World Transport
Policy and Practice

JOURNAL

COVER PHOTO:
Rainy streets of Porto, Portugal.
Photo: Bess Gaby

Male commuter wearing bike helmet walking away. Safe cycling in city, bicycle commuting, active urban lifestyle image. Photo credit Photoboyko, stock.adobe.com.

Mantova 2019 , by Michelle DeRobertis.

Traffic jam By PhotoSpirit, stock.adobe.com.

Rush Hour on the Dunsmuir separated bike lane, by Paul Krueger, flickr.com.

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ACKNOWLEDGEMENTS

Share The Road street sign on a California road, photo by Felipe Sanchez, stock.adobe.com.

EDITORIAL

Welcome to the second issue of the relaunched World Transport Policy and Practice.

First, we would like to acknowledge a past board member of many years, Eric Britton, who died last fall at the age of 83. A brief biography that does not give him all credit due is included in this issue. In addition to recruiting articles for WTPP too numerous to count, Eric contributed several articles of his own. Given that his most recent article in this journal, from 2011, is in line with the theme of two other articles in this issue, we have chosen to reprint it.

ZTL in Milan Italy, photo by Michelle DeRobertis.

While the other articles focus on reducing car use through physical and policy interventions that address the **vehicle**, Eric's paper, *Behaviour Change Travel Mode Choice Interventions to Reduce Car Use in Towns and Cities*, summarizes what policies are needed to influence **human behavior** change. He stresses one of my basic conclusions regarding mode choice: we cannot expect people to choose alternate modes to cars if the other choices are significantly less attractive or, like transit all too often, there is no alternative available.

Although I never met Eric Britton, in reading his resume I realized that for a time we were physically in the same city, seeing as he taught at Mills College in Oakland California. And it turns out that our six degrees of separation are really only three: he knew Wolfgang Zuckermann well; Wolfgang was Alex Zuckermann's brother; and I knew Alex through bicycle advocacy organizations in Oakland (East Bay Bicycle Coalition (EBBC) and Regional Bicycle Advisory Committee (ReBAC), both of which Alex cofounded). Years ago,

I bought Wolfgang Zuckermann's book *End of the Road: The World Car Crisis and How We Can Solve It* (*Chelsea Green Publishing, 1991*); in the Acknowledgements, Wolfgang mentions EcoPlan, Eric Britton, John Whitelegg and Jeffrey Kenworthy. Little did I know then that I would come to know all three, at least virtually, and that I would be editor of the journal to which they all contributed extensively and serve(d) on the Editorial Board.

Brankospejs, Traffic jam in the rush hour. Cars at the traffic junction. Overpopulation concept, stock.adobe.com.

This issue also presents the second part of the series begun in the last issue about the many and various Urban Vehicle Access Restriction (UVAR) strategies used in Europe. This second article discusses the European Union ReVeAL project and tool to help cities know which are the most appropriate to implement given their conditions and objectives. To accompany this article, we have included a brief history of one of the earliest UVAR strategies, the Italian traffic-limited zone (ZTL).

"Before beginning a Hunt, it is wise to ask someone what you are looking for before you begin looking for it."

- Winnie-the-Pooh, A.A. Milne.

In addition, this issue presents research by Charles Rivasplata on how Santiago Chile could better integrate biking with its transit system.

Finally, in this issue we present the following book: **Rights in Transit: Public Transportation and the Right to the City in California's East Bay** by Kafui Ablode Attoh. Attoh presents rights to transit not as a civil right, but as a right to the city. He cites the work of Henri Lefebvre and Peter Marcuse and the notion of accessing the city and its important places of encounter and exchange. This overlaps with the theme of the relationship between transportation decisions and livability that is covered in this issue.

Happy reading.

Michelle DeRobertis

Editor

www.andysinger.com

ReVeAL: A TOOLKIT TO HELP YOUR CITY DEVELOP GOOD PRACTICE URBAN VEHICLE ACCESS REGULATIONS (UVARS)

Lucy Sadler, Bonnie Fenton, and Sofia Pechin

ABSTRACT

Urban Vehicle Access Regulations (UVARs) are a useful tool used widely in Europe that help the move towards people-friendly cities and help reduce transport's climate impact. They include pedestrian zones, low emission zones, congestion charging, traffic limited zones, pedestrian priority zones and spatial interventions. The ReVeAL project produced a toolkit to support authorities developing UVARs, developing and trialling it with 6 cities. This article outlines how other cities can use the ReVeAL toolkit to develop good practice UVARs, to help take urban road and parking space from motorised vehicles, and give them to people and sustainable mobility.

KEYWORDS

Pedestrian zone, limited traffic zone, low / zero emission zone, congestion charge zone, spatial interventions.

BEHAVIOUR CHANGE TRAVEL MODE CHOICE INTERVENTIONS TO REDUCE CAR USE IN TOWNS AND CITIES

Eric Britton

ABSTRACT

This is an edited reprint of the transcript of Eric Britton's comments to the House of Lords Science and Technology Select Committee's subcommittee, to "investigate the use of behaviour change interventions to achieve policy goals...... to alter travel mode choice in order to reduce car use in towns and cities. It presents Mr Britton's frank assessment of British transport policy and what can be done to influence human behavior when it comes to mode choice.

KEYWORDS

Mode choice, British transportation policy, reduced car use.

A BRIEF HISTORY OF TRAFFIC-LIMITED ZONES (ZTL)

Michelle DeRobertis

ABSTRACT

This article provides a brief history of the Italian traffic limited zone (zone a traffico limitato-ZTL) as well as some of the other interventions to control traffic that were happening in other countries in the 1970s, to address the incursion of cars in city centers.

KEYWORDS

Limited traffic zone, pedestrian zone, reduced car use, spatial interventions, sustainable transport policy

INTEGRATING BICYCLES AND PUBLIC TRANSPORT IN THE DEVELOPING WORLD: THE CASE OF SANTIAGO, CHILE

Charles R. Rivasplata

ABSTRACT

The primary purpose of this study is to review the potential for greater bicycle-public transport integration in the developing world by exploring strategies for encouraging multimodal connections in Santiago, Chile. The provision of bicycle transport facilities at major public transport hubs can offer an alternative to

walking or driving distances of a kilometre or more. In addition, it can broaden the catchment area of public transport, adding the convenience of door-to-door (last-mile) travel not always available to passengers. A better understanding of opportunities and barriers surrounding bicycle access to public transport is essential in implementing any multimodal plan. However, whilst bicycle-public transport integration has been achieved in many cities of the industrialised world, its application has been limited in developing cities, where the predominance of private operators often makes it difficult to coordinate a systemwide program. In addition, the relative lack of capacity on most systems—particularly during peak periods—makes it virtually impossible to fit bicycles on public transport vehicles. What are the alternatives for facilitating connections between bicycles and the public transport system?

Mumbai, Buenos Aires, São Paulo and Santiago are examples of (middle income) cities where bicycle transport has been promoted and bikeshare systems have been implemented in recent years. However, whilst these systems and simultaneous efforts to extend bicycle infrastructure have further encouraged the use of bicycles, attempts to integrate these systems with public transport have been somewhat limited. For example, bikeshare systems have located facilities at several locations, including near rail stations, but in most cases, have not actively collaborated with planners and public transport operators to design convenient and accessible connections to rail and bus systems. Perhaps, if there were closer collaboration, the catchment areas for public transport systems in these cities could be further extended, yielding important transport benefits (e.g., greater mode choice, time savings and congestion relief to roadways and capacity-constrained bus systems).

This research will identify past efforts to integrate bicycle and public transport uses and obstacles preventing bicycle-public transport integration from further advancing. A mixed-methods approach will employ a literature review of bicycle-public transport integration in the industrialised and developing worlds; and will trace recent progress in Santiago through past reports and articles, as well as present the results of interviews with bicycle transport experts there. In addition, findings from a survey of bicycle users accessing public transport in San Francisco will also be explored, as its integration efforts have many issues in common with those of Santiago. Ideally, this study will provide insight into existing institutional barriers; as well as strategies for encouraging greater collaboration between bicycle planners, public transport operators and user groups.

KEYWORDS ....

Bicycles and public transport, Chile, Bikeshare, integration, multimodal, catchment.

Eric Britton: In Memoriam

By Michelle DeRobertis

Eric Britton (aka Francis E. K. Britton) was a founding member of the editorial board of WTPP. He had a long and influential career until his death on October 31, 2021 at the age of 83. He was ahead of his time in many ways and given his valuable role in this publication, we would like to inform our readers of his life, influence and many accomplishments.

Born in the USA, he was educated at Amherst College and Columbia University and conducted some of his doctoral research in France and Italy. After a brief stint as a lecturer in the Economics Department at New York University (1964-65) and then the History Department at Mills College, Oakland, California (1963-64), he crossed the Atlantic. He was a Fulbright fellow and did advanced research in planning at the University of Rome and at the Ecole des Hautes Etudes, Paris, 1967-69. He also received a certificate in Urban and Regional Planning in Salzburg (1968).

While in Paris, he joined with others to found EcoPlan, a consultancy focussed on sustainability and the challenging interrelated issues of economic development and public policy, technology and society. At EcoPlan, among other things, he was Managing Director of The Centre for Technology & Systems Studies.

According to John Whitelegg:

"For over 30 years, Eric was a source of excellent observations and policy suggestions that deliver sustainable transport and its widest possible outcomes for reducing carbon emissions, reducing air pollution and advancing the case for high quality living environments. He was without doubt decades ahead of almost everyone on most of the issues around sustainable transport and mobility. From a very early stage in the life of World Transport Policy and Practice (the first issue was 1995), Eric contributed material, provided editorial advice and kept several thousand subscribers to his EcoPlan web site informed about the journal."

Eric was one of the first to propose a Car-free Day or "Day Without a Car" when he presented at the World Conference on Accessible Cities, held in Toledo, Spain in 1994. Originally conceived as a local initiative, it has transitioned into larger initiatives, such as in 2000, when the European Community joined the call for a worldwide car-free day by agreement of all the inhabitants of a region.

He was one of the first to write extensively about how, given the appropriate set of policies and structure, carsharing could make a significant difference. In the 200+ page report, ***Carsharing 2000 – A Hammer for Sustainable Development***, he began by listing the many excuses that are given about why it can't work and wrote:

> *"However, there is also a growing number of situations in which organizers are actually beginning to prove to the driving public that they can face and deal with these challenges. Bumblebees can fly. And so, as it happens, can carsharing. Which is what this report is all about."*

In September 1999, WTPP published this report as special issue 5.3. It is a perfect insight into his wide-ranging policy recommendations, and is available here:

 https://eco-logica.co.uk/pdf/wtpp05.3.pdf

In its introduction, John Whitelegg wrote:

> *"This collection of original material on carshare thinking and carshare practice conceived and led by my friend and colleague Eric Britton …..is not thus just one more technical contribution to what we might do to manage traffic a bit better than we have in the past. If we read it with care, we can see that it provides the raw materials of a map of how to begin transforming our cities so that mobility can be delivered in a way that meets fundamental ethical, economic, social and environmental objectives. It is about smart mobility, as opposed to stupid mobility. It is about re-engineering our thought processes, and not just about introducing some clever new idea by mechanical formula."*

Eric's passion and advocacy went well beyond the interests of this journal—transport policy. For example, in 1994 he and Wolfgang Zuckermann, with whom he worked at EcoPlan, launched "Consumer Holiday – The one day a year we turn off the economy and think about it". It was part of the development of the international ***Buy Nothing Day***, created a few years earlier in Canada.

Eric was also founding editor of World Streets, where some of his work is still available (for now):

https://worldstreets.wordpress.com/

In addition, Eric wrote or contributed to hundreds of reports and articles.

Two of his books included:

- *Rethinking Work: New Concepts of Work in a Knowledge Society* (Nov. 1996, CEC Brussels)
- *The Information Society and Sustainable Development* (MCB University Press, Bradford, UK, March, 1996).

As far as we know, there is no collected list of Eric's writings, presentations and contributions. If any readers of *World Transport Policy and Practice* are aware of such a list and can supply it to us, we will gladly publish it.

Eric was a tireless supporter of WTPP, publicizing new issues, recruiting authors and contributing articles.

He wrote of WTPP in 2009:

> *"It has been an exciting and encouraging association. And over this time, the Journal and its advocates have gradually moved from being very much a voice in the wilderness and now are stepping right into the critical mainstream of policy, practice and thinking in the sector. Which is exactly where we belong."*

Although Eric did not live to see WTPP relaunched, we know we have his unwavering support.

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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.

A man of words, and not of deeds, is like a garden full of weeds.

- English Proverb

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.

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.

Sidewalk at public park with city skyline at coast promenade in Panama City, by Hanohiki, stock.adobe.com.

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.

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.

ZTL de Turin 38, by RdA-CH, https://wordpress.org/openverse/image/6628b908-a90b-43a5-976e-e80ecf0b3576.

Woonerf in Paris, France, photo credit Michelle DeRobertis

REVEAL: A toolkit to help your city develop good practice Urban Vehicle Access Regulations (UVARs)

By Lucy Sadler, Bonnie Fenton, and Sofia Pechin

Introduction

As outlined in the article in the last issue (Issue 27.1- May 2022), many European cities restrict access to an area, road, or portion of a road to all, or to specific vehicle categories of, motor vehicle traffic. This is done to improve issues such as safety, health, the environment or mobility (e.g., reducing congestion or air pollution, or increasing sustainable mobility). When such restrictions are implemented in urban and metropolitan areas, they are referred in general terms to as **Urban Vehicle Access Regulations** or **UVARs.**

Over 700 UVARs are currently in place in over 500 cities across Europe. These are shown in Figure 1, with more details available at www.urbanaccessregulations.eu[1], where further details on these UVARs can also be found. If you have not yet read the UVAR article in the May 2022 issue of this journal[2,] we would recommend you do this, as it explains the five main categories of access restrictions. This purpose of this paper is to explain the ReVeAL project, **R**egulating **V**ehicle **A**ccess for Improved **L**iveability, whose aim is to help cities to add Urban Vehicle Access Regulations (UVAR) to the standard range of urban mobility transition approaches across Europe, by providing an online toolkit for cities considering UVARs.

Figure 1: UVARs across Europe as shown on www.urbanaccessregulations.eu

[1] Sadler 2022 www.urbanaccessregulations.eu

[2] World Transport Policy and Practice May 2022, Urban Vehicle Access Regulations (UVARs), Lucy Sadler, Cosimo Chiffi and Bonnie Fenton https://static1.square-space.com/static/619593021331d42c0b62a1c6/t/62868b9445dd3825612c-b8e4/1652984802401/WTPP27.1-May2022-HighRes+%2818mb%29.pdf

ReVeAL explained – the basics

Building Blocks

An UVAR can be a simple or a complex measure. In the ReVeAL method, we break each UVAR down into its component building blocks, to allow an UVAR to be developed that suits your city.

In order to understand what a complete UVAR "package" consists of, the ReVeAL project analysed a wide range of UVAR schemes to identify the constituent components of the scheme. 33 UVAR "building blocks" were identified that can be combined to create an UVAR package.

The building blocks were categorised into three measure fields:

1) spatial interventions

2) pricing aspects

3) regulatory measures

Spatial interventions

Spatial interventions change the physical space in the city, creating spaces where cars are not able/allowed/easy to pass through. These can include things like roadblocks, parklets or reallocation of road space to walking or cycling or speed limit reductions.

Speed reduction by design

Traffic filter
- Recirculation of traffic (e.g., one-way streets)
- Road block
- Capacity restraint

Reallocating parking space
- Parklet
- Drop-off zone shared mobility
- Logistics bay (mini-hub)
- Kiss&Ride (e.g., school)

Reallocating road space for pedestrian
- Widen pavement
- Pedestrian priority street or zone (e.g., mixed used cycling-pedestrian, residents vs. other groups and temporal pedestrian streets, woonerf or car-free school area)

Reallocating road space for cycling
- Cycle lane
- Cycling street

Reallocating road space for public transport
- Bus/Tram priority lane

Pricing aspects

Pricing aspects are measures that require people to pay for vehicle access to a given area. Pricing can apply to all vehicles in an area (e.g., a congestion charge) or certain categories of vehicles (e.g., a charge based on emissions standards or on vehicle size) and can also include parked vehicles (parking charges). Charging can be flat rate or differential.

Road charges/tolls
- Charge applied to perimeter or area (congestion charge)
- Charge applied to specific points
- Distance-based charge
- Time-based charge
- Permit charge
- Charge based on emission standards (pollution charge)

Parking charge
- Dynamic price (real time)
- Fixed price
- Based on emission standards (pollution charge)
- Workplace levy
- From on-street to off-street parking

Regulatory measures

Regulatory measures restrict the vehicles that have access to a given area using regulations or bans. Regulations may be put in place, for example, to reduce emissions (low-emission zone or zero-emission zone) or the amount of traffic (limited-traffic zone) or to improve safety (regulating by vehicle size or dimension). Non-complying vehicles are not allowed into the regulated area and their owner/users can be punished with a fine if they do enter.

Regulation by emissions
- EURO standard
- Zero-emission vehicles

Regulation by vehicle type/dimension
- Vehicle type (e.g., HDV/LDV, car, van)
- Dimensions (e.g., weight, length, width)

Regulation by trip purpose
- Delivery and logistics
- Through traffic ban (e.g., access to residents and specific users only)

Regulation by permit
- Permit to travel
- Parking permit
- Planning permit conditions (e.g., permit to build car park space)

Figure 2: UVAR building blocks and their categories, as defined in ReVeAL

and split these into 12 sub-categories. Building blocks can be combined within or across the three measure fields to create an UVAR package.

See Figure 2 for an overview of the ReVeAL building blocks.

For each of the 33 identified building blocks in Figure 2, ReVeAL developed building block fact sheets.

Each factsheet (see Figure 3) provides a definition, a description of its implementation, which building blocks work well with each other, a case example of its use and other useful information about it.

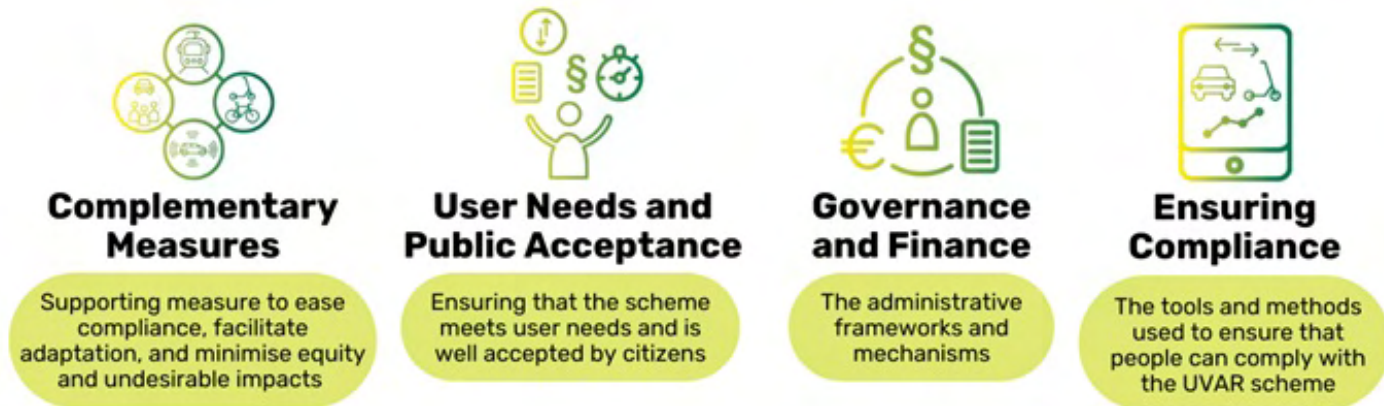*Figure 3: Factsheets on the different building blocks.*

Figure 4: ReVeAL's four cross-cutting themes

Cross-cutting themes

ReVeAL has also identified four cross-cutting themes that are relevant to all UVARs which are those aspects that need to be considered beyond the physical design and construction of the specific strategy (see Figure 4). The cross-cutting themes, *user needs and public acceptance, governance and finance, ensuring compliance,* and *complementary measures,* are cross-cutting in the sense that all UVARs need them, but the measures themselves are discrete measures that are combined with an UVAR, once a draft scheme has been developed.

The relationship between building blocks and cross-cutting themes can be visualised in Figure 5 below.

Cross-cutting themes

The cross-cutting themes are interwoven into each other, but have been grouped under the headings in Figure 4. While complementary measures are somewhat like building blocks, (i.e., individual measures that can be chosen and added to the UVAR scheme), the other complementary measures are more ongoing themes that need to be addressed in any UVAR.

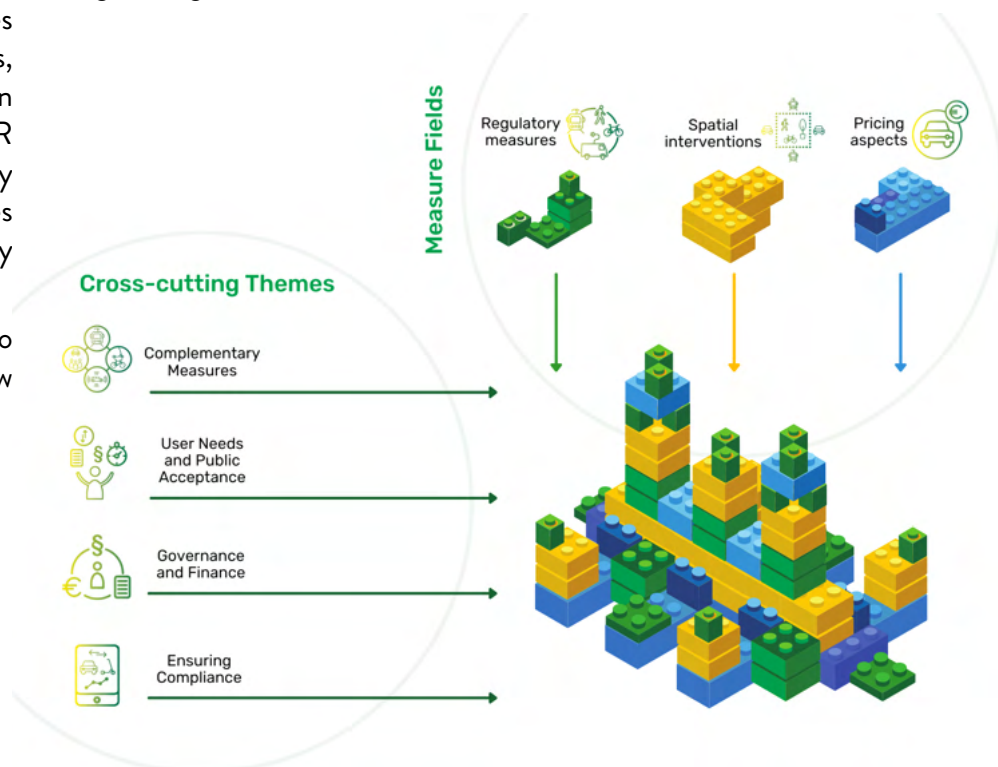The ReVeAL guidance[3] goes into these in more detail, but an overview is given here.

Figure 5: How the components of ReVeAL fit together

1. Complementary measures

A supportive complementary measure is an additional measure that complements a planned UVAR to ensure access of people, goods or services into the UVAR area while maintaining the goals of the UVAR, easing compliance and facilitating the best adaptation to the new reality. It can also serve to minimise any equity issues that may result from the measure it complements.

Complementary measures can be crucial to making an UVAR feasible and successful. The planned UVAR should be implemented with an integrated package of supportive complementary measures to improve cost effectiveness and the performance of the UVAR with respect to the declared goal and specific objectives. Complementary measures can, for example, enable trips to be taken by transport modes not affected by the UVAR, facilitate a higher level of compliance or help to avoid a disproportionate impact on disadvantaged groups.

Complementary measures can also increase public acceptance by showing citizens that the UVAR is not just about requiring a change in their mobility options, but that it is implemented as part of a full package that provides concrete solutions to those who are asked to change their behaviour.

ReVeAL has identified four categories of complementary measures. These are:

1. Complementary sustainable mobility measures
- Examples include additional public transport, increased or improved walking or cycling facilities, a consolidation centre, cycle logistics, micro-mobility, mobility hubs for different forms of shared mobility, a shuttle bus for those with reduced mobility or additional parking outside the zone[4]

2. Financial or in-kind incentives
- Examples include grants for retrofits or exchanging parking/access permits for sustainable mobility vouchers

3. Exemptions
- Examples include vehicles for people with disabilities, emergency vehicles, and – especially during the introductory phase – residents

4. Organisational support or other solutions based on the local situation
- Examples include pilot projects to support adaptation to the UVAR, linking service providers to one another, adapting the UVAR operating times or organising joint procurement[5]

Supportive complementary measures can be added to and selected with the UVAR building blocks and can work as paired carrot and stick measures to encourage more people towards the desired mobility behaviour. The UVAR might be seen as a stick while the supportive complementary measures are the corresponding carrot. However, spatial interventions can also act as complementary measures to regulatory or charging UVARs, by making use of the space for perhaps recreation or faster bus or cycle mobility. The overall scheme should include a balance of rules and restrictions together with services and opportunities that accompany them. The main thing to keep in mind is that the accessibility of people and goods is enabled, even if it is not with individual vehicles.

2. User Needs and Public Acceptance

User Needs

It is important that the UVAR area is still open for people and goods, even if it is not by their first mode of choice. So user *needs* are important to consider – rather than perhaps their *desires*. Stakeholder involvement is a good way of ensuring that the needs of users are met, ensuring that it is not only the 'usual suspects' with loud voices that are heard, but also those that may find it harder to attend meetings or reply to consultations and otherwise make their voice heard.

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[4] The European Sustainable Urban Mobility Plans (SUMPs) outline a structured approach to mobility planning. There are SUMP topic guides that provide guidance on the implementation of many sustainable mobility measures. Sustainable urban logistics planning, micromobility, active mobility and electrification may be particularly relevant; all have SUMP topic guides. See www.eltis.org/mobility-plans/topic-guides. For logistics measures, there are the Sustainable Urban Logistics Plans (SULP) Guidelines.
Additional guidance on parking can be found at Park4SUMP.

[5] Examples of complementary measures, including organisational support are given in the Dutch Zero-Emission Zone Support Framework, also translated into English
https://drive.google.com/drive/folders/1rp-fNiBiIxPcDf9d-vaIXxcAUqqZhRGH?usp=sharing

Figure 6: Space taken by people when they are travelling by individual cars as compared to by bicycle, on foot or by bus (source: Stadtwerke Münster)

Listening to all helps ensure that the UVAR is fair, and improves transport for those that may not always be well served by current transportation. The issue of spatial justice is also relevant here. Why should those travelling sustainably – which takes less space – be squashed onto a marginal space, and the majority of the space be given over to those travelling less sustainably?

The arrogance of space[6] highlights the difference between space given over to cars and to people in many European cities. This applies both to moving and to parked cars and, considering that the average car is parked roughly 96% of the time[7,] most cities dedicate astonishing amounts of their precious public space to the storage of private property. The three images in Figure 6 demonstrate the difference in public space consumed by the same number of people when they are travelling alone by car, walking, cycling or using the bus.

Figure 6: Space taken by people when they are travelling by individual cars as compared to by bicycle, on foot or by bus (source: Stadtwerke Münster)

Public Acceptance

Stakeholder involvement is a key part of meeting user needs and achieving public acceptance, as discussed above. If user needs are not taken into account when designing an UVAR scheme, a city may end up with a system that does not work as anticipated. It is important here to distinguish between user *needs* and user *desires*. The need may be to access the area, the desire may be to access the area by private car; ensuring the perceived access *need* is appropriate and an issue that the UVAR should address, but this may not always be in the *desired mode*.

It is important to make sure the needs of all groups are heard, and the diversity of different needs in a city is one of the reasons why UVARs are not a one-size-fits-all solution.

There is a risk that essential transport needs cannot be met or that certain groups will be unintentionally disproportionately affected if stakeholders are not involved. Some user concerns can be addressed, but the supposed automatic "right" to drive everywhere may not.

Public opinion and acceptance will almost certainly vary across user groups. While it is unreasonable to expect the scheme to please everyone, overall, it is important for any UVAR scheme to have a high level of general local support for it to work well. A scheme that is well designed with stakeholder involvement, tackling a known and agreed-upon problem has good chance of being accepted. Public opinion may vary across societal groups, as will the needs.

[6] https://colvilleandersen.medium.com/the-arrogance-of-space-93a7419b0278 and https://www.youtube.com/watch?v=CfXP6KOVBOY

[7] Source: https://www.racfoundation.org/research/mobility/spaced-out-perspectives-on-parking

Furthermore, public acceptance and opposition often fluctuate over time, meaning acceptance should be seen as a continuous process and not a once-and-for-all "for or against" a specific UVAR.

Stakeholder involvement

As with the Sustainable Urban Mobility Plan (SUMP) process[8], stakeholder involvement is an essential part of implementing an UVAR. This is because it is likely to make a better, more accepted and adapted scheme. Taking the extra time and resources to engage with different users can seem to make the planning process expensive and risks making the outputs inconclusive.

"Generally, stakeholder relations is quite simple, it is just about taking people on a journey, making them feel involved, and allowing them to represent the city they serve!"

- Victoria Wilson, Transport for London

However, these efforts can uncover issues not previously considered by experts. They can also be a source of innovative solutions.

Stakeholder involvement needs to be designed so that it hears more than the voices of those resisting any change that will inconvenience them. A judgement will need to be taken as to which concerns are legitimate, and which simply want to resist change. Care needs to be taken to ensure that voices such as those of youth, women, minorities and those with disabilities are heard as clearly as those who may otherwise have undue influence over the process.

"We spent nearly a year in stakeholder engagement, but it was worth it."

- Juan CarloS, Escudero, City of Vitoria Gasteiz

(when asked about how the city gained public support for the removal of hundreds of car parking spaces to use for sustainable mobility)

Communication

Communication is one of critical issues to take into account when planning and implementing an UVAR. Some of the reasons are:

- People cannot comply with an UVAR they are not aware of.
- How an UVAR is communicated will significantly affect how it is perceived; timely and appropriate communication can improve the perception.

- Dialogue fosters understanding and can enable a certain shared commitment, which can lead to voluntary compliance.
- Understanding the purpose of the UVAR makes people more willing – or at least less resistant – to adapt their behaviour; in this way, good communication contributes to the achievement of the goals of the UVAR.

Communication is related to how stakeholders are involved, but also goes beyond this to the general public within and outside the authority and even beyond the region and the country.

Communication plays a key role in all UVAR phases. The key aspects of communication for UVARs are:

- Two-way communication with stakeholders while developing the UVAR
- Dissemination of information about the agreed-upon scheme to enable people to comply; this includes opportunities to ask questions, from the time the scheme has been confirmed and continuing during its operation. This is essential and should be as wide ranging and use as many methods as possible – particularly for regulatory or area charging schemes.
- Providing opportunities to ask questions and for penalties to be contested during operation.
- Keeping people up to date on evaluation results and developments, and their implications *during operation*

"Don't underestimate the value of communication as a tool, as well as hard infrastructure. if you get your messaging right, people will comply."

- Samantha Tharme, City of London

[8] https://www.eltis.org/mobility-plans/sump-guidelines

Figure 7: Two road signs for the same thing – one saying road closed, the other road open (Alamy).

The way an UVAR is communicated can make all the difference – as communication can in all strands of life. For example, is the road **closed** to motorised vehicles or **open** to people?

3. Ensuring Compliance

It is important that an UVAR achieve high levels of compliance as an UVAR that is not complied with is not worth implementing. Indeed, it should be your goal to make it as easy as possible to comply with your UVAR, as greater compliance will lead to better achievement of the goals behind the UVAR. The main means of achieving compliance is, of course, effective enforcement. But it is important to keep in mind that there is more to ensuring compliance than blind enforcement of rules. Spatial interventions are often largely 'self-enforcing' through physical barriers or the alteration of the road layout. Ensuring compliance also includes aspects of communication as drivers can't comply with something they are not aware of. Flexibility, as can be achieved by well-focussed complementary measures, is also necessary, to minimise negative impacts for certain groups of users.

Having established these aspects first, effective enforcement will be the "last line of defence" for your UVAR, and it must be planned and considered carefully from the beginning.

There are a wide range of factors to consider when it comes to choosing enforcement mechanism(s). The type of UVAR, the scale, the cultural, political and economic context and the legal framework in which you are working, as well as the attributes of each option are all factors to take into account when these choices are being made.

4. Governance and Finance

Governance

For ReVeAL, good governance implies transparent procedures for policy and project design, project management, procurement, financial management and allocation of revenues at the local level. In many cases, policy and operational coordination is needed between different levels of government affected by the UVAR.

At its best, effective governance translates into professional project management of the UVAR scheme, with accompanying measures (short and long term) institutionally anchored by means of a specific agency/authority, different agencies working together or through the establishment of public-private partnerships.

Key aspects include:

- Decision-making context
- Legal frameworks (national and local)
- UVAR-specific EU legal issues
- Institutional setting and organisational arrangements
- Policy frameworks and planning instruments
- Political instruments
- Enabling sufficient resources (human and financial)
- Integration and interaction of cross-cutting themes (including champions; see below)
- Communications
- Champions for the UVAR
- Planning the UVAR in the context of electoral cycles

Finance

Financing refers to the way UVAR measures are funded and how any resulting revenue streams are generated and used. Within the ReVeAL context, any financial allocation must be fully transparent. Up-front financing of an UVAR scheme might be a challenge for an UVAR implementer, but there are financing instruments and options which can be considered for this purpose[9], as well as the option to rent as oppose to buy enforcement equipment.

Sometimes a higher initial investment can reduce operational costs. Clarity about how any revenue streams from UVARs (e.g., from fines or fees collected) are spent (in particular ringfencing any revenue for sustainable mobility), can improve acceptance. That said, UVARs (unless designed as toll schemes) are rarely net money makers. Generally, the city should prioritise compliance over collecting fines.

The financing of complementary measures also needs to be considered; this may take place at a national (e.g., retrofitting grants) or at the regional or city level (e.g., subsidised public transport passes or improvements in walking and cycling facilities).

"We had lots of involvement in our stakeholder process, and surprisingly few critical voices. we would normally expect much more discussion and criticism in the press. it seems that people could put both their negative and positive comments into the process and felt involved rather than frustrated. maybe people didn't know about it, but i doubt it as we reached out to many people."

- Oliver Spree, City of Bielefeld

Getting started with your UVAR

The first action of any UVAR development is to assess the 'business-as-usual' situation (i.e., what will happen if we continue on the same path). This helps identify the problem, what needs changing and which vehicles will be affected. For example: is the problem caused by commuters to the area or through traffic? Is it caused by light or heavy-duty vehicles? What sustainable mobility options are available for access to the potential UVAR area(s)?

The second step in developing an UVAR is to clarify the goal(s) that you aim to achieve by implementing it. An UVAR may help with many aspects of the city's strategies, and it is useful to clarify which main goals the UVAR should achieve. For example, reducing traffic volume will likely also improve air quality and reduce noise, climate emissions and congestion. It may also increase walking, cycling and public transport use, improve safety and enable more liveable space, all of which may be city goals.

There are several factors that might affect the goal of the UVAR, including:

- the main mobility-related problem in the city,
- how the scheme is perceived and communicated, and therefore accepted
- the national law under which the UVAR is implemented
- an UVAR often requires a clear legal justification in the form of an identified goal that can be measured as having been met. If this is not the case, the UVAR may be vulnerable to legal challenges

It is therefore wise to have one main goal for which the new UVAR is being implemented and acknowledge that it will support other aims as well.

Developing an UVAR is best done using a participatory process. One way to approach the process is through a series of workshops with selected stakeholders to select the building blocks (and then complementary measures) that are most appropriate for the city's UVAR.

Different stakeholders will need to be engaged in the process, both to ensure that all aspects are considered, as well as to gain buy-in for the scheme. Stakeholders range from colleagues from different departments in the city authority, politicians, different layers of government and many different aspects of society. As with many things, a balance needs to be struck; you and your colleagues know your city, its stakeholders, and the context of the UVAR development best. Even if there is no or little history of participatory development in the authority, it is worthwhile trying it.

[9] See eg SUMP Guidance on Funding and Financing

Involving stakeholders early in UVAR discussions will likely be better received than presenting them with a completed scheme; early involvement enables them to understand the purpose, offer constructive comments and help inform the development of the scheme, rather than being faced with a finished scheme to criticise. An UVAR development process that is and, importantly, is also seen as, transparent, open and fair can help increase public acceptance and ensure that legitimate are appropriately accommodated. Ensuring an inclusive UVAR development process helps achieve this.

Carefully considering the groups that you gather feedback from will ensure that your scheme is equitable and reflects the needs of the people who will be affected by it. This includes representatives of groups that may have particular needs, such as people with disabilities, the elderly or parents with children.

Workshop participants need to be informed about the process and the building blocks, as well as the current assessments that have been undertaken of the city/area, so they are in a position to make decisions. The REVEAL building block fact sheets (Figure 3) clearly explain the building blocks and provide concrete examples to ease this process. Making the materials available in advance is useful to achieve this, as well as introducing them in the first workshop.

During the workshop, each participant ranks each building block in terms of how relevant they feel it is for the area under consideration for an UVAR. After this, a discussion among the participants of their choices, and the reasons for them, is useful. The different perspectives and opinions expressed may impact a participant's initial choices and they may want to modify the rank given. Another round of workshop(s) might be done after making a shortlist of options, after combining different views and impact assessments, and / or with different workshop attendees.

The ReVeAL project created an online decision support tool (Figure 8) which is intended to help users identify which UVAR building blocks might be appropriate for their local context.

Figure 8: ReVeAL online decision support tool, with 15 question on the city, the likely UVAR area and the goals the UVAR should achieve

The online tool can help by steering the user to a combination of different UVAR building blocks that may become the basis of an UVAR package that suits the city. The ReVeAL decision support tool can be used to help participants identify the building blocks with the highest potential for success in their situation. One way to use the tool: in a first workshop, participants discuss building block options and comes to a general agreement on some that may be valuable. In a second workshop, the participants use the ReVeAL tool to see if it offers any new options. The differences and similarities can be compared and discussed.

Whatever format is used, the highest ranked building blocks would be selected, the aim being combined to create a coherent UVAR package. When deciding between different options, an estimate of the impacts of the options may be needed – with indicative impacts at early stages and later rounds of assessment being more detailed.

The selection may need to be reviewed, and steps repeated depending on the combinations selected, or assessments undertaken.

Some of the combinations of building blocks that might be used to provide some of the more common UVAR 'packages' are given in Figure 9.

Ideally, these processes will lead to two or more different "packages" of building blocks for the project area or different areas, where different building block combinations, geographic scales, timing or implementation conditions are considered. These scenarios can then be assessed in more detail during the design phase in order to choose between them.

A complementary measure is an additional measure that complements a planned UVAR to ensure access of people, goods or services into the UVAR area while maintaining the goals of the UVAR, easing compliance and facilitating the best adaptation to the new reality. It can also serve to minimise any equity issues that may result from the measure it complements.

It is useful to keep these in mind even at early stages of UVAR development; as they may make a building block possible or acceptable that otherwise would not be. They can also facilitate a more sustainable adaptation to the UVAR, reduce any undesired negative impacts on certain sectors of society or enable essential transportation needs. The need for complementary measures may arise from the project inception, in assessments, stakeholder workshops or through an understanding of the cultural, social and political situation in the city.

Figure 9: *Typical combinations of building blocks for different UVARs*

The ReVeAL toolkit

As described above, the ReVeAL toolkit is designed to help cities think about UVARs. It has been piloted in six European cities, and is completely scalable to different levels of city and scheme. It does not give a prescriptive method, but gives suggestions of types of building blocks that might be useful in your city, and how they might be combined to produce an UVAR package that suits you.

The toolkit consists of three aspects:

1. **Fact Sheets on each Building Block**[10]

The factsheets include the definition of the building block, aspects relevant to timing, phasing and upscaling, time window options, complementary measure and enforcement options, equity issues and future considerations. Where issues cross more than one building block, they are covered in the ReVeAL Guidance.

2. **ReVeAL Guidance**[11]

The ReVeAL guidance covers aspects that are broader than a single building block such as the cross-cutting themes, and/or go into more detail on implementational issues than the factsheets allow. There are also links to the other building blocks that might be relevant to use with each building block. The different aspects are linked from the factsheets where relevant, as well as available as a stand-alone document.

3. **Decision Support Tool: AccessRegulationsForYourCity.eu/tool** [12]

15 questions on your goal, your city and the area being considered for the UVAR, which gives a prioritisation of the building blocks that might be appropriate for your city.

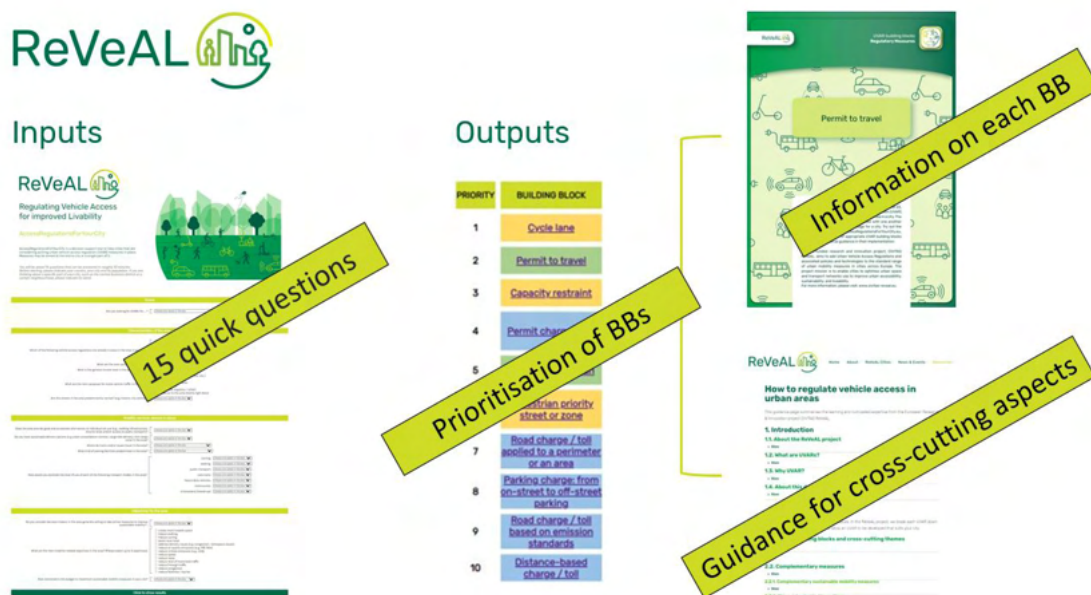*Figure 10: A schematic of the ReVeAL tool and its output.*

The best way to start with the ReVeAL toolkit is to go to the ReVeAL website. Webinars on the ReVeAL toolkit will be available on the ReVeAL website at the end of November.

[10] https://civitas-reveal.eu/about/approach/

[11] https://civitas-reveal.eu/resources-overview/publications/guidance/

[12] AccessRegulationsForYourCity.eu/tool

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[13] https://uvarbox.eu/uvar-exchange

[14] https://uvarbox.eu

Behaviour Change Travel Mode Choice Interventions to Reduce Car Use in Towns and Cities:
Evidence submission and commentary

Copenhagen bicycle culture, by Jorge Lascar, https://wordpress.org/openverse/image/e505640a-422e-4703-9431-70bbd5b81967.

By Eric Britton

Editor's note: This is an edited reprint of Eric Britton's article published in WTPP in 2011. I have taken the liberty to clarify some terms [in brackets] and to reduce the text somewhat. Read the full article in Issue 17.1, which was the transcript of his comments to the House of Lords Science and Technology Select Committee's subcommittee, chaired by Baroness Neuberger, to *"investigate the use of behaviour change interventions to achieve policy goals...... to alter travel-mode choice in order to reduce car use in towns and cities and therefore the level of carbon emissions from transport."*

While the exact question you are addressing – better understanding matters of behaviour change and ways to reduce car use in cities – is a good one, I would propose that it will be useful to take a step back first to determine if that, in fact, is the best next step or issue to be considered under the circumstances. I would say that there is a broader set of issues and trade-offs behind it, which need to be sorted out first.

INTRODUCTION

The submittal that follows is quite rough due to time limitations, but here is a summary of the key points that I would hope to draw to your attention. Thank you for bearing in mind that these observations and suggestions come from someone who has been in and out of the UK for professional reasons over the years but whose work is primarily international.

I address this committee on the understanding that you are looking for information, ideas, perspective and arguments to define and defend the public interest: social, economic, environmental, without reference to party or politics of whatever stripe.

Old man with a small bicycle, photo by Photomiqs, https://wordpress.org/openverse/image/d7ea2ac5-55a2-4b5c-bea6-0a11230a01c6.

NYC Rent a bike, Ed Yourdon, https://wordpress.org/openverse/image/98084ec8-bfec-4321-a8ec-5bdd7c25710c.

PRELIMINARY POINTS

1. Our past international work makes it clear that the range of viable alternatives to own car travel are too few in number and far too low in quality to give citizens reasonable (i.e., competitive) options. This is true virtually all over the world and certainly true in the UK.

2. It is in this context that the whole idea of "behavior modification" comes into context. For if the game is to see how we might today or in the near future tempt people to opt for what for many users might be considered to be an inferior mobility options (example: inferior quality public transport), then there is something fundamentally disloyal about such a concept. **The first step has to be to develop competitive alternatives to car travel**, and then to use our various analytic and operational tool and measures to bring them to the attention to the public so that they can in turn make their own choices.

3. We need to bear in mind that advantages of car travel to car owners are considerable, and even more so from a psychological perspective if we bear in mind that the "next trip" one takes in one's car is generally considered as being "free". So whatever our alternatives are in a fair society, they must be many in number – bearing in mind that the car offers quite a broad range of potential services – and they must be seen as being competitive. Including being perceived as "free" as using your own car for that next trip.

4. Which of course is very far from being the case today. But at least once we become aware of this underlying reality, the real challenge of "behavioral change interventions" becomes far more clearly delineated.

5. Popular conceptions aside, **it is an incontrovertible fact that the majority of people in the UK are for a wide range of reasons not car owner/drivers**: they are either too young or too old to drive, too infirm, too tired, too nervous, lack the necessary physical flexibility and reflexes, not psychologically prepared for the responsibility, cannot really afford a car (though they still may have one), have dangerous driving habits (smokers, drugs, mobile phones, text messages and other dangerous distractions), or perhaps simply prefer to live without a car and the long list goes on. **This is an important political point.** We are looking at a majority of the population, and all these people vote (even if they are not effectively organised as are the car and road lobbies). These **citizens need and deserve first class alternatives to own car travel**, and the public authorities (and private players) are not yet providing enough of them.

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*   The UK continues to be an island when it comes to deep knowledge and direct working experience with what is going on at the leading edge in other parts of the world.

*   You must be able to offer competitive (to cars) travel options if people are going to make new and better choices.

*   "How can a man, riding on an ox, looking for an ox, ever find an ox?"
    (You first have to get off the ox).

Near King's Cross Station - Traffic Jam on 00.24 hour from my window, UK, London, Vaidotas Stanevicius, *2009,* https://wordpress.org/openverse/image/d608a2fe-1bf2-4f72-9b39-242fc85a37b7.

6. This outside looking in view of transport, mobility and infrastructure in the UK makes it clear that you have grossly overbuilt your [automobile] infrastructure in and around cities – and are now grossly under managing it. This is, in fact, very good news. What it means is that you are not going to have to spend great gobs of taxpayer money on expensive infrastructure in the immediate future – you can instead get on with the management and creative innovation functions. The entire challenge is thus well within your means.

7. But you lack an overarching strategy. You have many groups working on various pieces of the puzzle, but as far as I can make out there is not broader unified vision or strategy. This is vital to determining what government could and should be doing next.

8. I therefore strongly recommend that you lay the base for a national dialogue on the topic of how to go from today's grossly unsatisfactory situation to a far more sustainable transport system as quickly as possible – and specifically in the period 2011-2015, starting this year. And as part of this dialogue there should be an immediate push to create and share information on numerous outstanding demonstration projects, which show the way in detail to what the broad strategic lines are trying to target and obtain.

Policy Soft Spots in the United Kingdom

I shall get to your questions shortly, but to be useful to you I must first take a few steps back and share with you what I, as an interested and not entirely uninformed observer of the UK transportation and government policy situation, have noted over several decades. I hope these remarks will serve your committee as evidence from an outsider international perspective that I have been able to develop through a long process of in place observations, consulting and advisory work exactly in the field of sustainable transport and sustainable cities over many years and around the world.

I look at the issues that define transport, sustainable and otherwise, in the UK with some knowledge and considerable sympathy, if at times a certain level of impatience as I ask myself: how is it that, with all the assets you have in hand, you are doing by and large so poorly in the broad area of sustainable transport, whether at the level of specific projects, cities or, indeed the country as a whole. Why is this? Well, as an outsider, I spot a certain number of soft spots which you really could correct once you put your minds to it. And once you have the appropriate strategic structure in place – this is really at the end of the day what is most lacking—an appropriate, articulated, explicit, responsible, consistent and continuing strategy for sustainability — many of the specific questions you bring up here will become clearer.
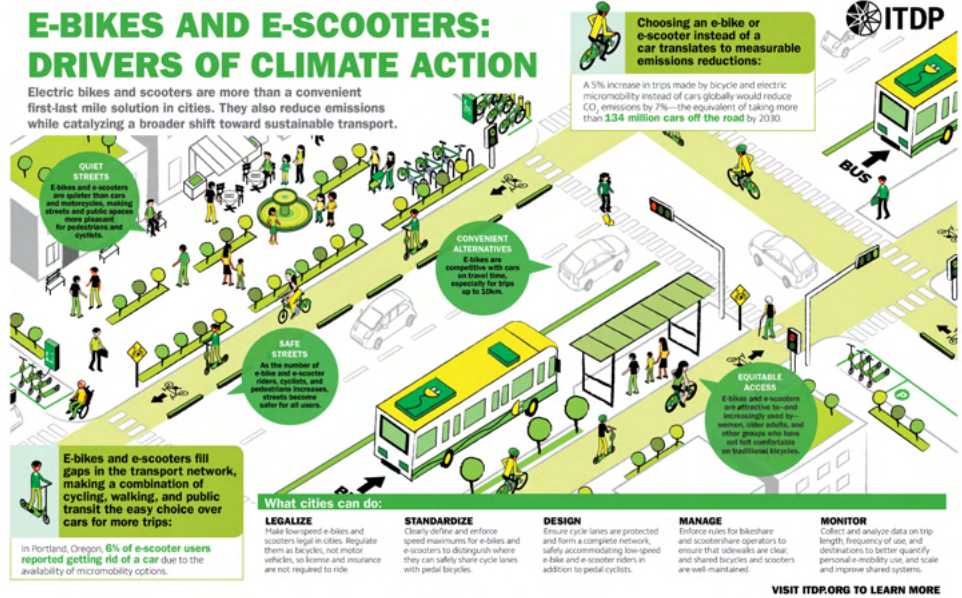

Rows of a new cars parked in a distribution center on a car factory on a sunny day. Parking in the open air,
photo by Evgenii Emelianov, stock.adobe.com.

The so called soft spots in your policy frame include:

1. Your successive governments, of no matter what political stripe, give full expression to the idea of supporting sustainability and pattern-break innovations until they take office – at which point they become de facto bearers of the standard of old mobility, old ways, and unsustainable transport. This of course is not limited to the UK, but still that is no excuse.

E-Bikes and E-Scooters: Drivers of Climate Action, Institute for Transportation and Development Policy; https://www.itdp.org/2019/09/24/e-bikes-e-scooters-drivers-of-climate-action/

2. Local government holds the key to the move to sustainable transport but is by and large today confused and nervous. The local council leaders have a hard enough row to hoe just to keep what they have going as well as they possibly can. They face real problems of resources, but above all seem to me to have a major vision failure. And if you don't have vision, you have nowhere to go.

- The only viable strategic starting point is that it must be prime government policy (a) to reduce VMT steadily starting in 2011; and (b) make this the central core of all government policy and investment decisions for the period 2011-2015

- Local government holds the key to the move to sustainable transport, but is by and large today confused, disoriented and nervous. This is a critical problem that needs attention.

3. Your NGOs and various interest and action groups are often world class, however by and large are organised into quasi self-contained silos. And those who do take a broader approach are for the most part substantially underused assets. The attitude of government to these important assets strikes me as ranging from patronising to evasive to adversarial, and by and large altogether unhelpful.

4. Currently the deep cuts and lack of serious support for sustainability on the part of your latest government are putting just about everybody who is committed to and working on the sustainability and social issues in the sector on the defensive; so there is today a general climate of deep despair, which I very much hope your committee will be able to help reverse.

5. The only possible strategic starting point is to make it the prime government policy:

   (a) to reduce [automobile] vehicle-miles of travel (VMT) steadily starting in 2011; and

   (b) make this the central core of all government policy and investment decisions for the period 2011-2015.

   Cutting back VMT has many enormous advantages—environmental, social, economic and strategic. And it can be done, but only with new thinking and strong leadership and participation from many levels of society. We have to help your government to understand this.

6. Once you have the strategic basics in place, the second core element of a viable sustainable transport policy has to be absolute consistency. No shilly- shallying. The same rigorous acid tests of cost-effectiveness, performance and impacts need to be applied to all public expenditures and investments. Once these principles are put into place, it is surprising how easy it becomes to separate the wheat from the chaff.

> **Core elements of sustainable transport policy:**
>
> - **to reduce VMT**
>
> - **consistent evaluation of cost and impacts of all transportation projects: the true costs including the externalities of road impacts are all too often ignored.**

7. The soul of success in sustainable development is not only vision, but also continuity once you get into an action mode. There is a huge amount of start and stop in Britain, which does no one any great good. It discourages and acts to sap the courage and energy of the sector.

8. And finally the grim bottom line reality. If you spend all your money on [automobile] infrastructure you get infrastructure [more automobile use]. But if what you want is high quality and fair mobility, well you have to spend the money on people [person-trips, not auto trips]. Year after year, government after government, you are consistently spending the great part of taxpayer money for the sector to support cars and roads. But the appropriate starting place for transport policy is [moving] people, not [building] hardware. I guess the first step has to be for you to figure out who you are and who you want to be
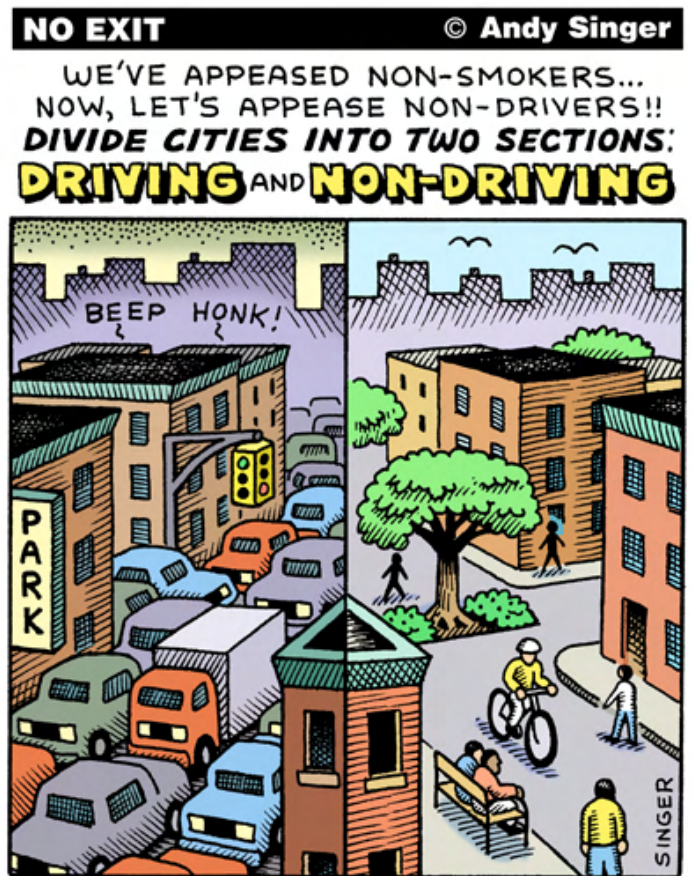
www.andysinger.com

Bus passengers in the rain, New York, photo by Michelle DeRobertis.

Responses to three selected questions:

I thought it important that I set the stage in this broader way so that you can see from where I come on all this. But I shall now dig into three of the questions you ask.

1. **What are the most influential drivers of behaviour affecting an individual's choice of mode of travel?**

Let me look for now at just one specific modal choice example to see if we can find some clues: Why do people decide to join car clubs? There is plenty of experience and evidence eon this. Here, as someone with rather deep knowledge of the field, is my quick read of the evidence from the perceive of the user:

a.   The alternative offers an improved mobility option in specific situations.

b.   It is considerably cheaper than owning and operating another car.

c.   It frees the driver from the charge and cost of dealing with parking

d.   It opens up a number of advantages of being "car-free" – that is unencumbered by the burden (financial, time, inconvenience) of such things as vehicle maintenance, upkeep, insurance, fueling

e.   There are bragging rights associated with backing away from being totally unsustainable.

f.   Most if not all people who share cars in this way have at least some awareness that they are behaving responsibly in terms of environment and climate.

What can we ascertain concerning your question from this brief and admittedly incomplete off the cuff profile?

Simple: You must be able to offer a **superior travel option** if people are going to make new and better choices.

This is a challenge since the received wisdom has been that public transport (which is almost always very narrowly defined: fixed route, scheduled services, usually run on a deficit and government financed) is basically the poor man's transport that Mrs. Thatcher reminded us all about so vividly so long ago. **Waiting for a bus in the rain is not an option.**

Also: this suggests that we have a far broader and more strategic picture of what in act are those "other modes"; as opposed to only travelling by (one's) own car. There are a very wide range of alternative options and it is important to know and understand them in depth, before asking about choice criteria.

- You must be able to offer competitive (to cars) travel options if people are going to make new and better choices.

2. What is the role of infrastructure in encouraging and facilitating changes in travel- mode choice?

Pedi Cab, Timothy J, https://wordpress.org/openverse/image/6a2c2fa9-4464-4146-9159-7cbe5230bbf5.

Of course, it is vital. But not perhaps as one might at first think. Here are a couple of important infrastructure truths which, once properly understood, give some useful clues for effective government policy at all levels.

a.   Our road and parking infrastructure in almost all of our cities across Europe, and certainly in the UK, have been grossly over-developed in terms of their dimensions and share of the total land area of the city. In summary: we have over-built and under-managed. When we understand this, it opens up a whole new strategy of polices and measures adapted to this situation.

b.   And we know too of course that the answers to the problems we face do not lie in more building and other forms of (road) capacity expansion. For either moving or parked cars. This hard-earned lesson is clear beyond any doubt.

c.   So, we go to work with what we have. (which turns out to be a very good thing indeed).

d.   21st century infrastructure policies: (a) shift available street space away from inefficient users of that space (namely private cars); and (b) make it available to efficient users, namely pedestrians, cyclists, public transit, and other forms of shared transport.

e.   The strategy has to be not a "war on motorists" but a deliberate and steady tightening of the noose on all inefficient users of the city's scarce space and environment. In addition to reducing road space available for these inefficient users (a purely physical strategy), a critical component of the infrastructure-use strategy has to be the strategic reduction of parking space for private cars. This is a far more cost-effective policy than congestion charging, and lends itself to being planned and handled with political address.

f.   A key tool in infrastructure management is that of slowing down all traffic in built-up areas. There is no good reason why all city traffic in the UK should not be strictly limited to a 10/20/30 mph strategy. The justifications for this are accident reduction and a range of public health and environment improvements.

g.   But we will, for the couple of decades ahead, still be seeing lots of cars in and around our cities, so our strategy must take this into account and not simply plunge into a denial mode. Cars are not the enemy, they have a place in society, but their indiscriminate inappropriate use is something that we can remedy. With strategy, with technology, with people skills and with patience.

3. What are the most appropriate type and level of interventions to change travel-mode choice?

Critical intervention No. 1: Get pricing right

Once you have finally put into place a pricing system that fairly exacts the full social and environmental costs from the users of each transport mode, much of your problem simply disappears. Getting this right requires vision, courage, excellent analysis, careful interaction with all branches of the travelling public, and a well thought-out implementation and communications strategy that gets the great majority of the voting public on your side. This is possible, necessary and can be done. If you want to.

Other interventions

At the other end of the travel-mode choice chain, the most creative thing you could do in the UK in the years immediately ahead and starting now (since it is possible) is to organise and deliver, through creative partnerships, a broader palette of high quality alternative transport options. This is a long list which can start with things like access control measures **(editor: See related articles in this issue on Urban Vehicle Access Restrictions (UVARs) and Traffic-Limited Zones (ZTLs))** strategic parking policies, innovative public transport, car clubs, ridesharing, new uses of taxis and small bus/van systems, safer and better cycling conditions in the city, ditto for walking, integrated ticketing and access systems, improved and consistent enforcement of regulations, and the long list goes on.

The target mode has to stretch way beyond traditional scheduled fixed route public transport and bus services. They (public transport) are going to be part of the solution, but only part.

A core driver for all new services is going to be information and communications technologies, so if you are going to use policy to drive innovation, here is a sector that bears far better promise than the traditional costly vehicle, motor and fuel technologies which are the proper affair of the private sector.

Photo credit: Eric Britton

Thank you for giving me this opportunity to share my experience and views with you. It is encouraging to know that you are giving these issues importance and looking for new thinking and new solutions to these pressing problems, challenges . . . and, yes, opportunities.

Eric Britton

Eric Britton

Note: An interview with the author appeared in Mobility Magazine on 20 January 2011.

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Brief History of Traffic Limited Zones (ZTL) in Italy and other early car-restricting strategies

By Michelle DeRobertis

Introduction

The rapid popularity of the automobile led to its fast adoption and use in both USA and Europe. This became a problem, especially for cities that were built for pedestrians and horses. By the 1960s, both city planners (e.g., Colin Buchanan in the UK) and citizen advocates (e.g., Jane Jacobs in the USA) were documenting these adverse impacts on historic cities. By the 1970s, new approaches were being tried in Italy, Europe and USA to address the incursion of cars in city centers. This short article will provide a brief history of the Italian traffic limited zone (zone a traffico limitato-ZTL) as well as some of the other interventions to control traffic that were happening contemporaneously.

*ZTL sign, Lecce Italy,
photo by Michelle DeRobertis*

First Car Restrictions: Pedestrian Streets and Areas

Many European cities have pedestrian areas. Some of these have remained pedestrian-only from before the auto-age, indeed even during the horse and buggy era. While some are to due topographical constraints and the presence of stairs (for example, parts of Perugia and Genova, Italy) or aquatic reasons (Venice), others were primarily due to the fact that their streets, and the buildings they provide access to, date back to medieval times and are extremely narrow, e.g. 2 to 4 meters (6.5 to 13 feet) from building-face to building-face, with buildings that are five or six stories high. Thus, the use of cars was extremely difficult if not impossible. A classic example of such a pedestrian area is the Old City of Dubrovnik, Croatia. There are even isolated examples in the USA of historically pedestrian-only towns or large areas; the truest example may be Mackinac Island in Michigan, where besides pedestrians, and human-powered bicycles, only horses and buggies are permitted; motorized vehicles were banned in 1901.[1]

But prohibiting cars from streets and places (such as the Italian Piazza) where they had been allowed for decades well into the auto era was another concept altogether. Indeed, it marks the beginning of the movement to reconsider how to allocate public space. While undoubtedly car bans happened here and there across the world soon after the invention of the automobile at the turn of the 20th century, the beginning of the second wave of car-free zones may have been in post-World War 2 Germany when bombed-out cities were rebuilding. Buchanan 1963 cites Cologne as one of the first when, after rebuilding their city center post World War 2, they closed the main shopping street to traffic during the day by inserting posts in slots at both ends of the street; deliveries took place early in the early morning or at night (1963, p. 174). R. Monheim (2002) cites the city of Aachen which, in the early 1950s, pedestrianized some small lanes and also closed the main shopping street in the afternoons (p. 187). Hass-Klau (2015) reported that by 1955, 21 German cities already had at least one traffic-free street, typically less than a kilometer, and by 1963 there were 63 cities. By the end of the 1960s, H. Monheim (2002) wrote that there were over 400 pedestrian zones in Germany (p. 155).

These days it is hard to imagine a medium or large European city without at least one main pedestrian commercial street, if not an entire area of the city center. According to Hass-Klau (2015,) in Germany most towns with a population over 50,000 have a pedestrian area and that "nearly every British city has pedestrian streets although they vary substantially in size and design" (p. 43).

Other Early Interventions

The concern in London and the UK in general about the potential of car traffic led to the commission of what is now called the Buchanan Report, published in 1963.

Figure 1a: Piazza Duomo Brescia circa 1940

[1] Mackinac State Historic Park; https://www.mackinacparks.com/why-are-certain-things-banned-on-mackinac-island/ August 6, 2021.

In response to its recommendations, efforts were made in some London neighborhoods to implement the idea of what he called "environmental areas" to reduce the incursion of the motor car. Their goal was to reduce cut-through traffic using a variety of traffic- regulating strategies such as selected one-way streets and permanent physical measures that turned streets into cul-de-sacs. Two case studies were evaluated by Appleyard, 1981 in Livable Streets.

Meanwhile, the zone and cell strategy (also called pie) was tried in other European cities. This strategy prohibits through traffic in the city center by dividing it into smaller zones (typically 4 or 5) and travel between zones is only possible by use of a ring road. According to Hass-Klau (2015), Bremen was the first German city to successfully restrict in traffic in this way. It was instituted for a trial period in 1960 and although initially opposed, it was considered a success. Nevertheless, it did not spread to other German cities, but it did spread to Gothenburg, Sweden, the first to initiate it abroad (Hass-Klau, 2015). Also in the early 1970s, Besançon, France and Uppsala, Sweden addressed traffic in their historic cities by implementing this type of strategy but with different names ("traffic cells" in Besançon and "protected area" in Uppsala). The intent was to reduce not eliminate vehicle traffic, but often a pedestrian-only street section was implemented as well . Both cities' work and results, describing improvements in traffic safety, environmental quality and economic activity, were documented in the 1975 OECD conference proceedings "Better Towns with Less Traffic". Across the Atlantic, in the 1970s, the City of Berkeley in California evaluated and then implemented its extensive system of traffic barriers. While the goal was not to protect the "city center" but rather to reduce cut-through traffic in residential neighborhoods, its aim was the same: restrict the streets that vehicle traffic could access. (De Leuw, 1974).

As these cases show, a new system of judgment was slowly being adopted in the 1960s, away from one which prioritized automobile access. Indeed, in many cities, the concept of controlling total access to some streets within a city had become politically and socially acceptable. To Buchanan, the remarkable thing about Germany's post war adoption of pedestrian streets was a) the widespread acceptance of pedestrian shopping streets, even for the main shopping street of large cities; and b) that it was not limited to bombed-out cities: even those with no war damage "were finding it desirable to close their main streets to traffic during shopping hours" (1963, p. 174).

Interventions in Italy

In Italy, cars had taken over streets and piazzas from the beginning of their existence, replacing the previous mode - horses. This is documented in numerous historical photos of almost any Italian city in the 1920s and 1930s, (Figure 1).

Figure 1b: *Piazza Maggiore Bologna circa 1960*

Figure 1c: *Piazza Plebiscito foto circa 1980s*

Figure 2: Sorbello Well Today (Source: Google street view)

By the 1960's, Italian piazzas had become parking lots and city center streets were crowded with cars. In addition to making the city center unpleasant and unsafe, the auto exhaust from all these cars in the city center was also damaging historic structures such as the Coliseum and the Milan Duomo. This untenable situation is described in the introduction to the *Ferrara Sustainable Urban Mobility Plan (PUMS)* 2016 as follows:

"The progressive increase of the individual or private mobility has in fact, in the last half a century, led to a crisis in the very concept of the city, saturating all spaces that before were dedicated to living; the space assigned to the car is in fact public space, squares and streets, today totally dedicated to traffic and

parking, but before were places for meeting and social interaction. In addition to the undeniable local and global air pollution produced from fossil fuels necessary for private motorization, the more serious and perhaps less perceived of environmental consequence of mass motoring is probably its space consumption: on the planet in fact there is no space for mass motorization similar to that which characterises the industrialised countries, and in our cities there is no space for all cars that circulate there." (Ferrara, 2016, p.144)

The following description of the Sorbello Well (Figure 2) in the historic city center of Perugia illustrates the adverse impact of motorized cars and trucks on the historical heritage of the historic

city center and its monuments; (bold text in indicates particularly relevant passages).

"Built sometime around the 3rd century BC, it is astonishing for its exceptional size and mastery of construction techniques. A series of concentric cylinders of various sizes are covered by slots supported by trusses made from the clever interlocking of travertine beams that have been able to withstand the **improper use of the square over the centuries, including the passage of cars and trucks***, in what is also a seismic zone. A symbol of these problematics - from which the Sorbello Well has always emerged victorious - is the well curb. The vicissitudes of the* **well curb** *shed light on the evolving forms of thought.*

At one point, Piazza Piccinino had become the terminus of the city tram line: the well was not only in the way but was also exposed to serious damage. In 1945 it was placed safely out of the way on the lawn in front of the Temple of San Michele Arcangleo, which was not bad, but it was entirely out of context. In the 1970s, it was brought back to its original location, **but it was suffocated by chaotic parking, which unfortunately spoils too many beautiful corners of our city.** The current restoration and the desire to redesign the space around it send a very strong signal, which goes far beyond the noteworthy but limited extent of the work.

For years monuments have been awkwardly moved to make room for cars; now, wisely, cars are sent away to restore the monuments to their original settings." *(Nucciarelli, 2017, emphasis added).*

Figure 3: Bologna First ZTL from OECD

The situations as described in Ferrara and in Perugia are illustrative of what had occurred throughout Italy in the 1920s-1960s; only the place names and historical monuments changed. Consequently, in the late 1960s and 70s, several cities had begun to restrict traffic in their city centers to counteract such degradation; early adopters were Siena, Bologna and Brescia.

First traffic-limited zones (ZTL) - Siena, Bologna, Brescia

In 1962, the city of Siena took action against the incursion of cars and passed what is considered by many to be the first prohibition of cars in Italy, and banned cars from Piazza del Campo (Maggi, 2016). This was followed in 1965 by the closure of the four main streets of the city center to traffic 24 hours a day with exceptions only for residents, busses, taxis, ambulances, plus a delivery window for local shops (Maggi, 2016). This can be considered the first ZTL but it is not clear if Siena used this term.

In the late 1960s, Bologna also wanted to restore the serenity of its historic center which had been violated by cars and their noise. As presented at the OECD conference (1975), the first concrete action was in 1968 with the pedestrianization of Piazza Maggiore and adjacent streets. Formaglini (1975) reported that in 1970, the city undertook a two-year traffic study, which was submitted to the city council in June 1972. The study looked beyond just the city center, observing that traffic did not only affect the historic city center, but the whole city:

"...effecting partial improvement to the historic center but increasing congestion on the periphery is no solution either to the problem of traffic or to that of the survival of the historic centre." (Formaglini, 1975, p. 59)

Formaglini (1975) stated that the recommendations for Bologna included two basic interventions: 1) a ranking order for streets; and 2) the bus-only lanes (novel, at that time) which extended well beyond the city center. The concept of the ranking order of streets is the most relevant to car-restricting strategies such as ZTLs. Formaglini writes that streets were assigned to either the primary network, which had to serve all zones of the city, or the secondary network, which provided access to dwellings and buildings; traffic was also divided into two categories: through traffic or local traffic as follows:

- Through traffic - to be channeled onto the primary system
- Local traffic - allowed to use the secondary system, similar to Buchanan's distributor network and environmental areas.

While this concept was applied citywide, it has special significance in the historic city center. It was decided that **through traffic had no place in the entire historic city center,** thus, as concluded Buchanan for Norwich, only local traffic would be permitted, with exceptions for deliveries during certain time periods. In addition, the plan called for an expansion of pedestrian areas.
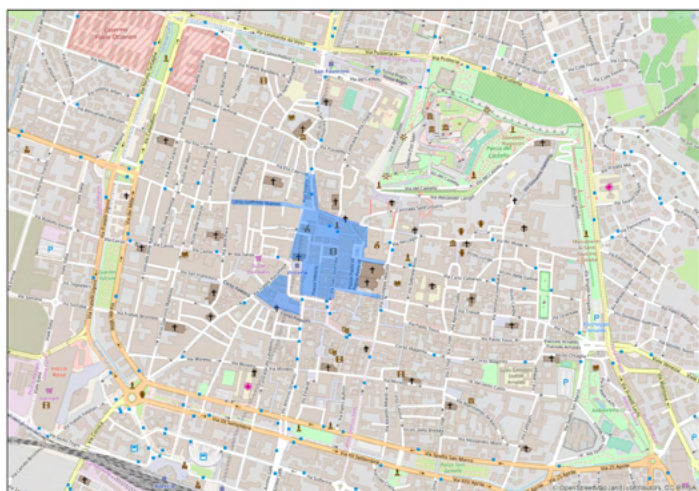
Figure 4: Brescia's first ZTL in 1974

Formaglini wrote that the implementation of the plan was staggered over several years beginning with one-way streets in 1972 and that the first designated area in which traffic was restricted, (called a Zona a Traffico Limitato) was in the Galvani district of the centro storico in February 1974 (Figure 3). The ZTL was extended to the Marconi district in December 1974.

It should be noted that the car restrictions were not unanimously well-received or accepted by all residents and stakeholders. Interestingly, Bologna (though not all Italian cities) had a process for public referendums. Thus, Bologna allowed its residents to vote, and it was ultimately approved by referendum in 1984 with 71% in favor (Mazza and Rydin, 1997, p.22).

In 1971, the City of Brescia established its first pedestrianized street by designating Via Antiche Mura and one block of Via Aleardi as pedestrian streets. The first defacto ZTL was established in 1974 when Brescia designated the central core of its historic center as a "Pedestrian Area" which it declared would be an area "closed to traffic and to the circulation of private vehicles" (City of Brescia Ordinance 2098, 1974) (Figure 4).

But in fact, there were several exemptions for vehicles of certain persons, similar to Siena, thus it was essentially a modern-day ZTL.
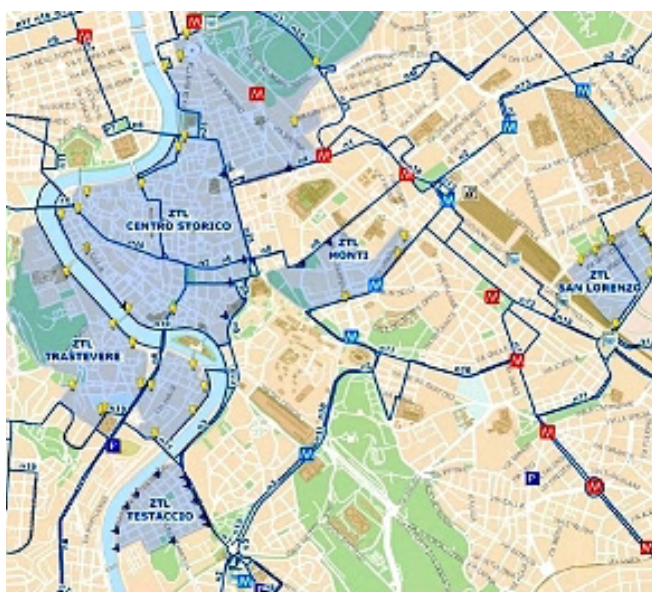
In subsequent decades, Brescia continued to expand both the ZTL and pedestrian areas. Between 1974 and 2016, more than 70 ordinances were adopted that expanded, contracted, or otherwise adjusted the ZTL. These ordinances affected the geographic area, the allowed users, the hours in effect, and/or the on-street parking. In addition, there were dozens of ordinances since 1974 establishing pedestrian streets and pedestrianized piazzas, affecting circulation and parking within the many piazzas in Brescia, and/or creating one-way streets. (DeRobertis 2019)

Throughout the 1980s, many other cities adopted similar strategies. However, cities used a variety of inconsistent terms since there was no national definition of a ZTL or pedestrian area. In fact, Brescia's first ZTL ordinance called the area a "traffic closure" and a "pedestrian area" but in fact there were the many exceptions which are now characteristic of a ZTL.

Main Features of a ZTL

Finally in 1989, a national law was passed that formally defined a Zona a Traffico Limitato (ZTL). Despite this nationwide definition, each city determines the main features of the ZTL including:

• the physical extent, i.e., which streets to designate

• the hours that the ZTL is in effect

• authorized users and vehicles

• enforcement methods

• control of street parking within the zone for both authorized users and for other vehicles during the hours they are allowed to enter.

While a ZTL is typically located in the city center, larger cities often have more than one distinct ZTL area, with different rules and hours, as shown in Figure 5

Figure 5: Five ZTL locations in Rome
(Source: Comune di Roma website)

for the city of Rome.

Even for ZTLs within the city center, a ZTL can be either:

1. **A strict cordon** where everything inside the border is a ZTL; examples are Torino and Bologna.

2. **An area** in which there remains a limited number of open streets or routes making it still possible to traverse the city center. An example is the ZTL of Brescia; when mapped it looks like several contiguous ZTLs.

Although in a ZTL anyone with a permit to enter the ZTL can drive anywhere within it, the main reason why residents do not drive indiscriminately within the ZTL, even though they can, is the difficulty in finding a place to park. This same difficulty is routinely felt by the residents of many neighborhoods of dense U.S. cities such as San Francisco and New York, where there are no restrictions on driving, but people think twice about using their car. Either they don't want to leave their hard-found parking place unless they have to (i.e., go to work or because it is street-cleaning day), or even if they have a private parking place at their residence, there is no guarantee they will find a parking place at their destination. So, they prefer to walk instead.

Indeed, the main mode within the ZTL is intended to be walking. The size of a ZTL is not so large that one cannot walk in from the peripheral neighborhoods, parking garages, or sometimes the main train station. Most large cities also allow public transit within the ZTL (buses, street cars, and in the case of eight cities, metros).[1] Bicycling is also promoted although not with separate bike facilities due to the narrow streets and narrow building-to-building widths in the historic city center.

To accommodate those not able to walk even these short distances, disabled persons are able to apply for and receive permits to enter the ZTL. Any vehicles authorized to enter may park within the zone, either in their own private garage or on the street. Street spaces where authorized vehicles may park are marked with yellow stripes. Some of these spaces are further restricted, for example they may be specifically designated for deliveries, vehicles of disabled persons, taxis or police vehicles (via pavement markings).

National Law on ZTL

The 1989 Tognoli law defined a ZTL as "an area in which vehicle access and circulation are limited to certain hours and certain categories of users and vehicles."[2] This law also first defined an Area Pedonale (AP, or Pedestrian Area) as "an area which bans the circulation of vehicles, except for bicycles and for vehicles in the service of handicapped people with limited mobility". Subsequently in 1992, ZTL and AP were formally included in the update to the Codice della Strada (CdS, the Italian National Highway Code). This law also expanded on several other issues pertaining to ZTL and AP as follows:

1. Revised the procedure to create these zones, from just a mayor proclamation to that of the entire "giunta", i.e., City officials and department heads appointed by the mayor

2. Allowed municipalities to charge a fee for vehicles entering and circulating within the ZTL (although very few cities have done so; the most well-known are Milan and Genova)

3. Included some reasons that a city may want to implement a ZTL including the prevention of pollution and the protection of national treasures possessing artistic and natural value.

In 1999 the CdS allowed electronic enforcement of the ZTL and AP and specified the fine that could be charged for violators.

ZTL versus Other Strategies

The key difference between a ZTL and other traffic-restricting strategies is that one cannot buy one's way in, as with tolls or congestion charge zones, or by buying a newer, less polluting car to enter a low emission zone (LEZ). In a ZTL, everybody except residents (and other authorized users) are prevented from entering during the indicated hours, which may be 24 hours per day or a specific time window. From this point of view, ZTL are much more socially equitable than these other measures.[3]

[1] Seven of these metros are underground, at least in the city center, and one, Perugia, is entirely above ground.

[2] "Un area in cui l'accesso e la circolazione veicolare sono limitati ad ore prestabilite o a particolari categorie di utenti e di veicoli."

[3] However, some cities do allow all electric vehicles, which partially negates the social equity aspect. Torino recently changed its ZTL rules to operate as a ZTL from 7:30 to 10:30 and a LEZ from 10:30 to 17:00 also negating somewhat the social equity aspect. The purpose of this section is merely to describe a ZTL for those not familiar with them, not to describe the infinite number of variations and permutations they can have.

The most comparable strategy to a ZTL would be a pedestrian street that still allows vehicle access for the few residents who do live on that street.

Based on information from the Italian Ministry of Infrastructure and Transportation , ISFORT, and two publicly accessible websites, (http://www.accessibilitacentristorici.it/ and www.urbanaccessregulations.eu/) and supplemented by research by the author[4], it has been ascertained that today at least 350 cities in Italy have a ZTL, including virtually all cities above population 90,000, at least half of those between population 60,000 and 90,000, and many other towns as small as 1000 inhabitants (Figure 6).

The fact that ZTL are so widespread in Italy and are present in large and medium cities as well as small towns indicates that the benefits of the ZTL are not accrued by just a few large cities, but indeed by hundreds of Italian cities.

Conclusion

Many strategies were adopted in the late 1960s and 1970s to curb the impact of automobile traffic on city spaces. Germany led the way with creating pedestrian streets after World War 2. The Italian strategy of the ZTL was adopted specifically for the context of the historic city center. From its beginning in Siena and Bologna, it has been adopted

Corso Zanardelli-Pedestrian Street in Brescia, Italy, photo by Michelle DeRobertis.

by more than 350 other cities and towns, both large and small. A ZTL can be considered a strategy for the city center in the way that a woonerf is a strategy for residential streets. The premise is the same: nonlocal traffic is considered unwelcome, (prohibited in a ZTL at least during certain hours, and intensely discouraged in a woonerf). However, a ZTL is relatively easy to implement, does not require expensive redesign, can be easily modified, does not restrict emergency vehicle response times, and is more equitable than congestion charge zones and LEZ.

Many cities outside Italy could undoubtedly benefit from implementing a ZTL. Indeed, Paris, while having some pedestrian-only streets, is now considering a ZTL (tentatively called "Paris-Centre-Saint-Germain Peaceful Zone") since the vast majority of its streets remain fully open to traffic. The objective of the peaceful zone is to prohibit through traffic, thereby reducing "air pollution, noise and other nuisances caused by car traffic." (Modijefsky, 2022). With respect to the U.S. and other "new world" cities, there are implementation challenges not present in Italy including:

a. the boundaries of most U.S. city downtowns are not as clearly defined as those of Italian and European historic city centers;

b. many U.S. downtowns have a significant investment in parking garages to which access needs to be maintained, whereas in Italy, parking garages are most often underground and/or outside the city center; and

c. many U.S. downtowns do not have the cultural and residential land use mix that is present in Italy (see sidebar).

Nevertheless, a ZTL could be the answer for certain streets or blocks of many downtowns where residential, cultural and historic sites are adversely affected by through traffic that could and should be on other streets or should not enter the city center at all.

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[4] This independent research consisted of either visiting a particular town in person and seeing the ZTL signs or researching the city's website and verifying that they have a ZTL webpage or a ZTL permit application form.

SIDEBAR

Trans-national Context: The Italian Historical City Center vs. the American Downtown/CBD

Most ZTLs were implemented in an historic city center (*centro storico*). However, it should be noted that the *centro storico* of Italian cities is different from the American downtown or Central Business District (CBD). It is also much more than just a residential neighborhood. If the historic city center were only for those who live or work there, cities could put up gates and lock them, keeping everybody out including pedestrians, as was done in the Middle Ages or as is still done in some neighborhoods within the City of St. Louis, Missouri (Waldron 2010). (Figure 7)

For the benefit of American readers, a few key differences between an American CBD and an Italian (or European) historic city center should be pointed out.

Figure 7: Gates on private streets and sidewalks, St. Louis, Missouri

First, a historic city center exists in cities and towns of all sizes not just large "great" cities which were Jane Jacobs' focus.[5] In fact there can be more than one *centro storico* within a city, since there are 22,000 historic centers in Italy (Pezzagno and Maternini, 2014) and only 8,000 official Italian *commune* (cities and towns).

The "historical" part of the historic city center could be Etruscan, Roman, medieval, renaissance, baroque, and/or even fascist, with its accompanying architectural and cultural heritage.

But two of the biggest defining differences between Europe and USA (beside the age and historical significance of the structures) are:

a.   the concentration of urban functions and

b. the narrowness of the streets and the space between buildings (e.g., a main street in the historic city center may be 12 m (40 feet) building-face to building-face not curb-to -curb).

Figure 7: Gates on private streets and sidewalks, St. Louis, Missouri

Another difference is that many historical city center boundaries can be clearly defined by the ancient city walls which, even if they don't still exist, have left their mark on the cityscape, while in the USA there is no clear visual or physical demarcation of where the "downtown" stops and the adjacent neighborhood begins.

The concentration of urban functions in the centro storico is worth discussing further as it provides a large amount of cultural and land use diversity. As in most "downtowns", there are city and provincial offices, professional offices of architects and lawyers, retail shops, restaurants and often theaters and/or concert venues. However, in contrast to American cities, there also may be Roman ruins and/or castles, not to mention a cathedral and numerous (sometimes dozens of) medieval, renaissance and/or baroque churches full of priceless works of art. More than most American cities, there are many secular buildings of historical significance.

[5] Jacobs wrote that The Death and Life of Great American Cities concentrated on "great" cities which she didn't define but specifically stated were "dense" and different from towns, little cities and suburbs. She wrote: "But I hope no reader will try to transfer my observations into guides as to what goes on in towns, or little cities, or in suburbs which are still suburban. Towns, suburbs, and even little cities are totally different organisms from great cities." (p. 16). Her primary examples came from New York, Boston, Chicago, Philadelphia, Pittsburgh, St. Louis, San Francisco, and Los Angeles. Their 1960 populations ranged from 600,000 (Pittsburgh) to 7.8 million (New York) (source: https://www.biggestuscities.com/1960. https://www.census.gov/library/publications/1960/dec/population-pc-a1.html

Antique market, Piazza Santo Spirito, Florence, Miles Berry, https://wordpress.org/openverse/image/9ed48a7b-3b29-4067-9940-d1c469fe37bb.

The historic center may also have universities and typically has museums, and daily or weekend outdoor markets in addition to the seasonal events held in the (many) piazzas. The Italian historic city center attracts many visitors, day-trippers, tourists, even in towns as small as one thousand inhabitants. There is also the very Italian "passeggiata del pomeriggio", where people go for a walk in the afternoon, no destination intended; the trip-purpose is to walk.

What Italian historic city centers of the major cities do not have, in contrast to American downtowns, are skyscrapers; for this reason also, they are not comparable to the CBD of U.S. cities. The skyscrapers, if any, are in another section of the city, called "quartiere direzionale", the business center, not in the historic city center.

While there are certainly many downtowns in the USA that are central to their region and attract numerous local visitors as well as tourists, the sheer scale of the number of **visitors to and residents of** the Italian historic city center of both large and small cities and towns is greater. Thus, while there is employment in the *centro storico* as there is in a U.S. CBD, residential and "other" trip purposes are just as prevalent. In traffic engineering terms, the percentage of daily trips to the Italian historic city center that are work trips would be lower than for the typical U.S. downtown.

In sum, the *centro storico* is for the enjoyment of all city residents as well as those who live in adjacent towns, and, in many cases, (not only Rome and Florence), for visitors from all over the world. This is revealed by this description of Piazza Maggiore in Bologna:

"The piazza is the primary destination for all people, regardless of their social strata or race in a now more multicultural Italian society. It is always the place to go, whether on an ordinary day or on those special occasions in which we congregate to celebrate, or to protest. Having served this role throughout the city's history, the piazza is also the soul of its collective memory and the most potent symbol of the city itself." (DiTommaso, 2015)

This can be capsulated by this quote from Mario Capponi:

"La città è un museo all'aperto"
*   - "Italian cities are outdoor /open air museums"*
(2005, p.104).

The above description of an Italian historic city center indeed also applies to historic centers in other European countries, as the following quote about the city center in England attests:

"It has been forgotten that the centre is not primarily a place to which people and goods travel but in which people work, shop, meet their friends and visit restaurants, theatres and concerts. The pedestrian is not just nuisance and a hindrance to traffic; his or her desire to move about on business, look into a shop window or just stand and stare **is the primary reason why the city centre exists at all***." (Tetlow and Goss, 1968, p. 187, emphasis added).*

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Integrating bicycles and public transport in the developing world: the case of Santiago, Chile

Summer of 2019 Santiago de Chile Parquemet - Parque Metropolitano De Santiago de Chile, photo by Armando Lobos, https://wordpress.org/openverse/image/80f3abd8-b568-4524-9bb5-e54b8bed5641.

By Charles R. Rivasplata

Introduction

In the 21st century, transport planners, researchers and authorities have placed increasing importance on the integration of public transport modes, as well as their integration with other modes. These connections offer yet another tool through which to promote sustainable urban planning, effectively extending catchment areas and reducing dependence on the private car. It is increasingly important to link public transport to "last mile" strategies, such as the accommodation of bicycles on public transport (Walker, 2012; Pucher et al., 2009).

The primary purpose of this study is to review the potential for promoting bicycle-public transport integration in cities of the developing world. Santiago, Chile provides a case study for exploring many of the institutional issues related to this form of intermodal integration.

Bicycle-Public Transport Integration

This paper is primarily focused on connecting public transport and bicycle transport in developing countries and Santiago, in particular; however, it is important to note that most of the early efforts to connect these modes took place in industrialised cities. For this reason, it is important to briefly review some of these efforts and some of the institutional constraints and opportunities that they have faced in both industrialised and developing countries.

Industrialised Countries

In many cities of the industrialised world, public transport systems have been adjusted and expanded to accommodate bicycles. In Europe, cycling has long played a significant role in transport provision. Such countries as The Netherlands and Denmark have permitted bicycles on board and have featured extensive bicycle parking facilities, either within or adjacent to rail stations (Reitveld, 2000; Martens, 2007). For example, in cities such as Copenhagen, there are vast spaces reserved for bicycle parking at the street level, often near metro station entrances.

In the U.S., public transport systems have increasingly accepted the bicycle, with on-site bicycle parking facilities, as well as the on-board accommodation of bicycles (Pucher, 2012). Many public transport agencies have recognised the growth in use of the bicycle as an alternative means of transport to the car, introducing policies and practices that permit the cyclist to conveniently combine a bicycle ride with a bus, train or ferry ride.

Some of the first publications to comprehensively cover the integration of bicycles and public transport were released in the 1980s and 1990s (Replogle, 1987; Doolittle and Porter, 1994). They provided background on the topic (often from a European perspective) and discussed some of the major issues surrounding integration, including its significance within the realm of transport policy. Doolittle and Porter concluded that the two modes complement each other, and that integration can be implemented without impacting public transport service.

Recent publications have explored aspects of bicycle-public transport integration in a variety of contexts. Krizek and Stonebraker (2011) assessed strategies for improving integration, while Hagelin (2005) studied its return on investment. Other studies have analysed the impacts of policy on public transport catchment areas (Guerra et al., 2012; Flamm and Rivasplata, 2014), as well as the benefits of bike sharing integration (Shaheen et al., 2012).

In addition, numerous publications on best practices have been released in the U.S. These have identified reasons for improving modal connections: to increase public transport ridership, to reduce congestion, to promote bicycle use, and to provide access to bus and rail systems (BART, 2012; Veryard and Perkins, 2017; APTA, 2018). Some federal agencies have developed websites that provide guidance to public transport operators (FTA, 2019).

Developing Countries

Whilst bicycle infrastructure has expanded in response to increased demand in the developing world (Suzuki et al., 2018), the coordination of bicycles and public transport has only recently received attention in developing countries. In part, this is due to several factors, including the private management of bus and rail systems and crowding on many systems. In many of these countries, the bicycle is seen as a travel mode of the poor and there is little interest in tailoring public transport to accommodate it (Dias Batista, 2010). In most cases, this has meant that bicycles are effectively prohibited from being taken onboard buses and rail. In other cases, there have not even been efforts to accommodate bicycle parking at public transport stations. However, in the past decade, an increasing number of developing cities in South America and Asia have begun to plan and implement integrated services.

A limited number of journal and press articles have addressed bicycle-public transport integration in developing world cities in Brazil, Colombia and Southeast Asia (Tobias et al., 2012; Nuñez, 2014; and Travelling Two, 2015). Many cyclists accessing public transport stations in these developing cities are low-income commuters seeking to access opportunities in the city centre (Carvalho de Souza et al., 2017). In general, common barriers to cycling cited in many of these studies include a widespread lack of infrastructure for bicycles, parking facilities, road safety, security and poor road maintenance.

In other cities, much of the data has come from agency publications reporting on bus rapid transit (BRT) systems that accommodate bicycles on board. For example, in Bogota, Colombia, where bicycle trips average seven kilometres in length, Transmilenio (BRT system) allows bicycles on board under certain conditions (Nuñez, 2014). Similarly, in Cape Town, South Africa, the MyCiTi system allows for bicycles on the BRT services, if they are stored safely (MyCiTi, 2019). In both cities, BRT serves less that 20 percent of all bus trips and most of the remaining bus services are privately owned/managed and do not accommodate bicycles on board.

Case Study: Santiago, Chile

Local planners and researchers in Chile have increasingly sought to improve the access of nonmotorized modes to public transport, as have bicycle advocates. The following paragraphs provide background on Santiago: its geographic setting, its urban expansion, its regional transport network and the implementation of Transantiago, a comprehensive public transport programme.

Urban Characteristics

Santiago, a city of more than six million inhabitants, is the capital of Chile. It is a primate city, far outdistancing the size and density of the next two largest metropolitan areas: Greater Valparaiso and Greater Concepcion (see Table 1). The downtown is still a centre of commercial activity; however, transport infrastructure investment has supported commercial and residential decentralisation (Rivasplata, 2006). Whilst Greater Santiago has seen spatial expansion, urban densities have also increased in certain areas of the city (INE, 2017).

This growth has continued to perpetuate an established pattern of development in Santiago: higher residential densities in lower-income areas of the south and west, and relatively lower densities in many of the affluent areas of the east (INE, 2017). In addition, motorisation rates have continued to rise, as increased investment in road infrastructure has further promoted car ownership. With more than 1.2 million registered vehicles (INE, 2017), Santiago has seen a significant rise in the levels of congestion and vehicle emissions.

Table 1. Chile: Characteristics of the Principal Metropolitan Areas, 2017			
Indicator	Greater Santiago	Greater Valparaiso	Greater Concepcion
Population	6,160,000	901,500	722,900
Land Area (hectares)	81,200	25,700	17,900
Density (persons/hectare)	76	35	40
Daily Trips	18,460,000	2,295,000	Not available
Sources: INE, 2017; City Population, 2019; SECTRA, 2017			

Transport Network

The Santiago transport network is chiefly comprised of many of the same modes found in other cities: private transport; public transport; cycling and walking. Historically, public transport played a predominant role in transport provision, however growth in disposable income and greater access to credit led to explosive growth in car use beginning in the 1980s. In the past few years, there has also been an influx of a few other alternative modes that have seen growth in the industrialised world, including scooters.

Bicycle day in Santiago de Chile, by Armando Lobos, https://wordpress.org/openverse/image/fd4b5ffa-9746-4ad6-ac6f-4bf4a3799eb8.

The public transport system in Santiago consists of buses, shared taxis, a heavy rail metro system and a regional rail line (Rivasplata, 2006). The road-based public transport modes are privately-operated and regulated by the government, whereas the rail-based modes are publicly operated. The entire public transport network has been branded as one multimodal network, Transantiago. Collectively, public transport carries over five million daily passengers: 80 percent by bus, six percent by shared taxi and 14 percent by rail (see Table 2).

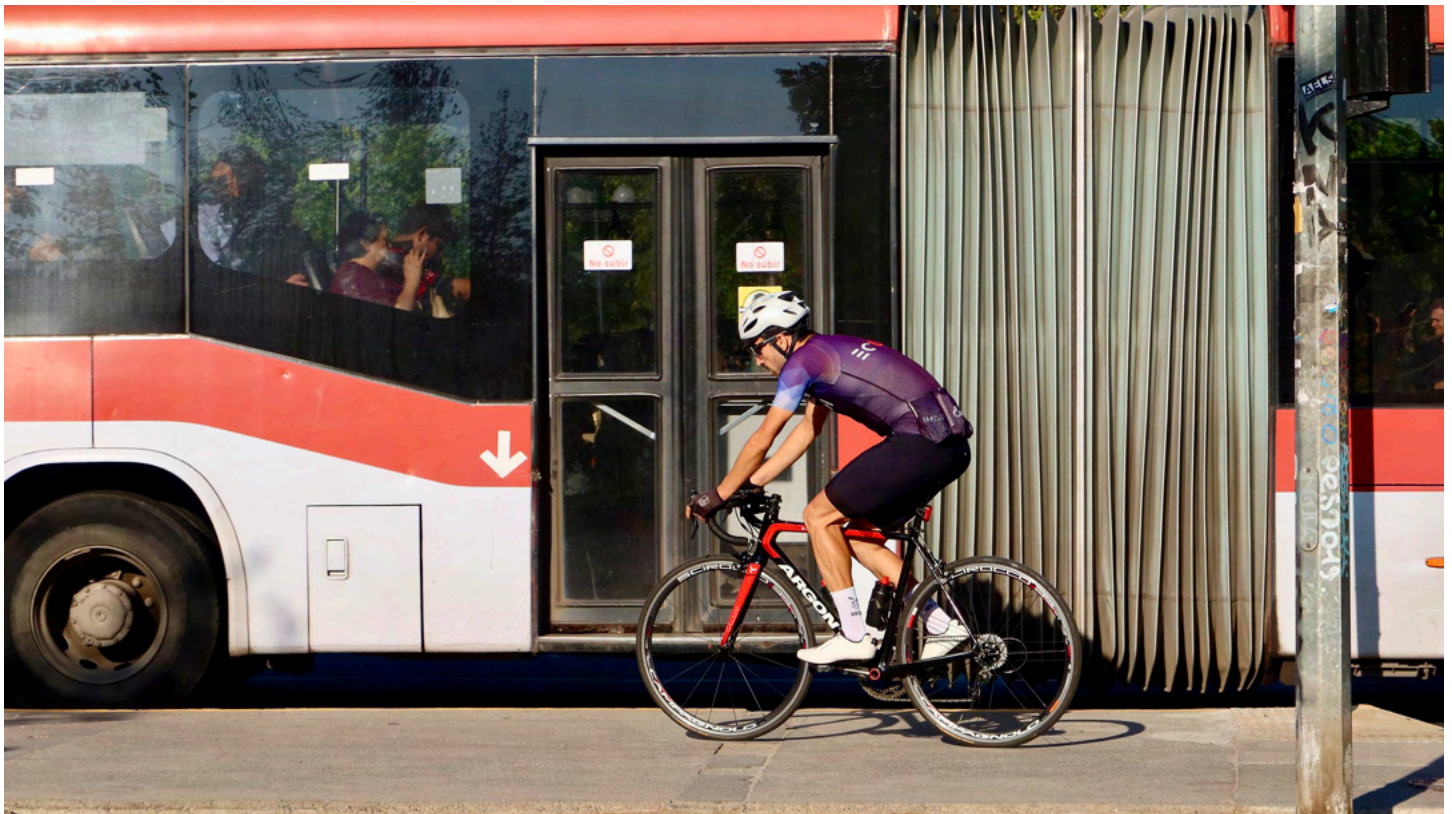| Table 2. Santiago Daily Travel Characteristics, 2012	
Indicator	Greater Santiago
Trips: All Modes (thousands)	18,460
Mode Split (percent)*	
Private Transport, including taxi	27.4
Public Transport	31.7
Metro	5.0
Bus	17.1
Multimodal (Metro and Bus)	6.7
Other (including Shared Taxi)	2.9
Walk	34.5
Bicycle	4.0
Other (including Motorcycle)	2.4
Public Transport Trips (thousands)	5,940
*Mode Split for all trips Sources: Subsecretaria de Transporte 2012, SECTRA 2017	

Bicycle Transport

In the past decade, there has been a meteoric rise in bicycle use, with Santiago now boasting one of the most extensive bicycle networks in South America. More than 1.2 million bicycle trips are taken on Santiago streets each day, as the mode split for bicycle now approaches six percent, a significant rise from the four percent mode share reported in 2012 (El Mostrador, 2019). In response to this increased demand, the Santiago local government has invested heavily in bicycle infrastructure: there are now 400 kilometres of bicycle lanes ("ciclovias") in Santiago, up from just over 200 kilometres in 2014 (El Mostrador, 2019; Chandler, 2014).

Transantiago

Structurally, Transantiago features a hierarchical route structure that includes buses, the Metro and shared taxis. It consists of two interconnected components: a system of long-distance trunk routes along major travel corridors of the region; and a system of local and feeder routes that supplement the trunk routes (Malbran et al., 2003). Collectively, these form a tight, well-connected network of routes with good physical integration at key points of transfer, as well as coordinated fare and information systems (Muñoz et al., 2008).

Transantiago's launch in February 2007 was problematic, as design issues and operator service changes (including the restructuring of routes and reductions in the number of vehicles available) resulted in inadequate service (Muñoz et al., 2008). However, in the past decade, Transantiago has regained the confidence of system users, as planners have established new fare and route standards, service frequencies and improved interchange (Muñoz et al., 2014).

Under Transantiago, service planners have achieved a higher level of coordination amongst public transport modes. However, whilst ground-breaking in its approach, Transantiago has been limited to public transport delivery and the challenge has been to improve last-mile bicycle access to bus or metro.

Santiago de Chile, photo by Armando Lobos, https://www.flickr.com/photos/armandolobos/52538612251/.

Transantiago and Bicycles

Transantiago was not initially designed to widely accommodate bicycles on board nor at bicycle parking facilities at points of interchange. Some early efforts to connect bicycle and public transport trips in Santiago took place before the implementation of Transantiago and were initiated through advocate-based efforts, coordinating with bus operators, the Metro and the suburban train operator (Sagaris, 2006). Some of these efforts have advanced to the proposal stage (El Mercurio, 2018).

Even though local government has recently secured a significant level of investment in bicycle infrastructure in Santiago, much of the initial bicycle route planning did not fully consider connections to public transport facilities (e.g., bus and rail stops and routes). Bicycle infrastructure has significantly expanded in the last decade, as advocacy groups and transport experts have generated increased interest in filling historic voids.

Methodology

This study explores efforts to link the bicycle with bus and rail, employing a case study approach in the analysis of the opportunities and constraints posed by integrated services. It also includes the results of a survey administered as part of a wider bicycle-public transport integration study conducted in San Francisco. In the case of Santiago, the intent is to identify the costs and opportunities encountered, whilst the San Francisco case identifies issues that are common to many bicycle-public transport integration efforts.

The case study method does not necessarily replicate conditions; however, it can facilitate the study of real-life situations where, under similar circumstances, specific variables are introduced. A case is selected in the context of a theoretical framework for the study (e.g., the establishment of specific forms of integration as a result of history, location and level of competition), within which the case illustrates a specific phenomenon.

This paper employs a mixed-methods approach, including a review of publications and journal articles on bicycle integration worldwide, as well as local government and transport industry documents and media reports in Santiago. This study also included interviews of bicycle experts in Santiago and a survey of cyclist-public transport users in San Francisco.

In the case of Santiago, several relevant public agency reports, newspaper articles and lecture presentations were consulted. This included the review of documents, articles, blogs and web pages from such sources as the Chilean Ministry of Transport, the Santiago Metro, and the Centre of Sustainable Urban Development (CEDEUS) in Santiago, as well as the El Mercurio and La Tercera newspapers In addition, it included one-on-one discussions with Dr. Juan Carlos Muñoz, Director of CEDEUS and Dr. Lake Sagaris, a bicycle advocate and urban planner, who has been involved in promoting bicycle transport for over 20 years.

The work in San Francisco consisted of administering a cyclist survey at nine major public transport nodes throughout the city, some in the city centre and others in neighbourhood commercial areas (Flamm and Rivasplata, 2014). It included intercept surveys of cyclists entering stations and terminals. In all, 174 surveys were distributed: 20 were administered on site, 134 were handed out to cyclists, and 20 were left on parked bicycles. A total of 71 surveys were returned, for a response rate of 40.8 percent.

Findings

The aforementioned research revealed an interest on the part of cyclists, transport planners and policy experts to develop strategies for improving bicycle access to public transport. Santiago has seen a surge in the volume of bicycles on the road only in the past decade, and thus, has only recently begun to develop bicycle-public transport integration options. In contrast, San Francisco has seen steady growth in bicycle use for the past 30 years and has provided an increasing number of options for accessing public transport.

Santiago

With the growth of cycling in Chile, several advocacy groups and university researchers have increasingly called for better bicycle access to public transport in Santiago. In the past decade, three separate services connecting these modes have been developed and made available to the general public: BiciMetro, Bike Santiago, and BiciBus. In addition, bicycle advocates and sustainability groups have proposed other alternatives for combining bicycle and public transport use (Muñoz Interview, 2020).

Figure 1: *Cyclist leaving his bike at a Metro guardería (Source: Santiago Metro)*

BiciMetro

This Metro-sponsored programme has provided "guarderías" or secure bicycle storage cages at eight Metro stations. The programme forms part of the Metro's sustainable transport policy to reduce impacts on the environment (Metro de Santiago, 2017). Most of these stations are located on the urban periphery, far from the city centre, providing cyclists with the opportunity to leave their bicycles at Metro stations and easily access the Metro (see Figure 1). Guarderías are closely monitored by Metro staff and feature numbered "cages," where the bicycle is protected until the cyclist returns to retrieve it (see Figure 1).

The primary barriers to programme expansion are the lack of space at several stations, and a hesitation on the part of the Metro to create new spaces. The price of this service for the user is not a limiting factor, as it is inexpensive—less than US$1 per day. Participating Metro stations are near commercial nodes on the urban periphery and over time, some infrastructure has been built to improve cycling in the immediate area. However, some corridors leading away from these areas still lack connections to other bicycle routes.

Bike Santiago

Inaugurated in 2013, Bike Santiago features more than 150 stations (Bike Santiago, 2019; La Tercera, 2015). Along with Bici Las Condes and a few smaller bikeshare companies, it comprises the city's Integrated System of Public Bicycles (La Tercera, 2014). Bike Santiago is financed by Itau Bank and managed by Tembici, a Brazilian bikeshare company. Most of the bike share stations are either located in Central Santiago, or the affluent areas to the east of the city (e.g., Providencia, Vitacura). Whilst this system features bike share stations at many strategic locations, several factors are considered when choosing a station location and only about a dozen Metro stations are directly served (Bike Santiago, 2019).

There are clear barriers to the use of Bike Santiago by a significant sector of the population and riding public. Whilst some cyclists, particularly tourists and high-income residents, access bikeshare at one or both ends of a Metro trip, for most daily bicycle commuters, this is an expensive option, given bike share costs are high (e.g., as much as US$9 per day). In addition, bike share stations have not been established in low-income areas of the urban periphery (e.g., La Pintana), where per capita bicycle use is highest (Advis Jimenez, 2011).

In contrast, communities on the affluent east side of the city have seen significant investment in bicycle infrastructure with Providencia boasting the highest concentration of bicycle routes in Chile. These facilities have made cycling an attractive option for these areas and have attracted the highest number of bike share stations in the city (Chandler, 2014).

BiciBus

The most recent effort to integrate bicycles with public transport began in 2018. It consists of a pilot programme to install bicycle racks at the front of participating buses in Santiago (see Figure 3). The concept was conceived by students and researchers at the Universidad Católica in Santiago, who argued that the installation of bike racks on buses would be inexpensive and only add an average of eight seconds per person to the overall loading time at stations (El Definido, 2018). In 2015, CEDEUS, a research centre affiliated with the Universidad Católica, studied the feasibility of implementing BiciBus with front-loading bike racks, and presented its findings to the Transport Ministry (Publimetro, 2015).

Subsequently, the Ministry approved the launch of a pilot programme and the Vule bus company, one of several private bus operators regulated by the government, agreed to participate in the programme. With government support, it equipped 10 of its buses (operated along a single route) with bike racks (El Mercurio, 2018). During the pilot period, ten monitors were employed to observe operations.
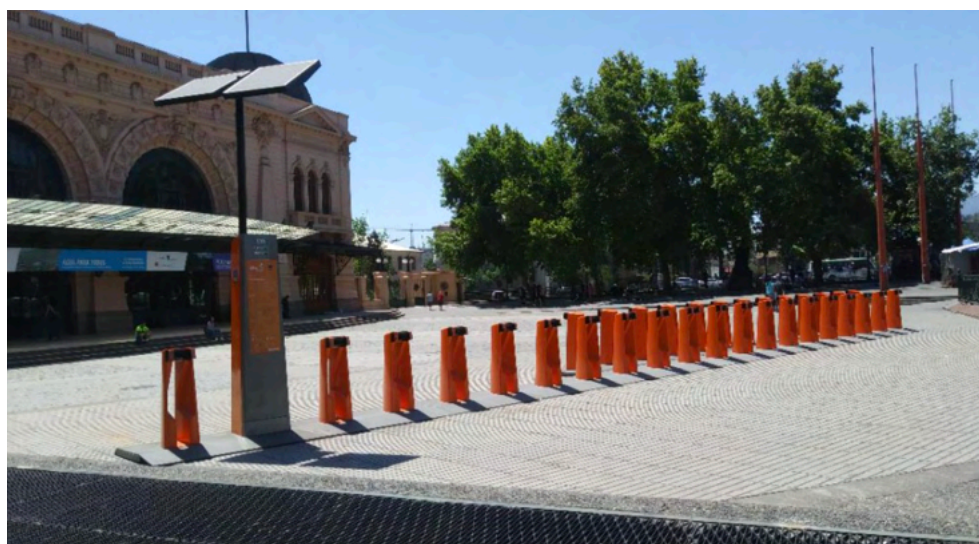
Since the initial pilot, the project has faced institutional barriers, preventing it from effectively offering intermodal connections to areas of high bicycle-public transport demand. Whilst initial reports indicated that the pilot was moderately successful (El Mercurio, 2018), no further pilot projects have been scheduled in the last few years. Thus, since the initial two-month pilot project ended in March 2018, the Ministry of Transport has not moved forward to provide incentives for other bus companies to equip their vehicles.

San Francisco

The focus of this study is on Santiago, however experiences with bicycle-public transport integration in San Francisco are worth exploring, as it has encountered many of the same coordination issues. San Francisco, a city of about 850,000 inhabitants, is the historical and cultural centre of the Bay Area, a metropolitan area of more than seven million in Northern California. Given its initial development as an important commercial center prior to the advent of the car (19th century), this city has the highest population density in the Western U.S., averaging around 72 persons per hectare. Unlike many other cities in the U.S., San Francisco has retained much of its historic public transport infrastructure, providing comprehensive service on a number of its bus and streetcar lines, particularly in the central city.

Since the 1990s, there has been an upsurge in the number of bicycles on the road, rising to approximately four percent of the City's entire travel demand in 2017 (SFMTA, 2017). The San Francisco Bicycle Coalition and other advocacy groups have been instrumental in seeing that bicycles are fully considered in all transport plans and development. In the 1990s, the city hired its first bicycle coordinator (1992) and adopted its first bicycle plan (1996) while simultaneously bicyling was increasing. 2009 Bicycle Plan has provided solid support for investing in bicycle infrastructure to keep up with growth in demand (SFMTA, 2009).

Figure 2. A bike station near the Cal y Canto Metro Station (Source: Charles Rivasplata)

An increasing number of public transport operators in the Bay Area have provided bicycle-public transport integration at key points of interchange: they have offered bicycle parking facilities at train stations, bus stops and ferry terminals; and have allowed for bike storage on buses and some trains. Additionally, since 2013, a regional bike share company has operated bike share stations in areas near public transport stations and terminals (BAAQMD, 2015).

During peak and off-peak periods, a survey was administered to bicycle riders directly accessing public transport at important stops and stations in the city of San Francisco. An analysis of the data yielded the following findings:

- Cyclists accessing public transport were largely male, white and well-educated, a profile that reflects the population of cyclists identified in most studies in the U.S. Similar to in Santiago, there was a genuine concern that there is not equal access to bicycle transport, and thus, historically-disadvantaged populations are unable to enjoy some of the benefits that cycling and its integration with public transport can offer (e.g., time savings)

- The users fell into one of two categories: those that use bicycles as an access mode to public transport and thus need bike parking facilities; and those who access public transport by bicycle and bring their bicycles with them. In Santiago, bicycle parking is being addressed but not the need to bring bikes on board.

- Most survey respondents combined public transport and cycling for work-commute trips, but just over one-quarter of the respondents combined public transport and cycling for non-work trip purposes. Again, this distinction between bicycle commuters and other bicycle users is important to highlight. In Santiago, it is not clear that efforts are designed to benefit both of these groups.

Analysis

This section provides a review of the findings for Santiago and lessons learned from the San Francisco survey. It provides a look at recent practice concerning the integration of bicycles and public transport.

Prior to the 1990s, bicycle infrastructure was non-existent in Santiago and the city was rapidly changing with the proliferation of the car. It was the return to democracy in 1990 that empowered transport planners and engineers to begin to dream of new alternatives, although emphasis was clearly placed on improving the public transport system and enhancing the road and highway networks in and around Santiago. A greater level of attention on quality of life concerns prompted residents to speak out against road projects that endangered their communities (e.g., Costanera Norte).

During the 1990s, bicycle advocates began to support less impactful modes that could mitigate potential impacts, gradually resulting in a strong call for better bicycle infrastructure (Sagaris, 2006). Local government eventually capitulated, identifying ways of improving bicycle infrastructure, initially in the middle- to high-income areas of the east side, but later, in other areas of the city. Moreover, despite its initial difficulties with implementation, the Transantiago Plan eventually prompted the need to improve bicycle-public transport integration, i.e., an initiative strongly supported by bicycle advocates (e.g., Ciudad Viva). In the spirit of integration, the next question was how the city's growing use of the bicycle could be further promoted through connections with public transport.

Even though most bicycle advocates were convinced that integration was indispensable, and some operators agreed, others questioned the possibility of integrating bicycles into bus and rail systems. Often, it was pointed out that space was an issue, particularly during the peak period when bus and rail vehicles are packed.

But what about the daily commuter? What is Santiago doing to encourage its communities to go green, reduce carbon emissions, reduce road congestion, and improve health? For the past decade, the answer has been the BiciMetro programme (secure bike storage). In a limited number of areas, bicycle paths connect one metro station to the next, with designated areas to park bikes. As mentioned, this service benefits a significant number of bicycle riders from the south and west, effectively allowing these users to access longer trips to commercial areas of the east and centre.

Another important service, especially for the recreational/occasional cyclist is the Bike Santiago bike share programme, which features some bike stations near the Metro. However, it can be costly for daily commuting, especially for low- and middle-income cyclists working in the city centre or areas of the east. In addition, it only serves some of the Metro stations and requires a special subscription (Bike Santiago, 2019).

The BiciBus, promoted by CEDEUS and bicycle advocates, effectively allows for two bicycles to be mounted onto the front of the vehicle (El Mercurio, 2018), but the pilot project did not result in full implementation, perhaps as the result of a change in national government in 2018. There has been hesitation on the part of the Transport Ministry to include bike rack requirements in the recent bus contracts. If implemented in the future, specific bus tendering provisions could prove to be a great way of ensuring that some or all buses offer this integrated service.

According to discussions with the Director of CEDEUS in Santiago, that organisation has even promoted the idea of allowing bicycles on Metro vehicles during off-peak periods (Muñoz Interview, 2020). This would involve allowing cyclists on the end train cars, much as BART did in the Bay Area in the late 1990s. In the latter case, advocates were successful in getting BART to allow bicycles in all but the first car during non-peak hours, and the first three cars during peak hours.

The findings in San Francisco allow us to draw some general conclusions concerning integration.

For example, bicycles and public transport serve as access modes for each other, allowing travellers to access public transport and use bicycles for transport when they might not otherwise be able to. In Santiago, this is especially relevant in peripheral areas, where access to opportunities is often poor.

In addition, catchment areas for cyclists accessing public transport are larger than for pedestrian-public transport users, as access trips by bicycle exceed the distance that public transport riders would be willing to walk.

Nevertheless, catchment areas are complex, as cyclists travel for many reasons and often do not take the shortest or most direct route to a public transport stop or station (Flamm and Rivasplata, 2014).

Further analysis of the data received from the 2014 survey in San Francisco identified current issues faced by cyclists accessing public transport (Flamm and Rivasplata, 2014). This effort yielded the following results:

• Catchment areas for bicycle riders are significantly larger than for riders who walk to public transport stations and stops.

• The distances that most bicycle users travel would take much longer to travel on foot.

• The value to bicycle users of combining cycling and public transport goes well beyond simple time savings.

• The ability to combine cycling and public transport provides an alternative to costlier modes of travel.

• The ongoing provision of orientation materials is a vital element in the promotion of bicycle-public transport integration, i.e., both parking availability and onboard options.

Figure 3. A BiciBus vehicle with a front-loading rack (Source: FMDOS)

Conclusion and Recommendations

In conclusion, bicycle-public transport integration not only requires a change in societal attitudes, but also depends a great deal on developing and managing infrastructure at points of interchange. In many countries, the bicycle has historically been considered a second-class transport mode, not worthy of the attention paid to motorised transport. Over time, many industrialised countries have responded, providing bicycle infrastructure and linking this mode to public transport at key points. In many developing countries with limited resources, it has been a challenge to coordinate key players and meet potential demand for intermodal connections. In Santiago and other developing country cities, advocates and bicycle planners have worked with government representatives to highlight the benefits of cycling and its contribution to broadening the catchment areas for public transport.

An examination of the available information on bicycle-public transport integration in Santiago revealed that despite past gains, Transantiago does not yet offer a comprehensive programme of options for connecting bicycle and public transport trips. Whilst BiciMetro has provided a cheap opportunity for low and middle-income residents to park a bicycle and access the Metro, it is limited to the amount of space available at each Metro station.

Since the BiciBus pilot project has not yet been fully implemented, cyclists do not currently have the option to bring their bikes with them when they combine modes.

The project has been paralysed since 2018, when there was a change in government—negotiations need to be resumed. Similarly, if the proposal to bring bicycles on the end cars of Metro trains were further piloted and expanded, perhaps it could be shown that there is room to accommodate bicycles on board during specific off-peak hours.

Such a programme could shift ridership to the off-peak periods, consistent with the objectives of off-peak pricing.

Interestingly, the San Francisco study yielded two key conclusions supporting the need for integrated services in industrialised and developing countries: (1) public transport catchment areas are much larger for bicycle-public transport users than for public transport users, who access buses and rail on foot; and (2) the concept of a bicycle-public transport catchment area is quite complex and good integration provides a variety of travel opportunities to public transport users. In Santiago, we see that cyclists often take advantage of larger catchment areas to reduce their travel costs.

In the San Francisco Bay Area, during non-peak hours, bicycles are permitted on BART, except for the first car. As part of a feasibility study, the Santiago Metro could conduct a survey of bicycle riders to see if they would take advantage of this opportunity and if so, develop a pilot project on a less congested line (during off-peak hours). It is recommended that the national and local governments in Chile take a more proactive role in implementing the BiciBus programme citywide, as well as in studying the feasibility of allowing bicycles on the Metro. Integration can be mutually beneficial: cyclists significantly extend their geographic range, whilst public transport operators expand their catchment areas and provide access to a much wider area (e.g., reducing dependence on the private car).

What is lacking in the Santiago case is an ongoing commitment on the part of the local and national governments to engage multimodality and expand the scope of integration so that a larger number of system users can combine their bicycle journeys with bus and rail trips, or vice versa. A political champion needs to commit to making sure that government carries through with integration.

Where financially and technically feasible, cities of the developing world should actively promote bicycle-public transport integration in order to provide more equitable access to mainstream activities. The Santiago example offers a few lessons concerning how to proceed. Clearly, there needs to be a comprehensive assessment of each city considered and the establishment of interagency groups to plan, design and implement services that account for settlement patterns and available transport modes. In addition to bicycle-metro and bicycle-bus integration, there needs to be public outreach to educate and provide residents with the tools that they need to fully participate in future planning.

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Rights in Transit: Public Transportation and the Right to the City in California's East Bay

By Kafui Ablode Attoh

Is public transportation a right? Should it be? For those reliant on public transit, the answer is invariably"yes" to both. Indeed, when city officials propose slashing service or raising fares, it is these riders who are often the first to appear at that officials' door demanding their "right" to more service. Rights in Transit starts from the presumption that such riders are justified. For those who lack other means of mobility, transit is a lifeline. It offers access to many of the entitlements we take as essential: food, employment, and democratic public life itself. While accepting transit as a right, this book also suggests that there remains a desperate need to think critically both about what is meant by a right and about the types of rights at issue when public transportation is threatened.

Drawing on a detailed case study of the various struggles that have come to define public transportation in California's East Bay, Rights in Transit offers a direct challenge to contemporary scholarship on transportation equity. Rather than focusing on civil rights alone, Rights in Transit argues for engaging the more radical notion of the right to the city.

About the author: Kafui Ablode Attoh is an assistant professor of urban studies at the CUNY School of Labor and Urban Studies.

Review by Michelle DeRobertis

This book discusses the intersection of rights, transit, equity and cities. The author presents rights from a different point of view, not as a civil right, but as a fundamental right to the city, citing research by Lefebvre and Marcuse. Attoh also devotes one chapter to the rights of transit workers vs transit riders. He also touches on other related transportation policy issues. For example he correctly points out how the complete streets movement has ignored transit needs: "complete" for many only means space for biking and walking, while transit lanes and the adverse impacts of "complete streets" on bus travel times are rarely addressed. This also has equity (as well as environmental) implications.

Like a lot of good research, this book raises more questions than it answers. Some of the equity issues it raises are presented through the case studies of several lawsuits that transit agencies have faced over the past four decades, which is interesting from a historical perspective. Many of these events are from San Francisco, Oakland and Berkeley, California, USA and being from Oakland myself, I am familiar with several of these events. While I could quibble with the characterizations and discussions of some of them, the book still provides a convincing thesis that transportation —and one's access to it —is fundamental to all other aspects of one's life.

However I would have liked to have seen acknowledgement that often transit agencies hands are tied in that they do not control their funding. For example, Chapter 2 highlights the lawsuit against the Oakland Airport BART connector which was challenged on Title 6 issues (the U.S. law on Equitable Impacts). Yet I would have liked the book to have more analysis of the issues behind the decision.
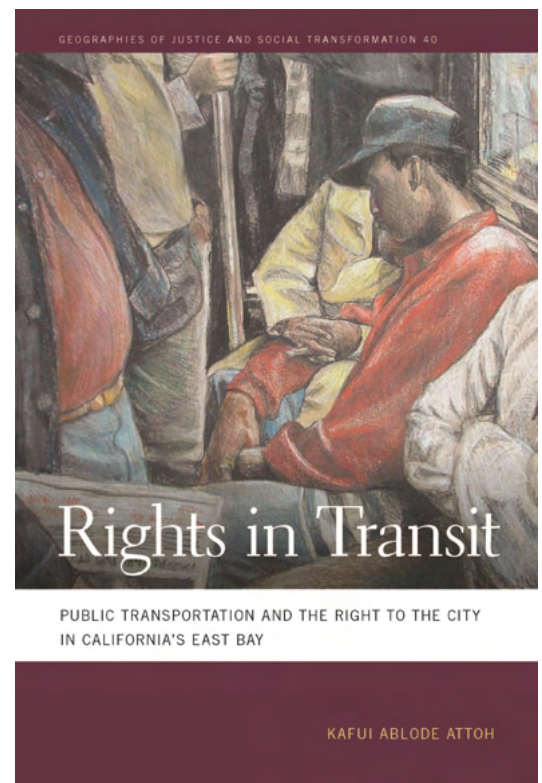
Particularly in this case, I would argue that regional transit projects such as airport connector projects are essential to—or at least very helpful to— the economic vitality of large metropolitan areas, not to mention are necessary to reduce the number of cars (and Ubers) to access airports. I agree that such projects should not be funded to the detriment of local bus service. But I disagree with the author that rail connections to airports are not important transit projects. To me the crux of the issue is: how could /should regional transit projects be funded? The fight over these funds illustrates how backwards transit planning has been in the USA in general and in San Francisco Bay Area: two key airport connector projects, (BART to SFO and BART to OAK), instead of being constructed in the first place, had to be retrofitted in decades later with scarce transit capital funds which had to compete for funds that could and should be used to expand and improve local bus service. This case begs the bigger question of who is responsible for funding and providing transit in the first place; transit agencies can only do what they are provided funding to do, especially given that in much of the U.S., transit agencies are not "the government" with tax authority, but are dependent on a hodgepodge of funding sources over which they have no control. In sum, the common thread that I picked up throughout this book was that of transit funding.

In addition, I would have liked to have seen an argument that even the most transit-dependent deserve high-quality, fast, affordable transit modes (not merely slow city busses stuck in traffic).

This requires adequate funding and is a public policy choice that most states in the USA still haven't grasped. It should never have to come to a choice between maintaining adequate bus service versus providing commuter rail (or a connector to a major international airport or a decent metro system or even BRT). Indeed, such fast modes, sited to serve major destinations, will also serve the people that this book is talking about. A look at any major German city will show you that they have it all— not just buses and one suburban rail line, but busses and multiple forms of rail transit that include rapid transit in the form of an underground metro, surface tram /light rail lines, multiple suburban/ commuter rail lines, intercity regional rail connecting cities within the states, and finally the national rail network. Consequently, all demographic groups—and especially those without cars—have the access to the city (and entire region) that Attoh espouses. This is research that is desperately needed: whether, which and how the multiple types of rail public transit (fast, frequent, and affordable) contributes to transportation equity.

I would argue that the true equity problem with transit in the USA is funding, and how each individual agency is often left to scramble for it for themselves. Even transit agencies within the same state have vastly different sources of funding, often county by county, (as in California). This presents numerous challenges to create a cohesive regional system in a large metropolitan area.

The interstate freeway network was not planned and funded county by county; why is public transportation treated differently?

Another aspect of equity that was touched on was that of fares. Needless to say, many more pages could have been devoted to just fares and equity. And as with service, fare policy is also dependent on funding. The U.S. mania with Farebox Recovery Ratio (considering transit subsidies as a bad thing) is misguided and out of step with the rest of the world. More transit riders is a good thing: for cities, for people of all demographic groups but especially the most vulnerable, for businesses, and for the planet. In March 2002, Paris recently addressed the equity in suburban train pricing by capping one-way fares within the Isle de France at €5 (including both RER and Transilien trains: see https://parisbytrain.com/rer-ticket/ and https://www.iledefrance-mobilites.fr/titres-et-tarifs/detail/billet-origine-destination#conditions) and reducing their suburban monthly pass price at the expense of raising the price of the pass that serves only the City of Paris. Admittedly in Paris, their demographics is the opposite of the U.S. (the wealthier tend to live in the city and more affordable housing is in the suburbs); the point is that pricing structures can be made equitable while providing a robust, affordable and frequent rail transit system for everyone. Subsidies, and therefore funding, again is key.

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.

Vertical photo of a man in winter clothes, waiting with his bike, the train. In the background the train that is about to arrive. Photo credit Lorenzo Photo Projects, stock.adobe.com.