

sustainable transport



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A young girl with brown hair, wearing a light blue t-shirt and colorful patterned shorts, is running towards the camera on a paved street. The street has painted blue and orange patterns. In the background, two women are sitting on white plastic chairs, and a man in a green shirt and a red helmet is walking away. The scene is outdoors with lush green trees and foliage in the background.

Reclaiming
the Streets of
Fortaleza, Brazil



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Editorial

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The Institute for Transportation and Development Policy works around the world to design and implement high-quality transport systems and policy solutions that make cities more livable, equitable, and sustainable.

ITDP is a global nonprofit at the forefront of innovation, providing technical expertise to accelerate the growth of sustainable transport and urban development around the world. Through our transport projects, policy advocacy, and research publications, we work to reduce carbon emissions, enhance social inclusion, and improve the quality of life for people in cities.

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A pop-up intervention in Fortaleza, Brazil
Photo: Fortaleza City Hall

New ITDP Leadership Embraces Old Values and New Opportunities



By Heather Thompson,
ITDP CEO

The staff and board of ITDP are proud to introduce our new CEO Heather Thompson. Ms. Thompson officially stepped into the role in October, having previously served as Interim CEO, and as ITDP Board President.



Photos: ITDP

This is an exhilarating time to be taking on a leadership position in the transport field. Although polluting internal combustion engines continue to flood our streets, there is much reason for optimism. Promising technologies offer us new ways to create better streets, better cities, and better lives. From the potential of electric buses, bikes, and scooters, to daily innovations of smartphone enabled information systems and the power of big data, to new platforms for shared vehicles – technology is a tool that we can wield to make the booming cities of the future more livable, equitable, and sustainable.

I grew up in Los Angeles, California, enjoying the beautiful beaches, hillsides, and great diversity of people and culture that LA has to offer. I also saw that beautiful land given to more and wider roads, with the forever unfulfilled promise of reducing traffic congestion. Without alternatives to cars, people lose hours in traffic each day, greenhouse gas emissions seep into the skies, air pollution is consistently ranked as the worst in the nation, and money pours into the bottomless pit of the gas tank. My later experiences living in York, England; Copenhagen, Denmark; and Guangzhou, China opened my eyes to the benefits of cities built around public transit, as well as the epic scale of an emerging nation's development boom.

I am proud to now find myself at the helm of ITDP, an organization with a long history of helping cities worldwide avoid the pitfalls that plague Los Angeles and other car-oriented cities. I am fortunate to be able to build on the great work of my predecessors: our visionary founder Michael Replogle, who played a huge role in mainstreaming sustainable transport as key to development, longtime CEO Walter Hook who led ITDP to fulfill our mission of building a gold standard Bus Rapid Transit system on every continent, and CEO Clayton Lane who helped us become more collaborative and build new partnerships. A big thank you to the donors who have supported ITDP for years, helping to make this great organization what it is today.

ITDP's future is in embracing new opportunities, while remaining true to our values. Our mission to provide accessible, equitable mass transit is more important than ever. The solutions of the future must build upon, rather than detract from, quality public transport that serves everyone, especially women, young children, and the elderly, who are the majority of transit users. As we have done for more than three decades, ITDP will continue to bring new, tangible solutions to cities worldwide, and will help cities learn from and inspire one another to build a different, brighter future.



The Effects of Transportation on Early Childhood Development

By Julien Vincelot and
Patrin Watanatada,
Bernard van Leer Foundation

The Bernard Van Leer Foundation: Investing in better mobility for babies, toddlers, and the people who care for them is one of the best investments a city can make—for now and for the future.

If you were in Los Angeles one morning last September, you might have noticed small groups of adults making their way downtown on foot while pushing empty strollers or carrying bags of rice as heavy as an 18-month-old child. These men and women had come from Amsterdam, California, Dakar, London, Madrid, New York City, Shenzhen, Tel Aviv, and other cities to contribute their expertise to an Urban95 meeting on urban transport for families, hosted by the Bernard van Leer Foundation. Urban95 asks city leaders, planners, designers, and engineers: “If you could experience the city from 95 cm—the height of a three year old—what would you change?”

Babies and toddlers deserve a good start in life, and the best way to achieve that is to support the people who care for them. So, what does this have to do with transportation?

URBAN TRANSPORTATION AND THE DEVELOPING BRAIN

Between conception and age three, the brain is developing rapidly and is more sensitive to external experiences and inputs—both negative and positive—than at any other time in life. These experiences set the foundation for health and learning in later childhood and into adulthood. And they are powerfully influenced by the mothers, fathers, uncles, aunts, grandparents, siblings, friends, and professionals who care for them. These primary caregivers not only influence the quality of food, play, and healthcare but they also provide warm, responsive human interactions that the developing brain depends on to build neural connections.

Urban transportation can affect the quality of the experiences that shape the developing brain—for good and for bad.

It affects access to healthy food, healthcare, childcare, and other key early childhood services. The quality of transportation and planning affects the extent to which pregnant women, babies, and toddlers can access the services they need for healthy development: sources of healthy food, well-baby clinics, and other primary healthcare, childcare, parks, and play spaces.

Photo: @petemilnes

Caregivers have different travel patterns than daily home-to-work commuters.

Measures that accommodate the needs of caregivers traveling with small children could include universal transit cards or time-based systems that allow passengers to transfer without needing to pay again, predictable schedules that make it easier to plan multi-leg journeys and reduce waiting times, and measures to make public transportation and sidewalks safer from harassment and violence, as well as more accessible for strollers or people juggling packages and children. Recife, Brazil—which approved a city-wide early childhood policy earlier this year—is upgrading streets, sidewalks, and stairs near the Compaz Centres, its flagship network of community centers providing services to families and adolescents. São Paulo, Brazil, has provided pregnant women with vouchers for free transportation to travel to prenatal appointments. Meanwhile, Santiago, Chile, is experimenting with anonymized mobile phone data to better understand how women move through the city.



Photo: creative commons zero

It can cause stress for caregivers. Traveling in the city can be tiring, long, stressful, or dangerous for caregivers. It affects the quality and amount of responsive care they can provide.

It can pollute the air. For children under five, the top two causes of death are preterm birth complications and lower respiratory illnesses. In urban areas, air pollution from vehicles is a significant contributor to both. What's more, the damage air pollution causes to still-maturing brains and lungs—asthma, cancer, cognitive impairment, and reduced lung functioning—can last a lifetime.

HOW CITY PLANNERS AND TRANSPORT AGENCIES CAN BUILD HEALTHY BRAINS

Better walking and cycling infrastructure, widespread, affordable and safe public transportation, and low-emission zones benefit every urban dweller, including babies, toddlers, and the people who care for them. But until these exist throughout every city, we encourage cities to prioritize the health of their youngest residents and the adults they will become by considering the following:

1. 20-minute (or less) neighborhoods for babies. City planning for the needs of pregnant women, babies, and toddlers starts with understanding where they live and where they need to go. Shortening distances to key early childhood services is one of the best things a city can do for the healthy development of its babies and toddlers.

Researchers at Turkey's Kadir Has University and the TESEV thinktank have produced Istanbul's first map of children under five by income level, and some of its municipalities are beginning to use the map to plan home visits and public spaces. In Tel Aviv, Israel, the departments of Community, Culture & Sports and Social Services are collaborating to share physical facilities to locate early childhood services closer to families. This is being piloted in five community centers with the goal to allow parents to walk to well-baby clinics.

2. Plan for the types of journeys made by caregivers—especially women. Planning mobility for children under five is largely about planning for the people they travel with. In many cities, this is still mostly women. Journeys made by caregivers tend to involve many stops to run errands and tend to the needs of the child, and often take place at off-peak times, compared to journeys made by people who are mostly traveling between home and work. Yet transport planners tend not to recognize “trips made while caring for others” as a distinct category. University of Madrid professor Inés Sánchez de Madariaga is working to change that through her work on “the mobility of care.”
3. Prioritize the routes and destinations most important to babies, toddlers and the people who care for them. It's overwhelming to think of improving every street and

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Fortaleza's Progress Shows that Change is Still Possible in Brazil

By Clarisse Cunha Linke,
ITDP Brazil

The capital of Ceará sees traffic fatalities drop to the lowest level in 15 years after creating a mobility strategy with speed reduction interventions, priority bus lanes, and cycling infrastructure.



Fortaleza has shown the impact that small, low-cost interventions can have on quality of life. Pedestrian improvements such as this raised crosswalk massively improve pedestrian safety and access to the streets.

Photo: Fortaleza City Hall

With 2.6 million inhabitants and rapidly growing, Fortaleza is Brazil's fifth largest city and fourth most popular tourist destination. From 2010 to 2015, the city's fleet of vehicles increased by 40%, while the population grew only by 5.7%. Motorbikes increased three times more than cars. The city had massive congestion and one of the highest death tolls in the country. When Mayor Roberto Claudio was elected in 2013, he made tackling traffic congestion a priority with the launch of a Plan for Immediate Interventions on Transport and Traffic in Fortaleza (PAITT - Plano de Ações Imediatas em Trânsito e Transporte). With a sustainable approach to mobility policies, emphasizing public transport, traffic safety measures, walking, and cycling infrastructures. By 2016, the annual monitoring system of traffic accidents revealed the lowest number of road traffic deaths in 15 years.

A BROADER CONTEXT

For decades, transport planning in Brazil has focused on improving the conditions for automobiles at the expense of public transport, pedestrians, and cyclists. The automobile industry has been central to Brazil's economy since the 1960s, shaping policies and incentives to own cars. Cities' regulations were modified to accommodate private vehicles, increase road capacity and ensure parking spaces were available at both origin and destination. As a result, public transport ridership has decreased by over 25% in the last decade, while the automobile fleet has doubled.

The country has an exceptional regulatory framework for sustainable urban mobility. After decades of debate, in 2012, the National Urban Mobility Policy was adopted to reshape the direction of the country's mobility plans and guide



transport investments. This policy stresses public transport, walking, cycling, and more integration between transport and land use policies. In parallel, the Growth Acceleration Program (PAC) pledged over 150 billion BRL for transport infrastructure.

However, a recent assessment by the Ministry of Cities showed only 15 out of 329 transport projects contracted were finalized, due to lack of technical capacity. There is mounting pressure by society on the government to be more prompt and adept in their urban mobility planning. That includes dialogue with the population, project design, identification of sources of funding and financing, ensuring project quality throughout the execution and monitoring & evaluation frameworks.

While the rest of the country has put most investments on hold due to the political and economic crisis, Fortaleza shows resilience and the political will to advance sustainable mobility.

CHANGE AHEAD

Learning from best practices implemented by progressive cities such as New York and Bogotá, the city has had an intense technical exchange with other cities and support from non-governmental organizations. PAITT looks at short- to medium-term, low-cost transport solutions. The city also looked at strategies to encourage active transport, such as cycling and walking, and measures to lower the speed of vehicles—a crucial step to reduce the high numbers of road deaths.

With the Bloomberg Initiative for Global Road Safety (BIGRS), a key partner in Fortaleza, PAITT has gained extra strength. Speed reduction interventions have been rolled out in hotspots where traffic injuries are highest. These measures include speed reduction of arterial lanes, narrowing traffic lanes, adding bike paths, raised pedestrian crossings, curb extensions, and redesigning of unsafe intersections.

Temporary interventions such as Cidade da Gente (People's City) had demonstrated urban transformation is possible. As an example, the residential neighborhood of Cidade 2000 shifted road priority from vehicles to pedestrians by turning 1,200 square meters of parking space and traffic lanes into a pedestrian area.



A recreation of a classic photo series showing the amount of space needed to transport the same number of people on bikes, transit, and cars.

Photo: ITDP Brazil



Cycle lanes and crosswalks are some of the ways Fortaleza is demonstrating priority for pedestrians and cyclists on its streets.
Photos: Fortaleza City Hall

The city has added over 111 km of bus lanes since 2013, with improved travel time for the 1,200 thousand trips a day. With the dedicated lanes, average bus speed increased from 4.4 to 13.5 km/h. The optimization of overlapping bus lines on the city's main bus corridor resulted in saving 9.2 tons of CO₂ per day. All 2,251 city buses have wifi, GPS and air conditioning. Recently, seven terminals were refurbished including integration with Light Rail Train (LRT) and subway.

The cycle network has grown 350%, or 170 km, since 2013. In 2014, a Cycling Infrastructure Strategic Plan was delivered, with a total grid plan of 524 km. With a cycling policy in place, the government has tagged investments for the cycling infrastructure. In August this year, revenue from the digital Zona Azul, a new on-street parking regulation system, was secured to be reinvested into bike lanes. Annual bike counts conducted by the city have seen a 153% increase in the number of cyclists from 2012 to 2017.

The city has now four bicycle sharing systems. The main one, Bicicletar (operator Sertell and sponsor UNIMED), has 80 stations (with 6 trips per day per bike, it is one of the most used in Brazil). Bicicleta Integrada is a system specific for the last mile. Seven stations and 350 bicycles are located in the bus terminals. The system runs with an Integrated public transport Fare card—there is no need to have a credit card, and users can stay for 14 hours with the bicycles (overnight)—which makes it accessible and equitable. One-third of users are women. Mini Bicicletar is a system with 50 bicycles located next to plazas, specifically for children, which is critical to encouraging toddlers and children using a bike for the first time. Finally, Bicicletar Corporativo is a pilot project to test a model for the corporate sector. Currently, there are 6 stations and 14 bikes at City Hall for public officials to ride. They can take bikes overnight and stay up to 20 hours. 42% of Bicicletar Corporativo users are women and 40% are between 45 and 60 years old.

The sharing system has moved beyond bikes in Fortaleza. Vamo is the first public electric car sharing system in the country, with 16 stations and 20 vehicles. On-demand travel with electric vehicles and ride sharing, along with greater use of public transport, cycling, and walking is the roadmap to reduce car travel and change the future cities.

Public space is one of the most important elements for a dignifying citizenship experience. To counterbalance the car hegemony of today's cities, we need to engage citizens and show them what can be done to enhance the public space.

In face of growing political conservatism and backward agendas, Fortaleza demonstrates that through creativity, innovation, and leadership it is possible to promote sustainable mobility. It gives us hope that political will combined with the capacity to prioritize and roll out mobility and people-friendly streets is not only the future we want - but a future we can deliver.



Bucheon City Goes from a Car-Centric City to a People-Friendly Vision

By Beatrice Ch'ng,
Ecomobility Officer,
ICLEI – Local Governments
for Sustainability

ICLEI is the leading global network of 1,500+ cities, towns and regions committed to building a sustainable future. Through their collective efforts, ICLEI impacts more than 25 percent of the global urban population. Learn more at iclei.org.

Bucheon City, located between Seoul and Incheon in the western part of South Korea, is a charming and bustling city that prides itself as a cultural, information and industrial hub. Approximately 55 square km, Bucheon is home to almost 900,000 people, making it the second most densely populated satellite city after Metropolitan Seoul. Like its neighboring cities, Bucheon grew massively during Korea's rapid urbanization in the 1970s. New city areas and facilities were established in the 1990s and 2000s, such as the four major higher education institutions, a philharmonic orchestra and colorful parks that host annual festivals.

THE OPPORTUNITY

In the 1970s, Bucheon followed the car-centric trajectory of many of the world's cities, resulting in major traffic congestion. Existing roads were expanded and new arterial roads and overpasses were constructed. Even the Simgokcheon stream that meanders through the old town from the east to the west was covered with concrete to make space for cars. Narrow sidewalks made walking almost impossible, especially for the children, elderly and people with reduced mobility. As a result, the city faced massive traffic congestion, air pollution, and a lack of public spaces.

Photo: ICLEI



Bucheon's projects turned city space into urban green space, with the idea of improving people's commutes and daily interactions with the city. Aesthetics aside, green spaces lower cortisol levels, thereby reducing stress.

Photos: ICLEI

Fortunately, the past decade has seen a major rethinking of transport in Bucheon. In 2010, the city government implemented a groundbreaking “pedestrian-centric transportation policy,” with sustainable mobility as the pillar. The policy prioritizes pedestrians, cyclists, commuters with buses and trains. Bucheon developed four strategic pathways to meet this new vision: (1) improving walkability; (2) creating green networks and urban forest; (3) expanding cycling paths; and (4) increasing the use of public transportation.

MAKING THE CITY WALKABLE AGAIN

Making the city walkable is not only about expanding walking networks but providing attractive facilities and creative spaces that invite residents to walk. Bucheon designed walking trails connecting the city's 188 libraries. As libraries are culturally significant, the purpose of connecting libraries and the pedestrian pathway was to enable access to knowledge. The city also opened book cafes along streets, delivered books to the elderly and disabled, and set up small libraries in busy subway stations, which resulted in more people using libraries and public transportation. These efforts were successful as the number of pedestrians increased to 4 million with a total of 133,506 square meters of walking trails, and green space around the libraries increased by almost 40% to 1,115,000 square meters. Today, the city plans to increase the number of libraries within a 5-minute walk, and continue to expand the walking network.

GREEN SPACE FOR LIVEABLE CITIES

Turning some city space into an urban forest improves quality of life for residents. People are drawn to trees. Aesthetics aside, they lower cortisol levels in pedestrians, meaning less stress. Bucheon created an urban forest by building a network of trees and connecting waterways. The city adopted a participatory approach by inviting residents to give input on paving materials, maintenance systems, and other details. Local community gardens were also cultivated and nurtured through a series of donations and volunteer activities.

In 2017, Bucheon also began the restoration of Simgokcheon Stream which has been a highway cum sewage system since 1986. The revitalization involved the creation of 40 kilometers of waterways, organically connecting the main streams and rivers, and planting various plants to restore the ecosystem. The city government transformed the waterways into a cultural asset by inviting street performances and local festivals. As a result, the green area per capita increased from 4.48 square meters to 5.45 square meters, while reducing the urban heat island effect.

CATALYZING CYCLING

The city encouraged cycling by building 200 kilometers of cycling paths, and installing bike parking stations at every subway for seamless connectivity. The city also managed seven public bike sharing and repair services, that served 15,892 people in 2017. Unlike other cities that rely on technology to manage bike sharing systems, Bucheon staffs stations with people to promote social interaction.

The number of bicycle users increased by 11% from 2010 to 2017, and after a bicycle insurance policy was implemented in February 2018, cycling increased from 12.9% to 26%. All residents registered with the city are automatically insured.



Bucheon upgraded metro lines and stations to add more space for pedestrians, and make them more like "community squares."

Photo: ICLEI

The insurance is renewed annually and covers injuries, hospitalization, permanent disability, and fatalities.

To promote biking, the city plans to extend the cycling network to 250 kilometers and offer bicycle training to 30,000 residents. An annual Grand Bike Festival is also hosted by the city every autumn with 5,000 participants.

IMPROVING CONNECTIVITY AND INTEGRATION OF PUBLIC TRANSPORT

To increase public transport ridership and reduce traffic congestion, metro lines and stations are being upgraded with new stations and trains. One of the metro lines that opened in

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In Cairo, ITDP Works to Improve Transport Access for Women



By Nour El Deeb,
ITDP Africa

"I leave home at 5:30 a.m. and arrive at 8 a.m. I take first a tok-tok for 5 EGP from the tunnel to Al-Khalafawy bus station. I wait 15 to 20 minutes for the bus to come. If the bus does not show up, I ride another taxi or bus until Al-methalat or Al-Sawah Station; and from there to the 10th of Ramadan and then to the Fifth Settlement. I repeat the same course while going home; either the bus is available or I have to go to the 10th of Ramadan and start the journey backward. The dangers for me consist in the cost, effort, and time wasted in transportation. The means of transport are so terribly crowded. When I arrive home, I am so tired that I cannot do anything anymore. I do not get tired from working, I am exhausted by the trip."

—A response to an anonymous ITDP survey of women commuters in Cairo

All over the world, women build healthy, safe, and prosperous societies. Due to the many responsibilities that fall on them—caring for children, running a household, and paid work—women have different travel patterns than men. When neighborhoods lack resources, such as grocery stores and healthcare facilities, the responsibility falls on women to find solutions. Cities need gender-responsive policies to address women's diverse mobility requirements and reduce their burden.

Greater Cairo, a region of more than 20 million people, is the largest metropolitan area in Africa. Like many megacities around the world, it is famous for its traffic congestion. A lack of rapid transit options and skyrocketing private car ownership has led to daily traffic snarls on the wide roads that crisscross the area. While these roads continue to be built, most of the population relies on public transport. The oldest and most organized mode of transport is the underground Metro. It covers 78 km connected by three lines that transport two million passengers daily. The overcrowded system is planned to expand to six lines by 2033.

Until recently, transport planning and operations in Cairo have taken a "one-size-fits-all" approach, assuming that men and women will benefit equally from improvements in transport services. In reality, women and men have different needs and expectations for the system, particularly with regard to safety. An integrated and safe public transport system provides access to education, work, health care, culture, and other important activities that are crucial to women's participation in society. A 2013 UN Women study in Cairo found that the majority of female respondents reported that they did not feel secure or safe in the street.¹ Women also do not feel safe on public transport. As a result, they may forego trips and seek less efficient or more costly alternatives when they perceive a threat.

Responding to these issues, ITDP has joined with organizations such as the New Urban Communities Authority, the United Nations Human Settlements Programme, and the

¹ UN Women, "Study on Ways and Methods to Eliminate Sexual Harassment in Egypt," Columbia Law School, 2013, https://web.law.columbia.edu/sites/default/files/microsites/gender-sexuality/un_womensexual-harassment-study-egypt-final-en.pdf.



A rendering of ITDP's proposed project in Cairo shows pedestrian plazas and protected cycle lanes. This project is focused on improving commute conditions for women, who face greater obstacles in using public spaces.

Photos: ITDP Africa

United Nations Entity for Gender Equality and the Empowerment of Women to plan a bus rapid transit (BRT) system in Greater Cairo. Key tasks include completing passenger demand assessment, corridor identification, service plans, infrastructure designs, and gender-sensitive analysis for the BRT corridor. To better understand the challenges faced by women using the transport system, ITDP conducted a series of surveys and focus groups with commuters in Cairo. The research included a women's travel pattern survey with 2,500 respondents; public transport terminal surveys that asked 220 men and 225 women about their travel patterns; operator interviews; rate of occupancy and gender counts; physical assessment surveys; and a women's focus group.

ITDP found that overcrowding, harassment, multiple transfers, long waits and travel times, high fares, and unsafe driving behaviors were issues of great concern to women reliant on public transportation. The solution is a BRT system that considers data-driven gender concerns when designing service plans and infrastructure. To this end, ITDP has proposed designated areas for women on each bus; seating for pregnant women, the elderly, people with disabilities, and adults with small children; cameras on BRT buses to monitor harassment and violence; and a complaint and redress system. Other recommendations include providing a sufficient BRT fleet to meet passenger demand and introducing an integrated electronic fare system to simplify transfers. ITDP has also suggested that all drivers and staff complete training on safety and mobility challenges. This includes customer service, sexual harassment, and sensitivity education. Additionally, increasing the number of women working in public transport would help to put female commuters at ease.

The new BRT Western system would consist of a 42 km corridor connecting 6th of October City to Giza. The corridor will have a critical load of 6,400 passengers per hour each way and around 50 buses per hour along Faisal Street. Overall, the system will carry 126,000 passengers per day.

The BRT Western corridor will significantly benefit city residents. In addition to time savings of at least 15 minutes per trip, the system has the potential to improve traffic by decreasing car use. The switch from polluting vehicles to high-capacity BRT buses will cut air and noise pollution, leading to significant public health benefits. A well-designed BRT will significantly reduce road fatalities, especially for pedestrians,



A 2013 UN Women study in Cairo found that the majority of female respondents reported that they do not feel secure or safe in the street. Women also do not feel safe on public transport. As a result, they may forego trips and seek less efficient or more costly alternatives when they perceive a threat.

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America, The Netherlands, and the Oil Crisis: 50 Years Later

By Jacob Mason,
ITDP

The 1973 oil crisis caused gasoline prices to skyrocket and supplies to dwindle. Gasoline rationing led to long lines at gas stations and paralyzed car movement. Two countries—the United States and the Netherlands—responded to the crisis in nearly opposite ways. The Netherlands began a long-term policy shift away from the a car-based society. The US, however, doubled down on car culture.

Above: A typical American street in Atlanta, GA. Wide arterials without much thought given to uses other than cars are common in and around cities all over the United States, a direct consequence of policy decisions made decades ago.
Photo: Creative Commons

Across the Netherlands, cities built bicycle lanes, people-friendly shopping streets, and spent large amounts of money on high-quality public transport. US cities built new highways and expanded low-density suburbs, car-centric shopping centers, and office parks. American public transit, cycling, and walking infrastructure deteriorated. The share of people using sustainable transport in the U.S. fell from 23% in 1970 to just 15% in 2016 (U.S. Census data). Today, nearly 87% of all trips take place in a private car, and American cities are five of the top ten most congested cities in the world, while Amsterdam does not even break the top 100.

Prioritized bicycle lanes and public transit make sure that everyone, including the poor, small children, and the disabled, have access to safe, efficient, and affordable transportation. A well-used bus is at least 14 times more space efficient than a single-occupancy car traveling the same distance¹, and light rail, bus rapid transit, and metro are even more efficient. Road designs focused almost exclusively on increasing and maintaining high car speeds, have the opposite effect. The proliferation of wide multi-lane roads and cul-de-sac street networks has the effect of cutting off neighborhoods. Today, in many places, few viable alternatives to driving exist. Today, unsurprisingly, most Americans drive nearly everywhere.

In the United States, the average household has 2.3 cars and spends nearly a third of its income on transportation. The lack of viable alternatives places a heavy burden on the poorest members of society, who struggle to afford basic

¹ UITP Europe, "Bus Systems in Europe: Towards a Higher Quality of Urban Life and a Reduction of Pollutants and CO₂ Emissions," 2015, [https://www.uitp.org/sites/default/files/cck-focus-papers-files/UITP_PositionPaper_Bus%20Systems%202015.pdf](https://www UITP.org/sites/default/files/cck-focus-papers-files/UITP_PositionPaper_Bus%20Systems%202015.pdf).



A typical Dutch street in Amsterdam. Cyclists have priority everywhere except the city center, where the tram has priority. These regulations were put in place after the oil crisis, and have made Dutch cities the most cycle friendly in the world.

Photo: Wikimedia Commons



A bus stop in Atlanta. Bus stops along wide roads often have no shelter, and require passengers to wait in a dangerous area next to fast moving cars.

Photo: Wikimedia Commons

transportation. Fines for driving without a license—because no other viable transportation options exist—trap many people in a cycle of poverty. While the cost of car ownership in the Netherlands is similar, people rely on high-quality transit, cycling, and walking for half of all trips. This helps poor families access jobs and save money, helping to improve their quality of life.

Good public transit leads to a safer, healthier society. In the U.S., there is a 90% lower crash risk² for public transit than car travel. According to the World Health Organization, U.S. residents are three times more likely to die on the streets than people in the Netherlands. And despite a more sedentary population, U.S. residents are five times more likely to be killed while walking. In addition, most public transit trips begin and end with walking or cycling, making exercise an integral part of daily life. This helps to reduce rates of obesity, heart disease, and diabetes. In the Netherlands, only 18.8% of adults (over 20 years old) are obese compared to 32% of Americans.

The economic benefits of a city built around public transport are manifold. Good transit boosts the economy³ and stimulates economic development⁴ by bringing people together for jobs and opportunities. Public transit uses space efficiently and supports dense development, which reduces travel distances and space requirements. American cities have spent billions creating vast networks of urban freeways, only to find this encourages more people to drive and results in gridlock.

When cities spend money on roads, they are also losing the benefits of more productive land use, like public spaces and housing. Car infrastructure is also expensive, particularly the elevated highways and tunnels needed to move cars around urban areas. In Milwaukee, renovating an existing freeway would have cost \$80 million, but it only cost \$30 million to remove it⁵ and replace it with surface streets. In addition,

² American Public Transportation Association, Public Transportation Benefits, 2018, <https://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx>.

³ Daniel Hertz, "Why Do We Care About Transportation Mode Share," New Geography, 2014, <http://www.newgeography.com/content/004466-why-do-we-care-about-transportation-mode-share>.

⁴ David King, "Developing Densely: Estimating the Effect of Subway Growth on New York City Land Uses," Journal of Transport and Land Use, 2011, <https://www.jtlu.org/index.php/jtlu/article/viewArticle/185>.



A focus on transit and cycling in Dutch cities makes space for many public squares and an excellent walking environment, such as this square in The Hague. In the US, these urban spaces are often used for parking cars.

Photo: Wikimedia commons

Through the more efficient use of space, transit-oriented cities prevent sprawl into natural areas and resources, protecting them for future generations. The Netherlands, with its cities built around public transit, generates 40% fewer GHG emissions per capita than the United States.

despite the country's enormous wealth, infrastructure in the U.S. is collapsing. The Netherlands, although slightly less wealthy, is managing to maintain and expand its infrastructure.

Cities built around public transit play an important role in protecting the environment. By moving more people per vehicle in less space, transit uses far less energy per kilometer of travel. Public transit cuts pollution and greenhouse gas (GHG) emissions and prevents premature deaths from poor air quality. Through the more efficient use of space, transit-oriented cities prevent sprawl into natural areas and resources, protecting them for future generations. The Netherlands, with its cities built around public transit, generates 40% fewer GHG emissions per capita than the United States.

Urban populations in the United States and the Netherlands are growing slowly—47% and 50% of people live in urban areas, respectively. In many parts of the world, such as Kenya, urban populations are exploding. While only 20% of residents there live in urban centers, it's not at all clear what shape cities will take when 40% or 50% live in those centers. Will those countries choose the United States' car-oriented model, with expensive infrastructure that punishes the poor, degrades the environment, and fails to effectively move people from one place to another? Or will they choose the Netherlands' transit-oriented model that boosts people out of poverty, protects the environment, and reliably gets people where they need to go? The choices that rapidly-growing cities make today will shape their future for generations.

⁵ Lolis E Elie, "Planners push to tear out elevated I-10 over Claiborne," Nola.com, Jul 22, 2010, https://www.nola.com/news/index.ssf/2009/07/photos_for_iten.html.

Frequency Is Freedom

By Joe Chestnut,
ITDP

In the United States, only about 9% of the population commutes to work via public transportation, cycling, or walking. Meanwhile, over 75% of people in the United States drive alone to their jobs. Many cities lack robust transportation systems because they have prioritized infrastructure for private vehicles. To better understand the state of sustainable transport in North America, ITDP developed a suite of 12 indicators and tested them on 25 cities. These indicators ranged from city characteristics such as weighted-population density to job accessibility by transit.

One of the indicators is People Near Frequent Transit (PNFT). This measures the number of residents in a city who live within a short walking distance of frequent (transit that runs every 12 minutes or less, 7AM-9PM) transit. ITDP looked at the percentage of a city's population that lives within a 10-minute walk or bike ride of a frequent transit stop.

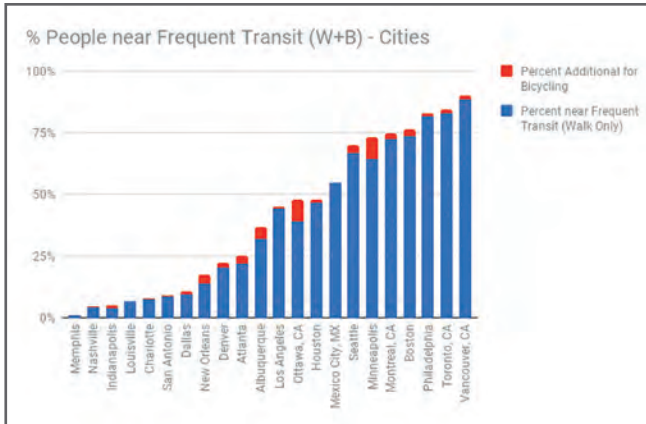
ITDP's analysis revealed several patterns of interest. The first is that good biking infrastructure improves access to frequent transit. Protected bike lanes provide a safe road space for cyclists to and from transit, in some cases solving the first-last mile problem. On average, bike lanes increased access to frequent transit by 2.5% or about 21,000 people. Protected bike lanes are an inexpensive way for cities to increase the number of people using frequent transit lines.

One city that accomplished this is Minneapolis. By investing in a quality bike network, Minneapolis increased its PNFT from 64% to 73% or about 35,000 people. This was the largest increase among all the cities that ITDP evaluated. Minneapolis has a Sustainable Transport Mode Share (STMS) of 24.3%. In contrast, Dallas—which has a limited frequent transit network—has a PNFT of 9.5% and an STMS of 6.2%. This shows that the higher a city's PNFT, the higher the

Minneapolis' frequent bus network, with frequency of 15 minutes or less for buses designated as part of Metro Transit's "Hi Frequency" network.

Photo: Minneapolis/
St. Paul Area Metro Transit





All cities in ITDP's study have higher percentages of people near frequent transit than near rapid transit

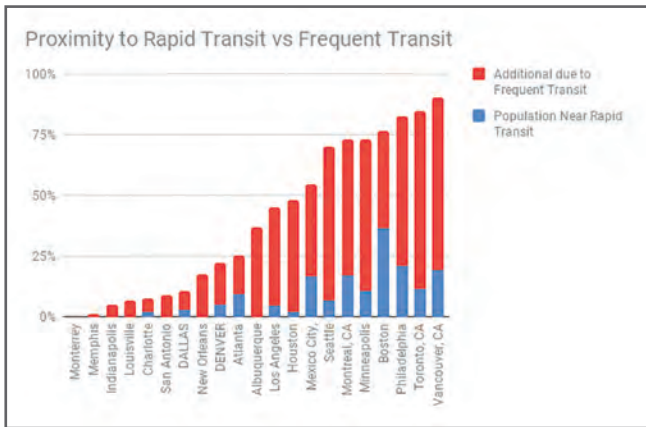
number of people walking, biking, and using public transport.

Frequent transit is an important feature of any city's transportation network. It often determines whether people will use the network at all. With frequent transit, riders do not have to plan their day around a bus schedule because a bus will arrive at a stop shortly after they do. Jarrett Walker, of the well-known blog Human Transit, often says "frequency is freedom." High-frequency transit networks are convenient, easy to use, and critical for cities looking to increase ridership.

ITDP also examined the correlation between frequent transit coverage and STMS—walking, biking, and public transportation. The data shows that high-frequency transit correlates with higher ridership. Frequent service enhances transportation networks and improves the passenger experience. While major transit projects are most visible, cities often overlook more simple solutions like increasing bus frequency, improving bus service, and adding protected bike lanes. Even cities that already have several rapid transit systems find it useful to add frequent transit.

Clear frequent transit corridors and bike lanes that connect to transit are easy things cities can do to increase the number of people using sustainable modes of transport. As North American cities look for ways to increase ridership and mitigate climate change, frequency is a simple solution. It makes cities more accessible and inclusive. It helps people reach the places they need to go. Frequency is freedom.

PNFT is only one of 12 different indicators which are part of a larger benchmarking effort for North American cities. Results for all indicators and analysis is available at itdp.org.



The DART (Dallas Area Rapid Transit) station at DFW Airport.

Photo: Jed Record via Flickr



Scooters, E-bikes, Rideshares, and More: Learning from Dockless Bikeshare

By Dana Yanocha,
ITDP

Privately-operated mobility services have changed how people get around cities. While fixed-route public transit remains the backbone of most cities' transportation networks, new mobility modes provide additional options for short, spontaneous, and/or multi-modal trips. The unfortunate reality is that most city budgets for transit expansions are inadequate and staff capacity is maxed out. Cities rarely have enough money to keep up with the demand for affordable, reliable transportation options that serve all neighborhoods and destinations, which results in people continuing to rely on personal vehicles for most trips.

NEW MOBILITY—FOR FREE?

Despite demonstrated success in New York, Montreal, Barcelona, Mexico City, and hundreds of cities in between, some cities have been reluctant or unable to find funding to support a capital-intensive docked bikeshare system. Recognizing and, in some cases, capitalizing on this, private companies have stepped in, providing dockless bikeshare accessible through mobile phone apps. These bikes are equipped with built-in locks, eliminating the need for expensive docking systems. More recently, privately-funded dockless electric scooters have emerged alongside, or in lieu of, bikeshare. However, such offers from the private sector to foot the bill for new mobility services comes on the companies' terms. They've crafted a narrative that public funding can be freed up for other uses when private companies are permitted to provide transportation services.

Private mobility providers tend to market their products as posing “no cost” to cities. However, “no cost” is misleading. Dockless bikeshare, for example, has been associated with negative impacts including overcrowded, cluttered sidewalks, neglected bikes, and widespread vandalism. These outcomes have forced cities to respond, spending staff time and public resources to address parking complaints, hold public forums, and ultimately design programs to better regulate negative outcomes. Streets, sidewalks, and public spaces are necessary for operating bikeshare and other light individual vehicles like e-scooters, but they are also critical to a city's overall mobility and access—and they are not free. Cities must recognize the value of these spaces, and should not allow private companies to use them for free if doing so jeopardizes their value to the public. It's also critical to ask: Who actually benefits from unregulated mobility solutions offered by private companies? And for how long? Is this the best case for users?

PRIVATE SECTOR, PUBLIC GOOD

Privately-operated, technology-enabled services can, in fact, have a positive impact on urban mobility. Bikeshare and scootershare extend the reach of transit networks by providing first-last mile connections to rail and bus riders and



Top: An e-scooter user and bikeshare rider in downtown Portland, OR.
Below: A dockless bike in front of a metro station in Beijing
Photos: ITDP

can help shift travelers away from relying on private cars for short trips around the city.

Compared to the cost of other transit modes, well-managed new mobility services like bikeshare, scootershare, and even transportation network companies (e.g., Didi, Uber, Ola) require relatively minimal long-term investment from cities but can generate massive improvements to accessibility. Cities should be proactive and manage new mobility systems in a way that leverages private-sector capital while preserving the public interest.

Cities can do this by:

1. *Planning with citywide goals in mind:* Implementing new mobility services like bikeshare and scootershare just for the sake of having them, or because other cities are doing so, is hardly worthwhile. Cities must identify what they want from these emerging systems and what steps will get them there. For example, a city could implement bikeshare as a tool to help increase bike mode share to a certain percentage of all trips. Meanwhile, the city might also install more bike lanes and/or bike parking which can be used by riders of personal and bikeshare bikes.
2. *Requiring that private operators share data:* Data sharing has been a contentious issue between cities and private mobility operators. Some companies are concerned about the risk of proprietary information falling into the hands of competitors, as well as about cities' ability to store and protect the personally identifiable data of users. It is entirely possible for cities to adopt data policies that protect user information and companies' proprietary information, and this must be part of every deal. Cities

must set a strong precedent that sharing certain data is non-negotiable, and communicate intended applications for the data, such as for planning, system monitoring, and enforcement. It is also critical to establish data reporting standards to harmonize the format in which data is shared. Real-time data on device locations should be made publicly available for use in third-party trip planning apps, and for further research and evaluation.

3. *Integrating new mobility with transit:* As cities work to redesign their transportation networks to maximize ease and efficiency for users, new mobility services can be seamlessly integrated with public transit. For example, cities like Los Angeles, Mexico City, and Montreal enable users to make per trip and annual bikeshare membership payments with their transit cards. U.S. cities like Detroit and Marin, CA, have partnered with Uber and Lyft to provide subsidized rides to users when connecting to transit or along recently removed bus lines. Privately-operated bikeshare has yet to offer integrated fare collection with transit or reduced fare transfers. Requiring transit integration from new mobility operators could preserve affordability and help facilitate multi-modal trips that can actually compete with the convenience of private cars.
4. *Prioritizing equity and community engagement:* Private companies are profit maximizing, and often have little incentive to ensure equitable service across the whole city. As a result, many of their service areas do not reach less dense, lower-income communities, where reliable, affordable transportation options are most needed. Integrating equity into major system decisions is key—as was done when planning Memphis’ Explore Bikeshare—along with requiring companies to meet equity-focused service levels. Cities should simultaneously design an engagement strategy that includes operators, community groups, and residents from all neighborhoods.

Shared point-to-point transport options can massively improve accessibility and connectivity in crowded cities, with the private sector playing a major role in these solutions. City policy will ultimately control the destiny of new mobility, and embracing emerging modes like dockless bikeshare and scootershare could contribute to more livable spaces that are cleaner and less congested. These modes can also help cities move toward existing goals to improve air quality, increase mode share of sustainable transportation, and reduce single-occupancy vehicle trips. But it is up to cities to ask for what they want: new mobility services that are affordable and safe, complement higher occupancy modes, and support environmental, economic, health, and other citywide goals.



Compared to the cost of other transit modes, well-managed new mobility services like bikeshare, scootershare, and even transportation network companies (e.g., Didi, Uber, Ola) require relatively minimal long-term investment from cities but can generate massive improvements to accessibility.

Photos: Wikimedia commons

On Mexico City's Buses, a Little Technology Goes a Long Way

By Santiago Fernández Reyes
& Gonzalo Peón Carballo,
ITDP Mexico

Over eight million people rely on public transport in the Mexico City Metropolitan Area (MCMA)¹. Many daily commuters travel two hours each way under conditions that are generally unsafe. In 2016, there were 3,667 traffic collisions involving public transport in Mexico City. Over 90% of commuters report fearing for their safety while riding public transport. Many cities in developing countries face similar problems because of unsafe and inefficient public transport systems. While some privately operated vehicles fill the gap, the service is poor and they are largely unregulated.

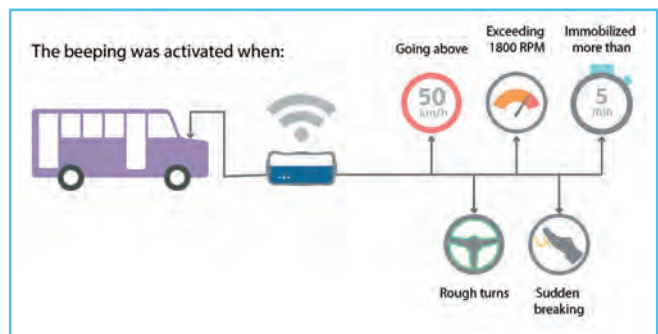
There is great potential for technology-driven applications to improve bus safety, quality of service, and sustainability in developing world cities. This year, ITDP Mexico conducted an experiment in which automated vehicle location (AVL) technology was applied to two privately owned bus routes in Mexico City². GPS devices were installed on the two bus fleets to collect data on their movements and operations. On the test route (Fleet A), a beeping mechanism let drivers know when they had accelerated, exceeded acceptable speeds, or broken safety rules, while the control route (Fleet B) operated normally. Early results show that a simple monitoring device can have a measurable impact on the safety of public transport and even cut fuel consumption, saving costs for operators and lowering emissions.

Today, cities have increasing amounts of data to help plan transport systems that are more efficient and accessible. Ride-hailing companies that offer services through mobile apps have become very popular in cities like Mexico City or São Paulo, yet their trip data is not consistently shared with cities. Despite the potential of new technology to give real-time information and simplify bus fleet planning, government agencies are often not equipped to collect or make full use of this data.

¹ Instituto Nacional De Estadística y Geográfica, "Encuesta Origen Destino," 2017, www.beta.inegi.org.mx/contenidos/_/OrigenDest2018_02.pdf.

² Instituto Nacional De Estadística y Geográfica, "Accidentes de Tránsito Terrestre en Zonas Urbanas y Suburbanas," 2017, <https://www.inegi.org.mx/proyectos/registros/economicas/accidentes/>.

A diagram of the conditions that triggered the alarm in the treatment route.
Image: ITDP Mexico



A fleet of buses from ESASA and AUISA that participated in the study.
Photo: CISA



Cities are learning how using mobile technologies can improve transportation systems by making them more efficient, sustainable, and equitable. This includes the mapping of informal transport systems on smartphones. The challenge is how to help governments use this data to benefit the low-income groups who most need improved transit access, as well as promote environmentally-sound transport practices.

To explore how technology could improve transportation planning in Mexico City, ITDP Mexico, with the assistance of AT&T, carried out a simple experiment. The project focused on two important issues: safety and fuel efficiency. With a simple experimental framework, ITDP installed a GPS device—to track movements over AT&T's 4G LTE wireless network—on buses traveling two comparable routes. This gave the research team information about a given bus' location, rate of acceleration, braking, turning, and fuel consumption.

ITDP tracked the fleets for a month to create a baseline of their operation. The next month, researchers activated a beeping mechanism on the buses belonging to Fleet A, our variable in this experiment. This beeping noise alerted drivers when they exceeded speed limits, idled for more than five minutes, made rough turns, or braked suddenly. Fleet B continued to operate as before.

Early analysis of the data collected confirms that technology-based applications can have measurable impacts. Researchers found two interesting results. First, they saw a tangible decline in maximum speeds. The frequency with which buses exceeded the legal speed limit was also significantly reduced. The second result was improved fuel efficiency. By reducing excessive engine idling and decreasing speed, buses consumed less diesel. On average, Fleet A buses were 3% more fuel-efficient, saving around 1.6 liters of diesel per day. If accompanied by other measures, this could significantly impact a company's bottom line and reduce emissions.

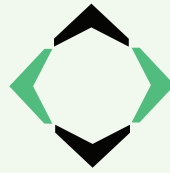
The study also found no changes in the frequency of accelerations, braking, or turning. The drivers told us that the calibration is tricky since a bus that is loaded to capacity is much more likely to exceed RPM limits even when it's not driving aggressively. Similarly, braking and turning are mostly affected



The routes selected for the study.
Image: ERSI

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MOBILIZE Dar es Salaam



In June 2018, ITDP brought 230 planners, elected officials, NGO representatives, and transport and development researchers from 61 cities in 31 nations to MOBILIZE Dar es Salaam. The year's theme, "Making Space for Mobility in Booming Cities," featured plenaries and breakout sessions such as "Radical Solutions for Urban Growth" and "Making Roads Work for People," site visits to the DART BRT, a cycle tour, and more!

Photos: ITDP



For more information
about MOBILIZE, visit
mobilizesummit.org.





In Jakarta's Urban Villages, Women Are Moving Mobility Forward

By Fani Rachmita and
Deliani Siregar,
ITDP Indonesia



The women of RW 01 Sunter Jaya, an urban village in Jakarta, which has great potential to be a walkable neighborhood.
Photos: ITDP Indonesia

In Indonesia, a *kampung kota* (urban village) is a compact, mixed-use neighborhood within the larger city. These neighborhoods, made up of everyday working people, sit between skyscrapers, elite and middle-class residences, and commercial buildings. Kampung roads often connect one main road to another. As a result, motorcyclists use kampung roads as a shortcut to reach their destinations. They often ride on sidewalks and disrupt people in the village. If designed properly, however, motorcyclists' paths could become the backbone of a new urban mobilization system.

ITDP Indonesia was looking for a demonstration project to show how the smallest neighborhoods could, by using the principles of transit-oriented development, transform into a walkable environment. Earlier this year, we traveled to three kampungs: RW 01 Sunter Jaya (North Jakarta), RW 01 Cikini (Center Jakarta), and RW 05 Mampang Prapatan (South Jakarta)—RW is a numbered district which has a local leader and represents government administration in a smaller area. These kampungs were on the list of Program Kampung Iklim (Climate Urban Village Program), a program organized by the Ministry of Environment to reduce emission in cities.

RW 01 Sunter Jaya, located near one of the biggest lakes in Jakarta, has the potential to be a walkable ecotourism destination. RW 01 Cikini, located in the heart of Jakarta's historical center, has the potential to be a walkable neighborhood for history and art lovers. And, RW 05 Mampang Prapatan, located in one of the busiest areas in South Jakarta, has the potential to be a child-friendly kampung because of its proximity to a school.

We met with groups of men and women, and discussed issues of neighborhood access, safety, and public transportation. They expressed concern about pedestrian safety—especially for the elderly and children affected by the motorcycle activity—a lack of sidewalks, public transportation, and bike facilities. A group of senior citizens echoed these concerns with requests for more benches and places to socialize.

We also asked 200 households to complete a travel diary for one week. After collecting the data, we listed the top three

concerns based on their gender group. The main concerns for women were the absence of sidewalks, unsafe alleys for children, and inadequate public transportation and bike parking. Men cited congestion in the main road, unsafe intersections, and a truck route through the kampung.

The travel diary provided information about transportation preferences. Walking is the most popular way to get around within the neighborhood. Women, seniors, and children chose walking and cycling. Men mostly chose motorcycles, especially for work or travel outside the neighborhood. We learned that most women stay more than 12 hours inside the neighborhood, have domestic activities within a kampung and most of them get around by walking.

As a way to get precise locations for specific issues, we asked Kampung women to share their knowledge through participatory mapping—the creation of maps by the local community— with the support of UN Women and a facilitator. The process began by defining what makes a street safe. In this stage, women listed things that can affect pedestrian safety. Divided into groups, women put colored dots on a map to show the safety levels of various streets.

Based on this data, we analyzed and remapped the neighborhood. For Indonesians, a “tourist neighborhood” or Kampung Wisata is a popular concept for the kampung as they believe it can generate the local economy of their neighborhood. The women spend more time in the urban village area, so they can see various kind of opportunities and uniqueness of the neighborhood. They are very excited to provide heterogeneous foods and handicraft items made from recycled materials and urban farming tools and activities.



Left: ITDP Indonesia staff meet with the women's community group to plan improvements to their neighborhood.
Right: a local woman cycles through the streets of her urban village.
Photos: ITDP Indonesia



We also spoke again with the men. This time we shared the stories of their wives, parents, and children. This persuaded them to shift from riding motorcycles to walking. It also helped them to see the importance of giving priority to pedestrians. Along with the storytelling process, we discussed

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Women-only Transport: A “Solution” To What End?

By Sonal Shah

Sonal Shah is a New Delhi-based urban planner focusing on equitable and sustainable transportation in cities.

Sexual harassment restricts women’s movement and access to opportunities. According to the Asian Development Bank, a considerable proportion of women in South and Central Asia experience sexual harassment—53% in Karachi, Pakistan; 30% in Baku, Azerbaijan; and 21% in Tbilisi, Georgia—which affects their use of public transportation. Women in Karachi are more likely to wear “cover-up” clothing and reduce their use of transport at night. This limits their access to continuing education, flexible working arrangements, and social activities.¹



Sexual harassment of women in public spaces is pervasive, and governments are under pressure to act. Many governments have reflexively responded by creating or expanding sex-segregated transport services: ladies’ coaches, special trains, segregated buses, “pink” taxis, during peak hours or full time.

Segregated transit has low implementation costs, and can often be implemented immediately. While some advocates for women are demanding this step, others have argued that segregated transport reinforces gender inequality and the notion that women need protection from men. Sex-segregated transport often becomes a knee-jerk response without consideration of the drawbacks, such as how women will travel with male companions and how long they may have to wait for a transport service. Little thought has been given to transgender and non-binary people, who are often excluded from women-only spaces, despite being more vulnerable to assault or harassment than cisgender women.

Women-only carriages in subways and trains are common in Brazil, Bangladesh, Egypt, Japan, India, Iran, Indonesia, Israel, Malaysia, Mexico, Taiwan, and the Philippines, among other countries. But do they work? No one really knows. There is some evidence from Japan that sex-segregated carriages reduce the rate of sexual harassment. In 2000, three rail operators introduced women-only carriages in Tokyo, and reports of lewd behavior dropped by about 3% per year. Yet Japanese women are ambivalent about the carriages. 35.9% of the women surveyed never used women-only carriages, 46.5% used them “sometimes,” 13.2% used them “usually,” and only 3.8% “always” used them.²

In many places, implementation has not been smooth or consistent. South Korea introduced women-only subway cars during peak hours in 1992, but discontinued them because men continued to use them. In 2006, Rio de Janeiro approved a law which mandated women-only carriages on commuter and metro trains. The system’s metro guards, often located at stations in affluent areas, are predominantly men. This has

¹ Asian Development Bank 2015.

² As cited in Mineta Transportation Institute 2009.



Opposite and above:
Women-only carriages in
trains are common in many
cities around the world. But do
they actually improve women's
commute experiences?
It depends.

Photos: ITDP India/
Wikimedia common

resulted in ineffective law enforcement and hostile reactions from men when women complain.³ A state-owned railway operator in Jakarta withdrew its female-only carriages after they were introduced in 2010. They argued that the dedicated cars were “largely empty,” while the mixed spaces were crowded.

Mexico City launched twelve women-only buses in 2008, which are popular, if very limited. In India, women-only buses do not achieve sufficient ridership. Women say that service is infrequent and they are unable to travel with male companions. The existing bus fleet is inadequate in most Indian cities. As of 2011, Delhi had 17 million people and only 5,000 buses. Yet more than double that number are required to serve the city adequately. Should gender-segregated services be a priority when a larger bus fleet would likely benefit everyone?

Some cities are getting the message that change is needed. In Quito, commuters can report sexual harassment by sending a text message. This alerts authorities and the driver, and triggers an anti-harassment announcement on the bus. The reporter will also receive a call from a psychologist for support. On average, the service receives at least eight calls per day between 6 a.m. and 9 p.m.⁴ Cities like Montreal, Toronto, Paris, and Bangalore have added request-a-stop service for buses after dark.

Gender-sensitive design is critical to safe and comfortable public transit. Cities can achieve this by expanding fleets (buses, rickshaws, metros, etc.) to reduce crowding; improving first-and-last mile transit connections; and adding crosswalks, well-lit paths, and request-a-stop services at night. Cities must have an effective complaint reporting and redressal system, a zero-tolerance sexual harassment policy, and bystanders should be encouraged to assist victims of harassment. Drivers and the police must receive training to prevent and address sexual harassment.

The goal of a public transport system should be to create an environment where women and girls can travel freely, without violence or worry about harassment. Sex segregation should not be the default response to harassment in public transport, as it does not foster behavioral change. Gender-equitable public transportation requires an integrated approach.

Creating safe cities for women and girls is not a one-time initiative, which can be solved by a magic wand, segregated service, or a technological device. It will require a sustained and coordinated effort to transform social behavior, and to make public transportation safe for women and girls. A safe city for women and girls is a safe city for all.

³ Yasmin Curzi, “Brazil: Women-only Carriages in Rio’s Subways: Safe Spaces for Women or Institutionalized Inequality?” Stop Street Harassment Blog, 2017, <http://www.stopstreetharassment.org/2017/06/brazil-womenonly-carriages/>. “Nearly 2,000 Ecuador Buses to Have Mechanism to Report Sexual Harassment Instantaneously,” teleSUR, January, 21, 2018, <https://www.telesurenglish.net/>.
⁴ “Nearly 2,000 Ecuador Buses to Have Mechanism to Report Sexual Harassment Instantaneously,” teleSUR, January, 21, 2018, <https://www.telesurenglish.net/news/Nearly-2000-Ecuador-Buses-to-Have-Mechanism-to-Report-Sexual-Harassment-Instantaneously-20180121-0011.html>.

As Cities in the US and Europe Explore Electrification, China Is Taking the Lead

By Benjun Huang & Xianyuan Zhu,
ITDP China

In 2017, the Chinese city of Shenzhen became the first in the world to run a fully electric transport system. The transformation took less than a decade, and is the first of 13 pilot cities that the central government has selected for demonstration and promotion of new energy vehicles. Shenzhen, a city of 12 million which links Hong Kong to mainland China, replaced their entire diesel fleet with 16,359 electric buses, and the results have already been impressive.

Much has been made of China's increasing contribution to global CO₂ emissions, and for good reason. The 2018 Annual Report of China's Motor Vehicle Environmental Management, published by the Ministry of Ecology and Environment, shows China as the world's largest motor vehicle market, in both production and sales, for nine consecutive years. There has been comparatively little attention paid to the major steps that the government is taking to mediate it, which is what they are attempting to do with the increasing development and use of "new energy" vehicles. This refers to plug-in electric, battery electric, plug-in hybrids, and fuel cell vehicles.

Shenzhen's e-buses, as well as the overall switch to new energy vehicles, have already reduced dependence on fossil fuels and lessened environmental pollution in the city. In Shenzhen, gas consumption in public transport has been reduced by 95%. Compared to the operating mileage in Shenzhen in 2016, electric buses are consuming 72.9% less energy, with a daily average operating mileage of 174.4 km, and energy consumption of 106.3 kWh/100 km. According to the Shenzhen Municipal Transportation Commission, the resulting energy savings amount to 366,000 tons of coal saved annually, substituted by 345,000 tons of alternative fuel.

There are also major reductions in CO₂ emissions. On average per year, electric buses emit 67 kg of CO₂ per 100 km, compared to diesel vehicles which emit 130 kg, a reduction of 48%. 2017 data show a total reduction of CO₂ emissions of 1.353 million tons. Annual emissions of pollutants such as nitrogen oxides, non-methane hydrocarbons and particulate matter was reduced by 432 tons.



Some of the new electric bus fleet of 16,359 in Shenzhen.
Photo: Wikimedia common.



An aerial view of Shenzhen, a city of 12 million connecting Hong Kong with mainland China.
Photo: Wikimedia common



The driving cockpit of a new electric bus in Shenzhen.
Photo: ITDP China

It's clear that China sees new energy vehicles as a way to continue its pace of rapid development while reducing emissions. However, like all big changes, it has its critics. Some have been using terms such as “zero emissions” to describe new energy vehicles, which is not entirely accurate. Many have pointed out that new energy vehicles simply transfer pollution from roads to power plants. The central government has been increasing its uses of renewable energy, but there has not been comparable progress in decarbonizing the grid. In 2016, coal-generated power still accounted for 72% of all power sources in China.

For electrification to have any real effect on global emissions, governments must focus more on long-term de-carbonization of the grid. Despite its rapid pace of development, China is still mainly based on coal-generated electricity. How much electrification still matters in spite of that is a complex question, and the answer is changing as electrification technology improves, and the sources of energy move away from oil and coal. Still, based on the average standard and composition of the Chinese power grid, electrification alone has decreased CO² emissions 15-20% compared to diesel vehicles¹.

Few governments have the resources, or the will, to replace their entire transit fleets and add the infrastructure necessary to go fully electric on this scale. Yet, China's progress in this area shows the advantages that big, sweeping investments in technology can have on transport emissions. Shenzhen has the potential to serve as a model for rapidly growing megacities finding themselves overwhelmed by transport emissions as their cities grow.

¹ Study on Demonstration Promotion and Business Model of New Energy Buses, China Electric Vehicle 100 People's Congress



Transforming Streets in São Paulo

By Danielle Hoppe,
ITDP Brazil



Sao Miguel before (inset)
and pop-up intervention
Photos: ITDP Brazil

Using paint and removable materials such as cones, flower pots, beach chairs, and umbrellas, ITDP Brazil, in partnership with the Bloomberg Initiative for Global Road Safety (BIGRS), is creating safe, pedestrian-friendly spaces in São Paulo. The goal is to improve the efficacy of the city's "reduced speed zones"—areas designated as unsafe for pedestrians—and increase compliance of the 40 km per hour speed limit. These tactical urbanism projects build support for new street designs and reduce the amount of space dominated by cars.

Drivers long ignored the speed limit in the São Miguel Paulista neighborhood. There was no law enforcement or street design to slow them down. In 2016, BIGRS and ITDP organized a pop-up tactical urbanism intervention to show the potential of a simple street redesign. It launched with a day of cultural activities for the local community—97% of who approved of the new design, according to a survey during the pop-up intervention. The successful pop-up resulted in an invitation for ITDP to repeat the experience in Santana neighborhood during São Paulo's Architecture Biennale. "Now it's a place where people walk slower," said Zuleide Muller, a local resident, "Cars slow down. When there is mutual respect, people begin to respect each other more." A few months later, the city began planning pedestrian safety improvements in the José Bonifácio neighborhood. The city tested the proposed design at a three-day intervention in May 2018. For the first time, the city's road safety team led a tactical urbanism intervention and began to see its value as a tool to test solutions and engage in a community dialogue.

The street redesigns in Santana and José Bonifácio were permanently implemented by the city in 2018. This shows that tactical urbanism can create momentum and speed up processes that are otherwise slow and often met with resistance. The ultimate beneficiaries, of course, are the people of São Paulo. Local resident Sergio Fernandes agrees, "We should spread this. There must be more interventions in other places."

The Santana neighborhood of São Paulo was transformed with a pop-up installation, leading to a permanently improved intersection with traffic-calming measures and increased pedestrian safety.

Photos: ITDP Brazil

ITDP Brazil, in partnership with the Bloomberg Initiative for Global Road Safety (BIGRS), is creating safe, pedestrian-friendly spaces in São Paulo. These tactical urbanism projects build support for new street designs and reduce the amount of space dominated by cars.



From the Narrow Lanes of Agra to the BRT Lanes of Pune: 20 Years of the ITDP India Program

By Kashmira Dubash
and Rohit James,
ITDP India

In 1998, a cycle-rickshaw journey in the bylanes of Agra launched the ITDP India Program's work to improve sustainable urban mobility in India. Twenty years later, the India Program offers tangible transportation solutions to about 100 Indian cities at the state and national level, impacting the lives of over 150 million people.



A newly-constructed protected footpath in Chennai, India, a result of ITDP's advocacy.
Photo: ITDP India

HUMBLE BEGINNINGS: MODEST CYCLE-RICKSHAWS

Back in 1998, the ITDP India Program's vision to develop a modern cycle rickshaw—to counter the growing threats of motor vehicular pollution—gave way to the India Cycle Rickshaw Improvement Project. This simple yet transformative project created rickshaw prototypes that were lighter, sturdier, and more comfortable for passengers and drivers. North Indian cities quickly adopted these models. Today, around half a million modern cycle-rickshaws serve 4 to 5 million trips daily and offer both a comfortable, zero-carbon transport option and a dignified livelihood to more than a million people.

BUS RAPID TRANSIT: AFFORDABLE, FLEXIBLE, AND EFFICIENT MOBILITY FOR ALL

In 2005, the city of Ahmedabad invited the ITDP India Program to work on improving its bus transit. By 2009, the city launched Janmarg, the first bus rapid transit (BRT) system in the country. The 87 km high-capacity bus network became the model for other Indian cities, including Surat, Rajkot, and Indore.

Influenced by Janmarg's success, Pune and Pimpri-Chinchwad (twin cities in Maharashtra) created the Rainbow BRT to address their growing transportation needs. The Rainbow system effectively uses Pune's bus fleet and network, while also improving Pimpri-Chinchwad's connection to its twin city. Today, Rainbow operates along a 43 km network of bus-only lanes and a 50 km expansion is planned.

COMPLETE STREETS: INDIAN CITIES WALK THE TALK

With the rapid growth in the number of cars on India's roads—210 million as of 2015—pedestrians and cyclists have been struggling for space and fearing for their lives. In a bid to tackle this inequity, the ITDP India Program introduced a Complete Streets program and worked with Chennai and other cities to improve cycling and walking conditions. The program redesigned streets with quality footpaths, separate cycle paths, safe pedestrian crossings, and on-street parking management.

The Rainbow BRT in Pune & Pimpri-Chinchwad, India.
Photo: ITDP India



Chennai also adopted India's first non-motorised transport policy, requiring that at least 60% of the transport budget is used to create and maintain walking and cycling infrastructure. Inspired by Chennai, Coimbatore adopted the Coimbatore Street Design and Management Policy—which will connect its major lakes and provide a 30 km network for walking and cycling.

The crown jewel, however, is Pune's ambitious Complete Street program. Modeled on the city's Urban Street Design Guidelines, with technical support from the ITDP India Program, the program proposes 100 km of street networks that prioritize pedestrians and cyclists. The first phase—on JM Road and DP Road—has been lauded nationwide, winning the Housing and Urban Development Corporation Award and the Volvo Sustainable Mobility Award in 2017.

PEDALING THE CONNECTIVITY BRIDGE

To complement its Complete Streets program, Chennai added a Public Bicycle Sharing (PBS) system to bridge the gap between public transport and a commuter's final destination. The system is designed to promote cycling citywide.

Upping the ante, Pune planned a 400 km cycling network. In 2017, the city piloted a dockless public bicycle sharing system which will have 8,000 bicycles by 2019. Following Pune's example, Pimpri-Chinchwad launched phase-I of its cycle sharing with 600 bicycles and 35 bicycle stations.

Ranchi also adopted the PBS system. With 1,200 cycles, 120 docking stations, and an initial coverage area of 11.5 sq km, the city is working to increase the number of daily trips completed on bicycles—which stands now at 8%.

THE VALUE OF A PARKING SPACE

When people are used to parking on the street for free, it can be difficult to implement a system that requires them to pay. Yet free on-street parking has led to a massive loss of revenue



The modernized cycle rickshaw in action, the first major project of ITDP India Program. More than 500,000 are still on the streets 20 years later.
Photo: ITDP India

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Early Childhood

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sidewalk in a city. Boa Vista, Brazil is working to identify the routes taken by families to early childhood services to make them safer. The city is also working with older children to use GPS to define the routes they take from home to school and other destinations. Andres Sevtsuk at the Harvard Graduate School of Design uses probability analysis to prioritize the routes most likely to be taken by people trying to reach a given set of destinations and has applied this technique to the routes that small children take to reach playgrounds in Cambridge, Massachusetts.

4. Design child-friendly streets. For babies and toddlers, safer roads mean both traffic safety and reducing air pollution. The Global Designing Cities Initiative is working on a Streets for Kids supplement to its Global Street Design Guide that provides technical guidance on designing streets that serve both as safer transport corridors and spaces for vibrant public life. Bogotá, Colombia is piloting some of these techniques for colorful pedestrian routes and traffic calming paint jobs in its Children's Priority Zone. In Barranquilla, Colombia, two grownups for every two dozen children lead "walking buses" along pre-established routes to keep preschoolers and older children safe on their journeys to school.
5. Create walkable cities. There are dozens of reasons to make a city more walkable. For babies, toddlers, and their caregivers, not only is walking good exercise and free—it is predictable, reducing stress on already stressed caregivers. And at its best, walking through city streets creates a stream of interesting sights, sounds, and people for small children to experience.
6. Make travel fun. City dwellers can spend hours a day in transit. Some recent projects to turn travel into moments for learning and love include Urban Thinkscape's work to convert a Philadelphia bus stop and the vacant lot next to it into science-based early learning spaces; ImagiNation Afrika's work in Dakar, Senegal, to promote play between parents and children on buses; and the Boston Basics-inspired project in São Paulo, Brazil, to post billboard messages to encourage caregivers to talk, sing, and play with small children.
7. Finally, regulate cars in places where small children spend the most time. Cities around the world from Paris to Jakarta have established or are considering partial or even permanent bans on cars in the city center, to reduce congestion, improve air quality, and make room for a growing population. We'd like to see this near places where babies and toddlers spend the most time, like the play streets near schools and in neighborhoods filled with families in Los Angeles, Bogotá, London, and Libreville (to name just a few).

Bucheon

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2013 had a slow ridership due to a flawed consultation on service intervals. After a review, the city made service adjustments and purchased two new electric trains in 201. In less than a year, the average ridership significantly increased by 67.27%. A new Sosa-Wonsi metro line opened this year will serve more residents.

Three of the metro stations were redeveloped to release the traffic congested space to community squares: the Maru Square, Rainbow Square, and Dohaeng Square. The connecting metro stations were redesigned with integrated platforms for safe and convenient one-stop connections with buses and taxis. Exciting cultural performances take place at these squares daily, for Bucheon as the city of culture. Overall, this project generated an economic benefit of over 500 million dollars.

MORE THAN JUST MOBILITY

As a result of Bucheon's progressive people-oriented and ecomobile transport policy, passenger cars decreased by 3.2%, while the number of pedestrians and cyclists increased by 5% and 15%, respectively. As the traffic volume decreased by about 90%, safety improved with the traffic accident risk index reduced from 4.4 to 4.3, and the number of traffic accidents reduced from 3,682 to 3,080 in 2017. Most of all, the average air quality improved by 13%. This illustrates how improving the transportation system is not only about mobility, but creating an accessible, people-friendly, safe, fun and livable city with positive economic benefits.

Bucheon's policies have won 135 awards since 2017, including winning the Honourable Mention for the 2019 Sustainable Transport Award. Visitors now come from around the world to study Bucheon's model for sustainable and equitable urban development.

Bucheon is an inspiration for active and integrated mobility that can truly improve the quality of life for local residents.

Transport Access for Women

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the most vulnerable road users.

ITDP and partners are working to ensure that this is a BRT system that takes into account the needs of women, children, the elderly, and people with disabilities. For society to grow and thrive, women in Cairo and beyond must have convenient, affordable, and safe options to access their cities' resources and opportunities.

Mexico City's Buses

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by traffic conditions. ITDP will consider including driver input and loading levels in future studies. A key part of this process will be translating the data into useful indicators for the people in charge of the day-to-day management and operation of the routes.

Through this experiment, ITDP learned that even a simple monitoring device can have a huge impact on the safety and efficiency of public transport systems. Ride-hailing companies already take advantage of this technology. These companies have been very successful in efficiently matching users and drivers, but they prioritize single vehicle trips, which could have adverse effects in terms of pollution and congestion. It is clear technology can play a key role in improving performance and reducing emissions. Can cities and public transport providers use these tools to improve the long-term sustainability and equity of our urban transport systems? It depends on whether collective modes of transport can become a viable and competitive option to traveling alone. These results prove that successful integration of technology will be key to improving transit service for millions of urban residents.

Jakarta's Urban Villages

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strategies for safer streets and better mobility, such as improved lighting, street safety designs, improving public transport service, and creating walking tours. These all have a much greater chance of success with local support, especially women who know their community so well. Women's groups are critical, as they are also advocates for vulnerable community members. In Jakarta, women are transforming former motorcycle routes into walkable streets to gather, work, and play. The Kampung project underscores how powerful women are in the planning of new urban mobility systems. ITDP Indonesia looks forward to our next step: training government officials to replicate our tools and methods for more neighborhoods in Jakarta.

India Program

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for municipal corporations across the country. The Chennai Corporation, for instance, stands to gain 550 million rupees per year if it charges for about 12,000 ECS (equivalent car spaces) of parking—a whopping 110 times increase.

The ITDP India Program raised this issue with several municipal corporations. In response, the Pune administration implemented a paid parking system. Ranchi's pilot parking management project, on the city's arterial MG Road stretch, led to a 12-fold monthly increase in parking revenue. Spurred by the revenue spike, the state of Jharkhand (of which Ranchi is the capital) passed parking regulations statewide.

END GOAL: BETTER STREETS, BETTER CITIES, AND BETTER LIVES

After 20 years of working with local and state governments, the ITDP India Program has achieved widespread reform, including urban mobility policies in states like Maharashtra and Jharkhand; a transit-oriented development policy in Jharkhand; and the Sustainable Cities Through Transport initiative and the Smart Cities through Smart Streets program in Tamil Nadu.

Today, Indian cities find themselves at a crossroads. One path leads to a future where infrastructure fails to deliver and people are constantly trapped in traffic and battle pollution daily. The ITDP India Program looks toward a sustainable future where generations can walk, cycle, and zip around cities on public transit. It is committed to better streets, better cities, and better lives.

New Resources from ITDP

The Institute for Transportation & Development Policy (ITDP) is a global organization with a global audience. We develop print and online guides, manuals, reports, and papers, along with videos, graphic materials, and webinars for global leaders, local governments, activists, academics, and everyday citizens. All materials are available for free at itdp.org.

The Bikeshare Planning Guide

The Bikeshare Planning Guide has become one of our emblematic publications. It provides in-depth guidance for city officials, practitioners, and other stakeholders about planning and implementing a successful bikeshare system. *The Guide* encourages cities to position bikeshare as a critical piece of their transportation network, and plan—and expand—systems that prioritize transit integration, equity, and a high-quality user experience.

Over the past decade, bikeshare has contributed significantly to sustainable mobility in cities: providing first-last kilometer solutions, replacing short trips made by cars, and offering a unique way for residents and visitors to explore their surroundings. As bikeshare continues to evolve—integrating pedal-assist e-bikes, dockless bikes, and multi-operator models—cities have to understand the opportunities and risks such innovations present, as well as how to define success and measure system performance over time.



Pedestrians First: Tools for a Walkable City

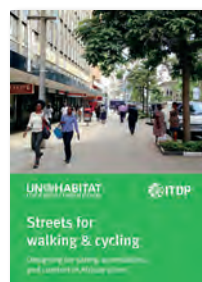
As the urban share of the world's population is expected to reach 70 percent by 2050, ITDP is introducing a new tool to help governments, city planners, NGOs, and developers make cities more equitable, healthy, safe, and vibrant. The simple solution? Walkability. The new tool, *Pedestrians First: Tools for a Walkable City*, will help leaders understand and measure the features that promote walkability in urban environments around the world. More consistent and frequent measurements of urban walkability will empower decisionmakers to enact policies that create more walkable cities.

Available in English, Spanish, and Chinese



Streets for Walking and Cycling: Designing for Safety, Accessibility, and Comfort in African Cities

Walking and cycling are healthy and pollution-free forms of mobility that are fundamental to life. Many African cities are dependent on these modes as their primary means of transport. *Streets for Walking and Cycling* is a quick reference street design guide to help create a safe, usable, and accessible environment for pedestrians and cyclists. The local and international best practices presented in the guide highlight street design techniques that have proven successful across cultures and contexts.



Street Design Manual for Mexican Cities

This manual was created with the Inter American Development Bank and IDOM (a Spanish urban design and development firm) for the Mexican Office for Agrarian, Land and Urban Development. It is the federal reference that the current administration offers to those interested in the design and project management of streets—the base of all mobility systems. Its use will help to prioritize people over cars and improve the quality of road projects in Mexico.

Available in Spanish



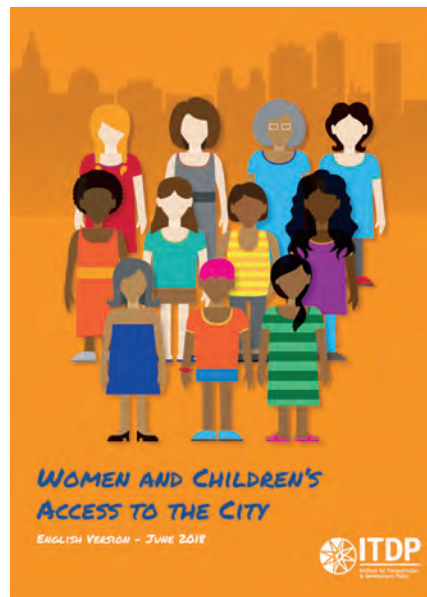
Women and Children's Access to the City: A Case Study of Recife, Brazil

Women and children face greater challenges than men to access work, educational, and leisure opportunities in cities. To shed light on this issue, ITDP Brazil focused on Recife to develop *Women and Children's Access to the City*. This report focuses on women, particularly those who are child caregivers, between the ages of 17 and 70, and who live in low-income areas.

Focus groups and discussions helped ITDP Brazil formulate gender-sensitive indicators and recommendations for nine

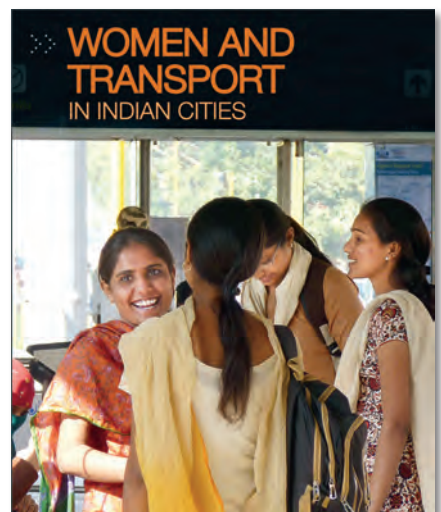
major areas: walking and land use, cycling, road safety, public transport, housing and urban infrastructure, childcare, management and public policies, transport financing, and sexual violence and harassment.

Available in Portuguese and English



Women and Transport in Indian Cities

While different levels of government address women's safety in public transport, urban transport investments are largely gender blind. There is a limited understanding of the relationship between gender and transport inequities. Sustainable urban development will remain elusive without integrating measures to improve conditions for women and girls in urban transport. The ITDP India Program and Safetipin address this in *Women and Transport in Indian Cities*, the first paper of its kind. This paper outlines the broad issues faced by women and girls when using or accessing urban transport and recommends key measures to enable equitable access. The brief recommends gender-responsive indicators, service level benchmarks and guidelines for comprehensive mobility plans, as well as walking, cycling, public and intermediate public transport.





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ITDP is a global nonprofit at the forefront of innovation, providing technical expertise to accelerate the growth of sustainable transport and urban development around the world. Through our transport projects, policy advocacy, and research publications, we work to reduce carbon emissions, enhance social inclusion, and improve the quality of life for people in cities.

ITDP is registered in the United States as a 501(c)3 charitable organization that is eligible for tax-deductible contributions under the Internal Revenue Service code. ITDP members include activists, transportation planners, economic development specialists, real estate developers, architects, engineers, small business owners, environmentalists, and other professionals from the U.S. and around the world.



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