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Santiago, Chile
Putting Pedestrians First

ITDP

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Cover:
Santiago's redesigned streets in the city center prioritize pedestrians, cycling and transit.
Image: Claudio Olivares Medina

Inclusive TOD for Sustainable, Equitable Cities

By Clayton Lane, CEO

As I write this, it is 6 AM in Mexico City, an hour before sunrise. The daily commute, a snarl of traffic, pollution-tainted grey skies, and life-risking dashes across busy roads, has already begun for thousands living in the city's car-oriented periphery. For these working parents, a three-hour trek via dirt paths, unreliable microbuses, BRT, and metro, connects two distant economic necessities: job opportunities in the city center and affordable housing on the outskirts. The spatial mismatch also effects their children's lifelong social outcomes of sprawl-induced segregation –shorter life expectancy, less educational attainment, and higher risk of cyclical poverty. Children will also experience the long-term effects of climate change spurred by inefficient cities, which currently comprise over 70% of global CO2 emissions.

Image: Adam Wiseman

Similar commutes play out every day for hundreds of millions of people around the world, as cities offer hope for economic progress, yet fail to meet needs for healthy, clean, equitable neighborhoods and mobility. Transport comprises 90% of Mexico City's smog, which reached its highest levels in decades last April, requiring emergency measures to restrict cars with an odd/even scheme. Similar crises are playing out in cities like Delhi, Beijing, and Paris, all of which recently adopted similar car-restriction measures.

The urgency to empower cities to address these spatial challenges could not be greater. India alone will add 400 million additional urban residents by 2050; African cities a staggering 850 million. All told, cities will add 2.5 billion people worldwide by 2050, yielding the largest, fastest change in human lifestyles in history, and with urban growth comes opportunity. The associated transport infrastructure investment – ITDP and UC-Davis estimate over $80 trillion by 2050 – will shape urban form, and therefore environmental and social outcomes for centuries. Cities have an unprecedented opportunity to get it right. Compact, transit-friendly cities can dramatically improve social inclusion and job accessibility, while supporting healthy, sustainable lifestyles.

So far, automobile-centric spatial growth has failed to address mobility needs, by outpacing the ability of cities to expand rapid transit. The majority of urban trips in less developed countries occur via public transit, foot, or bicycle. Yet only 25% of Johannesburg residents have access to public transport within a kilometer of whey they live – a figure that drops to 9% for the sprawling metro region, according to ITDP research. The same metric drops from 44% to 16% in metro Jakarta; or from 25% to 19% in São Paulo. Poorer households, more often living in sprawling suburbs, tend to fare worse than the averages. In Curitiba, Brazil, for example, households in the lowest-income quartile have just one-quarter as much access to rapid transit as their high-income cohorts.

Urban grown is inevitable. The question is how. Cities can sprawl, with unplanned or automobile-oriented growth that segregates land uses and people. Or they can grow with inclusive, compact, transit-oriented development (TOD) – providing an opportunity to not only improve social equity, but also require less energy use, save infrastructure costs, and cut greenhouse gas emissions.

Inclusive TOD features pedestrian-friendly neighborhoods, a mix of land uses, and high-quality rapid transit connections to other parts of the city. It also features a mix of affordable housing, diverse jobs and services for a variety of people, and preservation of residential buildings and busi-

In many cities, commutes involve walking on dirt roads for the majority of lower-income citizens.

The Dar es Salaam BRT, which opened this year, is a best practice in East Africa for safer, more equitable mobility.

nesses to minimize displacement of existing communities. Many cities have already developed in this sustainable manner, oriented along rapid transit corridors, with high-quality pedestrian areas and a diverse mix of people, jobs, and services. No example is perfect, though some provide inspiration. Think Barcelona or Berlin over Phoenix and Houston.

Inclusive TOD is difficult. Plans for London's 2012 Summer Olympics and Delhi's 2010 Commonwealth Games, for example, both failed to deliver promised legacies of new jobs and affordable housing oriented around rail stations. Under time and financial constraints, both projects ultimately yielded to market pressures, and in Delhi even displaced current residents that the project aimed to serve. Here are three key reforms that can help cities spur inclusive TOD.

Massively expand rapid transit: Cities must dramatically expand metro and BRT systems to serve existing communities, many of them already featuring affordable housing and a mix of jobs and services.

Guangzhou, China extended its BRT to the Tangxia neighborhood, home to 300,000 mostly migrant workers. The city upgraded Tangxia, building community institutions, and improving public space, security, electricity, water and sanitation in place. Today Tangzia's residents enjoy superb access to Guangzhou's metro region, with over 70% of trips using the BRT.

Globally, the need is enormous. Cities need to build 20,000 kilometers of rapid transit by 2050 to meet their needs. Financing is critical. ITDP research reveals that the countries with the most progress in expanding rapid transit have (a) prioritized debt financing, (b) empowered cities with financial and institutional capacity, (c) prioritized high-quality, cost-effective bus rapid transit (BRT), and (d) established predictable, long-term revenue flows from dedicated sources.

Reform and coordinate land use planning: Coordinated land use, transport, and housing policies are critical, and cities all over the world are embracing this method. London's King Cross Station mixed-use redevelopment plan will use developers' cash and in-kind contributions to generate over 24,000 local jobs and build at least 40% affordable housing, while Shenzhen, China shares land value premiums with developers to incentivize compact development and finance metro expansion; and actively coordinates across the local planning institute, metro company, and private developers to coordinate master and local plans.

Jharkhand, India, will adopt a statewide inclusive TOD policy to ensure that 80% of all residents live within 400 meters of public transport, with 50% near rapid transit. Brazil's national housing policy will seek to collocate social housing with rapid transit, ensuring better accessibility for the program's next 6 million residents. Singapore, envisioning high-quality density, has used TOD as its main form of spatial development since the 1970s, in coordination with its housing program that has lifted over 70% of residents out of sub-standard dwellings.

Strengthen government institutions: Strong, well-coordinated, accountable institutions are key to making it work. Political leadership should explicitly adopt the objective of inclusiveness, and set up indicators and methods to monitor progress. Public institutions should have a mandate to coordinate across agencies, with civil society, and with developers, authority to amass land and negotiate development terms, accountability to diverse interests especially marginalized groups; and long-standing stay to maintain the coalition and see projects through completion.

With inclusive TOD, daily commutes in Mexico City could start with blue skies. Parents could walk their kids safely to school in a diverse community, and continue onto the BRT for a short trip to work. Health services, greenways, grocery stores, and friends all would be accessible nearby. Children could have a fair shot at social and economic mobility. The saved time, money, and emissions would benefit all of society – and provide a critical keystone to help mitigate climate change.

Inclusive TOD is cities' best shot at a sustainable future. Lessons from around the world show that cities have extraordinary opportunity, and ITDP is committed to helping them make it happen.

Images: ITDP Africa

Santiago, Chile
Improves Equity by Putting Pedestrians First

By Jemilah Magnussson, ITDP Global

Santiago, the Chilean capital with an urban population of five million, and a metro area population of over seven million, is a beautiful old-world city enjoying a modern day renaissance. In 2006, the city opened Transantiago, an efficient service and the backbone of its transport system, but has since lagged behind other cities in the region on cycling and walking.

Over the past year, Santiago made major improvements in pedestrian space, cycling, and public transit. Santiago's Calle Aillavilú, in the central market of the city, has been transformed from a derelict, car-congested and unregulated parking lot to a pedestrian-friendly oasis. The street was repaved, the lighting improved, new trees were planted, and most importantly, cars were removed. Except for the scheduled delivery of goods, no motorized traffic is allowed. Calle Placer, one of the busiest pedestrian streets during a popular weekend market, is now completely closed to cars on the weekends, with a 2.2 million USD investment by the city for improved sidewalks, lighting, and sanitation.

Other public space improvements include an investment in 100 sq meters of new green spaces in historic residential neighborhoods, revitalizing a previ-ously abandoned area, and the re-design of the Historical Center's main streets, featuring more sidewalk space, improved lighting, beautification, and a "complete streets" redesign for public transport exclusive corridors in the most active pedestrian zone in the country.

Car ownership has soared in Chile over the past decade along with the economy, with more people buying cars each year from 2003 to 2014. Greater Santiago is now home to seven million people, and four million cars. However, the last few years have seen considerable changes. As traffic jams grow longer and parking becomes more scarce, more Santiaguinos are using transit, cycling, and walking to get around their city. The number of cyclists on major routes has grown up to 25 percent a year for the past two years, and cycling mode share has doubled since 2006, for a total of 6 percent.[1]

The changes made on the streets of Santiago this year are a reflection of that trend, and will go a long way toward improving social mobility in this city with significant class divides. On Sunday mornings, cars are banned from 40 kilometers of Santiago's roads. Around 30,000 people take to those vehicle-free streets on bikes, skateboards, roller-blades, or simply on foot.

The City has backed up these achievements with new sustainable transport policy changes and education programs. In April 2015, the National Ministry of Housing and Urbanism created a detailed standard of design for high quality cycle lanes, even piloting it in a major street near the presidential palace. The policy redistributes road spaces to create more space for cyclists. This standard was quickly adopted by Santiago, and the city has managed to

A street in the center of Santiago before
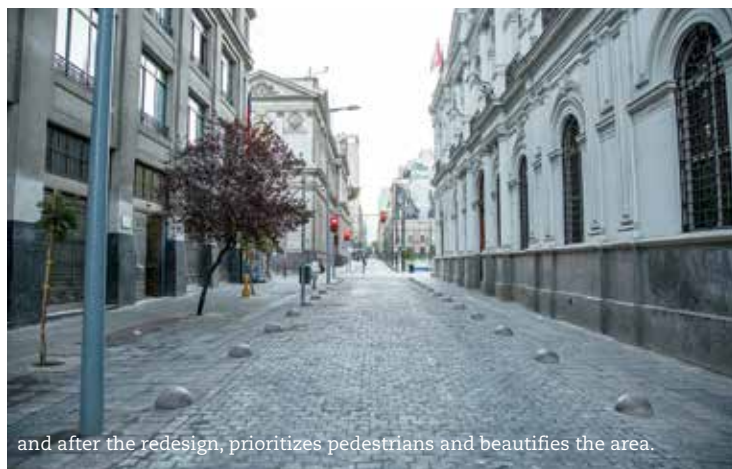
and after the redesign, prioritizes pedestrians and beautifies the area.

Images: Claudio Olivares Medina

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[1] https://www.theguardian.com/cities/2016/jul/21/cycling-challenging-santiago-chile-social-barriers

Left: The number of cyclists on major routes has grown up to 25 percent a year for the past two years, and cycling mode share has doubled since 2006.
Above left and right: Former Santiago Mayor Carolina Tohá introduces the cycling games program, intended to familiarize children with cycling culture and safety.

increase cycling trips from a negligible 150 per day to over 5000 per day. This number is expected to increase with the growing popularity of BikeSantiago, the city's bike share program, which is responsible for 50 percent of the increase. Santiago also gave support to BMov Trici, a free bicycle taxi in the historic city center operated by a private company, supported by advertising, that encourages cycle use and provides a non-motorized alternative to taxis. Santiago has adopted a pilot program of cycling games in kindergarten to help introduce cycling early in life, and a traffic education program at primary schools is helping to create better cyclist behavior.

The changes in Santiago have not been without political controversy. Santiago is a city made up of 36 counties, or *comunas* each with an elected mayor. Implementing these improvements at the city level required a massive effort in coordination throughout the whole municipality. Former Mayor Carolina Tohá, who represented the downtown county of Santiago Centro, not to be confused with the larger city, which won the award, stressed the collaborative nature of the process.

"This award is a recognition to the whole city. Our county has been actively promoting coordination processes with Santiago's Board of Public Transporta-tion, the Ministry of Environment, the Regional Government, civil society organizations and other municipalities", said Mayor Tohá, "Thanks to this coordi-nation and collaboration we have been able to move forward in local projects with greater metropolitan impact, such as the System of Public Bicycles, the Plan Centro, the Green Zone and to double the bicycle's path network".

Santiago will be the site of **Mobilize 2017**, ITDP's new annual Sustainable Transport Summit, supported by the Volvo Research and Education Founda-tions. This event will give international transportation researchers and profes-sionals and opportunity to experience this emerging city as a learning lab for best practice in sustainable transport.

For more information, visit **mobilizesummit.org.**

A street in the city center went from three went from three lanes of car traffic and narrow, often obstructed sidewalks
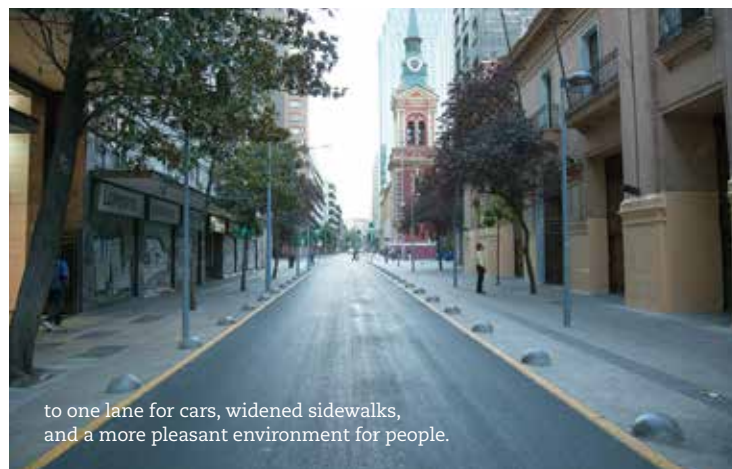
to one lane for cars, widened sidewalks, and a more pleasant environment for people.

At MOBILIZE Yichang, a Mid-Size City Takes the Lead

For three days in September, Yichang, a mid-size city in central China, was a hotbed of learning and innovation as the site of the first-ever MOBILIZE summit. 175 people from 20 countries, representing governments, development banks, urban researchers, civil society, and sustainable development and transport practitioners gathered in this emerging city for discussions, panels, presentations, and site visits on the cutting edge of international sustainable transport.

Yichang, the winner of the 2016 Sustainable Transport Award, has shown that a mid-size city can put great ideas into action and produce projects that inspire other cities. Many of today's mid-size cities, which are greater in number than mega-cities, will be the big metropolises of the future. The way these cities plan for and manage growth can provide particular lessons for practitioners as cities like Yichang continue to grow rapidly.

"The idea of MOBILIZE is to use winning cities as a learning lab, linking research and practice to fill knowledge gaps about lessons learned and how to get great projects implemented," says Michael Kodransky, Head of MOBLIZE at ITDP. "It's places like Yichang, these growing, under the radar cities, that are

Many of today's mid-size cities will be the big metropolises of the future. The way these cities plan for and manage growth can provide particular lessons for practitioners as cities like Yichang continue to grow rapidly.

transforming their streets, public spaces, and infrastructure, that we want to spotlight. We can learn from their practices and use them as a place to convene an international movement. We want to researchers, practitioners, civic society leaders and others to be inspired and to transform their cities through transport."

Participants spent their mornings discussing issues such as transit service frequency, the pedestrian as superhero, shared mobility,

urban development, using data for planning and engagement, how to develop gender equitable transport, and managing demand and capacity. In the afternoons, they took site visits to see some of Yichang's accomplishments, such as a new BRT system, cycling infrastructure, the canal park walking tour, and one of the largest urban freight centers in China.

Visit **mobilizesummit.org** for more info, and to register for the 2017 summit in Santiago, Chile.

People Near Transit:
A New Metric for Accessibility to Rapid Transit

By Jemilah Magnusson, ITDP Global
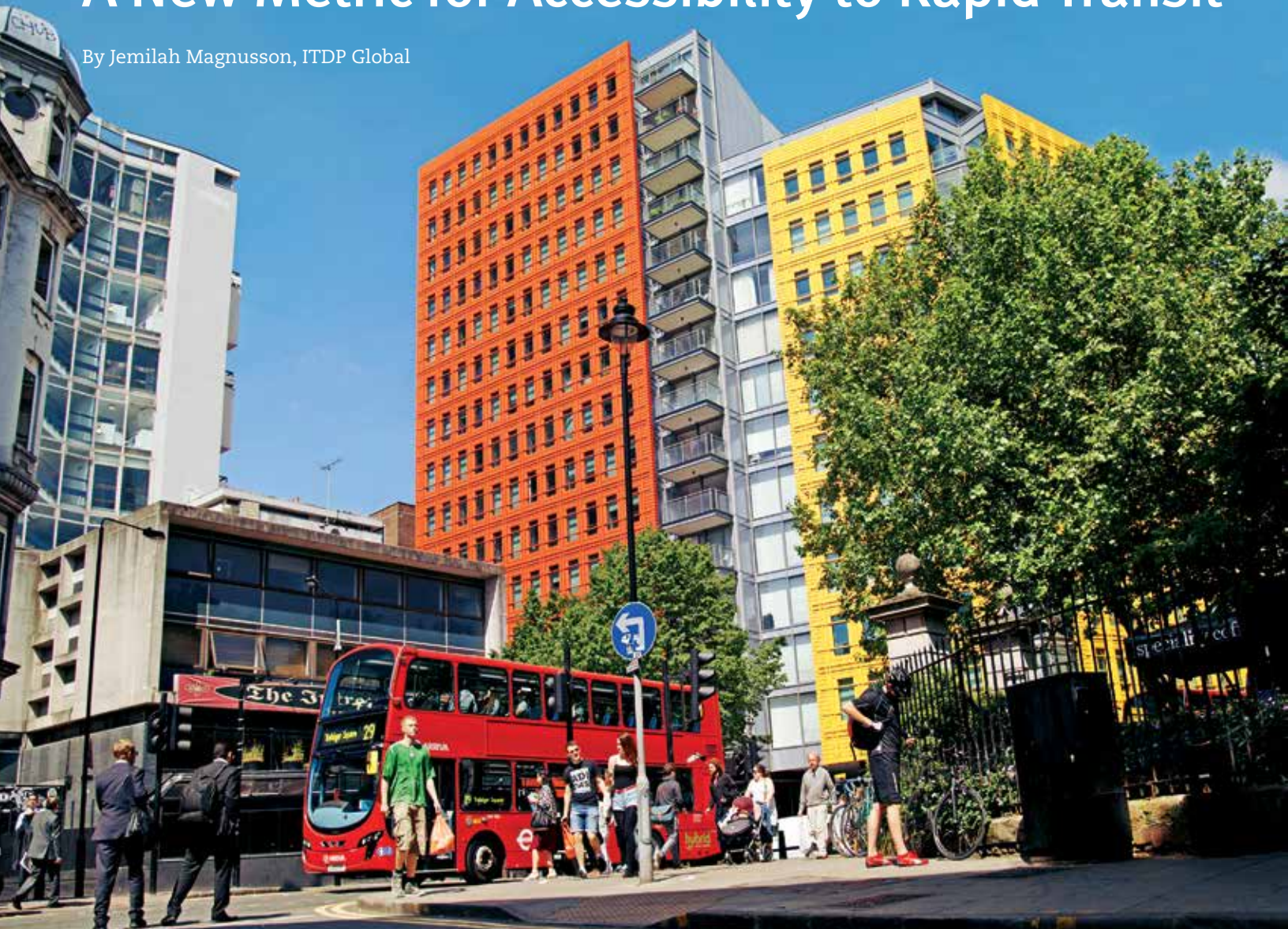
The city of London has some of the best PNT scores, due to an extensive, high-frequency transit system of trains and buses, and dense, transit-oriented developments such as Central Saint Giles.

As we all know by now, our cities are growing rapidly. Increasingly, the outlying regions of cities are home to less wealthy communities. A recent report from the Brookings Institution found that the poor population in US suburbs grew faster than anywhere else in the country, surging 64 percent in the past decade. Similar trends have already emerged in most countries around the world. Without a corresponding increase in rapid transit access, the poverty in these areas becomes entrenched, as the lack of transportation limits access to jobs and education in other parts of the cities.

Earlier this year, ITDP introduced a new metric, People Near Transit (PNT), which defines, in the simplest terms, what planners and activists already know, which is that cities everywhere are expanding rapidly without adequate transportation planning. Even cities known for great transport systems, such as Paris, London, and New York, are serving half of their population, at best, with transit.

In October, ITDP released a report, *People*

Near Transit: Improving Accessibility and Rapid Transit Coverage in Large Cities, which measured the number of urban residents who are within a short walking distance to rapid transit with our new metric, People Near Rapid Transit (PNT). Of the 26 major cities surveyed for the report, the city of Paris (but not the metro region) earned a perfect score and the metro regions of Washington, D.C., and Los Angeles were among the worst.
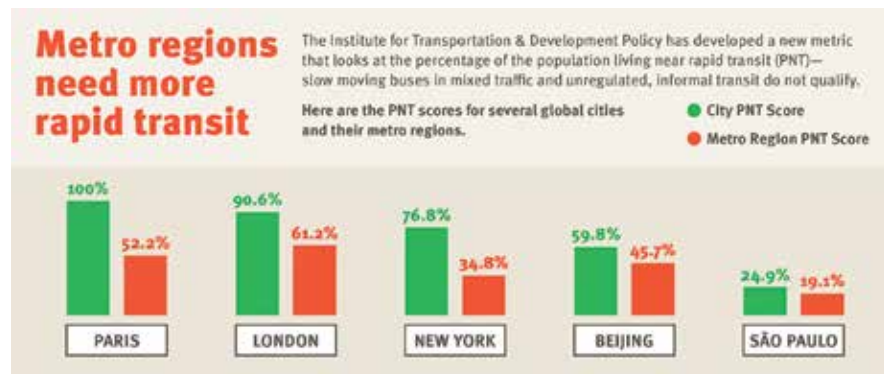
The PNT metric was established by ITDP researchers to measure the number of residents who live within 1 km of rapid transit. The report, *People Near Transit: Improving Accessibility and Rapid Transit Coverage in Large Cities*, released in advance of the United Nations' Habitat III conference, applies the metric to 26 cities around the world with high-capacity mass transit systems and the greater metropolitan regions anchored by these cities.

Very few cities are investing in the rapid transit systems that serve the less wealthy communities living outside of the urban core, even in Europe and especially in North America. For the 13 cities in industrialized countries that were scored, the average PNT was 68.5%, while those cities' metropolitan regions averaged 37.3%. The metro regions of the six US cities averaged a score of 17.2%.

"Mass transit systems should grow as cities grow; yet in most cities, governments still rely on automobile traffic as the primary way of getting people around," said ITDP's CEO Clayton Lane. "In today's megacities, road space is already massively congested with car ownership presently at only 10-30 percent, yet building more roads remains a misguided top infrastructure priority. Governments need to better serve the other 70-90 percent of the population without cars, and provide better mobility choices for everyone."

The rapid transit systems of Seoul and Beijing, the two largest cities in the survey, served the most people by far. Almost 11 million people live within 1 km of each system and their scores reflect the population density.

For the cities measured in low- and middle-income countries, the average PNT score was 40.3%, while the metropolitan regions averaged 23.7%. Of these cities, the rapid transit systems in Jakarta and Quito did not extend past the city borders. Almost all of the other systems only served a small fraction of the population living in these outlying areas.

Earlier this year, ITDP introduced a new metric, People Near Transit (PNT), which defines, in the simplest terms, what planners and activists already know, which is that cities everywhere are expanding rapidly without adequate transportation planning.

Mass transit should also be *rapid*. Here's how.

With urban regions growing in size, more people have longer distances for their daily commutes. If we want equitable cities, everyone needs access to safe and rapid transit.

But how can mass transit speed up?

1 Advance fare purchases— passengers line up at the station to buy their fare, so the line to board the bus or train moves quickly

2 Consistent service— the distance between stations does not exceed 5km

3 Short wait times— passengers have at most a 20-minute wait at every station between 6am and 10pm

4 No cars in the way— for bus and rail transit, vehicles must have dedicated lanes

Metro regions need more rapid transit

The Institute for Transportation & Development Policy has developed a new metric that looks at the percentage of the population living near rapid transit (PNT)—slow moving buses in mixed traffic and unregulated, informal transit do not qualify.

Here are the PNT scores for several global cities and their metro regions.

● City PNT Score
● Metro Region PNT Score

City	City PNT Score	Metro Region PNT Score
PARIS	100%	52.2%
LONDON	90.6%	61.2%
NEW YORK	76.8%	34.8%
BEIJING	59.8%	45.7%
SÃO PAULO	24.9%	19.1%

"In many cities, it's far too easy for municipal governments to ignore the problems on the other side of their borders," Lane observed. "But cities today do not exist in a vacuum. All metropolitan regions have an urban core, as well as surrounding communities. People in the outer regions cannot thrive without better transportation connections to the core and other outer communities. Government relationships across city and state lines are crucial to meeting the needs of their populations."
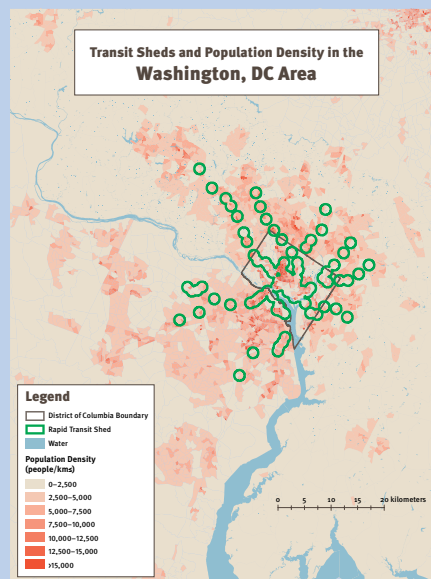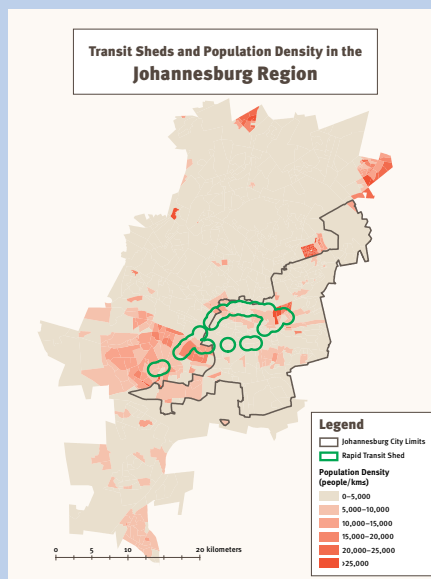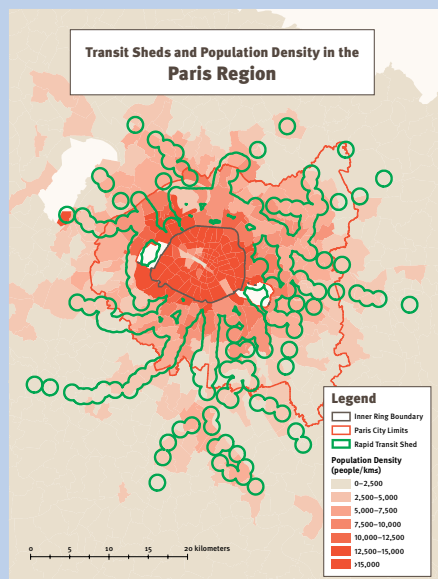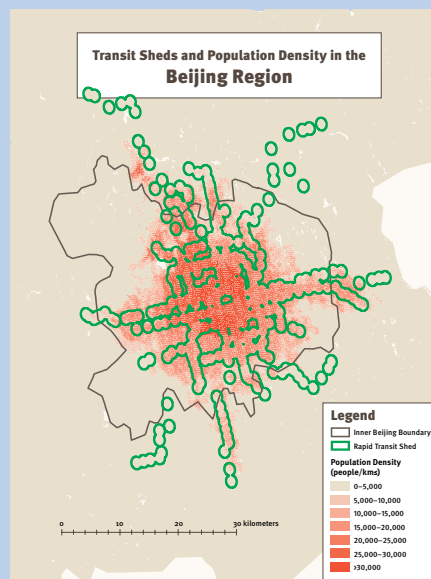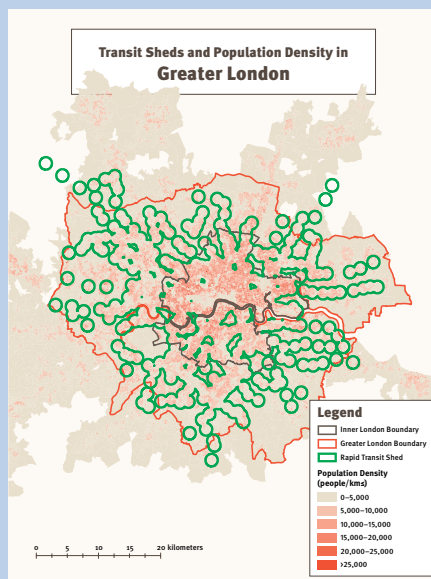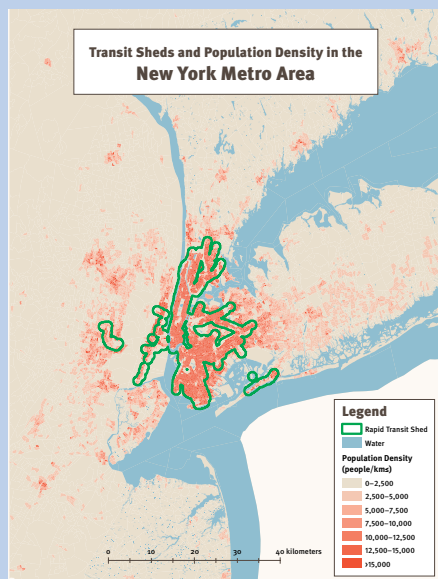
The city and metro area boundaries, showing population density and transit sheds, indicating areas where there is less than 1 km distance to a rapid transit line.

Mobility as Equity:
Low-Income People Near Transit

By ITDP Brazil

If the transit situation for the average commuter in the world's major cities is inadequate, the outlook for low income populations all over the world is likely to be much worse. In other words, no one likes an hour-long subway ride, but that's a comparative luxury if the alternative is a two-hour bus-to-bus journey. Such comparisons are increasingly the norm, however, as the past few decades have seen a trend in major cities: the wealthy are moving into the center, and the poor and middle class are being pushed out. This has serious equity implications for how we design our transit systems, in that the people who are most in need of transit have the least access to it.

To get a sense of this problem, ITDP Brazil researched the People Near Transit (PNT) metric for Brazilian cities and went even further, examining different income brackets' accessibility to rapid transit. The research encompassed the transit sheds of 900 stations along approximately 1,000 kilometers of rapid transit lines in the ten Brazilian metropolitan areas. These metros represent more than 60 million people, about a third of Brazil's population.

The results indicate that even in metropolitan areas where there is good overall population coverage by the rapid transit network, it is still mostly located near high-income people. These findings subsequently indicate the importance of taking further steps to provide transit access for low-income people and the overall need to pursue more socially inclusive development in Brazilian cities.

In general, cities with wider rapid transit networks had better PNT

results. The case of Rio de Janeiro, whose metropolitan area concentrates over 12 million people, is noteworthy. Between 2010 and 2015, the city increased its rapid transit network by 91 kilometers of BRT and a subway extension of 1.2km in investments for the 2014 FIFA World Cup and the 2016 Olympic Games. A new subway line and the downtown tram network were also opened in the second half of 2016. Rio showed the best population coverage by rapid transit at both the city (47%) and metropolitan area (28%) levels.

Other cities with similar rapid transit expansion patterns stood out, such as Curitiba (46% at the city level and 23% at the metropolitan level), Porto Alegre (42% city and 23% metropolitan) and Recife (29% city and 23% metropolitan).

However, São Paulo, Brazil's largest metropolitan area and the one that holds the country's most extensive rapid transit network (305.6 kilometers, of which 57 kilometers are BRT and 248.6 kilometers are subway and train), showed less significant PNT results (25% city and 20% metropolitan level). These results suggest that in certain contexts, the size of the rapid transit network alone is not able to influence the PNT outcome. Rather, the network's distribution across the landscape and the city's development patterns are decisive factors in the accessibility of rapid transit stations.

São Paulo is a city marked by a sharp process of verticalization, which increases density through high-rise construction. Consequently, since the 1970s, the metropolitan area's footprint

Recife's BRT stations are located near low-income settlements in the metropolitan area.
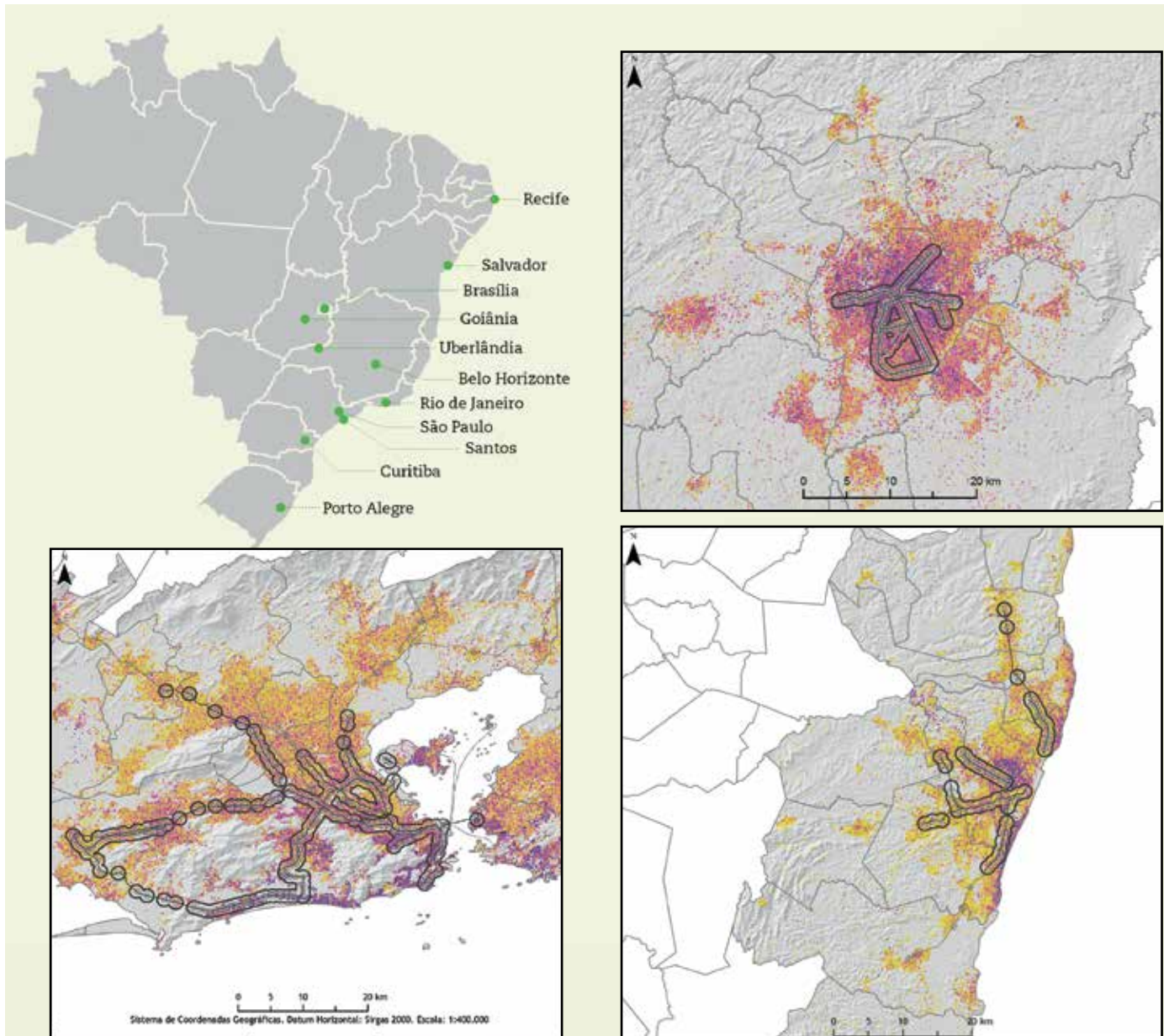
The cities of Curitiba (top), Rio de Janeiro (left) and Recife (bottom), showing transit sheds, population, and income. Darker color indicates higher income.

has increased less than overall population and density have increased. At the same time, growth has not been oriented to public transport infrastructure, which explains the low PNT scores. Recently, the government of São Paulo has been trying to reverse this pattern, with the incorporation of Transit-Oriented Development principles in the city's 2014 strategic master plan.

The study's indicator of accessibility for each income bracket, or "Social PNT," evaluates the percentage of people from each bracket that live within a one-kilometer distance of rapid transit stations. When analyzing the results of Social PNT, we find that, even in cities with relatively high PNT results, there are significant differences in the presence of people from different income brackets near rapid transit stations.

The main example among the metropolitan regions evaluated is Curitiba. The city is a worldwide reference for TOD given its pioneering role in the policy. In the 1970s, Mayor Jaime Lerner was responsible for the implementation of a policy that encouraged density along the city's BRT corridors.

Not surprisingly, Curitiba had one of the best PNT results among the cities and metropolitan areas evaluated. However, while 54% of the metropolitan area's population from the highest income brackets (more than 3x minimum wage per capita per month) live near rapid transit stations, only 13% of the population from the lowest income brackets (up to one-half minimum wage per capita per month) do. The difference (delta) of 41 percentage points in the rapid transit coverage between the highest and lowest income brackets was one of the largest, along with Porto Alegre, among the metropolitan areas evaluated in the study.

These results reinforce the importance of adopting social inclusion measures in the context of urban policies aimed at promoting TOD. The

cities with the best comparative results, in terms of social equality in access to rapid transit, were Recife and Salvador, both in Brazil's northeast region. These cities have a more significant presence of poor residents in central neighborhoods served by rapid transit.

When widening the vision from just the city proper to the metropolitan scale, inequalities in transport access inevitably increase. There is an average of 64% PNT decrease, along with an increase in the disparity between the highest and lowest income brackets between the city core and metropolitan level.

The results underscore the fact that the poorest populations are concentrated on the metropolitan area's outskirts, the product of an intense process of urban sprawl and spatial segregation Brazil's metropolitan areas over the last few decades. Central areas, which concentrate jobs and urban opportunities, tend to be more valuable, making it difficult for the lower income bracket to remain.

All ten metropolitan areas analyzed showed this trend. Newly implemented transport corridors within the context of investments for the 2014 FIFA World Cup managed to increase some cities' PNT and access for all income brackets. However, coverage still focuses on municipal boundaries and tends to favor higher income brackets. The case of Belo Horizonte is also noteworthy: the city implemented 41 kilometers of BRT and increased its PNT from 16% to 27% in a city level, but also increased income disparity between highest and lowest income brackets from 9 to 14 percent.
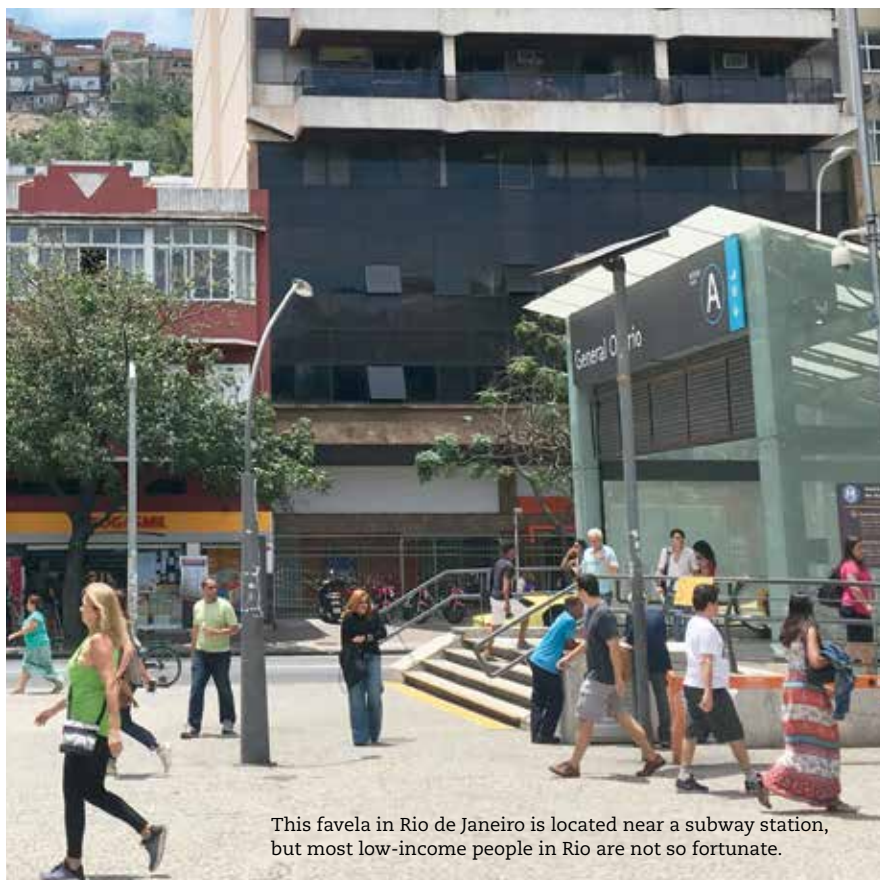
This favela in Rio de Janeiro is located near a subway station, but most low-income people in Rio are not so fortunate.

What should Brazilian cities do differently?

- Expand public transport networks to dense areas far from the city's central cores, especially in the metropolitan area's more consolidated urban sections;

- Promote, through zoning, densification around rapid transit stations situated in less occupied areas, with consolidated infrastructure and few environmental restrictions in order to stimulate new centralities and reduce the need for long commute trips;

- Implement policies (e.g.: production of social housing, rent assistance and vocational training policies) to attract and maintain people from lower income brackets in housing near rapid transit to ensure their access to the city's opportunities;

- Qualify the transport networks promoting ophysical, fare, operational and information integration between different modes of transport and expand the cycling network to ensure that transport is also available to people who live in remote and less dense areas still within reach of transport corridors.

Guaranteeing access to public transport is a good way of ensuring the right to a fair and sustainable city. It is important to consider, however, that the proximity to transport is only one of the elements of the access to the city as a whole. Other key factors to ensure accessibility include walking conditions to and from stations, the quality and capacity of public transport service offered and, in the case of social policies, the fare for different types of users. Cities that orient their development and concentrate a variety of opportunities around transit stations promote their residents' welfare, generate economic development, and reduce their environmental emissions. The PNT indicator, in turn, allows us to properly monitor their success in achieving this goal.

Image: ITDP Brazil

Is Your City Made for You?

By Aimée Gauthier, ITDP Global

Cities are designed for the male commuter. Transit is oriented to peak-time commutes. Buses are cumbersome for those carrying packages, travelling with children, or with limited mobility. Activities are separated, making it harder to do multiple errands in one trip. Sidewalks are obstructed, buckled, pockmarked, or even non-existent, making walking treacherous.

Stepping up into buses can be difficult for women and older people who may be shorter, carrying packages, or travelling with children, like in Trichy, India.

Kalpana Viswanath of Safetipin asserted this at Habitat III, the United Nations conference on housing and sustainable urban development in October in Quito, Ecuador. Much of the talk at the conference was about the goal of creating inclusive cities. ITDP assembled a group of key organizations representing women, youth and children, older people, the urban poor, and people with disabilities. One after another, they spoke about how their city isn't designed for them. They reported increased social isolation, insecurity, and spatial marginalization, as inequality gets hard-wired into the physical structure of the city.

Since women often retain the primary caretaker role, in addition to getting to work, they have to get kids to school or childcare, pick up groceries, care for older relatives, and take care of the house. For this reason, women tend to make more, shorter trips or more complex trips with multiple purposes, known as trip chaining. (See also Beyond the Women-only Train Car, page 22.)

More and more, lower income people (in which women, children, and the elderly are also disproportionately represented) are pushed to the periphery of the city in their search for affordable housing. When affordable housing exists in downtowns, it is often in informal settlements that may be threatened with eviction and displacement. Destruction of informal housing destroys communities and jeopardizes social safety nets. "One of the main challenges faced by shack dwellers is being evicted. With eviction comes displacement, often 40 to 50 kilometers away. And it is not just the loss of a home; it is the loss of your job, your schools, your community," says Sekai Chiremba from Shackdwellers International's Zimbabwe affiliate.

As Dr. Viswanath explains, though, it is not about transportation systems, but equal access to the city – the public spaces and its streets. The pandemic of violence against women is a global problem, and the fear of violence limits women's movement through the city. Sion Jones from HelpAge International mentions older people also curtail their movement because of feelings of insecurity, too. Car traffic and poor sidewalks also limits access to the city for older population. Their report, Ageing and the City: Making urban spaces work for older people, goes into further detail. "Broken and uneven pavements mean we risk falling and injuring ourselves," says an older Mexican woman in the report.

If too much car activity makes people feel unsafe, so does too few people on the sidewalk. When a street does not have an active life of stores, restaurants, entrances for both residents and workers to use, the street feels empty and abandoned. The trend towards gated communities exacerbates this. "Gated communities protect property, not people," Dr. Viswanath notes. Moreover, this segregation, according to Hirotaka Koike from UN Major Group for Children and Youth, statistically provides worse educational outcomes by creating divisions within society and making the situation where community cannot be formed in shared, public space.

Arina Hayati, from the Institute Teknologi Sepuluh Nopember (ITS)'s Department of Architecture who advocates for people with disabilities, describes testing new ramps to bus stations the government in Surabaya, Indonesia, recently built to make them universally accessible. She wheeled up the ramp with difficulty, because it was steep, but she persevered, only to arrive at the top to find the doorway was too narrow for her chair.Ms. Hayati says these half-hearted solutions inadvertently create more barriers, and cities around the world are filled with these imperfect examples of solutions. She advocates for designing from empathy, not sympathy. Participatory design allows the disabled to be actively

Arina Hayati, from the Institute Teknologi Sepuluh Nopember (ITS)'s Department of Architecture who advocates for people with disabilities, describes testing new ramps to bus stations the government in Surabaya, Indonesia, recently built to make them universally accessible. She wheeled up the ramp with difficulty, because it was steep, but she persevered, only to arrive at the top to find the doorway was too narrow for her chair.

Left: For older people and those with limited mobility, having places to sit helps them be able to walk around the city, like here in Quito, Ecuador. Right: Having space on buses for wheelchairs, as well as level boarding with no gap between bus and station and ramps into the station, is critical to giving freedom of mobility to many people with disabilities.

incorporated into the planning and design process.

Different users exist with different needs, but many users have similar concerns. As Soon-Young Yoon from the Women's Environment and Development Organization said, there is a high overlap between these groups. Most old people are women, and many are disabled. Women make up 51 percent of the population, and older people are the fastest growing cohort of urban populations. People with disabilities are 13 percent of the urban population, a number that will rise as populations age.

With the world about to add 2.5 billion more people to cities, we have an opportunity to re-imagine cities for all. As cities grow, we must fight the patterns of urban development that embody and perpetuate social exclusion and segregation. Cities must expand and redevelop in a compact manner, while achieving more equitable,

Without paved sidewalks, walking becomes harder, especially if it rains. But providing adequate space and good paving makes it easier for all to walk from school children to older people.

environmentally sustainable patterns. The building block for this is inclusive, transit-oriented development (TOD).

In 2014, ITDP published the TOD Standard to define best practices in transit-oriented development. The Standard is built upon eight principles: walk, cycle, connect, transit, mix, compact, dense, shift. From those, ITDP developed performance objectives and indicators to measure how well a particular project or neighborhood achieved those objectives. TOD is inherently pro social equity, as well as pro environmental sustainability, by prioritizing no to low-cost modes of transport with the goal of

increasing accessibility by all people by foot, wheelchair, bike, or transit.

ITDP is now updating the TOD Standard to more strongly incorporate inclusivity goals. The Standard now measures the mix of incomes and not just affordable housing. Building standards and planning regulations should not lead to the displacement of existing settlements. This affects households and businesses, disrupts communities, destroys social safety nets, and tends to move people further out, Ms. Chiremba points out. Finally, the Standard includes access to green or open space.

With these changes, the TOD Standard seeks to define the building block of the inclusive city. That mission is more urgent than ever, and not just resigned to the scale of urbanization the world is about to experience. As global political developments are showing us, our world is becoming more divisive, with a global populist movement grounded in desires for separation and segregation. And cities matter, as they are often places that help create more inclusive societies. Recognizing the multiple identities that form the city is crucial for making stronger and more resilient places. We have more similarities than differences, and our cities and our transportation need to build on that. Our cities need to facilitate interaction and inclusion, our public spaces need to help build civic respect and civility, and our public services need to bring people together. The need for urban spaces that create inclusive places is more important than ever. And they can when they recognize, respect, and design, with empathy, for all its inhabitants.

For more information on Transit-Oriented Development, visit **todstandard.org**.

14 Years in the Making, DART Brings Mobility to Dar es Salaam

By Naomi Mwaura, ITDP Africa

Until recently, extreme congestion was the story of life for commuters in Dar es Salaam, with rush hour commutes of up to four hours in one direction. Congestion was so extreme, with up to four hours of traffic daily for commuters, that drivers didn't even attempt to travel into the urban core. Thanks to Dar es Salaam Bus Rapid Transit (DART), the first phase of which opened on May 10 2016 after over a dozen years of intense work on the part of ITDP Africa and its partners, the Tanzanian capital is beginning to alleviate some of its worst mobility problems. The 21 km first-phase corridor is already serving 160,000 people per day and will carry 400,000 when the full bus fleet is in place.

Success in Tanzania may be a harbinger for the future, as Africa is the most rapidly urbanizing region in the world. By 2030, Dar es Salaam is expected to have more than 10 million people who will generate 23 million trips per day. Without a large-scale public sector intervention, the looming increase in travel demand would have led to ever worsening congestion, causing more and more people to switch from daladalas – the shared minibuses that make up the majority of informal transit service in Dar es Salaam – to private vehicles. This scenario would have added to existing congestion, pollution, and road safety problems in the city. By just one measure of the slow pace at which Dar es Salaam's traffic crawls, in 2007 average peak hour speeds were at 10-12 km/hour.

DART's origins go back to 2002 when ITDP found the city to be a willing partner for BRT

DART stations include new pedestrian crossings, improving the streetscape of Dar.

under then mayor Kleist Sykes and a cooperative city council. In partnership with the World Bank, USAID, and UNEP, ITDP oversaw a feasibility study as well as business and administrative planning. It also provided ongoing support throughout the planning stages of the project.

Year by year, the project moved along slowly but surely. Concept designs were completed in 2005. The DART agency was formed in 2007 and environmental planning was completed the same year. In 2008, the World Bank approved funding, but DART suffered a setback in 2008 when the construction tender failed after receipt of non-responsive bids. The contract was then re-tendered in a different format, splitting the initially large single package into seven smaller packages. The lowest evaluated bidder withdrew in May 2011 when the contractor was unable to take possession of the site because the compensation for businesses and property owners could not been completed in time. A contract with the next bidder, who ultimately took the project forward, was signed in December 2011.

Construction of the first phase finally began in March 2012 after the World Bank approved additional financing. In 2013, the city added center-aligned BRT lanes and median stations on Morogoro Road, one of the city's main thoroughfares, and soon embarked on DART's most daring feature: a fully dedicated BRT-only street running through the city center. The ITDP team pushed for high-quality cycle tracks parallel to the BRT corridor, as well as safe, universally accessible sidewalks and at-grade pedestrian crossings to the BRT stations.

As construction progressed, the project faced the challenge of establishing bus operating companies and attracting investors. ITDP worked

Passengers wait to board the BRT in the station.

On the whole, DART has dramatically reduced commute times for Dar es Salaam residents who live along the BRT corridor, who previously faced upwards of four hour commutes daily, now are seeing that reduced to 45 minutes on the BRT.

with the DART agency to incorporate the daladala industry as shareholders in BRT operating companies, relying on its firsthand experience from other cities like Johannesburg and Cape Town. The project isn't without its controversies, however, starting with the economic impact. Although over 1,000 construction jobs were created through this project, local workers were employed mostly on a contract basis in entry-level positions.

Corridor management also has been a challenge. Tuk-tuks and motorbikes frequently commandeer the bicycle and pedestrian infrastructure than runs parallel to the BRT corridor, and incursions of motorbikes on the busway contribute to delays and safety risks. To address these challenges, motorbike drivers are now required to get off and push their vehicles across the busway if they wish to cross to the other side of the road.

Information technology has streamlined fare collection in the DART system, with customers paying with smart cards when entering the stations. The contactless cards can even be recharged using mobile money—a popular form of payment over the mobile phone networks. Still, IT has not been fully integrated into the BRT system, so passengers do not yet have

real-time information on bus arrivals.

Despite these issues, DART is moving forward with plans to cover the entire city with BRT service via a 130 km network of segregated busways and more than 200 km of feeder routes. DART's second phase, which will involve the laying of BRT infrastructure on Kilwa Road from the central business district to Mbagala Rangi Tatu in Temeke Municipality, is expected to begin soon.

On the whole, DART has dramatically reduced commute times for Dar es Salaam residents who live along the BRT corridor, reducing 3 and 4 hour-commutes to 45 minutes. The project has the potential to be truly transformative, curbing sprawl and improving urban life in Tanzania. Even if there are some kinks to work out in future phases, DART is already breathing new life into Dar es Salaam and increasing its economic competitiveness in the East Africa region.

DART runs as transit mall along Morogoro Road, through the downtown of the city, a lively area with a great deal of transit demand.

[1] David Mfinanga & Erick Madinda (2016). Public Transport and daladala service improvement prospects in Dar es Salaam.

Images: ITDP Africa

Africa Rising in Kigali, Rwanda

By Naomi Mwaura, ITDP Africa

4G Internet service on city buses? Stored fare cards to pay for transit rides? Smartphone apps to hail taxis? Monthly car-free days? These perks may sound like standard fare for cities looking to enhance their sustainable transport bona fides in 2016, but the latest city to take the plunge may surprise those used to stereotypes of chaotic African mega-cities. Over the last decade, Rwandan capital Kigali, population one million, has established itself as the poster child of the African sustainable city.

While the country's reputation was tarnished by the horrific genocide of the early '90s, residents have to a large extent put that tragic history behind them, helped along by the city's youthful energy: 60 percent of Kigalians are under 30. In turn, Kigali has made phenomenal strides. In 2008, it won the UN-Habitat Scroll of Honor Award for its many innovations, like zero tolerance for plastics, improved garbage collection and a substantial reduction in crime.

Flying into the city's modest airport to attend an African Union Conference, I was curious to find out if Kigali would live up to the hype. Was it really as clean, safe and well-planned as I had heard?

My first impression was one of rugged topography. Rwanda is known as the land of a thousand hills and its

Top: Kigali sprawls across four ridges with valleys in between, Rwanda is known as 'the land of a thousand hills'. Bottom left: Kigali's wide sidewalks and safe pedestrian crossings make it a best practice in walking for African cities. Bottom right: Sidewalks along a local shopping street show a people-centered street design.

capital is no exception. Kigali sprawls across four ridges with valleys in between. As a result, like many African cities, motorcycle taxis (motos) are a cheap and effective way to get around. But unlike many of Kigali's neighbors, most motos here are registered and their drivers are law-abiding. I boarded a safeboda* and unlike my experiences

in other African countries, the driver did not overtake with a risky move into oncoming traffic or tailgate the vehicle in front of us. Overall, I felt much safer than I usually do.

These safety norms didn't come out of nowhere. According to the World Health Organization, 80 percent of the traffic accidents in Rwanda are caused

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* Safeboda and Safemoto are on-demand motorcycle taxi services that offers professional, trained drivers in African cities through mobile apps.

In addition to cleaner buses, better customer service, and safer driving, more than 500 buses now have free 4G Internet connections for passengers. In another technological innovation, the local transit agency recently introduced the Tap and Go smart fare card. In addition to passenger convenience, the card increases revenue by cutting down on ticket fraud.

Motorcycle taxi drivers wait for fares.

Passengers board buses, the service of which was improved with the Smart Kigali initiative.

by motos. Safemoto*, a social enterprise app, has been working to reduce accidents with a financial incentive tied to safe driving. If the customer gives the driver a good safety ranking, the driver receives a RWF 50 (US¢6) bonus. The app also monitors driver behavior, for example to track whether the drivers are using their phones en route. The best drivers are then connected with bad drivers, who can learn from their colleagues how to improve their safety ratings.

The government also has a hand in ensuring that motos operate safely. The Rwanda Utilities Regulatory Authority (RURA) issues motorbike operational permits to the country's two cooperatives – every motorcycle must belong to one in order to operate legally. Participating drivers get a sticker that displays their number plate, cooperative name, and engine number. If they commit any safety infractions, they must answer to the cooperative's disciplinary team. In order to maintain a close working relationship, the mayor chairs a monthly

steering committee with the cooperatives where the city can discuss any issues directly with the public transport operators.

Motos aren't the only way to navigate Kigali. There is also a bus system, which received a facelift in February with the launch of the Smart Kigali initiative. In addition to cleaner buses, better customer service, and safer driving, more than 500 buses now have free 4G Internet connections for passengers. In another technological innovation, the local transit agency recently introduced the Tap and Go smart fare card. In addition to passenger convenience, the card increases revenue by cutting down on ticket fraud. As of June, Tap and Go was accepted on 200 buses.

Even with an impressive transit system – BRT is on the way – Kigalians still need a respite from the daily grind. One Sunday per month, cars are banned from city streets. Instead, the pavement fills with groups of Rwandans clad in sweats and sneakers, walking, jogging, or stretching. People gather in Amahoro

Stadium for free eye tests and general medical check-ups. Mayor Monique Mukaruliza hopes that these monthly breaks from driving a car will encourage residents to take up cycling and walking as alternative modes of transport during the rest of the week.

Luckily, Kigalians that opt for active transportation have increasingly attractive options. The city has taken great care in adding greenery that serves both aesthetic and functional purposes. Kigali has gone beyond street beautification to implementing functional street designs such as footpaths and cycling lanes. I strolled myself, even at night, and although seeing regular armed policemen first took me by surprise, it ultimately gave me a sense of safety and security.

At the end of my trip, I was nothing but impressed with Kigali. The city has not only survived genocide, but also grown into a modern metropolis as the heart of the emerging Rwandan economy. I'm looking forward to seeing what happens next!

Beyond the Women-Only Train Car: Gender and Sustainable Transport

By Sonal Shah, ITDP India

In December 2012, a woman was gang raped on a bus in Delhi while traveling with a male companion. She later died of her injuries, prompting national outcry and widespread protests in India. The attack against the woman lifted a curtain on the fraught relationship between gender and public transport. What was once an issue for feminists and the LGBT movement – both of whom have long lamented discrimination and personal threats during the simple act of traveling around the city – went mainstream, galvanizing civil society action and compelling different levels of government to create safer public transportation systems.

India's story is hardly unique. Over the last decade, women's safety on public transport all over the world has drawn a great deal of attention, particularly in developing nations. Transit agencies, in turn, are struggling to comply. As many transport professionals are beginning to understand, however, this is not simply a matter of protecting women from violent men, but requires a more fundamental approach to issues of women's equality, poverty, and visibility in the transport sector overall.

Ultimately, transportation is the fulcrum that allows women to participate in the workforce, a societal shift that can transform the entire world economy. If women were to play an equal role in labor markets, as much as US$28 trillion could be added to the global economy by 2025 according to the McKinsey Global Institute. But first they have to get to work. One of the most essential keys to economic and social opportunities for women, especially poor women, is safe, accessible, and affordable transportation options.

It is now widely acknowledged that our cities and transportation systems are not gender-neutral. Women have inferior access to public modes (buses, trains, informal transit options) and private modes (two-wheelers, cars, carts), while assuming a higher share of the household's travel burden and caretaking responsibilities.

While media continue to focus on violent crimes in public transport and public spaces, the defining characteristics of violence against women are more mundane and harder to stamp out. Groping and catcalls are such

Women have inferior access to public modes of transport while assuming a higher share of the household's travel burden and caretaking responsibilities.

Transit systems are designed largely for the solo and able-bodied, making it difficult if not impossible to travel with children, the elderly, or disabled, as many women do.

Access to and from the Public Transport stop

Waiting at the bus shelter, interchange terminal

Boarding and alighting the vehicle

Experience in the vehicle

If women were to play an equal role in labor markets, as much as US$28 trillion could be added to the global economy by 2025 according to the McKinsey Global Institute. But first they have to get to work. One of the most essential keys to economic and social opportunities for women, especially poor women, is safe, accessible, and affordable transportation options.

Adequate transport planning for women should take into account the entire transport experience, not simply the ride, to address all areas where women are vulnerable.

constant occurrences that they have become ordinary, under the radar of law enforcement, while controlling women's everyday lives through a constant sense of insecurity.

In New York City, it is estimated that 96 percent of sexual harassment and 86 percent of sexual assaults in the subway system are unreported. In Baku, Azerbaijan, none of the 162 out of 200 women who reported having been sexually harassed on the metro to an NGO survey, reported it to the appropriate authority. Of 1,010 women surveyed in Egypt, 83 percent of female citizens and 98 percent of foreign women living or travelling in the country had experienced sexual harassment in a public place. In turn, only 2.4 percent and 7.5 percent, respectively, had reported the incident.[1] This underreporting is consistent throughout the developed and developing worlds, resulting in a vicious cycle. Daily harassment goes unpunished, which means that it continues to flourish. Because it continues, it's treated as normal – something to endure rather than speak out about – and thus continues to go unreported.

In response, transport authorities across the world have provided segregated rail and bus services, reserved seats, women-only taxi or auto-rickshaw services. While such services have provided some comfort to women commuters, they may not always achieve the desired objectives. For example, women-only buses in India have been critiqued for poor frequency and the inability to travel with men.

What's more, focusing on women-only services scratches the service of the issue without digging deeper into the gender biases in transportation planning. Planners rarely acknowledge mobility of care, or the travel needs associated with care and home-related tasks, which are predominantly done by women. Instead, transit systems are designed largely for the

solo and able-bodied, traveling only at peak hours, making it difficult if not impossible to travel with children, the elderly, or disabled, as many women do. Integrating care concerns into transport planning is not just important for women, but will become more significant for everyone as the participation of men in these tasks increases.

Transportation planning that fails to create a safe environment to travel at night is another example of gender bias. Inadequate public lighting, closed-off passageways between stations, or a lack security at transit stations are a few examples. Part of the problem is that there is a lack of female representation in the transport sector overall.

While many efforts to address gender bias in transportation planning focus on riders, there is another possible role for women as transport operators. In addition to offering employment opportunities, women in official roles – as bus drivers, subway conductors, and ticket takers – normalizes the presence of women in transit systems, making them less vulnerable.

In an increasingly urbanizing and motorizing world, and in the context of the Sustainable Development Goals and the New Urban Agenda, there is an urgent need to mainstream gender in sustainable transport - such that walking, cycling and public transport are preferred, safe, and accessible modes of transport for women. It is not only an issue of inclusion or rights but an imperative for sustainable and equitable urban growth.

Images: Meena Kadri, WRI, ITDP

[1] Allen and Vanderschuren 2016

The Art of Being a Local in Medan, Indonesia

By Fani Rachmita, ITDP Indonesia

With more than 13,000 islands, even fellow Indonesians can feel like foreigners in the world's largest archipelago nation. The islands vary widely in language and culture, which can complicate efforts by residents of one island to secure community buy-in on another island. Such was ITDP Indonesia's challenge when it sought to introduce BRT to transport operators in Medan, the country's third largest city with over three million people and home to the fiercely independent Batak ethnic group.

While the island of Java is home to Indonesia's two largest population centers, Jakarta and Surabaya, Medan is the capital of North Sumatra, an island famous for its coffee and local culinary delights like durian pancakes, pork roast, and unique Chinese-Malay dishes. With captivating scenery, the national government has targeted North Sumatra as an international tourist destination. That priority has promoted new infrastructure projects, such as an airport and a 600-hectare area for resorts, five-star hotels, and restaurants around 440 square mile (1,140 square km) Lake Toba, the world's largest volcanic lake. The growth spurt also opened an opportunity for a BRT system to replace a chaotic mini-bus system.

For the last few decades, Medan residents have mostly commuted via mini-buses, run by some 11 private transport operators. While there are a plethora of routes, the mini-buses lack comfort and safety. As a result, in recent years the number mini-bus passengers has decreased and Medan residents began switching to private vehicles, which has clogged city streets. Sensing an opportunity to revamp Medan's transport system, ITDP Indonesia set up a plan last year to introduce BRT. But first the Jakarta-based office had to find an entrée with the Batak.

While also home to Javanese, Chinese, Indians, and Malays, some 6.1 million Batak people are the largest ethnic group in North Sumatra. The Batak have a reputation as blunt, loud, and to the point – all expressed in a thick accent. They maintain a patriarchal society with exogamous patrilineal clans known as "marga". Kinship ties remain the primary system of social organization among Batak, which can make it even harder for outsiders to approach them.

Bataks run the private transport operations, making them key to any successful BRT rollout in the city. Luckily, ITDP Indonesia had an ace up its sleeve: Ria Roida Minarta and Ferdinand Parulian Marterer, staffers with Batak bonafides. Both of Ria's parents are Batak, while Ferdinand has Batak blood on his mother's side.

With that local connection, Ria and Ferdinand were able to make inroads with the mini-bus drivers and operators. "I sell my family name," admitted Ria with a laugh. "Being Batak is a privilege. For Batak people, if you meet

The proposed BRT route in Medan today, and a rendering of the center-aligned BRT corridor.

Left: ITDP Indonesia's Medan outreach team, L-R Ferdinand, Ria, Ari, and Anggi after a hard day's work.
Right: A typical street in Medan, with minibuses competing for road space with cars, pedestrians, and vendors.

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other Batak in any places in this world, they will consider you as their family."

Ria used her family background to get past the Bataks' gruff exterior. "Batak people are known for being unapproachable – especially to new people," she said. "Their personality makes people really hesitant to communicate with them. But once you know them, they are really warm-hearted and friendly."

Batak transport operators run the city transport system. They sell the vehicles, route permission, licenses, and everything that a driver would need to operate a mini-bus. With the help of Medan's transport agency, Ria and Ferdinand reached out to all 11 transport operators in order to meet with them in person. "Instead of gathering them in one room and potentially causing a ruckus because they will argue with each other, we decided to meet them separately in person," explained Ria.

Calling her Batak background "an effective ice breaker", Ria said, "From the very first time I mentioned my family name, they started asking me about my hometown, about my parents and ancestors. It made the conversation more casual and comfortable, because they feel that I am one of them."

Ferdinand, meanwhile, is not technically considered Batak because their lineage is patrilineal, but he is fluent in Bahasa Indonesia and he speaks with an accent similar to the Batak style of speaking. As a result, the transport operators grew comfortable with him as well.

From these conversations, all lubricated by local coffee and Batak food, Ria and Ferdinand got the information they needed and came to understand the transport operators' concerns. "They are afraid they will lose their jobs," said Ria.

However, legally speaking, the route permissions doled out by the mini-bus operators are, in fact, licenses to run buses. It was only in 1990 that a transportation cooperative established itself in Medan and began plying routes with mini-buses. As a result, if Medan adopts a BRT system, the operators can continue to use the same licenses. "They accepted it very well," Ria said. "They were relieved that what they thought about BRT all this time was not right."

Once they had assuaged the operators, Ria and Ferdinand then did some detective work as they tried to cross-reference what the operators told them with the drivers' own experience. Their

Batak background again came in handy here. To investigate, they disguised themselves as locals and chatted up the drivers, who most of the time also own the mini-bus.

They plied drivers for information about the mini-bus' daily earnings, and the costs of maintenance and of buying the mini-bus from the operator, all of which would factor into their BRT proposal. But this gumshoe reporting had its tedious moments as they jostled with other passengers. "The hardest thing was waiting for a mini-bus that has an empty front seat, so we can talk freely with the driver," Ria said.

As a result of the Batak connection, ITDP Indonesia's role as a moderator between the government and the operators brought significant progress to Medan's developing BRT system. The local government is now more confident about implementing the plan. They are willing to join upcoming site visits to Guangzhou and Yichang, and have even contributed novel ideas on BRT lane segregation and enforcement.

Designs for Medan's BRT are expected to be ready by early 2017. Implementation should soon follow, as the Medan Department of Transportation agreed to pour Rp. 100 billion ($US 7,459,000) from the Regional Development Budget into non-motorized transport improvements along the BRT corridor by next year. All in all, being a Batak paid off handsomely.

Images: ITDP Indonesia

Millennials Weigh Their Transport Options in Car-Centric America

By Nneka Njoku, ITDP Global

Downtown Minneapolis, Minnesota and surrounding area.

"My impression of the United States was Route 66. I've seen so many photographs. And I had this idea that you can ride in the car and go wherever you want to, and there's so much freedom to go wherever you want. But here I have a bicycle." - Qingyun Wu, Chinese native who lives in Flushing, Queens, New York City [The New York Times]

Wu's idea of a car-centric America is not just specific to a global impression of the United States, but is representative of the United States' current transport culture. There were almost 256 million registered passenger vehicles in the US in 2013 and the use of passenger vehicles is the most popular transportation method in the country. Wu lives in New York City, which is known for its public transportation infrastruc-ture, and New Yorkers are often the focus of the many analyses we've all seen showing that young Americans are less interested in cars, and less likely to own a car, than their parents were. However, in most American cities, there are still few, limited or no public transportation options. Minneapolis and St. Paul, Minnesota, are mid-size Midwestern cities known as the Twin Cities, and a more typical example of American cities. Does this trend still hold?

The Twin Cities, with a city population of 700,000 and a metro area population of three mil-lion, is known for its extremely cold and snowy

The Blue Line, Minnesota's Light Rail, is the transportation lifeline for social activities in Minneapolis. The line begins at Target Field, home to the MN Twins baseball team, and goes past First Avenue, a live music performance space, through the warehouse district with hip bars, the modern Guthrie Theater, and industrial architecture and eventually to the Mall of America and the International Airport both in Bloomington, a Minneapolis suburb at the end of the line.

Hop on the 5 bus, Metro Transit's most popular route, and you will see your view change from South Minneapolis on Chicago Avenue where you will find a mix of ethnic groups and more residential areas. You will quickly move into Uptown, then Downtown Minneapolis, and out of it just east to Elliot Park and into North Minneapolis, home to a large African-American community. Eventually, the route ends in Brooklyn Park and Center, two Minneapolis suburbs heavily populated by Minnesota's Liberian community.

winters, the Mall of America (largest shopping mall in the USA), the birthplace of Prince, the Twins baseball team, corn farming, and thousands of lakes, 11,8421 to be exact. There is also a lively art and music scene, beer breweries, artisanal food scene, ethnic diversity, and growing sustainable transportation options. The cultural landscape is both urban and American.

In 2014, the Minneapolis Star Tribune reported3 that the population of millennials in the Twin Cities rose 25 percent between 2007-2014, attributing this growth to an affordable cost of living, vast housing options, quality universities, and quality job availability. The study also stated that millennials in the area are, indeed, driving less. Car ownership is not the social marker it once was, and young people are open to using a variety of transportation options provided they are fast, easy, and efficient. Unfortunately, like many cities in the country and around the world, the Twin Cities' infrastructure does offer enough of these necessities quite yet.

As a millennial who used to live in Minneapolis without a car, transport determined the decisions I made daily about my professional and personal life. I lived in Uptown Minneapolis, which played a large role in where I looked for work, which ended up being a 20-minute walk, a bus ride in the aforementioned winter. I was able to shape my life around being car free, while staying mobile. However, I was in the minority of my friends. Even though we lived in the city proper, getting around was still harder and slower for me than for them and I regularly felt the weight of not owning a car (especially in the winter). However, the decision to go carfree or car owner is hardly as simple as cultural norms, bitter winters, or as Wu suggests, a sense of freedom.

Russell Smith, 23
UnitedHealth Group
Lives in: St. Louis Park
Uses: Car, Rideshare

"The times I have visited Chicago, I really enjoyed using the city's public transit. I didn't have to travel more than 7-8 miles to my next destination and the transit there was always readily available. Now, though, I live in Saint Louis Park which is one the first cities that border Minneapolis. With my friends, family, and work being spaced throughout the Twin Cities, I find driving to be a more efficient use of my time."

Russell was a heavy user of public transit during college, and told me that if personal and professional commitments don't cause one to travel as much as he does, it is not necessary to have a car in the Twin Cities. In order to improve public transport, Russell thinks that having more train lines would be ideal, but in the meantime more express buses to surrounding cities would be helpful. Ultimately, Russell's dream transport scenario involves moving to a denser, accessible city. At the moment, Russell relies solely on the car to move around but he feels that other influences could change that. "Changes in job locations and/or gas prices could be a driving factor to use metro transit. I have a car because it allows me more time to do the things I like but it would be great to live in a city that wasn't too spread out where I could travel easily and efficiently by train."

Michon Pagitt, 26
Realtor
Lives in: South Minneapolis
Uses: Car, Light Rail, Bus

Michon is a realtor and consultant for a real estate app developer. Her sources of income pull her to many different locations in the Twin Cities and suburbs. "I have a car because I have to drive to lots of different properties and be in back-to-back meetings. Taking public transportation is not possible to be in all those places on time," she explains. However, her job with the app developer is located in downtown Minneapolis and she often commutes via the bus and/or light rail due to high parking rates downtown, even though she suffers from motion sickness. "I wish I could take the bus as I think the commute is relaxing, but the bus makes me really sick no matter what tricks I try. I do still take the rail since it's close to my house, I don't get sick, and I don't have to pay for parking downtown."

Michon thinks that the Twin Cities could improve their transport infrastructure by offering more light rail lines and making the commute to the suburbs easier. When asked if she thinks it necessary for a millennial to have a car in the Twin Cities, she felt that it was circumstantial. "I think it depends on their job situation. There are public transport options as well as alternative sharing services like Uber and Lyft. Having a car is a big expense so any young person can save a ton of money by using other forms of transport." Saving money is a huge deal for young Americans especially as an increasing number of them are crippled with student loan. Michon's partner Sean takes cost heavily into account when it comes to transportation.

Sean Hoag, 28
Prop Maker
Lives in: South Minneapolis
Uses: Car, Rideshare

"I don't own a car because the overall cost is impractical compared to using rideshare apps (Uber, Lyft, Turo). I don't think it is necessary for a young person to have a car in the Twin Cities because owning a car is highly impractical considering the amount of resources it takes to produce and maintain one." While Sean has used all types of public transport in the past, with the increase in availability and accessibility of car-sharing and on-demand taxi apps, he also does sometimes use Michon's car. Looking to the future, Sean is more concerned with technological advances when it comes to transportation. "I believe that as technology continues to progress, our transportation systems will change dramatically. My hope for the future is fully automated, shared, self driving cars on demand."

Channing James, 25
Medical Student
Lives in: Uptown Minneapolis
Uses: Car, Bus, Bicycle

Channing is a medical student at the University of Minnesota. When she first started school, she did not have a car and heavily relied on bus and bicycle, using the Midtown Greenway in the warmer months, to get to class. Now in her third year, most of her education comes from rotations in different fields of medicine in numerous medical institutions in the cities. "I have a car because it made it easier and more convenient to get to different rotation sites," she says. Channing's main issue with public transportation is with operation times and, like Michon and Russell, areas of reach. "It would be great if the train system reached further to the suburbs for commuters. There is also limited public transportation in the early AM, making travel for those who are working overnight or during non-typical work hours more difficult." Channing does not believe it is necessary for young people to have a car in the Twin Cities provided that they do not go to the suburbs that often. "Public transportation can typically get you where you need to go if you know the city, and stay in the city."

Tarkor Zehn, 25
Journalist
Lives in: Brooklyn Park
Uses: Car

"My car is everything!" Tarkor exclaims. Similar to Russell, Tarkor's professional and personal commitments are spread out within the Twin Cities. "Living in Brooklyn Park doesn't allow me immediate access to the light rail or efficient public transport. On top of that, I have one job in Osseo, another in Blaine [both suburbs of the city 14 miles away from each other] and I spend a lot of time socially in Minneapolis. I have used a bike to get around, which is actually pretty easy to do in Minneapolis with all of the bike trails and the greenway. I relied on the metro system and used the bus a lot in college to get to work downtown every morning. I remember shopping at places on University Avenue (St. Paul) because it was easy to catch the 21 to the 16 [buses] from the University of St. Thomas."

Looking towards the future, Tarkor spoke of plans to expand infrastructure in the Twin Cities and how that would change her transport behavior. "I know there are talks of expanding the light rail to neighboring suburbs such as Brooklyn Park and Burnsville [17 miles from Minneapolis]. I think this is an excellent idea. For me, I would definitely use that when going out in the city. I also think that having buses run more frequently from the suburbs to Minneapolis would be great. Sadly, my car is the only form of transportation I use currently, but if there was more access to public transportation, I would definitely use it more." Tarkor generally loves having a car for the convenience, the alone time, efficiency and the opportunity to store things such as a change of clothes and yoga mat for trips to the gym or groceries- "[when I took the bus in college] I specifically didn't run errands late for safety reasons and I always made sure I traveled light. Now that I have a car, I don't worry about those things!" However, when I asked Tarkor what her ideal transportation situation would be in the city, she told a different story- "because I truly do care about the environment and hate the maintenance of having to keep a car, I would love to live in a city where I could get by on just

When I asked Tarkor what her ideal transportation situation would be in the city, she told a different story - "because I truly do care about the environment and hate the maintenance of having to keep a car, I would love to live in a city where I could get by on just walking, biking, and public transportation. It would probably be a lot cheaper and would make life so much easier. Until then, I guess I'll dream about it!"

walking, biking, and public transportation. It would probably be a lot cheaper and would make life so much easier. Until then, I guess I'll dream about it!"

A few things stand out to me about these accounts, which I've found to be typical of young Americans' attitudes toward cars. First, a car is still, for many, a practical necessity, but its not about status the way it has been for previous generations. Most young people in cities would be happy to take transit instead of driving, if it was available and efficient. While the Twin Cities does have a variety of sustainable transportation options, whether or not you can depend on them alone for mobility is about where you live, work, and play. And for most people, those answers are different than the routes that transit has been designed for – a single commuter going to and from the city center during rush hours.

If American cities are to make the kind of strides they need in sustainable mobility, they'll need to increase frequency, options, speed, and reach of bus and trains that are the backbone of the system, and they'll need to supplement fixed route transit to accommodate daily needs: car share, rideshare and bike share are all options that millennials are already using, cities could get a lot out of expanding and improving them. Restrictions on driving, such as high gas prices and parking regulations, also do quite a bit to move young people to alternative modes.

Americans are making huge cultural progress by moving beyond the car-as-status model, and if we want to take advantage of that, we must plan our cities and transport systems to meet this demand, and show the next generation that sustainable transport is the new status symbol.

Image: Wikimedia Commons

Better Living Through Buses

By Chris Van Eyken, ITDP US

There is an old saying attributed to Margaret Thatcher, likely apocryphal, that makes transportation advocates everywhere cringe: "A man who, beyond the age of 26, finds himself on a bus can count himself a failure." Yes, many buses plod along as a kind of lowest common denominator for public transit. But the Iron Lady's conservative attitude is decidedly antiquated in the 21st century. When run on more direct routes with quicker headways, the humble bus has proven itself to be a transit system's best friend, including in cities with robust subway systems. The answer lies in frequent bus networks, a cost-effective way of redeploying existing resources to maximize efficiency and serve the most number of riders.

Even the United States, where the bus is much maligned, is experimenting with better bus systems in the wake of a surging return to urban living. Seattle is successfully using frequent bus networks to increase ridership, Omaha is redesigning its but network for greater frequency and direct service, and Los Angeles Metro has a service plan centered around a network of frequent buses. From sprawl poster child Houston to smart city poster child Barcelona, cities are proving that expensive investments in rail aren't the only way to move people around town.

The need is stark. While the last decade has seen capital investments in bus rapid transit and light rail systems, most American cities remain woefully underserved in terms of transit service. Even in standout cities with legacy systems like New York City and Boston, where over half of residents live within one kilometer of a transit station, those who live in poorly served areas cannot depend upon transit as their primary means of getting around. In such places, residents still depend upon private cars for their commutes and to run errands. For those not able to own a car, their addresses force them to depend upon slow and unreliable bus service for their day-to-day travel needs. These gaps in quality transit make American cities less sustainable and equitable than they could be with more reliable transit systems.

With massive infrastructure projects like New York's Second Avenue Subway or Boston's Green Line extension proceeding slowly, it's unrealistic to expect a massive wave of subway or light rail transit build-out to reach the remaining underserved. As such, the bus may provide the answer for closing these transit gaps – but some fundamental changes are needed.

Today, many U.S. bus systems offer passengers infrequent service along meandering, indirect routes. This status quo leads to inconvenient, unreliable service. But many American cities are looking to make improvements to their bus networks as a cost-effective means of improving their transit systems. In recent years, the adoption of frequent bus networks has allowed cities to better serve riders' needs by redeploying existing bus fleets.

In bus network planning, there is always a conflict between creating a system that seeks to maximize ridership and a system that maximizes its coverage area. A system that best serves ridership requires frequent bus service in dense, central areas where most passengers live. A system that best covers a service area requires routes through sprawling low-density areas, which can lead to routes with few passengers – but service for all who desire it. As resources are limited, transit agencies cannot serve both of these goals. Frequent bus networks opt for the former approach: serve the most number of riders.

A frequent bus network is a route optimization strategy that aims to create a system-wide improvement in accessibility, reliability, and convenience through a full realignment of the system's route structure. Routes are realigned to increase the number of stops at which bus service

City	Total population	Year	Pop within 1km of transit stations	Percent of population near rapid transit (PNT)
New York	8,354,889	2014	6,414,768	76.80%
Boston	646,805	2015	396,078	61.20%
Washington, D.C.	633,736	2014	361,391	57.00%
San Francisco	829,072	2014	337,064	40.70%
Chicago	2,911,782	2015	1,175,360	40.40%
Miami	419,957	2014	113,826	27.10%
Los Angeles	3,860,183	2016	936,689	24.30%
Atlanta	459,204	2014	110,503	24.10%
Dallas	1,245,159	2014	188,102	15.10%
Houston	2,223,637	2014	120,920	5.40%

Percent of population near rapid transit (PNT) in ten US cities. American cities are woefully underserved by rapid transit. Source: ITDP

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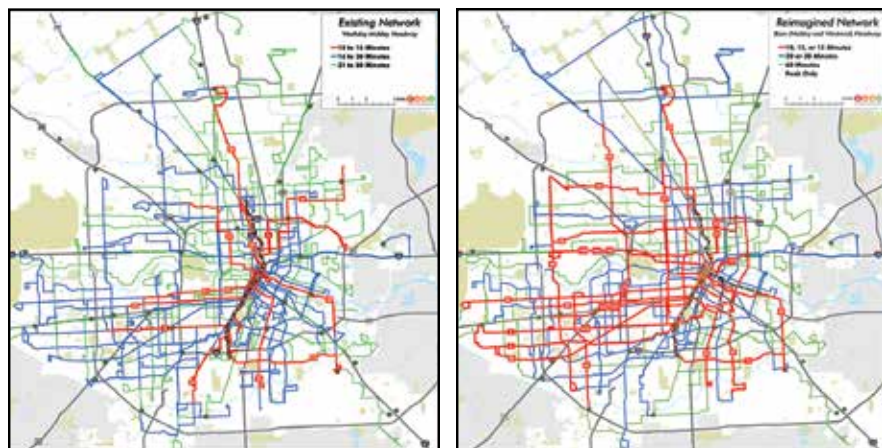
Houston's bus reimaging greatly increased the number of routes that offered service every fifteen minutes or less. The map on the left shows how few frequent services were offered compared to today's service on the right.

is available at a frequency of one bus every fifteen minutes or less. Simple, straight routes are created to increase system legibility and decrease time lost due to congestion along meandering journeys. Such improvements are used to improve transit service without significant increases in operational costs. Simply put, transit agencies seek to better use their resources by providing high levels of service where it is needed most.

Houston, Texas is the infamous city of no zoning, resulting in sprawling, auto-centric development. Surprisingly, it also provides one of the best examples of a successful implementation of a frequent bus network in the U.S. Faced with declining bus ridership and a system failing to meet the needs of a growing city, Houston METRO redesigned their network to increase the number of frequent routes and expand weekend service. Eighty percent of routes were designed to serve frequent ridership, whereas 20 percent provided wide coverage for overall ridership. Route design was shifted to create a grid of straight, simply drawn routes. These new routes created a 117 percent increase in the number of people within a mile of a frequent bus stop. Success followed: In the first quarter of 2016, bus ridership was up 32 percent compared to the first quarter of 2015.

The U.S. is hardly unique with this trend. Barcelona is a prime example of a European city with a robust transit system and a strong culture of public transit over private car use. It, too, gradually shifted its bus service toward this model. Over time, Barcelona has reduced redundancies and redrawn routes to provide straight, direct service that runs through the city center. Efficiency gains from these moves allowed the city to reorient their existing resources toward higher frequencies along their highest demand routes. Today, these sixteen routes run weekdays every 5-8 minutes between 7 AM and 9 PM.

The innovation goes a step further. Barcelona tied service improvements to dedicated infrastructure like bus lanes and transit signal priority. Bus service is not only more frequent, it is also more reliable now that it avoids heavy traffic and signal backups. These improvements have proven popular. As of 2016, the sixteen improved routes have reached up to 300,000 passengers on a single day. That figure represents approximately 42 percent of the city's bus ridership.

For transit planners scratching their heads about how to improve service without using more resources they don't have, designing a frequent bus network can offer a seemingly perfect solution. Cities as wildly different as Houston and Barcelona prove that the reapportionment of existing bus fleets and operational funding can produce demonstrable ridership gains. A reduction in redundancies and needless detours allows operating agencies to dedicate more of their funding toward providing the frequent, direct services that transit riders most desire. Now is the time for cities to get on the bus.
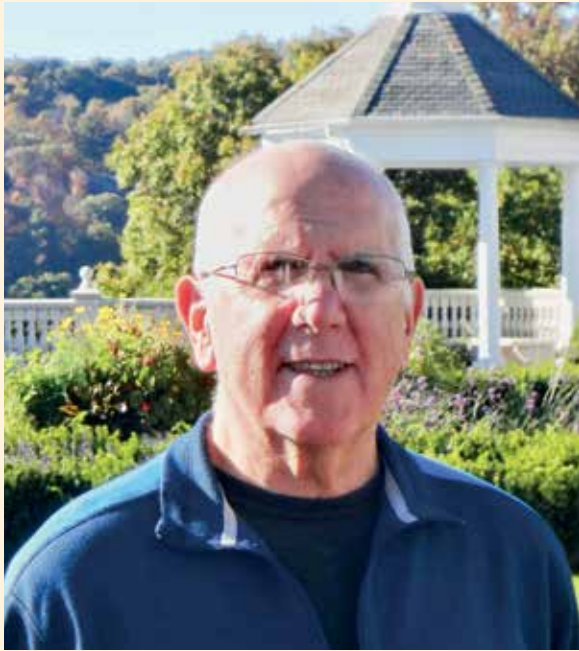

Top: Barcelona has reduced redundancies and redrawn routes to provide straight, direct service that runs through the city center. Bottom: Map of Barcelona's 16 frequent bus routes.

Mobility vs. Access:
An Interview with Dr. Elliot Sclar

Elliot Sclar, Professor Emeritus of Urban Planning at Columbia University, directs the Center for Sustainable Urban Development (CSUD) at the University's Earth Institute. CSUD is one of the ten global centers of excellence in Future Urban Transport initiated by the Volvo Research and Education Foundations. Sclar is an economist and urban planner. His two most recent volumes Improving Urban Access: New Approaches To Funding Transport Investment *(2016) and* Urban Access For The 21St Century: Finance And Governance Models For Transport Infrastructure *(2014) address the issue of reforming the institutions governing transport finance. Sclar's book on the economics of privatization,* You Don't Always Get What You Pay *won two major academic prizes: the Louis Brownlow Award for the Best Book of 2000 from the National Academy of Public Administration and the 2001 Charles Levine Prize from the International Political Science Association and Governance magazine for a major contribution to public policy literature.*

As most of us know well, the mid-20th century was a time of profound shifts in urban planning and transport infrastructure in the United States. Major economic incentives and policy changes led to a sprawl, car-oriented model for cities, a model which has been, and continues to be exported throughout the world.

By 1980, resistance to this model was building throughout the country, as the negative environmental, social, and economic factors became more and more apparent. Elliot Sclar's book, *Access for All*, laid out the problem from an equity perspective. In it, Sclar argued that in trying to solve a mobility problem, we have ignored the access issues that people face. The solution is to give people entry points to transport that empowers them, rather than excludes them.

As we near the 40th anniversary of the book's publication, these issues could not be more relevant today. There is a growing consensus that private car-based transport is inherently inequitable. ITDP's Michael Kodransky spoke to Dr. Sclar about his reflections on this work, and the history, tactics, and lessons passed down to us for 2017.

Michael Kodransky: If, as you state in the book, cities are the solution to the transport problem, and before the automobile, access to transportation was more evenly distributed, how did urban planning in the 70s change this?

Elliot Sclar: In the 70s, we saw massive urban highway expansions tearing through the heart of American cities. Lost in the freeway slicing and dicing was any sense of access destroyed in the name of mobility. The compact, transit oriented, mixed land use city that evolved by the mid twentieth century was being obliterated. Massive freeways were destroying the access of those living in lower middle class, poor, ethnic, and minority neighborhoods. Faster mobility for an affluent middle and upper class was being purchased by making access harder for others. As we saw then, and contemporary traffic jams now bear out, it was a lose-lose situation. The neighborhoods were damaged, causing massive displacements and the road congestion expanded. The substitution of urban highways for urban neighborhoods failed. We now reap the social costs.

MK: Is that failure the reason many cities are now tearing down urban freeways? But then why are others still building them?

ES: We must distinguish the cities tearing down highways from the ones building them. It is largely US cities, the early highway adopters that have learned the lessons and are removing or modifying freeways to diminish their worst anti urban features. US cities are not alone, cities like Tokyo and Seoul, early adopters of the US model have also followed suit.

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**MK: So who is still building them, and why?**

ES: African cities are prime. Kenyan officials are told by international finance and aid organizations that if Nairobi is to be a "world class African metropolis," urban highway construction is a necessary price. From the perspective of international lenders and private investors it is easy to see why; monetizing and capturing returns on highway infrastructure projects is comparatively easy.

MK: And they are being pushed to build these by institutional funding, right? There is much more money available for roads than transport.

ES: Right. Kenya needs external finance if Nairobi is to modernize. Highway projects are an attractive investment to outside finance. But as the world class cities tearing down highways demonstrate, they are built on agglomeration economies derived from good public transport, safe non motorized transport and pedestrian friendly spaces. Such democratically diffuse benefits are not easily captured as tolls or fees on highly specific infrastructure items. But it is these externalities that foster democratic urban access and personal opportunities, the essence of "world class" urbanism. Mistakes are sure to be made, but let African cities at least make new ones. We already know this doesn't work.

MK: When you wrote the book, what did you mean by access and how does it differ from mobility?

ES: Access is a social concept that is only partly manifest spatially. It is the public good created by urban density. People from all walks of life must have more or less equal and unfettered access to the opportunities urban life makes possible. High quality access is the base on which a vibrant urban and democratic society exists. Urban planning, governance and financing must be made to mesh if we are to achieve Access for All.
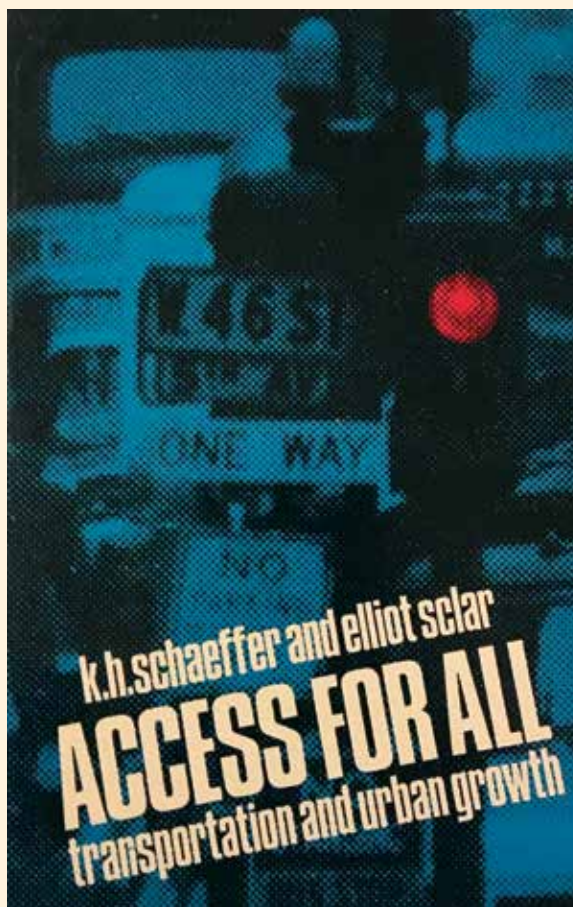
Access for All by K.H. Schaefffer and Elliot Sclar, published in 1980, was part of a new discussion of urban planning based on the principles of community and equity that continues to guide sustainable transport and urban planning.

MK: How can planners focus more on access rather than mobility in practice across different regions?

ES: To embed mobility in access it must be conceived as multi- tiered and multi-determined. The access-mobility nexus has five tiers in priority order: 1) mixed use land use (less trip generation); 2) pedestrian friendly public spaces among urban locations; 3) easy and safe exclusive corridors for non-motorized transport; 4) exclusive street lanes for public transport, such as BRT, and exclusive corridors for metros and

The city of Seattle removes part of the Alaskan Way Viaduct, a process that is currently underway. Several other US cities including Portland, San Francisco, and Milwaukee have removed highways or halted their construction.

commuter rail; 5) lastly automobile, taxi, but more importantly freight access for activities of daily life that fall outside of the other realms.

Because access is qualitatively social, sound physical planning must be embedded in a strong social policy commitment to equity. Specifically this takes the form of ubiquitous affordable housing options (including both public and private arrangements), good public schools and excellent public services overall. Absent that, mobility planning alone quickly devolves into gentrification, gated buildings and gated neighborhoods. That is to say less access, more segregation and a weakening of democracy.

MK: In 1980 you wrote critically about Personal Rapid Transit (PRT), a transport system that consists of small driverless vehicles operating on a network of exclusive guideways. Contemporary driverless vehicle (DV) developers promise even more door to door service in private automobiles traversing public thoroughfares. Are there lessons to be learned from PRT about how well DVs will fare?

ES: Both PRT and DVs offer the promise of highly personalized time saving, congestion free travel. DVs, like PRTs, promise to decongest roads and reduce travel time on an individual basis by ignoring laws of physics. No two bodies can occupy the same space at the same time. Serving the density that good urbanism requires means efficiently using precious urban space. In PRT computer simulations it was quickly discovered that as use expands and guideways congest, the system responded by prioritizing trips. Efficient prioritization was not by who was first in queue, but which vehicle could move next most efficiently. Later it becomes more efficient to put more people into vehicles going the same way and have them occasionally change PRTs at various stops along the routes. When run to the limit, the simulations reinvent metros with fixed routes.

Twentieth century urban transport governance is obsolete. It does not effectively meet the challenges of 21st century possibilities. The need for change is as imperative as climate change is a ticking clock.

DVs have the same problems with rationing existing street capacity. It will become efficient to reroute and regroup riders. The driverless bus on fixed routes is an outcome I heartily support. The use of DVs to enhance public transport holds our great promise for expanding both access and safety, if done properly.

MK: If you were to write a 2017 version of the book, what would you add or change?

ES: A good question, one I often think about. The book as written made sense for its time and place. Moreover, the principles about cities and access that it articulated have not changed. But does it make sense for the present moment? Much about the urban condition has changed. There is now an awareness of the rapid global nature of urban transformation. We will not effectively address global climate change unless we embrace the fully urban nature of the modern world. The size and social composition of global urban populations is dramatically different. The nature of urban work, and demands for workspace and living space has changed. Most important for present purposes, the technology of urban mobility no longer fits well within the governance silos charged with overseeing it. So while the articulated principles abide, the governance context calls for innovative policy and planning prescriptions. A rewrite would focus on the challenges of effective transformation of the governance institutions for a new time. Twentieth century urban transport governance is obsolete. It does not effectively meet the challenges of 21st century possibilities. The need for change is as imperative as climate change is a ticking clock. In a revision I would especially focus on the remarkable global convergence in the institutional ways mobility and access challenges are playing out across all countries.

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