

Urban Mobility, Health and Public Spaces: Reshaping Urban Landscapes

Urban 20 White Paper

A contribution from Felipe Targa, William Moose, Nicolás Estupiñán and Carlos Mojica to the Urban 20 (U20)



About Urban 20

Urban 20 (U20) is a new city diplomacy initiative developed under the leadership of, Horacio Rodríguez Larreta, Mayor of the City of Buenos Aires, Anne Hidalgo, Mayor of Paris and Chair of C40 Cities Climate Leadership Group (C40). Launched on December 12, 2017 at the One Planet Summit in Paris, the initiative is chaired by the cities of Buenos Aires and Paris, and convened by C40, in collaboration with United Cities and Local Governments (UCLG).

U20 seeks to highlight the expertise of cities in a range of global development challenges and to raise the profile of urban issues within the G20. U20 offers solutions and clear recommendations for consideration by national leaders ahead of the 2018 G20 Summit. It will culminate in the inaugural U20 Mayors Summit in Buenos Aires on October 29-30. This will be a stepping stone towards ensuring a dialogue between cities and the G20.

In 2018, 26 cities have participated in Urban 20: Barcelona, Beijing, Berlin, City of Buenos Aires, Chicago, Durban, Hamburg, Houston, Jakarta, Johannesburg, London, Los Angeles, Madrid, Mexico City, Milan, Montreal, Moscow, New York, Paris, Rio de Janeiro, Rome, São Paulo, Seoul, Sydney, Tokyo, and Tshwane.

For more information, please consult: www.urban20.org

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Urban 20 is proud to present a series of White Papers from our Strategic and Advisory Partners that highlight the most relevant topics on the cities development agenda and the forthcoming urban trends. These papers define the challenges that local governments are currently facing and offer open recommendations supported by relevant, up-to-date research and data. The intention of this work is to broaden the understanding and perspective of decision makers and stakeholders as to enhance their ability to tackle these most pressing issues. The White Papers also represent the hard work and dedication of these agencies and organizations to keep the public well informed about the ongoing efforts to address the present and future challenges we share as humankind.

Image Orbon Alija

Urban Mobility, Health and Public Spaces: Reshaping Urban Landscapes is a White Paper prepared by subject matter experts from U20 Strategic Advisory Partners as a voluntary contribution to enrich the discussions of the Urban 20 process.

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Executive summary

Cities are critical actors in the efforts to address global and localized challenges and their traditional role as drivers of economic growth and innovation. Coupled with the growing share of the global population residing in urban areas, cities' relative importance is ever increasing. Cities are uniquely poised to play a role at every scale necessary for urban transformation: the street, the neighborhood, citywide, and in collaboration with regional and national governments.

The challenges to be addressed, both locally and globally, relate to mobility needs and access to social and economic opportunities, public health, an insufficient supply of and access to public spaces, and interrelated issues relating to sustainability and resilience.

This paper argues that cities can have a positive impact on these issues by leveraging a nearly omnipresent but often overlooked asset: streets. To do this, cities need to reexamine the dominant existing uses of streets, which in most places are for moving and storing private motor vehicles. Instead, cities must embrace the multifunctional street concept, which recognizes that mobility is merely one of the uses of a street and that streets can also have a place or public space function as well as an environmental function. By balancing street space among these three uses—mobility, place, and environment—cities can create urban transformations and, in the process, address numerous local and global challenges. Reclaiming the streets' public space function can be an effective way of addressing the issues of supply and access to public spaces, while providing benefits for health equity, social inclusion, the environment, and sustainable forms of mobility.

In order to take advantage of the full potential of streets, coordination among government agencies will be key at the local, regional and national scales. Efforts to transform streets into drivers of positive change will also benefit from close collaboration with local communities and private sector stakeholders, and with non-traditional planning partners such as public health officials and researchers.

This paper reviews relevant plans, design guidelines, and academic literature on the topic of a multifunctional street paradigm, presents case studies of projects around the world where these principles have been implemented, and makes recommendations for cities and national governments in order to optimize transformative street initiatives. Collectively, the literature review, case studies and recommendations highlight an ongoing paradigm shift toward healthier and inclusive streets at a global scale. Accelerating the pace and scale of this transformation of urban landscapes will require a call for coordinated action and intervention at multiple levels ranging from the local street to the halls of national governments.

Glossary

BIGRS

Bloomberg Initiative for Global Road Safety

CAF

Development Bank of Latin Am

GDCI

Global Designing Cities Initiative

GDP

Gross Domestic Product

GHG

Greenhouse Gases

IDB

Inter-American Development Bank

ITF

International Transport Forum

NACTO

National Association of City Transportation Officials

SDG

Sustainable Development Goals

UN

United Nations

WBG

World Bank Group

WHO

World Health Organization

1. Introduction

We live in an increasingly urbanized world where cities are becoming the engines of global economic growth.¹ According to United Nations (UN) figures, as of 2018, 55 percent of the world's population lives in urban areas, a proportion that is projected to grow to 68 percent by 2050. The combined factors of urbanization and general population growth will likely add a further 2.5 billion people to urban areas by 2050 (United Nations 2018). Such rapid growth and urbanization pose immense challenges and opportunities for cities: in this context they will play an ever more vital role in addressing global challenges while having to continue to meet the local needs of their residents.

The complex and seamless intersection of the social, built, and natural environments in urban areas offers opportunities to address some of the global challenges for sustainable development while bringing benefits to urban residents. Conversely, poor management of this interaction poses serious risks to public health, social inclusion, and the environmental sustainability of cities. This paper presents a framework for local and national governments to address many of these challenges by focusing on one particular element of the city: the street. This element has the potential to continue serving the movement of people and goods while also offering more sustainable mobility options, increased access to opportunities, and the unlocking of a wide range of social, economic and environmental benefits for local residents.

The street can also play a fundamental role in contributing to global sustainable development goals. A critical first step toward tapping into this potential must be the recognition that many of these problems stem in large part from the automobile-centric design that until recently has dominated the public policy debate on urban design and transportation planning. The conceptual framework and recommendations presented in this paper offer elements and arguments for policy decision makers to scale and accelerate a paradigm shift that is already reshaping the urban landscapes in cities around the world.

Over the past decade, a new wave of collaboration has emerged among urban and transportation planners, engineers, public health researchers, and other social scientists who have studied how urban design and environments affect health, social inclusion, and other development outcomes. A new urban health agenda gaining momentum among researchers and public officials focuses on the effects of urban policies and interventions on health outcomes and social inequalities of health, as well as the environmental sustainability of cities (Diez Roux 2018). This agenda offers a novel approach to understanding how the form and quality of urban landscapes are interrelated with key concepts of human and environmental capital in cities and, from a development perspective, offers an alternative approach to identifying urban interventions with the potential to produce happier, healthier, more economically vibrant and prosperous communities and nations.

Evidence from this wealth of research has demonstrated that the environments where we live, work and play define and shape how healthy a community or an individual is, and, if combined with other policies, how prosperous and inclusive a society is. This is how public space is becoming integral to the urban health concept and to the sustainable development agenda. In spite of this evidence, practitioners and public officials continue planning and designing the most important shared places in cities—public spaces—without fully understanding and taking into consideration all of these interactions and implications.

The quantity and quality of public spaces differ considerably from city to city and within city neighborhoods. Based on the existing research, access to and quality of available public

¹ 600 cities are projected to generate more than 60 percent of global growth by 2025 (McKinsey Global Institute 2011).

spaces across and within cities may be related to health equity and social inclusion outcomes in urban areas around the world. A city's public spaces comprise streets (including curbs, sidewalks, and space of transportation networks), parks, plazas, river and sea waterfronts, cultural and recreational public facilities, and other open, privately owned spaces. These are the spaces that support mobility, recreational/physical activity, opportunities to access job markets as well as health and education centers, to meet and see others, to access nature and greenery, and more (Gehl Institute and Robert Wood Johnson Foundation 2018). Although public spaces could be distributed functionally and spatially in support of most of these needs, on a global scale streets represent around three-quarters of a city's public space.

“The high proportion of urban public space represented by streets offers an opportunity for governments to target a review of public policies on this particular infrastructure element of the city”.

With the advent of the automobile, many cities around the world faced a radical shift toward automobile-oriented development with the construction of wider urban roads and highways, and the rebalancing of street public space to accommodate motor vehicles. This dedication of street space to motor vehicles involves significant subsidies for private car use, both directly in the form of underpriced parking, street maintenance, and toll-free travel for motor vehicles, and indirectly through a range of negative social, environmental and health externalities created through motor vehicle use.

In recent years, cities around the globe are experiencing a new radical shift toward a healthier, more inclusive and balanced share of street public space. This change in paradigm is accompanied by ample evidence of the local and global costs from externalities associated with car-oriented street design, externalities that could be mitigated either by rebalancing the available space, or by pricing these externalities and eliminating the implicit subsidies historically provided for car parking and road space. This paradigm shift is being facilitated and accelerated by innovative approaches to street space use (e.g., participatory placemaking and tactical urbanism) and the advent of shared mobility services and autonomous vehicle technologies.

“This paper discusses key areas in which cities face significant challenges for equity, health, social inclusion, and environmental sustainability, and how the effective, equitable use of city streets can help to meet these challenges. The paper also discusses how cities and national governments can work together to harmonize their public policies and address these global challenges in a more effective manner”.

In order for cities to unlock the full potential of streets, they must shift away from a paradigm of using streets predominantly for moving and storing private motor vehicles toward one which recognizes that streets can serve other functions beyond mobility, such as place (the street's function as a public space) and environmental functions.

“By efficiently reallocating street space, cities can balance the mobility, place, and environmental functions of streets, thus improving urban health, reducing social inequalities, and strengthening resilience and environmental sustainability”.

It is important to realize that efforts to meet mobility, place, and environmental goals for streets do not need to be mutually exclusive and there are often opportunities to promote all three. The alternative to embracing a multifunctional paradigm for healthy and inclusive streets and instead prioritizing automobility will continue to lead to negative outcomes for cities and countries in terms of the numerous global challenges, and to worsen local equity and inclusion gaps.

This paper presents a conceptual framework for the evaluation of the mobility, place, and environmental functions of streets. This framework demonstrates how the intersection of the urban health, transportation (urban mobility and access to opportunities) and public spaces agendas shares a common objective, and how current trends in digital development, shared economy, and clean technologies offer an opportunity to accelerate this change in public policies. It also presents a number of cases from cities which have demonstrated the positive impacts of adopting holistic strategies that recognize the need to balance the three street functions. These cities include Madrid and Oslo for the creation of car-free zones; New York City, Buenos Aires and Paris as examples of the reallocation of street space for sustainable mobility and healthy public spaces; and Barcelona as one of the most radical citywide approaches to rebalancing the share of street space toward a multifunctional street paradigm. These cases illustrate how the new shift toward healthier and inclusive streets is occurring at a global level and is valid for various scales: the street, the neighborhood, and the city.

Reshaping urban landscapes through better street-based public space design, management and participatory approaches allows cities to explore quick and impactful ways to enhance the lives of citizens, neighborhoods, and cities as a whole. Well-designed and -managed public spaces within urban landscapes play multiple functions and serve as critical drivers of the quality and viability of a city's economic, social and environmental capital, impacting mobility, safety, public health, economic vibrancy, and innovation.

It is worth noting that addressing access, mobility, public space, and environmental challenges is firmly in line with many of the Sustainable Development Goals (SDG) adopted by the global community in the United Nations' 2030 Agenda for Sustainable Development and the New Urban Agenda, in particular the SDG 11.7 on Public Space: “by 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities”.



Source: Sustainability Writer - WordPress.com

2. Analysis

Cities are confronting a myriad of challenges today that have profound immediate and long-term impacts. To address many of these challenges, a critical first step must be the recognition that many of these problems stem in large part from automobile-centric design.

Several of these challenges are directly related to public health. One is the growing prevalence of sedentary lifestyles, which is directly related to the design of cities. Physical inactivity has been shown to increase the risk of heart disease, hypertension, stroke, diabetes, osteoporosis, and various forms of cancer, dementia, and depression. Urban places that encourage active forms of transportation like walking and cycling allow residents to benefit from physical activity as part of their daily routines. Because childhood obesity and diabetes are on the rise globally, including low- and middle-income countries, opportunities for active mobility are particularly important for reducing long-term negative health impacts for future generations (World Health Organization 2016). Unfortunately, development in many cities today is car dependent, leading to driving for even the shortest trips and consequently to negative physical, social and environmental outcomes. Although sedentary lifestyles are the leading cause of urban mortality in most cities worldwide, most national and local governments have not developed strategies to deal with non-communicable diseases related to urban living.

Ambient air pollution is another particularly alarming issue that accounted for an estimated 4.2 million deaths worldwide in 2016. The World Health Organization (WHO) identifies motorized transportation as a major contributor to the problem of poor air quality, and the noxious impacts of motor vehicles are particularly concentrated in urban areas (World Health Organization 2018). Motor vehicles are also a major source of noise pollution, which has proven harmful effects for the physical and psychological health of city dwellers.

Road safety also demands swift and decisive action: approximately 1.25 million people are killed each year in traffic crashes globally and a further 20 to 50 million sustain non-fatal injuries. These incidents have major impacts on victims' families, survivors' quality of life, and productivity. The WHO has estimated that road traffic deaths and injuries cause economic losses of three percent of Gross Domestic Product (GDP), while losses in low and middle-income countries account for as much as five percent of GDP. Moreover, nearly half of the victims of road traffic crashes are vulnerable road users such as pedestrians and cyclists (World Health Organization 2018).

However, the impacts of these challenges are not equally distributed. Communities located along major corridors of motor vehicle traffic bear the greatest burden in terms of both road

traffic incidents and health issues arising from poor air quality and high noise levels. The communities suffering from these issues are also disproportionately marginalized, both socially and economically, in many cities (Pratt 2015) (Smart Growth America 2016).

The lack of urban vegetation and the progressive expansion of anthropocentric structures in cities also pose challenges. Although the presence of greenery in urban contexts has been linked to positive mental and physical health outcomes, in many cases urban flora has been removed to make way for more and wider roads and other forms of development. Reversing this trend by planting trees and other forms of vegetation in urban areas provides benefits in terms of stormwater management and the mitigation of urban heat islands, which place greater demands on energy consumption and have negative impacts on human health.

Climate change mitigation and resilience to extreme weather-related events are two other critical issues that cities face. Cities are themselves major producers of greenhouse gases (GHGs), accounting for more than 70 percent of global CO₂ emissions. Furthermore, the potential threat from sea-level rise affects countless cities because 90 percent of all urban areas are coastal (C40 Cities Climate Leadership Group 2017). Motorized transportation constitutes a significant share of carbon emissions in cities. In Oslo, for instance, private cars account for 39 percent of all CO₂ emissions in the city. However, cities also present major opportunities with respect to transportation: greater population density, employment and diversity of land uses in urban settings are highly favorable to more sustainable forms of transportation such as walking, cycling and public transportation. There is an urgent need for a rapid shift to more sustainable transportation options. The need for urban greenery is particularly important from a resiliency perspective due to the effects of climate change, in particular increasingly frequent extreme weather events that can bring heavy rains and flooding and longer, hotter summers.

Addressing these challenges will require recognition by a range of actors, including urban and transportation planners, architects, engineers, developers, public health specialists, and social scientists, that their agendas have considerable common interests and that they must work in greater concert, breaking silos between professional disciplines and different levels of government. We argue that these actors can have a positive impact on global and local challenges through collaborative initiatives in local urban planning and design, with a focus on public spaces and the principle of health equity and social inclusion.

As argued in the introduction, in order to address these multiple challenges at the local level, there is arguably no more effective space for intervention than the street network. A 2013 UN report analyzed the street networks of 60 cities and found that more than 20 percent of all land area in many cities is dedicated to streets, with New York City allocating the greatest share of land area to streets at 36 percent. Other cities allocating a large share of space to streets were Hong Kong, Barcelona, Tokyo, Toronto, London, Paris, and Amsterdam (UN-Habitat 2013).² Streets also make up the greatest proportion of public spaces in cities at roughly 75 percent on average, according to the UN. The importance of streets as a public space is often overlooked. In fact, the area dedicated to streets in many urban areas is usually much greater than the total area dedicated to parks, plazas and other open spaces. The UN report states that, together, they should make up 45 to 50 percent of a city's urban area, with 30 to 35 percent occupied by streets and 15 to 20 percent by open space. By contextualizing the street in its proper place as urban areas' primary source of public space, its full potential as an asset for cities wishing to

² Although many of cities studied dedicated a large share (more than 20 percent) of land area to streets, suburban areas surrounding urban cores dedicated much less land area to streets. Likewise, many of the cities studied in the Latin America, Africa and Asia regions dedicated less than 20 percent of land area to streets and had lower levels of intersection and street density. Nonetheless, streets can still play an important role in urban transformation in these settings as well. Moving forward, in areas with a low proportion of land area dedicated to streets, it will be particularly important to emphasize increasing street and intersection density in development and redevelopment projects.

effect change becomes clear.

In essence, cities often have a vast network of public space right under their noses that can be leveraged to address local and global challenges. The importance of the street as a public space becomes even more relevant because many cities have a relatively low amount of public open or green space per capita, and large spatial and socioeconomic disparities are often present in terms of accessibility to existing public spaces.

“Reclaiming the streets’ public space function can be an effective way of addressing the issues of supply and access to public spaces, while providing benefits for health equity, social inclusion, the environment, and sustainable forms of mobility”.

Why has the street so often been overlooked as a public space asset? Historically, streets were used for many purposes, among them the transportation of people and goods, but they also served as spaces to meet the social, economic and cultural needs of urban residents. Although some separation of uses has always existed on streets, the introduction and massification of the automobile fundamentally transformed the use of streets. Within a few short decades, street space in countless cities had been surrendered mostly to the movement and parking of motor vehicles, with only residual spaces reserved for pedestrians. Other social, cultural and economic activities were gradually displaced from streets in many cities (Rodríguez-Valencia and L. Handy 2013). The extent to which streets have been surrendered to motor vehicles is nothing short of astonishing. In New York City, for instance, roughly 85 percent of street space is dedicated primarily to cars (UN-Habitat 2013). Likewise, according to the CAF (Observatorio Movilidad Urbana), in a sample of 29 Latin American cities less than one percent of their transportation network was prioritized for public transportation and even less to cyclists. Given the dominance of the automobile and of the mobility function of streets in many cities around the world, it is easy to see how they are overlooked as a public space: although they may be under public jurisdiction, they are often not places that encourage lingering, recreation, and other activities typically associated with public spaces. By focusing so much on the mobility function of motor vehicles, the street lost its most valuable aspect of providing local access to diverse economic and social opportunities at the neighborhood level.

In order for the street to assume its place as a cornerstone of cities’ efforts to address local and global challenges, a fundamental reassessment of the dominant paradigm of street use must be undertaken by a range of actors, including urban and transportation planners, public health professionals, private sector companies and organizations, and public policy makers. The dominant uses of streets today in many cities is mobility, and the allocation of street space for that purpose is often heavily imbalanced in favor of motorized modes. However, streets can also play critical public space and environmental roles (Rodríguez-Valencia and L. Handy 2013). The public space function, which may also be referred to as the place function, refers to the street as a place for socialization, recreation, and cultural activity, while the environmental function refers to streets’ capacity to maximize environmental benefits and reduce the environmental impact of street design. Through a reallocation of street space, a street’s functions can be significantly altered to achieve different goals. Moreover, just as streets can be transformed to incorporate public space and environmental functions, so too can the dominant mobility function itself be transformed: space currently allocated for moving and storing private motor vehicles can be reallocated to provide more high-quality space for people to more efficiently and equitably access opportunities for employment, education and recreation through walking, cycling and public transportation.

By rebalancing the street to accommodate these three interrelated functions, cities can tackle a myriad of challenges in the areas of mobility, public space, and the environment. These challenges are summarized by street function in the following graph. Numerous cross-cutting challenges, such as health, equity, and environmental sustainability, relate to multiple street functions. Furthermore, many of these challenges have profound implications at local and global scales.

Figure 1. Multifunctional street and local/global challenges



1

MOBILITY

Safety
Health
Efficiency
Sustainability
Equity

2

ENVIRONMENT

Resilience
Health
Sustainability
Urban Ecosystems

3

PUBLIC SPACE

Social Inclusion
Health & Quality of Life
Equity
Security

Source: Authors, adapted from photo by Paisea Magazine. Sant Joan Promenade. Barcelona, Spain.

1. Mobility:

Safety: reducing road-related deaths and serious injuries, especially for vulnerable road users such as people who walk or bicycle, children, older adults, and people with reduced mobility;

Health: addressing the health impacts of physical inactivity and motor vehicle dependence as well as the noxious effects of ambient air pollution and noise pollution;

Efficiency: addressing the impacts of congestion on the movement of people and goods;

Sustainability: encouraging trips by walking, cycling, and public transportation, and discouraging private motor vehicle use to reduce GHG emissions; and

Equity: improving affordable access to opportunities and basic services for all, regardless of mode of transportation.

2. Environment:

Resilience: adapting to the impacts of climate change, such as increasingly extreme weather-related events and longer, hotter summers;

Health: reducing the noxious effects of air and noise pollution, urban heat islands, and stormwater quality and quantity;

Sustainability: mitigating the human impact on the environment, including the reduction of GHG emissions and the improvement of water quality; and

Urban ecosystems: ensuring the health and biodiversity of urban flora and fauna.

3. Public Space:

Social inclusion: ensuring opportunities for interaction and promotion of social cohesion;

Health and quality of life: providing spaces and amenities for leisure and recreation to contribute to the mental and physical well-being of city residents;

Equity: ensuring that access to quality public spaces is available to all, regardless of income, age, gender, or race; and

Security: ensuring that public spaces are well-designed, maintained and used plays an important role in crime prevention.

2.1 A synthesis of key literature

A number of studies, reports, plans and design guidelines have presented proposals for analyzing and implementing multifunctional streets. They all recognize that there are considerable opportunities for fulfilling more than one street function at a time. For instance, reallocating a lane of traffic from motor vehicles to a protected bicycle lane can incorporate vegetation in the barrier between traffic and bikes, or permeable pavement can be used on the bike lane to provide environmental and mobility benefits.

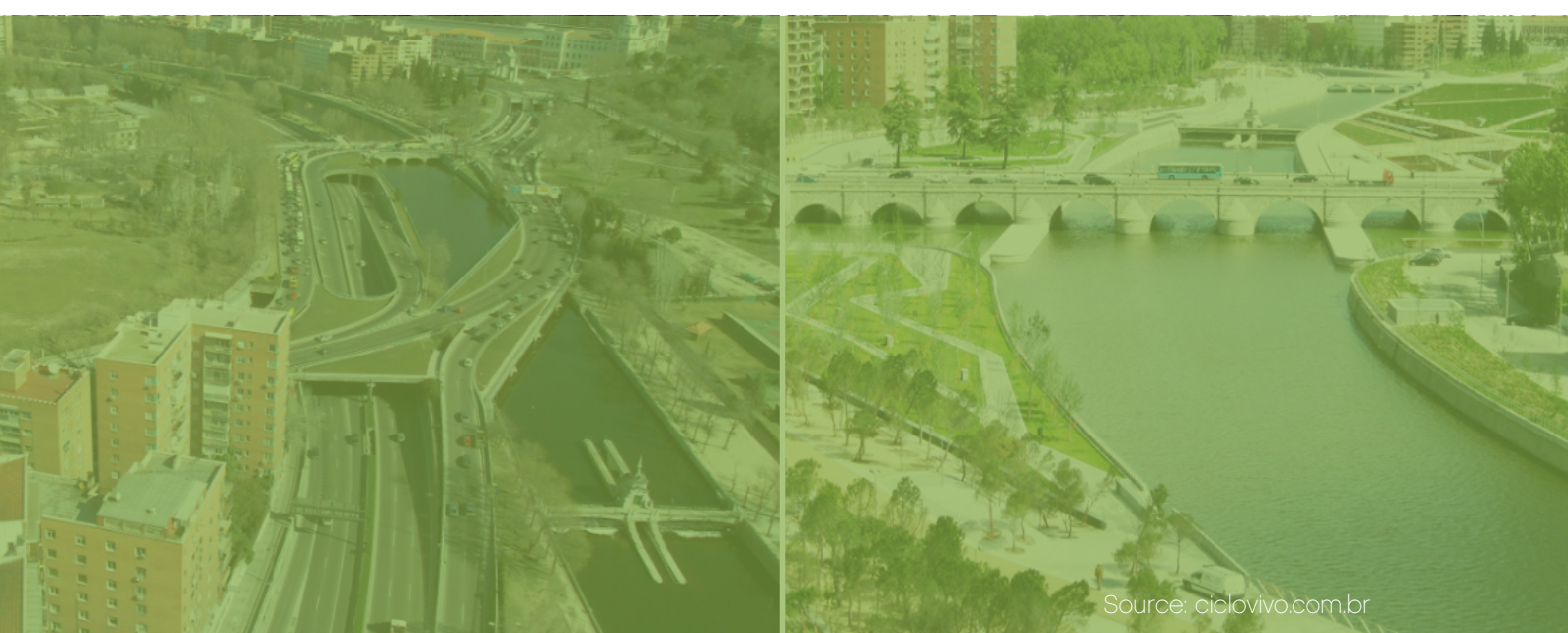
One article (Rodríguez-Valencia and L. Handy 2013) explicitly identifies the mobility, place, and environmental functions of streets. However, the authors point out an important challenge: because urban space is often in high demand by different users and uses, how can the right of way be distributed in a balanced and equitable manner? For instance, with a 15-meter right of way, how many meters should be allocated to mobility, how many to place, and how many to the environmental function? How should trade-offs be evaluated? Should a parking lane be converted to a bus lane or a wide sidewalk with trees and seating? There is no objectively right or wrong way to determine this allocation, but there is consensus that the number of people per unit of time and space (space footprint) and the environmental footprint should be accounted for in a context of equitable allocation of limited resources.

Another article (Hui 2018) attempted to address this issue of allocation of the different functions of streets. The authors analyzed a range of frameworks, plans and studies related to the concept of "complete streets". Although this term typically refers to the objective of accommodating all road users safely regardless of mode, it often references concepts like placemaking and environmental best practice in street design. However, the authors found that none of the materials reviewed, predominantly from North American cities, provided a suitable framework for assessing the completeness of complete streets in these three functions.

Both articles argue that the current paradigm of street space design and allocation is typically determined through an analysis of the trade-offs between vehicle mobility and property access. These articles also argue that this approach is incomplete even for the mobility function because it can omit important aspects like road safety and equitable access by transportation options to desired destinations. To move toward a more comprehensive approach for evaluating the completeness of complete streets and the trade-offs among alternatives, Hui et al. propose that context-sensitive standards should be established for different types of streets. This process would involve establishing metrics for the measurement of each of the three street functions and then setting target performance levels for each function based on the context of a particular street. For instance, a street designated as a critical bicycle corridor may require higher performance standards on mobility measures such as cyclist comfort and safety,

whereas a non-arterial street in a downtown urban core with high residential and/or employment density may require higher performance standards for the place function. Although the authors do not attempt to develop such a framework and prove its feasibility, this study serves to identify an important gap and suggest a path forward for creating a more methodical, standardized and replicable approach to developing streets that balance these three demands.

Although there will frequently be competition among the three street functions, and there will certainly be situations in which one function cannot be improved without worsening another, there are many cases in which changes to streets can further multiple street function objectives at once and mutually support one another. Despite the lack of clear, standardized frameworks to determine how this space should be allocated, a number of plans, reports and design guidelines provide recommendations on how to capitalize on the synergies among these three uses.



The National Association of City Transportation Officials (NACTO) published the Urban Street Stormwater Guide in 2017. As its title suggests, the primary focus of this guide is to provide design guidance on options for stormwater management. However, a significant theme of the guide is finding opportunities in which the introduction of green infrastructure can also promote mobility, place, and health goals, building on the work of previous NACTO guides such as the Urban Street, Urban Bikeway, and Transit Street Guides. The Urban Street Stormwater Guide notes that automobile-oriented infrastructure results in wide roadways with large expanses of impervious surface, which can lead to poor water quality, increase flooding, and worsen urban heat-island effects. In making geometric changes to streets to improve conditions for people who walk, cycle, and use transit, space is often unlocked for green infrastructure as well. For instance, green infrastructure can be incorporated into traffic-calming infrastructure such as curb extensions, or into sidewalk, transit stop, median island, and bikeway design. A wider sidewalk can provide more space for walking and seating, but also more space for trees and vegetation that retain stormwater, improve water quality, absorb air and noise pollution, provide a safety barrier from motor vehicle traffic, and create a more pleasant environment for street life. The guide provides numerous examples that demonstrate how resilience, sustainability, safety, health, and place goals can all be furthered simultaneously by embracing a multifunctional approach to street design (National Association of City Transportation Officials 2017).

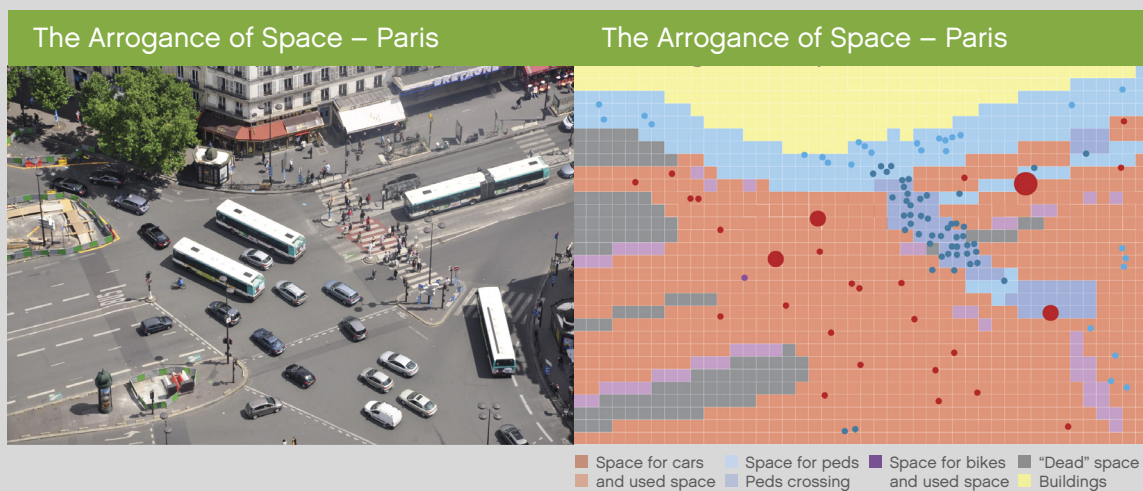
Two additional studies with a predominant environmental focus from the city of Barcelona are also noteworthy: Green Urban Corridors: Examples and Design Criteria from 2010, and the Plan for Urban Greenery and Biodiversity of Barcelona, 2020 from 2012. These reports are notable for suggesting a novel street typology: the green corridor. Green corridors are streets that cross the urban

fabric, connecting existing parks, plazas and open spaces with a dominant presence of vegetation and exclusive or priority use by pedestrians and bicycles. The concept of network connectivity is widespread in transportation planning. There are numerous examples of how connected networks (for example, of high-quality bicycle infrastructure) provide far more benefits than disconnected, one-off projects. By creating a connected network of green spaces, these streets can boost the environmental, social, and health benefits of urban green spaces and increase urban residents' quality of life, thus demonstrating that the benefits of network connectivity are not limited to mobility but also extend to place and environmental functions. Like the NACTO Urban Street Stormwater Guide, these plans also offer numerous examples of the environmental, mobility, place, health, and safety benefits of a multifunctional approach to streets.

From the health perspective, the 2018 report *Inclusive Healthy Places* by The Gehl Institute and the Robert Wood Johnson Foundation is significant. It provides one of the first frameworks to create equitable, vibrant public spaces through the lens of health. Elements of street and sidewalk design figure significantly in the report's recommendations. This framework bridges gaps in the fields of public health and urban planning and design. Similarly, the Project for Public Spaces produced the report *The Case for Healthy Places: Improving Health Outcomes through Placemaking* in 2016. This report also offers concrete guidance on reshaping streets with a focus on public space to promote healthier lifestyles, and provides numerous case studies throughout the United States, including several that involved the active roles of healthcare intuitions.

Although the trade-offs necessary to move toward a multifunctional street scheme are not always easy, the argument that there is simply not enough space to alter existing uses is not always convincing. To demonstrate this point, the bicycle design consulting firm Copenhagenize created a series of striking visualizations of the amount of street space dedicated to different users of the spaces: motorists, pedestrians, and cyclists.

Figure 2. The Arrogance of Space – Paris
(Copenhagenize.com The Blog by Copenhagenize Design Company n.d.)



Source: Copenhagenize Design Company.

These visualizations show how even in cities like Paris with ambitious goals for increasing cycling and with massive numbers of pedestrians, most space remains allocated to motor vehicles that impose the greatest share of negative externalities on society and the environment. With an estimated excess of 70 percent of road space dedicated to motor traffic in most of the developed world's cities, there are ample opportunities for rebalancing.

In the next paragraphs, the analysis points out a series of case studies of cities that have taken action by recognizing the excess road space dedicated to motor traffic and the ample opportunities for rebalancing, and have implemented or are in the process of implementing a rebalancing of streets through a multifunctional approach. These case studies illustrate different strategies and scales at which this paradigm shift is occurring, in order to draw lessons and recommendations for local and national governments at a global scale.

2.2 Shifting from car space to public space: from tactical urbanism to permanent interventions

In the past decade, numerous cities throughout the world have launched emblematic projects to reclaim street space from motor vehicles and create new public spaces. These projects often involve the use of low-cost materials such as paint and planters to demarcate public spaces in areas with excess pavement for parking or driving. This approach, known as tactical urbanism, allows for a swift shift in the use of a space.

The temporary nature of tactical urbanism interventions provides a valuable opportunity to measure how well the space performs its intended purposes and to gauge how users, local residents and businesses feel about the space. This information allows adjustments to be made before a possible permanent implementation and can provide important lessons for replicating similar projects in other locations. Although not all tactical urbanism projects move beyond the temporary trial and demonstration phases, this approach has, in numerous cases, catalyzed urban transformation and led to successful changes in many urban spaces, both iconic and commonplace.

The case of New York City provides useful lessons on how to undertake such a transformation. Tackling the transformation of emblematic spaces, such as Times Square, can pose significant challenges, but successful projects involving such significant spaces can lend credibility to scaling up similar initiatives citywide.

Several important steps should be taken prior to implementation: gathering data on the space and people's interactions with it can help to justify a project and evaluate its subsequent impact. Useful data may include information on traffic safety, local air pollution, and users' satisfaction with the spaces, among many other possible measures.

Another critical step in advance of implementation is to undertake intense stakeholder and community engagement. Attempting to change long-established uses, even if research indicates that the project will be beneficial, will inevitably provoke some resistance. Engagement can offer opportunities to integrate community feedback into the design of the project, alleviate the concerns of some stakeholders, and, if possible, enlist active stakeholder support. In many cases, public space transformation projects have worked with local business districts, cultural institutions, or community groups to help maintain and program activities for the transformed spaces.

Box 1. New York City and the Transformation of Times Square

A particularly noteworthy example of this approach is New York City's Times Square. There was widespread skepticism and hostility from some constituents when a proposed plan to pedestrianize the iconic square was announced, but the city's position was helped considerably through data collection. First, working with Gehl

Architects, the city studied the use of the streets comprising Times Square. Their observations showed that although 90 percent of the Square's users were pedestrians, 89 percent of the street was allocated to road space, weakening the argument against reallocating space for pedestrians (Goldwin 2014).

The city also carefully monitored the impact of the Times Square project following its implementation in 2009, and adjusted and refined the final design. The results showed that travel times for motorists actually improved in some cases or were only very modestly affected. Meanwhile, thanks to simplified intersections and shortened crossings introduced as part of the project, injuries of motorists, pedestrians and cyclists decreased substantially relative to the baseline. Observations also showed that pedestrian numbers increased and 84 percent more people lingered in Times Square and in nearby Herald Square, which received a similar treatment. Despite initial opposition in some circles, the project has proved very popular: 74 percent of New Yorkers polled one year after project implementation felt that the project had significantly improved Times Square, and the number of daily pedestrians increased from 356,000 prior to implementation to 480,000 (New York City Department of Transportation 2010) (Sadik-Khan and Solomonow 2017). These metrics, which demonstrated the initiative's success from a mobility, public space, and safety perspective, helped to make the case for permanent changes (Sadik-Khan and Solomonow 2017).

New York City replicated projects similar to the pedestrianization of Times Square on a smaller scale many times over throughout the city in subsequent years under its Pedestrian Plaza program. In 2018, the New York City Department of Transportation released a press statement to celebrate the tenth anniversary of the Pedestrian Plaza program, noting that 74 plazas comprising nearly 13 hectares of space had been reclaimed as public spaces (New York City Department of Transportation 2018).

2.3 Urban street transformation to address air-quality problems

Many European cities are undertaking ambitious urban transformation programs with multifunctional street elements. The challenge driving these transformations has primarily been the issue of poor air quality and the recognition that uncontrolled motor vehicle access to central urban areas is largely to blame for this public health issue. Approaches have included restricting motor vehicle access on major thoroughfares, as in Paris and Madrid, through the creation of zones of limited motor-vehicle access in center cities, as in Oslo and Madrid, or the adoption of a citywide approach to limiting motor vehicle access on local streets and converting these spaces into multifunctional spaces, as in Barcelona with its superblocks model.

Box 2. Paris and Reclaiming the Banks of the Seine

As in New York City, Paris launched a similarly emblematic reclamation of public space from motor vehicles. In 2014 the city began to tackle its dangerous ambient

air-pollution levels. To this end, in 2016 the city banned all motor traffic on the lower quays of the two-tier roadway running along the Right Bank of the Seine River, allocating €8 million to improve the space for pedestrians with seating and urban greenery (Cathcart-Keays, The Guardian 2015). Despite positive impacts in terms of improving air quality and the creation of a large riverfront public space, the project has received fierce opposition from car drivers. In 2018, a court ruled that the city's ban on cars on the riverfront was illegal, although the city's administration has vowed to fight for the public space and prevent the reversal of the space to an urban thoroughfare (O'Sullivan, Court Rules Paris's Car Ban is Illegal 2018).

Figure 3. Paris's reclamation of public space along the Right Bank of the Seine River



Source: Xia AKA Hisaux

Despite these difficulties, the reclamation of the Seine is only one of a range of policies that Paris has targeted to improve local air quality, such as the city's ambitious plans to expand cycling through the creation of a network of high-quality bicycle facilities with 61 km of streets slated for improvements by 2020 (2020 : Paris, capitale du vélo, les objectifs pour la Ville n.d.).

Box 3. Limiting Car Access in City Centers: The Cases of Oslo and Madrid

Many cities have experimented with limited pedestrianization projects. Smaller Dutch cities, such as Groningen, Delft and Houten, have long had areas with limited or no access to motor vehicle traffic in their city centers. However, in recent years there has been an increase in the scale of such projects and an increase in the number of major cities undertaking them. Such projects undertaken at a neighborhood scale provide a number of significant advantages: they reduce traffic, noise and air pollution in urban centers and free up substantial space for promoting sustainable mobility options like walking and cycling, for public space

functions, and for environmental functions like creating more green space and planting street trees.

Oslo is a notable example of this model. In 2015, the city announced ambitious plans to restrict car access in much of the city center by 2019. The city accompanied these plans with heavy investment in public transit and in improving cycling conditions. Unlike some other major European cities, such as Amsterdam, Copenhagen and Berlin, Oslo had relatively little bicycle infrastructure. In order to achieve the city's stated goal of doubling cycling levels within a decade, it plans to remove around 60 km of on-street vehicle parking in the city center in order to implement comfortable, wide bicycle facilities (Bliss 2018). There are also plans to repurpose some of the on-street parking into pocket parks, playgrounds or cycle parking (Cathcart-Keays, The Guardian 2017) (Streetfilms 2017).

Madrid is implementing an even larger area of restricted access for private vehicles in its city center. Beginning in November 2018, non-residents' motor vehicles will be banned from entering nearly the entirety of the city's center. Although the city had created a number of neighborhoods with limited car access beginning in 2005, the new restrictions will double the size of the area with motor vehicle restrictions to 472 hectares (Constantini 2018). These restrictions cover a dense area with many narrow, meandering streets that have always been ill-suited for motor vehicle traffic, and will convert much of the city center into an area where walking and cycling predominate and where additional space for place and environmental street functions can be introduced.

Simultaneously, Madrid's major center-city arterial, the Gran Vía, is undergoing a substantial transformation through the removal of two of the four lanes presently dedicated to the circulation of private cars and in their place adding space for pedestrians, for seating and for street trees (O'Sullivan, City Lab 2018). Together, the Gran Vía project and the soon-to-be implemented restrictions on private car access seek to dramatically reduce motor vehicle traffic in the city center and promote sustainable alternatives. Oslo and Madrid provide examples of how transformations at the street and neighborhood scale can complement and reinforce one another. Changes to street layouts can be more impactful when they are conceived as part of a larger neighborhood or citywide transformation, and the outcomes of larger-scale initiatives, such as car-restricted zones, can be improved by micro-scale, street-level interventions.

Box 4. A Citywide Approach: Barcelona's Superblocks

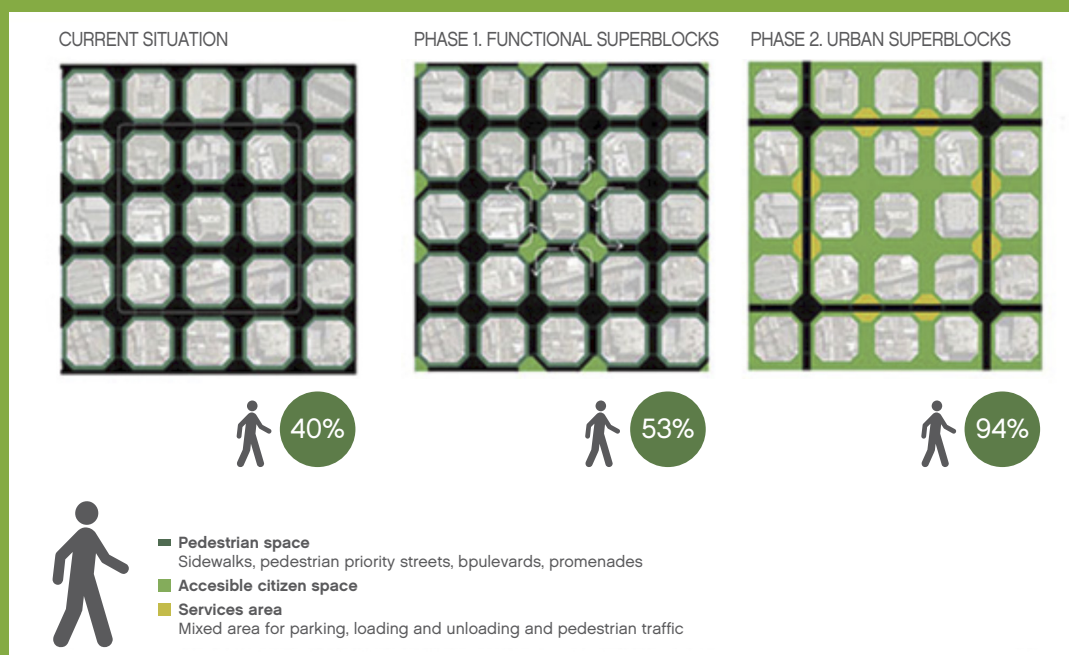
After consistently failing to meet EU-established air quality targets, and after identifying car traffic as the primary cause for noise pollution in the city (The Guardian 2016), the city of Barcelona prepared and adopted an ambitious new mobility plan around a principal guiding concept: the superilles (superblocks). The superblocks model is set to free up nearly 70 percent of street space, currently used by motor vehicles, for different public space uses, simply by adopting a

straightforward traffic management strategy. The idea is to restrict through-traffic in the superblocks (about 400 x 400 meters), and by doing so transform the space inside the superblocks into low-speed zones (10 km/h) and shared space where motor vehicles should feel like guests rather than the owners of the space.

The lack of public green open spaces has also driven the new mobility plan, which, through urban mobility strategies, aims to increase by nearly threefold the public (green) space in the most equal and inclusive manner, without demolishing any building or undertaking massive redevelopment efforts. The city has only 6.6 square meters (m²) of green space per inhabitant, with less than two m² per inhabitant in central areas (compared to London's 27, Amsterdam's 87.5, or the WHO's suggested minimum of 9) (Bausells 2016). The entire superblocks plan represents the largest street rebalancing and urban transformation experiment in the world today. With the new mobility plan, the city aims to reduce car use by 21 percent and increase active mobility and transit use. These sustainable mobility modes are already seeing an increase in demand as the introduction of 300 km of new cycling lanes is being implemented and a new orthogonal bus network has been put in place.

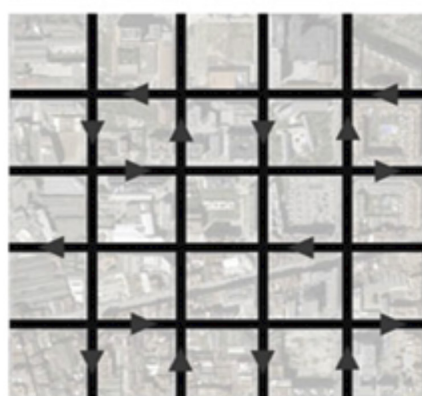
The superblock model has already been implemented in two test sites in L'Eixample (the district designed by Ildefons Cerdà in the 1850s), with a very modest budget of less than US\$60,000 per site. Local agencies estimate that Barcelona's entire traffic management pattern under the superblocks model could be reconfigured for less than US\$60 million, which is less than one km of a typical tram or metro project. It is estimated that superblocks will increase the number of neighborhoods with acceptable air quality from 56 percent to 94 percent, thus increasing Barcelona's livability by improving health equity for its citizens (Streetfilms 2018).

Figure 4. Barcelona's Superblock concept



Road hierarchy in the new Superblock model

CURRENT SITUATION



400 meters
BASIC NETWORK: 50 KM/H



SOLE RIGHT IN STREET SPACE: MOBILITY
HIGHEST AIM: PEDESTRIAN

SUPERBLOCK MODEL



400 meters
LOCAL NETWORK: 10 KM/H



EXERCISE ALL THE RIGHTS THAT THE CITY OFFERS
HIGHEST AIM: ACTIVE CITIZEN

CIRCULATING
VEHICLES DO
NOT PASS
THROUGH

Source: BCNecologia.

2.4 Street transformation: a global phenomenon

Transformation of city streets is by no means limited to North America and Europe. Many of the same approaches and driving factors have led to the undertaking of remarkable projects in cities across the globe. In Seoul, a transformative urban public space was created through the removal of a raised highway and the reclamation of the Cheonggyecheon stream, which had been paved over decades earlier to accommodate the highway. Bogotá has been temporarily transforming the use of city streets on a large scale since the 1970s through its much-emulated Ciclovía program, which closes roughly 120 kilometers (kms) of city streets to motor vehicles every Sunday for recreational purposes. Buenos Aires has also undertaken a range of projects aimed at both the permanent and temporary transformation of urban streets, several of which are described below.

Box 5. Buenos Aires and the Transformation of Urban Streets

The host of the inaugural Urban 20 Summit, Buenos Aires has promoted a number of significant projects with a multifunctional street paradigm that prioritizes the safety and convenience of sustainable transportation modes, discourages the use of private cars, and increases the quantity and quality of public spaces. These projects include the city's Plan Microcentro and Plan Prioridad Peatón, which created an area with improved pedestrian amenities, restricted private vehicle access, and the construction of an extensive network of protected bicycle lanes.

The plan focused on a roughly one square kilometer (km²) in the central area of Buenos Aires with a high concentration of offices, businesses, and government administrative services. The plan, which was launched in 2013, called for a restriction on private cars entering the area, the implementation of 5.5 km of bicycle facilities, and the leveling of sidewalks on several key streets to create more space for pedestrians, additional urban street furniture, and the planting of trees. Sidewalks on 33 city blocks were eventually made level with the street, and motor vehicle speeds within the area were limited to 10 km/h. These efforts substantially improved the pedestrian experience in the area for the one million people who pass through the area on an average day (Buenos Aires Ciudad n.d.). As of 2018, there are plans to more than double the area with restricted motor vehicle access by expanding to neighborhoods to the north, south and west of the existing Microcentro area (de Aróstegui 2018).

Figure 5. Buenos Aires Microcentro Plan



Source: www.buenosaires.gob.ar/movilidad/caminandoporlaciudad/plan-microcentro

In 2009, the city also began to implement bicycle infrastructure on a large scale. Buenos Aires currently has a network of 195 kms of protected bike lanes (Buenos Aires Ciudad n.d.). In most cases, the implementation of these lanes involved the reallocation of street space from motor vehicles. In combination with the launch of city's free Ecobici bike-share system, infrastructure investments contributed to an increase in trips to work by bicycle from 0.4 percent prior to the interventions, to 3.5 percent in 2015, translating to an estimated 180,000 people traveling by bicycle daily (Escayol 2015).

Furthermore, Buenos Aires has been taking its first steps to rebalance street-space allocation for all users, starting with the emblematic Calle Corrientes, home of the city's theater life. Sidewalks have been widened, and its traditional four lanes are being redistributed by closing two vehicle travel lanes at night,³ allowing only pedestrians and bicycles and encouraging locals and tourists to enjoy the public space and the cultural climate of the theater district.

³ From Av Callao to Florida, from 7:00 pm to 2:00 am.
(<http://www.buenosaires.gob.ar/noticias/la-calle-corrientes-se-transformara-en-peatonal-por-las-noches>)

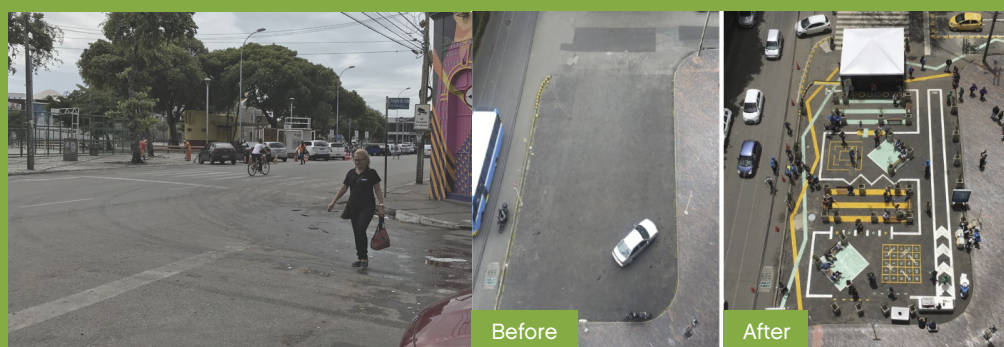
Despite the positive impacts of these projects, the case of Buenos Aires highlights a challenge that many urban centers face: regional coordination. Although the projects presented above have had a positive impact, they are all concentrated in the Autonomous City of Buenos Aires (Ciudad Autónoma de Buenos Aires, CABA), a densely populated urban area that is home to approximately three million people. The roughly 12 million remaining residents of the Buenos Aires Metropolitan Area (Área Metropolitana de Buenos Aires, AMBA) reside in 42 separate municipalities that surround the CABA. At a regional scale, the development pattern in the past several decades has favored dispersed, car-oriented growth for upper-income populations residing in suburban developments. The AMBA's fragmented governance makes coordination of urbanization and mobility a challenge. Consequently, there is pressing need for regional coordination to provide sustainable alternatives to the car-dominant, inequitable development patterns present in much of the metropolitan area.

Box 6. Bloomberg Initiative for Global Road Safety (BIGRS) in 10 Cities

The tactical urbanism approach discussed above in the case of New York City has been widely employed to bring about rapid, low-cost urban street transformation in cities all over the globe. An excellent example of the diversity of cities implementing this approach comes from the BIGRS.

In 2015, as part of the second phase of this initiative to reduce traffic fatalities and injuries, ten cities were selected across three continents to receive comprehensive technical assistance from the world's leading road-safety organizations, including support to implement the transformation of urban streets through tactical urbanism. The selected cities—Accra, Addis Ababa, Bandung, Bangkok, Bogotá, Fortaleza, Ho Chi Minh City, Mumbai, São Paulo, and Shanghai—have many distinctions in terms of income, population, density, local culture, and their built environments. However, the BIGRS program demonstrates that positive urban street transformations can be truly global. Images from projects implemented in Fortaleza, Brazil and Bogotá, Colombia are presented below.

Figure 6. Cidade da Gente Program, Deragão do Mar, Fortaleza, Brazil (left and bottom-right) and Plazoleta Program, Plaza Calle 80, Bogotá, Colombia (upper-right)





Source: The Global Designing Cities Initiative (GDCI) at NACTO.

2.5 A new transportation paradigm: shared mobility

There is ample evidence of how shared mobility is becoming an important factor in the rebalancing and reallocation of streets and public space, with the potential to maximize the efficiency of current excess capacity.

The past few years has seen outstanding growth in a range of shared mobility services. These include bikeshare, which is operating in hundreds of cities, both with station-based models and increasingly with dockless models. Electric bicycles, which are also progressively appearing in bikeshare systems, reduce the challenges posed by hilly terrain, and allow a wider range of users, such as older adults who may be unable to use a conventional bicycle, to take advantage of the benefits of bicycle mobility. Similar to dockless bikeshare, dockless electric scooters are also beginning to appear in a large number of cities. These services add options and flexibility to the panorama of urban mobility.

Carsharing and ride-hailing services also provide urban residents with additional alternatives and reduce the need for private car ownership. Unlike mobility services, such as bikeshare or scootershare, which are highly efficient in terms of the use of space, low emission, and, in the case of bikeshare, provide opportunities for physical activity, carsharing and ride-hailing services still present the same negative externalities as conventional cars. In fact, evidence suggests that ride-hailing services likely lead to more cars on the road, more trips, more kilometers driven, and consequently more congestion and vehicle emissions (Clewlow and Gouri Shankar 2017).

New self-driving technologies coupled with shared mobility could provide considerable benefits if appropriately managed. According to the International Transport Forum (ITF) report on shared mobility, and building on the 2015 report *Urban Mobility System Upgrade: How Shared Self-driving Cars Could Change City Traffic*, the research conducted shows the impacts of replacing all car and bus trips in a city with mobility provided through fleets of shared vehicles. Using Lisbon for the simulations based on real mobility and network data, when reassigning the network using 100 percent shared taxis and taxi-buses congestion disappeared, 95 percent less space was required for public parking, the car fleet needed would be only 10 percent of the existing fleet, and traffic emissions were reduced by one third.

The liberation of space dedicated to motor vehicle parking and travel lanes would considerably reduce the often difficult trade-offs associated with reallocating street space, and create many new opportunities to introduce public spaces and space for sustainable modes of

transportation and environmental uses. Such radical shifts in street use have important implications not only for planning but also for asset management. For instance, if former parking spaces become additional sidewalk spaces, municipalities can play a role in programming these new public spaces with cultural activities or in leasing space for commercial purposes, such as for sidewalk vendors or outdoor seating for restaurants. Revenues generated by leasing this space could be reinvested in further street improvements and public space activation.

“Despite the potential benefits presented by new technologies, regulation and guidance from local and national governments will be key because a transition to self-driving mobility will present significant challenges. The same study discussed above found that if only 50 percent of the vehicle fleet shifted to shared mobility vehicles, total vehicle travel would increase between 30 and 90 percent, indicating the need for strong leadership to guide cities toward more optimal outcomes”.

RECOMMENDATIONS

In order to take advantage of the full potential of streets, coordination among government agencies will be key at the local, regional and national scales. Efforts to transform streets into drivers of positive change will also benefit from close collaboration with local communities, private-sector stakeholders, and non-traditional planning partners. In order to contribute to this paradigm shift, the final section of this paper presents a set of recommendations aimed at accelerating the pace and scale of the transformation of urban landscapes through coordinated action and intervention at multiple levels.

1. Data-driven approach

A first step toward unlocking the potential of streets as multifunctional spaces to improve mobility, access to opportunities, public space, and environmental outcomes is to **measure how a street, plaza or neighborhood with the potential to be transformed is being used, and use benchmarks at local and global levels**. As shown in the New York City case study discussed in this paper, those who wish to bring about change are well served by equipping themselves with data.

The methodology applied in the UN-Habitat Report *Streets as Public Spaces and Drivers of Urban Prosperity*, which calculated the share of land dedicated to streets in 60 cities across the globe, is a good starting point. It is also important to understand how existing public spaces are distributed in the city and where there are inequalities in access to high-quality public space. Even more important is understanding the area occupied by streets as a share of all public spaces in a city and **understanding the allocation of street space to mobility, place, and environmental functions**. New remote-sensing technologies and open-source platforms and tools⁴ could be deployed to carry out these assessments quickly and to track changes over time.

The World Bank is currently developing **a spatial analysis framework to assist multi-layered geospatial diagnostics that could be applied in any city to determine gaps between available public assets and their targets**. This framework consists of five steps to assess: (i) how public spaces have been changed; (ii) how public spaces are distributed and interact with other land uses; (iii) how people are using public spaces; (iv) how spatial information can be used to operate specific public-space projects; and (v) how spatial analyses can aid monitoring and capacity building for cities. Each step will showcase a variety of tools developed by diverse institutions, mainly by UN-Habitat and the European Space Agency, so that cities can choose a set of tools that best suit their needs.

2. Institutional and jurisdictional coordination

Institutional coordination and collaboration is perhaps the key recommendation for a multifunctional street paradigm to become common practice. This collaboration must occur within cities themselves across public agencies. Departments of transportation, public works, planning and zoning, parks and recreation, and transit operators all need to work in concert because the design and use of multifunctional streets will likely involve all of them. These agencies should overlay plans for pedestrian, bicycle, transit, public space, stormwater and

⁴ Shared Streets (<https://sharedstreets.io/>) is one of the examples of a non-profit digital commons for the street. It is a data standard and a platform that serves as a launching pad for public-private collaboration and a clearing house for data exchange to help communities around the world better understand and manage their streets.

urban greening projects to coordinate construction and tap into synergies that benefit sustainable mobility and improve public space and environmental outcomes. City agencies should also work with policy makers to reform zoning in order to encourage walking, cycling and transit use and incentivize or require green building practices such as incorporating green roofs, on-site green stormwater management, reducing impervious surfaces, and requiring tree plantings as part of public benefits for development. Some city and metropolitan governments around the world have already created offices of innovation as a silo-breaker strategy⁵ that could be emulated by others under the multifunctional street concept.

Fostering regional coordination and collaboration across jurisdictions is a related challenge.

Alternatives to private car use will be seriously undermined in metropolitan areas if coordination between the central city and surrounding municipalities is absent. This coordination needs to take place not only in the planning of transportation networks but also in terms of supportive land uses. National governments can play an important role in fostering this regional coordination and funding and providing planning support for regional transportation projects, including inter-urban rail, bus, and bicycle infrastructure, such as the numerous bicycle connections between towns and cities in The Netherlands, or the Copenhagen and London cycle superhighways.

Collaboration across different levels of government presents another key challenge. The control of the road network in cities and their surrounding areas is usually distributed across different levels of government. Consequently, the investment, maintenance and traffic management roles in the road network are often highly dispersed. In order to **redefine and implement an effective public policy on rebalancing the street public space**, coordination among these levels of governments and institutions must exist.

3. Leadership and capacity building

Conducting a massive capacity-building effort to train public officials, professionals and policy makers in the new understanding of streets as multifunctional public spaces should go hand in hand with the drive to forge closer collaborations. This capacity-building effort across professional disciplines, institutions and jurisdictions will likely nurture new leadership as public policies and the conceptualization of projects move toward the multifunctional street paradigm.

The urban health movement presents a powerful point around which the disciplines of health, environment, urban design and transportation planning can coalesce. This alternative approach to traditional planning, which is heavily dictated by the level of service for car traffic flow, can be used to show how the form and quality of urban landscapes is related to key

⁵ For example, the Office of Extraordinary Innovation for LA Metro (<https://www.metro.net/projects/oei/>) and the Office of Innovation in SFMTA (<https://www.sfmta.com/units/office-innovation>), among others.

concepts of human and environmental capital in cities. The example of Scotland is illustrative: from a national perspective the government doubled the funding for walking and cycling after concurring with the recent evidence that the most effective strategy to prevent health problems was to induce more physical activity in the population (Sustrans 2018). From a development perspective, the urban health movement provides an alternative means of identifying urban interventions with potential to produce happier, healthier, more economically vibrant and prosperous communities and countries.

4. Guidelines and financial support

A sound policy strategy for multifunctional streets must be holistic and part of a broader urban mobility plan with public-health and social-inclusion objectives, and with a clear funding structure. This could be coordinated at a higher national government level, with clear policy guidelines for different urban areas and street network hierarchy, including financing of infrastructure not only for mass transit but also for sidewalks, street landscapes, protected bike lanes, and large-scale traffic calming initiatives to benefit the often-neglected users of active mobility. Many national urban transport programs, matching grants or co-financing facilities at the national or federal government levels must be updated to include or support interventions that unlock the potential of streets as multifunctional spaces to improve mobility, access to opportunities, public space, health, and environmental outcomes.

Creating and adopting planning and design standards for multifunctional streets. Several of the already available planning and design standards can be adopted to create national multifunctional street planning and design guidelines. In parallel, clear goals and targets in terms of improving the quantity and quality of inclusive, healthy streets or public spaces should also be adopted as a national priority. Part of this process should include the introduction of an urban resilience strategy into the environmental function of the street, involving the reintroduction of urban greenery and the connection of natural areas and the public spaces of a city.

Cost-benefit analyses (CBAs) and other methodologies for prioritization of investments and budget allocation in public institutions should be revised to include a holistic approach for multifunctional street interventions. This is a necessary step because CBAs have traditionally favored projects aimed primarily at reducing traffic congestion and travel time for motorists by ignoring the negative externalities of car use (and hidden subsidies), including the increase in average traveled distance, and failing to incorporate the numerous positive externalities of more sustainable transportation options. Contributions to health and well-being are critical elements of a CBA, but are yet to be included (with the occasional exception of traffic accidents and air pollution). A more holistic assessment of the externalities associated with different transportation modes can yield remarkably different results. For instance, an assessment of the impact of cycling and driving in Copenhagen (City of Copenhagen 2013), which took into account such factors as health, security, travel times, and comfort, estimated that each kilometer traveled by bicycle generated a societal gain of DKK\$1.22 (about US\$0.20), whereas

each kilometer driven by car cost society DKK\$ 1.13 (about US\$0.18).

5. Embracing the new shared mobility paradigm

Shared mobility services are constantly growing in importance and present challenges and opportunities for existing and future uses of public spaces. Cities and national governments should monitor these developments carefully and harness and encourage promising new services. Conversely, other emerging shared-mobility services may require steering and regulation to ensure positive outcomes for cities.

6. Engage and empower local communities

An important opportunity to accelerate the scale and pace of this paradigm shift toward streets as multi-use public spaces comes through the engagement and empowerment of local communities. The process of collaborating with local communities can build capacity and help to generate a sense of ownership that can propel and sustain the changes necessary to transform urban spaces.

Fred Kent, the founder of the Project for Public Spaces, stated, “If you build cities for cars and traffic, you get cars and traffic. If you build cities for people and places, you get people and places.” Ultimately, the design and allocation of the three functions of streets—mobility, place, and environment—are key determinants of whether now and in the future we will build our cities for cars or for people, thus shaping the quality of life, social inclusion, public health, sustainability, and resilience.

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Acknowledgments

The authors would like to thank Horacio Terraza for his content contributions, as well as reviewers Jon Kher Kaw and Santiago Ezequiel Arias of the World Bank; Soraya Azan of the CAF; and Daniel Rodriguez of the University of California at Berkeley for sharing their expertise and thoughtful critiques throughout the development of this paper.

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