theme among the interviewees was the difficulty that space-constricted stops present. Regardless of the other curbside demands, buses still need to be able to pull into and out of the curbside bus stop. In particular, bus stops need to be long enough so that on-street parking does not interfere, which is especially problematic for near-side stops. Enabling the bus to pull parallel to the curb not only facilitates boarding for disabled passengers, but also ensures safe egress for all passengers from all doors onto the sidewalk. There is also the separate issue of utility poles, sign posts, and other city-permitted street furniture that can interfere with egress from vehicle doorways.

The interviewees provided good and bad examples of city cooperation. For example, Hennepin Avenue, a major Minneapolis thoroughfare, was cited as a good example—the roadway owner allowed Metro Transit to put in a bus-only lane. However, elsewhere in the city, when the transit agency requested parking be removed to facilitate access to the bus stop, there was resistance. Despite the substantial benefits to bus operations, several interviewees reported that cities often resist removing parking, especially metered spaces.



Photo credit: Michelle DeRobertis, narrow sidewalk in New York shared by pedestrians, bus passengers and trees.

An example of a practice that hindered good transit operations was one city’s policy to request reimbursement from the transit agency for lost parking meter revenue resulting from the elimination of parking to lengthen the bus stop.

The challenge of managing the curb lane for multiple modes often comes at a price for bus service. The value of bus bulbs, where the sidewalk is extended into the travel lane so that the bus does not need to pull over, is well established (Fitzpatrick et al 2009, Transport for London 2017). Similarly, pedestrian bulb-outs have effectively made pedestrians more visible and shortened street crossing distances. However, several transit agency planners cited examples where new pedestrian bulb-outs were placed near a bus stop without consulting the transit agency. The resulting crosswalk in the middle of a bus stop necessitated relocation of the bus stop and other retrofits. This example illustrates the importance of the city coordinating with the transit agency when modifying the roadway on a bus route. In sum, access to curbside bus stops is essential for bus operations. Moreover, a location where a bus can pull fully parallel to the curb is essential for proper wheelchair boarding and for the safety of all passengers as well as mobility-impaired passengers. But such curb side access is not within the direct control of the transit agency, but rather that of the city.

The following good city practices were identified in our interviews:

Bus bulbs at bus stops

Bus bulbs circumvent the problem of buses pulling in and out of a bus stop by allowing the bus to stop in the travel lane; the bus does not lose time pulling into the stop and then merging back into traffic. One planner noted that when there is no parking lane, the bus already travels in the curbside lane, which provides the same benefit as a bus bulb.

Transit boarding islands

Transit boarding islands help transit vehicles in the same way as bus bulbs—buses do not have to pull into and out of curbside bus stops. They are particularly appropriate in two situations:

1. To board street cars and light rail vehicles that cannot pull to the curb.
2. To locate the bus stop outside of a protected bike lane.

Other policies to help buses access the bus stop

The interviewees suggested the following best practices:

- Ordinance or policy to prohibit on-street parking too close to a bus stop.
- City policy to proactively provide full-length bus stops.
- City policy to prohibit parking at bus stops, when requested by the transit agency.
- City-adopted bus stop standards, either the transit agency’s or the city’s own, created in conjunction with the transit agency.



Photo credit: Michelle DeRobertis, Bus Bulb.



Photo credit: Michelle DeRobertis, BRT-only lane & Boarding Island, Cleveland, Ohio, USA.

Bus Stop Placement

The above discussion addressed access to existing curbside bus and streetcar stops, but choosing where along a street or corridor to place a bus stop involves several decisions that are within the purview of the city. Issues include the selection of the actual physical location and the overall planning process for siting new and relocated bus stops.

Here, appropriate practices revealed from the interviews include:

- City cooperates and provides quick response time when transit agency requests to relocate a bus stop at the same intersection or nearby, e.g. near-side to far-side.
- City is involved in and helpful when the transit agency asks for a new or relocated bus stop (e.g., a few blocks away, or on a new route alignment).
- Pedestrian access: for new and relocated bus stops, city is involved in the review of pedestrian street crossings that access the bus stop, including the need for new or enhanced pedestrian crossing traffic control devices.
- In conjunction with the transit agency, city adopts a bus stop location policy.

Compliance with Americans with Disabilities Act (ADA)

Under the U.S. federal requirements of ADA, all buses need to be wheelchair accessible (along with other accessibility requirements), but passenger boarding of buses requires the use of city-controlled rights-of-way, such as sidewalks.

Some transit agency staff noted that ensuring compliance with ADA requirements can consume a great deal of resources; however, by law, it is a regulatory responsibility that government agencies must keep up with. They expressed the sentiment that city involvement could reduce the onus on transit agency staff and facilitate compliance.

Relevant city practices identified include:

- City involvement in the review of new bus stops to assess ADA compliance, including landing pad provision, assessment of obstructions to egress from bus doors, and assessment of nearby sidewalks for path-of-travel obstructions.
- For existing bus stops, address access to stops in federally-required ADA Transition Plans.
- Prioritization of transit-agency-identified needs for ADA features in cities' ADA Transition Plans, (e.g. those obtained through transit customer requests or vehicle operator/supervisor observations).

Passenger Waiting Area at Bus Stops: Design and Amenities

Bus stops also include passenger waiting areas which are located on city-controlled sidewalks or roadway shoulders. Consequently, the transit agency needs to contact the city for permission to do anything at a bus stop, including those measures that would improve passenger safety and comfort. In addition, the city is the entity that sets requirements for sidewalk width and building setbacks, which affect whether and how amenities can be physically accommodated at bus stops (e.g., ADA landing pads, shelters, benches).

One interviewee suggested that bus stop improvements be part of the scope of work for any roadway infrastructure project, since this would be the most cost-effective way to provide additional space back-of-curb for such amenities.

Good practices include:

- City adopts standard specifications for bus stops that include wide sidewalks to accommodate such features as a shelter, an ADA loading pad and an electrical conduit, (developed in cooperation with the transit agency). In addition, the city enforces and monitors these specifications.
- City provides a mechanism for passengers to report bus stop issues (e.g., maintenance).
- City manages or coordinates a bus shelter program, in coordination with the transit agency. (This is often financed through an advertising conglomerate that provides shelters in exchange for ad revenue; the drawback is that often potential advertising revenue drives the design and/or location of the shelter).
- City includes transit stop improvements as a routine part of the scope of work for roadway repaving or reconstruction projects (at least adequate space for amenities, if not the amenities themselves).
- City takes responsibility for providing and maintaining passenger amenities at bus stops to promote passenger comfort and safety, including benches, trash cans, and street lighting.
- City conducts inventories and develops an improvement plan or otherwise has a policy and program to proactively evaluate bus stops.

Layover Areas

Transit agencies need a designated place where buses can lay over at the end of each trip and before the next one. This can occur on public or private property, but locations typically need to meet certain conditions, e.g., near a restroom and where a parked bus will not interfere with traffic (including other buses) and pedestrians. The general good practice is for city staff to recognize that it is a significant issue, facilitate arrangements for using city property where appropriate, and to support transit agencies when they need to negotiate with private property owners.

Pedestrian Access to Bus Stops and Rail Stations

Facilitating safe and convenient pedestrian access to bus stops and transit stations is an important consideration that falls outside the direct control of the transit agency. One transit planner said that providing safe and comfortable pedestrian access is a key foundation for how well transit functions. It should be noted that access to transit applies to modes other than just surface transit, such as commuter rail, subways and ferries, since their passengers also use city streets and sidewalks to access the stations and terminals.

Good practices include the following:

- Sidewalk and intersection inventories and improvement programs along routes that access transit stops (e.g., sidewalk maintenance, and traffic control devices to facilitate pedestrian crossings).
- Improved bicycle access to transit stops and stations.
- Pedestrian-scale lighting along main walk routes to bus stops.
- Secure bike parking, especially at LRT and regional transit stations.

A particular issue came up regarding sidewalk maintenance. In many cities, the responsibility for sidewalk maintenance, from leaf and snow removal to repairs of broken concrete, falls to the adjacent property owner, even though sidewalks are open to the public.



Photo credit: Douglas J. Cross, Bicycles are key for transit access, particularly to rail stations, Dresden, Germany.



For example, the City of Philadelphia only owns the sidewalks in the "original" part of the city before the 1854 City-County consolidation; this is a very small part of the City—the historic core and the CBD². More typical may be San Francisco, where the adjacent property owner is always responsible for sidewalk repairs, (except where a city facility or project damages it), and is enforced through city ordinances³. However, whether they own them or not, cities are ultimately in control of sidewalks, from setting minimum width and location standards to enforcing their maintenance.

One transit agency interviewee advocated for cities to assume responsibility to maintain sidewalks that access bus stops, at least major stops. The transit agency representative felt strongly that this would be a tremendous help, particularly on principal transit corridors.

TRANSIT CONSIDERATIONS IN ALL PLANNING AND OTHER CITY ACTIVITIES

In the interviews, questions were posed to measure the extent to which, from the perspective of the transit agency, city staff understand and acknowledge transit needs and their connection to roadway planning activities. The interviews yielded several desirable practices that cities can adopt to include transit agencies in internal city planning activities regarding streets and sidewalks. These have been separated into the following subcategories:

City Staff and Transit Planning Activities

With the exception of some of the larger cities, transit agency staff reported that few local jurisdictions in their service areas had staff assigned to addressing transit service infrastructure needs. Transit agency staff agreed that, of all the internal practices that cities could adopt that would help them, the most effective was having city staff involved in transit-related tasks.

The following helpful practices with respect to City staff were identified:

- **Dedicated Staff** – City has a dedicated person(s) with transit responsibilities. These responsibilities could be codified in the position title and/or job description.

- **Transit-Specific Grants** – City staff applies for grants that are specifically for transit. The grant applications can be a one-time project or a routine practice during every grant cycle. For example, according to an interviewee, the City of Minneapolis applied for and received funding from American Cities Climate Challenge to implement new bus-only lanes on its streets.
- **Transit Planning Activities** – City staff initiates and conducts planning activities that benefit transit operations and passengers. Agency staff agreed that it would be optimal if there were city staff whose duties included such things as evaluating bus stop conditions and amenities and ensuring that there were safe pedestrian and biking routes to transit such as sidewalks, signals to cross the street to access bus stops, etc. Two examples from our interviews were:
 1. Pittsburgh, Pennsylvania which manages the new bus shelter installation program.
 2. City of Alameda California, whose staff conducted inventories of all bus stops to better accommodate soon-to-be-acquired three-door buses.

Routine Planning Activities Incorporate Transit Considerations

Good city practices include incorporating transit issues and transit needs into all transportation planning activities affecting transit vehicles or transit passengers (e.g. short and long-range transportation plans, pedestrian plans, roadway improvements).

Transportation Planning Documents

Good practice is for all short and long-range transportation plans to include a robust transit element, e.g. in the Circulation Element of the General Plan and in Specific Plans.

Transit Plans and Transit Sections of Other Plans

Many cities do not incorporate transit into overall transportation planning, resulting in the absence of transit in basic planning documents. A good practice is to proactively develop a short and long-range transit plan, in conjunction with the relevant local and regional transit providers. Another is to include transit sections in other transportation plans.

2. Correspondence with Christopher Puchalsky, City of Philadelphia. October 9, 2020.
3. Correspondence with Ricardo Olea, City Traffic Engineer, San Francisco Municipal Transportation Agency (SFMTA) on November 4, 2020.



Pedestrian Planning Includes Transit Access

Good practice is to ensure that transit access is considered in all pedestrian planning activities, such as pedestrian plans, or prepare a combined transit-pedestrian plan and to involve the transit agency in developing the scope of work, development of scoring criteria and plan recommendations.

Roadway Improvements and Roadway Construction

Since buses operate on roadways that are owned and maintained by others, activities that affect roadways can adversely impact transit. The interviews revealed examples of good practices that minimize the adverse impact on transit operations. Interviewees, particularly from WTA and Metro Transit, cited many instances where cities involved transit agency staff in the process of planning road work that affected transit routes or bus stops.

Good staff practices could include:

- City staff inform and involve the transit agency(s) in any planned changes to roadways that have transit routes and that could affect transit stops. This includes all major and minor roadway projects, from restriping and reconstruction to bikeways to bulb-outs at intersections.
- City requires the contractor to maintain access to bus stops when there is construction that affects the sidewalk or bus stop; e.g. City of Minneapolis makes sure that contractor maintains pedestrian access on all affected sidewalks.
- If roadwork necessitates bus detours, the cost of planning/implementing the detour is included in the scope of work and the transit agency is reimbursed.
- As mentioned above (“Passenger waiting areas at bus stops” section), a desired good practice is for bus stop improvements to a specified standard are included in the scope of work of all street repaving and reconstruction projects.

To illustrate the need for involving the transit agency, several interviewees cited instances in which the lack of coordination resulted in unfavorable conditions for transit operation and compromised bus passenger safety. For example, when one city installed a separated bike lane (Caltrans Class IV bikeway) on a thoroughfare that also was a major transit route, the final design prevented buses from gaining access to curbside bus stops and as a result, transit patrons were required either to cross the bike and parking lane to board the bus, or wait in the travel lane

for the bus. In response to this issue, the City retrofitted boarding islands, and even the retrofit was not ideal. It would have been better if the transit agency had been part of the project planning team from the outset, ensuring that the boarding islands were safe and ADA compliant.

Another example of lack of coordination was when a local jurisdiction hurriedly installed a pedestrian bulb-out with bollards at an unsignalized intersection to improve pedestrian safety. The bulb-out was located within the bus stop zone, forcing buses to stop in the crosswalk. The transit agency was not consulted and was not involved in finding a solution, even though it directly affected the ability of buses to pull into the bus stop. In this case, attempting to address one pedestrian safety problem caused another. Early communication with the transit agency would have avoided adverse impacts on transit and would not have put transit passengers at risk when boarding and alighting. This example illustrates how adopted guidelines can help transit agencies educate city staff on how their decisions will affect transit.

Consideration and Integration of Transit with the City’s Roadway and Transportation Network

Transit operates on city streets; however, cities have multiple types of roadway users and priorities. From the transit agency perspective, it seems that some city staff consider transit a wholly separate transportation network and not within the city’s purview, often resulting in an “us vs. them” attitude. For example, there is still a considerable disconnect between transit and bicycle planning in many jurisdictions. The Complete Streets movement has engaged many cities in the reallocation of roadway space for bicyclists and pedestrians, however, many cities still ignore transit when juggling the multiple modes that must be accommodated. Thus, road space reallocation projects such as road diets routinely consider bicyclists and pedestrians, but not always bus needs. One transit agency planner commented that cities are at long last taking bikes seriously, but often transit operations are not considered. Thus, bike lanes are frequently implemented, while bus lanes are not.

One example where transit was not considered in a roadway redesign was a corridor where the city wanted to improve pedestrian safety and crossings, especially given the number of schools in the corridor.

The city implemented a standard road diet and bike lanes were added. To facilitate pedestrian crossings, they added stop signs at many intersections along the corridor; however, this resulted in significant increases in bus travel time. The transit agency had been considering implementing enhanced bus service in this corridor, but that it is no longer feasible. An overarching problem is that **none** of the streets in the city have been prioritized for bus travel.

This example illustrates how cities have difficulty balancing transit with bikeway priorities. It is good practice to have transit be considered the priority mode on at least some if not all trunk transit routes, since transit vehicles have **no choice but to operate there**. This has effectively been done in San Francisco and is consistent with the growing trend to consider land use context and transportation characteristics in the planning and design of city streets, instead of solely the standard “arterial, collector, local street” classifications. It has been adopted from Boston to Seattle as well as many smaller cities (NACTO 2013).

Good practices adopted by cities to support this policy include the following actions:

- Designate certain streets / corridors as transit-priority or preferential routes. Since buses only use certain streets, this could readily be incorporated into bicycle plans.
- City Complete Streets policy that specifically mentions transit and incorporates transit lanes into complete streets projects.
- In all road space reallocation projects, city includes the evaluation of providing bus-only lanes; assesses the adverse impact of road diets without bus-only lanes on bus travel times; and identifies ways to mitigate any adverse impacts.

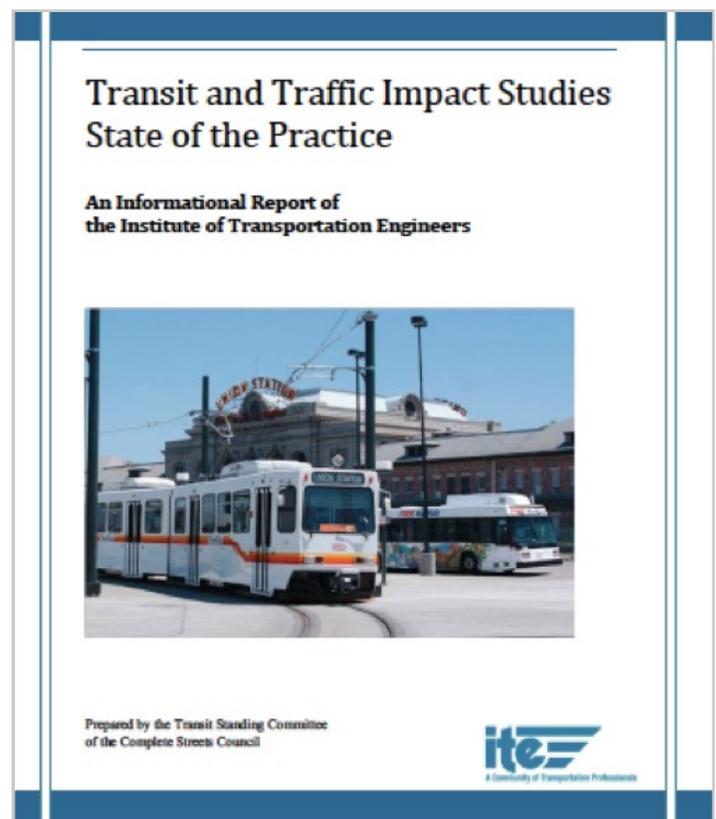
Development Review and Zoning

Cities have primary authority over local land development. There are good practices in the development review process that can immensely help transit operations, such as the following:

Consideration of Transit in Traffic Impact Studies

The recently published Institute of Transportation Engineers (ITE) “State of the Practice Report on Transit and Traffic Impact Studies (TIS)” (ITE 2019) revealed many transit issues that should be considered in a TIS.

In alignment with the ITE report, the interviews included questions as to whether/how transit was considered in TIS conducted in their service areas. The interviews revealed that the TIS generally focus on vehicular traffic and its impact on intersection and roadway capacity. When transit is included as part of a TIS, the analysis is often cursory, examining whether the new development will cause crowding on buses. While transit improvement projects funded by developer or traffic impact fees are not unheard of, these are generally limited to large projects. Transit improvements are commonly negotiated on a case-by-case basis, if at all.



An AC Transit planner noted that under state legislation passed in 2013 (Senate Bill 743), California is moving from roadway Level of Service (LOS) to Vehicle Miles Traveled (VMT) as the primary criteria for measuring transportation impact. Auto LOS analysis focused project mitigations on roadway improvement for cars, while impacts on transit and other modes were ignored. In contrast, SB 743 promotes walking, biking, and transit as mitigation measures and thus, appears to benefit transit and “active” modes. However, SB743 allows developments to provide little or no mitigation if they are in areas with VMTs below the jurisdictional average.

As a result, many transit-rich areas fall in such “no mitigation required” zones.

The interviews revealed a few good practices, including:

- TIS addresses whether there is a direct pedestrian path between the project site and the nearest bus stops and stations.
- TIS evaluates bus stops for features and amenities, such as bus shelters, wheelchair accessibility, benches and lighting.
- TIS assesses impacts of construction activities on transit, e.g. will buses be rerouted or will bus stops be temporarily closed or relocated?

Site Plan Review

Another stage of the development process is site plan review. The cities of both Minneapolis and St. Paul closely involve Metro Transit in the entire site plan review process such as all meetings and correspondence. Issues are identified early and if, for example, bus stops are affected, a condition of approval can require that the project be responsible for public noticing and for the costs of relocating the bus stop. Other interviewees cited the desire to at least be given an opportunity to review site plans.

Developer Conditions of Approval and Development Fees

Related to TIS and site plan review is the practice of imposing “conditions of approval”. Again, WTA and the process that Metro Transit has with Minneapolis and St. Paul revealed good practices for practices that relate to transit operations and bus stops.

Good practices identified include:

- New developments are required to buy transit passes, such as for employees or for residents of large residential developments.
- If Transportation Demand Management (TDM) plans are required, they include elements that improve transit operations; (unfortunately more often than not, they only fund transit passes, but provide nothing to improve transit service).
- A monitoring plan is implemented for such conditions of approval, particularly for the TDM plan’s many components.
- Developers are required to talk to the transit agency about their site frontage with respect to bus stop location and design. As a condition of approval, developers fund transit stop improvements on project frontage.

- Developers must evaluate safe access from their sites to and from transit stops and to pay for any improvements (e.g., well-placed crosswalks, traffic signals, pedestrian bridges or tunnels that would shorten the walk distance between stops and the project site).
- Large developments with new streets include (and pay for) well-designed bus stops (e.g., with benches, lighting, shelters).
- If the sidewalk is closed during construction, pedestrian access to bus stops is maintained.
- If a bus stop is relocated or temporarily closed during construction, the project funds the noticing of the relocated bus stops.
- Project-specific conditions of approval facilitate project-generated person-trips to be taken by transit, such as when the project site is beyond the nearest transit line.

A recently missed opportunity was a new delivery distribution center that was built miles from transit. The multi-billion-dollar corporation wanted the transit agency to provide a shuttle to the nearest light rail station but did not offer to pay for it, and the city did not require them to. Other examples are special events (e.g., large concerts and professional sports games), which need significant additional transit capacity on an irregular basis. This additional transit service involves extra staff, not just to operate vehicles, but to assist with crowd control and to act as transit ambassadors. (DeRobertis, Lee & Kala, 2017) Good city practice would be to require that the event organizer compensate the transit agency for the significant additional labor costs incurred.



Photo credit: Bess Gaby, Bus Lane, Lisbon, Portugal, 2022.

FUNDING STRATEGIES FOR TRANSIT

All the transit agencies interviewed for this study provide transit service to multiple jurisdictions, typically funded with a mix of district-wide sales and/or property taxes, state aid, and fare revenue. The staff were asked if they received direct revenue for general operations from any of the almost 300 cities and counties collectively served by them, and all replied no. This illustrates one drawback of the multi-jurisdictional model common to transit agencies in the U.S.: no single city wants to provide additional funding to serve other jurisdictions⁴. One county had a small percentage of sales tax revenue go to transportation and in the past, one-third of this went to Sunday service for transit, but this has been discontinued. Nevertheless, three main strategies were found under city control to bring more funding to transit agencies:

Supplementary Service

One jurisdiction, Boulder Colorado, provides funding to RTD to operate **additional** service within the City above RTD service frequency standards. For example, it pays RTD to operate Route BOUND on a 10-minute weekday headway instead of the RTD practice of 15-minute service.

Transportation Impact Fees/ Pro Rata Share Districts/ Special Benefit Districts

Although many cities in the U.S. have developed traffic impact fees to fund new and expanded roads and for new traffic signals and signal coordination systems, few of the municipalities served by the interviewees had such fees and **none funded public transit**. Many U.S. municipalities are recognizing the need to provide funds for transit, bicycle and pedestrian projects as well as roadways through such areawide fees. Thus, funding mechanisms are evolving and today there are Special Assessment Districts, Transportation Benefit Districts, Pro-Rata Share Districts⁵ (ITE 2019 and even transit-specific mechanisms, such as Transit Development Impact Fees (TCRP 2006, City of San Francisco 2004). Interviewees agreed that it would be helpful to transit agencies to include transit needs—both capital and operating—in these expenditure plans. Given their capital-intensive nature, this should include long-range transit needs (e.g., new and expanded commuter rail, light rail, and metro/heavy rail).



Photo credit: Josh Couch, Trip to New York City, 2017.

Bulk Fare Ticket Purchases

When asked about innovative funding sources, several agency planners mentioned institutional bulk fare programs, which are typically implemented at universities and other large employers. Often the additional revenue enables the transit agency to increase service to the site in question, such as the university. Under these programs, all affiliated persons (e.g. students, staff, and employees) receive a transit pass that enables them to ride for free. One model is for the university or employer to annually pay the transit agency for the passes at a reduced “bulk” rate and the actual amount paid is based on audited ridership, which usually increases over time.

4. Whether or not such a multi-jurisdictional model is ideal or even inevitable, given the U.S. urbanized landscape characterized by varying extents of suburban sprawl, is not within the scope of this research.
5. A PSD is “a geographic area defined for the purpose of securing needed improvements to transportation facilities in that area. Developers in the district are required to pay toward the cost of those improvements in proportion to how much they create the need for those improvements”. Recommended Practice on Multimodal Transportation Impact Analysis (MTIA). Institute of Transportation Engineers, Washington D.C. Anticipated publication December 2020.

SUMMARY AND OBSERVATIONS

The primary objective of this paper was to identify—from the perspective of the transit agency—how cities can facilitate the provision of efficient transit service. Many city practices were identified that exemplified good coordination between the local government and the transit agency. A city that recognizes that transit is an integral part of the whole transportation network also tends to proactively cooperate with the transit agency to implement practices within city purview. The agency interviews found such practices in built infrastructure, planning policies and in attitude.

City Practices that Help Transit

The transit-friendly policies and practices that are within the purview of cities and other road owners fall in the following areas:

- Infrastructure for buses, including bus lanes, signal treatments, curbside access, and layover areas.
- Infrastructure for pedestrians walking to transit stops and stations and waiting for transit vehicles.
- Internal city transportation planning policies and practices including staff that has some transit responsibilities.
- Development review policies, including requirements for Traffic Impact Studies and conditions of approval.
- Funding strategies and mechanisms that benefit transit.

“Us versus Them”

A general conclusion is that most of the interviewees experience an “Us vs. Them” relationship with at least some of the cities they serve; (“Us:City:cars” and “Them:transit agency:buses”). The “Us vs. Them” mindset of city staff essentially sets the stage for the range of policies and practices that cities control that can help or hinder transit operations. Many municipalities, particularly suburban locations, consider auto flow, not transit, their primary sphere of duty. Thus, decisions are made from the perspective of what is best for automobile flow and LOS. Rarely were bus operating needs on city streets as important as those for cars or even bicycles. One planner stated that cities in the service area do not necessarily intend to hinder transit. However, in practice, auto traffic engineering concerns often prevail at the expense of transit operations.

The notable exception of the five interviews was WTA, which serves a county of 220,000 inhabitants. The WTA planner stated that they received excellent cooperation and consideration from the City of Bellingham, (population 90,000). The city staff perceived bus transportation as integral to the transportation network as automobiles, bicycling and pedestrians.

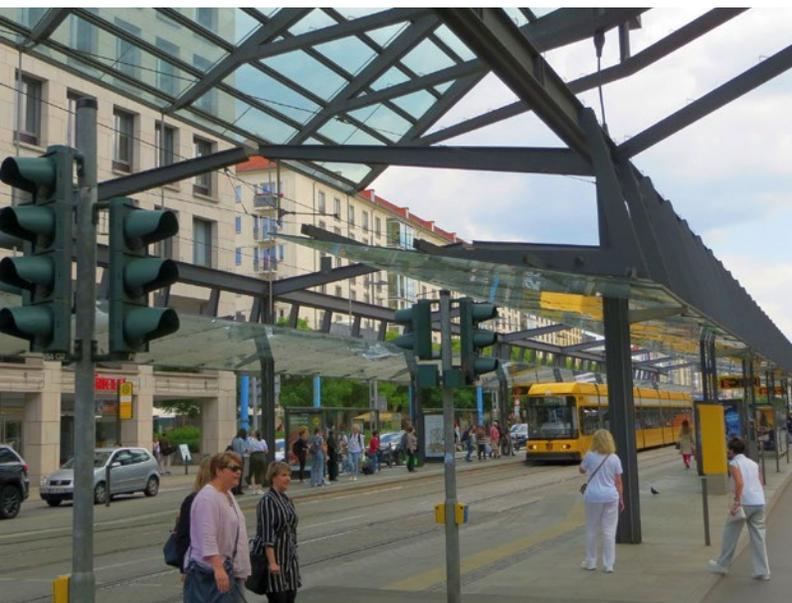


Photo credit: Douglas J. Cross, covered passenger waiting areas in Dresden, Germany.



Photo credit: Michelle DeRobertis, passenger waiting areas with bicycles in Freiburg, Germany.



Photo credit: Michelle DeRobertis, Freiburg, Germany.

Future Research

The full research project, MTI Report 21-09, supplemented the transit agency interviews with a review of the literature and input from a panel of experts. Over one hundred city practices that help transit were identified. Five cities were then interviewed to determine whether they had implemented and /or institutionalized any of these practices. **Based on these findings, the MTI research report also identified several avenues of future research needs, including:**

- Identify the most important practices and develop a Best Practices Handbook.
- Differentiate between practices appropriate for large cities versus smaller cities.
- Do cities that run their own transit agency as a city department have lessons for cities where transit is provided by a special district?⁶
- Determine best practices regarding whether and how cities are directing developer fees to fund public transit.

CONCLUSION

In the provision of urban services, many government agencies are involved with their delivery besides the city itself. In the area of transportation, public transit agencies, often a separate agency from the city, provide essential services using city streets.

Whether cities acknowledge it or not, key elements of transit service are under city control such as travel lanes, the curb-lane environment and sidewalks. Thus, cities must recognize how their decisions, policies and practices can help or hinder efficient transit services.

There are always competing interests among modes (cars, bicyclists, pedestrians, buses, streetcars, light rail and parking) in the use of roadways and of curbside space. The allocation of space among these competing interests is in the purview of the roadway owner, and transit vehicle operations are one of many functions that need to be incorporated. When the responsibility for providing transit service lies with an “outside” agency, i.e., is not part of the city (or county or state) organizational structure, functions under city purview tend to get priority. A transit-friendly city, however, will consider the needs of transit service and its passengers on a level playing field with other modes. Consideration and implementation of the types of policies and practices identified in this report will help cities to do so.

6. In California, City-owned transit agencies are more common in small cities in rural counties such as Petaluma, California (population 60,000), than in medium to large metropolitan areas with wall-to-wall suburbs. However, two examples of large California cities that own and operate the public transit system as a city department are the City and County of San Francisco (population 880,000) and the City of Fresno (population 522,000).

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Photo credit: Michelle DeRobertis, Freiburg, Germany.

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TRANSFORMING DHAKA, BANGLADESH INTO A CYCLING CITY

By Nazia Nawrin Hossain

INTRODUCTION

Dhaka is a rapidly developing city with rapid economic growth. Although it is the political, economic, and cultural centre of Bangladesh, its urban neighbourhoods have poor planning regulations and traffic management generating severe vehicular congestion (Barua & Hoque, 2015), loss of working hours and the wastage of natural resources (Mahmud et al., 2012). The transport sector focuses on building infrastructure to accommodate motorised vehicles (Dey et al., 2014), whereas non-motorised modes are minimally addressed during mobility planning. The lack of inclusive planning of both formal and informal transit has given rise to an inefficient transport system in the city. Effective policies to implement sustainable transport modes are needed to mitigate existing mobility problems, congestion, and pollution in Dhaka (Haroon et al., 2018).

The government of Bangladesh is focusing on achieving the United Nation's Sustainable Development Goals (New Age, 2022), and Dhaka, as a rapidly urbanising megacity, requires a sustainable mobility transition. Due to the rising traffic congestion and increasing public transport fares, some people have switched to commuting with bicycles (Taslim, 2005) as they are sustainable, cheaper and faster through the heavy traffic of Dhaka. However, the lack of infrastructure and cycling-supporting policies in the city makes it difficult to commute by bicycle. Currently, cycling remains neglected in Dhaka's mobility planning, and research on increasing its modal share will give an insight into the benefits. Bicycle-inclusive planning will optimise the benefits of using them in the dense mixed-use neighbourhoods of Dhaka, which generates short-distance trips suitable for cycling. The overall objective of this paper is to understand the role of cycling in Dhaka's current mobility scenario and give insight into methods to shift the paradigm of bicycles to an efficient and sustainable model.

Photo credit: Salman Preeom, A Look Down Aerial view Of Hatirjheel Lake Bridge at Dusk; Dhaka, Bangladesh, 2021.

https://unsplash.com/photos/mO1_udD5iCs

Therefore, the core research question for this paper stands as follows:

How can Dhaka increase its modal share of bicycles and formulate a cycling-inclusive policy framework?

To develop the study and address the core research question, the following questions are considered:

1. Which cities have implemented bicycle-promoting strategies, and how far have they achieved the goal?
2. How did Dhaka evolve in the transportation network?
3. What is the current mobility situation in Dhaka, and what role does cycling play in the existing mobility dynamics?
4. How can the central districts of Dhaka be optimised for maximum bicycle use with the framework of coherence, safety, directness, comfort, and attractiveness?

The study aims to formulate a policy framework for increasing the safety, comfort, and attractiveness of using bicycles in an expanding Global South city. There is a lack of research exploring the substantial role of cycling in developing cities. This paper attempts to minimise the research gap and address the current cycling scenario in Dhaka by analysing the transport challenges and eventually proposing guidelines to enhance the modal share of bicycles in the city's central districts.

RESEARCH METHODOLOGY AND LIMITATIONS

The paper is framed around the research questions and aims to answer them in the following sections. The first part of the paper is the theoretical framework focusing on a literature review with case examples of cities who already implemented cycling promoting strategies. The second part of the paper is the analytical framework focusing on Dhaka's mobility indicators by critically assessing the land-use management, road network system, current transport policies, and modal options using data from secondary sources. It attempts to understand why the current situation failed to accommodate bicycles into the transport system and summarises the problems and potential of cycling in Dhaka. The third section of the paper analyses the inner neighbourhoods of Dhaka, and the current mobility dynamics in the Shahbag-Ramna-Dhaka University area. However, the lack of previous studies regarding the transport situation in this area proved to be the most significant limitation of this research.

This paper has limited discussion on the role of other non-motorised vehicles in Dhaka's transport scenario as this study focuses on cycling. The author selected relevant sources to guide the research. The presented data are from selective years because of the lack of updated data from government agencies and independent organisations, and often cycling is left out in the mobility indicators limiting the analysis. A survey is also carried out on people already using or interested in using bicycles since it is crucial to

address the opinions of active and possible users of bikes before formulating policies for any area. The survey is shared on cycling forums (BD Cyclists and Dhaka University Cycling Club) in Dhaka. The people who participated in the survey varied in age and profession and their responses are analysed in later sections. Reflecting on the initiatives taken by cycling-friendly cities, the mobility analysis, and the opinions of the cyclists from the survey, a general guideline is formulated, which comprises both infrastructural strategies and regulatory policies to promote cycling in the inner neighbourhoods of Dhaka.

LITERATURE RESEARCH

The literature review aims to develop a theoretical framework of bike-inclusive policies and to refer to them later when proposing guidelines and strategies for increasing cycling in the centre of Dhaka. It focuses on initiatives to promote bicycle usage in urban settlements and reflects upon their outcomes by exploring case examples.

1. Expanding Asian Metropolises and their transport situation

Asian cities are experiencing robust economic development (Asian Development Bank, 2019) and urban mobility challenges (Wulforth et al., 2013). Migration from rural areas in search of work and better living standards has escalated the expansion of urban territories.

Rising wealth and growing population increase the number of vehicles, and motorised and non-motorised transit has to share the limited road space in the cities (Boquet, 2010). The total area for automobile access is only 8% in Dhaka (Labib et al., 2013 p.140), 12% in Bangkok, 7% in Shanghai and 6% in Kolkata, in contrast to 25% in Paris and 23% in New York (Boquet, 2010, Section: Asian cities: high density, rapid growth and heavy congestion, para.7). Despite a low motorisation level, the dependence on informal transit and non-motorised vehicles such as rickshaws (Asian Development Bank, 2019), Dhaka faces extreme vehicular congestion.

2. Strategies for promoting cycling in a city

Newman and Kenworthy (2006) discussed how city planning has shifted from prioritising cars to formulating alternatives for other modes of transport to help diminish the necessity of cars and decrease the traffic volume. Bicycles are low-carbon vehicles that provide healthier, cheaper, and more flexible commute options. It is essential to have a vision that would cater for the need of the cyclists, along with dedicated political schemes and support from society (Pettinga et al., 2009 as cited in Panthasen et al., 2021, p.3). Cycling requires physical labour, and cyclists get exposed to external conditions of weather, traffic pollution, noise and crashes (Buehler and Pucher, 2017, as cited in Panthasen et al., 2021). Hence, the infrastructure to make cycling comfortable and safe is necessary when planning cycle-inclusive transport policies.

This section addresses the initiatives needed to support cycling in cities and achieve a higher bicycle modal share to apply them later when discussing cycling prospects for Dhaka.

The strategic and integrated planning system

Although urban growth is inevitable, automobile-centred transport development only leads to building more roads, leaving public transport and non-motorised vehicles neglected in the planning process (Kenworthy, 2006). An integrated urban and transport plan implies that a cycling policy alone is insufficient if other city development plans do not consider them in the planning process. Cities that build bicycle lanes and high-speed motor streets simultaneously

will only increase traffic volume and be unsafe for cyclists. However, integrated transport policies by restraining cars, improving the public transport system, and introducing car-free zones give all the transport modes their dedicated space (Deffner et al., 2012, p.15).

Infrastructure planning

It is imperative to have a cohesive cycle network with separate bicycle lanes and safe parking facilities (Deffner et al., 2012, p.21) to ensure a better experience and encourage cyclists even more to use bikes. When planning for a bicycle-friendly city, the parameters of coherence, directness, safety, comfort and attractiveness (Panthasen et al., 2021, p.4; Deffner et al., 2012, p.34) define the outcome of the implemented infrastructure. Coherence refers to a cycling network with the maximum origin and destination in any given area. Directness indicates movement in the shortest distance from the point of origin to the destination, sometimes achieved with preferences in traffic signals and intersections. Cyclists are vulnerable to collisions with other vehicles, and separate bicycle lanes with proper traffic management can ensure the safe movement of cyclists. Smoother roads, uninterrupted passages, adequate bicycle parking, and bike take-on options in public transport make cycling comfortable. Visually pleasing and socially busy routes are prone to more usage than empty routes, especially by women, making cycling attractive and safe (Panthasen et al., 2021, p.4).

Service for cyclists

Public transport that allows bike take-on encourages more people to use them in intermodal trips where cycling is part of the journey (Deffner et al., 2012). Adequate parking facilities in stations and bus stops also raise the use of bicycles as feeder transport. Alongside the guarded service, bike stations can provide bike maintenance, bike rental service, and charging for e-bikes and pedelecs. E-bikes and pedelecs have become increasingly popular as they require less effort to manoeuvre. Bike-sharing schemes are popular in many cities, allowing people to cycle without worrying about the maintenance of a personal bike (Midgley, 2011).

3. Case examples

In this section, the paper analyses the impact of cycling-friendly policies implemented in Bogota, Bangkok and Groningen as case examples. Exploring Bangkok and Bogota’s biking infrastructure will give insight into initiatives implemented in growing Global South megacities similar to Dhaka. Although Groningen does not have similarities with Dhaka, its well-developed strategies show how a city can grow from highly car-dependent circumstances to a higher bicycle modal share.

| | BOGOTA | BANGKOK | GRONINGEN |
|-----------------------|---|---|--|
| Coherence | Exclusive network of bike routes -CicloRutas- connects residential areas, city centre, stations, BRT system and public open spaces. | Lack of connectivity, often isolated bike lanes depending on neighbourhoods. City centres have better connection than residential neighbourhoods. | Interconnected bike network in the entire city, connecting with city centre, university, hospital area, and stations. |
| Directness | Alleyways and narrow lanes connecting to the bike routes provide shortcuts and decrease travel time. | Non-crossable main roads, lack of connected alleyways and cycle lanes, and frequent “Cul de Sacs” increase travel time. | Frequent shortcuts across the city and priority at traffic lights reduce travel time. |
| Safety | Separated bike lanes, car-free day and reducing space for cars help keep the cyclists safe to some extent. | Motorised vehicles, limited space for bicycles, obstructions in the bike lanes and driver’s unchecked behaviour compromises the safety of cyclists. | Bike-only crossing signal phases, traffic calming, car restrictions and well maintained bike lanes enhance safety of cyclists. |
| Comfort | Design along the topography, separated bike lanes, car-free days and traffic calming make bicycling comfortable. | Illegal car parking, vendors in the bike lanes, noise and pollution, inadequate parking facilities, and traffic congestion contribute to discomfort when cycling. | Tailored bike parking, integrated multi-modal options, bike lane maintenance importance, and priority in traffic signal operations increase comfort of cyclists. |
| Attractiveness | Connections to public spaces, parks, wetlands, bridges and hills make cycling rewarding for recreation and health benefits. | Mundane looking streets, poor connectivity to public amenities, heavy traffic congestion reduce the desire to cycle in the streets. | Improved connectivity with city centre, car-free zones, pedestrian and public amenities, and attractive city centre increase cycling in the city. |

Table 1: Summary of case examples

Source: Author, 2021

Bogota

Bogota is recognised internationally as a leader in implementing cycling (Teunissen et al., 2015, p-457) in Latin American cities. Its sustainable initiatives minimised access inequalities, decreased traffic congestion and improved quality of life (Teunissen et al., 2015). In 1998, approximately 400km of protected cycle routes were built in the city called ‘CicloRutas’. Over the years, there was a rise in the daily share of cycling trips from less than 1% in 1995 to 5%-6% in 2015 (C40 Cities Finance Facility,

2018, p.10), with most trips made for commuting to work or school. The dense and mixed-use neighbourhoods generate trips shorter than 10km, and makes it ideal for cycling rather than using cars in congested Bogota streets. The CicloRutas form an extensive network connecting neighbourhoods and BRT stations, where bicycles are used as feeder mode. Bogota also introduced car-free scheme supported by citizens and politicians. The cycling policies are monitored and updated according to the challenges faced while executing the program.

Bangkok

Bangkok has become extremely traffic-congested due to its rapid urbanisation and car-promoting policies. Despite investment in the public transport sector, the buses and paratransit modes are insufficient. Motorcycle taxis are the most common vehicle for short-distance trips in neighbourhoods. Since 2008, Bangkok Metropolitan Administration (BMA) has built 200km of separate bike lanes as of 2016 (Bakker et al., 2018, p.421). Other initiatives include traffic calming, bicycle parking facilities, and bike-sharing schemes; however, a large portion still commits to cycling as a recreational activity rather than commuting to work or other purposes. There is no reliable source to confirm their modal share, but it is assumed that only 1% of total trips in Bangkok use bicycles (Panthasen et al., 2021, p.6). The lack of enthusiasm despite the improvement in the infrastructure are because the bike lanes lack connectivity and are often isolated, except near the city centre (Panthasen et al., 2021). Most main roads are non-crossable and require detours increasing travel time. The high density of motorised vehicles leaves minimal space for cyclists, while the dedicated bike lanes are often used by motorcycles increasing the chances of collision and jeopardising their safety.

Groningen

Groningen is one of the most bicycle-oriented cities in Europe, with 61% of total trips completed using bikes (City of Groningen, 2015, p.8). More than 90% of the jobs are within a 3km radius of the city centre, ideal for bicycle rides (Pucher and Buehler, 2007, p.18). The main aim of their transport policy is to maintain cycling as a viable, safe and sustainable form of transport instead of using cars (Pucher and Buehler, 2007, p.19). The city approached this with reinforced cycling infrastructure, dense land use and traffic calming measures since 1980. Bike routes are given priority by maintaining a smooth obstacle-free way to make cycling safe and comfortable (City of Groningen, 2015). The route is connected entirely by considering the start and destination point, especially in the city centre, university area, and stations. Bikes are permitted on the trains to ensure multi-modal connection in the transport system, making them feeder modes for long-distance journeys. This city is an excellent example of increasing bicycle modal share through improved infrastructure and car-restricting policies that encourage everyone to adopt

cycling. The table summarises the strategies to compare the case examples using the framework of coherence-directness-safety-comfort-attractiveness.

Bicycle-friendly cities typically have comfortable, safe and well-designed infrastructure to protect cyclists and encourage pro-cycling incentives in the urban area. In Bogota, their politicians' dedication and vision elevated the cycling scenario. Although Bangkok established bike-promoting infrastructure, the city has not seen a significant change in its modal share. Groningen is the cycling city in Europe that prioritises bicycles in its planning system, which is why people enjoy cycling more than driving cars in the city. The three case cities have different socio-political situations and cultural attitudes, and each showed different outcomes from the implemented bicycle-friendly policies. The case example provides insight into the consequences of implementing sustainable strategies that will help formulate a guideline for the central parts of Dhaka.

DEVELOPMENT OF DHAKA WITH THE TRANSPORT SYSTEM

Dhaka, a constantly growing capital city, has expanded organically over the years. In the last 50 years, Dhaka evolved from a habitat of one million people in underdevelopment to 20 million citizens (The World Bank, 2021) with a growing economy. According to the Bangladesh Bureau of Statistics (2013), Dhaka metropolitan area covers 303 km², with a population density of approximately 30,500 inhabitants per square kilometre (p.15). 30% of the population lives below the poverty line and does not have access to transport services (Ministry of Finance, GoB, 2012, as cited in Alam et al., 2020, p.1). This section of the paper discusses the expansion of Dhaka to understand the city's transport change over the years.

1. Expansion of Dhaka with growth in transportation

Established more than 400 years ago, Dhaka was one of the most influential cities during the Mughal period. However, the first public transport in Dhaka was horse-driven wheel carts brought in 1824. During the 1840s, the British had metal roads and railway tracks built in the city that expanded the city in the southwest direction (Kabir & Parolin, 2012, p.10). The railway network made transportation faster and cheaper (Das & Rahman, 2011).



Figure 1: Change in Motijheel CBD over 50 years

Source: Images collected from Bangladesh Old Photo Archives, 2021; Edited by Author (2021)

During World War II, more thoroughfares and roads were built to facilitate Dhaka's growth in the northward direction (Ahmed et al., 2013). The first public buses started operating from the 1940s (The Contextbd, 2020). Many wealthy families in Dhaka began to own private motor vehicles in the 1960s (The Financial Express, 2019), but the lack of public transport made walking popular among the majority. After its independence in 1971, the mass transport sector expanded over time, with public buses, private cars, auto-rickshaws, minibuses, rickshaws, and other informal vehicles taking up significant space on the streets. Before 1970s, there were few motorised vehicles, but as the city's economy grew, it saw a rise in automobiles. Motijheel is the business centre of Dhaka, which grew into a traffic-congested neighbourhood as thousands of people commute here daily for work due to its commercial importance (Figure 1).

2. Land-use change in Dhaka

Dhaka expanded in the north-south direction over the years, with residential areas on the northern peripheries and commercial sectors near the central zone (Kabir, 2013). According to Khaleda et al. (2017), the total urban built-up land has increased more than ten times (11.6 km² to 118 km²) from 1989 to 2014 (p.195). While Dhaka is not easily defined spatially (Kabir & Parolin, 2012, p.5), many planning proposals have been developed to accommodate the growing population.

DHAKA METROPOLITAN DEVELOPMENT PLAN (DMDP) was a 20-year strategy plan (Iqbal, 2013) proposed in 1995, with policies for expansion on the north side as a "low-rise, low-density city form" (Zaman & Lau, 2000, as cited in Kabir & Parolin, 2012, p.17). The strategies recommended more highways and a mass transit system in the north-south corridor to accommodate the growth, connecting the new suburbs (Kabir & Parolin, 2012, p.16); however, increasing the distance that workers were able to commute.

Dhaka has changed the land-use functions to accommodate the high population density and rising economic activities while opening doors to more automobiles. Dhanmondi area transformed from planned residential blocks during the 1950s (Khan & Mitra, 2011) to mixed-use commercial, educational and high-rise residential buildings. It converted from 28% non-residential space in 1984 to almost 50% in 2000 (Khan & Mitra, 2011, p.6) as shopping malls, hospitals, and schools replaced older residences. As most users of these facilities travel from other parts of the city, more traffic accesses (Mahbub-Un-Nabi & Hashem, 2007, as cited by Khan & Mitra, 2011) the roads, which were initially designed for limited vehicular movement. Most neighbourhoods in the city have experienced a similar transition due to a lack of monitoring from authorities and unplanned development.

According to Wegener & Fürst (1999), transport policies supporting land-use plans can help restrain cars in cities (p.19). However, the Bangladesh government focuses on investing in transport infrastructure without planning an inclusive urban plan, which only increases automobiles on the streets. A city with mixed land-use functions generates short-distance trips. However, Dhaka's residents use private cars, rickshaws or public buses to travel these short distances. A more sustainable approach is required to address this rising traffic volume, and bicycles are a space-efficient and environmentally friendly alternative that should be promoted to complete such short trips in Dhaka.

MOBILITY ANALYSIS OF DHAKA

This section comprises the mobility analysis of Dhaka and the current transport policies and infrastructures under development. Its objective is to understand the transport status-quo of the city and investigate the existing transport network, modal share, and cycling in the present road network.

1. Transport plans and policies

In Bangladesh, the government authorities' coordination and policy directions are often conflicted, with complicated organisational structures, mismanagement and duplication of services within them (Ahasan et al., 2021, p.2). Bangladesh Road Transport Corporation (BRTC) and Bangladesh Road Transport Authority (BRTA) are regulatory authorities focused on public bus service and enforcing regulations (The Project on the Revision and Updating of the Strategic Transport Plan for Dhaka, JICA, 2015). Dhaka Transport Coordination Authority (DTCA) is the coordinating authority of the transport sector for Dhaka.

Existing Regulatory framework

The first transport survey, The Greater Dhaka Metropolitan Area Integrated Transport Study (DITS), was conducted in 1991 to formulate Dhaka Urban Transport Project (DUTP), funded by the World Bank, proposing improvements to the existing transportation system in the city. The DUTP was implemented in two phases, and its outcome formulated the Strategic Transport Plan (STP) for Dhaka city (Ahasan et al., 2021). STP was a 20-year-long integrated land use and transport plan,

and proposed a mass transit system in Dhaka. STP was revised to formulate the Revised Strategic Transport Plan (RSTP), where provisions for non-motorised transport are still limited. The report titled "The Project on the Revision and Updating of the Strategic Transport Plan for Dhaka (RSTP) Urban Transport Policy, JICA (2016)" summarised Policies 70 and 71, which stated that separate lanes and prioritised crossings will be implemented in the city (p.47) for safe and comfortable cycling. The government will also promote local cycle manufacturing industries to make bicycles affordable (p.47).

What are the drawbacks of the existing transport system?

Although the government has established numerous laws for the road network, vehicles, and traffic order, the overlapping regulations are hard to maintain. The biggest drawback of having multiple stakeholders in one sector is the virtually non-existent coordination. Four individual ministries are involved in different sectors for transport development and maintenance in Dhaka. Directly working under them are the eight agencies with overlapping responsibilities. Repetition of services has severe financial consequences, as the authorities are doing similar infrastructure work consecutively, wasting resources (Ahasan et al., 2021). Although DTCA is the coordinating authority of the transport sector for Dhaka, the municipalities implement their mobility plans without discussing it with them. The parent ministries need to provide a legislative guideline and bring all the institutions under one umbrella and specify their objectives without duplicating their roles to establish a well-coordinated system.



Photo credit: Al Amin Mir, City Buildings in Dhaka, Bangladesh, 2021. <https://unsplash.com/photos/jkW9ES-w79Q>

2. Road Network

Dhaka has 8% of its land for road networks (Labib et al., 2013, p.140), with 3000 km of usable road in the urban area. They are categorised according to their usage and location (200 km primary road, 110 km secondary road, 50 km feeder road and 2,640 km narrow road) (SUTI, 2018, p.4). Although a considerable percentage of the trips are by public buses, only 250 km of the road is suitable for bus operation (Labib et al., 2013, p.140). During peak hours, the vehicles create heavy congestion due to insufficient space for all the transport modes. There are 157 bus routes across the city, and only five of them travel in the east-west direction, while the rest are on the north-south alignment (SUTI, 2018, p.4). The population relies on rickshaws for short-distance trips as they are cheaper and takes less time than buses during peak hours on the primary roads.

The idea of “more road, more space” has boosted the growth of the city by adding more lanes to the already occupied roads (The Business Standard, 2023). The car-dependent infrastructure only exacerbates the situation, as the problem is not only inadequate roads but a lack of integrated transport planning for Dhaka. The government has heavily invested in building more elevated roads instead of maintaining and improving the existing ones. In the last 20 years, eight new flyovers have been built in Dhaka to improve connectivity and reduce the traffic on the existing roads.

The first flyover in the Mohakhali area, opened in 2004, and was completed for 9.6 million Euros financed by The World Bank (The Business Standard, 2023). The 11.7km long Mayor Hanif flyover opened in 2014 and was financed by six state-owned banks and financial institutions for a record amount of 193 million Euros (Dhaka Tribune, 2016). Although the proposed budget was much less, corruption, delay and lack of management in construction are reasons for the increased cost of these mega projects. However, the traffic scenario has not changed despite such massive infrastructure built around the city. They provide a temporary ease, as the travellers face the same congestion once they get down from them (The Financial Express, 2017). Although the government has plans for expanding the existing MRT network and implementing the BRT, which aims to improve the

traffic situation, the progress of these projects is slower compared to the construction of flyovers that failed to provide any significant solution to the traffic congestion.

3. Mobility indicators

Transport planning policies in Bangladesh concentrate more on motorised vehicles, whilst non-motorised modes are considered a hindrance to automobile flow. Both private automobiles and public vehicles have seen a rise in recent years with the growing population. Limited road space and an elevating amount of motorised transport have reduced the overall speed of Dhaka’s traffic to 4.5 km/h from 21 km/h within a decade (The Business Standard, 2020). The traffic congestion contributes to the loss of working hours, wastage of fuel, traffic crashes during peak hours and an annual economic loss of Tk 560 billion (5.6 billion euros) at the end of 2021, which drastically increased from Tk 370 billion (3.7 billion euros) in 2018 (The Financial Express, 2021). According to BRTA data, Dhaka has approximately 500,000 motorcycles registered; however, experts believe the actual number is a lot more due to poor public transport service (The Daily Star, 2018). This situation calls for immediate measures to mitigate the traffic congestion problems and look for alternate options to reduce the overall number of motorised vehicles in the street.

In Dhaka, public transport consists of buses, minibuses, autorickshaws, and informal transit such as rickshaws, human hauliers, and other non-motorised vehicles. Despite such unfavourable conditions and the constant struggle for road space, buses and rickshaws provide maximum service to the citizens at an affordable cost. In 2012, the total number of buses operating were 11,060 (Hoque et al., 2014, Section 3.1 Modal Characteristics); however, the quantity is inadequate to fulfil the demand of the growing population of Dhaka. Insufficient and disorganised bus scheduling increases the use of non-motorised vehicles like rickshaws. Approximately 600,000 rickshaws are found in the streets of Dhaka (Rahman, 2007, p.1636), and although a significant share of everyday trips is by non-motorised modes, there is no separate road space allocated for them. Instead, the constant competition for space increases the risk of traffic crashes for operators and passengers.

Figure 2 attempts to show some of the popular vehicles in Dhaka at a glance. Only buses, CNG, and autorickshaws are registered public motorised transport vehicles, while the rest are informal vehicles, sometimes unregistered; hence their actual number is difficult to ascertain. Dhaka is one of the least motorised cities globally; however, the air pollution in the city is soaring. The popularity of non-motorised modes is not only because they are easily accessible and faster than public buses but also because most bus fares are higher than the fixed government charge, making them expensive for low-income citizens. As most of the population is in the lower-income group; therefore, they mostly rely on walking in their everyday commute. Middle-income groups use rickshaws for short-distance trips and public buses when they travel long distances.

Buses are the most popular public transport available in Dhaka. The estimated average length of a bus trip is 9.7 km, whereas a rickshaw trip is 3.6 km, and out of the 21 million trips generated daily, 44.7% are commuting to work, and 17.1% are for travelling to school (JICA and DTCA 2015 as cited in SUTI, 2018, p.4). 28% of all the trips are carried by public buses, whereas cars complete only 5% of them. Nevertheless, buses occupy 5% of the road space, whereas cars take up 80% of it. Although most trips are by walking and non-motorised modes (58%), there is not enough provision for non-motorized vehicles to move around safely and comfortably without struggling for space with automobiles (Fang, 2014, as cited in SUTI, 2018, p.8). Gallagher (2016), in his report, represented the modal share in Dhaka for 2014 from the data collected from the RSTP survey (Figure 3). It deduced that public buses and rickshaws show a significant mobility share, whereas cars, autorickshaws and motorcycles are the second most used vehicles. This data further emphasises that Dhaka needs transport plans that integrate non-motorised modes with public transport.



Figure 2: The different transport modes in Dhaka

Top Row: Left-Rickshaw and CNG congestion in Old Dhaka, Middle-Dhaka University Bus, Right-School van;

Middle Row: Left-Motorised and non-motorised vehicles in Shahbag, Middle-Bicycle, Right-Rickshaws;

Bottom Row: CNG stuck in water-clogged Dhanmondi, Middle-Mini-Bus, Right-Goods-carrying van

Source: Flickr; Edited by author, 2022

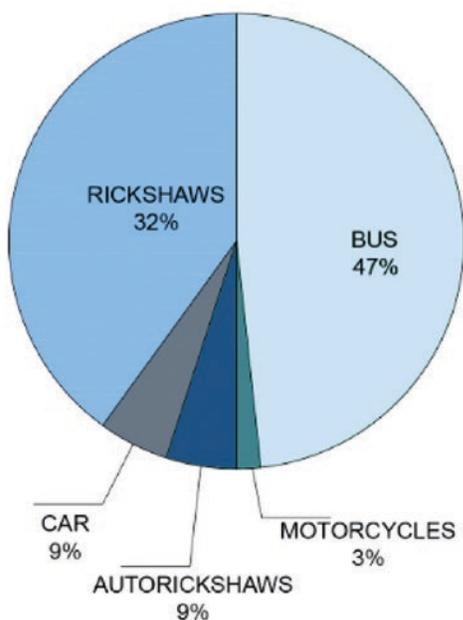


Figure 3: Modal share percentage of different modes in Dhaka, 2014
 Source: Data collected from Gallagher, 2016; Edited by author, 2021

4. Current scenario of bicycle usage in the city – challenges and difficulties

This section attempts to describe the current mobility scenario and the growing bicycling interest in Dhaka to develop the parameters required for proposing cycle-friendly policies in the city. The current traffic situation in Dhaka has influenced some people to take up cycling as an alternate mode. As the overall traffic speed has come down to 4.5 km/h, whereas a survey shows bicycles in Dhaka travel at 10 km/h (The Financial Express, 2018), many have switched to cycling instead of spending hours in traffic congestion. It also saves up to Tk.24,000 (240 Euro) per month compared to travelling by public transport (The Financial Express, 2018). The emergence of online stores and food delivery services has employed young cyclists to make delivery fast and affordable for customers. According to Gallagher (2016), there are approximately 200,000 bicycles in Dhaka, making up 2% of the modal share (p.34). Although cycling is an “environmentally, economically and socially sustainable” (Pucher and Buehler, 2017, para.1) non-motorised transport mode, it is currently the “invisible mode in Dhaka” when formulating the transport policies (Gallagher, 2016, p.34). Almost 65% of the trips in the urban area are less than one mile (1.6km) (Hoque et al., 2014, Section 5. Role of NMT in Dhaka’s Transport system, para.1), and the

compact mixed-use neighbourhoods show a potential to use bicycles for these trips. During the imposed lockdown to slow the spread of COVID-19, there was a three-fold increase in the sales of bicycles in Dhaka. Previously the bicycle stores in the city sold 3-4 bikes a day, which has increased to 8-10 since the countrywide lockdown began (Dhaka Tribune, 2020). Social groups and community clubs such as BD Cyclists and Dhaka University Cycling Club encourage potential cyclists from all over Dhaka through events and campaigns.

Despite the growing cycling trend in Dhaka, there is not enough infrastructure to sustain it in the city. There are only two separate bike lanes, which remain illegally occupied and lack integration with the entire road network (Figure 4). According to the Bangladesh Institute of Planners, the city needs a cohesive network of cycle lanes (The Daily Star, 2021) and not segregated routes. Using the bicycle as a feeder mode is not currently possible due to the inefficient and poor quality bus service and parking facilities. Although bicycle-share schemes are an effective way to encourage people to cycle short distances, the first public bike-sharing app in Bangladesh, JoBike, provides limited services in the neighbourhoods of Mirpur DOHS and the Dhaka University area (The Daily Star, 2019).



Figure 4: Bicycle lane in Manik Mia, Dhaka
 Source: The Business Standard, 2020; Edited by author, 2021

However, the popularity of the scheme emphasises people's interest in using alternate modes if provided with the infrastructure and services.

Dhaka was named the “traffic capital of the world” (Fang, 2014) because of extreme vehicular congestion. Insufficient road space, poor quality of roads, manually operated traffic signals, illegal parking, unregulated non-motorised modes, and numerous institutional and policy gaps combine to form such devastating traffic conditions on the city streets (Salam, 2012). The absence of separate lanes for non-motorised modes create a constant struggle for road space. This reduce the safety of the operator and passengers of non-motorised transit and lead to traffic crashes. As the majority population of Dhaka is lower or middle-income and cannot afford private vehicles, it is essential to find solutions which are affordable and accessible for everyone. The cycling trend that has picked up the pace during the lockdown requires a cohesive, safe and comfortable bicycle network for the people. The growing cyclist communities, rising bike sales, and public bike-sharing schemes show the potential for a mobility plan prioritising cycling in Dhaka.

ANALYSING THE BICYCLE SITUATION IN CENTRAL DHAKA

This part is an overview of the central area of Dhaka, and discusses the current land use functions and the mobility situation in the area. Due to insufficient literature and data exclusively discussing mobility for this area, the exact modal share was unavailable. The author was a regular commuter of this neighbourhood, and some views in this section are direct experiences. This section also compiles and analyses the survey results of the existing and potential bike users to understand their opinions on the current bicycle infrastructure. The main objective is to find the potential for promoting bicycle usage and explore the possibilities for implementing bike-friendly infrastructure in the central parts of Dhaka.

1. Development of the area – Rise to prominence

Dhaka started developing from the banks of Buriganga and eventually spread towards the north. The city centre grew from the Ramna and Shahbag zone (Kabir, 2013). After 1905, Ramna became the administrative centre

of Dhaka. During this period, Dhaka University and Bangladesh University of Science and Technology were built, making it the educational hub of the city. Post-1971, the district gained importance in cultural, historical and political aspects. Acting as an oasis in the middle of highly dense urban Dhaka, the districts Shahbag, Ramna, and Dhaka University form a threshold between the modern urban fabric and the city's colonial structures.

Today, Ramna is a plush green public open space serving the surrounding residential, commercial and educational institutions (Begum, 2018). The adjacent racecourse, Suhrawardy Uddyan, hosts national festivals, political and social events, attracting thousands of people to the vicinity. (Begum, 2018, p.53). Almost all the government offices were built in this area, making it the most administratively important location of Dhaka in modern times. The street moving alongside Ramna consists of ministries, secretariats and court buildings. The side of Dhaka University is the mixed-use urban fabric of museums, libraries, art institutes and cultural centres. The university campus itself covers approximately 243 hectares, with a student-teacher population of 38,000 (DU, 2021). Apart from the students, the working population consists of government employees, law officials and local vendors entering the area daily.



Photo credit: Sazzad Aryan, Dhaka 1230, Bangladesh, Dhaka, 2018
<https://unsplash.com/photos/olFpgSOSHfE>

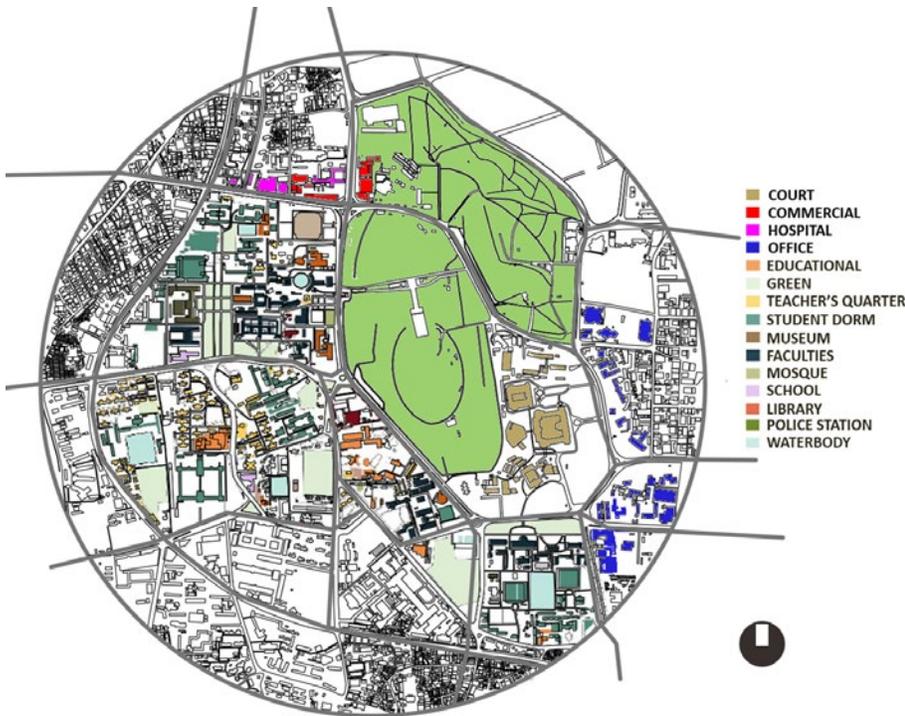


Figure 5: Land-use map of the area
 Source: Author, 2021

Figure 5 attempts to mark the essential functions in the area. The map identifies the area as a mixed-use urban space with a mixture of administrative, educational, cultural, health and commercial facilities. Outside the central part are the dense residential neighbourhoods. The compact planning of this area creates numerous short trips ideal to be completed by non-motorised modes, which accounts for the highly rickshaw-congested narrow lanes in the neighbouring parts.

2. Current transport mode

This area has good public transport coverage with numerous overlapping routes because of government institutions and universities (Rahman et al., 2012). Public vehicles include buses, human hauliers, autorickshaws, and rickshaws. Shahbag-Motsho Bhaban road gets heavily congested during the morning and evening office hours. Multiple bus companies serve this area due to the high number of passengers commuting to the neighbourhood (Alam et al., 2020). Majority population, specially students, use buses and autorickshaws, while government employees travel in cars or motorcycles to the offices in the neighbourhood. Amid these motorised vehicles, bicycle usage is low due to insufficient road space.

The Shahbag to Doyel Chottor road is very crowded during the evening hours, and the nodes and intersections are open gathering spaces bustling with people, travelling in rickshaws, motorcycles and sometimes bicycles. Ramna and Suhrawardy Uddyan are busy with residents from the neighbourhood in the evening. During holidays, rickshaws are most common in this vicinity as people from all over the city visit museums, libraries and monuments. The compact planning and close proximity of the public amenities make non-motorised transit an ideal option for such short-distance travel, and the dependence on rickshaws among the students, teachers, and locals emphasises the need to develop measures for non-motorised modes in the area.

Development of MRT in the area

As the city centre, the area is a functionally important neighbourhood in Dhaka; therefore, all the proposed transport plans will create an efficient mobility network. The proposed MRT and BRT lines intersect and circle the city's inner core to have adequate public transport for the zone. According to the STP's estimates, the entire Metro System will carry more than 1.5 million commuters daily once it starts operating at full capacity (Nawaz, 2015). MRT line 6 runs through the middle of the central area and is given priority as it connects vital points of the city with the central area to provide better accessibility (JICA's final report, 2016). However, unless MRT lines 4 and 5 are completed, line 6 is not operating at total capacity. Japan has been funding some of the mega structures in Dhaka, and has partially funded the MRT network to improve the overall traffic congestion of the city. The estimated cost for line 6 was initially 1.8 billion euros; however, it has been revised to 2.8 billion euros due to the delayed construction. Although the project has been delayed due to the pandemic, the MRT line 6 has been currently operating from Uttara to Agargaon for only 4 hours daily, without stopping at intermediate stations in the city (The Daily Star, 2022).

Existing bicycle situation

The bicycle-sharing app, JoBike, started its operation at Dhaka University in October 2019. The budget-friendly scheme has become popular among students and costs only 0.025 Euro for the first five minutes, making it one of the cheapest transport modes in the city (Dhaka Tribune, 2019). A bike parking station opened inside the supreme court area in November 2020 to promote a positive attitude among government officials toward cycling to work. However, the absence of bike lanes and parking facilities on the University campus discourages most people from cycling in the vicinity. This scenario further emphasises that isolated initiatives will not promote cycling. According to the new master plan for Dhaka University, the area will expand with new sustainability goals, improved public transport facilities and separate bicycle lanes with proper bike parking facilities (The Business Standard, 2021).

3. Analysing current and potential bike user's Opinions

As discussed previously, a survey was carried out to understand the perspective of current and potential bike users. Since this survey was conducted online for academic purpose within a short span of time, the number of people participating was few. In total, 140 respondents (108 men and 32 women) answered the eight questions. The respondents were 55 students, 15 businesspeople, and 70 job holders. There were 93 bicycle owners, and one respondent had his bike stolen recently. The survey asked about trip purpose, length, frequency of bicycle usage, the challenges faced when cycling, and reasons behind using bikes as a mode of transport.

Trip Purpose

In the streets of Dhaka, cycling can be hectic and tiring; therefore, the people who choose the bicycle over other transport modes have a specific purpose for the modal choice. According to the survey (Figure 4), 56 people (40.6%) said that they use or might use it for commuting to work and school. 45 (31.2%) of them chose cycling for exercise, and 34 individuals (24.6%) said that they preferred it for recreation. 4 participants (3%) answered that they cycle for all the purposes listed, and only one person did shopping with the bicycle. Although some people preferred cycling for everyday commutes, recreation and exercise combined were more popular choices in Dhaka.

If you own a bicycle or plan to own one in the future, for which purpose would you use a bicycle?

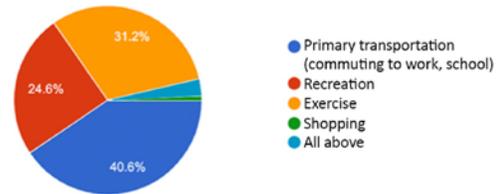


Figure 6: Purpose of cycling in Dhaka
Source: Author, 2021

Trip length

To understand how far people are willing to cycle, it was crucial to identify the distance covered by current users daily. Only 131 respondents answered the question in this case (Figure 5), as the people not owning a bicycle did not participate in this part. 23 participants (17.6%) travelled less than 3km; 41 people (31.3%) cycled an average of 3-7 km daily; 22 people (16.8%) cycled 7-10 km; 21 people (16%) cycled between 10-15 km; and 24 individuals (18.3%) were commuting more than 15km daily. The number of people who cycled more than 7km was almost the same as the number who took shorter trips and travelled less than 7km with bicycles per day.

On an average how many kilometers do you travel using bicycle everyday?

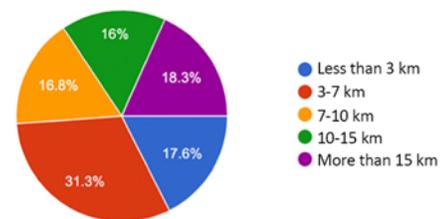


Figure 7: Trip length of cycling daily
Source: Author, 2021

Cycling Frequency

The next question focused on how often people use bikes despite the absence of infrastructure, and 133 people answered the question (Figure 6). 44 respondents (33.1%) use it daily, 38 of them (28.6%) for 2-3 days a week, 21 people (15.8%) for 4-5 days a week, and 18 (13.5%) people use it only once a week. 6 people cycled only once every 15 days, and the remaining 6 cycled once every month. The results portrayed that the highest number of respondents are regular bicycle users, since 103 respondents cycle at least twice per week.

If you own a bicycle how often do you use bicycle for transportation?

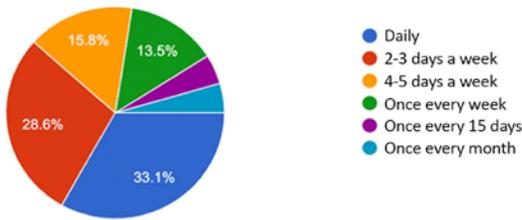


Figure 8: Frequency of cycling

Source: Author, 2021

Challenges in cycling

In the survey, people were asked to rate the problems they face during cycling. All 140 participants answered this question (Figure 7). Among them, 49 people (35%) mentioned that not having a dedicated bicycle lane is the biggest challenge for cycling. 42 people (30%) blamed the safety of roads; 32 individuals (22.9%) indicated the lack of bicycle parking facilities; and 11 (7.9%) of them believed poor traffic management was the primary problem. 3 people (2.1%) felt that extreme weather conditions impacted cycling, while 2 people (1.4%) agreed that all the options were challenges. According to survey results, the absence of a dedicated bike lane is the biggest threat to cycling in Dhaka.

According to you, what is the biggest challenge for cycling in Dhaka?

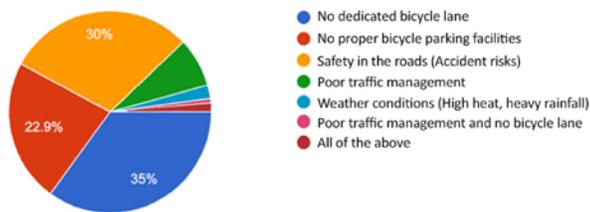


Figure 9: Challenges of cycling in Dhaka

Source: Author, 2021

Reasons to choose the bicycle

The survey asked why the respondents used bikes as their regular mode of transport. 138 participants answered this question (Figure 8). 46 (33.3%) of the survey attendees cycled for health benefits, whereas 37 (26.8%) were cycling to save time in the traffic-congested streets. 25 (18.1%) of them used bikes as it was cheaper than buses; 23 people (16.7%) cycled to contribute to environmental benefits; and 8 respondents (4.4%) were cycling for all the mentioned reasons.

Only 1 person (0.7%) was cycling out of passion. As using bicycles saves public transport fares and is faster than the buses, it is evident that most people prefer cycling for financial and social benefits in the congested Dhaka streets.

If you own a bicycle or plan to own one in the future, why would you use bicycle for transportation?

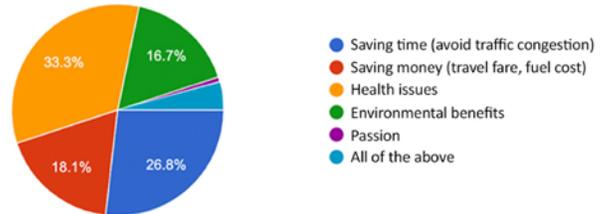


Figure 10: Reasons to use a bicycle in Dhaka

Source: Author, 2021

This section summarises the potential of central parts of Dhaka to promote the already prevailing non-motorised dependency trend and utilise it to formulate a guideline for increasing cycling in the coming chapter.

Listed below are the factors identified to support the idea of improving cycling in the neighbourhoods:

1. Wegener and Fürst (1999) stated that dense mixed-use functions with car-restraining transport policies have a sustainable impact on neighbourhoods. The mixed land-use functions in the inner districts of Dhaka generate a high number of short-distance trips within the vicinity. The public facilities, offices and university are easily accessible by walking or cycling, and they can become popular among the population if the government builds adequate infrastructure in the neighbourhoods.
2. The development of MRT lines and the BRT system will ensure reduced traffic congestion with better public transport facilities, comfortable and time-saving commutes to work and school. However, the success of this transport system is contingent upon other factors (Morshed, 2019). In a city with a majority population from a lower-income group, riding expensive public transit is dubious as the fares may not be as affordable as the existing bus services.

The central parts of the city will have the highest connections to the proposed mass transit system. However, the mega project will be inefficient if integration with other modal choices are not available (Morshed, 2019). It is important to incorporate infrastructure such as bike parking stations, bike take-on options in the MRT carriages and separate lanes to optimise bicycles as a feeder mode to the mass transit system.

3. The existing physical infrastructure within the central parts of Dhaka is not suitable for cycling. Nevertheless, there are initiatives from social clubs to create behavioural change among the citizens to adopt cycling as an alternative transport mode. Campaigns, workshops, and open discussions on the Ramna and Suhrawardy Uddyan are regularly hosted, demanding separate bike lanes for the cyclists in the area. The mayor has approved an integrated bike route for the entire campus, that will connect the nearby public facilities and government offices to facilitate an easier commute for the students, teachers and office employees.
4. JoBike is the first and only public bike-sharing scheme in the city centre. Many students use the service as it is budget-friendly, fast and sustainable; however, it only serves a small portion due to a lack of investment funding. If the scheme expands its service, it will further engage more people towards cycling as a hassle-free commuting choice.
5. Finally, the survey results give an insight into the people's opinions and the challenges in the current cycling situation. Out of the 140 respondents, the majority of participants cycle every day. Most participants use their bikes for commuting to work or school, whereas some use them for exercise and recreation. However, cycling is challenging for Dhaka citizens, and according to the survey participants, the lack of separate bike lanes and parking stations, unsafe roads, and poor traffic management account for discouraging cycling. The respondents believe cycling reduces time and transport costs while saving the environment, which is a motivation to formulate a bicycle-friendly network.

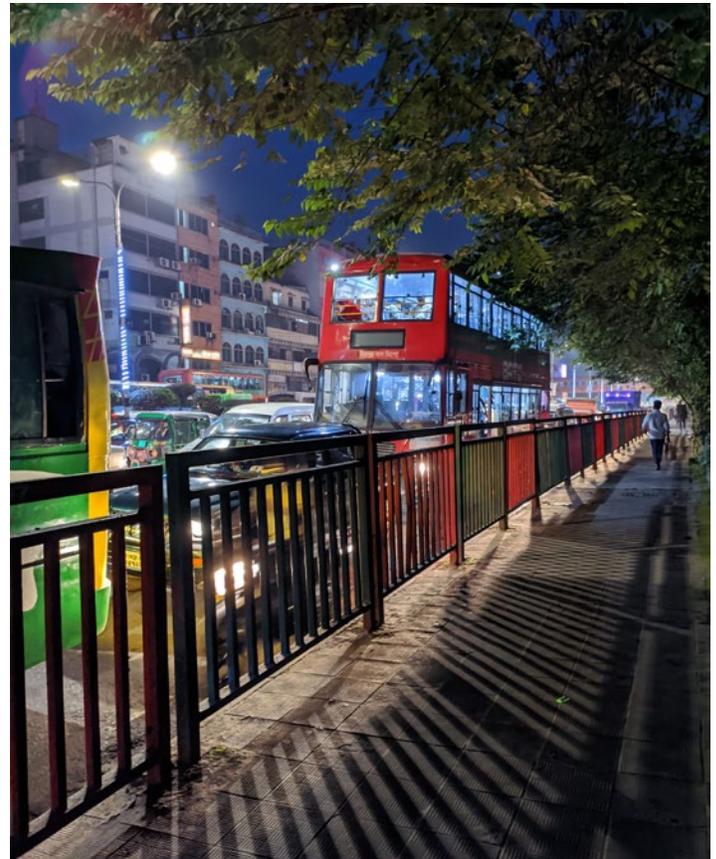


Photo credit: Arif Hossain, Shoinik Club Mor, Dhaka, Bangladesh, 2020. https://unsplash.com/photos/U_pFXR7JF6M

BICYCLE INCLUSIVE PLANNING – GUIDELINES AND RECOMMENDATIONS

Previously, the paper discussed and analysed the overall transportation of Dhaka, eventually establishing bicycles as a growing modal option in the current mobility dynamics. Bicycles are a neglected mode in Bangladesh's transport policies; however, with the growing population and rising number of automobiles, they could be effective in reducing traffic congestion and pollution. They are inexpensive and accessible to everyone in a low-income country like Bangladesh. The main objective of this paper is to develop a framework to increase cycling as a safe, comfortable and attractive mode in Dhaka's urban transport system. As pointed out, the central parts of the city demonstrate a promising situation for implementing inclusive bicycle policies. In the following section, a series of recommendations are developed to increase bicycle modal share through improved infrastructure, upgraded service, and behavioural change of people towards cycling within the framework of coherence-directness-safety-comfort-attractiveness.

1. Integrated transport planning

Many cities have tried incorporating cycling into the urban transport network, but despite having infrastructure, cycling continues to be marginal in some cities. “Planning is a relevant part of cycling promotion” and it is imperative to formulate “integrated, mutually supporting policies” to enhance bicycle use in any area (Pucher and Buehler, 2007, p.3). The success of urban planning, hence, depends vastly on implementing well-developed strategies considering all aspects of mobility and land use. An integrated plan aims to correct the deficiencies in the status quo and balance the mobility dynamics of the city.

As previously discussed, the complex chain of numerous authorities in Dhaka responsible for transport planning, implementation and maintenance has led to poor coordination and execution of the existing projects. The city’s central area falls under the jurisdiction of DSCC (Dhaka South City Corporation), which has an elaborate master plan for constructing coherent bicycle lanes in the zone connecting the university area with the surrounding neighbourhoods. Dhaka University student communities have volunteered to conduct surveys in the surrounding areas to develop a cohesive design of the cycling network and public bus routes. DSCC, as the regulatory and administrative authority, can work with the university to ensure that the project is designed and executed in the best interest.

Inclusion of bicycles as a feeder in mobility plans of Dhaka

The current trend shows that bicycles do not act as feeder transport in Dhaka; instead, they are used as vehicles to complete round trips. However, in cycling cities such as Bogota, Groningen or Bangkok, bicycles are often used as part of the trip (C40 Cities Finance Facility, 2018) (Bakker et al., 2018). Following the case examples, bicycle integration with institutional public transport systems would be a way to increase connectivity and enhance intermodal travelling in Dhaka.

This strategy emphasises the characteristics of ‘coherence’ and ‘comfort’ from the cycle-inclusive planning framework.

MRT line 6 has started operating recently, and the intermediate stations in Shahbagh and Dhaka University will be operational in the coming months. These proposed MRT and BRT systems can introduce bike take-on options and parking facilities to facilitate a multimodal chain in the zone. In the future, when all the MRT and BRT lines operate, it will be an intense network of transport connections, provided the bike lanes are already in place. When more people are using public transport and bicycles, fewer private automobiles will be on the street, thus reducing the current traffic congestion at the Motsho Bhaban and Shahbag intersections.

Traffic calming and traffic off-limit

Traffic is a threat for both cyclists and pedestrians in terms of speed and volume if not curtailed. As mentioned earlier, an integrated plan aims to balance the mobility dynamics of the city. The central area of Dhaka experiences severe traffic congestion at the two critical roads of Motsho Bhaban and Shahbag. Car-restricting policies can be implemented from Shahbag to Motsho Bhaban by limiting the number of cars. Every government car should take the maximum number of passengers to reduce traffic volume and fuel use. This could drastically decrease cars entering the neighbourhood as high-ranking government officials are currently entitled to one car per employee. The road from Shahbag to Doyel Chottor could have car off-limit policies. Since the university area is highly dependent on university buses and non-motorised modes, restricting cars and motorcycles and enhancing public transport options with bicycle facilities for students will reduce the motorisation of the area. Coherent bicycle lanes, attractive pedestrian walkways, and designated bus stops in the University campus will create a safe and better environment for everyone.

2. Infrastructure development

Separate bike lane

According to the RSTP Policies 21 and 71, all types of non-motorised modes will be encouraged as feeder services, with dedicated lanes to create an urban network connecting commercial sectors, city centres and communities (JICA, 2015, p.33) (JICA, 2015, p.45).

However, bicycle lanes should avoid conflicts with other modes at intersections (City of Groningen, 2015), as roads which are overcrowded with automobiles can jeopardise the safety of cyclists. Therefore, it is essential to have a physical barrier separating motorised vehicles and bicycles and protected crossing for bicycles at intersections to avoid conflicts. This idea is already implemented in the bike lane on Agargaon road in Dhaka, where the city corporation built a green divider to separate motorised vehicles from entering the bike lane. This design can be replicated on the dense traffic-congested Shahbag-Motsho Bhaban route and the road adjacent to Dhaka University, where the bicycle lane should have a visible partition to keep automobiles from running and illegally parking in it.

E-bikes and pedelecs

Pedelecs and e-bikes can provide a solution to alternative of bicycles for people who find cycling a difficult physical work. Dhaka has recently started importing e-bikes due to the slowly growing demand for this alternative to traditional bicycles. However, the price starts from 350 euros (E Smart, 2021) and is beyond the affordability of the majority population. However, they can be alternate options for civil servants and politicians who travel in cars in this area. The necessary infrastructure for these advanced transport modes, such as charging facilities, storage, parking stations, and maintenance hubs, must be located at strategic points to facilitate their usage.

Bike Parking facilities

Cycling requires well-organised, convenient and safe public parking facilities to promote a multimodal connection and chained trip by using bicycles as a feeder mode. Additional parking facilities in the University area will encourage more students to cycle to the campus. The central area has thousands of people commuting every day, and increasing bicycle trips will require a mix of distributed parking establishments and secure storage facilities adjacent to the offices, museums, art institutes and cultural centres.

3. Improving services

For the policy framework to work efficiently it is important to share information about the implemented initiatives with the users.

Cyclists will only use the infrastructure and services if they know about the facilities provided for them. When the first bicycle lane was inaugurated in Dhaka, only a portion of the population knew about it, thus reducing the possibility of more people using the infrastructure. Readable maps of the bicycle routes indicating the intersection crossings, parking stations, maintenance hubs, and recharging points will make people aware of the services, making it an attractive hassle-free transport mode. Indicative signposts, boards and maps in the strategic nodes of Dhaka University and the Ramna area will provide relevant and up-to-date information to cyclists for a comfortable commute within the campus and surrounding neighbourhoods.

Bike-sharing schemes or bike rental services are an effective strategy in increasing bicycle modal share. The roads of Dhaka University already have JoBike as the first and only public bike-sharing service in the vicinity, and it is popular among the students and teachers in the area. It can broaden its service to the nearby localities and motivate people to adopt cycling at an affordable price, reducing traffic congestion during peak hours and travel from other parts to the city centre.

4. Communication and behavioural changes

Bicycles often evoke a negative connotation as they are considered old-fashioned, dangerous, and inconvenient in the urban streets of Dhaka. Integrated planning and better infrastructure alone do not promote cycling; rather, socialisation, awareness and a positive attitude towards riding bikes cumulatively contribute to the modal share. Creating a behavioural change among government employees in the district is a challenge. The state officials get the privilege of travelling in cars under government expenses. Therefore, cycling to their respective workplace is considered a sacrifice of their luxury. Only students are keen to travel by bike as they are cheaper than the available public transport in the vicinity. Regular campaigns, workshops, and seminars by cycling clubs and government authorities can create awareness about the available cycling facilities and their benefits. While formulating a bicycle strategy, surveys and participatory processes gives insight into public's view and opinion that will advance the planning process and create an inclusive public-supported bicycle policy for everyone.



| | Coherence | Directness | Safety | Comfort | Attractiveness |
|--|--|---|--|--|---|
| Bicycle as a feeder mode | It will create an inclusive multimodal system, with coherent connections between non-motorised modes and the proposed MRT. | | | Long-distance trips will be easier to complete, for people coming to work from other parts of the city to the government offices in the city centre using bikes when part of the journey is carried out with public transport. | |
| Traffic calming and restricting | | | Restraining and restricting motorised vehicles will give more space for the cyclists, ensuring safety in the otherwise busy Shahbag-Motsho bhaban route. | Traffic calming methods will reduce vehicular congestion, thus cycling will be comfortable without the emission of greenhouse gases in the extremely congested Shahbag intersection. | Both traffic calming and traffic limiting measures will keep the serene environment of the Dhaka university campus and the adjacent Ramna and Suhrawardy Uddyan intact, making cycling more attractive. |
| Separate bike lane | An integrated network of separate bike lanes will create a cohesive system of bicycles within the inner-city vicinity of Shahbag and Dhaka University. | Separation of routes promotes faster travelling as there are less obstructions and intersections. | Separating bicycles from motorised vehicles will ensure safety, especially in the highly congested road of Shahbag-Motsho Bhaban. | Not having to compete for road space will make cycling comfortable for students and office employees of the area. | |
| Using pedelecs and e-bikes | | | | Since they require less effort to operate, they are more comfortable to ride than conventional bikes, and government employees who are inclined to use cars for comfort can switch to this alternate option | These are gaining popularity in the Dhaka market as they remove the negative connotations of traditional bikes. They are faster and easier to operate. |
| Improved parking facilities | | | | Secured and adequate parking will ensure more people, especially students, cycling with ease and comfort | |
| Public bike sharing scheme | | | | Renting bikes is more convenient for people who want to avoid bike maintenance costs. Students are keen to use the service as it is cheaper and easily available within the Dhaka University premises. | |

Table 2: Summarising the policy frameworks within the five essential criteria of cycling infrastructure

Source: Prepared by author, 2021.

This part attempted to outline the proposed policies to increase the bicycle modal share in the inner neighbourhoods of Dhaka.

The strategies are listed within the framework of the five essential criteria of cycling inclusive transport planning, coherence-directness-safety-comfort-attractiveness.

CONCLUSION

This paper attempted to give an overview of the current mobility situation and the role of the bicycle in Dhaka to propose strategies for enhancing its position in the modal share as a sustainable vehicle within the central parts. This final section will summarise the findings of the mobility analysis of Dhaka, the potential of developing a bicycle-friendly network and the policies to enhance its modal share.

Highly dense urban settlements such as Dhaka, with fast economic progress, lack of an inclusive planning and poor public transport, insufficient road space for both motorised and non-motorised modes, and no car restraining initiatives, cause dreadful traffic congestion and pollution. Hence, the city requires an alternative transport mode, such as bicycles, which are sustainable and space-efficient to eradicate the rising mobility issues. Like most developing Asian cities, Dhaka depends on non-motorised modes, public transport and paratransit vehicles. Despite low motorisation levels, the streets experience severe traffic congestion and contribute to the large volume of greenhouse gases and air pollution.

The complex hierarchy of transport regulatory authorities and lack of integrated planning policies contribute to the city's inefficient mobility system. The city has modified its land use functions over the years to accommodate the growing demand for public facilities, and converted into mixed-use sectors, developing into a compact and highly dense urban morphology. The mixed-use phenomenon has increased short-distance trips mostly completed by rickshaws. The increased traffic flow into the streets has reduced the overall traffic speed to 4.5 km/h, even slower than riding bicycles on Dhaka roads. The small number of poor-quality public buses are always overcrowded, behind schedule, and do not have designated stops for the passengers, making the entire system inefficient.

Bicycles have gained popularity over the years as they move past traffic congestion and easily access the narrow lanes of the neighbourhoods, saving both time and transport fare for the users. Nevertheless, the lack of integration between the different transport modes keeps the cycling trend from utilising its full potential. Bicycles are used for a complete journey which is difficult in the case of longer distances. Although Dhaka has recently constructed bike lanes in two different neighbourhoods, they are disconnected from the entire transport network and remain occupied by vendors or illegal parking.

Before formulating policies, it is essential to identify the potential of cycling. The central part of Dhaka is a place that has seen a growth in cycling among the population. It is the city centre with public functions, green open spaces, and administrative and educational facilities, and famous for its historical and cultural buildings within walking distance. The neighbourhood has frequent bus services to accommodate people commuting for work or study in the district. However, due its administrative importance, numerous cars enter the area causing severe traffic congestion in the crucial nodes. The architecture of the university campus facilitates cycling and walking, and some people have already adopted using bicycles to avoid morning and evening traffic jam in this area. JoBike, a public bike-sharing scheme within the university campus also encourages students to cycle in the neighbourhood.



Photo credit: Kabiur Rahman Riyad, Dhaka, Bangladesh, 2022.
<https://unsplash.com/photos/bbqFB16vY5U>

The research emphasised the importance of finding solutions for the highly dense and traffic-congested Dhaka. Therefore, the question arises:

How can Dhaka increase its modal share of bicycles and formulate a cycling-inclusive policy framework?

The paper focused on finding strategies to promote cycling in the inner neighbourhoods of Dhaka. Analysing Dhaka's mobility situation and the city's inner core, the potential for incorporating bicycles in the current mobility scenario provided the basis for formulating the regulatory framework. The recommendations suggested integrated transport planning, infrastructure development, improving services and behavioural change, framed around the five essential criteria for cycling-inclusive transport planning.

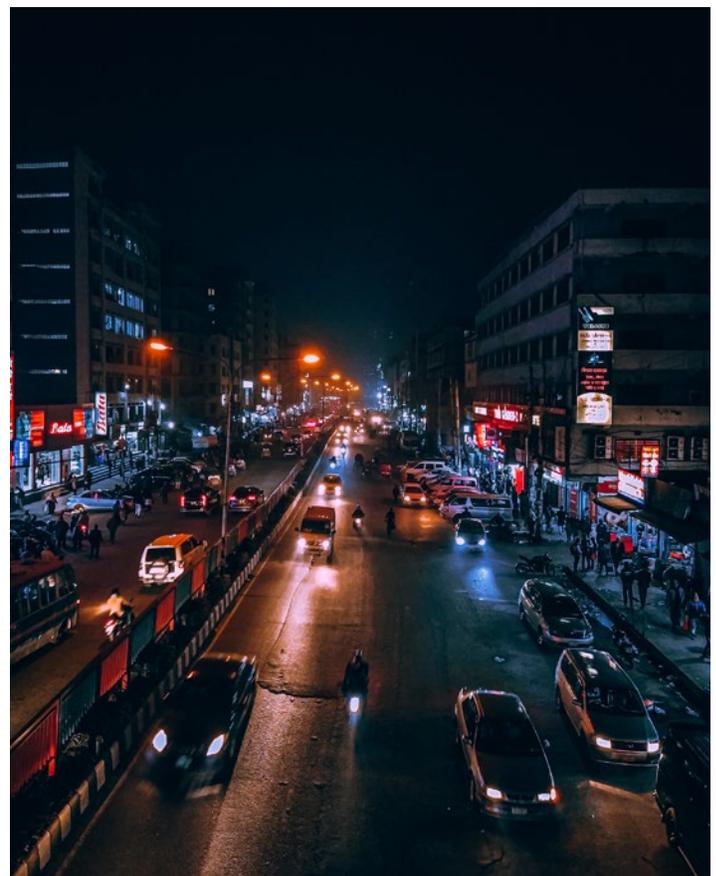
- 1. Planning is essential for promoting bicycle usage, and incorporating bicycles with public transport increases their modal share. In a successful cycling network, connecting bicycles as a feeder mode ensures a multimodal chain in the system, where cycling can be a part of the journey.**
- 2. To ensure safe cycling, it is crucial to have separate bike lanes to avoid collisions with motorised vehicles. Traffic calming methods also create safe streets by reducing the number of automobiles entering. For the inner neighbourhoods of Dhaka, these initiatives can have a positive impact on the growing cycling trend in the serene university campus.**
- 3. Introducing e-bikes may attract more potential users, such as office employees who find cycling a physical a task. Public bike-sharing schemes are also efficient initiatives for people interested in cycling without maintaining a personal bike.**

The policies mentioned are co-dependent, and implementing only one will not deliver the expected result, as we have seen in Dhaka's recent construction of isolated bike lanes.

Therefore, it is essential to develop an integrated system to achieve the maximum modal share of bicycles within the inner vicinities of Dhaka.

Formulating the policy framework of strategies that will increase the modal share of bicycles in the inner parts of Dhaka requires an in-depth analysis of the existing mobility situation. The lack of information explicitly regarding cycling and its modal share was a limitation of this research. However, the suggestions presented in this paper are a compilation of the analysis of the available data on the mobility situation and effective policies from the case examples discussed in the literature review.

The expansion of Dhaka requires integrated strategies that are efficient in reducing traffic congestion and pollution, and in serving the growing population with a comfortable, safe and affordable transit system. The city needs alternate transport modes, such as bicycles which are sustainable, space-efficient and faster in the streets alongside the proposed mass public transport network. As the trend of cycling grows, it strengthens the fact that cycle-friendly infrastructure and services are essential for further increasing the cycling modal share in the streets of Dhaka.



Ahnaf Tahsin Rafi, Dhaka, Bangladesh, 2020.
https://unsplash.com/photos/1S-ciO_0dO

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Photo credit: Tanvir Islam, Dhaka, Bangladesh, 2019. <https://unsplash.com/photos/4SDtJV3Rbsl>

NORTH WALES REPORT

A REPORT FOR THE NORTH WALES TRANSPORT COMMISSION

International Best Practice and Innovation in Transport of Direct Relevance to Policy Development in North Wales

By John Whitelegg

February 2023

INTRODUCTION

The Welsh Government has adopted a new transport strategy¹ that puts social justice, climate change, public health, local economy and future generations at the heart of transport policy. This is fully in line with European best practice on integrated and co-ordinated transport policies to deliver the widest possible range of benefits.

The Wales Transport Strategy, sets out a vision for an accessible, sustainable and efficient transport system that:

- contributes to a more equal Wales and to a healthier Wales, that everyone has the confidence to use.
- delivers a significant reduction in greenhouse gas emissions, maintains biodiversity and enhances ecosystem resilience, and reduces waste.
- contributes to our wider economic ambitions, and helps local communities, supports a more sustainable supply chain, uses the latest innovations and addresses transport affordability.
- supports the Welsh language, enables more people to use sustainable transport to get to arts, sport and cultural activities, and protects and enhances the historic environment.

The Welsh Government has moved strongly to implement this new direction in its support for major public transport improvements, cancelling road building projects², adopting a national 20mph speed limit on residential roads and improving bus-rail connections.

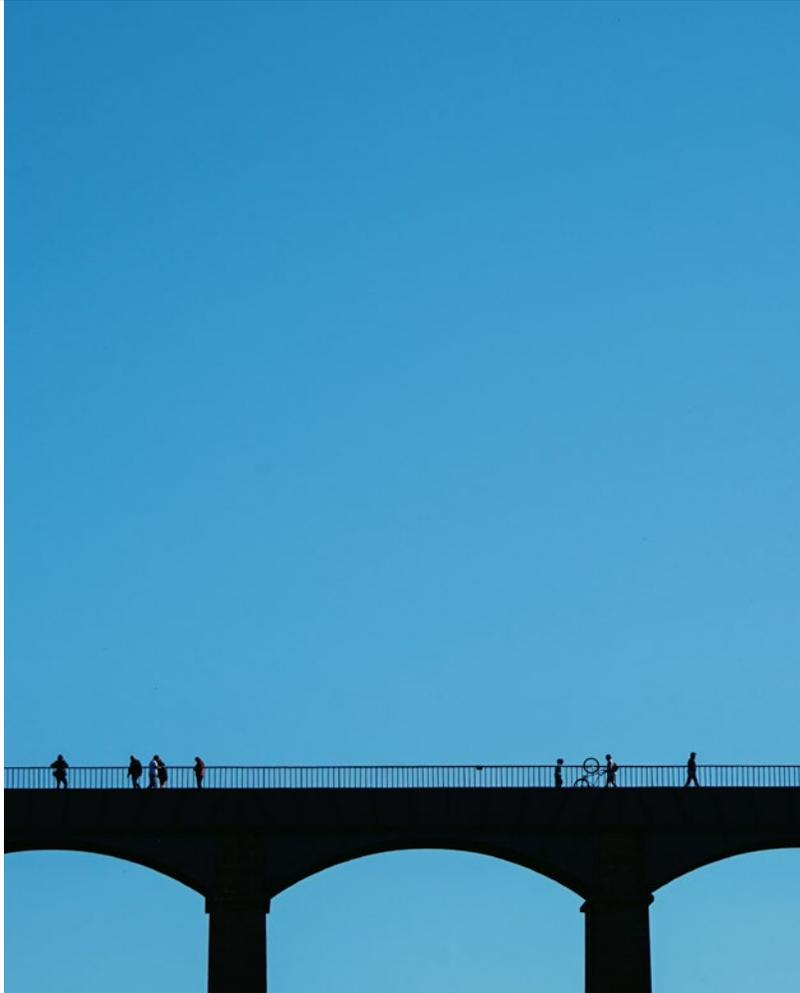


Photo credit: Catrin Ellis, Pontcysyllte Aqueduct, Station Road, Trevor, Llangollen, Wales, 2021. <https://unsplash.com/photos/mLF18yYhNyg>

Only 15 of the schemes examined by the roads review panel – an independent expert group tasked with assessing more than 50 road-building projects – were given the go-ahead, with the remainder scaled back, postponed or scrapped altogether³.

The North Wales Transport Commission was appointed by Welsh Ministers to consider modal shift opportunities in the region. The Commission wished to learn from best practice in mainland Europe and commissioned John Whitelegg to summarise that best practice and apply it to the distinctive geography of North Wales and its 600,000 residents.

¹ Llwybr Newydd: the Wales transport strategy 2021 | [GOV.WALES](https://gov.wales)

² Welsh Government response to the Roads Review [HTML] | [GOV.WALES](https://gov.wales)

³ Welsh road-building schemes scrapped following climate review | ConstrucNon News

⁴ Rural / urban definiNon (England and Wales) - Office for NaNonal StaNsNcs (ons.gov.uk)

REPORT SUMMARY

The report brings together best practice in Germany, Sweden, Switzerland and Denmark and uses that information to inform policy choices at different geographical scales following the definitions used by the Office for National Statistics⁴.

- Urban (population over 10,000)
- Town and Fringe
- Village
- Hamlet and isolated dwellings

The report scrutinises and evaluates best practice in European transport policy and distils that large body of evidence into specific measures and interventions that are directly relevant to the distinctive geography of North Wales. The report discusses important issues around knowledge transfer and learning from best practice e.g., what would it cost and is there an evidence base confirming that the measures and interventions deliver on important policy objectives e.g., reducing carbon emissions, supporting local economies, improving health and social justice and delivering value for money.

The evidence base on best practice in Germany, Sweden, Switzerland, Denmark and Austria is clear. A transformation to a desirable future based on the widest possible application of best practice is possible and essential to deliver on climate change, public health and local economic viability objectives.

The report notes that the measures and interventions discussed are directly relevant to the policies and objectives in the Wales Transport Strategy. The report concludes that ten specific transformational changes could be made across all aspects of transport provision, budgets, modal choice and behaviour.

The North Wales Transport Commission will use this report and the highlighted measures in making its recommendations for the Welsh Government.

THE 10 “TRANSFORMATIONAL CHANGES”

1. A clear organisational system based on the German Verkehrsverbund which is very similar to the Swedish and Swiss regional transport systems, and it replaces the disorganised, fragmented, under-funded and privatised approach that is enthusiastically followed in England.
2. Significant improvements in public transport provision along the lines of those in place in Switzerland with defined services levels of bus frequency by settlement population size plus pulse timetabling (Switzerland), with all bus and local rail services co-ordinated and integrated.
3. Significant and attractive public transport offers e.g., the German 49 Euros per month that covers all bus, local rail and tram options and the end of buying separate tickets for separate legs of journeys.
4. The full-scale adoption of Mobility as a Service (MaaS) to inform and precipitate large scale voluntary behaviour change in transport choices from privately owned cars to walk, cycle, car-share and public transport.
5. The Konus card giving free public transport to tourists/visitors and paid for (partly) by a tourist tax. This, if adopted, would be applied in the Snowdonia National Park.
6. Fiscal reform to generate income to pay for significant upgrades to public transport e.g., road pricing and work place parking levies (Nottingham)
7. Best practice monitored travel plans covering all schools, colleges, hospitals and new housing areas.
8. Car-free housing on the German, Swedish and USA model.
9. Significant upgrades to all pedestrian facilities including car-free streets and conformity with the principles of the International Charter for walking⁵
10. Significant upgrades to cycling facilities and infrastructure in conformity with the Dutch Cycling Embassy guidelines⁶:
 - a. Hardware: physical elements of the built environment – infrastructure
 - b. Software: mental and virtual elements – ideas, plans, policies, programs, laws
 - c. Orgware: organizational and institutional elements – administrations, governments

⁵walking-charter-document-2020.pdf (walk21.com)

⁶Dutch Cycling Embassy - Think



NEXT STEPS

The report aims to inform the North Wales Transport Commission of the rich, evidence-based opportunities for transforming transport and to apply that list to the special geography of North Wales. It recognises that Wales (unlike England) has already moved significantly in that direction and has a sound policy base in the 2021 transport strategy (Llwybr Newydd) to deliver its detailed policy interventions. It is understood that a final selection of detailed measures and interventions is for the Welsh Government, balancing budgets and priorities along with the demands of its distinctive regions and geography. The international experience described in this report can inform that process but cannot second guess the shape of the outcome.

The Welsh Government has demonstrated that it has the capabilities and policy judgment to get this right and the story so far is very encouraging indeed.

Author Details:

Professor John Whitelegg is a visiting Professor in the School of the Built Environment at Liverpool John Moores University and a transport consultant. His PhD was in industrial location theory and change over time in the opening, closing, decline and growth of the firm. He has worked on transport projects for over 40 years, written 10 books on transport and was the former editor of the journal “World Transport Policy and Practice”.

His projects include ex-post evaluation of job creation and inward investment following new highway and motorway investments, the impact of new highways on air quality and greenhouse gases and the performance of non-highway building measures on reducing congestion and pollution and stimulating local economic performance.

Photo credit: Catrin Ellis, View from Llangollen Bridge in North Wales Llangollen, Wales, 2023. <https://unsplash.com/photos/9T8uTmgxOE>

Transport for humans. Are we nearly there yet?

Written by Peter Dyson and Rory Sutherland | Reviewed by John Whitelegg

London Publishing Partnership • 2021 • 312 pages • ISBN: 978-1-913019-35-8

Transport for Humans' premise is that "People are not cargo. We choose how and when to travel, influenced not only by speed and time but by habit, status, comfort, variety – and many other factors that engineering equations don't capture at all. The greatest hope for a brighter future lies in adapting transport to more human wants and needs."

This book is well-written and illuminating regarding the need for **behavioral changes** but it misses the key dimension of **how public policy and spending shapes and determines transport choices**. If we have a situation in the United Kingdom which allocates the bulk of public spending on policies that support and promote car use, we will get more car use and low levels of public transport and cycling. If we adopt the Freiburgian approach based on superb, high quality, totally integrated public transport, superb walking and cycling infrastructure, car-free housing, reduced and expensive car parking, and a largely traffic-free centre, we get the 72%-28% split in favour of non-car use.

Freiburg-im-Breisgau in Germany latest data on mode choices shows that car use (MIV) accounts for 28% of all trips in the urban area while 72% of trips are by walking (Fuss), cycling (Fahrrad) and public transport (OPNV). Indeed cycling has increased since 1982 from 15 to 28% as shown in the chart below.

| Mode Split Trend - Freiburg im Breisgau, Germany | | | | | |
|--|------|------|------------------|---------|-------------|
| | Walk | Bike | Public Transport | Carpool | Drive Alone |
| 1982 | 35% | 15% | 11% | 9% | 29% |
| 1999 | 23% | 27% | 18% | 6% | 26% |
| 2020 | 24% | 28% | 20% | 4% | 24% |

Source: Stadt Freiburg im Breisgau, Germany: Planning / Transport Department; Bautz & Zelle, 2011.



It is helpful and correct to adopt a behavioural approach and emphasise the importance of how human beings choose how they travel but it is at best a partial approach if it misses the Freiburgian approach. This approach has also been adopted in Lund (Sweden), Amsterdam, Vienna and, Swiss urban and rural areas.

It is disappointing that this well-written book is silent on the rich menu of measures and interventions that deliver sustainable transport choices by funding those choices and sending strong signals that there are ways of delivering accessibility, public health, zero carbon, and local economic successful outcomes.

The rich menu of “10 transformational changes” is described in detail in Whitelegg (2016) and in the report of the South Shropshire Climate Action project (SSCA, 2021) (Editor’s note: reprinted in this issue in Summary of the Report for the North Wales Transport Commission). These reports also contain 15 suggestions for changes in public policy that will shift transport choices away from the car and towards the alternatives to the car and in ways that influence behaviour and promote that shift. These include proven, evidence-based measures. The public policy changes are also the basis for the Welsh Government’s totally integrated approach to shaping a transport future that embraces serious attention to human behaviour, canceling new road building and promoting sustainable alternatives to car trips by shifting funds to walking, cycling, and public transport and by adopting a nation-wide 20mph (30kph) policy on roads and streets where people live to support that policy (Welsh Government, 2021).

The book is well-worth reading but if the objectives of public policy are to include zero carbon, zero air pollution, zero deaths and serious injuries in road traffic and dramatic improvement in quality of life for all urban and rural residents then the primary need is for a **transformation of public policy and spending** to deliver these objectives. **Behavioural change will follow public policy change and will not happen otherwise.**



Photo credit: Michelle DeRobertis, Freiburg, 2009.

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His projects include ex-post evaluation of job creation and inward investment following new highway and motorway investments, the impact of new highways on air quality and greenhouse gases and the performance of non-highway building measures on reducing congestion and pollution and stimulating local economic performance.

Good to Go? Decarbonising Travel After The Pandemic

Written by David Metz | Reviewed by John Whitelegg

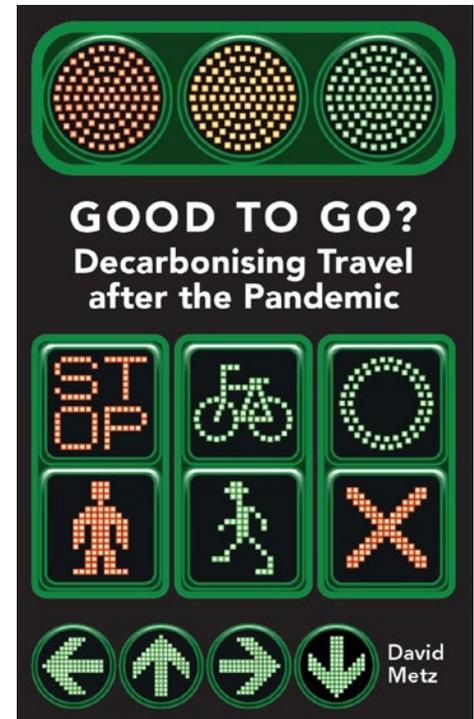
London Publishing Partnership • 2022 • 224 pages
ISBN 978-1-913019-61-7

This is an excellent but flawed contribution to an important public policy area by an author well-placed to comment on trends in transport choices and outcomes and the relationship between those outcomes and how we set policy priorities and what we spend. Metz was the chief scientist at the Department of Transport (UK Government) during its period of neglect of walking, cycling, and public transport and its billions of pounds of spending on road schemes that ignored science and facilitated the vigour of induced traffic (New roads generate new traffic).

A (negative) feature the book has in common with many transport experts involved with the gestation and development of UK transport policy, is that it does not deal with (and learn from) international experience and the large well-documented successes in reducing car traffic and boosting walking and cycling in best-practice countries. A few days spent in Freiburg-im-Breisgau in Germany, Lund in Sweden, Vienna, a Dutch urban area, or a Swiss rural area would reveal the enormous potential of what we can do to change travel behaviour so that it delivers key public policy objectives that embrace public health, social justice, climate change and an end to the 40,000 deaths every year (UK) related to air pollution, the bulk of which is produced by vehicles and not cement factories.

This is still an interesting and exciting book but it does not provide a clear alternative to the British attitude to transport policy.

The British attitude is characterised by unintelligent privatisation of public transport, lack of clear systems for creating and promoting integrated public transport (e.g. the German "Verkehrsverbund"), rejection of Vision Zero (Sweden), rejection of 20mph as a national policy that reduces road deaths and injuries, and accepting very poor quality public transport in rural areas. Why is my last bus on a weekday from Bishop's Castle to Shrewsbury (Shropshire) timed at 1530? Why is the Shrewsbury bus station locked and shut with no buses on Sundays and public holidays? Why is there no ticket that will cover my combined bus and train journey? Why do train stations like Church Stretton in Shropshire never see a bus? Have any senior civil servants or politicians taken the trouble to observe, experience, and compare what happens in best-practice countries with what happens in Church Stretton and hundreds of similar places in England?



In Dornach, Switzerland buses, trains, and trams meet each other, passengers can move effortlessly from one mode to another while using one reasonably-priced ticket to complete the entire journey. Interchanges (transfers) are made very easy. Even villages and communities with less than 1000 residents are well-served by public transport. I congratulate Metz on his comments on road building (pp75-78): "new road capacity fills up with more traffic"; but why do we still have unintelligent and evidence-free funding of new roads like the utterly useless Shrewsbury North West Relief Road? Do senior civil servants inform government ministers of the overwhelming evidence that a new road or bypass will not reduce congestion and will not generate new local economic success?

Sadly Metz makes a number of broad generalisations that damage the chances of shifting policy,

spending and trips away from the car and towards walking and cycling e.g. “promoting cycling as an alternative to the car is an uphill task and all the more so for walking which is the slowest transport mode and therefore the least effective in achieving the access to which we have become accustomed” (P157)

This is wrong on several counts. Promoting cycling is not at all difficult and a short stay in Germany, Denmark, or Lund in southern Sweden will reveal all. What is difficult is changing mindsets and Metz does not tackle the defective mindset of many (not all) UK politicians when there is a discussion of cycling. The access point is also wrong. We **can** have spatial and planning policies that set out to maximise walking and cycling and reduce car use. Access is made worse by tens of thousands of new homes being built on greenfield sites miles from jobs, shops, and schools (all approved by local councilors) and this **can be** changed. A short visit to the car-free residential areas of Freiburg-im-Breisgau (Vauban and Rieselfeld) show how this can be done. Our national transport problems are made worse by language and rhetoric around “uphill”.

It’s a great pity that Metz does not refer to the splendid book by Carl Honoré (2004) ***In Praise of Slow***.

I congratulate Metz on his parking views (p151) ”prohibiting on-street parking”. The majority of councils encouraged by car-centric ideology in the Department of Transport adopt policies to increase parking provision in those places that desperately need traffic reduction. The co-

existence of expensive park and ride provision with free car parking on residential streets is a significant example of poor thinking, waste of money, and making things worse.

I congratulate Metz on his discussion of travel time savings (pages 59-60). The spending of billions of pounds of public funds on the basis of “saving time” and then inserting a monetary value for the time saved is a historical con trick of enormous proportions. It does however reveal one very simple change in the way we think about and justify transport spending and that is **we should totally abolish any discussion or calculation of time savings linked to flawed assessments of the value of that time**. Metz makes this point but does not reference the detailed empirical evidence that made this same point almost 30 years ago (Marchetti, 1994).

This is an important and well-written book but it falls short of spelling out exactly what we should do to fully explain the elusive potential of “synergy”. What can we actually do at national and local levels to reduce congestion, improve public health, achieve zero carbon transport, and deliver world-best public transport and cycling and do all of these things at the same time in the same place? Luckily the Welsh Government has started to do this and we have a rich menu of detailed policies that are already in place in other countries that do this (**Editor’s note: reprinted in this issue in Summary of the Report for the North Wales Transport Commission**) (Whitelegg, 2016 and 2023). Sadly Metz does not explain why other countries can do this and we (UK) can’t; it would be more than

interesting if—based on his (former) senior position in the Department of Transport—he could explain why **we are so very bad at doing the right things and so very good at making things worse**.

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UK English vs American English

We have made the editorial decision to let authors write in the English of their choice. We will not be editing word choice or spelling to either UK English or American English; we will retain the English style chosen by the author. This means that English usage may be inconsistent within a single issue. Therefore we provide this legend of primarily transportation terms to help not only non-native speakers but native speakers as well. However in the interest of clarity, we will try to put **sidewalk** in parentheses after the British use of **pavement** since these two words have opposite meanings in American English.

| UK | USA | Canada |
|---|--------------------------------|--------------------------------|
| Word choice | | |
| pavement | sidewalk | sidewalk |
| road surface | pavement | pavement |
| motorway | freeway, interstate | freeway |
| dual carriageway | divided highway | divided highway |
| main road | highway | highway |
| coach | bus | bus |
| Petrol, diesel | gas/gasoline | gas/gasoline |
| public transport | public transportation, transit | public transportation, transit |
| lift | elevator | elevator |
| boot (of a car) | trunk (of a car) | trunk (of a car) |
| bonnet (of a car) | hood (of a car) | hood (of a car) |
| barrister, solicitor | attorney, lawyer | attorney, lawyer |
| Lorry, artics/semi-trailer ⁽¹⁾ | Truck ⁽¹⁾ | truck, semi ⁽¹⁾ |
| return (ticket) (transit context) | round trip | round trip |
| underground; underground railway ⁽²⁾ | Subway ⁽²⁾ | subway, metro ⁽²⁾ |
| puncture | flat tire, flat | flat |
| tyre | tire | tire |

| Spelling | | |
|--|-------------------------------------|-------------|
| kerb | curb | curb |
| -ence (defence, licence, offence) | -ense (defense, license, offense) | follows USA |
| -our (colour, honour, labour, neighbour) | -or (color, honor, labor, neighbor) | follows UK |
| -ise; (e.g., prioritise, organise) | -ize (prioritize, organize) | follows USA |
| - yse (e.g., analyse) | -yze (e.g., analyze) | follows USA |

⁽¹⁾ Professional papers may differentiate between tractor-trailers, semis, and single-unit trucks

⁽²⁾ Term used is very colloquial, i.e. Tube in London, Subway in New York, the "L" in Chicago, the "T" in Boston, Metro in Washington DC. Much of Western Europe, regardless of language, calls it metro, or at least understands the word.



Photo credit: Petr, Kratochvil USA Flag In New York Flag of United states in the streets of New York
<https://www.publicdomainpictures.net/en/view-image.php?image=284031&picture=usa-flag-in-new-york>